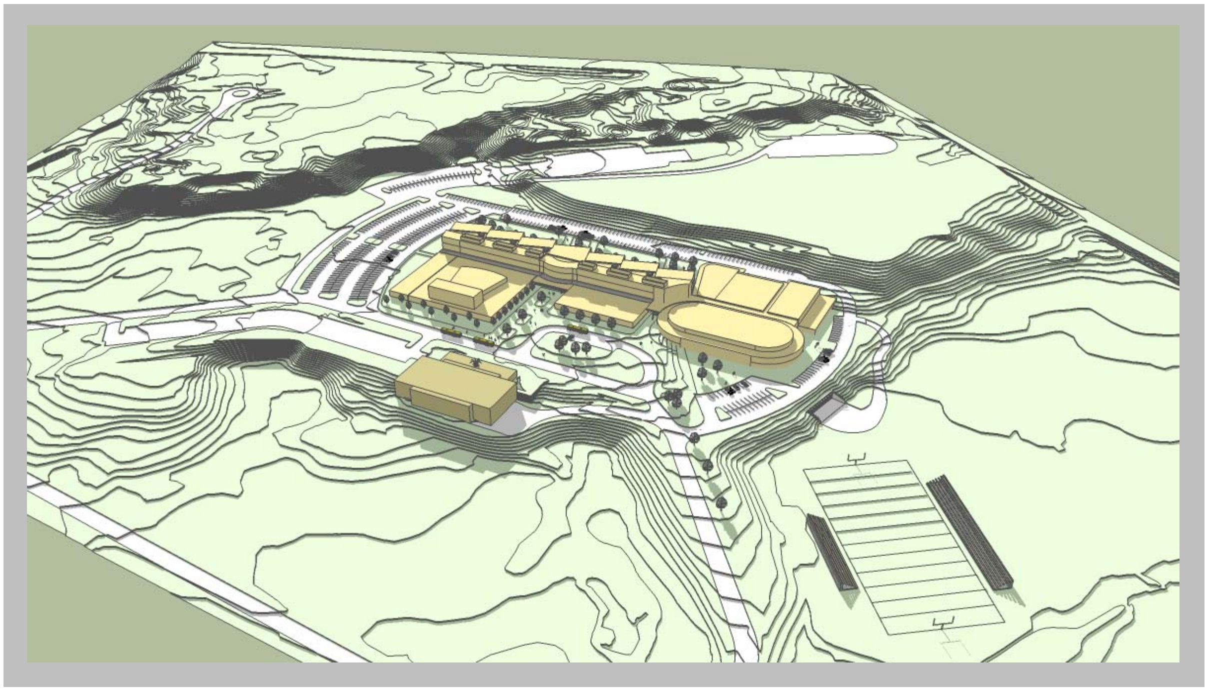
Concord - Carlisle High School
Concord, MA



Facilities Master Plan Report
24 March 2010 **DRAFT**

Submitted by

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Project No. 0906.00

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1 Executive Summary

1 Executive Summary

This Manual includes all information relevant to the development of the Concord - Carlisle High School Facilities Master Plan, and its process and results, as it has unfolded with the collaborative bodies, including the Concord Carlisle High School Facilities Master Plan Committee (CCHS FMPC), the communities of Concord and Carlisle and the Design Team. All analyses, investigations, alternative options and community participation notes are included. In this Executive Summary, we will summarize this work to date.

The charge of the CCHS Facilities Master Plan Committee was to develop a transformative and flexible plan that addresses the existing conditions deficiencies, needed systems upgrades and new space requirements at the high school. Options were to be prepared "that significantly transform the existing facility to address issues of educational excellence, safety and security, sustainable design, long term maintenance and multi-phase projects". The final renovation plan option should be designed to be constructed "all at once or over time". This final master plan option will be compared by the Committee with the 2005 study recommendation for an all new facility on a separate footprint.

In October 2009, the CCHS FMPC engaged The Office of Michael Rosenfeld, Inc., Architects (OMR) in developing a Master Plan based on the charge given to this group. Since that time, the design team has met with the FMPC, the School District Administration, the High School Administration, Faculty and Staff on a regular basis. Also participating in meetings were members of the local Green Team, community residents and the local newspaper. In order to gain the feedback necessary to guide their decision making process, throughout the study Committee members have kept the community informed via their website and through regular information presented to the committees and boards on which they serve. On the next page is the Master Plan Work Plan schedule.

CCHS Master Plan Work Plan

Groundwork

- *Prepare contract*
- *Obtain all available/ pertinent documents*
- *Prepare draft of schedule and work plan*
- *Review existing conditions information*
- *Review all documents including SOI, NEASC*
- *Begin preparing base drawings*

Meeting # 1 Project Start-Up

10/28/09

Objectives
- Review schedule and process
- Discuss goals, values, priorities
- Discuss space needs and deficiencies
- Discuss visioning

Follow-up
- Site walk thru with engineers and Facilities Manager
- Develop site analysis
- Develop existing conditions reports
- Meet with school representatives, as appropriate

Meeting # 2 Goals and Values / Vision and Program

11/12/09

Objectives
- Review goals and values
- Discuss visioning and program

Follow-up
- Prepare draft program
- Conduct User Group Meetings

Meeting # 3 Finalize Goals and Values / Draft Space Program

11/18/09

Objectives
- Discuss visioning and program
- Review and finalize goals and values

Follow-up
- Develop building analysis and space utilization
- Prepare final program

Meeting # 4 Space Program / Building Organizational Analysis

12/09/09

Objectives
- Review space utilization
- Review program
- Review Building organizational diagrams

Follow-up
- Refine program
- Refine Building organizational diagrams

Meeting # 5 Existing Conditions Site & Building Analysis

12/16/09

Objectives
- Discuss Existing Conditions with Engineers
- Discuss Goals for Sustainability/ Building Systems

Follow-up
- Prepare Preliminary Options

Meeting # 6 Alternative Approaches

1/13/10

Objectives
- Review Preliminary Options
- Select Option(s) to further develop

Follow-up
- Revise selected Option(s)
- Prepare Option(s) Phasing and budgets

Meeting # 7- 9 Conceptual Designs

1/27/10, 2/10/10, 2/24/10 , 3/10/10*

* Up to three meetings as necessary

Objectives
- Review revised Option(s)
- Compare with "New School Option"
- Select Preferred Option

Follow-up
- Prepare Final Master Plan Report
- Prepare Final Cost Information, as appropriate

Meeting # 10 Final Master Plan Report

3/24/10

Objectives
- Review Final Master Plan Report
- Vote to approve report

Follow-up
- Present to School Committee
- Prepare for Town Meetings

Justification of Proposed Project

The Concord Carlisle Regional School District (CCRSD) submitted a Statement of Interest (SOI) with the MSBA in November 2008. The priorities outlined in this SOI, which is attached in its entirety in Section 2, include:

- Elimination of existing severe overcrowding
- Prevention of the loss of accreditation
- Prevention of severe overcrowding expected to result from increased enrollments
- Replacement, renovation or modernization of the heating system in a schoolhouse to increase energy conservation and decrease energy related costs in the schoolhouse
- Replacement of or addition to obsolete buildings in order to provide for a full range of programs consistent with state and approved local requirements.

Through historical enrollments, building permits issued, data of non-public school students and other information provided in conjunction with the New England School Development Council (NESDEC), the CCRSD has determined that the enrollment projections for this study should be 1250 students for CCHS grades nine through twelve.

Space Utilization studies have shown that most classrooms are 100% utilized, with many over 80%. The few that are well below these percentages are located in temporary, portable, modular classrooms. Shared science laboratories have proven to be ineffective for proper education and planning and are compromised relative to health and safety.

After four years of review, in July 2008, the New England Association of Schools and Colleges Commission on Public Secondary Schools (NEASC) “continued the school’s accreditation, but placed CCHS on warning for concerns regarding its adherence to the Commission’s Standards for Accreditation on Curriculum and Community Resources for learning.” The concerns involved space constraints and overcrowding, lack of storage, ADA issues, safety and security, roof leaks and inadequate and outdated electrical and mechanical systems.

Educational Program Needs

The philosophical goals of the CCHS FMPC can be summarized as follows:

- The project must be completely responsible and sustainable while being flexible, affordable and achievable.
- The project must promote 21st century learning, educational excellence and high performance for all users, young and old.
- The project must holistically connect all parts of the campus into an inspirational, safe and healthy, state-of-the-art building.

Through ongoing conversations with administration, faculty and staff, the educational needs of the school were established both quantitatively and qualitatively. It is apparent that CCHS is a school ready for 21st century educational techniques, as the teachers and students have been teaching and learning in this way, without the facilities to make it effective, efficient and completely evolved. With this educational style in mind, the already overcrowded facility is lacking in appropriate sizes and types of spaces to provide a natural 21st century educational facility.

From our educational space programming, it has been determined that the total net square footage needed for a 1250 student school for grades nine through twelve is 206,295 NSF, and with a targeted 1.40 net to gross ratio, the total gross square footage for CCHS would be 288,813 GSF. The most significant increases are in core academic and athletic spaces. More information is provided in Section 3.

Existing Conditions Evaluation

Set on a 94 acre site and originally constructed in 1958, with subsequent additions and renovations in 1964, 1973 and 1992, the existing brick building has numerous deficiencies: most notably these deficiencies are related to handicap accessibility; safety and security; the mechanical, ventilation, fire protection and electrical systems; and the energy efficiency of the complete building envelope. In addition, if the building is renovated to last another 50+ years, seismic and other structural implications will also be required. In summary, the building systems throughout have reached their life expectancy and the cost to replace would be significant. Section 4 provides this information in more detail.

Development and Evaluation of Alternatives

OMR developed nine different alternative schemes focused on Basic Repair, Major Renovation/ Minor Addition, Major Renovation/ Major Addition, Minor Renovation/ Major Addition, All New Phased Building, and an All New Building. Each scheme was directed at optimizing:

- Value (Fiscal, Physical, and Natural Resources)
- Phasing (Time, Feasibility, Ease, and Safety)
- Program (21st Century Learning and Appropriate Adjacencies)
- Integration (Site and Building Relationships)
- Sustainability (Solar Orientation, Compactness, Efficiency, and Reuse)

The nine schemes were reduced to three with further design study, and then reduced to one, which was studied in three new ways, before a solution was chosen to be developed into the Preferred Alternative. Pricing, expansion capability and phasing solutions were integrated with each evolution of design study.

Preferred Alternative

The FMPC selected Option F2 -- Minor Renovation/ Major Addition -- as the preferred development option. The Committee remained open to all renovation and new construction options throughout the process. There was no predetermined solution prior to undertaking this study and the process has given the Committee insight into the advantages and disadvantages of each alternative.

The Committee strongly feels that Option F2 provides the best combination of new and renovated space in a configuration that meets all of their goals. A full description is summarized in Section 6. Option F2 accomplishes the following FMPC goals better than the alternatives in these ways:

- The project is responsible and sustainable while being flexible, affordable and achievable.
- The project promotes 21st century learning, educational excellence and high performance for all users, young and old
- The project holistically connects all parts of the campus into an inspirational, safe and healthy, state-of-the-art building

The Master Plan details the goals for a sustainable design methodology. The project will meet or exceed the threshold 34 points defined by the Massachusetts Collaborative for High Performance Schools (MA-CHPS) and will maximize the energy efficiency incentive points established by the MSBA.

With Option F2 as shown in this Master Plan study, the full project could begin construction in second quarter 2012 and be built aggressively in 36 months or phased over a lengthier time. As per the conceptual cost estimate, this translates into an approximately $108,000,000 Total Project Cost scenario. Note that these costs are based on a 2Q2012 construction start and do not account for fluctuations in the construction market or for latent or unforeseen conditions.

Commonwealth of Massachusetts Requirements and Impacts

Key to the success of this project is the partnership with the Massachusetts School Building Authority (MSBA) and the Commonwealth. After this Master Plan has been approved by the FMPC, and funds have been voted by the Towns to move forward with a Feasibility Study, conversations with the MSBA will continue. Through these early conversations, CCHS's enrollment projections will be discussed and approved and an Owner's Project Manager will join the team. With this process, the partnership in funding will begin.

The programs, requirements and potential impacts are described in Section 7. Without some initial decisions from the MSBA, the complete cost impact and reimbursement of this project cannot be fully vetted, but potential variables have been addressed.

Financial Analysis

As our Master Plan shows, there are additional cost implications relative to constructing a new building or a renovation and addition project, when the construction start date is at least two years away. Our focus is to provide and maintain safe, adequate and educationally functional facilities for students, faculty, staff, and the community assuming a major construction project will occur within a five year time period. We have determined that the existing building has significant issues as the building systems – mechanical, electrical, plumbing, roof, and food service equipment -- have reached their life expectancy; most of which can and should wait to be dealt with in a total building construction project occurring within five years, as modifications can be costly and may lead to additional code compliance related construction, not necessarily planned for at this time. Over the next one to five years, the systems will continue to fail. Costs for the replacement of these systems will be solely borne by the Towns of Concord and Carlisle, if a major renovation/ addition project is not in partnership with the MSBA under their grant program process.

Regardless of when a potential major construction project might begin, the Master Plan Preferred Alternative is intended to minimize the duration of the construction and lessen disruption to the daily school activities. It also is intended to bring new energy efficient systems "on line" as soon as possible to maximize the cost savings benefits of more efficient building systems, and to remove or update antiquated systems from the existing building, as the renovations continue fluidly. Section 8 has more detail on this discussion.

We would like to acknowledge the members of the Concord- Carlisle High School Facilities Master Plan Committee who have provided clear direction, intelligent discussion and unwavering commitment to this study. The committee includes:

Michael Fitzgerald	Chairperson and Carlisle Citizen
Diana Rigby	Superintendent of Schools
John Flaherty	Deputy Superintendent - Finance & Operations
Dave Anderson	Director of Facilities
Jerry Wedge	Concord School Committee
Louis Salemy	Carlisle School Committee
Elise Woodward	Concord Board of Selectman
Bill Tice	Carlisle Board of Selectman
Peter Badalament	CCHS Principal
Brian Miller	CCHS Teacher
Margaret Waterman	CCHS Student
Brian Crounse	Comprehensive Sustainable Energy Committee
Joseph Morahan	Police Sergeant
John Boynton	Concord Citizen
Michelle Ernst	Concord Citizen
Karla Johnson	Carlisle Citizen
Charlie Sample	Concord Citizen
Eileen Curtin	Business Analyst, CCRSD

This Master Plan report was prepared with input by:

Architect:	OMR Architects *West Acton, MA*
Client:	Concord- Carlisle High School FMP Committee *Concord, MA*
Structural Engineer:	Foley Buhl Roberts & Associates Inc. *Newton, MA*
MEP/FP Engineer:	Garcia Galuska DeSousa Consulting Engineers Inc. *Dartmouth, MA*
Civil Engineer:	Nitsch Engineering, Inc. *Boston, MA*
Landscape Architect:	Brown / Sardina, Inc. *Boston, MA*
Food Service Consultant:	Colburn & Guyette Consulting Partners Inc. *Pembroke, MA*
Building Envelope Consultant:	Wiss, Janney, Elstner Associates, Inc. *Cambridge, MA*
Accessibility Consultant:	Kessler McGuinness & Associates, LLC *Newton, MA*
Cost Estimator:	D.G. Jones International, Inc. *Woburn, MA*
Visioning Consultant:	Frank Locker Educational Planning *Dover, NH*
Code Consultant:	Harold R. Cutler, PE *Sudbury, MA*
Indoor Air Quality Consultant:	Universal Environmental Consultants *Framingham, MA*

2 Justification of Proposed Project

- Statement of Interest
- New England Association of Schools and Colleges Reports
- Current and Projected Enrollments
- Space Utilization Study and Evaluation

2 Justification of Proposed Project

Concord- Carlisle High School was designed and built in multiple phases beginning in 1958, with additions and renovations in 1964, 1973 and 1992. Though the facilities once served the community well, over time this sprawling campus has developed numerous deficiencies relative to building, educational and compliance needs. The building systems -- structural, mechanical, electrical, plumbing, fire protection, roofing, energy, and technology -- have all outlasted their useful life, and do not meet current codes. Science laboratories are outdated and lacking in size and quantity. Special Education requirements have grown over time; without improvements, CCHS will need to out-place additional students. Portable classrooms are undersized and ill equipped. Security is unmanageable in this multiple building campus which requires numerous unlocked points of ingress and egress. Handicap access to the lower gymnasium level is not code compliant nor are Library ramps. Roof systems are leaking. Due to the nature of the previous additions, the resulting building has become unwieldy for effective collaboration and basic day to day operations. Community access to core facilities, which are used daily and throughout the evening, is unmanageable. With these deficiencies, the school was placed on a warning status with the New England Association of Schools and Colleges (NEASC), in July 2008.

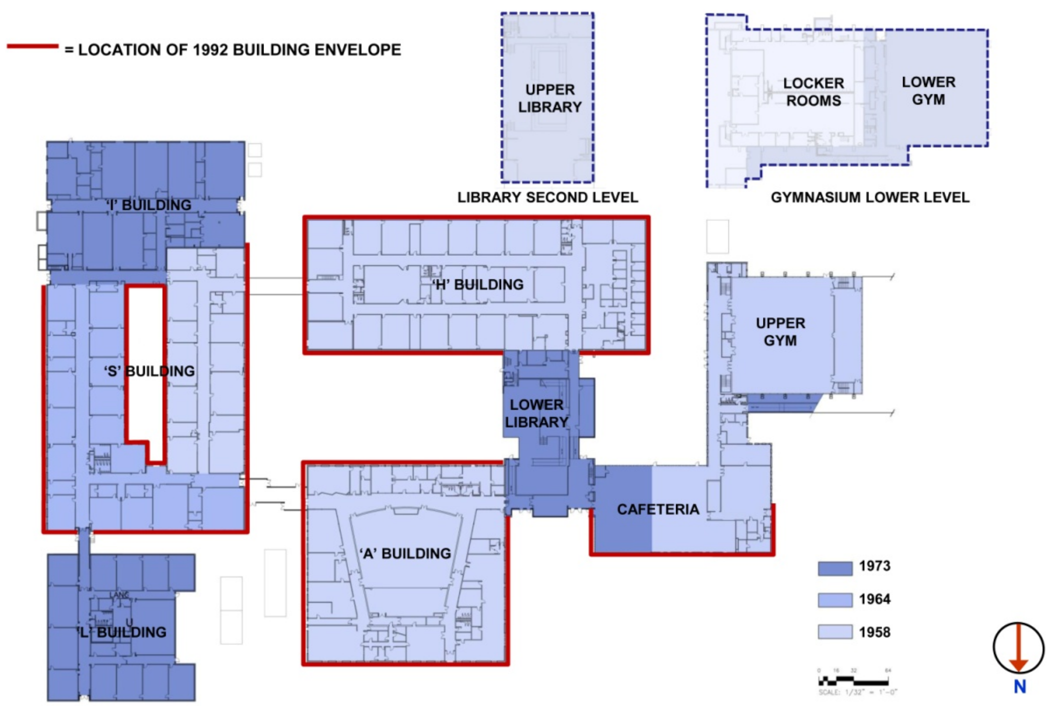

Illustration: Previous Existing Building Additions

In 2005, Symmes Maini McKee Associates (SMMA) prepared a feasibility study describing the conditions at the existing high school building. The determinations by SMMA and by the MSBA Data Collections and Needs Survey were the basis for the development of the attached Statement of Interest (SOI).

The priorities outlined in the SOI have been developed to correct the existing deficiencies and bring the facility to a level where the school district can maintain a healthy and safe educational environment for the students and teachers. At the same time, the intent is to provide programmatic spaces that can accommodate interdisciplinary delivery methods, project based learning, collaborative teaching instruction and hands-on educational practices -- hallmarks of a 21st century educational program.

In addition to the 10 July 2008 NEASC report, five years of interim, reports have also been reviewed. The Master Plan addresses all of the physical plant deficiencies mentioned in the NEASC report by providing adequately sized classrooms, special education spaces, and adequately sized and flexible combination classroom - laboratories for all Science spaces with the ability to share Biology and Chemistry facilities. ADA, security, HVAC, electrical and roof issues are addressed as well with a renovation or new scheme.

The following pages include the Statement of Interest submitted to the MSBA in November 2008 and the NEASC report dated 10 July 2008.

The current and projected enrollments at CCHS were reviewed by OMR. Projected enrollments have generally followed predicted trends since 2000; however, according to the District, actual enrollments have been slightly higher than projected. Enrollment appears to have peaked in 2008. NESDEC projections completed in November, 2009 show an enrollment plateau and overall gradual decline through 2019. With CCHS's history of slightly higher than expected enrollments, anticipated growth in Carlisle, current economic conditions that might bring back some students currently attending independent schools, and the attractiveness of a renovated and transformed CCHS, a projected enrollment of 1,250 was selected as the basis for the Master Plan.

Using the information above and scheduling information provided by the School, OMR evaluated the existing space utilization against the facility's ability to meet the educational requirements of future enrollments. OMR prepared a Space Utilization Study that identified the number of periods each classroom was used relative to the total available periods for that classroom in that department. The study showed that core academic area usage ranged from 76% for Science to 92% for Math and a critical 100% usage rate for both of Chemistry's combination classroom/ laboratories and one of its two teaching classrooms.

Typical usage rates for core academic areas are around 85% and about 75% for Science. Core classrooms need to be adequately sized, well equipped and equally accessible teaching spaces. Two small and remote modular classrooms for English and Social Studies are only used 8% and 13% of the time. Most existing core classrooms are smaller than current standards stipulate. The Master Plan program provides classrooms that are adequately sized, well equipped, and equally desirable to provide scheduling flexibility and help level room use rate discrepancies. In Science, only 7 of 12 teaching spaces are currently combination classroom/laboratories, and of those, only four meet or are close to meeting current size standards. The Master Plan space program provides adequate sized classroom/laboratories for <u>all</u> Science teaching stations. Increased scheduling flexibility is provided by equipping classroom/labs to allow shared use between similar labs: Chemistry and Biology, Earth Science and Physics, or Physics and the new “Hooked on Science” lab. Increased flexibility may also be possible for core academic departments by making scheduling adjustments such as those already made by the Science Department. Added flexibility and ease of scheduling is intended reduce current instances where students must skip, or choose to skip lunches in order to take certain classes. The planned addition of flexible support spaces including resource rooms, numerous multi-use presentation rooms of various sizes, and shared fabrication labs are intended to increase learning opportunities for students at current enrollment levels and in the future. Below is a summary of the Space Utilization Study. The full plan follows in this Section.

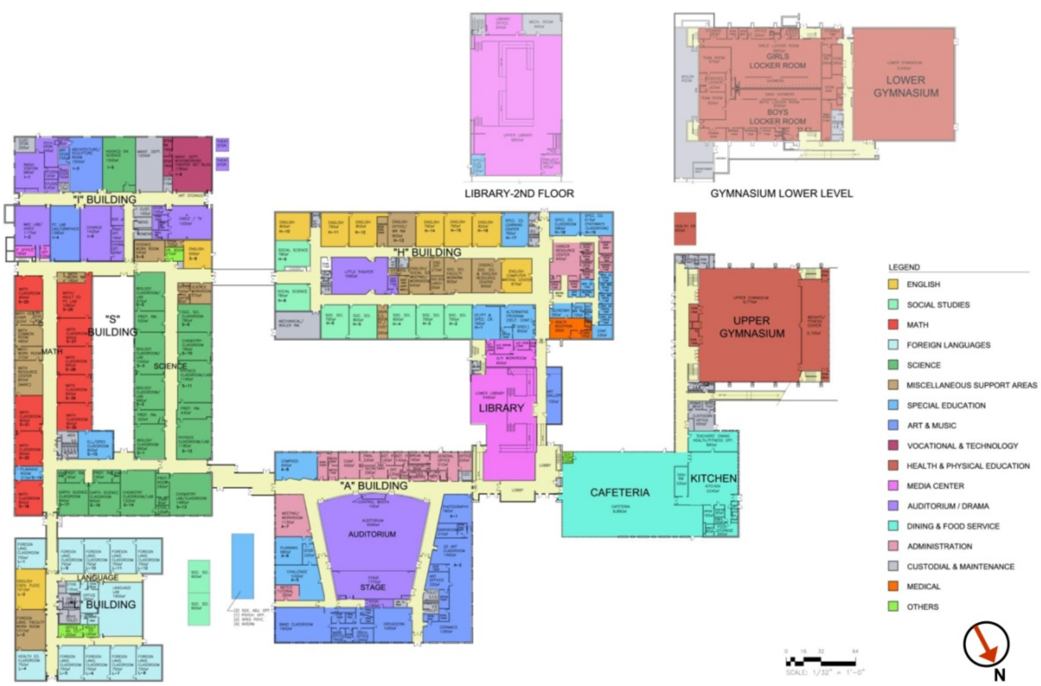

Illustration: Existing Space Utilization Summary

Massachusetts School Building Authority

School District Concord-Carlisle

District Contact TEL:

Name of School Concord Carlisle High

Submission Date 11/14/2008

Note

The following Priorities have been included in the Statement of Interest:

1. Replacement or renovation of a building which is structurally unsound or otherwise in a condition seriously jeopardizing the health and safety of school children, where no alternative exists.
2. Elimination of existing severe overcrowding.
3. Prevention of the loss of accreditation.
4. Prevention of severe overcrowding expected to result from increased enrollments.
5. Replacement, renovation or modernization of the heating system in a schoolhouse to increase energy conservation and decrease energy related costs in the schoolhouse.
6. Short term enrollment growth.
7. Replacement of or addition to obsolete buildings in order to provide for a full range of programs consistent with state and approved local requirements.
8. Transition from court-ordered and approved racial balance school districts to walk-to, so-called, or other school districts.

Potential Project Scope: Major Project

Is this SOI the District Priority SOI? YES

The MSBA ID for the District Priority SOI: 2009 Concord Carlisle High

District Goal for School: Please explain the educational goals of any potential project at this school

The district's goal is to develop a facility that meets current educational requirements. The facility developed would: address the outdated 1960's era science labs and expand the size and number of science labs to allow more rigorous laboratory lessons, provide adequate special educational space to meet programming needs, reduce inordinate out-of-district placement costs, eliminate the use of modular classrooms, address undersized classrooms in Science, Music, Art, General Classrooms, Special Education, Specialty Teacher Spaces, provide a more secure building envelop with improved building access, meet ADA requirements, support use by the broader community, replace and update inefficient energy systems and life safety systems.

Is this part of a larger facilities plan? YES

If "YES", please provide the following:

Facilities Plan Date: 7/12/2005

Planning Firm: Symmes Maini & McKee Associates (SMMA)

Please provide an overview of the plan including as much detail as necessary to describe the plan, its goals and how the school facility that is the subject of this SOI fits into that plan:

The 2005 SMMA feasibility study was conducted to identify three cost options. Option#1 was to determine the cost of bringing the facilities' infrastructure into a condition that would allow the building to continue as is for fifty more years with a 2005 dollars estimate of $42M. The 2nd option was to determine the cost to renovate and expand the facility to meet current educational and programmatic requirements with a 2005 dollars estimate of $82M. The 3rd option was to determine the cost to build a new high school facility ($90M in 2005 dollars) and identify the preferred on-site location. The study also required that the site be evaluated for its ability to support a newly constructed facility while the present facility was in use and to identify a construction phasing plan for option 2. Please note the Concord-Carlisle School Committee voted to accept the study but has never identified a preferred option. Recent deliberations of the facilities subcommittee have been increasingly focused on option 2.

Please provide the current student to teacher ratios at the school facility that is the subject of this SOI: 23 students per teacher.

Please provide the originally planned student to teacher ratios at the school facility that is the subject of this SOI: 23 students per teacher.

Is there overcrowding at the school facility? YES

If "YES", please describe in detail, including specific examples of the overcrowding.

Since 1998 our enrollment has increased from 938 to 1,268 students; this 35% increase in enrollment has led to classrooms scheduling at over a 90% utilization rate. This most impacts science, special education and the arts. In science, seventeen sections of chemistry in four full-time chemistry classrooms share two lab-equipped classrooms. This shared lab arrangement compromises chemistry instruction as well as eliminates common planning time for chemistry teachers. Teachers also improvise by using mobile carts to move demonstration materials from classroom to classroom.

Physics lab experiments are conducted in the hallways because only two classrooms are equipped to be physics labs. Physics is not able to offer double block lab periods, and this arrangement also eliminates common planning time for physics teachers. CCHS does not have a biology lab due to inadequate space.

The small size of the science classrooms doesn’t provide adequate net free space for students. During science instruction, the entire class of students is clustered at one end of the room to observe a demonstration. In one classroom, access to the eye wash station located at the back of the room requires navigation through a crowded cluster of desks or workstations.

Additional space is needed to educate the 17% of the CCHS students requiring federal and state mandated special education programs. There is no space for Active Daily Living facilities for developmentally delayed young adults in the Pathways program. Previously dedicated space for occupational, physical, and counseling therapy is now shared among several departments. Privacy for counseling is not available due to shared spaces. Out-of-district placements for special education students have increased from 3% to 3.5% due to lack of adequate space for special education programs.

The arts program also suffers from overcrowding. The band and chorus are each split into two sections because the classroom space cannot accommodate the entire band or the entire chorus at one time. Sculpture and architecture are held in a former autobody shop area due to lack of classroom space. The radio station doubles as a storage area. Drama musical productions have serious issues with lack of storage and no space for changing costumes. The auditorium is undersized and can only accommodate 40% of the student body.

General Description

SITE DESCRIPTION: Please provide a detailed description of the current site and any known existing conditions that would impact a potential project at the site (maximum of 5000 characters).:

The 94 acre site contains varying topography and is located in a water conservancy area. The large flat areas may have drainage issues that could impact a potential project on those portions of the site. The current location of the high school would not pose significant issues for a renovation/expansion project. The soil conditions are excellent throughout the site. Electric, water, sewer and natural gas are provided through local utilities.

The community has built a swim and fitness facility that is located on the high school campus and Concord recently used CPA funds to build two artificial turf fields for shared community and school use.

BUILDING ENCLOSURE: Please provide a detailed description of the building enclosure, types of construction materials used, and any known problems or existing conditions (maximum of 5000 characters).:

The building was constructed in 1960, with additions in 1965, 1975 and renovations in 1990. Much of the exterior envelope is built with masonry veneer and backup. The roof is a built up system. The majority of the structure contains 12-15 foot high ceilings. The foundation is primarily shallow spread footings with 4" concrete slab on grade flooring.

Age of EXTERIOR WALLS (In Years): 48
Year of Last Repair or Replacement: 1960
Description of Last Repair or Replacement:
All walls are original to the building, or to the additions made to the building with the exception of a limited number of walls that were replaced in the 1995 renovations. Curtain walls use metal clad components.

Age of ROOF(In Years): 33
Year of Last Repair or Replacement: 1975
Description of Last Repair or Replacement:
A, H & S building roofs were replaced in 1975. During the 1990's roofs in the L, I, Lower Gym and Library were replaced. None of the roofing systems comply with existing energy codes.

Age of WINDOWS(In Years): 48
Year of Last Repair or Replacement: 1995
Description of Last Repair or Replacement:
Original single pane plate glass windows exist in 60% of the building. These windows are non-tempered making them unsafe in a school building. The original window systems are very inefficient and do not provide any thermal breaks. The caulking is deteriorating and the metal frames are rusting out. The other 40% of the building (A, H & S wings and a portion of the cafeteria have been replaced with insulated safety glass systems. As window sections fail or break in the single pane systems they are replaced with like kind.

MECHANICAL and ELECTRICAL SYSTEMS: Please provide a detailed description of the current mechanical and electrical systems, and any known problems or existing conditions (maximum of 5000 characters).:

The majority of the mechanical systems were replaced in the 1990's. Secondary electrical panels were upgraded in the 1990's but the main electrical distribution is original to the building and replacement of components for the main system are difficult to find and very expensive.

Age of BOILERS(In Years): 16
Year of Last Repair or Replacement: 1992
Description of Last Repair or Replacement:
Two boilers were replaced in 1992; a third was added in 1995 as the two boilers could not service the complex.

Age of HVAC SYSTEM (In Years): 16

Year of Last Repair or Replacement: 1995
Description of Last Repair or Replacement:
The majority of the HVAC systems were replaced in the 1995 renovations. Portions of the buildings do have roof top gas-fired systems installed in 1975.
Age of ELECTRICAL SERVICES AND DISTRIBUTION SYSTEM(In Years): 48
Year of Last Repair or Replacement: 1960
Description of Last Repair or Replacement:
All main distribution electrical systems are original to the building, or to the additions made to the complex. Secondary electrical feeder distribution panels during the 1990's renovations.

BUILDING INTERIOR: Please provide a detailed description of the current building interior including a description of the flooring systems, finishes, ceilings, lighting, etc. (maximum of 5000 characters).:

Flooring - Asbestos tile, asbestos tile covered by carpet, VAT tile, maple hardwood in gymnasium, ceramic in kitchen.
Walls - concrete block, studs and gypsum and large expanses of single pane plate glass.
Ceilings - Dropped ceilings in administrative areas. Exposed steel joists with structural tectum decking in most classrooms.
Lighting systems have been upgraded to T8 bulbs with matching high efficiency ballasts.

PROGRAMS and OPERATIONS: Please provide a detailed description of the current programs offered and indicate whether there are program components that cannot be offered due to facility constraints, operational constraints, etc.:

CCHS offers core curriculum and co-curricular activities which meets both the Department of Elementary and Secondary Education (DESE) requirements and NEASC Accreditation standards. The majority of students are enrolled in college preparatory courses which require 4 years of English, Mathematics, Science, Social Science, Physical Education and two years of World Languages, Music, Art, Applied Technologies and/or Drama. There are 36 distinct co-curricular offerings as well as 26 varsity interscholastic sports and numerous sub-varsity squads.

The configuration and types of spaces contained in the CCHS do not adequately support instruction in today’s educational environment. There is a significant lack of tutorial and specialist spaces in the facility. Three modular buildings were added in 2005 and 2007, but site limitations and egress issues constrict further expansion by addition of modulars. The conversion of storage space to instructional space exacerbates the lack of proper storage areas.

CORE EDUCATIONAL SPACES: Please provide a detailed description of the Core Educational Spaces within the facility, a description the number and sizes (in square feet) of classrooms, a description of science rooms/labs including ages and most recent updates, and a description of the media center/library (maximum of 5000 characters).:

The net square footage of the facility is 186,420 which equates to 138 square feet per student. There are 58 classrooms which average 786 square feet.

CAPACITY and UTILIZATION: Please provide a detailed description of the current capacity and utilization of the school facility. If the school is overcrowded, please describe steps taken by the administration to address capacity issues. Please also describe in detail any spaces that have been converted from their intended use to be used as classroom space (maximum of 5000 characters).:

Classrooms are scheduled at over a 90% utilization rate. Science labs do not meet fully safety standards for ventilation to the outdoors. These health and safety issues are compounded by lack of sufficient science labs. Seventeen sections of chemistry in four full-time chemistry classrooms share two lab-equipped classrooms. This shared lab arrangement compromises chemistry instruction as well as eliminates common planning time for chemistry teachers. Teachers also improvise by using mobile carts to move demonstration materials from classroom to classroom.

Physics lab experiments are conducted in the hallways because only two classrooms are equipped to be physics labs. Physics is not able to offer double block lab periods, and this arrangement also eliminates common planning time for physics teachers. CCHS does not have a biology lab due to inadequate space.

The small size of the science classrooms doesn't provide adequate net free space for students. During science instruction, the entire class of students is clustered at one end of the room to observe a demonstration. In one classroom, access to the eye wash station located at the back of the room requires navigation through a crowded cluster of desks or work stations.

Additional space is needed to educate the 17% of the CCHS students requiring federal and state mandated special education programs. There is no space for Active Daily Living facilities for developmentally delayed young adults in the Pathways program. Previously dedicated space for occupational, physical, and counseling therapy is now shared among several departments. Privacy for counseling is not available due to shared spaces. Out-of-district placements for special education students have increased from 3% to 3.5% due to lack of adequate space for special education programs.

MAINTENANCE and CAPITAL REPAIR: Please provide a detailed description of the district's current maintenance practices, its capital repair program, and the maintenance program in place at the facility that is the subject of this SOI. Please include specific examples of capital repair projects undertaken in the past, including if any override or debt exclusion votes were necessary (maximum of 5000 characters).:

The district has two shifts of custodians and a maintenance staff. A work order system is used to track and address facility repair requests. The facilities manager assists finance and operations in the development of a five year capital plan. The current 5 year plan under consideration by the school committee identifies over $9M of repairs, however the $9M of identified facility needs do not yield any programmatic improvement. Significant relief of space and programmatic issues are far more costly and cannot be addressed by yearly requests for capital projects. The Regional School District has initiated several capital projects in the last five years. Four debt exclusion requests made from FY05 to FY08 totalling $3.57M have been approved by the member communities. We have focused on projects that would be portable, addressed safety concerns, and outside the building envelope. These projects have included new language lab equipment, internal and external bleacher systems, improved fire detection in public areas, lighting upgrades and cosmetic updates to science lab facilities. Please note that the science lab improvements do not expand the labs or address the limitations of the instruction that can take place in the labs. Modular classrooms have also been added to the complex via approved debt exclusions.

Priority 2

Please describe the existing conditions that constitute severe overcrowding.

1. Classrooms are scheduled at greater than 90% usage with some rooms at 100% utilization.

2. Every available classroom/computer lab/art room/music room is used during homerooms. Four homerooms must be held in the library due to lack of classroom space.
3. CCHS has open/off campus privilege for juniors and seniors. If the school did not have these privileges there would definitely not be enough rooms to hold the entire student body in either supervised studies or classes. CCHS would not have enough space in the cafeteria to feed the entire student body if they all ate within the school. This is true despite the fact that CCHS has three lunch blocks.
4. Due to lack of space every science room is used all day. The two science labs are shared. Many science classes must meet in more than one room during the week so that other science classes can access the labs.

5. The MCAS ELA classes are held in a former storage area.

6. The band is already broken up to two groups because the classroom cannot accommodate the entire band at one time. It is possible that band may need to break it into three groups next year. The chorus meets as two separate groups because the classroom cannot accommodate the entire chorus. Due to lack of space the "Little Theater" (not a classroom space) is regularly used as a classroom. Due to lack of space two temporary office areas have been established at the rear of a classroom using 4’ tall dividers. Due to lack of space all supervised studies are held in the cafeteria, except during lunch when they are held in classrooms vacated for lunch.
7. During passing time the corridors are shoulder to shoulder with students. There are two bottleneck areas where students are backed up waiting to get through the corridor doors.
8. Because of lack of space, a former auto shop/storage area is used for sculpture and architecture classes.
9. The radio station doubles as a storage area.
10. Numerous people, including special education teachers and counselors, share office space (about 100 Sq feet per office) where privacy issues often exist.
11. There are no adequate storage facilities; this results in items often being stored in little used corridors, a rented trailer, and a balcony over the stage.
12. There is no space for storing chemicals and cleaning equipment as well as the big equipment (snow removal, etc.) for custodial usage.
13. Two offices, one for a counselor and one for a special education teacher, are simply partitions in an otherwise open meeting area.
14. The school library is regularly closed-off to additional students because it accommodates only 150 students at a time.
15. Teacher workrooms (typically less than 700 sq feet) each hold at least 12 teacher desks/files/etc.
16. The "tutoring" room sometimes must accommodate as many as 12 students.
17. Due to lack of space the Main Office conference room (typically used for principal’s meetings) is being used for special education IEP meetings.
18. Cheerleading has no space and sometimes rehearses in classrooms and hallways.
19. There is no place where a whole school assembly can be held. Use of the gymnasium for assembly purposes exceeds the fire codes by almost 200 people. The auditorium holds about 40% of the school population.
20. Drama and musical productions have serious issues with storage and no facilities for changing costumes.

Priority 2

Please describe the measures the School District has taken to mitigate the problem(s) described above.

1. Three portable buildings been installed and the District is considering requesting more.

2. Several committees have studied the building usage, space needs, and feasibility of new building vs. renovations and other options. In the most recent study the committee, led by an architectural firm and including representatives from all local political committees as well as engineers, builders, and architects who live in town, unanimously voted that a new school is needed.
3. The District pays a monthly fee to rent a trailer for storage of certain equipment

Priority 2

Please provide a detailed explanation of the impact of the problem described in this priority on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.

In science, seventeen sections of chemistry in four full-time chemistry classrooms share two lab-equipped classrooms. This shared lab arrangement compromises chemistry instruction as well as eliminates common planning time for chemistry teachers. Teachers also improvise by using mobile carts to move demonstration materials from classroom to classroom.

Physics lab experiments are conducted in the hallways because only two classrooms are equipped to be physics labs. Physics is not able to offer double block lab periods, and this arrangement also eliminates common planning time for physics teachers. CCHS does not have a biology lab due to inadequate space.

The small size of the science classrooms doesn't provide adequate net free space for students. During science instruction, the entire class of students is clustered at one end of the room to observe a demonstration. In one classroom, access to the eye wash station located at the back of the room requires navigation through a crowded cluster of desks or workstations.

Additional space is needed to educate the 17% of the CCHS students requiring federal and state mandated special education programs. Out-of-district placements for special education students have increased from 3% to 3.5% due to lack of adequate space for special education programs. There is no space for Active Daily Living facilities for developmentally delayed young adults in the Pathways program. Previously dedicated space for occupational, physical, and counseling therapy is now shared among several departments. Privacy for counseling is not available due to shared spaces.

The arts program also suffers from severe space limitations. The band and chorus are each split into two sections because the classroom space cannot accommodate the entire band or the entire chorus at one time. Sculpture and architecture are held in a former autobody shop area due to lack of classroom space. The photography room is used to the maximum and there is no space for more than 20 students or for building another darkroom. The radio station doubles as a storage area. Drama musical productions have serious issues with lack of storage and no space for changing costumes. The auditorium is undersized and can only accommodate 40% of the student body.

Please also provide the following:

Cafeteria Seating Capacity: 240

Number of lunch seatings per day: 3

Are modular units currently present on-site and being used for classroom space?: YES

If "YES", indicate the number of years that the modular units have been in use: 3

Number of Modular Units: 3

Classroom count in Modular Units: 26

Seating Capacity of Modular classrooms: 26

What was the original anticipated useful life in years of the modular units when they were installed?: 10

Have non-traditional classroom spaces been converted to be used for classroom space?: YES

If "YES", indicate the number of non-traditional classroom spaces in use: 7

Please provide a description of each non-traditional classroom space, its originally-intended use and how it is currently used:

Four homerooms must be held in the library due to lack of classroom space.
The cafeteria is used for classroom studies.
Art classes are held in a former autobody shop space.
Some physics experiments are conducted in the hallways due to lack of suitable classroom space.
Closets and storage areas have been converted into special education instructional spaces.

Please explain any recent changes to the district's educational program, school assignment polices, grade configurations, class size policy, school closures, changes in administrative space, or any other changes that impact the district's enrollment capacity (maximum of 5000 characters).:

There have been no significant changes.

What are the district's current class size policies?:

The goal is 23:1.

Has the district closed, taken off-line, or converted to another, non-school use, any school facilities within the last 10 years?: NO

If "YES", please provide the name and address of any such school facility and provide a description of the reasons for removing the school from service.:

Priority 3

Please provide a detailed description of the "facility-related" issues that are threatening accreditation.

In 2004 The New England Association of Schools and Colleges sent a visiting team to review all aspects of the educational program we offered. Since that time NEASC has requested several updates on the state of the facility. At their June 22, 2008 meeting, NEASC decided to continue the school's accreditation, but **placed the school on warning** for concerns regarding its adherence to the Commission's Standards for Accreditation. NEASC issued the following recommendation that cannot be satisfied without additional space and/or significant renovation of the existing facility:

Curriculum

· The limited classroom space resulting in a limited number of classrooms available some periods of the day

· The number of overcrowded classrooms

· The significant space constraints in the science department as evidenced by the fact that classes are relocated/rotated on a regular basis in order to provide lab time for all courses

· The school's inability to increase the number of physics and chemistry classes due to lack of space

Community Resources for Learning

· The space constraints placed on the delivery of special education programs and services resulting in the inability to offer in-school services and thus necessitating out-of-district placements

· The lack of running water and restrooms in the portable buildings

· The electrical system which remains in need of updating

· The limited number of electrical outlets

· Storage constraints throughout the facility

· The ongoing HVAC issues

· The continuing issues with roof leaks

· The steep slope of the ramp leading to the lower gymnasium

· The number of doors (80) within the facility which present serious safety and security concerns

The Commission is particularly concerned that not only has little progress been made to resolve these concerns, but there is no formal plan, including funding sources, nor a timeline to ensure their resolution.

Priority 3

Please describe the measures the School District has taken to mitigate the problem(s) described above.

The school district has upgraded facilities within the limits of space constraints. An undersized music room was retrofitted with more space efficient instrument lockers but the crowding issue remains uncorrected. A sufficiently sized language lab was retrofitted with new video streaming and instructional technology. To alleviate overcrowding in the Health & Fitness program a modular classroom was installed in 2005. The purchase and installation of of one modular classroom and one modular office space has been completed with funding from the Fiscal Year 2008 Capital plans. The district is considering addition of another modular building.

Priority 3

Please provide a detailed explanation of the impact of the problem described in this priority on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.

The most immediate educational program limitations are the conditions of the 1960's era science labs and lack of adequate space for science, special education and art programs. The science program is limited by space, technology, and water, gas, and electrical distribution systems. Regulator and safety issues require immediate focus. Since 1998 our enrollment has increased from 938 to 1,268 students; this 35% increase in enrollment has led to classrooms scheduling at over a 90% utilization rate. In science, seventeen sections of chemistry in four full-time chemistry classrooms share two lab-equipped classrooms. This shared lab arrangement compromises chemistry instruction as well as eliminates common planning time for chemistry teachers. Teachers also improvise by using mobile carts to move demonstration materials from classroom to classroom.

Physics lab experiments are conducted in the hallways because only two classrooms are equipped to be physics labs. Physics is not able to offer double block lab periods, and this arrangement also eliminates common planning time for physics teachers. CCHS does not have a biology lab due to inadequate space.

The small size of the science classrooms doesn't provide adequate net free space for students. During science instruction, the entire class of students is clustered at one end of the room to observe a demonstration. In one classroom, access to the eye wash station located at the back of the room requires navigation through a crowded cluster of desks or workstations.

Additional space is needed to educate the 17% of the CCHS students requiring federal and state mandated special education programs. Out-of-district placements for special education students have increased from 3% to 3.5% due to lack of adequate space for special education programs. There is no space for Active Daily Living facilities for developmentally delayed young adults in the Pathways program. Previously dedicated space for occupational, physical, and counseling therapy is now shared among several departments. Privacy for counseling is not available due to shared spaces.

The arts program also suffers from severe space limitations. The band and chorus are each split into two sections because the classroom space cannot accommodate the entire band or the entire chorus at one time. Sculpture and architecture are held in a former autobody shop area due to lack of classroom space. The photography room is used to the maximum and there is no space for more than 20 students or for building another darkroom. The radio station doubles as a storage area. Drama musical productions have serious issues with lack of storage and no space for changing costumes. The auditorium is undersized and can only accommodate 40% of the student body.

Please also provide the following:

Current Accreditation Status; Please provide appropriate number as 1=Passed, 2=Probation, 3=Warning: 3

If "WARNING", indicate the date accreditation may be switched to Probation or lost:: 3/22/2009

If "PROBATION", indicate the date accreditation may be lost::

Please provide the date of the first accreditation visit that resulted in your current accreditation status.:
3/22/2004

Please provide the date of the follow-up accreditation visit:: 3/22/2007

Are Facility related issues related to Media Center/Library? If yes, please describe in detail in Question 1 above.:
YES

Are Facility related issues related to Science Rooms/Labs? If yes, please describe in detail in Question 1 above.:
YES

Are Facility related issues related to general Classroom spaces? If yes, please describe in detail in Question 1 above.:

YES

Are Facility related issues related to support spaces? If yes, please describe in detail in Question 1 above.: YES

Priority 4

Please describe the conditions within the community and School District that are expected to result in increased enrollment.

During the past 12 years the high school enrollment has grown by 342 students, from 926 students in School Year 1996 – 1997 to 1,268 in School Year 2008 -2009. This represents a nearly 37% increase in the number of students in the high school. This strong growth pattern runs counter to projections that rely on birth rates. Historically Concord and Carlisle have provided a strong school system that attracts professional couples that have started their families, often in urban areas and then moved into our towns as their children approach school age. Despite an overall declining trend in birthrates Concord's K-5 enrollment, at 1,233 students is currently 55 students above the 2007 NESDEC projections of 1,178 students. This will translate into higher 9-12 enrollments in the near future. Discussions with building departments in Carlisle and Concord also indicate that there is an abnormally high level of development underway in each town as a result of 40B projects moving forward after lengthy approval processes. Concord's building department reports that permits for mutli-family homes in 2008 will leap from a ten year average of 3.1 to 391. Carlisle's building department reports that a 35 unit 40B development has been approved and that 7 to 10 other 3-5 bedroom homes have also been approved as paving in new areas of town will support expanded development. We also believe that the decline in real estate prices will attract families into our communities that are seeking strong school systems. And, Concord's three new elementary schools and Carlisle's plan to rebuild the Spaulding school building will attract students from the private schools as will the economic downturn. The turnover in housing stock as older residents of large homes in Concord and Carlisle downsize will also bring students in to the high school population in the future.

Priority 4

Please describe the measures the School District has taken or is planning to take in the immediate future to mitigate the problem(s) described above.

Conducted Master Plan Studies in 1999.

Conducted feasibility study in summer of 2005.

Submitted MSBA Statement of Interest in December 2006 and a refreshed Statement of Interest in November of 2008.

We have placed three modular buildings on the campus to alleviate the 90% utilization rate of classrooms within the building. We are discussing the addition of a fourth modular.

Priority 4

Please provide a detailed explanation of the impact of the problem described in this priority on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.

Our current high school facility contains a high percentage of undersized classrooms. The facility was built before the introduction of technology into the classroom was envisioned and the space needs for classroom technology compounds the space issue. In priority two we have cited specific problems in our science labs, special education and art programs associated with the facility.
We believe the continued growth in enrollment will lead to serious impact on the district's ability to deliver services. We need addtional space to develop stronger in-house special education programs to offset increasingly expensive out-of-district programs. We can barely meet the demand for science labs in our facility. The NEASC has placed the high school on warning status due to facility issues.
Further enrollment growth will further exacerbate the problems that are described in detail in priority 2. As the high school enrollment grows we will no longer be able use the cafeteria as a study hall. We have an undesireable amount of studies taking place in the cafeteria and we are running out places for studies. As the student count increases we will need to offer more lunches as the throughput capacity of the cafeteria will limit our ability to have only three lunch seatings. Teachers are conducting some physics experiments in the hallways, are carting materials from classroom to classroom and resultantly have less common planning time which directly impacts students.

Please also provide the following:

Cafeteria Seating Capacity: 240
Number of lunch seatings per day: 3
Are modular units currently present on-site and being used for classroom space?: YES
If "YES", indicate the number of years that the modular units have been in use: 3
Number of Modular Units: 3
Classroom count in Modular Units: 26
Seating Capacity of Modular classrooms: 26
What was the original anticipated useful life in years of the modular units when they were installed?: 10
Have non-traditional classroom spaces been converted to be used for classroom space?: YES
If "YES", indicate the number of non-traditional classroom spaces in use: 7
Please provide a description of each non-traditional classroom space, its originally-intended use and how it is currently used:

Four homerooms must be held in the library due to lack of classroom space.
The cafeteria is used for classroom studies.
Art classes are held in a former body shop space.
Some Physics experiments take place in the hallway due to lack of suitable classroom space.
Closets and storage areas have been converted into specialty instruction spaces.
CCHS has open/off campus privilege for juniors and seniors. If the school did not have these privileges there would definitely not be enough rooms to hold the entire student body in either supervised studies or classes. CCHS would not have enough space in the cafeteria to feed the entire student body if they all ate within the school. This is true despite the fact that CCHS has three lunch blocks.

Please explain any recent changes to the district's educational program, school assignment polices, grade configurations, class size policy, school closures, changes in administrative space, or any other changes that impact the district's enrollment capacity (maximum of 5000 characters).:

There have been no significant changes.

What are the district's current class size policies?:

The goal is 23:1.

Has the district closed, taken off-line, or converted to another, non-school use, any school facilities within the last 10 years?: NO

If "YES", please provide the name and address of any such school facility and provide a description of the reasons for removing the school from service.:

Priority 5

Please provide a detailed description of the energy conservation measures that are needed and include an estimation of resultant energy savings as compared to the historic consumption.

Energy consumption in this 48 year old facility is high, several key concerns are noted below:

1. An evaluation of electrical energy efficiency performed by Symmes, Maini & McKee Associates (SMMA) indicates that Concord-Carlisle High School's energy consumption density is slightly higher than 10kwh/ft^2 per year, or 25% higher than the national average of approximately 8kwh/ft2 per year in the SMMA database.
2. Water conserving fixtures should be installed in all toilet rooms.
3. Replacement of single pane non-insulated window systems should be a priority in order to meet energy codes, and increase efficiency of HVAC systems. Large expanses of single-pane plate glass should be replaced with thermally insulated safety glass.This is a safety issue as well as an energy issue. Many of the exterior wall systems are not insulated and not properly designed for the New England climate.

Addressing the issues above would result in estimated annual savings of 10%.

1. During the 2004-05 school year a building study committee worked with the architectural firm Symmes, Maini & McKee Associates (SMMA) to thoroughly examine all aspects of the school. The following represent the findings, observations, and recommendations of the SMMA study presented to the committee.

    1. The buildings have significant issues with respect to accessibility requirements. Of particular concern is handicapped access to major public spaces such as the library, the gyms, and the auditorium. Handicapped accessibility to toilets and compliant door approach clearances are also of concern.
    2. Major building components, such as some finishes and the roofing system, are candidates for replacement because of age.
    3. Major public spaces are the most worn out areas of the building. The cafeteria and locker/gymnasium spaces are in particularly poor condition.
    4. Plumbing conditions, while serviceable, require re-piping kitchen waste-drains and replacement of suspected broken piping.
    5. Signs of corrosion on the water systems exist.
    6. High pressure gas main service and meter need to be replaced and relocated to run through the building.
    7. Water conserving fixtures should be installed in all toilet rooms.
    8. Currently the science classrooms and prep areas are being supplied by domestic hot and cold water piping (a violation of today's plumbing code requirements). The science classrooms and prep areas should be supplied with non-potable water with proper backflow prevention devices to protect the potable system from contamination. The emergency showers and eyewashes that support these science areas are supplied with cold water only. Emergency showers and eyewash stations should be supplied by tempered water (a blend of hot and cold water).
    9. The fire protection system in the mechanical space in Building A is a limited area sprinkler system and is supplied from the domestic water system. The high school complex is not a fully sprinklered facility.
    10. The gas-fired rooftop HVAC units serving the shop spaces in I-Wing should be replaced. The control system should be replaced with a system that will satisfy the future requirements of the school and be maintainable through an independent service agent, if necessar
    11. Existing air handling units installed in the cafeteria should be modified or replaced to resolve the excessive noise levels.
    12. An operator work station should be installed in the high school to allow for on-site monitoring and adjustment of the HVAC systems; this can be in addition to the off-site operator workstation installed at the Ripley Building.

    Building Code Implications – Massachusetts is planning to revise its building codes by adopting a modified application of the International Building Code; revisions may have some bearing on any proposed modifications to the HVAC system.

Electrical Systems

Power Distribution

Priority 5

Please describe the measures the School District has already taken to reduce energy consumption.

1. Many lighting fixtures have been replaced under a state energy grant and district capital funds.
2. A high efficiency hot water system was installed in close proximity to the kitchen facility and eliminated a long circuitous route from an older system.
3. Control systems are being updated where possible and capital funds have been designated for more substantial improvements to the energy management systems.

4. Many doors have been replaced with properly fitted insulated exterior doors.

Priority 5

Please provide a detailed explanation of the impact of the problem described in this priority on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.

Monies that could be used to enhance educational offerings and improve facilities are being diverted to inordinately high energy costs.

The existing infrastructure will not support emerging demands.

Please also provide the following:

Age of Roof (Years): 33
Were any major repairs or renovations of the roof undertaken in the past?: YES
If "YES", please provide the year of the last major repair/renovation of the roof: 2007
Age of Windows (Years): 48
Were any major repairs or renovations of the windows undertaken in the past?: YES
If "YES", please provide the year of the last major repair/renovation of the windows: 1994
Age of Doors (Years): 2
Were any major repairs or renovations of the doors undertaken in the past?: YES
If "YES", please provide the year of the last major repair/renovation of the doors: 2006
Age of HVAC (Years): 48
Were any major repairs or renovations of the HVAC undertaken in the past?: YES
If "YES", please provide the year of the last major repair/renovation of the HVAC: 1997
Age of Boilers (Years): 13
Were any major repairs or renovations of the boilers undertaken in the past?: YES
If "YES", please provide the year of the last major repair/renovation of the boilers: 1995
Age of Electrical System (Years): 48
Were any major repairs or renovations the electrical system undertaken in the past?: NO
If "YES", please provide the year of the last major repair/renovation of the electrical system:
Age of Lighting System (Years): 13
Were any major repairs or renovations of the lighting system undertaken in the past?: YES
If "YES", please provide the year of the last major repair/renovation of the lighting system: 2007
Have the systems identified above been examined by an engineer or other trained building professionals?: YES
If "YES", please provide the name of the individual and his/her professional affiliation:
John O'Dell Concord Municipal Light Plant and Energy Consultants
Please also provide the date of the inspection:: 7/1/2007
Please describe how addressing the system will extend the useful life of the facility that is the subject of this SOI (maximum of 5000 characters).:

The district has requested debt exclusions to address facility deficiencies. Key components of the projects within the building are described as follows:

The Regional School District has initiated capital projects to replace a non-functioning classroom communication system. While several areas of the facility could not be reached via the intercom the replacement enables two-way communication between the Main Office and classrooms, the facility still contains over seventy exterior doors and cannot be readily secured for a lockdown.

Funds available for capital projects plan have targeted resolution of safety concerns. The non-operational magnetic release/fire alarm interface to the fire alarm system has been remediated during the summer of 2006. The integration of the door hardware to the fire alarm system required is budgeted for $360,000 of capital expenditures.

Several classroom areas lighting fixtures have been replaced in conjunction with a State Energy Conservation Improvement Program grant.

Significant relief of space and programmatic issues are far more costly and cannot be addressed by yearly requests for capital projects. The work described above is on-going maintenance that will extend the useful life of the building.

Priority 7

Please provide a detailed description of the programs not currently available due to facility constraints, the state or local requirement for such programs and the facility limitations precluding the programs from being offered.

1. The two science labs are both Chemistry labs. Having only two labs constricts the number of chemistry classes that can be offered. This year (06-07) the chemistry labs are scheduled all day and additional sections of chemistry cannot be added. Concord-Carlisle High School (CCHS) chemistry students are usually a combination of sophomores and juniors. The current freshman class (as of this writing) is more than 30 students greater than either of the current classes involved in chemistry. Next year chemistry classes will be restricted.

2. CCHS does not have a biology lab. Faculty must be creative in offering biology as a laboratory science. The teachers and students regularly move desks and chairs around the room to establish a lab type setting which is unfortunately so crowded that the types of labs offered must be restricted to maintain safety.

3. CCHS does not have a true physics laboratory and therefore physics laboratory science is very limited. In an effort to provide learning opportunities for students, the physics teachers regularly use the corridors, parking lots, and other outdoor areas for student experiments.

4. The photo room is used to the maximum. There is no space for expansion so that the classes could be larger than 20, or for building another dark room space so that the number of classes offered could be increased.

Priority 7

Please describe the measures the School District has taken or is planning to take in the immediate future to mitigate the problem(s) described above.

1. Limit the number of course offerings and electives to fit within the available space.
2. Limit the size of science classes and photo classes and limit the number of classes in order to fit the available space.
3. Limit the types of experiments conducted within the science offerings due to high utilization of existing lab spaces, and the associated constrictions of these outdated facilities.
4. Limit the breadth of programs for special education services. The District would like to further expand the delivery of special education services within the district.

Priority 7

Please provide a detailed explanation of the impact of the problem described in this priority on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.

The most immediate educational program limitations are the conditions of the 1960's era science labs and lack of adequate space for science, special education and art programs. The science program is limited by space, technology, and water, gas, and electrical distribution systems. Regulator and safety issues require immediate focus. Since 1998 our enrollment has increased from 938 to 1,268 students; this 35% increase in enrollment has led to classrooms scheduling at over a 90% utilization rate. In science, seventeen sections of chemistry in four full-time chemistry classrooms share two lab-equipped classrooms. This shared lab arrangement compromises chemistry instruction as well as eliminates common planning time for chemistry teachers. Teachers also improvise by using mobile carts to move demonstration materials from classroom to classroom.

Physics lab experiments are conducted in the hallways because only two classrooms are equipped to be physics labs. Physics is not able to offer double block lab periods, and this arrangement also eliminates common planning time for physics teachers. CCHS does not have a biology lab due to inadequate space.

The small size of the science classrooms doesn't provide adequate net free space for students. During science instruction, the entire class of students is clustered at one end of the room to observe a demonstration. In one classroom, access to the eye wash station located at the back of the room requires navigation through a crowded cluster of desks or workstations.

Additional space is needed to educate the 17% of the CCHS students requiring federal and state mandated special education programs. Out-of-district placements for special education students have increased from 3% to 3.5% due to lack of adequate space for special education programs. There is no space for Active Daily Living facilities for developmentally delayed young adults in the Pathways program. Previously dedicated space for occupational, physical, and counseling therapy is now shared among several departments. Privacy for counseling is not available due to shared spaces.

The arts program also suffers from severe space limitations. The band and chorus are each split into two sections because the classroom space cannot accommodate the entire band or the entire chorus at one time. Sculpture and architecture are held in a former autobody shop area due to lack of classroom space. The photography room is used to the maximum and there is no space for more than 20 students or for building another darkroom. The radio station doubles as a storage area. Drama musical productions have serious issues with lack of storage and no space for changing costumes. The auditorium is undersized and can only accommodate 40% of the student body.

Vote

Vote of Municipal Governing Body YES: NO: Date:

Vote of School Committee YES: NO: Date:

Vote of Regional School Committee YES: 7 NO: 0 Date: 11/13/2008

Form of Vote

The following form of vote should be used by both the City Council/Board of Aldermen, Board of Selectmen/equivalent governing body AND the School Committee in voting to approve this Statement of Interest.

If a regional school district, the regional school district should use the following form of vote.

Resolved: Having convened in an open meeting on ___________________, the ____ *[City Council/Board of Aldermen, Board of Selectmen/Equivalent Governing Body, School Committee]* of ___________________________*[City/Town/School District]*, in accordance with its charter, by-laws, and ordinances, has voted to authorize the Superintendent to submit to the Massachusetts School Building Authority the Statement of Interest dated _____________ for the __________________________________*[Name of School]* located at ____*[Address]* which describes and explains the following deficiencies and the priority category(s) for which ____*[Name of City/Town/District]* may be invited to apply to the Massachusetts School Building Authority in the future

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____*[Insert a description of the priority(s) checked off on the Statement of Interest and a brief description of the deficiency described therein for each priority];* and hereby further specifically acknowledges that by submitting this Statement of Interest, the Massachusetts School Building Authority in no way guarantees the acceptance or the approval of an application, the awarding of a grant or any other funding commitment from the Massachusetts School Building Authority, or commits the _________________________________ *[Name of City/Town/District]* to filing an application for funding with the Massachusetts School Building Authority.

CERTIFICATIONS

The undersigned hereby certifies that, to the best of his/her knowledge, information and belief, the statements and information contained in this statement of Interest and attached hereto are true and accurate and that this Statement of Interest has been prepared under the direction of the district school committee and the undersigned is duly authorized to submit this Statement of Interest to the Massachusetts School Building Authority. The undersigned also hereby acknowledges and agrees to provide the Massachusetts School Building Authority, upon request by the Authority, any additional information relating to this Statement of Interest that may be required by the Authority.

LOCAL CHIEF EXECUTIVE OFFICER/DISTRICT SUPERINTENDENT/SCHOOL COMMITTEE CHAIR (E.g., Mayor, Town Manager, Board of Selectmen)

Chief Executive Officer	**School Committee Chair**	**Superintendent of Schools**
(print name)	(print name)	(print name)
(signature)	(signature)	(signature)
Date	Date	Date

Founded in 1885

NEW ENGLAND ASSOCIATION OF SCHOOLS & COLLEGES, INC.
COMMISSION ON PUBLIC SECONDARY SCHOOLS

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July 10, 2008

Peter A. Badalament
Principal
Concord-Carlisle Regional High School
500 Walden Street
Concord, MA 01742

Dear Mr. Badalament:

The Commission on Public Secondary Schools, at its June 22-23, 2008 meeting, reviewed the Deferred Special Progress Report of Concord-Carlisle Regional High School and continued the school's accreditation, but placed the school on warning for concerns regarding its adherence to the Commission's Standards for Accreditation on Curriculum and Community Resources for learning.

The concerns prompting the warning status, many of which have been identified in previous correspondence, include the following:

Curriculum

- the limited classroom space resulting in a limited number of classrooms available during some periods in the school day
- the number of overcrowded classrooms
- the significant space constraints in the science department as evidenced by the fact that classes are relocated/rotated on a regular basis in order to provide lab time for all courses
- the school's inability to increase the number of physics and chemistry classes due to lack of space

Community Resources for Learning

- the space constraints placed on the delivery of special education programs and services resulting in the inability to offer in-school services and thus necessitating out-of-district placements
- the lack of running water and restrooms in the portable buildings
- the electrical system which remains in need of updating
- the limited number of electrical outlets
- storage constraints throughout the facility
- the ongoing HVAC issues
- the continuing issues with roof leaks
- the steep slope of the ramp leading to the lower gymnasium
- the number of doors (80) within the facility which present serious safety and security concerns

As school officials are aware, it is the Commission's expectation that all recommendations in a member school's decennial evaluation report should be completed or be in the final stages of implementation at the time the Five-Year Progress Report is submitted. In the case of Concord-Carlisle High School the Commission has been monitoring cited facilities and space concerns for four years At this point in time not only has little progress been made resolving these concerns, but there is also no formal plan, including funding sources, nor a timeline to ensure their resolution. Lacking such assurance, the Commission voted to place the school on warning. The school will not be removed from warning until such time as all concerns have been fully resolved.

The Commission wishes to remind school officials that the required Five-Year Progress Report is due March 1, 2009. The report should provide detailed responses to the five (5) recommendations highlighted in the Commission's notification letter dated March 19, 2007. In addition, the report should include responses to the following highlighted recommendations:

- submit firm plans to resolve both on a short-term and long-term basis all identified space and facilities concerns, to include timelines for seeking voter approval of funding
- explain how the two new general education programs scheduled to be implemented in Fall 2008 have fully resolved the school's past inability to provide appropriate services for some out-of-district placements
- confirm that the portable classrooms are connected to the school's public address system and do not isolate teachers, teachers, students, or programs

While the Commission remains concerned about the identified issues, it wished to acknowledge the planned implementation of two general education programs designed specifically to provide increased services to students who need additional academic support in therapeutic environments.

The school's warning status will be reviewed when the Commission considers the Five-Year Progress Report. Consistent with the Commission's follow-up procedures, the Five-Year Progress Report should be signed by the principal and chair of the Follow-Up Committee and sent to the Commission office in duplicate by certified mail, return receipt requested.

Sincerely,

Pamela Gray-Bennett

PGB/mms

cc: Brenda Finn, Superintendent, Concord-Carlisle Regional School District
Michael Fitzgerald, Chairperson, Concord-Carlisle Regional School Committee
Thomas R. Moore, Chair, Commission on Public Secondary Schools

SPECIAL PROGRESS REPORT
to the NEASC
Concord-Carlisle High School
Concord, MA
June 3, 2008

I am writing this Special Report in response to the letter dated April 22, 2008 which requested additional information on the state of our building project.

To date we have no new information from the Massachusetts School Building Authority. As a district we have attended requested meetings and provided all requested data, and are awaiting a response to our request for a meeting with MSBA to discuss the implications of the "Hold" rating as of the writing of this letter. As I noted in my last letter dated March 1, 2008, the MSBA informed the district of its the status following the submission of our Statement of Interest – our project was placed in the "Hold" category. This means that at this time the State is currently not moving forward on providing funds for either a renovation or a new construction project. The Concord-Carlisle Regional School Committee is waiting for the MSBA to provide greater clarity on their funding plans before proceeding with building plans.

As I also noted in my last letter, the School Committee will continue its ongoing partnerships with organizations in the town and with the MSBA. Once the state funding issue has been resolved, the District will work with these groups to start addressing Concord-Carlisle High School's facility needs. Given the fact that we are still waiting to learn more about what the State's intentions are, there are no current improvement plans on the table at this time. If state funding is not forthcoming, the School Committee will have to make plans to address both the short-term and long-range issues.

Currently, there are no plans for major capital improvements for the 2008-09 school year. In order to address most of the concerns listed in your April 22 letter the school would require a major renovation to the existing facility or the construction of a new building. The renovation versus new building decision will be a difficult decision for the School Committee because the cost differential estimated in the July 2005 feasibility study identified a cost premium to new construction of less than 10%. The costly infrastructure remediation required to make the building efficient for the next fifty years is somewhat obscure, and the expansion required to make the building educationally viable will require further analysis by all stakeholders.

If neither of those scenarios comes to pass in the near future, we would undertake as many of these projects as we could as major capital improvements funded by debt exclusions subject to voter approval.

The Commission's concerns are listed below followed by commentary that might prove helpful:

- the limited classroom space resulting in the lack of any classrooms available during some periods of the day
    - Major renovation or new building.
- the number of overcrowded classrooms
    - Our new modular classrooms have taken significant pressure off of our building utilization rate.
- the lack of running water and restrooms in any of the portable buildings

  - This is not currently possible. People in the modular offices are able to access both water and restrooms in nearby school facilities. They are typically no farther from facilities than other teachers in the building.
- the significant space constraints in the science department as evidenced by the fact that classes are relocated on a regular basis in order to provide lab time for all courses
  - Major renovation or new building.
- the school's inability to increase the number of physics and chemistry classes due to lack of space
  - We are looking to increase the number of chemistry classes we are offering next year - available lab space will be a factor.
- the special education classrooms that are located in various areas of the school
  - Most of our special education classrooms are located near one another in the H-building. We have done are best to make sure we are in full compliance with state regulations regarding the location of these rooms and to ensure that they are equitable facilities.
- the space constraints placed on the delivery of special education programs and services related to the school's inability to offer in-school services which are currently provided for some students in out-of-district placements
  - We are currently developing two in-school general education programs designed to provide services to students in need of more support and therapeutic environments.
- the electrical system which remains in need of updating
  - Major renovation or new building.
- the limited number of electrical outlets
  - Capital improvement, major renovation or new building.
- the limited storage space throughout the facility
  - Major renovation or new building.
- the ongoing HVAC issues
  - Capital improvement, major renovation or new building.
- the continuing issues with roof leaks
  - The remaining life expectancy of the roof is approximately 3 years. We will need to make a determination as to whether of not we are going to replace the roof at that time based on the plan for renovation or a new building.
- the steep slope of the ramp leading to the lower gymnasium
  - Capital improvement, major renovation or new building.
- the number of doors (80) within the facility which present serious safety and security concerns
  - Major renovation or new building.

As previously outlined in my August 31, 2007 Special Progress Report and as noted in a recent CPSS response letter, the District has put in significant resources to maintain the current facility. We are indeed at a crossroads with regard to whether or not we embark on a major project or attempt to address our issues in another fashion. We appreciate the Commission's recognition of the difficult position we are in at this time.

If the Commission has any questions regarding this report, please feel free to contact me at (978) 341-2490 x. 7110.

Sincerely,

P. Badalament

Peter Badalament
Principal
Concord-Carlisle High School
Concord, MA

Brad McGrath

Brad McGrath
Director of Guidance
NEASC Follow-up Committee Co-chair

Cc Brenda Finn, Superintendent, Concord-Carlisle Regional School District
Jerry Wedge, Chairperson, Concord-Carlisle Regional School Committee

NESDEC

Concord-Carlisle HS Historical Enrollment

School District: **Concord-Carlisle HS with METCO** **11/16/2009**

Historical Enrollment By Grade

Birth Year	Births	School Year	PK	K	1	2	3	4	5	6	7	8	9	10	11	12	UNGR	9-12	9-12
1994	0	1999-00	0	0	0	0	0	0	0	0	0	0	295	271	231	218	0	1015	1015
1995	0	2000-01	0	0	0	0	0	0	0	0	0	0	273	301	264	218	0	1056	1056
1996	0	2001-02	0	0	0	0	0	0	0	0	0	0	307	276	295	261	0	1139	1139
1997	0	2002-03	0	0	0	0	0	0	0	0	0	0	328	309	286	285	0	1208	1208
1998	0	2003-04	0	0	0	0	0	0	0	0	0	0	301	325	303	275	0	1204	1204
1999	0	2004-05	0	0	0	0	0	0	0	0	0	0	311	311	316	304	0	1242	1242
2000	0	2005-06	0	0	0	0	0	0	0	0	0	0	321	304	305	314	0	1244	1244
2001	0	2006-07	0	0	0	0	0	0	0	0	0	0	337	321	299	300	0	1257	1257
2002	0	2007-08	0	0	0	0	0	0	0	0	0	0	304	331	326	298	0	1259	1259
2003	0	2008-09	0	0	0	0	0	0	0	0	0	0	312	297	329	330	0	1268	1268
2004	0	2009-10	0	0	0	0	0	0	0	0	0	0	302	312	297	334	0	1245	1245

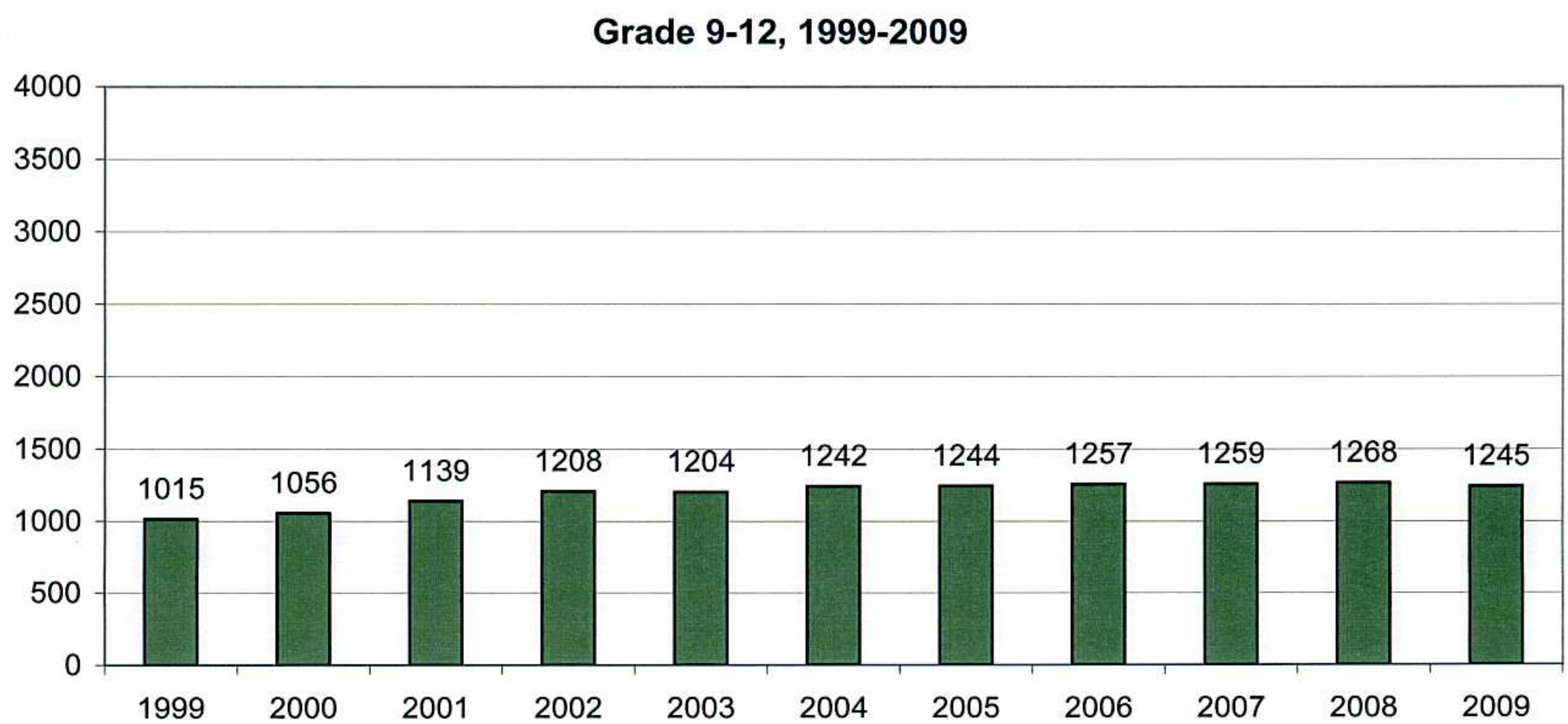
Historical Enrollment in Grade Combinations

Year	PK-5	K-5	K-6	K-8	5-8	6-8	7-8	7-12	9-12
1999-00	0	0	0	0	0	0	0	0	1015
2000-01	0	0	0	0	0	0	0	0	1056
2001-02	0	0	0	0	0	0	0	0	1139
2002-03	0	0	0	0	0	0	0	0	1208
2003-04	0	0	0	0	0	0	0	0	1204
2004-05	0	0	0	0	0	0	0	0	1242
2005-06	0	0	0	0	0	0	0	0	1244
2006-07	0	0	0	0	0	0	0	0	1257
2007-08	0	0	0	0	0	0	0	0	1259
2008-09	0	0	0	0	0	0	0	0	1268
2009-10	0	0	0	0	0	0	0	0	1245

Historical Percentage Changes

Year	9-12	Diff.	%
1999-00	1015	0	0.0%
2000-01	1056	41	4.0%
2001-02	1139	83	7.9%
2002-03	1208	69	6.1%
2003-04	1204	-4	-0.3%
2004-05	1242	38	3.2%
2005-06	1244	2	0.2%
2006-07	1257	13	1.0%
2007-08	1259	2	0.2%
2008-09	1268	9	0.7%
2009-10	1245	-23	-1.8%
9-12 Change		230	22.7%

Concord-Carlisle HS Historical Enrollment



NESDEC

Concord-Carlisle HS Projected Enrollment

School District: Concord-Carlisle HS with METCO — 11/16/2009

Enrollment Projections By Grade*

Year	Births		School Year	PK	K	1	2	3	4	5	6	7	8	9	10	11	12	UNGR	9-12	9-12
2004	0		2009-10	0	0	0	0	0	0	0	0	0	0	302	312	297	334	0	1245	1245
2005	0		2010-11	0	0	0	0	0	0	0	0	0	0	310	298	313	299	0	1220	1220
2006	0		2011-12	0	0	0	0	0	0	0	0	0	0	284	306	299	316	0	1205	1205
2007	0		2012-13	0	0	0	0	0	0	0	0	0	0	309	280	307	301	0	1197	1197
2008	0	(est.)	2013-14	0	0	0	0	0	0	0	0	0	0	310	305	281	309	0	1205	1205
2009	0	(est.)	2014-15	0	0	0	0	0	0	0	0	0	0	288	306	306	283	0	1183	1183
2010	0	(est.)	2015-16	0	0	0	0	0	0	0	0	0	0	290	284	307	308	0	1189	1189
2011	0	(est.)	2016-178	0	0	0	0	0	0	0	0	0	0	272	286	285	309	0	1152	1152
2012	0	(est.)	2017-18	0	0	0	0	0	0	0	0	0	0	296	268	287	287	0	1138	1138
2013	0	(est.)	2018-19	0	0	0	0	0	0	0	0	0	0	295	292	269	289	0	1145	1145
2014	0	(est.)	2019-20	0	0	0	0	0	0	0	0	0	0	215	291	293	271	0	1070	1070

*Projections should be updated on an annual basis.

Based on an estimate of births — Based on children already born — Based on students already enrolled

Projected Enrollment in Grade Combinations*

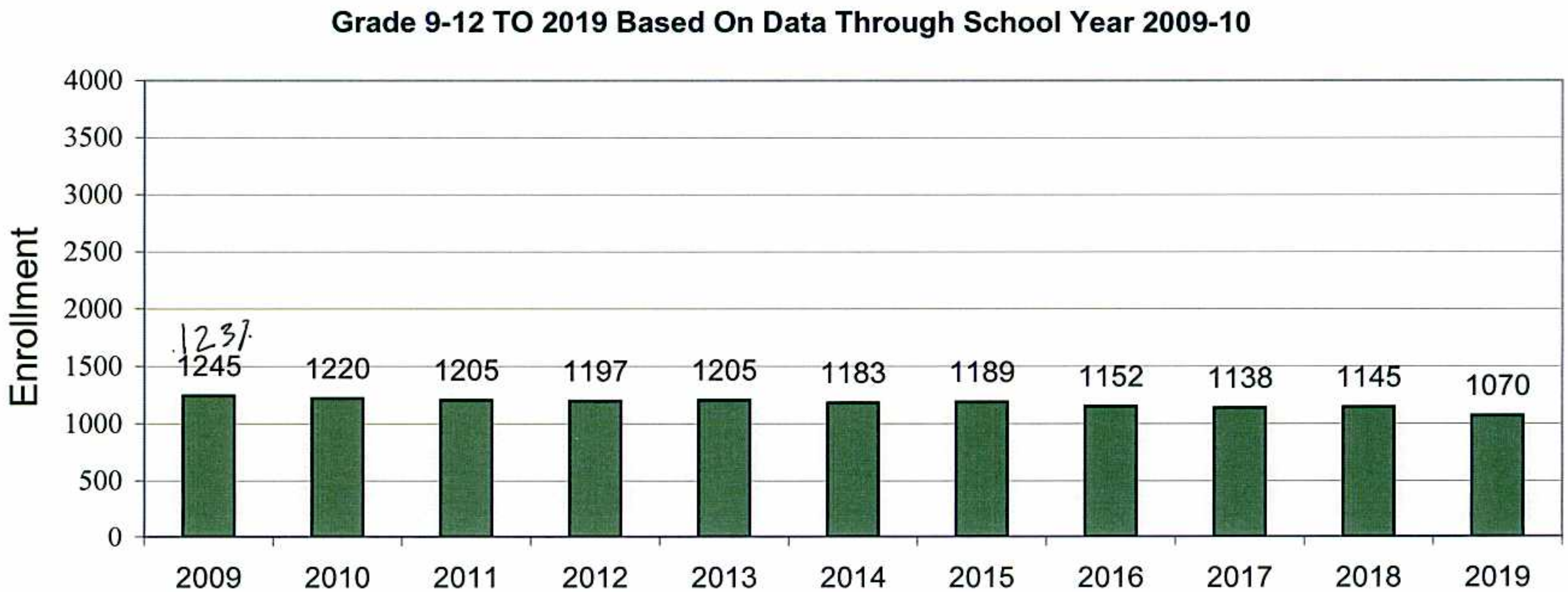
Year	PK-5	K-5	K-6	K-8	5-8	6-8	7-8	7-12	9-12
2009-10	0	0	0	0	0	0	0	0	1245
2010-11	0	0	0	0	0	0	0	0	1220
2011-12	0	0	0	0	0	0	0	0	1205
2012-13	0	0	0	0	0	0	0	0	1197
2013-14	0	0	0	0	0	0	0	0	1205
2014-15	0	0	0	0	0	0	0	0	1183
2015-16	0	0	0	0	0	0	0	0	1189
2016-17	0	0	0	0	0	0	0	0	1152
2017-18	0	0	0	0	0	0	0	0	1138
2018-19	0	0	0	0	0	0	0	0	1145
2019-20	0	0	0	0	0	0	0	0	1070

Projected Percentage Changes

Years	9-12	Diff.	%
2009-10	1245	0	0.0%
2010-11	1220	-25	-2.0%
2011-12	1205	-15	-1.2%
2012-13	1197	-8	-0.7%
2013-14	1205	8	0.7%
2014-15	1183	-22	-1.8%
2015-16	1189	6	0.5%
2016-17	1152	-37	-3.1%
2017-18	1138	-14	-1.2%
2018-19	1145	7	0.6%
2019-20	1070	-75	-6.6%
9-12 Change		**-175**	**-14.1%**

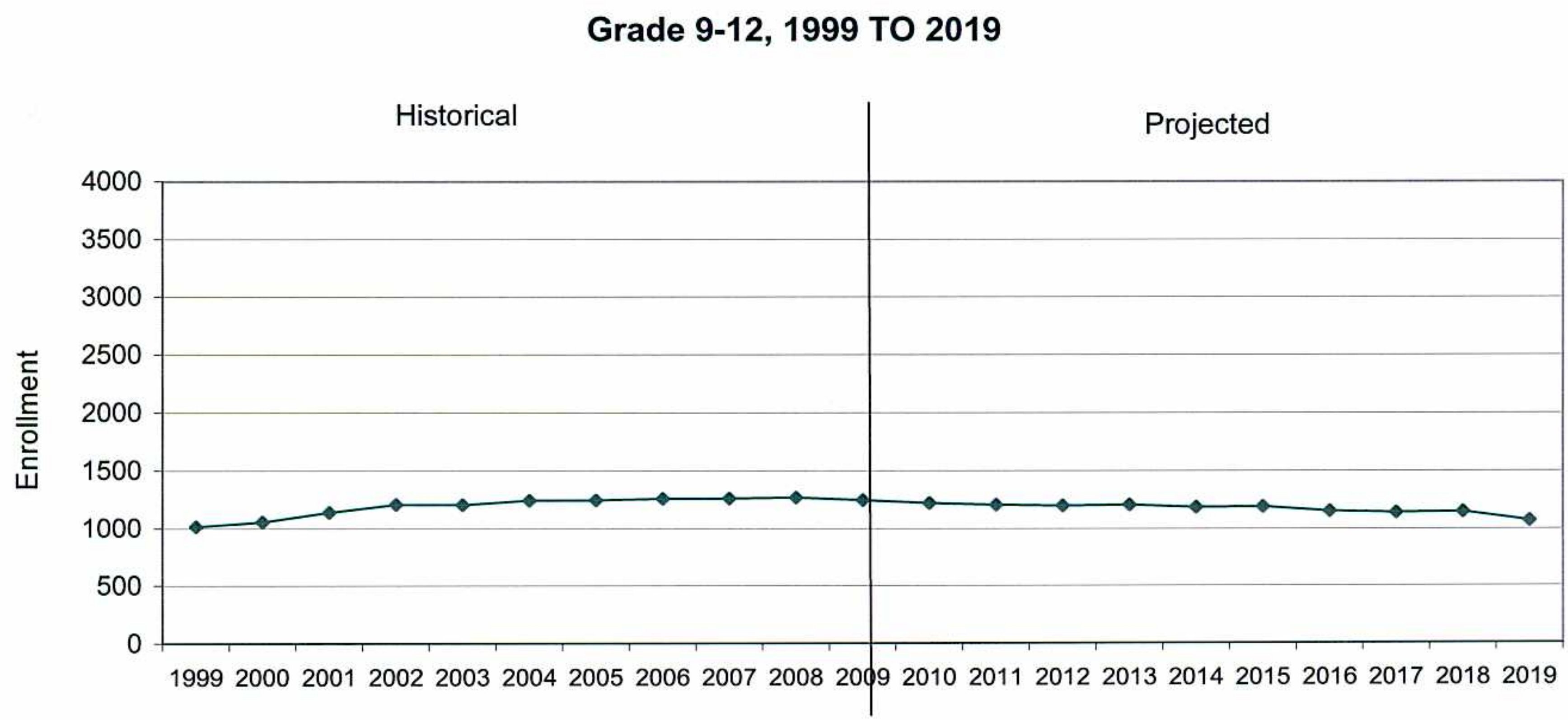
NESDEC

Concord-Carlisle HS Projected Enrollment



NESDEC

C-C HS Historical & Projected Enrollment



NESDEC

Concord-Carlisle HS Additional Data

Building Permits Issued (C+C)		
Year	Single-Family	Multi-Units
1998	50	4
2005	37	6
2006	32	8
2007	20	0
2008	28	3
2009	12 to 8/31	0

Enrollment History		
Year	Voc-Tech 9-12 Total	Non-Public 9-12 Total
1999-00	14	206
2005-06	23	n/a
2006-07	23	n/a
2007-08	25	248
2008-09	19	255
2009-10	23	n/a

Grade 9-12 Residents in Non-Public Independent and Parochial Schools (Regular Education)

Enrollments Jan. 1, 2009	K	1	2	3	4	5	6	7	8	9	10	11	12	K-12 TOTAL
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	63	75	60	57	255

K-12 Home-Schooled Students	
2009	3

K-12 Residents Enrolled in Charter or Magnet Schools	
2009	1

K-12 SpEd Outplaced Students	
2009	36

9-12 Choiced-In, Tuitioned-In, & Other Non Residents	
2009	0

The above data were used to assist in the preparation of the enrollment projections. If additional demographic work is needed, please contact our office.

Concord - Carlisle High School
Utilization Study
OMR File: 2001- 1.5.2
Date: March 16, 2010

Basis 2009-2010 School Year - 2nd Semester Schedule
School has (8) Block schedule with (7) Period Days over a five day cycle
Daily schedule "drops" one block each day (dropped blocks vary)

Version: Core Departmental Lunches

Building Room Number	Room Name / Primary Use		Monday								Tuesday								Wednesday								Thursday								Friday								Periods used per week	Periods available per week	Use Percentage	Comments
		Blocks	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H				
English																																														Dept. Lunch - 'F' Block
H 10	CR - English		1		1	1	1	1			1		1	1	1	1			1		1	1	1	1	1		1	1	1	1	1					1	1	1	1	1			26	30	87%	6 periods/day ('09-'10)
H 11	CR - English		1	1	1	1	1		1		1	1	1	1	1		1		1	1		1	1				1	1		1	1		1		1	1		1	1		1		26	30	87%	6 periods/day ('09-'10)
H 12	CR - English			1	1	1	1		1			1	1	1	1		1			1	1	1	1		1			1	1	1	1		1		1	1	1	1	1		1		26	30	87%	6 periods/day ('09-'10)
H 14	CR - English		1	1	1	1	1	1			1	1		1	1	1			1	1	1	1	1	1			1	1		1	1	1			1	1		1	1	1			27	30	90%	6 periods/day ('09-'10)
H 15	CR - English / SS		1		1	1	1	1	1		1	1		1	1	1	1		1		1	1	1	1			1	1	1	1	1	1	1		1	1	1	1	1	1	1		31	31	100%	6 periods/day ('09-'10)
H 16	CR - English / SS		1	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1		1	1	1	1	1	1	1		1	1	1	1	1	1	35	35	100%	6 periods/day ('09-'10)
S - 8	CR - English			1		1	1					1	1	1	1	1				1		1	1	1	1				1	1	1	1			1		1	1	1	1			22	30	73%	6 periods/day ('09-'10)
S - 19	CR - English (small size)					1	1	1						1	1	1						1	1	1						1	1	1				1			1				14	30	47%	Small CR 6 periods/day ('09-'10)
L - 2	CR - English		1		1	1	1	1	1		1		1	1	1	1	1		1		1	1	1	1	1		1	1	1	1		1	1			1	1	1		1	1		29	30	97%	6 periods/day ('09-'10)
Mod - 2	CR - English (modular)			1	1							1								1	1							1							1	1							8	30	27%	6 periods/day ('09-'10)
Wrt Lab	English Writing Center		1	1	1				1		1	1	1				1		1	1	1				1		1	1	1				1		1	1	1				1		20	35	57%	7 periods/day ('09-'10), computer carts in future
H 21	SSERC (Resource)		1	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1		1	1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10) Eng/SS Resource
	Subtotal																																										**299**	**376**	**80%**	
Social Science																																														Dept. Lunch - 'E' Block
H 2	CR - Social Science		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		30	30	100%	6 periods/day ('09-'10)
H 3	CR - Social Science		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		30	30	100%	6 periods/day ('09-'10)
H 4	CR - Social Science		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		30	30	100%	6 periods/day ('09-'10)
H 5	CR - Social Science		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		30	30	100%	6 periods/day ('09-'10)
H 6	CR - Social Science		1	1	1	1			1		1	1	1	1			1		1	1	1	1			1		1	1	1	1			1		1	1	1	1			1		25	30	83%	6 periods/day ('09-'10)
H 8	CR - Social Science			1	1	1	1	1	1		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		1	1	1	1		1	1		30	30	100%	6 periods/day ('09-'10)
H 9	CR - Social Science		1	1	1	1		1	1		1	1		1		1	1		1	1	1	1		1	1		1	1		1		1	1		1	1		1		1			26	30	87%	6 periods/day ('09-'10)
Mod - 1	CR - Social Sci. (modular)		1	1		1					1			1					1	1	1	1					1			1					1			1					13	30	43%	6 periods/day ('09-'10)
	Subtotal																																										**214**	**240**	**89%**	
Math																																														Dept. Lunch - 'D' Block
S - 18	CR - Math		1	1	1		1	1	1		1	1				1	1		1	1	1		1	1			1	1			1	1			1	1			1	1			23	30	77%	6 periods/day ('09-'10)
S - 20	CR - Math		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		30	30	100%	6 periods/day ('09-'10)
S - 21	CR - Math			1	1		1	1	1			1	1		1	1	1			1	1		1	1	1			1	1		1	1	1		1	1	1		1	1	1		26	30	87%	6 periods/day ('09-'10)
S - 25	CR - Math		1	1	1	1	1		1		1	1	1		1		1		1	1	1	1	1		1		1	1	1	1	1		1		1	1	1	1	1		1		29	30	97%	6 periods/day ('09-'10)
S - 26	CR - Math		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		30	30	100%	6 periods/day ('09-'10)
S - 27	CR - Math		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		30	30	100%	6 periods/day ('09-'10)
S - 28	CR - Math		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		30	30	100%	6 periods/day ('09-'10)
S - 29	CR - Math		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		30	30	100%	6 periods/day ('09-'10)
S - 30	CR - Math		1	1	1						1	1	1						1	1	1				1		1	1	1						1	1	1		1				17	30	57%	6 periods/day ('09-'10)
S - 22	CR - MARC (Resource)		1	1	1	1	1	1		1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1		1	1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10) Resource
	Subtotal																																										**280**	**305**	**92%**	

Concord - Carlisle High School
Utilization Study
OMR File: 2001- 1.5.2
Date: March 16, 2010

Basis 2009-2010 School Year - 2nd Semester Schedule
School has (8) Block schedule with (7) Period Days over a five day cycle
Daily schedule "drops" one block each day (dropped blocks vary)

Version: Core Departmental Lunches

Building / Room Number	Room Name / Primary Use		Monday								Tuesday								Wednesday								Thursday								Friday								Periods used per week	Periods available per week	Use Percentage	Comments
		Blocks	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H				
Language																																														Dept. Lunch - 'D' Block
L - 1	CR - Language			1	1			1				1	1			1				1	1			1	1			1	1			1			1	1	1			1			17	30	57%	6 periods/day ('09-'10)
L - 5	CR - Language		1	1				1	1		1	1	1			1	1		1	1				1	1		1		1			1	1		1		1			1	1		21	30	70%	6 periods/day ('09-'10)
L - 6	CR - Language		1		1		1	1			1		1		1	1			1		1		1	1	1		1	1	1		1	1				1	1		1	1			22	30	73%	6 periods/day ('09-'10)
L - 7	CR - Language			1	1		1	1	1			1	1		1	1	1			1	1		1	1	1			1	1		1	1	1		1	1	1		1	1	1		26	30	87%	6 periods/day ('09-'10)
L - 8	CR - Language		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		30	30	100%	6 periods/day ('09-'10)
L - 9	CR - Language		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		1	1	1		30	30	100%	6 periods/day ('09-'10)
L - 10	CR - Language				1		1	1							1	1					1		1	1				1			1	1				1			1	1			14	30	47%	6 periods/day ('09-'10)
L - 11	CR - Language		1	1	1						1	1	1						1	1	1				1		1	1	1						1	1	1						16	30	53%	6 periods/day ('09-'10)
L - 12	CR - Language		1	1	1		1	1			1	1	1		1	1			1	1	1		1	1	1		1	1	1		1	1			1	1	1		1	1			26	30	87%	6 periods/day ('09-'10)
L - Lab	Language Lab/Resource		1	1	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1		1	1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10) Language Resource
	Subtotal																																										**237**	**305**	**78%**	

Building / Room Number	Room Name / Primary Use		Monday								Tuesday								Wednesday								Thursday								Friday								Periods used per week	Periods available per week	Use Percentage	Comments
		Blocks	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H				
Science																																														No Dept. Lunch Block
S - 1	Bio CR		1	1		1		1			1	1		1		1			1	1		1	1	1			1	1		1		1	1		1	1	1	1		1	1		24	35	69%	7 periods/day ('09-'10)
S - 2	Bio CR/Lab		1	1		1		1			1	1		1		1	1		1	1	1	1		1	1		1		1	1		1	1	1		1	1	1		1	1		26	35	74%	7 periods/day ('09-'10)
S - 3	Bio CR/Lab		1	1		1		1			1	1		1		1	1		1	1		1	1	1			1	1		1		1			1	1	1	1	1	1	1		25	35	71%	7 periods/day ('09-'10)
S - 5	Bio CR/Lab		1		1	1		1			1	1	1	1		1			1	1		1		1			1	1	1	1		1	1			1		1		1			22	35	63%	7 periods/day ('09-'10)
S - 9	CR - Chemistry		1	1	1	1	1	1		1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1		1	1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10)
S - 10	CR- Chemistry				1	1		1					1	1		1					1	1		1				1		1	1	1	1			1		1		1			17	35	49%	7 periods/day ('09-'10)
S - 11	CR/Lab - Physics		1	1	1	1	1	1			1	1	1	1	1	1			1	1	1	1	1	1	1		1	1	1	1	1	1			1	1	1	1	1	1			31	35	89%	7 periods/day ('09-'10)
S - 12	CR/Lab - Physics		1	1	1	1		1			1	1	1	1		1			1	1	1	1		1			1	1		1	1	1			1	1	1	1		1			25	35	71%	7 periods/day ('09-'10)
S - 13	CR/Lab - Chemistry		1	1	1	1	1	1		1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1		1	1	1	1	1		1	1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10)
S - 14	CR/Lab - Chemistry		1	1	1	1	1	1		1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1		1	1	1	1	1		1	1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10)
S - 16	CR - Earth Science		1	1	1				1		1	1	1				1		1	1	1				1		1	1	1				1		1	1	1				1		20	35	57%	7 periods/day ('09-'10)
S - 17	CR - Earth Science		1	1	1	1			1		1	1	1	1			1		1	1	1	1			1		1	1	1	1			1		1	1	1	1			1		25	35	71%	7 periods/day ('09-'10)
I - 5	Hooked on Science																																										0	0		Unscheduled; specialized space
	Subtotal																																										**320**	**420**	**76%**	

Concord - Carlisle High School
Utilization Study
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Basis 2009-2010 School Year - 2nd Semester Schedule
School has (8) Block schedule with (7) Period Days over a five day cycle
Daily schedule "drops" one block each day (dropped blocks vary)

Version: Core Departmental Lunches

Building Room Number	Room Name / Primary Use		Monday								Tuesday								Wednesday								Thursday								Friday								Periods used per week	Periods available per week	Use Percentage	Comments
		Blocks	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H				
SPED																																														No Dept. Lunch Block
H - 0	Alternative Program (SPED)		1	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1		1	1	1	1	1	1	1		1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10) Typical
H - 1	OT/PT (SPED)		1	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1		1	1	1	1	1	1	1		1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10) Typical
H - 17	SPED Learning Center		1	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1		1	1	1	1	1	1	1		1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10) Typical
H - 18	SPED CR		1	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1		1	1	1	1	1	1	1		1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10) Typical
H - 19	SPED CR - Pathways		1	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1		1	1	1	1	1	1	1		1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10) Typical
	Subtotal																																										**140**	**140**	**100%**	

Building Room Number	Room Name / Primary Use	Blocks	Mon A	Mon B	Mon C	Mon D	Mon E	Mon F	Mon G	Mon H	Tue A	Tue B	Tue C	Tue D	Tue E	Tue F	Tue G	Tue H	Wed A	Wed B	Wed C	Wed D	Wed E	Wed F	Wed G	Wed H	Thu A	Thu B	Thu C	Thu D	Thu E	Thu F	Thu G	Thu H	Fri A	Fri B	Fri C	Fri D	Fri E	Fri F	Fri G	Fri H	Periods used per week	Periods available per week	Use Percentage	Comments
Fine Arts	(4.5 FTE)																																													Dept. Lunch - 'F' Block
A - 1	Photography		1	1		1	1		1		1	1	1	1	1		1		1	1		1	1		1		1		1	1	1		1		1		1	1	1		1		26	30	87%	6 periods/day ('09-'10); specialized
A - 2	2D Art				1								1								1				1			1	1							1	1						8	30	27%	6 periods/day ('09-'10); specialized
A - 2C	Ceramics 3D Art				1				1				1				1				1				1			1	1				1			1	1				1		12	30	40%	6 periods/day ('09-'10); specialized
A - 3	Orchestra					1			1				1				1					1			1				1				1				1	1			1		11	30	37%	6 periods/day ('09-'10); specialized
A - 4	Band			1		1	1		1					1			1		1			1	1					1		1			1					1	1		1		15	30	50%	6 periods/day ('09-'10); specialized
Aud	Auditorium / Stage			1	1				1			1					1			1	1							1					1		1	1					1		12	30	40%	6 periods/day ('09-'10) (shared Drama/English)
I - 6	Chorus			1	1	1			1			1	1	1			1			1		1			1			1	1	1			1		1	1	1	1			1		20	30	67%	6 periods/day ('09-'10); specialized
I - 2	Mac Lab / Video				1				1				1				1				1				1			1	1				1			1	1				1		12	30	40%	Excludes unscheduled directed learning
I - 3	Arch/Sculpture		1	1							1	1							1	1							1								1								8	30	27%	Unscheduled Sculpture in 2nd semester
I - 4	PC Lab / CAD/ Graphics		1	1							1	1							1	1							1								1								8	30	27%	Excludes unscheduled directed learning
	Subtotal																																										**132**	**300**	**44%**	

Building Room Number	Room Name / Primary Use	Blocks	Mon A	Mon B	Mon C	Mon D	Mon E	Mon F	Mon G	Mon H	Tue A	Tue B	Tue C	Tue D	Tue E	Tue F	Tue G	Tue H	Wed A	Wed B	Wed C	Wed D	Wed E	Wed F	Wed G	Wed H	Thu A	Thu B	Thu C	Thu D	Thu E	Thu F	Thu G	Thu H	Fri A	Fri B	Fri C	Fri D	Fri E	Fri F	Fri G	Fri H	Periods used per week	Periods available per week	Use Percentage	Comments
Adm./Student Support Services																																														No Dept. Lunch Block
S - 15	CR - ELL/SPED shared		1	1	1	1	1	1		1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1		1	1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10)
A - 5	METCO / Challenge		1	1	1	1	1		1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1		1	1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10)
A - 6	In-house planning (susp)		1	1	1	1	1		1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1		1	1	1	1	1	1	1	35	35	100%	7 periods/day ('09-'10)
A - 8	Compass			1	1	1	1	1		1		1		1	1	1	1	1		1	1	1	1	1	1				1	1	1	1	1	1		1	1	1	1	1	1		30	35	86%	7 periods/day ('09-'10)
	Subtotal																																										**135**	**140**	**96%**	

Concord - Carlisle High School
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Basis 2009-2010 School Year - 2nd Semester Schedule
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Daily schedule "drops" one block each day (dropped blocks vary)

Version: Core Departmental Lunches

Building / Room Number	Room Name / Primary Use		Monday								Tuesday								Wednesday								Thursday								Friday								Periods used per week	Periods available per week	Use Percentage	Comments
		Blocks	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H				
Physical Education (5 FTE)																																														No Dept. Lunch Block
L Gym 1	Half Gym (1)TS		1	1		1		1			1	1			1		1		1	1		1		1			1		1		1		1	1			1		1		1		20	35	57%	Specialized Space, exludes Athletics uses
L Gym 2	Half Gym (1)TS		1		1		1			1	1			1		1		1	1		1		1		1		1			1		1		1		1		1		1		1	20	35	57%	Specialized Space, exludes Athletics uses
U Gym 3	Perf. Gym (1)TS		1	1		1		1			1	1			1		1		1	1		1		1			1		1		1		1	1			1		1		1		20	35	57%	Specialized Space, exludes Athletics uses
U Gym 4	Weights / Fitness (1)TS		1		1		1			1	1			1		1		1	1		1		1		1		1			1		1		1		1		1		1		1	20	35	57%	Specialized Space, exludes Athletics uses
Mod - 3	CR -Health and Fit (1)TS		1				1				1					1			1				1				1					1				1				1			10	35	29%	Excludes Athletics uses
L - 4	Health CR (1)TS				1					1				1				1			1				1					1				1				1				1	10	35	29%	Excludes Athletics uses
	Subtotal																																										**100**	**210**	**48%**	

Building / Room Number	Room Name / Primary Use		Monday								Tuesday								Wednesday								Thursday								Friday								Periods used per week	Periods available per week	Use Percentage	Comments
Other																																														
I - 1	Radio Station																																										0	0		Non - curricular program
Cafe - 1	Directed Learning/Lunch		1	1	1					1	1	1					1	1	1	1	1				1		1		1				1	1		1	1				1	1	20	20	100%	Directed Learning: 4periods / day; Lunch 3/day
H - 24	Little Theater		1	1							1	1							1	1							1		1														8	35	23%	(2) English Classes/week; excludes un-sched.
Library	Library/Media																																										0	0		Excludes unscheduled directed learning
	Subtotal																																										**28**	**55**	**51%**	

		Periods used per week	Periods available per week	Use Percentage	Comments
	Summary				
	Eng, SS. FL, Math	1030	1226	84%	
	Science	320	420	76%	
	SPED	140	140	100%	
	Fine and Perf. Arts	132	300	44%	
	Adm/Student Support Serv.	135	140	96%	
	Health and PE	100	210	48%	
	Summary Totals	**1857**	**2436**	**76%**	

Concord - Carlisle High School
Prior Studies Program & Space Utilization Comparisons
Date: March 22, 2010

	2000 Study		2002 Study		2005 Study		2009-2010 Existing		2010 Master Plan	
Enrollment Projected	1288 (2007)		1275 (2006-2007)		1350		1245 (Oct. 2009)		1250	
Enrollment Existing	1056 (actual)									
	# Rooms	%	# Rooms	%	# Rooms	%	# Rooms	%	# Rooms	Target %
Classrooms										
English	9 crs	85	9 crs	85	9 crs(writ. lab)	NA	9 crs	80	9 crs	85
Social Sciences	9 crs	85	10 crs	85	10 crs	NA	9 crs	89	9 crs	85
Foreign Language	9 crs	80	9 crs	80	9 crs (F.L. lab)	NA	9 crs (F.L. lab)	78	9 crs (F.L. lab)	85
Math	9 crs	80	10 crs	80	13 crs	NA	9 crs	92	9 crs	85
Science Cr / Labs	13 crs/labs	70-80	14 crs/labs	75	14 crs/labs	NA	7 CR/labs, 5 crs +	76	12 cr/labs+ H.O.S.	75
							H.O.S. (Chem 100%)			
SPED (self contained)		NA	6 crs	85	4 crs	NA	5 crs	100	4 crs (see Stud. Suppt.)	100
Art, Music, Tech., & Auditorium										
Art		NA	6 crs.	NA	4 crs.	NA	5 crs	41	5 crs	71%
Music		NA	4 crs	NA	3 crs	NA	3 crs	19	4 crs	71%
Technolgy		NA	4 crs	NA	3 crs	NA	2 (MAC & recording)	NA	1 (recording)	NA
Auditorium		NA	1	NA	1	NA	1	NA	1 + little theater	NA
Vocational & Technolgy		NA		NA		NA	1 wood shop	NA	2 Fabrication Labs	NA
Health & Pysical Education							(6 teaching stations)		(10-11 teaching stations)	
Athletic Rooms		NA	3 rooms	NA	4 rooms	NA	3 rooms	NA	3 rooms	NA
Health Classrooms	2crs	80	2crs	60	2 crs	NA	2 crs		1 cr	
Field House/Athletic Center		NA	3 P.E. Alternates	NA	1 Field House	NA			1 Athletic Center	NA
Student Support			4 crs + 2 Multi-P.		3 crs		4 crs		4 crs	
Study Hall/Resource Room		NA	3 crs	80	6 crs	NA	3 crs	100	5 crs	100
		NA		NA	(Eng., S.S., Sci.,		(Eng., S.S., Math		(Eng., S.S., Sci.,	
		NA		NA	Math, Art, and		and Lang. Lab)		Math, and	
		NA		NA	Lang. Lab)				Lang. Lab)	
Presentation Rooms		NA	0 (loss of little theater)		1 large	NA	1 large	NA	7 small + 1 large	NA

3 Educational Program Needs

- CCHS FMPC Goals and Values
- Educational Needs Analysis
- Analysis of Previous Educational Specifications
- Proposed Space Program Summary

3 Educational Program Needs

The Mission Statement of Concord- Carlisle High School is:

- **Commitment:** Committing through practices, policies, and procedures to maximize each student's opportunities for intellectual and personal development.

- **Citizenship:** Fostering within students a social consciousness to perform effectively in and become productive citizens of a rapidly changing world.

- **Harmony:** Surrounding students with a highly competent and caring staff in a supportive and safe environment consistent with the communities' historic commitment to mutual respect and harmony.

- **Scholarship:** Providing a rigorous and varied educational experience as measured against best educational practices, guided by intellectualism, and the highest standards of scholarship in a public education setting.

During the Master Plan process, OMR gathered information from the Facilities Master Plan Committee, and Community-wide and Faculty/ Administration Visioning sessions in order to understand the Goals and Values for this project.

Members of the Communities of Concord and Carlisle, Faculty and Administrators at CCHS, past and present students, parents and local officials convened for a half day community visioning session at the Willard School in Concord. Brainstorming around Desired Learning Outcomes for students, Community Needs for this building and Community Values that should inform the design were discussed and fully evaluated. The concepts of a High Performance School, Sustainability, and Creativity and Innovation were common threads. In addition, the team felt that the building should serve the whole community as a Performing Arts Center, an Athletic Center, a community meeting and education center, an emergency shelter and generally should stand out as a "place to be" for all students and citizens in general. The Appendix includes a summary of this Workshop.

Following this session, the FMPC, administration, and faculty representatives met with Frank Locker, PhD, to understand current trends and educational ideals of a 21st century education. Using built projects as examples, the group discussed their educational goals and teaching styles as they envisioned the functional, spatial and physical possibilities for applying these teaching styles at the future Concord- Carlisle High School.

Community Visioning Session: 14 November 2009

Community Visioning Session: 14 November 2009

The final Goals of these workshops are distilled into three subsections: Process, Project and Product and are as follows.

GOALS: Process

- **Proactively manage the process** with foresight and insight
- **Communicate clearly, convincingly, strategically and sensitively** regarding the issues and challenges intrinsic to building momentum for this project at this time
- **Model and reflect our Communities' values** with a design that fosters civic pride and garners social, financial and political support
- **Qualitatively and Quantitatively solve** the new school vs. renovation-addition conundrum
- **Explore financial options** with MSBA and public/private partnerships and develop innovative ways to generate project funding and sustainable income

GOALS: Project

- Develop a project which is **fiscally, academically, environmentally and socially responsible and sustainable**
- Design a facility which is **flexible, adaptable, affordable and achievable**
- Create a facility that is **fully accessible, highly functional, cost effective, energy efficient, and easy to maintain**
- Plan for a fully integrated campus that **promotes 21st century learning, educational excellence, high performance and shared intergenerational community and recreational use**
- **Actively engage our communities** in this ongoing and exciting opportunity for teaching and learning
- **Holistically integrate all campus elements** into a practical and inspiring new and transformed CCHS

GOALS: Product

- Create a campus which is **safe and secure**
- Provide state-of-the-art facilities with the full and appropriate array of **formal and informal learning, gathering, and performance spaces**
- Provide state-of-the-art building systems in an environment with an abundance of **natural light, clean healthy air, and practical and sustainable** design strategies
- Integrate and maximize the current and future use of **effective, cutting-edge technologies**
- Develop intuitively clear, **logical and efficient organizational and circulation patterns**
- Build an engaging center for **"24/7" community use**
- **Minimize the impact of the design and construction** on the students, teachers, parents, neighbors and the greater community

Unlike the current facility, the Master Plan option will provide the needed number of adequately sized and equipped teaching and support spaces to meet the requirements of today's high performing secondary schools in general and the specific needs of CCHS and its communities' goals and values as identified in the planning process. One of the key benefits of the Master Plan option is flexibility. The facility will be able to adapt to: new and innovative educational ideas such as co-curricular project based teaching; "authentic" educational programs dealing with real-world problems in collaboration with other schools, government agencies, and institutions from "around the corner" to "around the world"; ideas and improvements that assist new ways teachers teach and reflect increased understanding of how students learn; new ways to structure educational organizations and the hours they operate; increased educational, cultural and recreational programs for citizens of all ages; possible use as an emergency shelter, just to name a few. One example is the Master Plan option's ability to transform from a traditional departmental organization across all four grades to one that is organized by clustered interdisciplinary subjects, by a grade level cluster, or a combination of many models of learning.

Following the visioning sessions and working directly with the faculty and administration at CCHS, OMR analyzed the educational specifications from both the 2002 and the 2005 feasibility studies and developed a proposed space program summary for CCHS based on current needs and deficiencies. Analysis of MSBA requirements and guidelines aided in this analysis and helped in the development of an appropriate set of programmatic requirements for a high school of 1250 students.

Attached herein is the Proposed Space Program Summary developed with the Faculty and Administration for the Concord- Carlisle High School, which details quantitatively how much space is needed for the educational and community programs to function. The total net square footage is 206,295 NSF, the net to gross ratio is targeted at 1.40 and the gross square footage is targeted at 288,813 GSF.

We have also developed a comparison matrix, showing a summary of the differences between the existing program, the proposed program, the 2005 SMMA program and current MSBA approved guidelines.

Preliminary Space Summary Comparison

Description	Existing Program Projected Enrollment:1250	Draft Proposed Program Projected Enrollment:1250	SMMA Program (2005) Projected Enrollment:1350	MSBA Guidelines Projected Enrollment:1250 Estimated MSBA areas
CORE ACADEMIC SPACES	53,956	67,400	72,400	50,530
SPED	7,845	5,190	9,670	10,010
Art & Music	14,400	15,675	22,150	7,700
Vocations & Technology	2,060	4,000	3,500	16,000
Health & Physical Education	34,275	36,100	32,500	20,300
Media-Library/Information Commons	18,309	16,090	19,500	6,150
Auditorium	11,727	12,600	12,050	10,400
Dining & Food Service	13,068	10,600	11,660	10,363
Medical/Nurse	690	1,110	1,240	1,110
Student Support (Adm. & Guidance)	9,632	9,730	8,560	3,770
Custodial & Maintenance	2,779	2,800	2,200	2,375
Other	695	25,000	16,000	15,459
Total Net Area (nsf)	169,440	206,295	211,430	154,167
Not updated to 1/21/10				
Net/Gross Ratio	1.38	1.40	1.4	1.5
Total Gross Area (gsf)	233,800	288,813	296,002	231,250

In the chart above, net square footages are used to compare programmatic categories as defined by the MSBA.

- Existing Program: Reflects the net areas (interior area of rooms) currently used in each program category.
- Draft Proposed Program: Reflects the areas needed by CCHS to support the desired educational program as determined in the planning process. It is based on a projected enrollment of 1,250 students, approximately

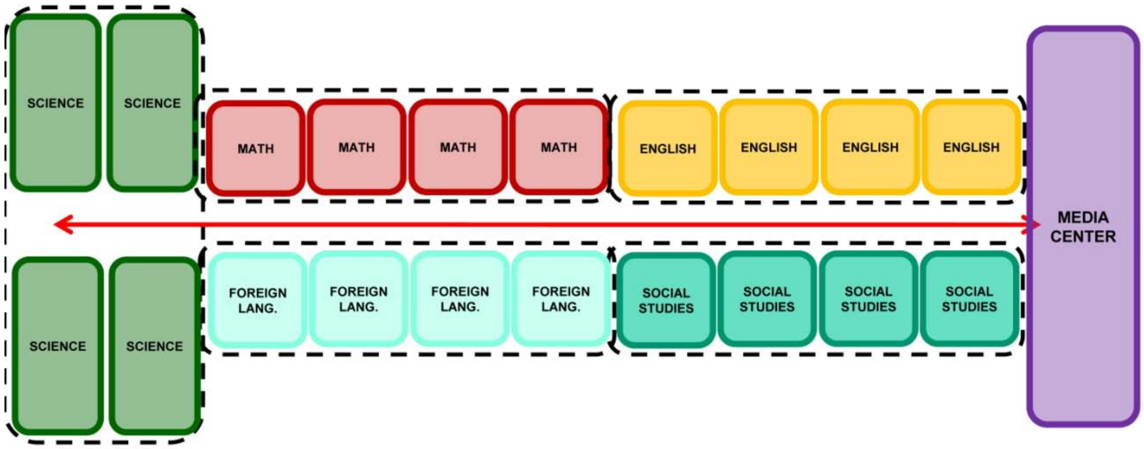
equal to the existing enrollment. Relative to the existing program, the larger Core Academic area reflects room sizes that meet current MSBA Guidelines, and additional flexible teaching stations for presentations, student resource rooms, and faculty work spaces. The actual number of core academic classrooms and Science rooms are the same. Special Education (SPED) spaces are increased to meet current size standards including self-contained rooms with toilets and Life Skills training facilities, to keep more students on campus rather than sent to costly off-campus facilities. Vocations and Technology reflect increased use of technology in schools today and provide "hands-on" teaching capabilities in recognition of the many ways students learn ("hands-on" includes the "Hooked on Science" program and Fabrication Labs). Health and P.E. supports a program that promotes life-long health as well as team activities and a successful athletic program. The Media-Library or Information Commons program reflects current inefficiencies in the library (inefficient ramps) and recognizes effective use of technology in today's education; this Info Commons is intended to become the hub of student activity. The Auditorium is programmed to accommodate 750 people (maximum capacity per MSBA) and will be equipped with up-to-date theater lighting, rigging and audio-visual systems. The dining and food service area is approximately the same size as the existing, but with new kitchen, serving, and dining facilities. The Nurse's area meets current MSBA and Health standards. Student Support areas include spaces to support the school's Administrative needs, Guidance Department requirements, and general education student programs such as Compass, METCO, Challenge, Planning (for students-at-risk), and a proposed Post-Hospitalization Program to reduce sending more students to off-campus programs. The overall Custodial and Maintenance areas roughly equal the existing. The "Other" category includes programs that are assumed to not be eligible for State reimbursement such as the Athletic Center, Adult Education offices, school store, and Yearbook.

- 2005 SMMA program: Differs from the existing program, the proposed program and the MSBA program in several ways, most notably its enrollment. Many program areas are larger reflecting the 1,350 enrollment projection and program approaches at that time. Both the 2005 program and the proposed program address similar deficiencies in the Fine and Performing Arts and in Physical Education (it included a smaller Field House).

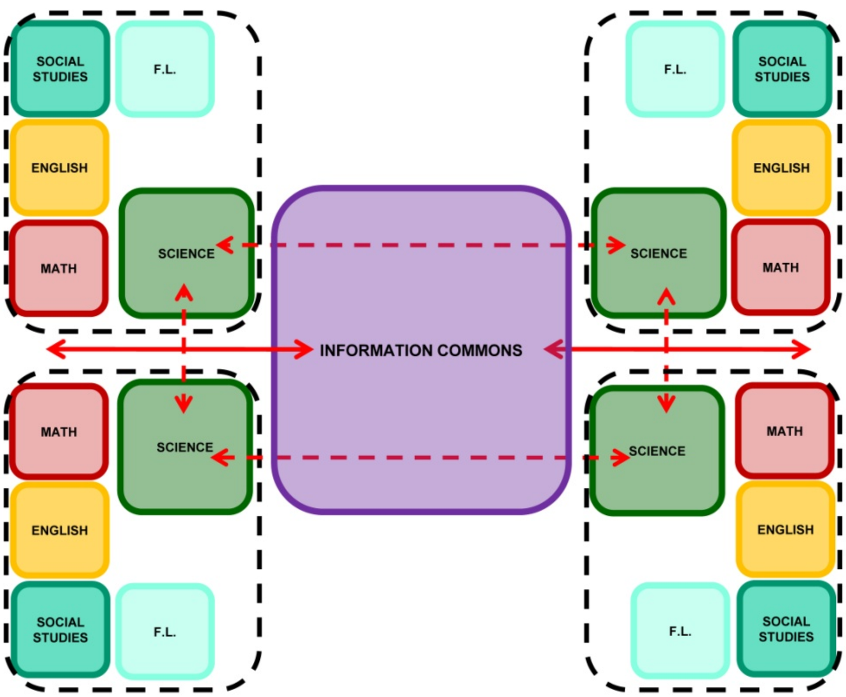
- MSBA Guidelines: Defines current program areas, room space sizes, and net/gross ratios used to evaluate proposed school programs or Educational Specifications. Recognizing differences in schools across the State, MSBA has shown flexibility in use of its Guidelines. MSBA must comply with strict total gross square foot per student limits for schools of different enrollments. Currently, proposals to revise MSBA Guidelines are being reviewed. Please refer to Section 7 for more information.

An attached chart includes comparisons of major spaces with prior programs.

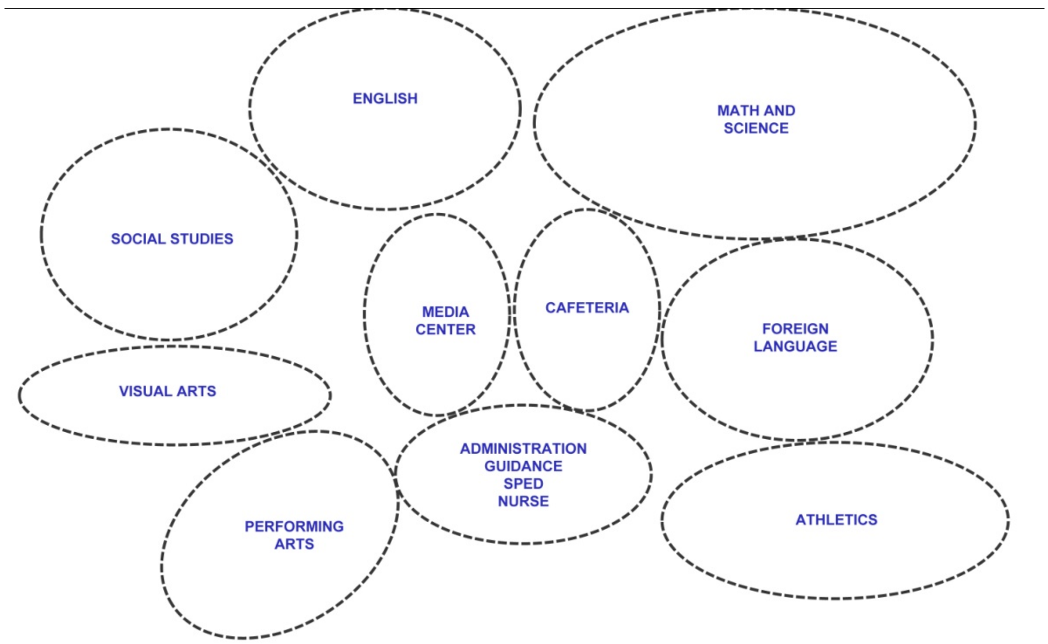
Further understanding of how the visioning exercises merged with the strictly functional aspects of programming, OMR developed a series of functional relationship diagrams for organizing the program elements in an academic arrangement and in the overall conceptual facility arrangement.



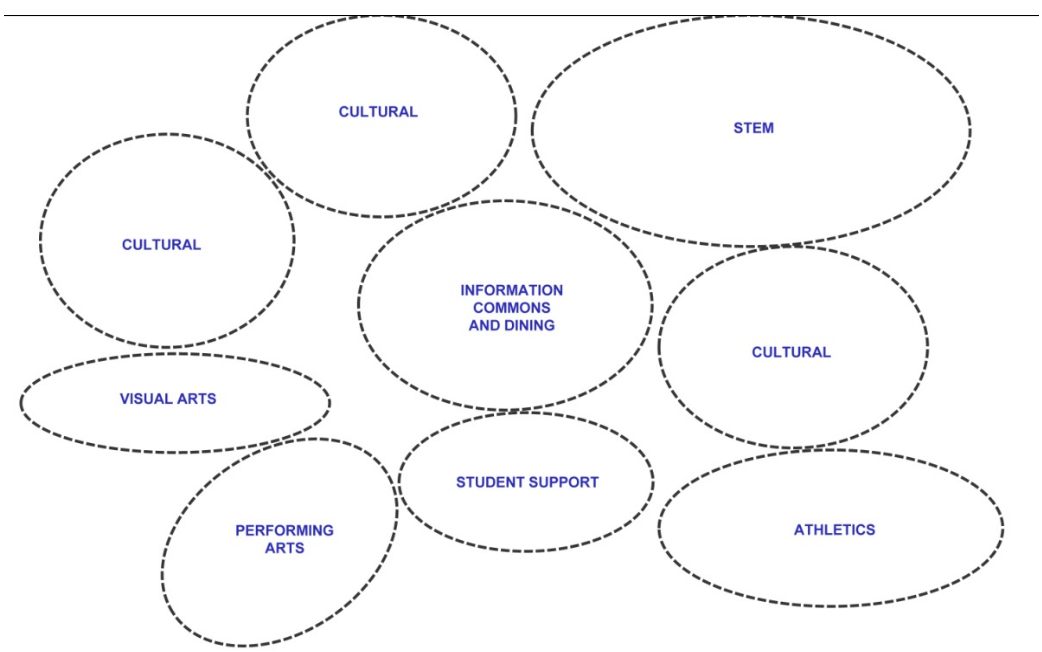
Current Academic Organization



Proposed 21st Century Academic Organization



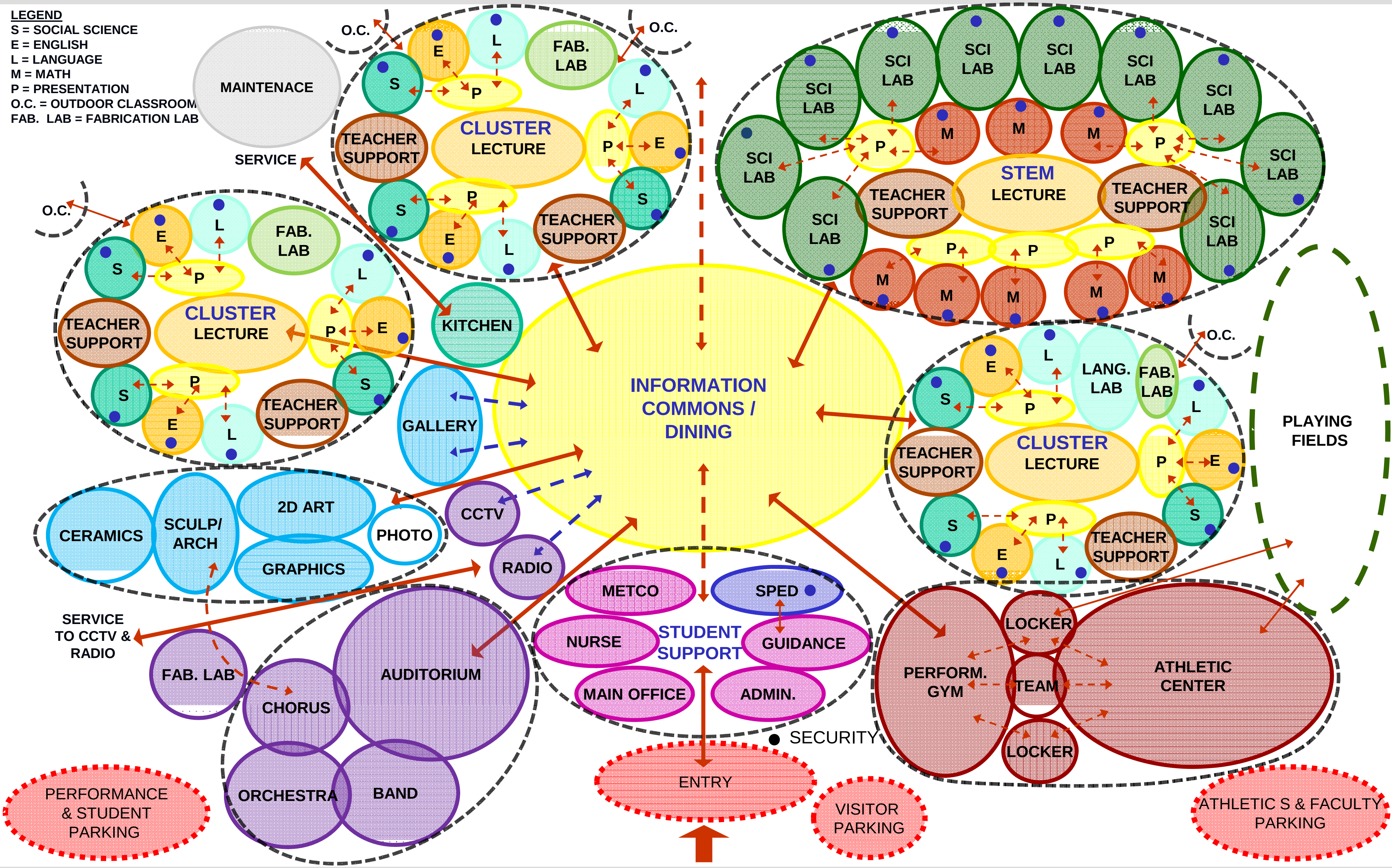
Current School Facility Organization



Proposed 21st Century School Facility Organization

These conceptual arrangements of spaces can be further diagrammed into a facility organizational diagram, as shown attached herein.

Organizational Diagram



Proposed Space Summary - Concord-Carlisle High School

Date: 3/18/2010

PRELIMINARY PROPOSED PROGRAM

CONCORD-CARLISLE HIGH SCHOOL	Existing Conditions			Program			Comments	MSBA Guidelines (1250 Students) (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**57,626**			**67,400**				**50,530**	
(List classrooms of different sizes separately)											
Academic Teaching and Learning		**36**	**27,831**		**37**	**31,450**		**950**	**39**	**37,050**	850 SF min - 950 SF max. Use based on Capacity 23 x 85% utiliztaion = 20 seats
English (13 FTE teachers)		9	6,776		9	7,650					
Ex CR - English	800	1	800	850	2	1,700	Freshman				
Ex CR - English	790	1	790	850	7	5,950	Academic Clusters				
Ex CR - English	800	1	800								
Ex CR - English	795	1	795								
Ex CR - English (shared w/ Social Sci.)	795	1	795								
Ex CR - English (shared w/ Social Sci.)	820	1	820								
Ex CR - English	656	1	656								
Ex CR - English (small)	310	1	310								
Ex CR - English (shared w/ F. Lang.)	1,010	1	1,010								
*Social Science (**13 FTE** teachers)*		9	6,750		9	7,650					
Ex CR - Social Science	795	1	795	850	2	1,700	Freshman				
Ex CR - Social Science	795	1	795	850	7	5,950	Academic Clusters				
Ex CR - Social Science	800	1	800								
Ex CR - Social Science	800	1	800								
Ex CR - Social Science	795	1	795								
Ex CR - Social Science	785	1	785								
Ex CR - Social Science	780	1	780								
Ex CR - Social Science (small)	600	2	1,200								
*Math (**14 FTE** teachers)*		9	7,555		9	7,650					
Ex CR - Math	810	1	810	850	2	1,700	Freshman				
Ex CR - Math	800	1	800	850	7	5,950	Academic Clusters (STEM)				
Ex CR - Math	795	1	795								
Ex CR - Math	815	1	815								
Ex CR - Math	1,080	1	1,080								
Ex CR - Math	815	1	815								
Ex CR - Math	815	1	815								
Ex CR - Math	815	1	815								
Ex CR - Math	810	1	810								
*Foreign Language (**12 FTE** teachers)*		9	6,750		10	8,500					
Ex CR - Foreign Language	750	1	750	850	2	1,700	Freshman				
Ex CR - Foreign Language	750	1	750	850	8	6,800	Academic Clusters				
Ex CR - Foreign Language	750	1	750								
Ex CR - Foreign Language	750	1	750								
Ex CR - Foreign Language	750	1	750								
Ex CR - Foreign Language	750	1	750								
Ex CR - Foreign Language	750	1	750								
Ex CR - Foreign Language	750	1	750								
Ex CR - Foreign Language	750	1	750								
Foreign Language Lab (72 capacity)		**1**	**2,110**		**1**	**2,300**					
Language Lab / Resource	1,950	1	1,950	2,000	1	2,000	Includes tutorial center				
Foreign Language Recording/stor.	160	1	160	150	1	150					
Foreign Language Lab Storage				150	1	150					
Group Seminar / Presentation		**1**	**1,690**		**8**	**6,050**		**500**	**2**	**1,000**	MSBA guide but no criteria listed
Small Foreign Language w/ kitchenette				650	1	650	Freshman				
Small Foreign Language w/ kitchenette				650	2	1,300	(2-FL) Academic Cluster				
Small Standard size				600	4	2,400	(1) Fresh. (2) Academic Clusters & (1) STEM				
Large Presentation/Seminar (Little Theater size - share w/ Drama)	1,690	1	1,690	1,700	1	1,700	Locate (1) in STEM w/ operable divider; (1) in "Arts" near Public or Info Commons				

Proposed Space Summary - Concord-Carlisle High School

Date: 3/18/2010

CONCORD-CARLISLE HIGH SCHOOL	Existing Conditions			PRELIMINARY PROPOSED PROGRAM: Program			Comments	MSBA Guidelines (1250 Students) (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
Science (*14 FTE* Teachers)											Capacity 23 x 85% utilization = 20 Seats
Science Classroom/Laboratories		**12**	**12,205**		**12**	**14,400**		**1,200**	**10**	**12,000**	- 1 period / day / student
Biology		4	3,785	1,200	4	4,800	Academic Cluster (STEM)				
ExCR Biology Classroom	890	1	890								
ExCR Biology Classroom/Lab	880	1	880								
ExCR Biology Classroom/Lab	1,040	1	1,040								
ExCR Biology Classroom/Lab	975	1	975								
Chemistry		4	4,360	1,200	4	4,800	Academic Cluster (STEM)				
ExCR Chemistry Classroom	780	1	780								
ExCR Chemistry Classroom	780	1	780								
ExCR Chemistry Classroom/Lab	1,480	1	1,480								
ExCR Chemistry Classroom/Lab	1,320	1	1,320								
Physics		2	2,370	1,200	2	2,400	Academic Cluster (STEM)				
ExCR Physics Classroom/Lab	1,190	1	1,190								
ExCR Physics Classroom/Lab	1,180	1	1,180								
Earth Science		2	1,690	1,200	2	2,400	Freshman				
ExCR Earth Science Classroom	850	1	850				Water, tables, specimen cabinets				
ExCR Earth Science Classroom	840	1	840								
Science and Engineering		**1**	**1,500**		**1**	**1,500**	Academic Cluster (STEM - 15) students				
Hooked on Science (incl. 200 nsf storage)	1,500	1	1,500	1,500	1	1,500					
Science Prep/Storage Rooms		**10**	**2,220**		**10**	**800**	Doubles MSBA guidelines; includes storage	**80**	**6**	**480**	Per Sci CR/Lab except roundup
Biology Prep Room	320	1	320	80	4	320	STEM; includes storage				
Biology Prep Room	520	1	520								
Chemistry Prep Room	260	1	260	80	2	160	STEM; includes storage				
Chemistry Storage	80	1	80								
Chemistry Storage	100	1	100								
Physics Prep Room	430	1	430	80	2	160					
Earth Science Prep Room	190	1	190	80	2	160	Freshman: includes storage				
Earth Science Prep Room	160	1	160								
Earth Science Storage	80	1	80								
Earth Science Storage	80	1	80								
Miscellaneous Support Areas		**26**	**10,070**		**9**	**10,900**					
Teacher Centers				1,500	5	**7,500**	Sized for (14) faculty @ 100+ nsf per. (1) Teacher Center per Department/Discipline or Academic Cluster				Adm Program per MSBA
Workroom / Workstations				1,100			(14) @ 75+ sf per teacher				
Planning /Break/Kitchenette/Storage				250			(1) @ 250 nsf per Teacher Center				
Private Offices (Chair and other)				150			(2@75) Chair and shared private office				
English		5	**2,270**		0	**0**	Included in Teaching Centers except as noted.				
English Computer Writing Center	870	1	870				Computer lab not required in future				
English Book Storage	290	1	290								
English Storage	100	1	100								
English Office/Work Rm.	800	1	800								
English Office	210	1	210								

Proposed Space Summary - Concord-Carlisle High School

Date: 3/18/2010

CONCORD-CARLISLE HIGH SCHOOL	Existing Conditions			PRELIMINARY PROPOSED PROGRAM: Program			PRELIMINARY PROPOSED PROGRAM: Comments	MSBA Guidelines (1250 Students) (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
English		4	**1,750**		1	**850**	Included in Teaching Centers except as noted.				
English/Social Science Resource Center (SSERC)	840	1	840	850	1	850	(1) per discipline, not shared; keep academic core				MSBA program category TBD
English/Social Science Work Room	640	1	640								
English/Social Science Kitchenette	115	1	115								
English/Social Science Storage and Copy	155	1	155								
Social Science		3	**1,290**		1	**850**	Included in Teaching Centers except as noted.				
Social Science Faculty Work Room	800	1	800								
Social Science Faculty Lunch Room	200	1	200								
Social Science Book stor (shared w/ serv./cust)	290	1	290								
Learning Center Resource Room				850	1	850	(1) per discipline; keep academic core. Now shared with English (SSERC).				MSBA program category TBD
Math		6	**2,070**		1	**850**	Included in Teaching Centers except as noted.				
Math Work Room	180	1	180								
Math Work Room	310	1	310								
Math Common Room	480	1	480								
Math Dept Chair	210	1	210								
Math Resource Center (MARC)	800	1	800	850	1	850	(1) per discipline; keep academic core				MSBA program category TBD
Book Storage	90	1	90								
Foreign Language		4	**1,595**		0	**0**	Included in Teaching Centers except as noted.				
Book Storage	135	1	135								
Book Storage	65	1	65								
Foreign Language Office	385	1	385								
Foreign Language - Faculty Work Room	1,010	1	1,010								
Learning Center Resource Room							Included in Foreign Language Lab				
Science		4	**1,095**		1	**850**	Included in Teaching Centers except as noted.				
Science Work Room	540	1	540								
Science Work Room	370	1	370								
Science Office	100	1	100								
Science Office	85	1	85								
Learning Center Resource Room				850	1	850	(1) per discipline; keep academic core				MSBA program category TBD

Proposed Space Summary - Concord-Carlisle High School

Date: 3/18/2010

CONCORD-CARLISLE HIGH SCHOOL	Existing Conditions			PRELIMINARY PROPOSED PROGRAM: Program			PRELIMINARY PROPOSED PROGRAM: Comments	MSBA Guidelines (1250 Students) (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
SPECIAL EDUCATION			**5,390**			**5,190**				**10,010**	
(List classrooms of different sizes separately)											
Self-Contained SPED		**5**	**3,590**		**4**	**3,490**	850 nsf basis plus internal office or self-contained toilet as noted	950	7	6,650	Assumed 8% of population in self-contained SPED
Self-Contained SPED Toilet							Included in spaces as noted	60	6	360	Self contained toilets
Special Education Learning Center (Tutorial)	765	1	765	850	1	850					
Special Education Classroom (Tutorial)	580	1	580	500	1	500					
Special Education (Pathways / Life Skills)	615	1	615	1,070	1	1,070	10-12 students. Includes internal office listed below and toilet				
SPED Self-contained (Alt Program)	850	1	850				Not required in future				
Therapy Room OT/PT & SPED CR	780	1	780	1,070	1	1,070	10-12 students. Includes 150 nsf private office and toilet				
Resource Room / Seminar Room		**9**	**935**		**6**	**750**		500	3	1,500	1/2 size Genl. CR.
Special Education Office	115	1	115		0	0	Capacity: 170 nsf, (5) persons and table: see SPED Tutorials and Classrooms				
Special Education Office	110	1	110								
Special Education Office	120	1	120								
Social Workers Office	120	1	120	170	1	170					
Social Workers Office	115	1	115	170	1	170					
Social Workers Office	115	1	115	170	1	170					
ELL Office (in Alt. Program Room)	120	1	120				ELL not SPED; existing in Alt Pro Rm H-1				
SPED Psychologist Office	60	2	120	80	3	240	Shared use for testing and English CR				
Small Group Room (conf. room)		**1**	**230**		**1**	**250**		500	3	1,500	1/2 size Genl. Clrm.
Conference Rm. (in library / shared w/ guid.)	230	1	230	250	1	250	For group meetings; 12 people per room				
Support		**4**	**635**		**4**	**700**					
Special Education Secretary	260	1	260	250	1	250					
Special Education Waiting	175	1	175	150	1	150					
Special Education Work room	155	1	155	150	1	150					
Kitchenette	45	1	45	150	1	150					

Proposed Space Summary - Concord-Carlisle High School

Date: 3/18/2010

CONCORD-CARLISLE HIGH SCHOOL	Existing Conditions			PRELIMINARY PROPOSED PROGRAM: Program			Comments	MSBA Guidelines (1250 Students) (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
ART & MUSIC			**13,689**			**15,675**				**7,700**	
Studio Arts											
Art Classroom - 25 seats [5 *teachers*]		**5**	**6,375**		**5**	**6,360**		1,200	3	3,600	Assumed use - 25% Population - 5 times/week
Art Workroom		**6**	**715**		**6**	**1,050**		150	3	450	
2D Art Classroom (1 - T.S.)	1,465	1	1,465	1,500	1	1,500					
2D Art Storage	120	1	120	150	1	150					
Ceramics (1 - T.S.)	1,290	1	1,290	1,200	1	1,200					
Ceramics Storage	100	1	100	300	1	300					
Ceramics Storage	90	1	90								
Kiln Room				100	1	100					
Architecture/Sculpture (1 - T.S.)	1,500	1	1,500	1,500	1	1,500					
Architecture/Sculpture Storage	150	1	150	150	1	150					
Digital Imaging (current PC Lab: 1 - T.S.)	1,360	1	1,360	1,400	1	1,400					
Photography (1 - T.S.)	760	1	760	760	1	760	Retain "wet" photo lab				
Dark room	210	1	210	300	1	300	Enlarged				
Photography Storage	45	1	45	50	1	50					
Support		**3**	**1,200**		**3**	**1,550**					
Art Gallery	720	1	720	750	1	750	Locate near Info Commons				
Art Office (Teacher Center)	330	1	330	500	1	500	(5) Teachers @100 nsf				
Art Storage	150	1	150	300	1	300	Students projects, portfolios, library				
Performance and Music											
Band/Chorus		**3**	**4,110**		**4**	**5,600**		1,500	2	3,000	Assumed use - 25% Population - 5 times/week
Ensemble - Multipurpose							See Orchestra below	200	1	200	
Band Classroom (1 - T.S.)	1,600	1	1,600	2,000	1	2,000	100 max. capacity				
Orchestra (1 - T.S.)	1,090	1	1,090	500	1	500	12- 15 capacity				
Chorus (1 - T.S.)	1,420	1	1,420	1,400	1	1,400	80 max. capacity				
Large Presentation/Seminar (Little Theatre size - Drama / "BlackBox") (1 - T.S.)				1,700	1	1,700	Locate (1) in "Arts" adjacent to Info Commons (Little Theater); (1) in STEM				
Music Practice Rooms		**3**	**215**		**5**	**375**		75	6	450	
Practice Room	70	1	70	75	5	375					
Practice Room	70	1	70								
Practice Room	75	1	75								
Support		**7**	**1,074**		**4**	**740**					
Orchestra Office (Perf. Arts Teacher Center)	240	1	240	400	1	400	(4) Teachers @100 nsf				
Band Office	169	1	169								
Chorus Office	200	1	200								
Theater Office	160	1	160								
Band Storage	120	1	120	120	1	120					
Music Library (Sheet Music Storage)	75	1	75	100	1	100					
Drama Costume Storage	110	1	110	120	1	120					
VOCATIONS & TECHNOLOGY		2	**3,235**		2	**4,000**				**16,000**	
Tech Classroom (Drafting, Business) (MSBA)								1,200	5	6,000	Assumed use - 50% Population - 5 times/week
Tech Shop (E.G. Consumer, Wood) (MSBA)								2,000	5	10,000	Assumed use - 50% Population - 5 times/week
MAC LAB Video (currently in Art)	1,175	1	1,175				Not required in future				
Woodworking / Maint. / Set Building	1,780	1	1,780				Share set construction with Arts Fabrication Lab				
Woodworking Spray Booth	140	1	140								
Woodworking Storage	140	1	140								
Fabrication Lab (Large)				2,000	2	4,000	(1) STEM, (1) near auditorium: Equipped with tools, benches, and equipment for projects including science, technology, engineering, and construction. Arts includes spray booth.				

Proposed Space Summary - Concord-Carlisle High School

Date: 3/18/2010

CONCORD-CARLISLE HIGH SCHOOL	Existing Conditions			PRELIMINARY PROPOSED PROGRAM: Program			PRELIMINARY PROPOSED PROGRAM: Comments	MSBA Guidelines (1250 Students) (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
HEALTH & PHYSICAL EDUCATION			**35,025**			**36,100**				**20,300**	
(6 existing teaching stations including two Health Classrooms per P.B. 3/15/10)*							Add 2 Teaching Stations min.(8 total); with Athletic Center add 4 T.S. min. (10 total)				
Gymnasium (*Existing Upper Performance Gym .* (1 -T.S.))	9,775	1	9,775	9,540	1	9,540	Proposed (2 - T.S.): Renovate existing Lower Gym. Add wood floor, dividing curtain, and bleachers (730- 800 capacity). Use for PE and performance athletics, (cheerleading, dance, aerobics, wrestling, fencing, etc.)	10,000	1	10,000	*No population based criteria listed.*
Gym Storeroom (MSBA)				500	1	500		300	1	300	*No population based criteria listed.*
Upper Gymnasium Storage	130	2	260								
Upper Gymnasium Storage	120	1	120								
Weight Room Storage	65	2	130								
PE Alternatives (MSBA)				3,000	1	3,000	Add (2-T.S.) Aerobics and Wrestling (wood floor) incl. cardio, dance, fencing, yoga, cheerleading, etc.	3,000	1	3,000	*No population based criteria listed.*
PE Alternatives (if no Athletic Center)				7,000	1	*7,000*	Proposed (2 - T.S.) (2) courts, climbing wall, etc. (Use for PE and JV athletics, climbing wall, etc.) **Add if no Athletic Center**				
Lower Gymnasium (2 existing T.S.)	9,540	1	9,540				See new Performance Gym above				
Weights/Fitness Center (1 - T.S.)	2,100	1	2,100	3,000	1	3,000	(2 - T.S.) Weights and Fitness added 2/11/10				
Ex Health Classroom - (1 - T.S.)	600	1	600	850	1	850	(1 - T.S.)				
Ex Health CR (1 - T.S.)	750	1	750	850	1	*850*	(1 - T.S.) (use for Health and PE) **Add if no Athletic Center**				
Locker Rooms (MSBA) - Girls and Boys w/ toilets				1,400	4	5,600		1,400	4	5,600	*No population based criteria listed.*
Locker Rooms - Girls w/ Showers	3,800	1	3,800				5-6 Showers.				
Locker Rooms - Girls toilets	165	1	165								
Locker Rooms - Girls Storage	80	1	80								
Locker Rooms - Girls Storage	100	1	100								
Locker Rooms - Girls Storage	260	1	260								
Locker Rooms - Boys w/ Showers	3,040	1	3,040				5-6 Showers.				
Locker Rooms - Boys toilets	155	1	155								
Locker Rooms - Boys P.E. Office	175	1	175								
Locker Rooms - Boys Storage	130	1	130								
Locker Rooms - Boys Storage	150	1	150								
Locker Rooms - Boys Storage	250	1	250								
Team Room	675	1	675	675	4	2,700					*MSBA doesn't list.*
Team Room	605	1	605								
Team Room	260	1	260								
Visitor's Team Room				150	1	150	10'x10' or 12'x12' added 2/11/10				
PE Storage (MSBA)				500	2	1,000	per MSBA	500	2	1,000	
Phys. Ed. Storage	330	1	330								
Phys. Ed. Storage	260	1	260								
Phys. Ed. Storage	170	1	170								
Phys. Ed. Storage	70	1	70								
Athletic Director's Office	120	1	120	200	1	200		150	1	150	
Athletic Director's Office Storage	25	1	25								
Health Instructor's Office w/Shwr&Toilet (MSBA)								250	1	250	
Teachers Center (*5 FTE*)				1	500	500					
Locker Rooms - Girls P.E. Office	200	1	200	80	2	160	Office for opposite gender - M or F.				*MSBA doesn't list.*
Officials & coaches' Locker Room w/ shwrs	420	1	420	225	2	450	Male and Female.				*MSBA doesn't list.*
Athletic Trainer	310	1	310	600	1	600					*MSBA doesn't list.*

Proposed Space Summary - Concord-Carlisle High School

Date: 3/18/2010

CONCORD-CARLISLE HIGH SCHOOL	Existing Conditions			PRELIMINARY PROPOSED PROGRAM: Program			Comments	MSBA Guidelines (1250 Students) (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
MEDIA CENTER/INFORMATION COMMONS			**18,309**			**16,090**	Incl. IT, Radio Sta, CCTV		1	**6,150**	
Media Center/Reading Room								6,150	1	6,150	
Commons/Media Center (Ex. less Mac Lab) (4 staff)			**13,480**			**10,750**	MSBA less MAC Lab, CCTV students, IT, and ramps				
Lower Library (includes Lower Level ramps)	5,640	1	5,640								
Upper Library (stacks)	6,850	1	6,850								
Library Office	640	1	640								
Project Room/Conf.	350	1	350								
Faculty/Staff Workroom				400	1	400					
Faculty/Staff Breakroom				150	1	150					
Circulation Desk				400	1	400					
Dedicated On-line / Silent area				850	1	850	(25) stations, classroom size				
Social Learning (100 students, comfortable furniture)				3,400	1	3,400	Area + (4) 850 nsf classrooms				
Stacks areas (11,800 volumes)				4,000	1	4,000	Low bookshelves on wheels				
Conference/Project Rooms											
Large				400	1	400	24 capacity (verify qty)				
Medium				250	1	250	12 capacity (verify qty)				
Small / independent study				100	3	300	2-4 capacity (verify qty)				
Student Presentation Area (Multi-purpose)				600	1	600	30 capacity				
Recording Studio (MIDI Lab)			**1,100**			**1,100**					
A/V Workroom	600	1	600	600	1	600					
A/V Repair	225	1	225	225	1	225					
A/V Storage	100	1	100	100	1	100					
A/V Storage	130	1	130	130	1	130					
A/V Storage	45	1	45	45	1	45					
Radio Station			**1,839**			**1,840**	May not be ineligible for MSBA funding				
Radio Station general	980	1	980	980	1	980	Locate at Commons/Media				
Radio Studio	145	1	145	150	1	150					
Radio Studio	120	1	120	120	1	120					
Tran. Storage	150	1	150	150	1	150					
Tech Storage	444	1	444	450	1	440					
Cable / TV			**1,600**			**1,600**	May not be ineligible for MSBA funding				
Cable / TV general	1,200	1	1,200	1,200	1	1,200	Locate at Commons/Media				
Cable / TV Proj. Room	60	1	60	60	1	60					
Cable / TV Proj. Room	110	1	110	110	1	110					
Cable / TV Storage	105	1	105	105	1	105					
Cable / TV Storage	125	1	125	125	1	125					
IT (3 Staff)			**290**			**800**					
IT Office (in ex. Media/Library)	190	1	190	800	1	800					
IT Office (in ex. Media/Library)	100	1	100								
AUDITORIUM / DRAMA			**9,667**			**12,600**				**10,400**	
Auditorium (MSBA)								7,500	1	7,500	2/3 Enrollment @ 10 SF/Seat - 750 seats MAX
Auditorium (existing +/- 500 seats)	6,090	1	6,090	7,500	1	7,500	750 Capacity @10 nsf/per				
Control Booth	105	1	105	200	1	200	per MSBA	200	1	200	
Stage	1,770	1	1,770	1,600	1	1,600	40' x 40'	1,600	1	1,600	
Wings				600	2	1,200	(1) 40'x15' wing each side				
Auditorium Storage (MSBA)	190	1	190	500	1	500	per MSBA	500	1	500	
Theater Storage (existing outside units)	504	3	1,512	500	2	1,000	verify qty/size				
Dressing Rooms/Makeup				300	2	600	per MSBA	300	2	600	

Proposed Space Summary - Concord-Carlisle High School

CONCORD-CARLISLE HIGH SCHOOL	Date:	3/18/2010		PRELIMINARY PROPOSED PROGRAM				MSBA Guidelines (1250 Students) (refer to MSBA Educational Program & Space Standard Guidelines)			
	Existing Conditions			Program			Comments				
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
DINING & FOOD SERVICE			**13,068**			**10,600**				**10,363**	
Cafeteria	8,880	1	8,880	6,250	1	6,250		6,250	1	6,250	3 seatings - 15SF per seat
Staff Lunch Room / Teacher's Dining	860	1	860	560	1	560	(28 capacity/seating) Verify	563	1	563	20 SF/Occupant
Allowance for Dispersed Serving (MSBA)				600	1	600		600	1	600	OMR understands that MSBA may allow 600 nsf extra for "scattered" or dispersed serving.
Table and Chair Storage (MSBA)				400	1	400		400	1	400	
Kitchen	2,245	1	2,245	2,550	1	2,550		2,550	1	2,550	1600 SF for first 300 + 1 SF/student Add'l
Dishwashing	330	1	330				Not required				
Kitchen Office	165	1	165								
Food Storage	260	1	260								
Walk-in Cooler	95	1	95								
Walk-in Freezer	55	1	55								
Walk-in Freezer	80	1	80								
Staff Lockers	60	1	60	50	2	100	Kitchen staff				
Kitchen Staff Toilet	38	1	38	70	2	140	Male and Female, (HP)				
MEDICAL			**690**			**1,110**				**1,110**	
Medical Suite (MSBA)				1,110	1	1,110	per MSBA Guidelines				
Medical Suite Toilet (MSBA)	45	1	45					60	1	60	
Nurses Office / Waiting Room (MSBA)								250	1	250	
Health Receptions	500	1	500								
Interview Room (MABA)								100	3	300	
Examination Room / Resting (MSBA)	145	1	145					100	5	500	

Proposed Space Summary - Concord-Carlisle High School

		Date:	3/18/2010	PRELIMINARY PROPOSED PROGRAM							
CONCORD-CARLISLE HIGH SCHOOL	Existing Conditions			Program			Comments	MSBA Guidelines (1250 Students) (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
STUDENT SUPPORT (ADMINISTRATION & GUIDANCE)			**10,217**			**9,730**				**4,970**	
Administrative Suite		**12**	**3,545**		**12**	**3,080**				2,270	
General Office / Waiting Room	510	1	510	500	1	500	incl. copy area - verify	400	1	400	
Adult Support Rm. (Teach. Mail & Time Room)	190	1	190	300	1	300	(*3 Adm. FTE* @ 100 nsf)	100	1	100	
Duplicating Room							FL request general, for faculty?	200	1	200	
Records Room (Vault)	55	1	55	60	1	60		200	1	200	
Principal's Office (w/conference)	220	1	220	220	1	220		375	1	375	
Principal's Secretary / Waiting	290	1	290	290	1	290		125	1	125	
Assistant Principal's Office - AP1	145	1	145	200	1	200	Desk w/ round table, 4-5 capacity	150	1	150	
Assistant Principal's Office - AP2	140	1	140	200	1	200	Desk w/ round table, 4-5 capacity	150	1	150	
Supervisory / Spare Office	205	1	205	200	1	200	Shared; 3 people	120	1	120	
Administrative Office	125	1	125	120	1	120					
Conference Room	450	1	450	450	2	900		450	1	450	
Kitchenette	85	1	85	90	1	90					
Meeting / Work Room	1,130	1	1,130				Not req'd in future; use shared space				
Metco		**3**	**515**		**2**	**300**					
Metco Director	115	1	115	200	1	200	Desk w/ 4-5 person table				
Metco Secretary	100	1	100	100	1	100					
Metco Tutoring	300	1	300				Not req'd in future; use shared space				
Guidance Suite		**19**	**2,452**		**19**	**3,500**				1,500	
Guidance Office (MSBA)								150	5	750	
Guidance Waiting Room (MSBA)								100	1	100	
Guidance Storeroom (MSBA)								100	1	100	
Career Center (MSBA)								400	1	400	
Records Room (MSBA)								150	1	150	
Teachers Work Room/Lounge w/toilet (MSBA)							Share with Adm. Meeting / Workroom	450	1	450	
Program Capacity (MSBA)							Share with Adm. Meeting / Workroom	750	1	750	
Adult Support (Planning/Break/Kitchenette)				600	1	600	(*6 Guidance FTE* @ 100 nsf)				
Career Resource Center	945	1	945	950	1	950					
Guidance Office	95	4	380	100	8	800					
Guidance Office	112	1	112			0					
Guidance Office	140	1	140			0					
Guidance Office	90	1	90			0					
Guidance Office	110	1	110			0					
Conference Room (shared with SPED)	200	1	200	200	4	800					
Records Room (shared with SPED)	70	1	70	100	1	100					
Copy Room (shared with sped)	65	1	65	70	1	70					
Social Adjustment Offices	60	2	120	60	2	120					
School Psychologist Office	60	1	60	60	1	60					
Interns	40	4	160				incl. in Guidance Office				
Student Service Programs needed or in development.		**5**	**3,705**		**5**	**2,850**					
Compass	940	1	940	850	1	850	6-10 students.				
Metco / Challenge	1,050	1	1,050	500	1	500	20-30 students				
Requested Programs											
Post-Hospitalization Program/toilet				500	1	500	New program; 5-15 students				
Requested Network Program				500	1	500	New Program: 12-17 students; mini Freshman Academy for those at risk.				
ELL/ SPED Shared Classroom	815	1	815				Not required in future				
Planning (In-house Suspension/Social Worker)	680	1	680	500	1	500	5-20 capacity				
Planning Room Storage	220	1	220				Not required				

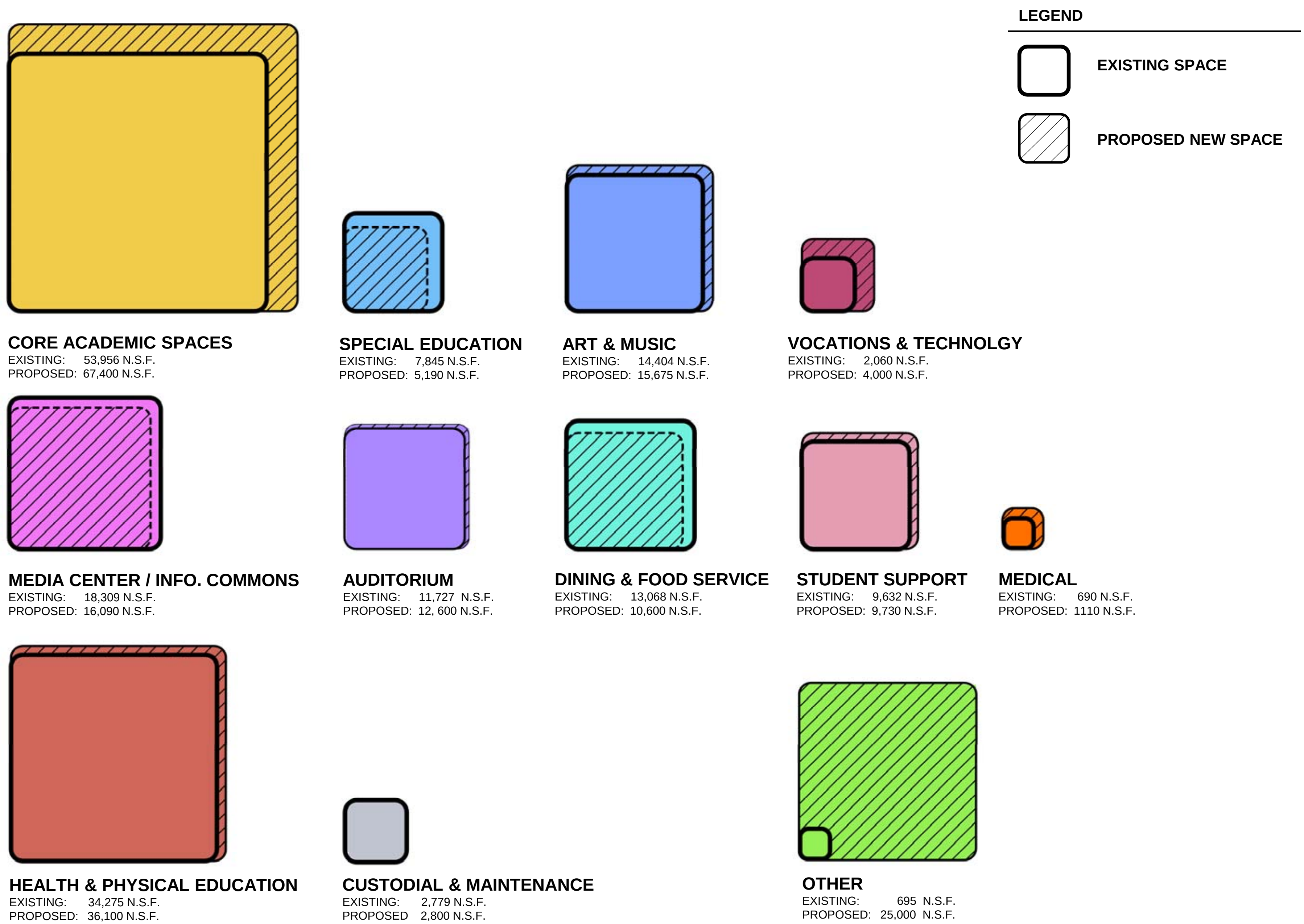
Proposed Space Summary - Concord-Carlisle High School

Date: **3/18/2010**

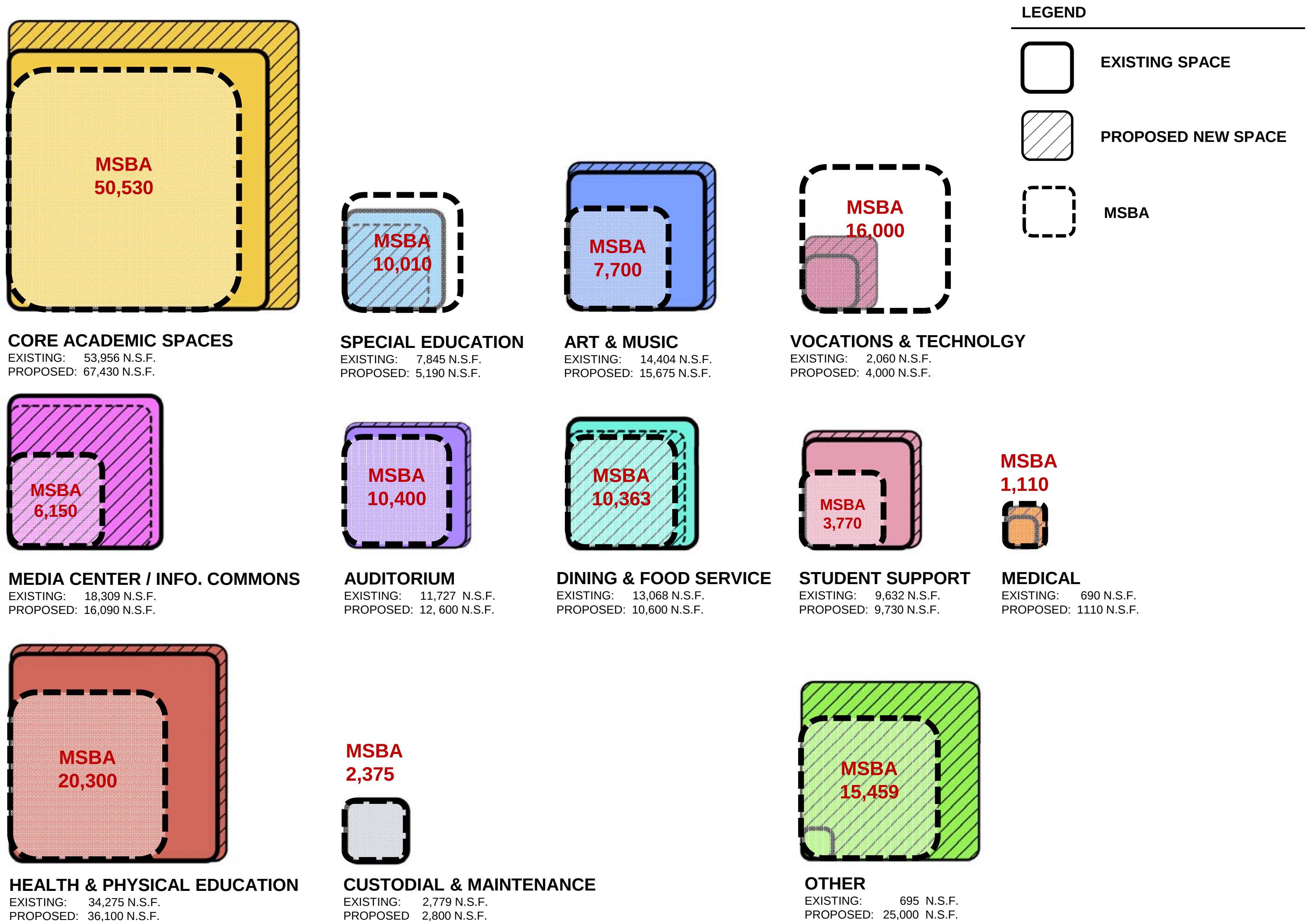
CONCORD-CARLISLE HIGH SCHOOL	Existing Conditions			PRELIMINARY PROPOSED PROGRAM: Program			PRELIMINARY PROPOSED PROGRAM: Comments	MSBA Guidelines (1250 Students) (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
CUSTODIAL & MAINTENANCE			**2,779**			**2,800**				**2,375**	
Custodian's Office	450	1	450	150	1	150		150	1	150	
Custodian's Office	75	1	75								
Maintenance Workshop				250	1	250		250	1	250	
Maintenance Department	1,250	1	1,250								
Custodian's Storage	80	1	80	800	1	800		375	1	375	
Custodian's Storage	165	1	165								
Custodian's Storage	255	1	255								
Recycling Room / Trash				400	1	400		400	1	400	
Receiving and General Supply				400	1	400		400	1	400	
Storeroom (existing trailer)	504	1	504	600	1	600		600	1	600	
Network/Telecom Room		incl. in gsf		200	1	200		200	1	200	
Grounds Equipment - Exterior		incl. in gsf									
Janitor's Sink Closet		incl. in gsf						1 per floor per wing			In gross square foot area
Telecommunications Switch Closet		incl. in gsf						1 per floor per wing			In gross square foot area
OTHER			**695**			**25,000**				**14,260**	*Derived nsf (total gsf /Net:Gross) less other program nsf*
Athletic Center incl. 180 meter track, and (3 or 4) basketball courts (If 4 courts, 2 would overlap track radaii).				23,600	1	23,600	Athletic Center (3 to 4 T.S.)				
Storage - track & field equipment				350	2	700					
Adult Education Director	225	1	225	200	1	200	Separate entrance requested				
Adult Education Office	160	1	160	400	1	400	2 people & waiting				
School Store	100	1	100	100	1	100	Locate in/adjacent to Cafeteria				
Year Book	210	1	210				Locate in Info Commons				
Total Building Net Floor Area (NFA)			**170,390**			**206,295**	**Includes Athletic Center**			**154,167**	*calculated @ 1.50 net:gross ratio*
Proposed Student Capacity/Enrollment			**1,245**			**1,250**				**1,250**	*Preliminary enrollment projection*
Permanent Building		230,050									
Temporary Trailors		3,750									
Total Building Gross Floor Area (GFA)[2]			**233,800**			**288,813**	**Includes Athletic Center**			**231,250**	*calculated @ 185 gsf/student*
Grossing factor (NFA:GFA)			**1.37**			**1.40**	*Target NFA:GFA ratio*			**1.50**	*Assumed normal NFA:GFA ratio*

[2] **Total Building Gross Floor Area (GFA)** Includes the entire building gross square footage measured from the outside face of exterior walls

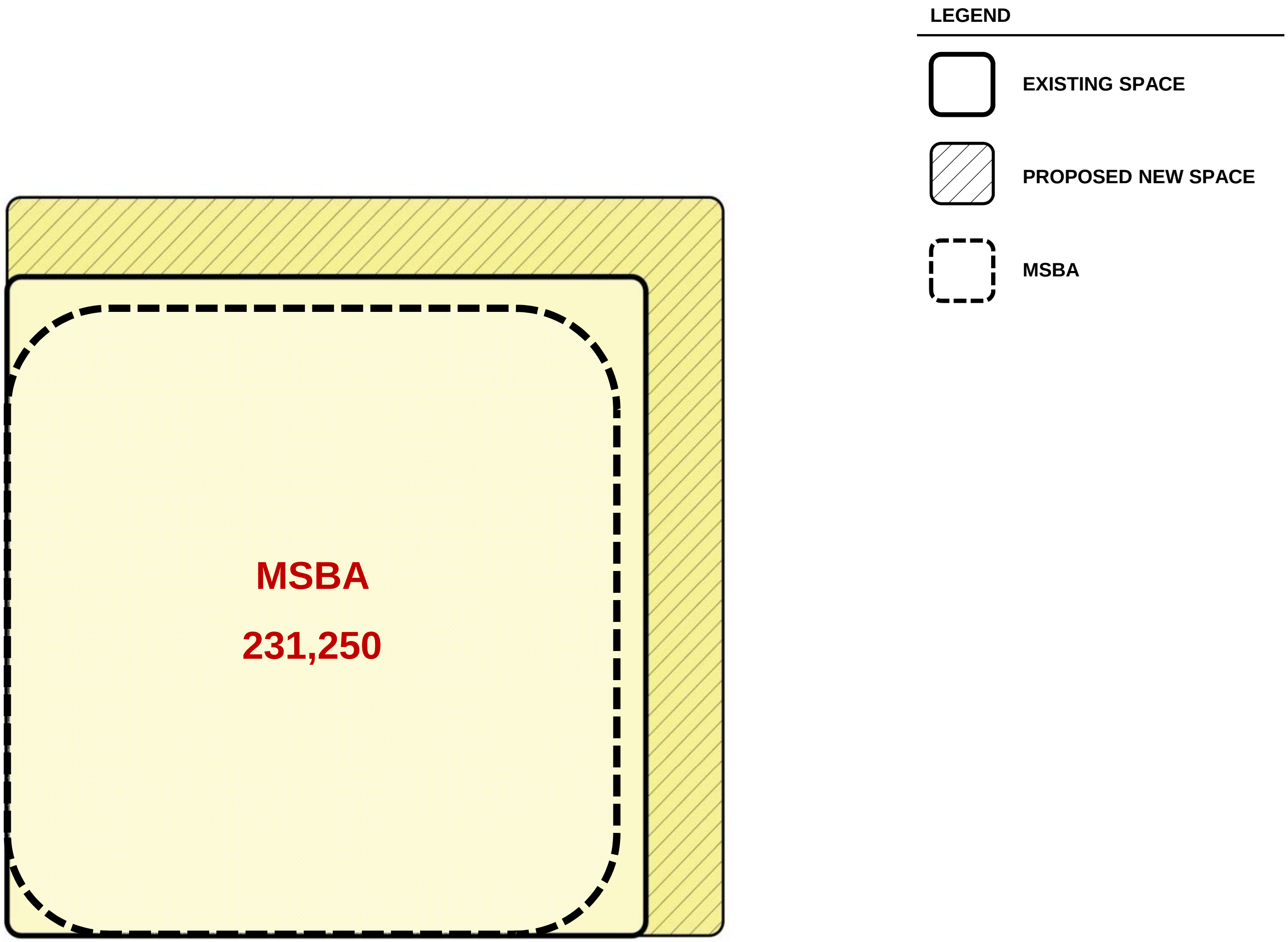
Graphic Program



Graphic Program



Graphic Program



TOTAL BUILDING GROSS FLOOR AREA
EXISTING: 233,800 G.S.F.
PROPOSED: 288,813 G.S.F.

Concord - Carlisle High School
Comparison of prior Study's Programs or Educational Specifications
Date: March 22, 2010

	2000 Study	2002 Study	2005 Study	2009-2010 Existing	2010 Master Plan
Enrollment Projected	1288 (2007)	1275 (2006-2007)	1350	1245 (Oct. 2009)	1250
Enrollment Existing	1056 (actual)				
	# Rooms	# Rooms	# Rooms	# Rooms	# Rooms
Classrooms					
English	9 crs	9 crs	9 crs(writ. lab)	9 crs	9 crs
Social Sciences	9 crs	10 crs	10 crs	9 crs	9 crs
Foreign Language	9 crs	9 crs	9 crs (F.L. lab)	9 crs (F.L. lab)	9 crs (F.L. lab)
Math	9 crs	10 crs	13 crs	9 crs	9 crs
Science Cr / Labs	13 crs/labs	14 crs/labs	14 crs/labs	7 CR/labs, Science 5 Crs + H.O.S.	12 cr/labs+ H.O.S.
SPED (self contained)		6 crs	4 crs	5 crs - Learning Center, SPED CR, Pathways (Life Skills), Alt. Prog, OT/PT	4 crs - Learning Center, SPED CR, Pathways (Life Skills), OT/PT
Art, Music, Tech., & Auditorium					
Art		6 crs.	4 crs.	5 crs	5 crs
Music		4 crs	3 crs	3 crs	4 crs
Technolgy		4 crs	3 crs	2 (MAC & recording)	1 (Recording in Info. Commons)
Auditorium		1	1	1	1 + Little Theater
Vocational & Technolgy				1 wood shop	2 Fabrication Labs
Health & Pysical Education				(6 teaching stations)	(10-11 teaching stations)
Athletic Rooms		3 rooms	4 rooms	3 rooms	3 rooms
Health Classrooms	2crs	2crs	2 crs	2 crs	1 cr
Field House/Athletic Center		3 P.E. Alternates	1 Field House		1 Athletic Center
Student Support		4 crs + 2 Multi-P.	3 crs	4 crs - Compass, Metco/Challenge, ELL/SPED shared CR, Planning (Students at Risk)	4 crs - Compass, Metco/Challenge, Post-Hospitalization, Network, Planning (Students at Risk).
Study Hall/Resource Room		3 crs	6 crs	3 crs	5 crs
			(Eng., S.S., Sci., Math, Art, including	(Shared Eng./S.S., Math, including	(Eng., S.S., Sci., Math, including
			Lang. Lab)	Lang. Lab)	Lang. Lab)
Presentation Rooms		0 (loss of Little Theater)	1 large	1 large	7 small + 1 large

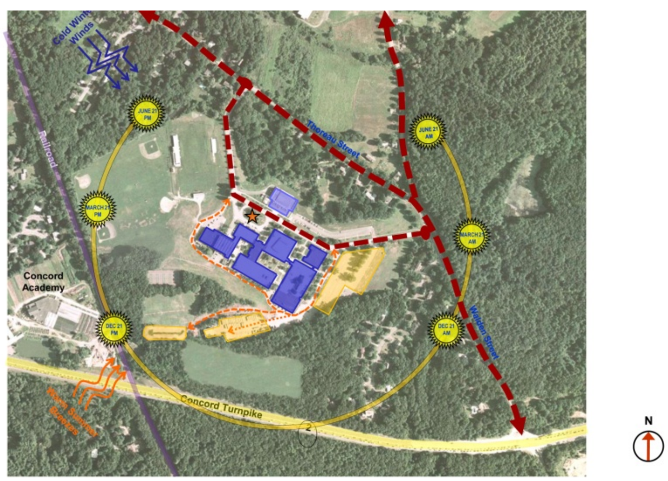
4 Existing Conditions Evaluation

- Site Conditions Analysis
- Building Conditions Analysis
- Safety and Security Analysis
- Energy Use Analysis

4 Existing Conditions Evaluation

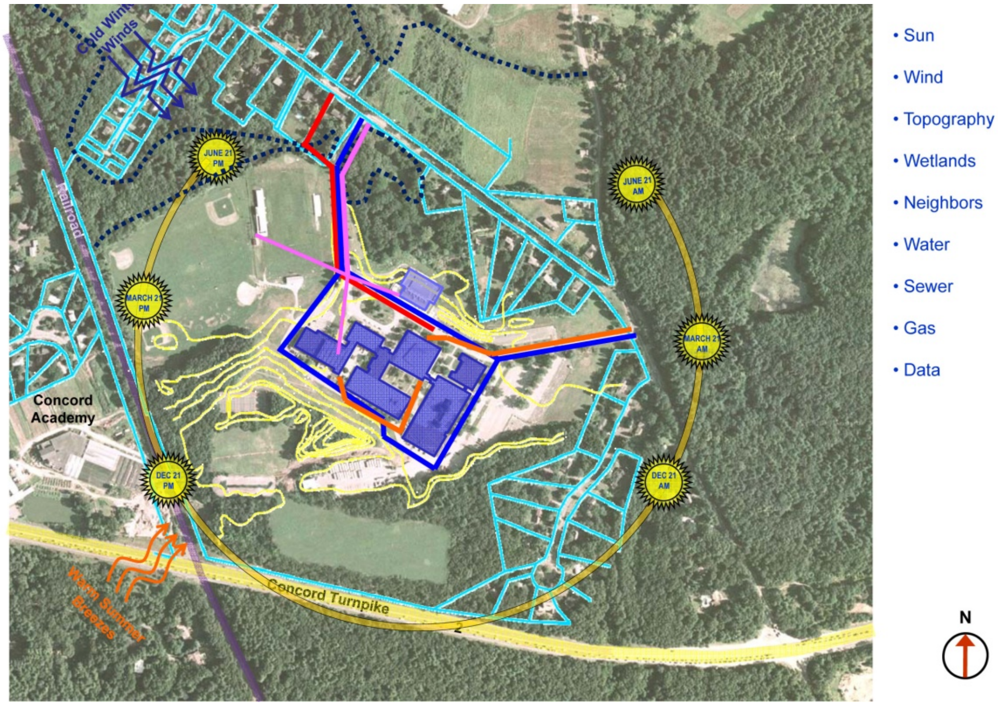
The existing Concord- Carlisle High School facility, located at the corner of Thoreau Street and Walden Street off of Route 2 in Concord, MA includes the football and athletic fields and on-grade parking for cars surrounding the sprawling circa 1958/1964/1973 building. In the rear of the site is the transportation office and parking for the District buses.

The existing school facility, housing grades 9-12, is composed of multiple buildings with interior or exterior covered or semi-enclosed connections and three stand-alone trailers used by students. This 233,800 GSF facility is arranged as a single level, except at mechanical spaces in each wing, at the library, and at the gymnasium wing where locker facilities and a second gymnasium are located below the main floor. Underground mechanical piping tunnels are scattered throughout the structures making maintenance and repair of the buildings and grounds almost inaccessible. A privately funded, town operated swim and fitness facility sits on the edge of the school campus and is used by the High School for the swim and fitness curriculum and afterschool activities under special non-exclusive agreements. The separate pool and transportation buildings, and the immediate site, are not part of the existing conditions study, though it is considered in the design approaches for the entire campus.

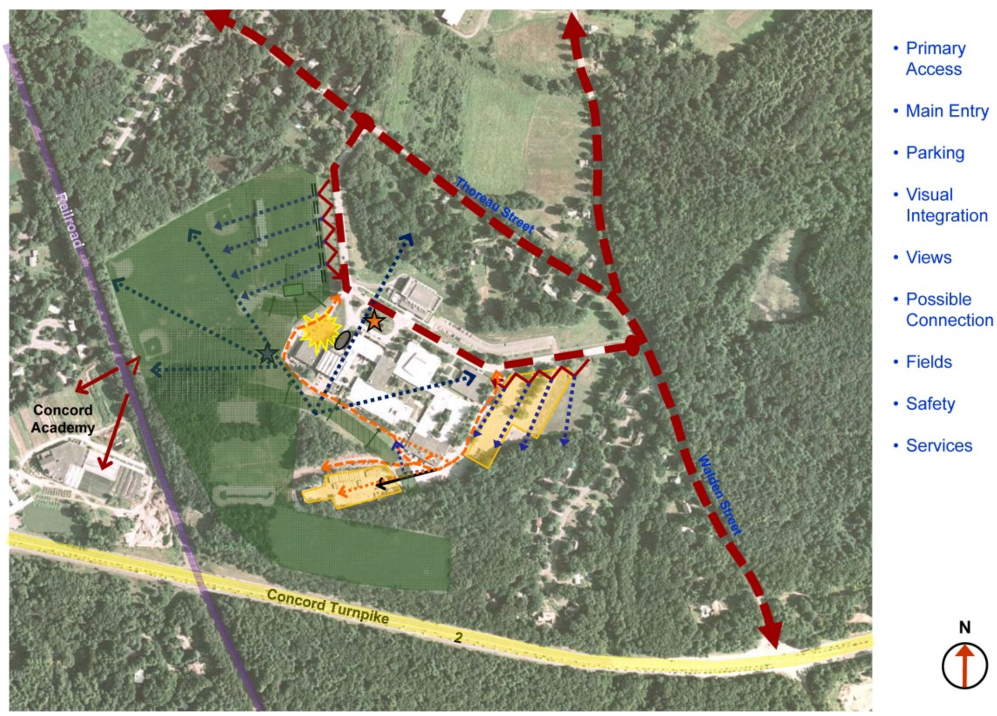


A summary of our site analysis follows. Key factors include:

- Environmental Conditions: Solar Orientation, Wind, Topography, Wetlands
- Neighbors
- Utilities: Water, Sewer, Gas, Data
- Access: Primary Access, Main Entry, Parking
- Connections: Visual Integration, Views, Possible Connections, Fields
- Issues: Safety, Services



Site Analysis Summary 1



Site Analysis Summary 2

Site Conditions

There are two entrances to the school; the northwest entry is off of Thoreau Street and the northeast entry is off of Walden Street. The asphalt roads and parking areas around the school are cracking and in need of repair. The existing high school site is constructed on well drained soils, but the northwest end of the property along Thoreau Street is a wetlands area. The school is connected to the town's Municipal water and sewer system. The building is served by natural gas, there are no fuel oil tanks on campus however one of the emergency generators runs on diesel fuel (the other generator is gas fired).

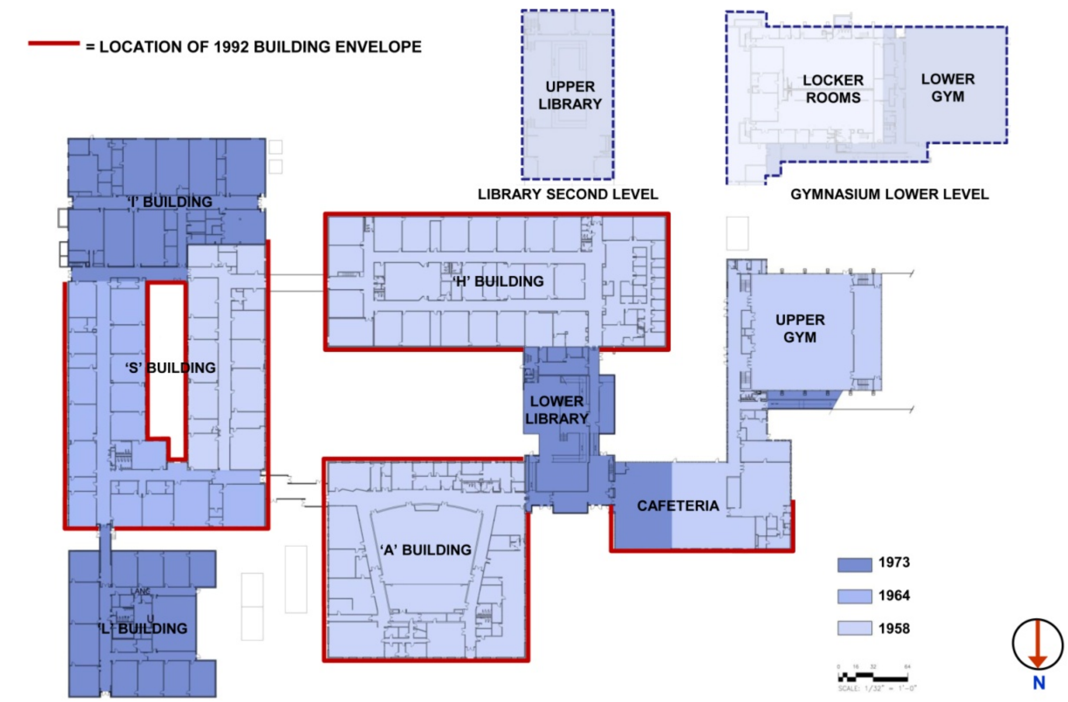
The main building entry is located on the north side of the site where there is a bus loop and minimal visitor parking. The existing lower athletic fields are compacted and in need of repair. The upper fields along Route 2 consist of an older natural turf field and two large synthetic fields which were recently installed.

Building Conditions

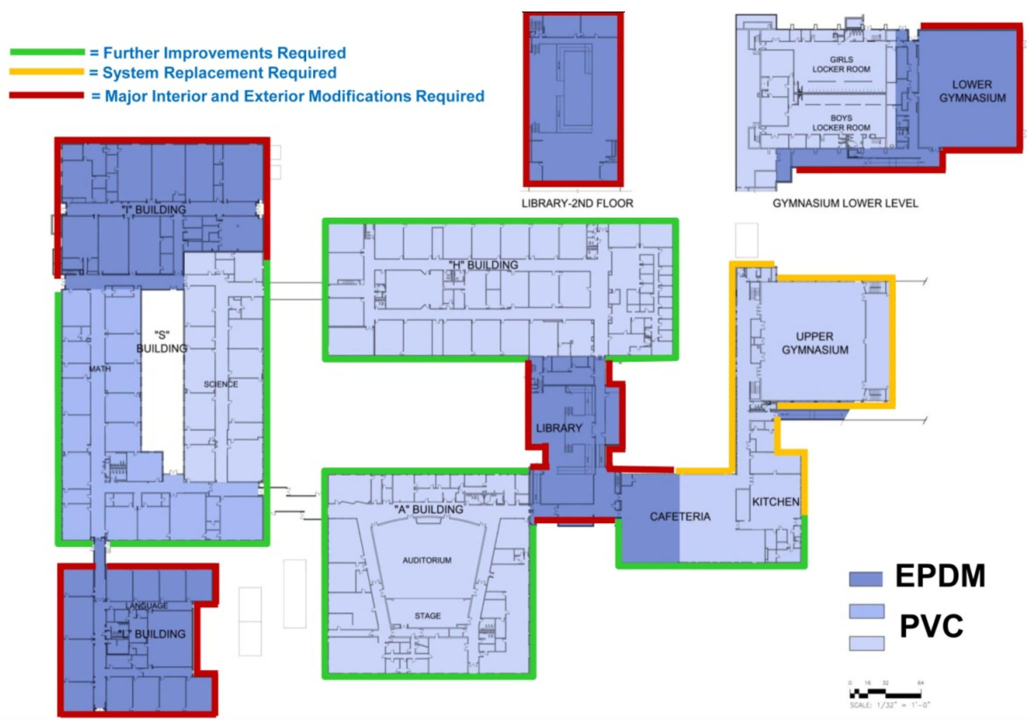
The building envelope on the "S", "H" and "A" buildings and part of the cafeteria was reconstructed in the 1990's. The new envelope is adequate but does not provide an air tight barrier. Buildings "I", "L", the lower gymnasium and the Library were all built in the 1970's and have the original building envelope. These buildings are not energy efficient and are in need of repair. The upper gymnasium was constructed in 1958 and has the original building envelope which includes an exterior exposed structural system and a poorly insulated curtain wall system. The existing roof systems, a combination of EPDM and PVC, are at the end of their life expectancy and are in need of replacement.

The existing structure for the building is in satisfactory condition but does not meet the standards of the current building code, including seismic considerations. The existing electrical system has reached its life expectancy and requires replacement; the school currently experiences regular power failures. The mechanical system is nearing the end of its serviceable life and the mechanical tunnels are congested and inaccessible in many locations. The fire alarm system has been updated in many areas of the school, and the new system has the capacity to add more fire alarm devices. A majority of the building does not have an automatic sprinkler system. The plumbing fixtures are not energy efficient and the science lab emergency fixtures do not meet current code requirements. The existing school does not have code compliant ramps, toilet rooms or stairwells. Interior finishes were replaced in some areas during the 1990's but most finishes are worn and in need of replacement.

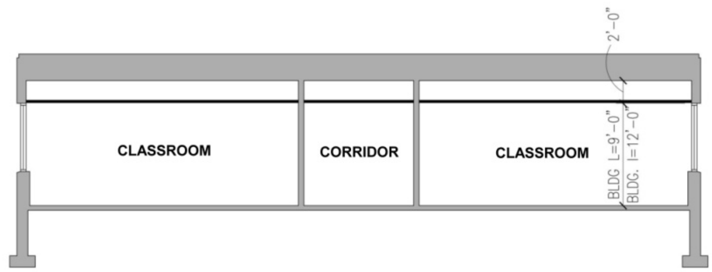
Indoor Air Quality was tested and it was determined that the TVOC levels in the "S" and "L" wings were elevated and that CO2 levels were elevated in all classroom wings where unit ventilators are located. These issues may be controllable with proper mechanical and ventilation systems.



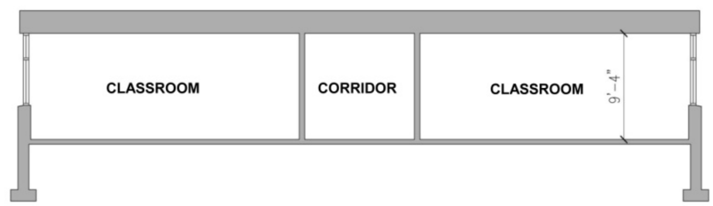
Existing Building Age of Construction



Existing Building Envelope Conditions



DIAGRAMATIC SECTION AT BUILDING 'L' AND I



DIAGRAMATIC SECTION AT BUILDING 'S' (SIM. AT H & A)

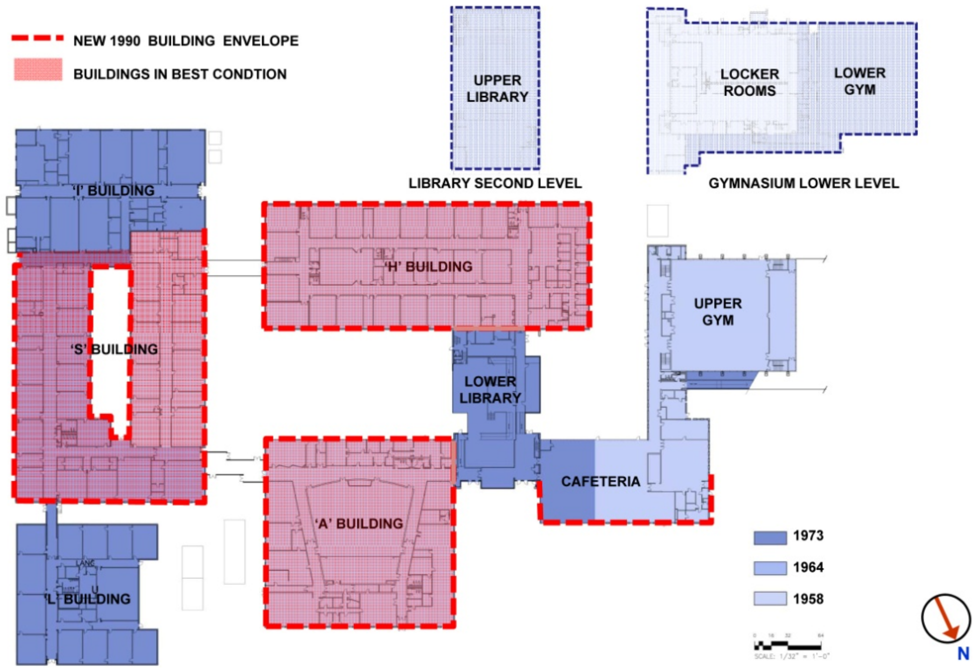
Existing Building Sectional Conditions (used to understand future Mechanical space considerations)

Attached herein are the full existing conditions reports by the consultant team, including:

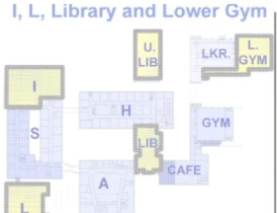
- Site Utility
- Architectural
- Structural
- Mechanical
- Electrical
- Plumbing
- Fire Protection
- ADA Compliance
- Building Enclosure
- Energy Use Analysis
- Indoor Air Quality
- Kitchen Equipment

Also attached are Existing Conditions Summary charts for each section of the building. A summary of the overall facility follows:

Analysis: Existing *Building* Conditions Summary



I, L, Library and Lower Gym



1970's

+ Door hardware meets ADA/MAAB
+ New hooked on science classroom

- Ongoing deferred maintenance
- Outdated rubber floor in gymnasium
- Inaccessible door clearances, ramps, and toilet rooms
- Classrooms are remote, Lack of presentation space
- Core spaces have no natural light or views
- EPDM roof in poor condition
- No vapor barrier in exterior walls/single pane exterior glazing
- Congested tunnels
- MEP systems exceed life span
- No sprinklers in public space
- Structural lateral, seismic & snow loads do not meet current code
- Classrooms do not support interdisciplinary teaching and learning

Upper Gym & Locker Rooms

1960's

+ Gymnasium floor in good condition
+ Most door hardware meets ADA/MAAB
+ New bleachers in gym
+ New lockers in locker rooms

- Ongoing deferred maintenance
- Hazardous materials
- Inaccessible door clearances in weight room and P.E. offices
- PVC roof in poor condition
- Thermal bridge at exposed exterior gymnasium structure
- Single pane exterior curtain wall
- Non-code compliant stairs
- MEP systems exceed life span
- No sprinklers in public areas
- Structural lateral, seismic & snow loads do not meet current codes
- Health classroom in trailer
- Current space does not meet athletic program requirements

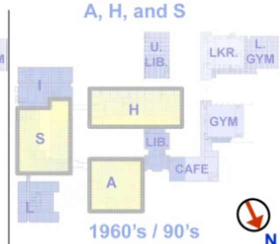
Cafeteria

1960's / 90's

+ Masonry walls in relatively good condition on renovated part of cafeteria
+ Door hardware meets ADA/MAAB

- Ongoing deferred maintenance
- Kitchen hoods outdated / not code compliant
- Dishwasher does not function
- Inaccessible kitchen toilet room (two are required per code)
- Dumpster and recycling area
- PVC roof in poor condition
- Half of the exterior walls have no vapor barrier and are single pane glass
- Beams not thermally broken at new roof/wall interface
- Structural lateral, seismic & snow loads do not meet current code
- Serving equipment does not meet Board of Health regulations
- Inadequate and congested serving area (low participation)

A, H, and S

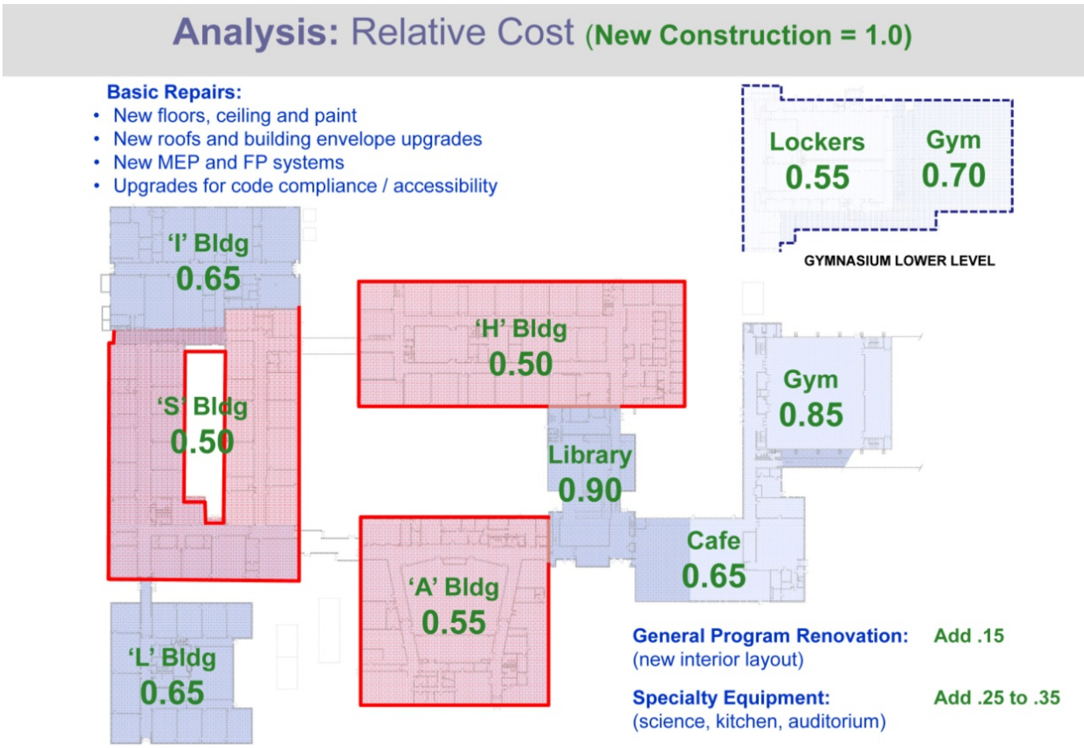


1960's / 90's

+ Masonry walls relatively good
+ 1" insul. win. /thermally broken frames
+ Door hardware meets ADA/MAAB
+ New fire panel and alarm system
+ Structure is satisfactory

- Ongoing deferred maintenance
- Hazardous materials
- Inaccessible door clearances, ramps, toilets, labs and stage
- Roof beams not thermally broken
- Tunnels are difficult to access
- PVC roof in poor condition
- MEP systems exceed life span
- Minimal sprinkler system
- Structural lateral, seismic & snow loads do not meet current codes
- Science labs are outdated, non compliant emergency showers
- Classrooms do not support interdisciplinary education

We then applied a relative cost to each of the buildings to better understand which parts of the facility are the most feasible for a renovation.



From this existing conditions analysis, it was determined that the "S", "A" and "H" buildings were in the best physical shape to renovate and the least expensive to renovate if their current programmatic space usage was retained.

Geotechnical Analysis

It was determined by the Client that test borings and a geotechnical report were not necessary at this time, but would be pursued in the next phase of the project.

Safety and Security Analysis

The following safety and security conditions were observed at the Concord Carlisle High School:

1. Poor security at the main entry - main entry doors are not visible by the administrative offices.
2. The building has an abundant of exterior doors that are operable from the outside.

3. The access road behind building “I” is very tight to the building causing poor traffic visibility and dangerous pedestrian access.
4. Exterior lighting around the school is poor during the night time hours, the main school entry off of Walden Street is difficult to identify in the dark.
5. Mechanical tunnels are cluttered with ducts and utility piping and sometimes flooded with water, leaving the maintenance staff with a hazardous working condition.
6. Non-compliant ramps throughout the school make accessibility difficult for people with disabilities.
7. Guardrails in the library along the ramp, stairs and balconies are not code compliant.
8. Guardrails in the performance gymnasium stairwells are not code compliant.
9. Corridors in building “A” and “I” are cluttered with tables and chairs due to lack of facility space.
10. Emergency fixtures in the science labs are not supplied with tepid water.
11. The emergency gas shut off valves in the science labs are located within cabinets and not in a visible location at the point of evacuation from the room. Currently not all of the science labs are equipped with emergency gas shut off valves. Individual emergency valves are required.
12. The building is not fully protected with an automatic sprinkler system.
13. Hazardous building materials should be removed.
14. Original electrical panels in the mechanical spaces are severely corroded and have live bussing.

Building Condition Analysis

Building A

The exterior building envelope of building "A" was replaced in the 90's. The building envelope system is adequate but does not provide an air tight barrier as there is thermal bridging at the intersection of the roof and exterior walls. The new envelope consists of brick veneer with punched aluminum window openings. The new windows have insulated glass and many of the units are operable (a combination of single hung and awning were used). The window sills have very little slope and in some locations the sills slope back to the window. The building has older painted aluminum fascia with new anodized aluminum fascias above; in some locations the paint is peeling off of the older fascias. The roof is PVC, there are limited roof drains and many areas have ponding. The upper portion of the auditorium extends above the main roof, these walls are constructed of metal panels. Many of these panels are faded and deteriorating.


Brick veneer with punched window openings


Metal panels at auditorium and PVC roof

The interior corridors have newer VCT floors (some cracks), exposed steel/Tectum deck ceiling and pendant lights. The corridors walls are original (exposed brick and hollow metal frames with paneling). Wood doors appear to be original and worn (most doors have newer hardware). VAT on auditorium floor, older VCT in art and music classrooms (band has worn carpet). Wood stage in auditorium was recently painted black and new curtains were installed. The art rooms have pendant strip lights with exposed Tectum ceilings. Exposed insulated piping, wiring, and mechanical ducts in the art rooms. The music room has 2x4 act ceiling with recessed lights. Administrative offices have newer carpet and 2x2 ACT ceilings with newer recessed lighting. Toilet rooms have original metal toilet partitions, 1x1 tile floors and CMU or 4x4 ceramic tile walls.


Exposed ceilings, paneled walls, VCT flooring


Inaccessible floor slope and stage

- \+ Door hardware meets ADA/MAAB requirements
- \+ Insulated glass window units/new exterior envelope
- \+ New lighting
- \+ Exterior entries appear to be accessible
- \+ Skylights in the corridors provide day lighting
- +/- Fin-tube radiation and unit ventilators (U.V.'s installed in the 90's - noisy and inefficient)
- +/- Men's and Women's toilet rooms meet some ADA standards
- \- Boys and Girls toilet rooms do not meet ADA/MAAB regulation
- \- Sinks and casework do not meet ADA/MAAB regulations
- \- Corridor along side of auditorium is used for storage
- \- Some doors do not have proper accessible maneuvering clearances and/or proper door widths
- \- Slope at auditorium floors does not meet ADA/MAAB; stage is in accessible from the auditorium
- \- Auditorium control booth, lighting platform and catwalk do not meet ADA/MAAB regulations
- \- Ponding on roof (PVC roof needs to be re-done)
- \- Paint is peeling off of fascia
- \- Exterior panels on auditorium walls above the main roof are rusting

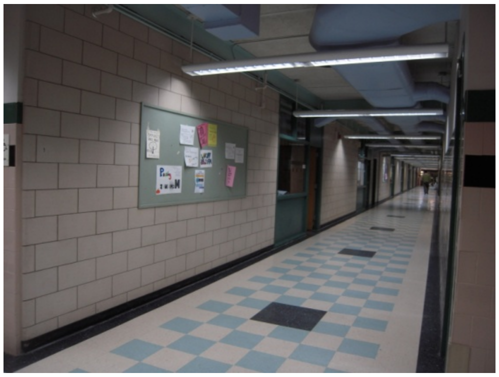
Building H

The exterior building envelope of building "H" was replaced in the 90's. The building envelope system is adequate but does not provide an air tight barrier as there is thermal bridging at the intersection of the roof and exterior walls. The new envelope consists of brick veneer with punched aluminum window openings. The new windows have insulated glass and many of the units are operable (a combination of single hung and awning were used). The window sills have very little slope and in some locations the sills slope back to the window. Half of the windows have a metal louver infill that extends from the windows sill to the top floor slab. These louvers are connected to the unit ventilators. One of the main boiler rooms is located in building H, there are three large louvers located on the east wall, and the remaining lovers are locked in areaways. The building has older painted aluminum fascia with new anodized aluminum fascias above; in some locations the paint is peeling off of the older fascias. The roof is PVC, there are limited roof drains and many areas have ponding.


Brick veneer with punched window/louvers


Aluminum sill sloping back towards window

The interior corridors have newer VCT floors (some cracks), exposed steel/Tectum deck ceiling and pendant strip lights. The corridors walls are a mix of the original glazed CMU and newer ceramic tile. Exposed insulated piping, wiring, and mechanical ducts in corridors. Wood doors appear to be original and worn (most doors have newer hardware). Classrooms and offices are a mix of VCT, VAT, or carpet. Perimeter classrooms have exposed Tectum ceilings and pendant strip lights, core classrooms have ACT ceilings and recessed lights. Toilet rooms have original metal toilet partitions, 1x1 tile floor and 4x4 ceramic tile walls.



Corridor: glazed block, exposed struct. & MEP

Classroom: ACT floor and exposed structure

- \+ Door hardware meets ADA/MAAB requirements
- \+ Insulated glass window units/new exterior envelope
- \+ One exterior entry appear to be accessible
- \+ New ACT ceilings, carpet and lighting in Sped/Guidance suite
- +/- Natural light brought into some core spaces but no view out
- +/- Fin-tube radiation and unit ventilators (U.V.'s installed in the 90's - noisy and inefficient)
- +/- Some single occupancy toilet rooms meet ADA, multiple fixture toilet rooms do not meet ADA/MAAB regulations
- \- Some doors do not have proper accessible maneuvering clearances and/or proper door widths
- \- Corridor in sped and guidance suite is too narrow and does not allow for a turning radius
- \- Seating rows in the little theater are not accessible
- \- Some classrooms still have VAT flooring
- \- Sinks and casework do not meet ADA/MAAB regulations
- \- Internal offices without windows or views to the exterior
- \- Nurses office does not meet ADA/MAAB regulations
- \- Writing surface in poor condition
- \- Ponding on roof (PVC roof needs to be re-done)
- \- Exterior ramp to S building does not meet ADA/MAAB regulations

Building I

The exterior building envelope of building "I" is the existing 1970's split faced ribbed block. The building envelope system is poorly insulated and does not provide an air tight barrier. The window units are an aluminum storefront system with single pain glass. Some window units have been in filled with painted plywood, the panels are delaminating. There are a few overhead doors into the hooked on science classroom and maintenance garage. The building has anodized aluminum fascias. The roof is EPDM with limited roof drains, the EPDM membrane is beginning to fail. There are two large storage trailers along the west side of the building in which the drama department uses for set and costume storage. A gas meter and generator are located on the east side of the building.

Ribbed block/delaminating plywood panels

West and south side view of building I

Interior corridors have VCT floors with a 2x4 ACT ceiling and 2x4 recessed lights. The corridors walls are the painted CMU with recessed metal lockers (lockers are full height and newer than the lockers in S, H and L building). Wood doors appear to be original and worn (most doors have newer hardware). Classrooms have worn VCT floors or carpet and 2x4 ACT ceilings with recessed lights. The hooked on science classroom and maintenance shop have concrete floors and exposed ceilings. The wood shop has worn recessed wood floor. Toilet rooms have original metal toilet partitions, 1x1 tile floor and 4x4 ceramic tile walls. The choral room has unfinished plywood risers which are not code compliant

Corridor with recessed lockers and ACT ceilings

Chorus: VCT floors, ACT ceilings plywood risers

+ Door hardware meets ADA/MAAB requirements
+ Men's and Women's toilet room appear to meet ADA/MAAB regulations
+ EPDM roof appears to be in ok condition (water is draining)
+ New ceilings and lighting
+ New roof flashing
+ New hooked on science classroom
+ Building appears to be accessible from three exterior doors
- Sinks and casework do not meet ADA/MAAB regulations
- Some doors do not have proper accessible maneuvering clearances and/or proper door widths
- Choral room risers do not meet ADA/MAAB
- Core spaces have no natural lighting or views out
- Exterior single pain glass windows and existing exterior masonry envelope
- Some exterior light fixtures are broken
- De-laminated plywood infill panels at exterior window openings
- Storage trailers on the west side of building I

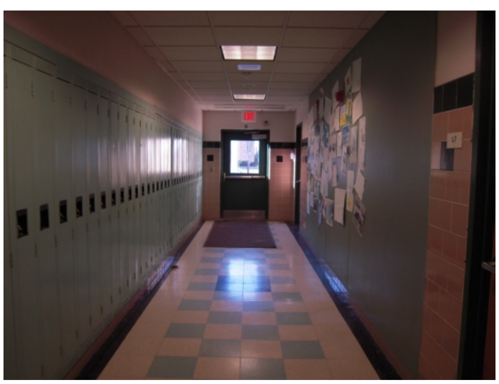
Building L

The exterior building envelope of building “L” is the existing 1970’s split faced ribbed block. The building envelope system is poorly insulated and does not provide an air tight barrier. The window units are an aluminum storefront system with single pain glass. There are 2-3 awning style operable sashes in each classroom, some of these units have been screwed shut. Each class room has an exterior louver below the storefront system which supplies air to the unit ventilator. The building has anodized aluminum fascias. The roof is EPDM with limited roof drains, the EPDM membrane is beginning to fail. There are two large trailers between buildings “I” and “A”, one of the trailers houses two social studies classrooms and the other trailer has office spaces for student support.


Spilt faced ribbed block and aluminum storefront


Classroom trailer outside of building I

Corridors have newer VCT floors with a 2x2 ACT ceiling and 2x2 recessed lights. The corridors walls are a mix of the original 1x1 wall tile and newer 4x4 ceramic tiles. Narrow (1970’s) metal lockers in corridor are worn (full height lockers at 8” wide). Wood doors appear to be original and worn (most doors have newer hardware). Classrooms have worn VCT floors and 2x4 ACT ceilings with recessed light fixtures (carpet in the language lab). Toilet rooms have original metal toilet partitions, 1x1 tile floor and 4x4 ceramic tile walls and newer 2x2 ACT ceilings.


Corridor: VCT floors, ACT clg’s, metal lockers


Classrooms: VCT floors, ACT clg’s, recessed lights

+ Door hardware meets ADA/MAAB requirements
+ EPDM roof appears to be in ok condition (water is draining)
+ New roof flashing
+/- Boys and girls toilet room meet some ADA/MAAB regulations
+/- Fin-tube radiation and unit ventilators (U.V.’s installed in the 90’s - noisy and inefficient)
- Sinks and casework do not meet ADA/MAAB regulations
- Some doors do not have proper accessible maneuvering clearances and/or proper door widths

- Writing surface in poor condition
- Exterior single pain glass windows and existing exterior masonry envelope
- Water damage on existing masonry
- Some exterior windows are not operable

Building S

The exterior building envelope of building "S" was replaced in the 90's. The building envelope system is adequate but does not provide an air tight barrier as there is thermal bridging at the intersection of the roof and exterior walls. The new envelope consists of brick veneer with punched aluminum window openings. The new windows have insulated glass and many of the units are operable (a combination of single hung and awning were used). The window sills have very little slope and in some locations the sills slope back to the window. Half of the windows have a metal louver infill that extends from the windows sill to the top floor slab. These louvers are connected to the unit ventilators. The building has older painted aluminum fascia with new anodized aluminum fascias above; in some locations the paint is peeling off of the older fascias. The roof is PVC, there are limited roof drains and many areas have ponding. Building "S" has an enclosed court yard with mature trees, small man made pond, and a Thoreau Cabin. The plantings in the court yard are over grown. The exterior walls of the court yard were also restored in the 90's


Brick veneer with punched window/louvers


Enclosed courtyard

Interior corridors have newer VCT floors, exposed steel/Tectum deck ceiling and pendant strip lights. The corridors walls are the original glazed CMU, newer ceramic wall tile was used at the entries. Exposed insulated piping, wiring, and mechanical ducts in corridors. Worn small combo lockers in the corridor. Wood doors appear to be original and worn (most doors have newer hardware). Classrooms and offices are a mix of VCT, VAT, or carpet and exposed Tectum ceilings with pendant strip lights. Toilet rooms have original metal toilet partitions, 1x1 tile floor and 4x4 ceramic tile walls.

+ Door hardware meets ADA/MAAB requirements
+ Insulated glass window units/new exterior envelope
+ New fume hoods in the Chemistry labs
+/- Some single occupancy toilet rooms meet ADA, multiple fixture toilet rooms do not meet ADA/MAAB regulations
+/- Courtyard (with learning elements) not accessible and overgrown
+/- Fin-tube radiation and unit ventilators (U.V.'s installed in the 90's - noisy and inefficient)
- Casework in math classrooms was installed in the 90's but many doors are broken and hardware is falling off.
- Some doors do not have proper accessible maneuvering clearances and/or proper door widths

- Science lab casework does not meet ADA/MAAB regulations
- Emergency showers and eyewash stations do not meet ADA/MAAB regulations
- Toilet rooms do not meet ADA/MAAB regulations
- Some classrooms still have VAT flooring
- Sinks and casework do not meet ADA/MAAB regulations
- Writing surface in poor condition (sliding chalk boards are broken)
- Ponding on roof (PVC roof needs to be re-done)
- Paint is peeling off of fascia
- Exposed wiring along exterior of building (no conduit)

Library

The exterior building envelope of the Library is the existing 1970's split faced ribbed block. The building envelope system is poorly insulated and does not provide an air tight barrier. A majority of the building is an aluminum curtain wall system with single pain glass and metal panels. The Library building is two stories, the main level of the library also contains the entry lobby, art gallery and main corridor connections to Building "H" and "A". The roof is EPDM with limited roof drains, the EPDM membrane is beginning to fail and the seams are coming apart. The sunken court on the east side of the library is in poor condition.


Sunken court on east side of library

Main entry at two story library building

The interior of the library is carpeted with the exception of the rubber tiled ramp. The finished ceiling is 2x2 ACT with textured plaster soffits and continuous recessed strip lighting. At the entry of the library you can transcend down to a lower level or up to a few different levels. The corridors and art gallery have VCT flooring and low 2x2 ACT ceilings. The lobby has the original quarry tile floor, masonry walls and ACT ceilings with plaster soffits and recessed lighting. The corridor ramp has roundel rubber tile and wood hand rails, there is an intermediate hand rail in the center of the ramp.


Multi-level library


Entry lobby with ramp

+ EPDM roof appears to be in ok condition (water is draining)
+ New roof flashing
+/- Some door hardware meets ADA/MAAB requirements
- Library ramps do not meet ADA/MAAB regulations and railings/guardrails do not meet the requirements of the building code
- No floor curb at balconies and ramps
- Sinks and casework do not meet ADA/MAAB regulations
- Some doors do not have proper accessible maneuvering clearances and/or proper door widths
- Toilet room is not accessible
- Stair railings and guardrails do not meet building code regulations
- Main corridor ramp and ramp from lobby to exterior courtyard does not meet ADA/MAAB regulations
- Exterior single pain glass windows and existing exterior masonry envelope
- Some exterior windows are not operable

Cafeteria

During the 90's the building envelope was replaced on east, north and part of the west sides of the cafeteria. The building envelope system is adequate but does not provide an air tight barrier as there is thermal bridging at the intersection of the roof and exterior walls. The new envelope consists of brick veneer with punched aluminum window openings. The new windows have insulated glass and some of the units are operable awning units. The remainder of the cafeteria building has the existing curtain wall system with single pane glass and metal panels. The building has older painted aluminum fascia with new anodized aluminum fascias above. The roof is PVC, there are limited roof drains and many areas have ponding.

Newer north/east corner of the cafeteria

Original curtain wall system on south side of cafe.

The VCT flooring in cafeteria was replaced in 2008. The kitchen has the original quarry tile. The cafeteria has exposed steel columns and beams with an exposed Tectum deck ceiling and pendant strip lights in cafeteria. The kitchen has 12" x 12" perforated metal ceiling panel with recessed fluorescent strip lighting. The cafeteria has exposed insulated piping, wiring, and mechanical ducts and units in cafeteria. The dish room is closed off to the cafeteria with stainless steel window panels, the dish not currently used by the school. Worn wood doors off of the lobby and newer fiberglass doors at the exterior.


New VCT cafeteria floor and exposed structure


Glazed block walls in kitchen and S.S. ceiling

- \+ Most of the door hardware meets ADA/MAAB requirements
- \+ Exterior entries appear to be accessible
- +/- Half of the cafeteria has insulated glass window units/new exterior envelope, the remaining walls are single glazed units with un-insulated metal panels
- \- Kitchen staff toilet room does not meet ADA/MAAB requirements.
- \- Dish washing machine is broken
- \- Some doors do not have proper accessible maneuvering clearances and/or proper door widths
- \- Ponding on roof (PVC roof needs to be re-done)
- \- Dumpsters and recycling bins are not mounted on a pad

Gymnasium

The performance gym has the existing curtain wall system with single pane glass and metal panels. The Building envelope is poorly insulated with a weak air barrier. The paint finish on the metal panels is peeling in many locations on the east wall. Fiberglass doors were installed at the east entry. The structure of the gym is exposed on the outside of the building causing thermal bridging. The roof is PVC and needs to be replaced.


Exterior entry to performance gym


Exposed performance gym structure & curtain wall

The performance gymnasium has two floor levels, the gymnasium and weight room are on the main level and the locker rooms are on the lower level. Corridors in upper gym have a mix of new and old VCT flooring. The corridor ceilings are exposed steel/Tectum deck and surface mounted strip fluorescent fixtures. The walls are existing brick and painted CMU. Wood doors and wood panels are worn in the gym and the wood floor has been sanded and refinished many times. The performance gym ceiling has exposed steel and Tectum deck, the walls are a combination of painted block and wood panels. The large folding partition in the gym appears to be in-operable. The locker rooms have exposed concrete floors and new lockers on original CMU plinths. There are original tile walls in shower area. The locker room walls are a mix of painted CMU and glazed CMU; the ceilings are 12x12 perforated metal panels (stainless steel). Painted metal dividers at changing area with fixed wood benches. Corridors have exposed insulated piping, wiring, and mechanical ducts.

Performance gym

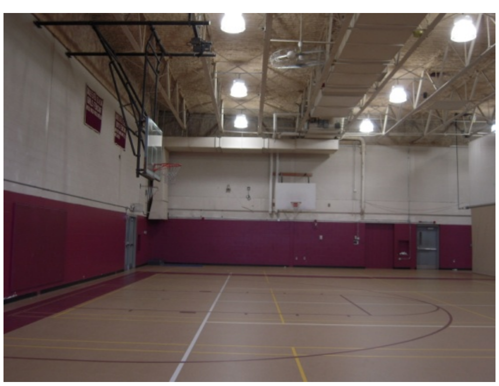

Girls locker room showers

The building envelope for the lower gym is the existing 1970's split faced ribbed block. The building envelope system is poorly insulated and does not provide an air tight barrier. The window units are an aluminum storefront system with single pain glass. Fiberglass doors were installed at the east entry. The building has anodized aluminum fascias. The EPDM roof is in poor condition.


North and west wall at lower gym


Lower gym entry and ramp to performance gym

The lower gym has a worn and faded rubber floor, painted CMU walls, an applied acoustical ceiling with exposed steel trusses and pendant lights. There is a roll up curtain divider that appears to be functioning and batting cage nets that are hung from the roof structure.


Rubber floor in lower gym


Ramp down to lower gym

- \+ Wood floor appears to be in good shape in performance gym
- \+ Bleachers appear to be new in the performance gym
- +/- Most door hardware meets ADA/MAAB requirements
- +/- Rubber floor in the lower gym is durable but outdated
- +/- Boys' and girls' toilet room appear to meet some ADA/MAAB regulations
- \- Door hardware to weight room does not meet ADA/MAAB regulations
- \- Threshold at weight room is not code compliant
- \- Unappealing ceiling in lower gym
- \- Folding partition in the performance gym is broken
- \- Ramp down to lower gym and locker rooms do not meet ADA/MAAB requirements
- \- Boys locker room has gang showers
- \- Stair railings and guardrails do not meet building code regulations in the performance gym
- \- Drinking fountains in stairwell (not accessible)
- \- Steps up to locker room offices are not accessible
- \- Some doors do not have proper accessible maneuvering clearances and/or proper door widths
- \- Exterior single pain glass windows and existing exterior masonry envelope
- \- Water damage on existing masonry
- \- Paint peeling off of exterior metal panels, panels are not insulated
- \- Ponding on roof (PVC roof needs to be re-done)
- \- Exterior doors from lower gym are not accessible

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EXISTING CONDITIONS STUDY - CIVIL
CONCORD CARLISLE HIGH SCHOOL
CONCORD, MASSACHUSETTS

March 8, 2010

Nitsch Engineering has performed research of the existing site conditions and anticipated site permitting requirements for the Concord Carlisle High School located on Thoreau Street in Concord, Massachusetts. Nitsch Engineering's research included an initial site visit/walk through and conversations on November 9, 2009 with David Anderson, School Facilities Manager, Steven Wall, School Building Superintendent, and Principal, Peter Badalament. Information included in this report is also based on existing condition plans and compiled documents gathered by OMR Architects. Nitsch Engineering reviewed the plans and documents in preparing this document.

It should be noted that the Beede Swim and Fitness Center located across the High School's main entrance is not associated with the High School. The Beede Center existing site conditions survey was not included as part of this study.

A summary of our observations and findings are summarized below.

EXISTING SITE UTILITIES

Concord Carlisle High School was constructed in phases. The school was originally constructed in 1960 and consisted of the Science Building, Humanities Building, Theater-Arts Building, and the Dining-Gymnasium Building. These buildings were unconnected. Further school expansion in 1965 and again in 1975 connected the original school buildings with a library, covered walkways, and hallways. Based on record documents, site observations, and conversations with town officials, the summary descriptions below represent the site utility conditions/assumptions as we understand them at this time.

STORM DRAINAGE

Based on information gathered on the site visits and existing design plans, the original and expanded school roof run-off are routed internally into the onsite storm drain system. The roof drainage collection system appears to be conveyed below-grade to connect to an existing 12-inch unspecified type of drain pipe. The drainage systems are split in two (2), with the run-off picked up on the east side of the campus ultimately discharging into a 15-inch reinforced concrete pipe under Walden Street into the Town Forest. The west side run-off is collected into an existing 12-inch unspecified type of drain that discharges into the wetland along the Thoreau Street entrance roadway. An existing reinforced 30-inch concrete culvert conveys the water under Thoreau Street into the wetland.


Culvert under Thoreau Street to wetland


Wetland across Thoreau Street from school entrance

The football field has a separate storm drain system consisting of drain inlets and 12-inch pipe. This system conveys the stormwater to an outlet north of the football field into a drainage ditch. This ditch is shown as a wetland connection on Mass GIS maps and may have implications in permitting any new work around the football field. The ditch is then routed under the Thoreau Street access road and into the wetland, east of the access road. There is a drainage collection system along the western edge of the baseball field that connects to a drain system at the football field. Stormwater on the football field is collected and discharged into the ditch adjacent to the wetland.

Some of the stormwater run-off collected from the rooftops of the newer building additions appear to be conveyed via metal downspouts external to the building that connect to the underground drainage system. There are weep holes that collect some roof runoff in the L-Building that is routed internally and discharges at the wall face to daylight. These weep holes are about an inch in diameter and are partially clogged with debris on the roof which limits their drainage capacity. Covered walkways discharge runoff to the adjacent ground surface.


Weep holes at face of L-Building


Down spout between S and L-Buildings

The drain inlets shown on the record plans indicate that the bottom of the inlets have a 6-inch opening through the bottom of the structure filled with gravel. The inlets act as a leaching basin in addition to conveying larger flows. Given the installation of these inlets were in 1960, it can be assumed that these inlet openings are filled with silt and do not function as originally intended. It should be noted that some inlets were replaced with catch basins when the school expanded.

The site of the Concord Carlisle High School is on the side of a hill. The drainage flows are generally split into two (2) directions; an easterly direction toward Walden Street and a westerly direction toward Thoreau Street. Only a handful of catch basins were observed in paved or landscape areas immediately surrounding the High School. One catch basin was observed in the student parking lot area located east of the Science and Language Buildings. The majority of stormwater landing onsite appears to travel as overland flow into adjacent landscape areas. Runoff that is not absorbed within the landscape is assumed to find its way into the catch basins and drain inlets around the perimeter of the campus.

The catch basins and drain inlets observed are not maintained due to budget and personnel constraints. Conversations with Maintenance Personnel did not indicate that the basins are maintained on a regular schedule. School Maintenance personnel did not indicate any major flooding issues immediately surrounding the High School, any parking lots, and in any interior courtyards.

The courtyard area between the S and I Buildings contains an unlined re-circulated pond with no visible area drains or catch basins within the courtyard. There have not been any reported drainage issues in this or any courtyard areas.

The courtyard behind the library building has two (2) catch basins that are assumed to connect to the existing storm drain system.

The temporary trailer between the L and Arts building has down spouts that discharge to grade and travel overland to catch basins.

In general, the catch basins around the site need to be cleaned and inspected to determine if any structures need to be replaced.

The renovation or reconstruction of CCHS will require new stormwater structures that reduce or eliminate Total Suspended Solids (TSS), infiltrate roof top run-off and reduces the overall rate and volume of stormwater traveling over the site. Any proposed work should include the cleaning of the drainage system from the wetland up to the existing building.

WATER

Concord Carlisle High School is connected to the Municipal water system in Thoreau Street to provide potable water and fire protection. Currently there are no indications from the School Facilities Management that there are issues with the water for the site. Nitsch Engineering contacted the Concord Department of Public Works (DPW) and received a plan that indicates water service to the site. Currently, there is a 12-inch cast iron water line (1961) that runs in Thoreau Street. An 8-inch asbestos concrete (AC) pipe, installed in 1974, that connects to the 12-inch main and loops under the entry road from Thoreau Street to Walden Street. Another 8-inch AC water line extends from the 8-inch water line and loops behind the building to service the fire hydrants. Water service to the school enters the building at A-Building.

Given the age and pipe type, the DPW recommends both 8-inch water lines be replaced with new 8-inch cement lined ductile iron pipe.

Two (2) fire department connections (standpipes) were observed in the courtyard off the gym and cafeteria and south of the H-Building across from the storage trailers at the I-Building.

Six (6) fire hydrants were observed to be within 300 feet of the High School. One (1) is located along the entrance road from Thoreau Street east of the football field. The second fire hydrant is located at the entrance circle of the School across from the Beede Center. The third fire hydrant is located off the access road to Walden Street at the student parking lot. The fourth and fifth hydrants are located south, behind the H-Building and the Gymnasium. The sixth hydrant is located near the Gym parking lot on the slope behind the guardrail to the football field. Nitsch Engineering will further investigate with the Fire Department and the Water Department on the condition of the hydrants, water lines and appropriate life safety requirements for the site.

SEWER

The High School is connected to the Municipal sewer system via a 6-inch sewer line which runs behind the visitor's bleachers in the field parallel to the Thoreau Street road. The School has been connected to the Municipal sewer system since 1974.

Nitsch Engineering received information from the Concord DPW about the existing sewer line at the school. CCHS is connected to an eight inch AC pipe that collects the school waste near A-Building and then travels down the access road, then takes a country route behind the football field visitor bleachers and follows a sewer easement that directs the sewer between house numbers 360 and 364 Thoreau Street where it connects to the 8-inch sewer main. An 8-inch sewer line collects waste from the gym and connects to the sewer line before it travels behind the visitor bleachers.

Sewer location behind bleachers

Sewer manhole

Based on conversations with Facilities Management, there does not appear to be any issues with the main sewer system and its connection to the sewer main. Nitsch Engineering recommends video inspection of the sewer line to determine the pipes integrity. If any part of the system appears compromised, Nitsch Engineering recommends the entire sewer line should be replaced from Thoreau Street up to the building.

NATURAL GAS

Concord Carlisle High School is serviced by natural gas for the kitchen, hot water heater, and an emergency generator. The existing gas service connects to the main gas regulator at the Arts Building which then feed the rest of the campus. The trailer between the Arts and L Building has a gas connection. Nitsch Engineering received plans from Natural Gas that indicate two (2) services that enter the site at the Walden and Thoreau Street intersections. A 2-inch service line comes off the 2-inch main in Thoreau Street. This service travels along the shoulder of the access road and then breaks off into two (2) 2-inch service lines. One (1) line connects to the Beede Center and the other line travels behind the school where it connects to a gas meter at the G Building. This 2-inch line also feeds the temporary trailers located between the L and A Buildings. A 1.5-

inch high pressure service line enters the site from a 2-inch gas main in Walden Street. The 1.5-inch line travels under the access road and connects to the main gas regulator at the A-Building.


Gas regulator for school at Art Building


Gas meter at trailer

The 1.5-inch gas line was installed in 1959 and portions of the 2-inch line were installed in 1990, 2004, and 2007 with the main 2-inch line installed in 1990. There does not appear to be a gas capacity problem based on discussions with the Facility Managers. Any new building construction or renovation will require evaluation by the Plumbing Engineer and Natural Gas to determine appropriate gas main and service sizing.

UNDERGROUND/ABOVE GROUND TANKS

Based on record drawing information provided and a report prepared by Symmes, Maini and McKee Associates, there does not appear to be any fuel oil tanks located on the campus. All mechanical equipment, including the boilers, is gas-fired, except for one (1) emergency generator which runs on diesel. Nitsch Engineering will confirm the location with Facilities personnel.

Grease traps are located internally in the building.

The septic system was abandoned in place in 1974. The system consisted of two (2) tanks and a leach field at the time of abandonment. The location of the leach field and tanks are near the access road across from the student parking lot on the north side of the Walden Street entrance.

ELECTRICAL

Overhead wires were observed to enter the campus from Thoreau Street. The wires are fed to underground conduits that run along the east side of the Thoreau Street entrance presumably for the Beede Center. It appears that power may also enter along utility poles off of Thoreau Street for the school. Based on information obtained from the Concord Municipal Light Plant, there are two (2) electrical feeds entering the site. The first feed is off Thoreau Street from utility pole 39 to underground conduits. This electrical service connects to the Beede Center and the CCHS gym. There is also a feed to the equipment shed and broadcast booth at the football field. Lights for the football field are powered from this feed. The existing electrical service replaces the original electrical service for the school that came off utility pole 41 off Walden Street.

A second service off Walden Street off utility pole 42 with 2-4-inch electric and 1-4-inch communication feed that follows the access road past the L and S Buildings, through the bus parking lot up to the turf field and parking lot to power the lights and appurtenances at the upper field. The JV field does not have an electric feeds. The tennis court has lights

Underground electric service to Beede Center

SITE CONDITIONS AND OPERATIONS

SOILS

Based on the Natural Resources Conservation Service (NRCS) Web Soil Survey (2009), the majority of the Concord Carlisle High School property is unclassified urban area. The adjacent areas to the school are classified as Merrimac fine sandy loam, Windsor loamy sand, and Hinckley loamy sand. The rest of the site is classified as Udorthents (unclassified). The Merrimac, Windsor, and Hinckley soils are generally well drained classified as hydraulic soil group A (HSG A). Based on the record information available the soil is a generally sand with groundwater generally 10 feet or greater below grade.

PAVEMENT

The asphalt pavement in the parking lots, service drives, and walkways adjacent to the school were observed to have a high severity of cracking and degradation. The asphalt curb is in fair to poor condition through out the site. The parking lot at the Gymnasium is in poor condition. Bituminous curbing was observed at all sidewalk areas except at some handicapped ramps where concrete was used. There is no curbing at the parking lot except for concrete wheel stops at the handicapped parking spots.

Cracks in pavement

Concrete cracking in courtyard

Sloped vertical granite curb is located along the curve at the entrance at Walden Street. The Thoreau Street entrance has bituminous curb.

The bituminous and concrete pavements in the courtyards are in poor condition at all locations.

SNOW REMOVAL

The Facilities Maintenance personnel indicated that snow is not removed from the property; rather, it is moved to the edge of parking lots and walkways into grassy areas. A snow blower is used to move snow over the fence at the parking lot into the adjacent grassy area.

DUMPSTER

Dumpsters are located at various locations throughout the school, generally on paved surfaces. Except for the dumpsters located near the cafeteria, there were no enclosures for the dumpsters.

Dumpsters behind cafeteria

Bins near the S-Building

EXISTING FIELDS/TENNIS COURTS

CCHS has a large open area between the Gym and Massachusetts Bay Transit Authority (MBTA) railroad tracks that are used for athletics and gym. Although the fields are infrequently watered and aerated about once per year, they are generally not extensively maintained.

The field has bare spots and uneven ground due to compacted soils. Upgrading the fields to an appropriate playing level would require the removal of the existing grass and loam up to 8 inches in depth. The new surface would require new loam, up to 8 inches, and seed. Also, a network of drainage pipes to provide a well drained even surface practice area is recommended.

There is another practice field between Walden Street and the student parking lot. This field also requires 8 inches of new loam and seed along with an under drain system. Any work performed at this field should maintain the row of trees along the east side of the field to provide a buffer for the neighbors.

The slopped area and hill near and above the lower gym parking lot is a popular sledding location.

The tennis courts, near the JV field, are cracked. Nitsch Engineering recommends the re-surfacing of the tennis courts.


Baseball fields


Practice fields

PRELIMINARY PERMITTING CONSIDERATIONS

WETLANDS PROTECTION ACT (310 CMR 10.00)

The Wetlands Protection Act ensures the protection of Massachusetts' inland and coastal wetlands, tidelands, great ponds, rivers, and floodplains. It regulates activities in coastal and wetlands areas, and contributes to the protection of ground and surface water quality, the prevention of flooding and storm damage, and the protection of wildlife and aquatic habitat.

A review of the Massachusetts Department of Environmental Protection (DEP) wetland layers available on the Massachusetts Geographic Information System (MassGIS), dated April 2007, appear to indicate that the High School has wetlands located to the north of the football field, east of the entry road off Thoreau Street and an extensive wetland across Thoreau Street at the entrance. Based on the MassGIS information, there may be a wetland connection that may be considered a perennial stream.

SURFACE WATER SUPPLY PROTECTION (310 CMR 22.20)

The Massachusetts Department of Environmental Protection (DEP) ensures the protection of surface waters used as sources of drinking water supply from contamination by regulating land use and activities within critical areas of surface water sources and tributaries and associated surface water bodies to these surface water sources.

A review of the Massachusetts DEP resource layers available on the MassGIS indicates the High School is located within an Interim Well Protection Area (IWPA).

NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM

A review of the 13th Edition of the Massachusetts Natural Heritage Atlas prepared by the Natural Heritage and Endangered Species Program (NHESP), dated October 1, 2008, indicates that the High School site is NOT located within a Priority Habitat of Rare Species or an Estimated Habitat of Rare Wildlife.

FLOOD PLAIN

Based on the Flood Insurance Rate Map (FIRM), Community Panel Number 250189 0010 B, dated June 3, 1988 the site is located within Zone C (Areas of minimal flooding).

ZONING

Concord Carlisle High School is located in the Residence A Zoning District. According to the schedule of permitted uses, schools are considered a permitted principal use under the Residence A Zoning District.

US EPA NPDES

Construction activities that disturb more than one acre are regulated under the United States Environmental Protection Agency's (EPA) National Pollution Discharge Elimination System (NPDES) Program. In Massachusetts, the USEPA issues NPDES permits to operators of regulated construction sites. Regulated projects are required to develop and implement stormwater pollution prevention plans in order to obtain permit coverage.

SEWER CONNECTION PERMIT (314 CMR 7.00)

New connections to sanitary sewers, increases in flow to existing sanitary sewers, and discharges from businesses that are not considered to be "industrial wastewater" are subject to state requirements based on their expected discharge volume:

- Discharges ≤ 15,000 gallons per day (gpd) will need only local approvals (no approvals by MassDEP)
- Discharges >15,000 gpd but ≤ 50,000 gpd must file a one-time certification statement with MassDEP within 60 days after the connection starts to be used
- Discharges of > 50,000 gpd must obtain a MassDEP permit before construction

Nitsch Engineering will review the projected sanitary flows for the High School to verify whether the project will exceed the 15,000 gallon per day threshold.

SUSTAINABLE SITE POSSIBILITIES

A new or reconstructed building provides opportunities to incorporate sustainable features which may help achieve Massachusetts Collaborative for High Performance Schools (MA-CHPS) points for funding.

Bio-Swales are grassed channels that capture runoff from parking lot and walkway that remove sediment from stormwater. Bio-swales can be used throughout the site, primarily along parking lot edges and access roads.

Rain Gardens use soils, plants, and microbes to treat stormwater before it is infiltrated and or discharged. Rain gardens are shallow depressions filled with sandy soil topped with a thick layer of mulch and planted with dense vegetation. Rain gardens can be utilized in parking islands and within the site to treat road run-off.

Rain Garden

Porous Pavement and Porous Concrete

Porous Pavement is a paved surface with a higher than normal percentage of air voids to allow water to pass through it and infiltrate in the subsoil. Porous pavement, like all drainage systems, requires maintenance at least twice per year. Due to its frequent maintenance porous pavement is not a preferred option at CCHS.

Subsurface Structures are underground systems that capture run-off (usually rooftop) and gradually infiltrate it into the groundwater. This method of infiltrating stormwater saves space by placing the system under parking lots or fields.

Based on the Natural Resources Conservation Service (NRCS) Web Soil Survey (2009), test pits and geotechnical information; it appears that the site has a significant sandy soil layer which is excellent at providing adequate treatment and infiltration of stormwater into the ground.

Opportunities for rainwater reuse are possible at a new or renovated CCHS. However, the initial capital required for tanks, pumps and dual plumbing may be prohibitive in providing payback for water reuse.

Appendix A - Maps

Flood Insurance Rate Maps

Town of Concord GIS Information

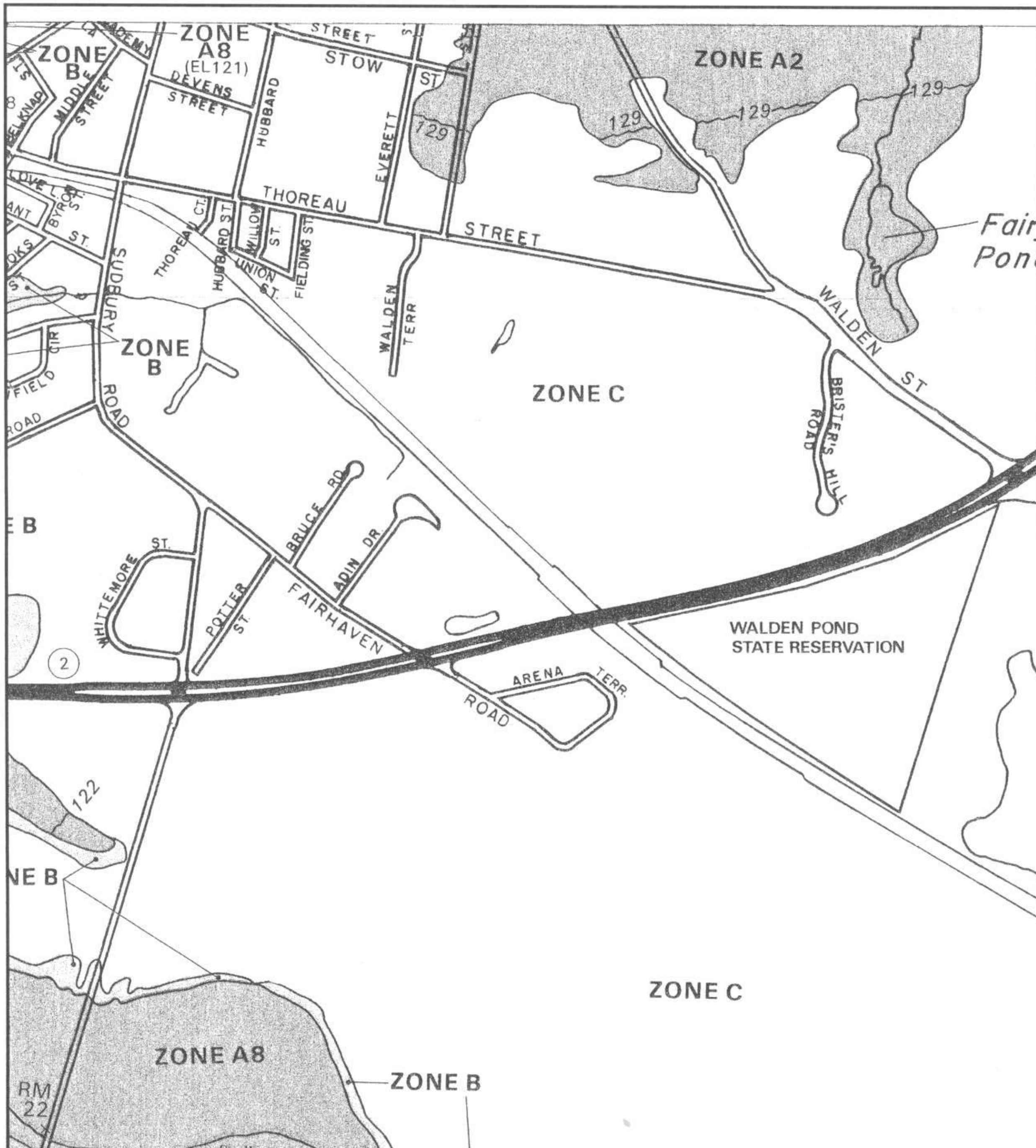
2008 Priority and Estimated Habitat

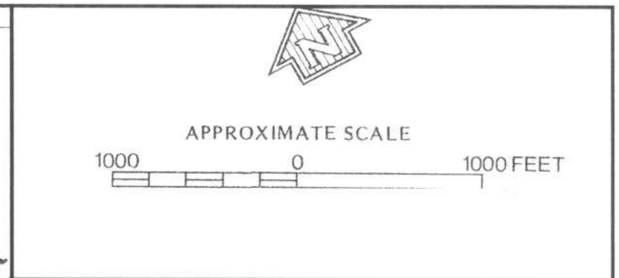
DEP Wetlands

Topographic Map

Soil Map

Practice Field Area Maps





NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

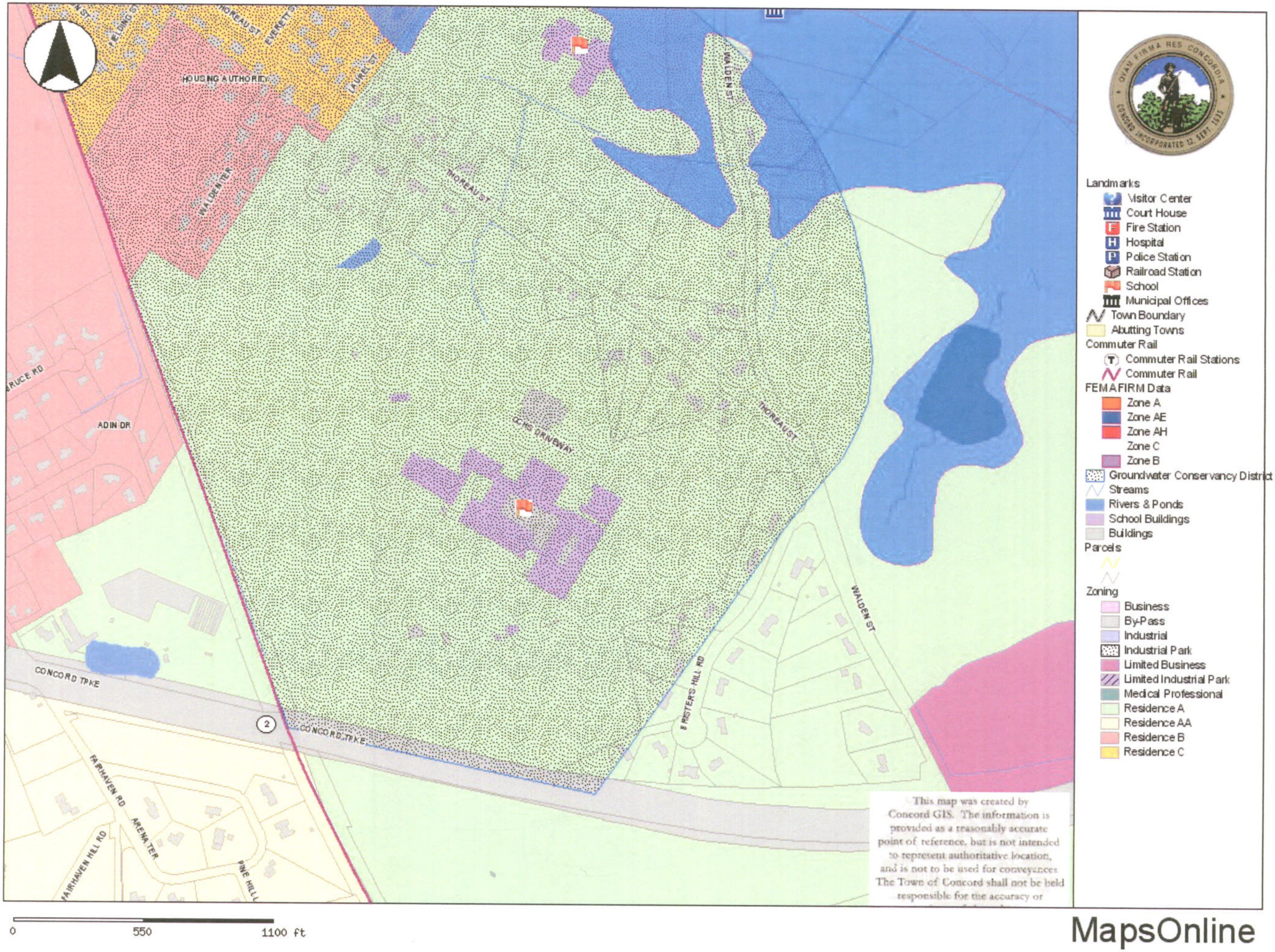
TOWN OF
CONCORD,
MASSACHUSETTS
MIDDLESEX COUNTY

PANEL 10 OF 10
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
250189 0010 B

MAP REVISED:
JUNE 3, 1988

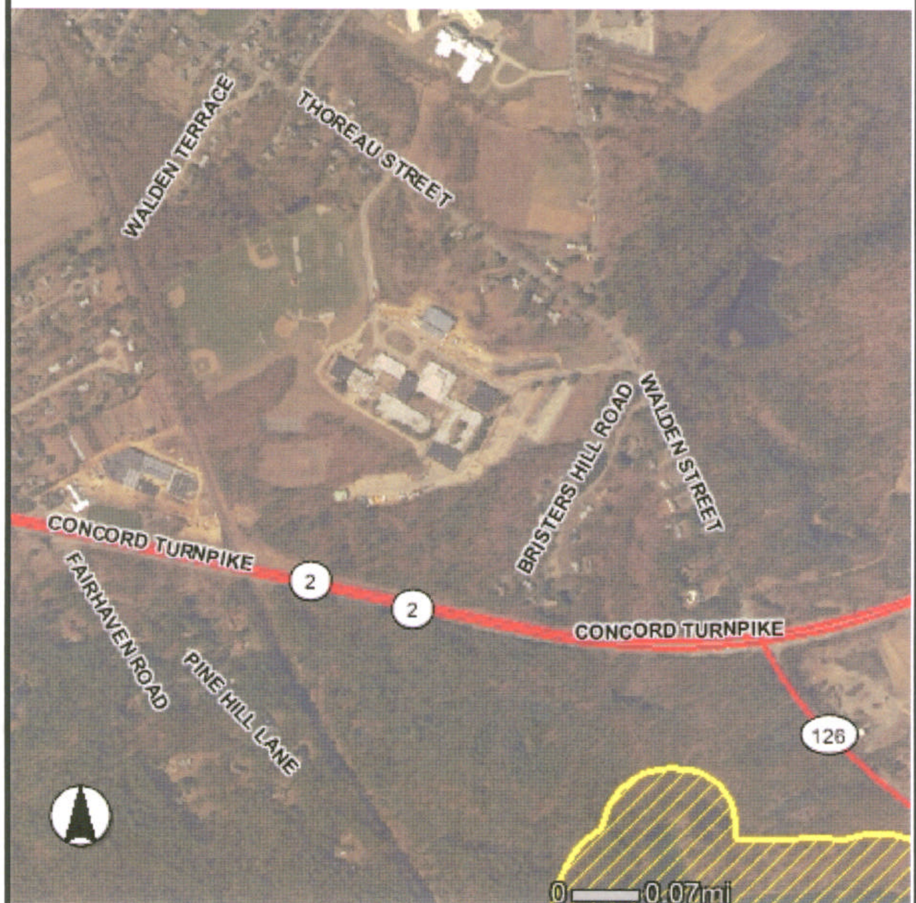
Federal Emergency Management Agency



HOUSING AUTHORITY
THOREAU ST
EVERETT ST
LAUREL ST
FIELDING ST
WALDEN TER
WALDEN ST
CCHS DRIVEWAY
SISTERS HILL RD
CONCORD TPKE
2
BRUCE RD
ADIN DR
FAIRHAVEN RD
FAIRHAVEN HILL RD
ARENA TER
PINE HILL
QVAM FIRMA RES CONCORDIA
CONCORD INCORPORATED 12 SEPT. 1635
Landmarks
Visitor Center
Court House
Fire Station
Hospital
Police Station
Railroad Station
School
Municipal Offices
Town Boundary
Abutting Towns
Commuter Rail
Commuter Rail Stations
Commuter Rail
FEMA FIRM Data
Zone A
Zone AE
Zone AH
Zone C
Zone B
Groundwater Conservancy District
Streams
Rivers & Ponds
School Buildings
Buildings
Parcels
Zoning
Business
By-Pass
Industrial
Industrial Park
Limited Business
Limited Industrial Park
Medical Professional
Residence A
Residence AA
Residence B
Residence C
This map was created by Concord GIS. The information is provided as a reasonably accurate point of reference, but is not intended to represent authoritative location, and is not to be used for conveyences. The Town of Concord shall not be held responsible for the accuracy or
0
550
1100 ft

MapsOnline

2008 Priority Habitat and Estimated Habitat Natural Heritage & Endangered Species Program-CCHS



Legend

EOT-OTP Roads Names

EOT-OTP Roads

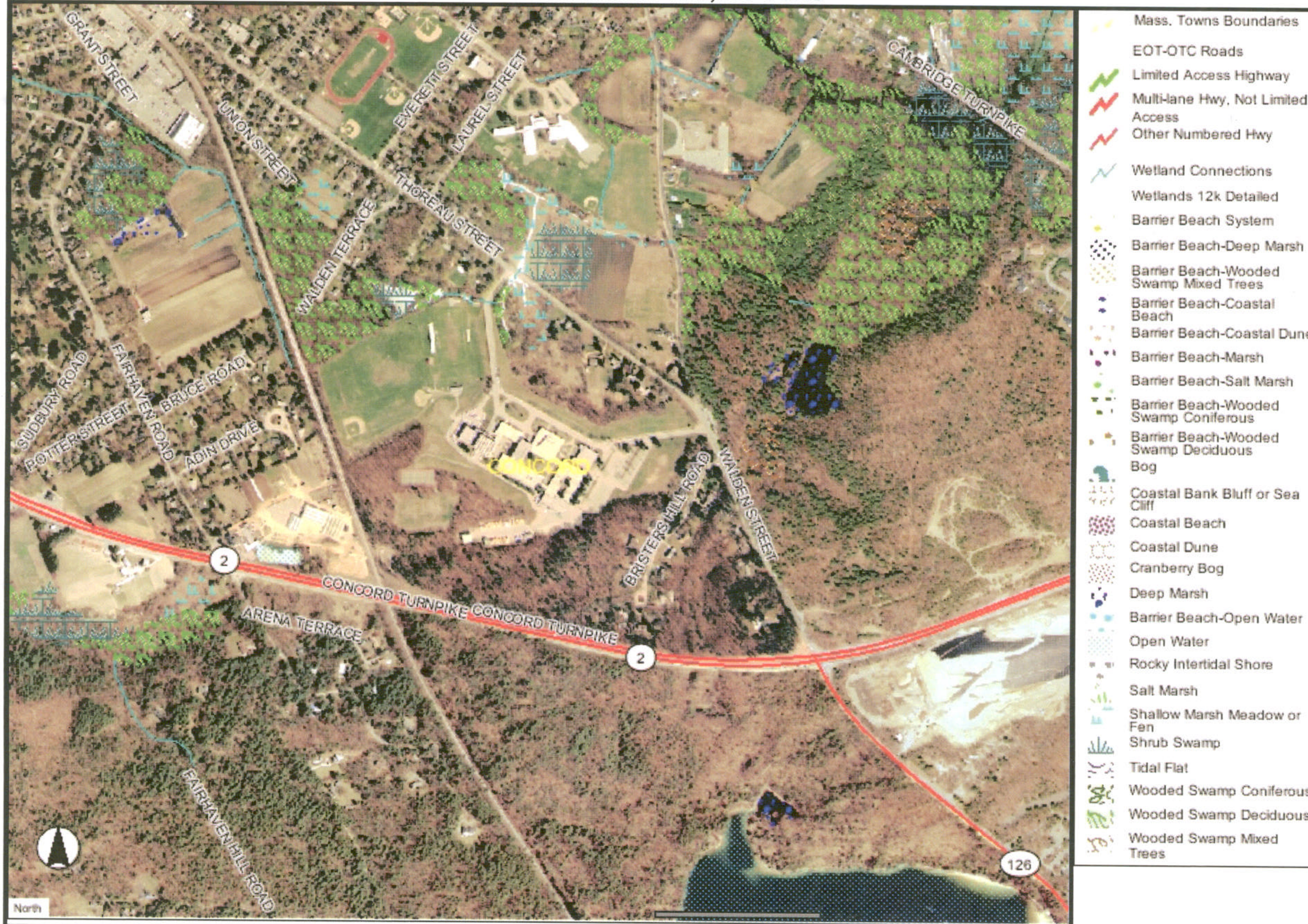
- Limited Access Highway
- Multi-lane Hwy, Not Limited Access
- Other Numbered Hwy

NHESP 2008 Priority Habitats of Rare Species and also Estimated Habitats of Rare Wildlife

NHESP 2008 MA Priority Habitats of Rare Species

Color Orthos 2005

DEP Wetlands 1:12,000-CCHS



MassGIS Topographic Map-CCHS

Map Scale: 1:5,640 if printed on A size (8.5" x 11") sheet.

N

Meters: 0, 50, 100, 200, 300

Feet: 0, 300, 600, 1,200, 1,800

Map Unit Legend

Middlesex County, Massachusetts (MA017)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
6A	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	0.1	0.1%
32B	Wareham loamy fine sand, 0 to 5 percent slopes	0.1	0.2%
253D	Hinckley loamy sand, 15 to 25 percent slopes	4.8	6.3%
253E	Hinckley loamy sand, 25 to 35 percent slopes	4.0	5.3%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	16.5	21.8%
255B	Windsor loamy sand, 3 to 8 percent slopes	0.6	0.8%
255C	Windsor loamy sand, 8 to 15 percent slopes	7.9	10.5%
256A	Deerfield loamy sand, 0 to 3 percent slopes	1.5	2.0%
602	Urban land	18.0	23.8%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	0.6	0.8%
653	Udorthents, sandy	9.4	12.4%
654	Udorthents, loamy	12.0	15.9%
Totals for Area of Interest		**75.6**	**100.0%**

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25 November 2009

MEMO

To: Whitney Granger

From: David Kessler

Re: Concord-Carlisle Regional High School
Accessibility Requirements

The Concord Carlisle High School (CCHS) is located at 500 Walden Street Concord, MA. OMR is developing a Master Plan for the CCHS and has retained KMA to assist them in insuring the master plan accounts for all applicable state and federal accessibility requirements. This memo summarizes the state and federal accessibility regulations that apply to any renovations of, or additions to, the CCHS. The requirements of these regulations may affect decisions regarding program spaces and/or phasing. In preparing this memo I reviewed relevant sections of the 2005 SMMA report. According to this report, the school was constructed in 1960 and 1965 with additions in 1975 and renovations in the 'early 1990's." Accessibility issues identified in the SMMA report include:

- Identification, in the NEAS & C letter of April 2005:
    - The lack of an accessible toilet room for the Pathway program;
    - Insure compliant ramps are provided in the Media Center
    - Repair/replace all non-operational water fountains
- The slope of the auditorium floor;
- Many interior doors lack required clearances;
- Many toilet rooms are not full compliant;
- The Auditorium stage and platforms in the Chorus Room and Little Theater;
- Library ramps are not compliant;
- The ramp to the Gym's lower level lockers;
- The exterior ramp connecting wings H & S;
- Accessibility to the two level courtyard;
- Accessible seating areas in the Auditorium and bleachers;
- Copy areas and kitchenettes.

OMR should confirm whether any work has been since the SMMA report addressing any of these issues.

Regulatory Context

There are both state and federal accessibility regulations that apply to the High School, including:

- Section 504 of The Rehabilitation Act of 1973[1]
- 28 CFR Part 35: Nondiscrimination on the Basis of Disability in State and Local Government Services – U.S. Department of Justice regulations Implementing Title II of the Americans with Disabilities Act (ADA)
    - o Public entities such as the Town of Concord Carlisle may choose from two design standards for new construction and alterations. They can choose either the Uniform Federal Accessibility Standards (UFAS) or the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG), which is the standard that must be used for public accommodations and commercial facilities under title III of the ADA. If ADAAG is chosen, however, public entities are not entitled to the elevator exemption. There are many differences between UFAS and ADAAG and it is difficult to say one is stricter. (see Appendix - ADAAG/UFAS Differences). One standard must be followed for the entire facility/project. It is important to note that UFAS is the standard referenced by the US Department of Education for 504 compliance.
- *521 CMR – The Rules and Regulations of the Massachusetts Architectural Access Board (MAAB)*

The Concord Carlisle High School project is commencing at a time of transition in the federal standards for accessibility. I recommend that once the parameters of the planned alterations are established, the issue of applicable codes should be revisited and the more stringent requirements be identified.

In summary, the requirements of these regulations are:

- Whether or not alterations are performed, the High School must insure that people with disabilities have equal access to <u>all of the programs and services</u> provided at the High School.
- Any element or space that is altered must comply with the accessibility standard in effect at the time of that the building permit is issued.
- The ADA requires that an accessible path of travel be provided to altered primary function areas.
- If the costs of the alterations exceed 30% of the *full and fair cash value of the building*[2], the entire building must comply with 521 CMR.

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[1] The Rehabilitation Act of 1973 applies to any entity that receives federal funds for any purpose.

[2] **FULL AND FAIR CASH VALUE OF THE BUILDING**: The assessed valuation of a *building* (not including the land) as recorded in the Assessor's Office of the municipality at the time the *building* permit is issued as equalized at 100% valuation. The 100% equalized assessed value shall be based upon Massachusetts Department of Revenue's determination of the particular city's or town's assessment ratio.

504/ADA PROGRAM ACCESSIBILITY

Whether or not alterations are performed at the High School, the Towns of Concord and Carlisle have an obligation to insure that all of programs and services provided at the Concord Carlisle High School are accessible to individuals with disabilities.

ADA Title 11 and Section 504 require covered entities to operate each program so that, when viewed in its entirety, the program is readily accessible to and usable by people with disabilities [28 C.F.R. § 35.150(a) and 34 C.F.R. § 104.22(a)]. This is known as the *program accessibility* standard. The Concord Carlisle High School must make its programs and activities accessible unless it can demonstrate that required modifications would result in a fundamental alteration of the program or in undue financial and administrative burdens. In addition to the academic programs of the school, Appendix A of the SMMA report provides a Community Use Summary that identifies over 130 activities, clubs, events, etc. that are held at the school and must be accessible.

Both Title 11 of the ADA and Section 504 require that a new or altered facility (or the part that is new or altered) be readily accessible to and usable by individuals with disabilities [28 C.F.R. § 35.151 and 34 C.F.R. § 104.231. The new construction and alterations requirements focus on providing physical access to buildings and facilities rather than on providing access to programs and services. There is no fundamental alteration or undue burden limitation on the new construction and alterations requirements.

Neither regulation requires public entities or recipients to make all existing facilities, or every part of the existing facility, accessible to and usable by individuals with disabilities, as long as the program viewed as a whole is accessible. The following are examples of programs or activities that, when viewed in their entirety, must be readily accessible to and usable by individuals with disabilities: academic programs; food services; library services; health services; counseling; physical education; athletics; recreation; transportation; extracurricular activities, including school clubs and other after-school activities, as well as events open to the public; graduation ceremonies; vocational programs; apprenticeship programs; and employer recruitment opportunities. This list is, of course, not intended to be exhaustive.

Mitigation of architectural and communication barriers that are structural in nature is only necessary if other means for providing *program access* are not successful. Other means of providing program access include operational and policy changes. For example, a class held in an inaccessible space can be relocated to an accessible space. Both 504 and the ADA require that the Towns of Concord/Carlisle perform a *Self Evaluation* of its programs and services to identify barriers to full accessibility. The *Self Evaluation* is required to identify changes in operations and policy that will be implemented to provide accessibility. If architectural barrier removal is necessary and cannot be completed in one year, the public entity is required to develop a *Transition Plan* that identifies the barrier, the planned mitigation and a schedule for implementation that includes measurable benchmarks. OMR should review the Town of Concord/Carlisle's 504/ADA Self Evaluation and Transition Plan.

ALTERATIONS

Alterations of the Concord Carlisle High School must be performed in compliance with ADAAG and 521 CMR.

> Note: "While the Section 504 regulation provides that compliance with the provisions of the Uniform federal Accessibility Standards (UFAS) constitutes compliance with the provisions of Section 504, the US department of Justice has taken the position that compliance with ADAAG would also constitute compliance with Section 504 requirements. Thus, a recipient could opt to comply with the ADAAG standards and would be in compliance with both section 504 and Title II."[3]

ADAAG. The ADA is a federal civil rights statute and is therefore not enforced by local building inspectors. Its enforcement is driven by complaints by individuals or the US Attorney General's office.[4] Normal maintenance, re-roofing, painting or wallpapering, or changes to mechanical and electrical systems are not alterations unless they affect the usability of the building or facility. Limits on the Town of Concord Carlisle's obligations to fully comply with ADAAG are summarized in the Appendix to this memo - Limitations on Barrier Removal Requirements.

In July 2004, the Federal Access Board issued updated accessibility guidelines for new or altered facilities covered by either the ADA or the 1968 *Architectural Barriers Act.* The "new ADAAG" is an updated version of the original 1991 *ADA Accessibility Guidelines* (ADAAG) and has been adopted by the US Departments of Transportation and Defense (US DoT and DoD), the General Services Administration (GSA) and the US Postal Service. It has not yet been adopted by the US Department of Justice (US DoJ) adoption is expected in 2010. Examples of differences between the existing standard and ADAAG 2004 include:

Element/Requirement	ADAAG 1994	ADAAG 2004
CL of water closet to near side wall	18"	16" – 18"
High side reach	54" AFF	48" AFF
Van accessible spaces	1 for every 8	1 for every 6
Clear maneuvering space at doors	_	Within 8" of door plane

<u>Depending upon the date of adoption and effective date established by the US DoJ, ADAAG 2004 may be the enforceable design standard for the Concord Carlisle High School project. Once adopted by the Department of Justice, it is expected that it will replace UFAS as the referenced standard for the 504.</u>

[3] Compliance with the Americans with Disabilities Act; A Self-Evaluation Guide for Public Elementary and Secondary Schools.
[4] The ADA defines as discrimination *"...failure to make alterations in such a manner that, to the maximum extent feasible, the altered portions of the facility are readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs...."*

It should be noted that ADAAG requires that alterations to employee areas be compliant. Employee common use areas (staff toilet rooms, faculty lounges, etc) must meet the same accessibility standards as public areas. Employee only work areas must be "approachable enterable and exitable" – maneuvering space is not required within the spaces. As design development progresses, I recommend that the review of public, employee common use and work areas be ongoing.

ADA ACCESSIBLE PATH OF TRAVEL
The ADA accessible path of travel requirement states: "*When alterations are made to a* *__primary function area__* *that affect the* *__usability__* *of that area, alterations to provide an* *__accessible path of travel__* *to the altered area must also be made unless the cost is* *__disproportionate__*".

A *__primary function area__* is an area of a facility that houses a major activity for which the facility is intended. This includes employee areas as well as public areas. At the Concord Carlisle High School, primary function areas include all of the program space as well as office areas. Primary function areas do not include the lobbies, elevators, or bathrooms.

Alterations that trigger the accessible path of travel requirement are only those that affect the *__usability__* of the space. Moving partitions and walls affect the usability. Repainting or alterations to windows, hardware, controls, electrical outlets, and signs do not. The path-of-travel is also not triggered if alteration work is limited solely to the electrical, mechanical, or plumbing system, unless the project involves alteration to elements required to be accessible - such as toilets and electrical outlets.

The *__accessible path of travel__* includes the following elements, in order of priority:

- accessible entrance
- accessible route to the altered area
- at least one accessible restroom for each sex or a single unisex restroom
- accessible telephones
- accessible drinking fountains
- accessible parking
- accessible storage
- accessible alarms
- accessible signage

The impact of this requirement is that barrier removal may be required for elements or spaces that are not included in the project scope of work. For example, alterations may not be planned for an inaccessible toilet room because an accessible toilet room is nearby. However, if the inaccessible toilet room is closer to an altered primary function area, then barrier removal must be performed despite the nearby accessible toilet room.

Accessible path of travel costs that exceed 20% of the primary function area's alteration costs are deemed *__disproportionate__*, and are not required. The ADA "accessible path of travel" requirement is also colloquially known as the "20% requirement", in reference to owners' limitation to affirmatively remove barriers. The Town of Concord/Carlisle never has to spend more than 20% of the cost of an alteration to a primary function area on barrier removal from the path of travel. Note that once a path of travel is fully accessible, no additional expense or barrier removal actions are required.

Cumulative obligation over 3 years. The accessible path of travel requirement is cumulative over 3 years. Specifically: *"If an area containing a primary function has been altered without providing an accessible path of travel to that area, and subsequent alterations of that area, or a different area on the same path of travel, are undertaken within three years of the original alteration, the total cost of alterations to the primary function areas on that path of travel during the preceding three year period shall be considered in determining whether the cost of making that path of travel accessible is disproportionate."* This rule was established so that property owners would not try to avoid accessible path of travel barrier removal by phasing alterations into smaller projects. At the CCHS, if smaller alterations are undertaken to spaces along a single path of travel (i.e. using the same entrance, elevator, or toilets), then the costs associated with providing an accessible path of travel can (and must) be aggregated over three years.

<u>Once the conceptual plan for the planned alterations is established, I recommend that we review the different building areas to identify the impact of the accessible path of travel requirement.</u>

AAB. Alterations to the CCHS that are "open to and used by the public" must be constructed in conformance with 521 CMR. The MAAB's regulations are incorporated by reference into the State Building Code. As a result, they are enforced by state and local building inspectors, as well as the MAAB.

MAAB defines alterations as: "A change or modification of a building or structure, or portion thereof, that requires a building permit. Alterations shall include but not be limited to: remodeling, renovation, rehabilitation, reconstruction, historic restoration, changes or rearrangements in the plan configuration of walls and full height partitions, and any repairs which require a building permit. Ordinary repairs as defined in *780 CMR: The State Building Code* are not alterations." This definition is substantially similar to the ADAAG definition, although it is not based on "usability". In fact, it is possible to trigger 521 CMR obligations by undertaking a substantial amount of remodeling (i.e., paint, paper, and/or carpeting that exceeds $100,000 <u>and</u> 5% of the property's equalized assessed value).

$100,000 and 30% Triggers. If the cost of alterations to areas of the CCHS which are open to and used by the public exceeds $100,000 within a 36 month period, then the MAAB requires that an accessible entrance be provided. In addition, if toilets, telephones, or drinking fountains are available to the public, then an accessible toilet, telephone, and drinking fountain must also be provided. This requirement is designed to reflect - although not replicate - the ADA accessible path of travel requirement described below.

If the costs of alterations performed over a 36 month period exceed 30% of the 100% equalized assessed value of the building (as on record at the City Assessor's Office), then all areas open to and used by the public must be made accessible. This requirement is unique to 521 CMR, having no similar counterpart in ADAAG.

Based on the above summary, KMA recommends:

- Existing ADA/504 Self-Evaluation and Transition Plans be identified and reviewed;
- The assessed value of the building be established;
- Determine whether the estimated cost of alterations will trigger full compliance under 521 CMR 3.3.2;
- Review planned scope of work to determine accessible path-of-travel obligations;
- Review planned exterior scope of work to determine extent of accessible site requirements.
- Review plans for accessibility at schematic and design development stages.

Please call if you have any questions regarding this memo.

Appendix: LIMITATION ON BARRIER REMOVAL REQUIREMENTS

Following is a summary of the various limitations on barrier removal requirements allowed by ADAAG and AAB.

Structural Impracticability

ADAAG 4.1.1(5) (a)
New Construction

In new construction, the Town of Concord/Carlisle is not required to meet fully the requirements of these guidelines where it can demonstrate that it is structurally impracticable to do so. Full compliance will be considered structurally impracticable only in those rare circumstances when the unique characteristics of terrain prevent the incorporation of accessibility features. If full compliance with the requirements of these guidelines is structurally impracticable, a person or entity shall comply with the requirements to the extent it is not structurally impracticable. Any portion of the building or facility which can be made accessible shall comply to the extent that it is not structurally impracticable.

...to the maximum extent feasible...

ADAAG 4.1.6(1) (j) EXCEPTION
Alterations

In alteration work, if compliance with 4.1.6 (Accessible Buildings: Alterations) is technically infeasible, the alteration shall provide accessibility to the maximum extent feasible. Any elements or features of the building or facility that are being altered and can be made accessible shall be made accessible within the scope of the alteration.

Senate Report 101-116, at 68

The term...should be construed as not requiring entities to make building alterations that have little likelihood of being accomplished without removing or altering a load bearing structural member unless the load-bearing structural member is otherwise being removed or altered as part of the alterations.

Technical Infeasibility

ADAAG 4.1.6(1) (j) EXCEPTION
Alterations

Technical infeasibility means, with respect to an alteration of a building or a facility, that it has little likelihood of being accomplished because existing structural conditions would require removing or altering a load-bearing member which is an essential part of the structural frame; or because other existing physical or site constraints prohibit modifications or addition of elements, spaces, or features which are in full and strict compliance with the minimum requirements for new construction and which are necessary to provide accessibility.

Equivalent Facilitation

ADAAG 2.2
New Construction and Alterations

Departures from particular technical and requirements of this guideline by the use of other designs and technologies are permitted where the alternative designs and technologies used will provide substantially equivalent or greater access to and usability of the facility.

(d) Accessible routes from an accessible entrance to all publicly used spaces on at least the level of the accessible entrance....
(e) Displays and written information, documents, etc., should be located where they can be seen by a seated person. Exhibits and signage displayed horizontally (e.g. open books), should be no higher than 44 in. above the floor surface.

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BUILDING ENCLOSURE EXISTING CONDITION REPORT

Concord Carlisle Regional High School

500 Walden Street, Concord, Massachusetts

As a part of an integrated design team led by The Office of Michael Rosenfeld, Inc. (OMR), Wiss Janney Elstner Associates, Inc. (WJE) has completed a review of the existing conditions of building enclosures at the Concord Carlisle Regional High School (CCHS) located in Concord, Massachusetts. The findings in this study will be used by OMR and the Concord Carlisle High School Facilities Master Plan Committee to develop a plan that identifies the existing deficiencies, needed systems upgrades, and new space requirements of the 500 Walden Street complex. The master plan will create a framework for a transformative solution to address facility requirements to support CCHS's educational requirements for the future. This report summarizes WJE's observations related to the building enclosure and related documents in terms of conditions and energy efficiency.

Background

The building complex was completed in three phases:

- Buildings A, H, the west half of S, cafeteria, and upper gymnasium were designed in 1958 and dedicated in 1960
- The east half of building S was designed in 1964 and dedicated in 1965
- Buildings I, L, library and lower gymnasium were designed in 1973 and dedicated in 1975

The building enclosures for buildings A, H, S, cafeteria and upper gymnasium were designed as steel framed structures with aluminum framed single pane glass and insulated metal panel curtain walls with built-up roofing over 3” Tectum decking supported by steel bulb tees. (Figure 1 to Figure 7) During a 1992 renovation, many of the exterior aluminum curtain wall systems were removed and replaced with brick veneer over 2” air space over building paper over 1/2” exterior gypsum sheathing over 6” metal studs insulated with batt insulation over 6 mil polyethylene vapor barrier over 5/8” gypsum wallboard. (Figure 10 to Figure 12) Some of the original glass and insulated metal panel curtain walls exist at breezeways, the cafeteria and along the walkway to the upper gymnasium.

The building enclosures for buildings I, L, library, and lower gymnasium include exterior walls with 4” split face concrete block over 1-5/8” airspace with 1” rigid insulation over 6” concrete block and 5/8” interior plaster finish. According to the construction drawings, the original low sloped roofs included composition [sic] roofing over 2” rigid insulation over 1-1/2” metal deck over open web steel joists. (Figure 8 and Figure 9)

Roofing replacement work was completed at buildings I, L, library, and lower gymnasium in 1992. The original composite roofing and 2” rigid insulation was replaced with a VersiGard EPDM single-ply membrane manufactured by Goodyear over new 3” rigid insulation.

Roofing replacement work was completed at buildings A, H, S, cafeteria and upper gymnasium as each of these roofs have a Sarnafil PVC single ply membrane. The existing PVC roofing membrane is identified on the 1996 construction drawings, so replacement occurred sometime between 1974 and 1996 and was not included in the 1992 construction drawings.

The construction drawings indicate that except at areas where mechanical tunnels and boiler/mechanical rooms are located below grade, most of the buildings include concrete slabs on grade over a gravel base with 2” of rigid insulation at the perimeter foundation walls extending 2 feet below grade.

Existing Conditions

WJE visited the site twice and reviewed the construction documents related to original construction in 1958, 1964, and 1973 and the major renovations completed in 1992 and 1996. We offer the following observations related to the building enclosure construction and condition:

Building A, S, and H

- The masonry walls that were added in 1992 are in relatively good condition (Figure 16)
- The windows include thermally broken aluminum frames with 1” insulated glass units (Figure 14)
- Sealant joints are in good condition
- The modifications made to the exterior walls were designed to improve the thermal performance of the original curtain wall framing, but several details from the original construction limited the thermal upgrades including the roof/wall interface where steel beams are not thermally broken from the exterior cornice fascia. (Figure 13 and Figure 15)
- The insulated metal panels at the roof level of the auditorium in building A are in poor condition with deteriorated sealant joints.
- The PVC roofing is in fair condition with patches and areas of ponding water (Figure 26 and Figure 27)

Buildings I, L, library and lower gymnasium

- The splitface concrete masonry unit cladding is in fair condition. The block was laid up in a stack bond and some cracking was observed at mortar joints. (Figure 17 to Figure 20)
- Sealant joints are in poor condition. (Figure 21)
- The EPDM roofing is in poor condition with patches and open splits observed at the library roof. (Figure 28 and Figure 29)

Upper gymnasium and cafeteria

- Original curtain wall construction exist at many of the exterior walls (Figure 22 and Figure 23)
- The steel structure for the upper gymnasium exists outside the building enclosure and penetrates through the roofing enclosure; it is a serious thermal bridge.
- Steel framed columns and beams are exposed to exterior temperatures at curtain wall construction. (Figure 24)
- Masonry and windows added at some of the exterior walls at the cafeteria are in good condition, but details related to roof/wall interface are not thermally broken. (Figure 25)

Discussion and Conclusions

Any major HVAC system upgrades will be deeply affected by the ability of the existing building enclosure to manage heat, air, and moisture transfer. While some of the exterior walls were greatly improved through the renovations in the 1990s, critical major thermal bridges exist at all of the wall/roof interfaces and at many of the exterior walls.

While interior work utilizing spray polyurethane foam could improve the air, thermal and vapor performance of the masonry exterior walls, the existing steel structures that are exposed to the exterior will remain a thermal bridge and seriously reduce the efficiency of the building enclosure. Consideration should be given to insulating these areas on the exterior.

Major exterior improvements would be required at buildings I, L, library, cafeteria and both gymnasiums. All roofing should be replaced. The remaining single pane curtain wall systems at the cafeteria and upper gymnasium would require replacement.

If existing structures are to be renovated and included in future planning, whole building air tightness testing should be conducted to evaluate and identify continuity of a retrofit air barrier. This testing could be conducted prior to building enclosure modifications and during construction so that all contributing sources of air leakage can be identified and modified to create a code compliant air barrier system.

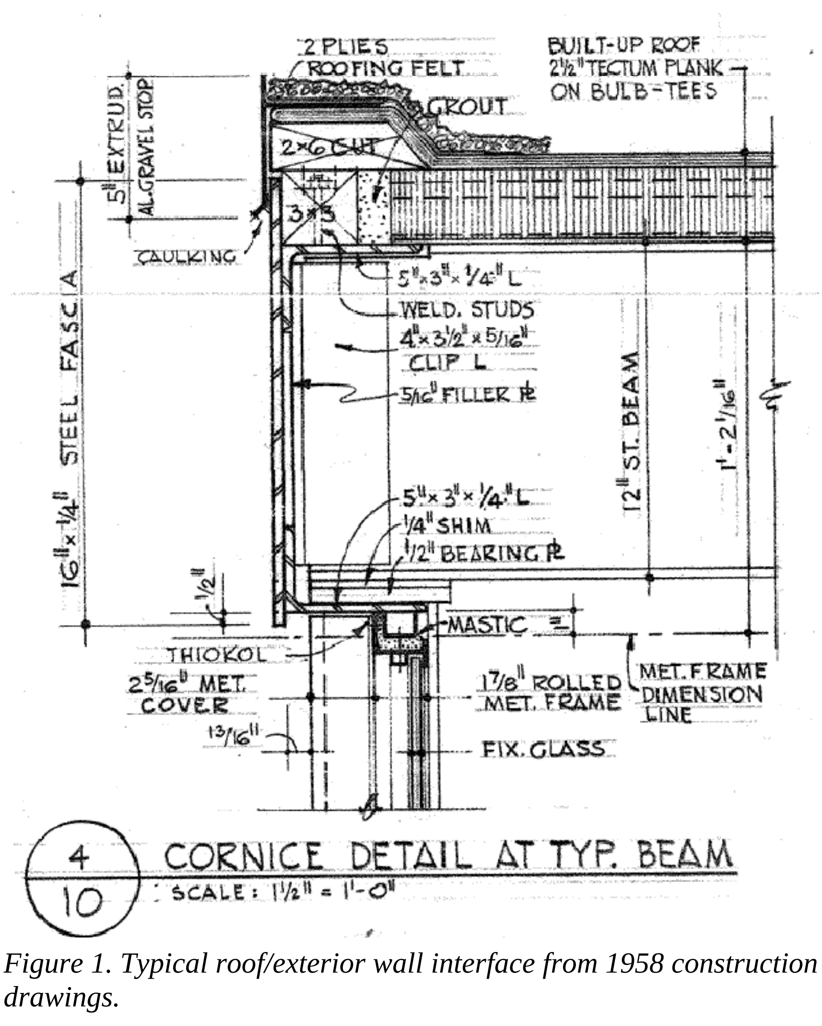

Figure 1. Typical roof/exterior wall interface from 1958 construction drawings.

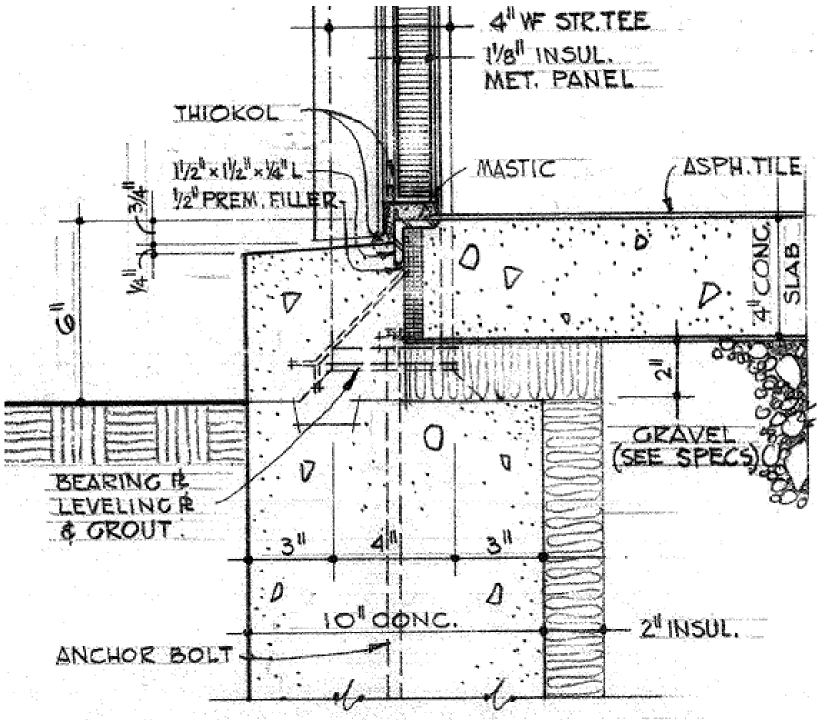

Figure 2. Typical roof/exterior wall interface from 1958 construction drawings.

Figure 3. Typical roof/exterior masonry wall interface from 1964 construction drawings.

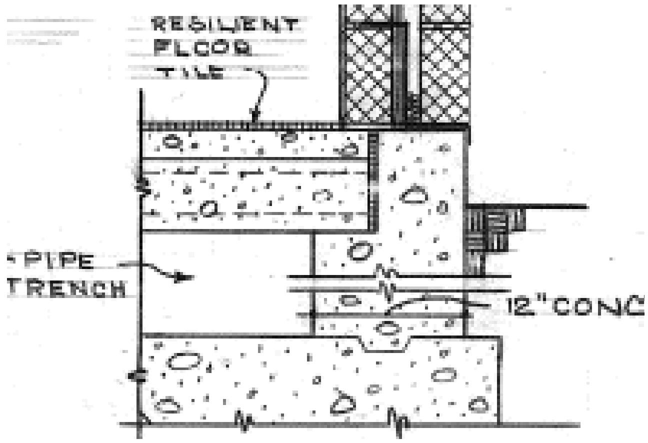

Figure 4. Typical roof/exterior wall interface from 1964 construction drawings.

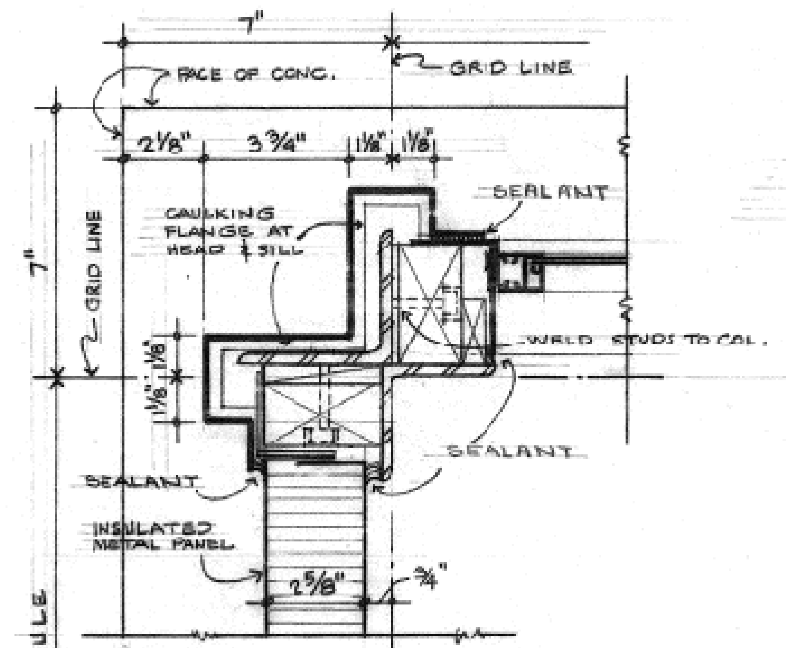

Figure 5. Typical plan detail at exterior corner from 1964 construction drawings.

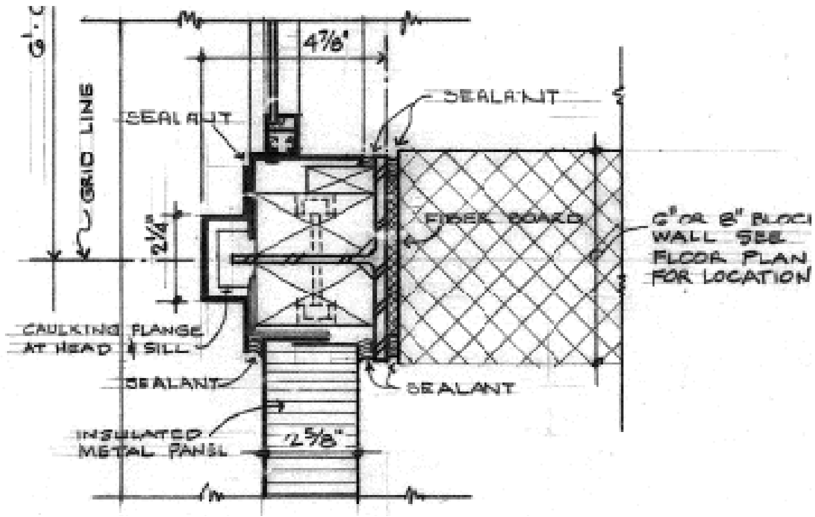

Figure 6. Typical plan detail at exterior column from 1964 construction drawings.

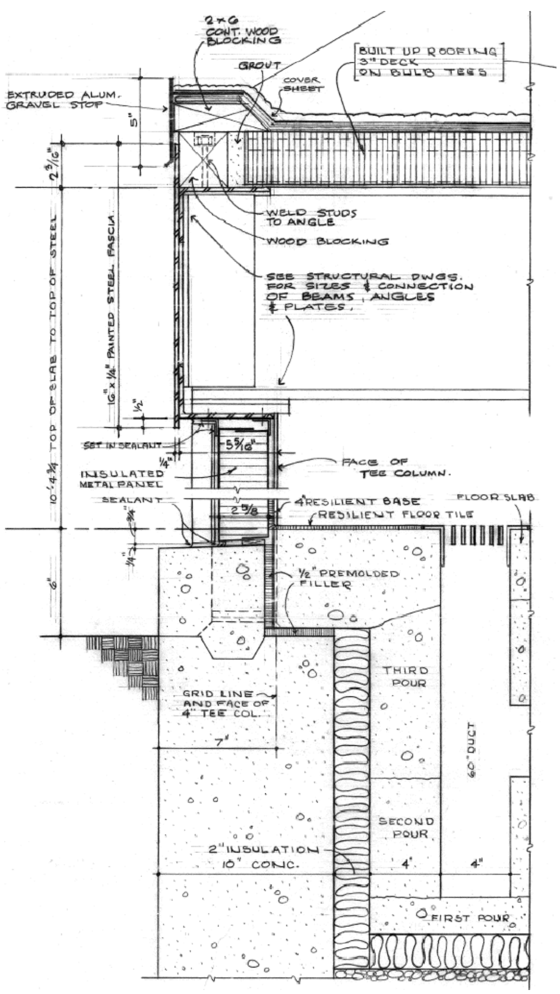

Figure 7. Typical roof/exterior wall/sill detail from 1964 construction drawings.

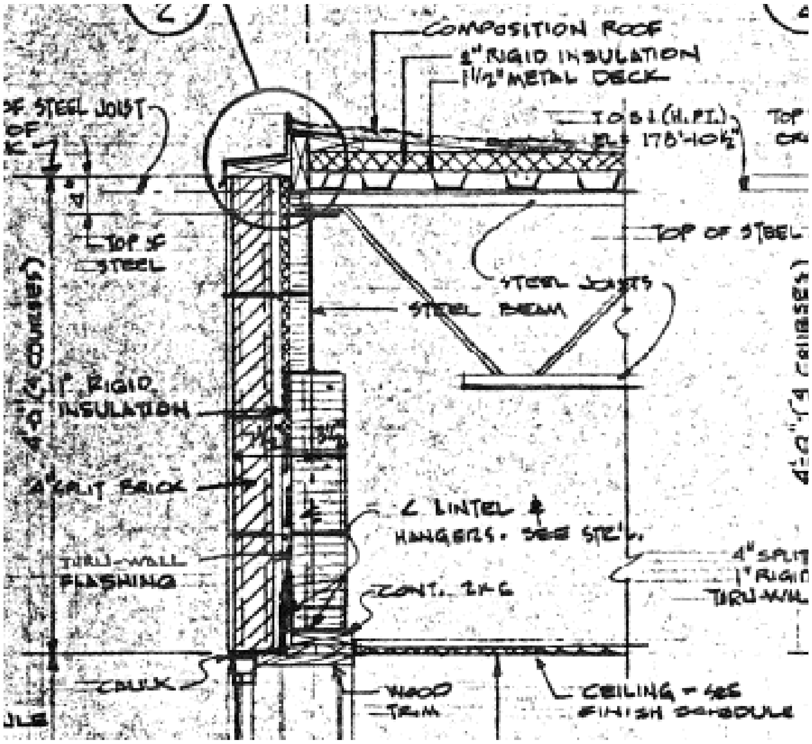

Figure 8. Typical roof/wall interface from 1973 construction drawings.

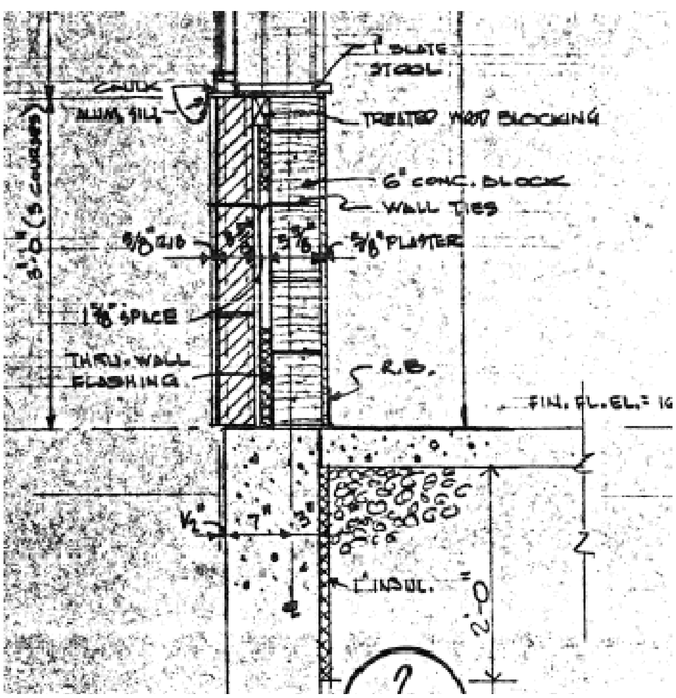

Figure 9. Typical roof/slab interface from 1973 construction drawings.

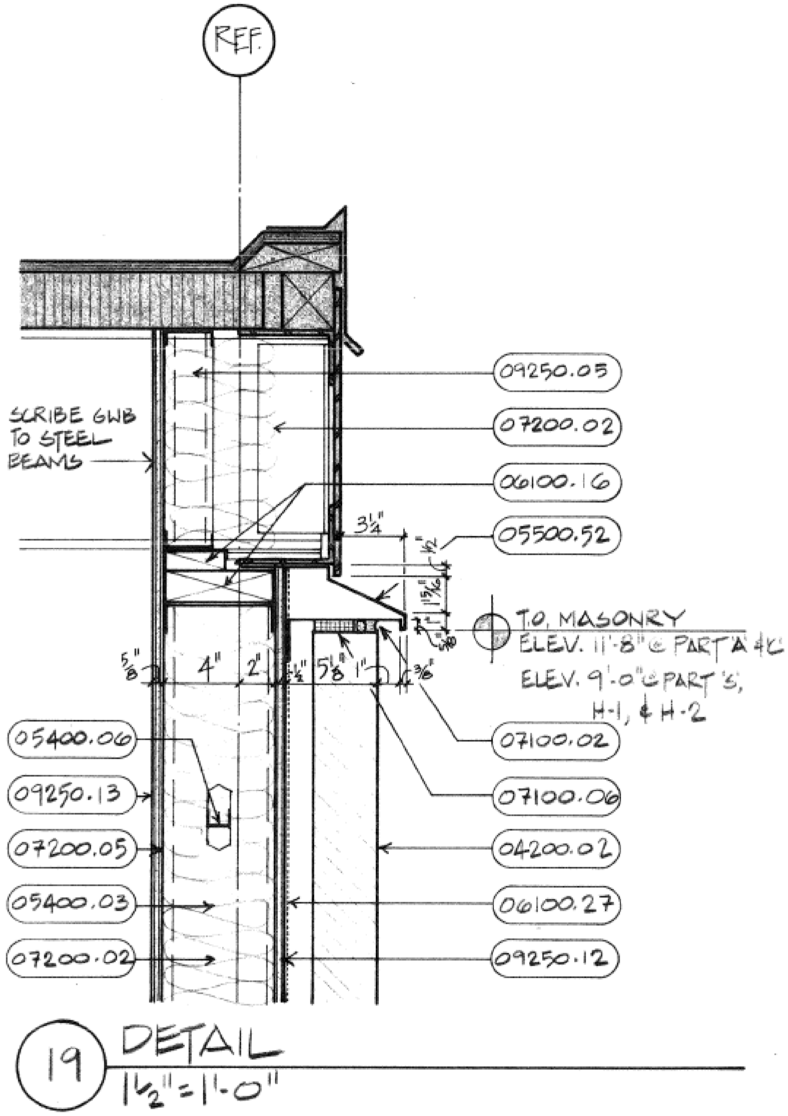

Figure 10. Typical modification to 1960/1965 exterior walls as illustrated in the 1992 construction drawings.

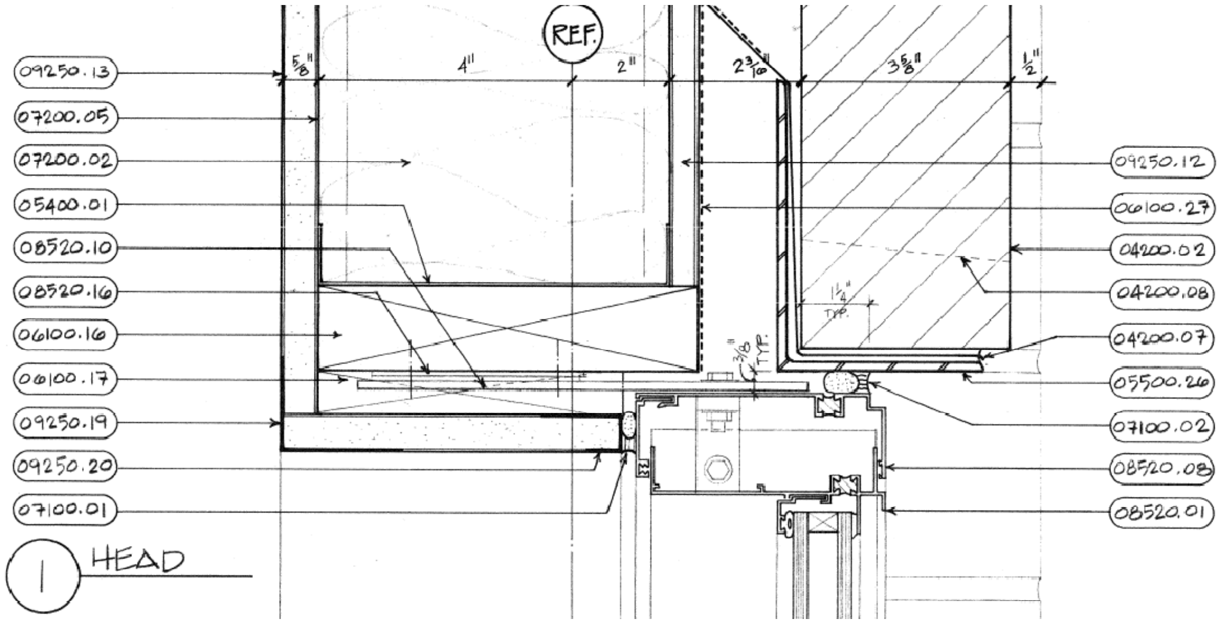

Figure 11. Typical window head detail at masonry walls from 1992 construction drawings.

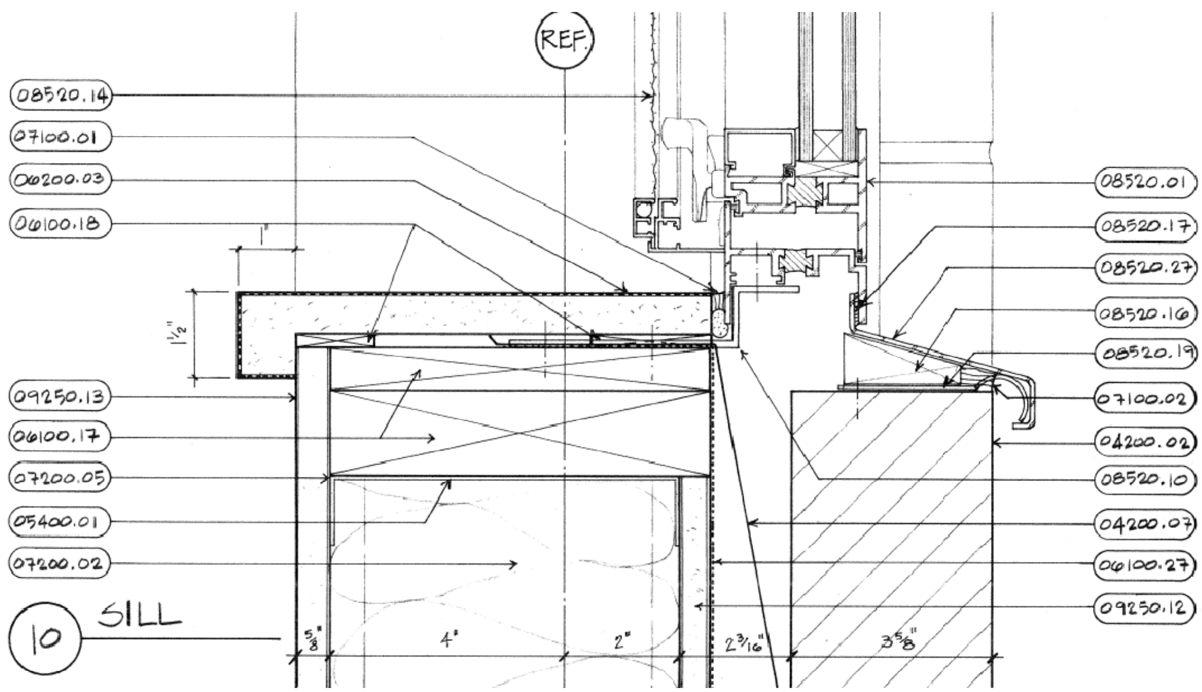

Figure 12. Typical window sill detail at masonry walls from 1992 construction drawings.

Figure 13. Typical single pane curtain wall at breezeway between buildings A and S. Note that steel beams extend out to exterior overhangs.

Figure 14. Typical modification to original curtain wall at courtyard exterior wall in Building S. These modifications were made in the 1990s.

Figure 15. Courtyard overhang at Building S. Note that steel structure is not thermally broken where it penetrates the exterior walls.

Figure 16. Typical masonry exterior walls and cornice details at 1992 exterior wall modifications in Buildings A, H, S and the cafeteria.

Figure 17. Typical window wall at Building L from 1970s construction.

Figure 18. Condition of exterior wall at library.

Figure 19. Typical exterior wall construction at lower gymnasium.

Figure 20. Masonry/curtain wall interface with steel structure penetrating the building enclosure at the library/cafeteria.

Figure 21. Typical condition of sealant joints at 1970s construction.

Figure 22. Original curtain wall construction and upper gymnasium structure beyond.

Figure 23. Exterior curtain wall at upper gymnasium.

Figure 24. Original curtain wall construction at cafeteria.

Figure 25. Modified curtain wall construction at the cafeteria from 1990s renovation project.

Figure 26. Overall view of ponding water at PVC roofs.

Figure 27. Severe ponding water at roof membranes between buildings H and S at PVC roofs.

Figure 28. Overall view of EPDM roof.

Figure 29. Split at EPDM roofing membrane over library.

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December 7, 2009

Lisa Pecora-Ryan, RA, LEED AP
The Office of Michael Rosenfeld, Inc., Architects
543 Massachusetts Ave.
West Acton, MA 01720

Dear Lisa,

The following is a report of our findings from our walk-through and evaluation of the foodservice operation at Concord Carlisle High School. The foodservice operation is comprised of a main production kitchen and storage area, a serving area, and a seating area. We toured these facilities prior to meeting with the foodservice director, the school superintendent and representatives from The Office of Michael Rosenfeld Inc. Architects and offer the following observations and comments:

MAIN KITCHEN AND STORAGE:

The main kitchen seemed to be adequately sized. Performing a visual assessment of the existing equipment and the general layout we believe that the majority of the existing cooking and support equipment should be replaced. The hoods in this area are old with no visual UL listing posted and one of the main hoods is not currently being used. The cooking equipment is currently split between two other hoods and would benefit from being consolidated underneath one new energy efficient hood. There are not enough hand sinks (current layout has only one) and more will be required to meet Department of Health regulations. Two of the three walk-ins, while functional, seem to be quite old and should be replaced. The units may have outlived their useful life and the facility would benefit from having newer more efficient units. The third unit is a new freezer that was purchased within the last two years and can be disassembled and re-used in the new design. Freezer storage is adequate but additional cooler storage is required.

MAIN SERVING AREA:

The main serving area consists of three points of service including deli, hot specials and snacks, this space is very small and becomes extremely congested during lunch periods. It was discussed that this congestion is a contributing factor to the fairly low rate of participation and this area would really benefit from a re-design to help imporove the flow and overall feel of the schools foodservice facility. The serving line also lacks the proper NSF approved equipment to display and serve cold foods, the Department of Health no longer allows ice wells to be used as a means of serving or displaying cold food. With the small space and limited flexibility it is difficult to keep up during the rush and although it is obvious that there have been attempts to rectify this situation the the result is the look and feel of a temporary service.. There is also insufficient storage area in this space. The result is a bank of reach-in refrigeration in the main kitchen requiring staff to travel back and forth through the serving area to retrieve additional product as necessary. More space and a total re-design of the serving area is suggested.

GENERAL COMMENTS:

Despite the fact that the main kitchen seems to be adequately sized the addition of new energy saving equipment along with a modified layout would go a long way in increasing the overall efficiency of back of the house production. Cooking, cold and dry storage, office space and employee lockers and bathroom would all benefit from an updated and coordinated layout.

The serving area is small, congested and employs equipment that no longer complies with Department of Health standards, additional space and a redesign of the layout would help eliminate the problem areas that have been identified. A scatter/food court style of service was discussed as an option during the meeting and we feel that the implementation of such a style with varying options, POS service at each station and the dispersion of students among individual points of service would improve the function and overall feel of the area. The F.S. Director and staff are doing their best to increase participation, but are limited by serving facilities, the nearby competition and the lingering stigma associated with school foodservice. A goal of increasing participation was discussed. To do that the school needs to create a program that is as interesting and convenient to the students as the other nearby options.

A food court style of service with varying options and quicker service times would help to keep students interested and on campus on a more regular basis. This would require a commitment to more service space and a willingness to change the way food is served.

CONCLUSIONS:

- The main kitchen spaces are generally adequate with respect to space but do need some attention with respect to equipment replacement and layout.
- The hoods, two out of three walk-ins and some pieces of support equipment are old and out of date and should most likely be replaced.
- The serving areas are inadequate and are a contributory factor in the low rate of participation. Additional space and equipment combined with a shift in serving style and options would be required to help increase participation and student satisfaction.

Please let me know if you have any questions of if you require any additional information at this time.

Kevin Sullivan
Senior Associate

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CONCORD CARLISLE REGIONAL HIGH SCHOOL
Concord, MA

Existing Conditions Structural Report
December 16, 2009

INTRODUCTION

Foley Buhl Roberts & Associates, Inc. (FBRA) is collaborating with The Office of Michael Rosenfeld, Inc., *Architects* (OMR) to review and analyze structural conditions and issues at the Concord Carlisle Regional High School in Concord, MA. The purpose of this report is to identify and to describe the existing structural systems of the various sections of the school and to comment on the structural conditions/issues observed. General comments relating to potential renovations, alterations and additions to the facility are presented as well. This report should be used in conjunction with the existing conditions reports of the other disciplines.

Structural conditions at the Concord Carlisle Regional High School were observed at the site on November 9, 2009.

The following documents were reviewed in the preparation of this Existing Conditions Structural Report:

- *Structural Drawings S-1 to S-13*, prepared by A. B. Onderdonk Consulting Engineer, Glastonbury, CT, dated July 7, 1958 (Includes soil boring logs on Drawing S-1).
- *Architectural Drawings A-1 to A-9,* prepared by Warren H. Ashley, AIA Architect, West Hartford, CT, dated August 31, 1964 (Science Building addition - Structural Drawings not available).
- *Structural Drawings S-1 to S-10,* prepared by Korslund, LeNormand & Quann, Inc. Architects and Engineers, Norwood, MA, dated October 11, 1973 (Includes soil boring logs on Drawing G-3).
- *Renovations to the Concord-Carlisle High School – Architectural Drawings,* prepared by HMFH Architects, Inc., Cambridge, MA, dated January 8, 1992.
- *Revised Phase II Renovations to the Concord-Carlisle High School – Structural Drawing S-1,* prepared by Foley & Buhl Engineering, Inc., Watertown, MA, dated February 1, 1996.
- *Concord Carlisle High School Existing Conditions Report* (Structural Section), prepared by Symmes Maini & McKee Associates, Cambridge, MA, dated March 18, 2005.
- *Preliminary Phase Geotechnical Studies,* prepared by The Geotechnical Group, Inc., Needham, MA, dated June 20, 2005.

The November 14, 2000, *Concord-Carlisle High School Space Utilization Study,* prepared by HMFH Architects, Inc. was not reviewed, as this particular report did not address structural issues.

No exploratory demolition or structural materials testing was conducted in conjunction with this existing conditions review.

I. GENERAL DESCRIPTION

The Concord Carlisle Regional High School is located at 500 Walden Street in Concord, MA. The school has an enrollment of over 1260 students. The total area of the complex is approximately 228,550 gross square feet.

The original high school was constructed in 1960 and included a science building (S - Building), a humanities – administration building (H - Building), a theater arts building (A – Building (includes the Auditorium)), a dining building (Cafeteria) and a Gymnasium/Locker Room building.

A one-story addition to the original science building was constructed in 1965.

In 1975, several new buildings/wings were added to the complex. The I – Building (Industrial Arts) was constructed to the south of the original S – Building. The L – Building (Language) was constructed on the north side of the S – Building. A multi-level Library structure with a lobby was also constructed, providing an internal connection between the A – Building and the Cafeteria. The Cafeteria was expanded (to the east) at this time as well. An additional Gymnasium (the Lower Gym) was constructed to the west of the original gym.

All original buildings/wings and subsequent additions are one-story, with the exception of the (1960) Gymnasium and the (1975) Library. Buildings/wings in the complex are interconnected by interior or exterior walkways/corridors. The First (Main) Floor elevation of the buildings varies, in some cases. Internal ramps and exterior connecting links transition between buildings where the First Floor elevations do not align.

There are (partial) basement Mechanical Rooms below the First Floor in the A – Building, the H – Building, the I – Building (this mechanical room was actually constructed with the 1965 S – Building addition) and the Gymnasium.

A significant portion of the original, 1960 buildings were re-clad in 1992, eliminating the areas of original, floor-to-ceiling glazing. In addition, there have been various repairs and renovations to the complex (in 1992 and in 1996), involving little or no structural work.

The original (1960) buildings and subsequent (1965 and 1975) additions are steel framed, as described below and as summarized in the 2005 Symmes Maini & McKee Associates report. Typical 1960 roof construction consists of manufactured, cementitious wood fiber (e.g. Tectum) roof decking with steel bulb tees (sub-purlins), supported by wide flange steel purlins spanning to steel beams that are supported by steel columns (“W”, “T”, “L” or Tube shape). The roof of the 1965 S – Building addition appears to be similarly framed (Structural Drawings not available). 1975 roof construction typically consists of 1½” deep steel roof deck spanning to open web steel joists. Steel joists are supported by steel beams and steel columns.

Second Floor construction at the (1975) Library is steel framed, with a concrete slab on open web steel bar joists, supported by steel beams and columns.

First (Main) Floor construction is typically a concrete slab on grade, except precast concrete plank was installed over MEP tunnels and basement Mechanical Rooms below the First Floor level. At the original Gymnasium building, the floor is structured with either precast concrete plank (over the Mechanical Room) or a reinforced concrete slab supported by steel beams and columns (over the Locker Rooms).

Foundations at all buildings/wings are conventional spread footings.

II. STRUCTURAL SYSTEMS DESCRIPTION

Structural Materials:

Original Construction – 1960:

Concrete is noted to be 2,500 psi typically, with 3,000 psi used at the Gymnasium Building (structural slab at the First Floor). Structural Steel specifications are not noted on the Structural Drawings; however, structural steel is likely ASTM A7, with a minimum yield strength of 33,000 psi.

1975 Additions:

Concrete is noted to be 3,000 psi, generally. Reinforcing bars are typically intermediate grade (40,000 psi). Structural Steel is noted to be ASTM A36, with a minimum yield strength of 36,000 psi.

Allowable Soil Bearing Pressure:

Original Construction – 1960:

Spread footings were proportioned for a maximum allowable bearing pressure of two (2) tons per square foot (tsf). Representative structural calculations generally confirm this design bearing pressure. The bottom of exterior footings is typically a minimum of 4 feet below finished grade.

1975 Additions:

Spread footings were proportioned for a maximum allowable bearing pressure of two (2) tons per square foot (tsf). Representative structural calculations generally confirm this design bearing pressure. The bottom of exterior footings is typically a minimum of 4 feet below finished grade.

Design Roof and Floor Loads:

Original Construction – 1960:

Roof construction has typically been designed for a 40 psf live (snow) load. Representative structural calculations generally confirm this design load. The current building code would require that flat roofs be designed for a minimum snow load of 42.4 psf (based on a ground snow load of 55 psf in Concord). It does not appear that low roofs adjacent to higher roofs (e.g. surrounding the Auditorium) have been designed for increased loading due to snow drifting. These areas will need to be evaluated and reinforced (as appropriate) in conjunction with future renovations to the facility.

The design live loads for framed floor construction (over MEP tunnels and the First Floor of the Gymnasium Building) are not noted on the Structural Drawings. The determination of design live loads for framed floor construction is beyond the scope of this report.

1975 Additions:

Roof construction has typically been designed for a 40 psf live (snow) load. Representative structural calculations generally confirm this design load. Again, the current building code would require that flat roofs be designed for a minimum snow load of 42.4 psf (based on a ground snow load of 55 psf in Concord). It appears that low roofs adjacent to higher roofs (e.g. between the original and lower Gymnasiums) have been designed for increased loading due to snow drifting. Original low roof areas adjacent to the higher, 1975 Library construction were reinforced when the Library was built.

The design live loads are noted to be 50 psf at typical classrooms and laboratories, with a 100 psf live load at corridors and storerooms and 150 psf at the Library. With the exception of the Library Second Floor, most floor areas are slab on grade construction.

Roof Construction:

Original Construction – 1960:

Roof construction at the S – Building consists of a 2½" thick, manufactured cementitious wood fiber (Tectum) decking supported by steel bulb tees (sub purlins). Steel bulb tees are typically spaced at 2'-8" o.c. and span to wide flange steel purlins. Interior columns (typically 5" WF) are generally arranged in a double-loaded corridor fashion, with 28'-2", 10'-10" (corridor) and 32'-6" typical spans. Perimeter columns/mullions (typically structural tees) are spaced at 6'-6" o.c. and are integrated with the exterior wall construction. The top of steel is 10'-4½" above the floor. Roof construction at the 1965 addition to this building is likely similar.

Roof Construction at the H – Building is similar, with typical purlin spans of 26'-0" and beam spans varying across the width of the building. Interior columns are typically square tubes. Perimeter columns/mullions (typically structural tees) are spaced at 6'-6" o.c. and are integrated with the exterior wall construction. The top of steel is 10'-4½" above the floor.

The roof of the Gymnasium is suspended from six (6), external, 36" deep wide flange steel rigid frames, clear spanning the space (approximately 106 feet). The frames are spaced at 21'-1½" on centers. The roof is suspended from the frames by 3½" diameter steel pipes and consists of a 2½" deep Tectum deck with steel bulb tees, typically spanning 9'-9" to the suspended steel beams. Perimeter columns/mullions (typically structural tees) are spaced at 6'-6" o.c. and are integrated with the exterior wall construction. The top of steel beam is approximately 21'-10" above the floor below.

Roof construction at the Cafeteria consists of Tectum deck/steel bulb tees spanning to wide flange steel purlins. Purlins typically span 19'-6" and are supported by 27" deep, wide flange steel rigid frames. Steel frames clear span the space, approximately 79 feet. Perimeter columns/mullions (typically structural tees) are spaced at 6'-6" o.c. and are integrated with the exterior wall construction. The top of steel is 10'-4½" above the floor.

The roof of the A – Building is also constructed with Tectum decking and steel bulb tees. At the high roof, bulb tees span 6½ +/- feet to 52 inch deep longspan steel joists, which clear span the space. At the lower, surrounding roofs, Tectum Deck/steel bulb tee construction is supported by wide flange steel purlins and beams. Perimeter columns/mullions (typically structural tees) are spaced at 6'-6" o.c. and are integrated with the exterior wall construction. The top of low roof steel is approximately 13 feet above the floor; the top of high roof steel is approximately 9'-4½" higher.

1975 Additions:

1975 roof construction typically consists of a 1½" steel deck spanning to open web steel joists. Steel joists are supported by steel beams and steel columns.

At the L – Building, steel roof deck typically spans approximately 5 feet, to 20" deep, open web steel joists. Steel joists generally span 33'-6" and are supported by wide flange steel beams (14" to 21" deep). Interior and perimeter columns are typically 6" wide flange sections. Roof steel pitches to provide drainage; the high point is approximately 12'-10½" above the floor.

Roof construction at the I – Building is similar, with 14" or 16" deep steel joists spanning approximately 19 to 25 feet to wide flange steel beams (14" to 18" deep). Interior and perimeter columns are typically 6” wide flange sections. Roof steel pitches to provide drainage; the high point is approximately 13’-10½” above the floor.

At the Library, steel roof deck typically spans approximately 5 feet to 16” deep, open web steel joists. Steel joists typically span 26 feet and are supported by wide flange steel beams (16” to 18” deep). Beam spans vary from 25’-9” to 32’-6”. Interior and perimeter columns are typically 8” square tube and 8” wide flange sections, respectively. Roof steel slopes; the high point is approximately 13’-10½” above the Second Floor.

The roof of the Lower Gymnasium is framed with steel roof deck spanning 6’-6” to 48 inch deep, long span open web steel bar joists. Steel joists clear span the space (approximately 92’-5”) and are supported by W21 inch deep, wide flange steel beams. Steel beams span 19’-6” to 21’-6½” and are supported by wide flange steel columns.

The expanded Cafeteria roof matches the original roof construction, as described above.

Second Floor/Mezzanine Floor Construction:

1975 Additions:

The Second Floor of the Library is framed with a 3” concrete slab, on 26 gauge steel form deck, spanning 2’-0” to 16” or 18” deep open web steel bar joists. The joists typically span 26 feet and are supported by 24” deep, wide flange steel beams and square tubular steel columns. The top of steel beam is 11’-6½” above the First Floor. The design live load is 150 psf.

A small Mezzanine Floor (600+/- square feet) was constructed in the I – Building. Floor construction consists of a 5½” thick, one-way reinforced concrete slab spanning 11+/- feet to masonry bearing walls. The top of slab is approximately 7’-6” above the First Floor.

Typical First (Main) Floor Construction:

Original Construction - 1960:

Typical First Floor construction for all buildings (except at the Gymnasium) consists of a 4” thick, concrete slab on grade, reinforced with welded wire fabric.

First Floor construction over the various MEP tunnels consists of a 2” concrete topping slab on 6” thick, precast, prestressed concrete (Dox) plank. Tunnels are typically 5’-8” deep, with a 4” concrete slab on grade floor. Floor construction over the basement Mechanical Rooms in the A – Building, the H – Building and the Gymnasium is similar, with 8” thick precast plank.

At the east side of the Gymnasium, 8” thick Dox planks, with a 2” concrete topping slab spans 21+/- feet over the Mechanical Room below. The Gymnasium floor is framed with a one-way, reinforced concrete slab (5” to 7½” thick) typically supported by 12” deep wide flange steel beams.

1975 Additions:

Typical First Floor construction for all buildings (including the Lower Gymnasium) consists of a concrete slab on grade, reinforced with welded wire fabric. The slab thickness is 4” at the L - Building and at the northern half of the I – Building. Elsewhere, the slab is 5” thick. First Floor construction at the Library is split between a high and low level, with concrete walls retaining soil at the changes in elevation.

Typical Basement Floor Construction:

Original Construction – 1960:

Typical Basement Floor construction in the Mechanical Rooms consists of a 6" thick concrete slab on grade, reinforced with welded wire fabric. The Locker Room floor is a 4" thick slab.

Expansion Joints:

Original Construction – 1960:

Internal expansion joints were provided in the S – Building, the H – Building and the A – Building to reduce the overall length of the structural steel frame. The joints are typically 1" or 2" in width.

1975 Additions:

No internal expansion joints were provided in the 1975 Buildings; however, each building is separated from the original construction by an expansion joint (typically 1").

Foundations:

Original Construction – 1960:

Foundations for all buildings are typically continuous strip footings at the perimeter and basement foundation walls and individual spread footings at interior column supports. As noted above, footings at all buildings have been proportioned on the basis of a 2+/- tsf allowable bearing capacity. Typical foundation walls are 10" thick, but wall thicknesses vary from 8" (tunnel walls) to 16" (Mechanical Room walls at the Gymnasium).

1975 Additions:

Foundations for all buildings are typically continuous strip footings at the perimeter and basement foundation walls and individual spread footings at interior column supports. As noted above, footings at all buildings have been proportioned on the basis of a 2+/- tsf allowable bearing capacity. Typical foundation walls are 10" thick, but wall thicknesses vary from 8" to 16".

Drainage:

It does not appear that perimeter foundation drains or underslab drainage was provided for any of the original buildings or the 1965 and 1975 additions. Further review is required to determine if any drainage provisions were made. Facilities personnel report that there are no groundwater issues in the basements or in other areas. During the November 9, 2009 visit to the school, it was noted that sump pits have been provided in all basement Mechanical Rooms.

Exterior Wall Construction:

Original Construction – 1960:

Original exterior wall construction was brick veneer with an unreinforced masonry backup, or floor to ceiling glazing. Much of the 1960 facades were removed and replaced in 1992 with brick veneer cavity wall construction and new window units (1960 S – Building and 1965 addition, H – Building, A – Building and the front of 1960/1975 Cafeteria wing). Control joints and weep holes were provided. Details of the reconstructed exterior wall construction are shown in the above-referenced Architectural Drawings, prepared by HMFH Architects, Inc. in 1992.

1975 Additions:

Exterior wall construction typically consists of a 4" split face block veneer with a pumice block backup. An insulated cavity was provided. Control joints and weep holes are present in this construction.

Fire Resistance:

Steel framing at the original buildings and at the 1965 and 1975 additions is typically unprotected and has no fire resistance rating. The construction is classified as Type 2B, Non-Combustible, Unprotected.

Sprinklers have been installed in the H – Building only.

Fire rating issues will need to be evaluated in conjunction with potential, future additions and/or renovations to the complex. Fire protection of the existing floor and roof construction and/or the introduction of new building joints with fire walls may be required to meet current code requirements.

Lateral Load Resistance:

Original Construction – 1960:

The means by which lateral (wind and seismic) forces are resisted is not defined on the original (1958) structural drawings (typical for buildings of this era). However, the non load bearing masonry walls (at the building perimeter, at corridors and between classrooms, etc.) provide a degree of lateral force resistance. Rigid steel frames at the Cafeteria and the Gymnasium provide lateral stability in the direction of the frame spans. The original buildings do not meet the seismic requirements of the current building code.

1975 Additions:

The 1975 additions were also designed prior to the introduction of seismic codes; however, (per the Structural Drawings) these buildings were designed for a 20 psf wind load. The lateral (wind) force resisting system is not clearly defined on the Structural Drawings; it is expected that interior and perimeter (unreinforced) masonry walls serve as lateral load resisting shear walls. The additions do not meet the seismic requirements of the current building code.

III. SUBSURFACE SOILS/FOUNDATION CONSIDERATIONS

Boring logs were included on the 1958 and 1973 Structural Drawings. Four (4) additional borings were taken by The Geotechnical Group in June, 2005. Subsurface conditions generally consist of loose to medium dense natural sands. Groundwater was encountered at the northern end of the site at a relatively shallow depth in two of the 2005 borings (approximately 5 feet below the existing ground surface). This finding may indicate liquefaction potential; however, additional explorations and evaluation will be required to make such a determination. If soil conditions are classified as liquefiable, either deep foundations or in-situ densification of soils will be required for any proposed additions. If the water table is found to be consistently high, perimeter/underslab drainage may also be required for new construction.

Earlier borings, referenced above, did not indicate the presence of high groundwater. FBRA recommends that additional/deeper borings be taken, once it is determined where new construction may be located.

IV. STRUCTURAL CONDITION/COMMENTS

Structural conditions at the Concord Carlisle Regional High School were reviewed (to the extent possible) during a visit to the site on November 9, 2009. Floor and roof construction was obscured by finishes (hard ceilings) and could not be viewed in a number of areas. However, the roof and floor construction of the original building and the subsequent (1965 and 1975) additions generally appears to be in satisfactory condition. Foundations appear to be performing adequately; there is no evidence of excessive, total or differential settlements.

It appears that the building has been constructed in general accordance with the original Structural Drawings.

Facilities personnel report that there are no structural problems/concerns and that there are no groundwater related issues in any of the buildings. There is evidence of moisture in the basement Mechanical Rooms; however it is not clear if this is related to equipment/piping or groundwater. Sump pumps have been provided, which presumably control peak groundwater levels.

Several areas of the slab on grade have settled over time. At the northwest corner of the S – Building, settlement was observed in the floor of the 1965 Chemistry Lab/Classroom. A similar condition was observed at the interface of the original S – Building and the 1975 I – Building. In each case, the settlement observed is likely related to inadequate soil material and/or compaction against the original S – Building foundation wall, prior to placing the new slab. There are no structural concerns related to this condition.

Existing roofs are adhered membrane and are in need of replacement, according to Facilities personnel. The condition of the Tectum roof decking should be examined, in areas where the roof has failed and moisture may have come into contact with the panels. Refer to the envelope consultant's report for further information regarding the condition of the existing roofs.

Exterior wall construction generally appears to be in satisfactory construction. Limited areas of the original (1960) wall construction still remain – the condition of these walls was not determined. Caulking and repointing if the split face block veneer of the 1975 additions facades is required in some areas. Refer to the envelope consultant's report for further information regarding exterior wall conditions.

Additional structural/structurally related conditions that should be reviewed and evaluated during Schematic Design and the subsequent design phases include the following (all buildings, unless otherwise noted):

1. Floor Live Loads: Additional structural calculations should be run to confirm the live load capacity of the structured floor in various areas of the complex. Based on our preliminary calculations, however, if the proposed use(s) of the buildings remain essentially the same throughout, floor live load capacity is not expected to be an issue.
2. Snow Load: Roof design loads are typically 40 psf (confirmed by representative structural calculations). The Seventh Edition of the Massachusetts State Building Code (780 CMR) currently requires that flat roof construction for new structures in Concord be designed for a 42.4 psf minimum snow load (plus drifting snow), based on a 55 psf Ground Snow Load (P_g). It does not appear that low roof areas surrounding the higher, Auditorium roof were designed for drifting snow. This issue will need to be evaluated and addressed in conjunction with future renovations to this building. Local reinforcing at potential snow drift areas will likely be required. Future additions (if planned) should be located and massed in a manner to minimize/avoid drifting snow on the existing roof construction.
3. As previously noted, fire resistance rating issues will need to be evaluated with respect to proposed, future renovations and/or additions to the complex.

V. RENOVATIONS AND ADDITIONS – 780 CMR 34.00 STRUCTURAL REQUIREMENTS

General comments relating to potential renovations, alterations and additions to the Concord Carlisle Regional High School are presented in this section. Renovations, alterations, repairs and upgrades to the complex will be subject to the provisions of 780 CMR 34.00 (*Existing Structures*) of the Massachusetts State Building Code (7th Edition), as currently amended.

Renovations:

If the facility is partially or fully renovated, additional structural work may be required per the provisions of 780 CMR 34.00. Five (5) levels of structural work are defined in the code. More extensive renovations and alterations to buildings/wings which have minimal, existing lateral load resistance are classified as higher level renovations and require considerably more structural work/cost.

If renovations to the buildings are architectural in nature, additions are structurally separated, existing masonry walls remain in place and no new, major openings in floor or roof diaphragms are made, the renovations would be classified as *Level 1.* Minimal structural work would be required by code; however, FBRA recommends that each building be evaluated to ensure that a minimum lateral load resistance capacity exists (e.g. approximately 2/3 the current code required wind load). A preliminary review of the various buildings of the complex suggests that this level of capacity likely exists and that little or no additional structural work would be required.

If significant structural alterations to a particular building are proposed (removal/modification of over 25% of the existing masonry walls, openings in the floor or roof exceeding 5% of the area, increase in building mass and/or area greater than 10%, etc.), the renovations would be classified as *Level 2 (or higher).* In this case, the extent of structural work required by the code increases significantly.

- A structural survey/investigation of each building will be required, to confirm the as-built details of roof, floor and foundation construction (Section 3408.6.2.1).
- Soil explorations and a geotechnical evaluation will be required per Sections 3408.6.2.2.1 and 3408.6.2.2.2.
- A complete evaluation of the total service load capacity of the roof and floor construction will be required, per Section 3408.6.2.3.3. Presently, FBRA does not believe that there are any floor loading issues; however, if the use in a particular area were to change, the floor structure would need to be reviewed to confirm that adequate live load capacity exists.
- Key details of the existing construction will need to be determined and evaluated per Section 3408.6.2.4; including the connectivity of structural elements, anchorage of floor and roof construction to masonry walls, etc. Existing masonry walls/partitions scheduled to remain, will need to be laterally restrained at the top (e.g. steel angle restraints bolted to the underside of the slab above will be required).
- An Existing Conditions Structural Report will need to be submitted to the Building Department, as a condition for the building permit (Section 3408.6.3).
- Each existing building will need to be evaluated for wind and seismic (lateral) loads and structurally upgraded per Section 3408.7 for the appropriate renovation level. New bracing and/or shear walls (with foundations) may be necessary to meet code requirements.
- Connections of the existing floor and roof diaphragms to the existing lateral force resisting elements will need to be evaluated per Section 3408.9.5.

- Basic snow loads and drifting snow loads will need to be further evaluated per Section 3408.8.2. Note that 780 CMR 34.00 allows a 15% reduction in the design ground snow load for this evaluation. As previously noted, it does not appear that typical flat roof areas (designed for a 40 psf snow load) will be a significant issue; however, local reinforcing at potential snow drift areas will likely be required.

The aforementioned investigations and evaluations are beyond the scope of this existing conditions report.

***Additions*:**

New additions to the Concord Carlisle Regional High School should be structurally separated from the existing construction by an expansion (seismic) joint and be proportioned/massed to avoid/minimize drifting snow on the adjacent, existing lower roof construction. If additions are structurally attached (resulting in an increased building mass and/or area greater than 10%), the requirements for a Level 2 renovation (or higher) will apply.

END OF EXISTING CONDITIONS STRUCTURAL REPORT

FIRE PROTECTION

Portions of the school are protected by automatic sprinkler systems. The building is not fully sprinklered.

Massachusetts code requires that any new school building or substantially renovated school building, 12,000 square feet or more must be sprinklered. Per 780 CMR 34.00 work shall not be considered a substantial renovation if the cost of installing a sprinkler system exceeds 15% of the total renovation cost. Should the existing building undergo a major renovation the building will require upgrades to the existing sprinkler system to provide complete protection of all spaces.

Existing Conditions

- Limited area sprinkler systems fed from the domestic water supply are provided in the Building "A" Basement Mechanical Room, Building "I" Basement Mechanical Room, and Upper Library Mechanical Room. Limited area systems include system control valve, check valve, and flow switch.

Building "A" Basement Mech. Room control valve & flow switch

Building "I" Basement Mech. Room control valve & flow switch

- A partial sprinkler system is provided in Building "H". There is an 8" fire water service that enters Building "H" Basement Mechanical Room. This service is controlled by an exterior post indicator valve (PIV) and includes a 6" Febco double check valve assembly with 6" wet alarm valve and free standing storz Fire Department connection. The sprinkler main reduces to 4" after the alarm valve. The system provides sprinkler protection to the Building 'H' Basement Mechanical Room, Boiler Room, and portions of the School building. Fire Hose Cabinets are provided in the building's corridors.

Building "H" PIV

Building "H" sprinkler service

Building "H" Corridor sprinkler

Fire Hose Cabinet

- A partial sprinkler system is provided in the "Lower Gym" building. There is an 8" fire water service that enters "Lower Gym" Basement Mechanical Room. This service is controlled by an exterior post indicator valve (PIV) and includes a 6" Watts double check valve assembly with 6" wet alarm valve and free standing storz Fire Department connection. The sprinkler main reduces to 4" after the alarm valve. The system provides sprinkler protection to the "Lower Gym" Basement Mechanical Room only.

Lower Gym PIV & Fire Department connection

Lower Gym sprinkler service

Mechanical Room upright sprinkler

PLUMBING

Presently, the Plumbing Systems serving the building are cold water, hot water, sanitary, waste and vent system, storm drain piping, and natural gas.

Municipal sewer and municipal water service the Building. Rainwater from roof areas is collected by interior rain leaders which appear to discharge to a below grade drainage system.

Fixtures:

Plumbing fixtures generally are in fair condition. Attempts have been made to make bathroom fixtures accessible.

The water closets are predominately wall hung vitreous china with battery operated sensor flush valves.

Urinals are wall hung vitreous china with battery operated sensor flush valves.

Lavatories are wall hung vitreous china. The majority of lavatories have been retrofitted with single handle mixing faucets. Accessible lavatories are fitted with hot and cold water handle faucets.



Typical bathroom fixtures

Drinking fountains consist of wall hung stainless steel fountains.

Electric water coolers are wall hung, non accessible.


Janitor's sink are generally trap standard mounted, enameled cast iron sinks. Faucets are equipped with vacuum breakers.

Science classroom sinks are resin type with cold and hot water faucets. Faucets are equipped with vacuum breakers. Classrooms contain an emergency shower fixture fed by the cold water system. Sinks are piped to an exterior lime stone chip acid neutralization system that ultimately discharges to the municipal sewer. It was noted by staff that the system has clogged in the past.

Tech labs contain an emergency shower/eye wash fixture fed by the cold water system; water is not tepid.

Classroom emergency shower

Tech Lab emergency shower/eye wash

Kitchen area fixtures are in fair condition. The pot washing sinks are fitted with grease interceptors. There are a total of two (2) interior grease interceptors. The dishwasher is currently not being used.

Grease Interceptor

<u>Water Systems</u>:

The main domestic water service is located in the Building "A" Basement Mechanical Room. The service is 6" in size and includes a 4" meter and pressure reducing valve. The main domestic cold-water distribution is 4" in size. The majority of the domestic distribution piping is located in pipe trenches throughout the facility. The pipe trenches allow for minimal accessibility for maintenance.

Main water service

Water meter and PRV

Piping, where exposed, appears to be copper with sweat joints. The majority of the piping is insulated. Due to the lack of accessibility a major renovation should include all new domestic water piping.

Domestic hot water in Buildings "A", "H", "I", "L", and the Science Classrooms are generated through electric tank type water heaters. The hot water systems are recirculated. There are thermostatic mixing valves on the systems to prevent scalding. The electric water heaters vary in size and age.

Building "A" electric wtr heater

Building "H" electric wtr heater

Domestic hot water for the Gym locker rooms and Kitchen areas is generated through two (2) gas fired tank type water heaters located in the "Lower Gym" Boiler Room. Each water heater has a natural gas input of 1,200,000 BTUH and 600 gallon storage capacity. Heaters appear to be in good condition.

Lower Gym gas-fired water heaters

Gas:

An elevated pressure natural gas is supplied to the building. Exterior gas meters are located at Buildings "A", "H", and "I", and the modular buildings. Natural gas is distributed throughout the site, buried below grade, and through buildings from these locations.

The gas service at Building H is elevated pressure and it supplies the heating boilers located in the first floor Mechanical Room.

Building "I" gas meter

Building "H" gas meter

Gas piping is black steel with a combination of screwed and welded joints and fittings depending on the time of installation.

Natural gas is provided in the science classrooms. Classrooms are equipped with emergency shutoff valves.

Natural gas is provided for kitchen cooking equipment. Kitchen supply is equipped with an automatic shutoff valve.

Science classroom

Kitchen automatic gas shutoff

Drainage Systems:

Cast iron is used for sanitary and storm drainage. Where visible, the cast iron pipe appears to be in fair condition. Smaller pipe sizes appear to be copper.

In general, the cast iron drainage piping can be reused even in a major renovation where adequately sized for the intended new use.

HVAC

Executive Summary

In general, the majority of the heating, ventilation and air conditioning equipment and systems that serve the high school where installed in 1992 and 1996 as part of building renovation and upgrade projects. This equipment includes the boilers, chillers, central air handling units, and terminal heating and cooling equipment. In addition, ductwork and piping mains (including branch piping for the chilled water system) appear to have been installed during the 1992 and 1996 renovations to connect replacement equipment to older existing ductwork and piping distribution systems. Much of this existing ductwork and hot water piping was originally installed during the 1972, 1964 and/or 1958 building projects. Therefore, the majority of HVAC equipment installed is between 14 and 18 years old, while a large portion of the distribution systems were installed 37 to 50 years ago.

The majority of the equipment and systems installed appear to have been well maintained and are generally in fair to good condition. However due to the age and relatively low energy efficiency of the systems in comparison with today's state of the art equipment and systems, it is our recommendation that the majority of the HVAC systems be replaced with new high efficiency systems. New HVAC systems would also provide improved thermal comfort while contributing to a better learning environment by operating lower noise levels while also improving indoor air quality.

Boiler Plant

The existing hot water boiler plant is located in Building H. The boiler plant consists of (3) three gas-fired cast-iron section boilers which appear to be in good condition. Two (2) of the boilers were installed in 1992 as manufactured by Weil McLain Model 94, each with a capacity of 219 BHP (6092 MBH). The third boiler, manufactured by Weil McLain Model 94 with a capacity of 179 MBH (5217 MBH output) was installed as part of the 1996 renovation. The boilers have a rated efficiency of 80% which is relatively low in comparison to high efficiency condensing boilers that are available today. The boilers are capable of providing 200 deg F heating hot water on a design heating day. There is also a 3-way modulating valve which controls the system hot water temperature based on outdoor air conditions. The boilers are connected to common breeching system which terminates outside the building to a free standing chimney. The combustion air intakes for the boiler plant are code compliant and appear to have been installed in 1992.

Boiler Plant – Building H

Boiler Plan Free Standing Chimney at Building H

Heating hot water from the boiler plant is delivered to the majority of buildings in the high school by three (3) base mounted end suction pumps which are located in the boiler room. Pumps P-1 and P-2 were installed in 1992. The pumps have a capacity of 620 gpm, 25 hp motors and appear to be in fair condition. Pump P-3 was installed in 1996 and has a capacity of 520 GPM and a 20 HP motor. The hot water pumps are not equipped with variable speed drives which would provide improved energy efficiency. The pumps appear to be in fair condition and are nearing the end of their expected service life.

Hot Water Pumps in Boiler Room

Boiler Room Combustion Air

Chiller Plant

The existing chiller plant is located in Building H. There are two (2) indoor chillers, each with a capacity of 120 tons @ 1.03 kw/ton efficiency and dual compressors as manufactured by McQuay, located in the basement mechanical room. The units are connected to two (2) remote air cooled condensing units which are located on the roof of Building H. Chiller No. 1 was installed in 1992 and Chiller No. 2 was installed in 1996. The chillers appear to be in good condition and the outdoor condensing units appear to be in fair condition. The chiller plant has three (3) base mounted end suction pumps (with one pump serving as a standby) that are also located in the basement mechanical room. The pumps each have a capacity of 228 GPM and 10 HP motors. The pumps appear to be in fair condition, but are nearing the end of their expected service life. The chilled water pumps do not appear to have variable speed drives installed which would provide improved energy efficiency. Chilled water is distributed to central station air handling units and 4-pipe fan coil units located throughout the high school via an overhead steel and copper piping distribution system.


Chiller in Building H Basement Mechanical Room


Air Cooled Condensing Units on Building H Roof

Piping Distribution Systems

The majority of hot and chilled water piping distribution systems are located in the first floor areas exposed in corridor and classroom areas and concealed above offices and areas with ceilings. Piping is typically routed to and from basement mechanical rooms through underground tunnels. Many segments of piping and valves do not have identification. In general the heating hot water mains were installed in 1992 (with modifications in 1996) and were connected to a then existing hot water piping distribution system. The majority of the chilled water piping system was installed in 1992 with modifications occuring during the 1996 project.

A 5" main chilled water supply and return line originates in the Building H chiller room. An 8" Hot water supply and return main originates in the Building H Boiler room. In general the majority of piping and insulation appears to be in fair to good condition. Due to the age of the piping systems, we would expect that main sections of piping are in better condition than smaller branch lines of hot water piping, many of which were typically installed during 1958, 1964 and 1973. There was some evidence of pipe rusting and corrosion noted at some of the air handling unit coil connections.

Much of the hot water and chilled water piping located in underground tunnels is not easily accessible, which is of concern due to the increased potential for pipe leaks as the system ages. We would recommend that new piping systems are located in more accessible locations.

Typical Hot and Chilled Water Piping in Corridors

Typical Hot Water Piping in Corridors and Above Ceiling

Hot Water Piping with Expansion Loop in Corridor

Hot and Chilled Water Piping in Tunnel

<u>Air Handling Equipment and Distribution</u>

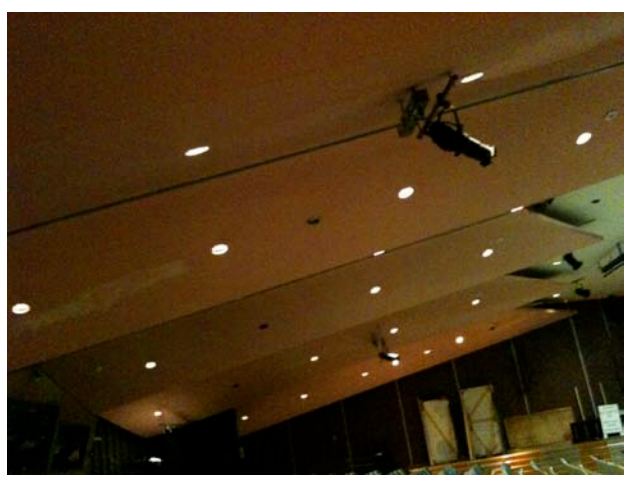
<u>Building A – Auditorium and Performing Arts:</u>

The auditorium is heated, ventilated and air conditioned by a central station air handling unit, HVAC-3, that is located in the basement mechanical room of Building A. The air handling system was installed in 1996 has an approximate capacity of 16,400 CFM and is equipped with a hot water heating coil, chilled water cooling coil, energy efficient supply fan motor and pneumatic/DDC controls. Return air is delivered back to the unit via an inline return air fan, RAF-3, which is located in the same mechanical room. Both the air handling unit and return fan appear to be in fair to good condition. The majority of the ductwork serving the auditorium was re-used as originally installed in 1958 with the main ductwork being routed from the mechanical room to the auditorium via ductwork located in underground tunnels, with many sections of the ductwork being very difficult to access. At the first floor level, supply air is delivered to the space via overhead diffusers and returned via return air grilles located in the step risers at the stage.

HVAC-3 – Auditorium Air Handling Unit

RAF-3 – Auditorium Return air fan

Auditorium Return Air Grilles



Auditorium Supply Air Diffusers

The interior administration office and practice room areas of Building A are heated and air conditioned by 4-pipe ceiling mounted fan coil units. A central station indoor air handling unit, HVAC-5, which was installed in 1996 and is located in Storage Room A2-G, provides tempered ventilation air (840 cfm, 3 tons cooling capacity) to these fan coil units. The majority of the distribution ductwork and piping in this areas, along with new general and toilet exhaust fans, were also installed in 1996.

Building C – Cafeteria and Kitchen:

The cafeteria is heated and ventilated by an indoor heating and ventilation unit, HV-3, that is located in the basement mechanical room of the Gymnasium basement mechanical room. The unit is a hot water heating and ventilation unit with a capacity of 16,000 cfm manufactured by McQuay. The unit was installed in 1996 and appears to be in fair condition. The unit's (along with HV-1,2 & 4) outdoor air ductwork connection is ducted to an underground concrete trench this condition will typically not provided the highest quality of fresh air. The unit is capable of delivering 100% outside air. The amount of fresh air delivered in controlled by the automatic temperature control system which is interlocked with the kitchen exhaust fan operation. The unit delivers air to the cafeteria via a ductwork distribution system that is routed through underground tunnels to floor supply air diffusers. In general the supply air diffusers appear to be soiled and in poor condition.

Cafeteria Floor Diffusers

Cafeteria Floor Diffusers

In addition, two ceiling mounted 100% outside air indoor air handling units (HV-8A & HV-8B, 3000 CFM, 265 MH heating capacity each) and associated ductwork were installed in 1996 to provide supplemental heating and ventilation. It is our understanding that these units operate above recommended noise criteria levels.


Cafeteria HV-8A & 8B Heating and Ventilation Units

During the 1996 renovation, new kitchen hood exhaust, general exhaust and toilet exhaust fans and ductwork were also installed. These exhaust fans generally appear to be in good condition. Ceiling mounted heating and ventilating units and associated ductwork was also installed in 1996 to provide heating and ventilation to the Faculty dining room and adjacent lobby and office areas.

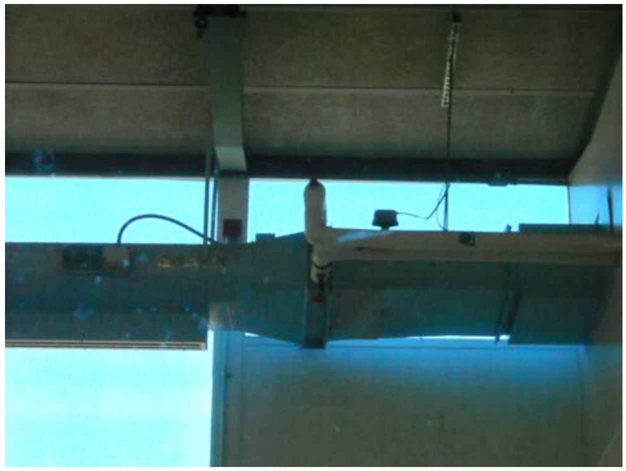
Building G – Upper and Lower Gymnasium:

Upper Gymnasium:

The upper gymnasium is heated and ventilated by an indoor, hot water heating and ventilation unit, HV-1. The unit has a capacity of 14,000 cfm and is capable of delivering 100% outside air to the gymnasium. The unit was installed in 1996 as manufactured by McQuay and is located in the Gynasium basement mechanical room. The majority of ductwork was originally installed in 1973 and is in fair condition. New main supply ductwork and piping feeds were installed in 1996. During the 1996 renovation, exhaust relief vents and four (4) destratification fans with wire guard cages were also installed to serve the gymnasium.

The weight and fitness rooms located in the back of the Upper Gymnasium are heated and ventilated by a ceiling mounted hot water unit ventilator, HV-7, which is connected to overhead ductwork and diffusers located at the perimeter wall. This unit was installed in 1996, has a capacity of 7000 cfm (3000 cfm outside air) and appears to be in fair condition. The unit's location does not allow for adequate room for service access.

HV-1 – Upper Gym H&V Unit


HV-7 Upper Gym Ceiling mounted H&V Unit

Lower Gymnasium:

The lower gymnasium is heated and ventilated by two (2) indoor, hot water heating and ventilation units, HV-6A & HV-6B. The units each have a capacity of 7,000 cfm and are each capable of delivering 3000 cfm of outside air to the gymnasium. The units were installed in 1996 as manufactured by McQuay. The units are ceiling mounted within the lower gymnasium and are connected to overhead supply air distribution ductwork and diffusers. Return air ductwork is routed from each unit overhead and down towards the floor where it terminates approximately 8'-0" above the floor. The majority of ductwork was originally installed in 1973 and is in fair condition. During the 1996 renovation, exhaust relief vents and three (3) destratification fans with wire guard cages were also installed to serve the gymnasium.


HV-6B - Lower Gym Heating & Ventilation System
(similar to HV-6A)

Locker Rooms and Gym office areas:

The Boys and Girls Locker rooms are heated and ventilated by an indoor, hot water heating and ventilation unit, HV-2. The unit has a capacity of 12,000 cfm and is capable of delivering 8040 cfm of outside air to the locker rooms. The unit was installed in 1996 as manufactured by McQuay, and is located in the Gymnasium basement mechanical room. New main ductwork and piping were also installed in 1996. The majority of the locker room ductwork distribution system, which generally runs under the locker rooms, was previously installed in 1958. In general the unit appears to be in fair condition and the majority of the associated ductwork and air distribution devices appear to be in poor condition. The general exhaust and toilet exhaust fans serving these areas were also installed in 1996 and appear to be in good condition. However, the associated ductwork appears to be in fair condition.

The majority of Gym office and corridor areas are heated and ventilated by HV-4. This unit is a hot water; indoor heating and ventilation unit with a capacity of 4000 cfm (1000 cfm outside air) located in the gymnasium basement mechanical room. The unit was installed in 1996 as manufactured by McQuay. The unit and associated ductwork appear to be in fair condition. The gym corridor areas are also heated with supplemental hot water fin tube radiation heating which appears to be in fair to poor condition.

HV-2 Boys & Girls Locker Room H&V Unit

HV-4 Gym Office and Corridor H&V Unit

Building H:

The interior office and resource room areas of Building H are heated, ventilated and air conditioned by a modular central station air handling unit which is located in the basement mechanical room of Building H/I. The unit was installed in 1992 as manufactured by Trane. The unit has an approximate capacity of 8181 cfm supply air, 1280 cfm outside air, 318 MBH cooling and 244 MBH heating. The unit's supply fan is equipped with a 20 HP motor. The unit's associated return air fan, RAF-2, has a capacity of 7,365 cfm and a 5 HP motor. The central station air handling unit distributes air to and from the interior building areas through a galvanized sheetmetal ductwork system equipped with variable air volume boxes with hot water reheat coils. The unit appears to be in good condition and is equipped with supply and return fan variable speed drives.

HVAC-1 – Building H Central Station Air Handling Unit

Building I:

The interior office, resource room and classroom areas of Building I are heated, ventilated and air conditioned by a modular central station air handling unit, HVAC-2, which is located in the basement mechanical room of Building I. The unit was installed in 1992 as manufactured by Trane. The unit has an approximate capacity of 18,625 cfm supply air, 4080 cfm outside air, 802 MBH cooling and 650 MBH heating. The unit's supply fan is equipped with a 20 HP motor. The unit's associated return air fan, RAF-2, has a capacity of 16,763 cfm and a 10 HP motor. The central station air handling unit distributes air to and from the interior building areas through a galvanized sheetmetal ductwork system equipped with variable air volume boxes with hot water reheat coils. The unit appears to be in good condition and is equipped with supply and return fan variable speed drives.

Industrial arts classrooms located towards the west exterior wall are heated and ventilated by a combination of indoor hot water heating and ventilation units and a rooftop gas fired heating and ventilation unit. The indoor heating and ventilation unit appears to be in good condition, whereas the outdoor gas fired unit appears to be in fair condition. An outdoor packaged gas fired/DX cooling air conditioning unit is installed on grade to serve the Building I TV Studio area. The unit appears to be in fair condition. The associated outdoor ductwork appears to be in poor condition.

Packaged AC Unit - Building I

Gas Fired Rooftop Unit – Building I

Building L – Library:

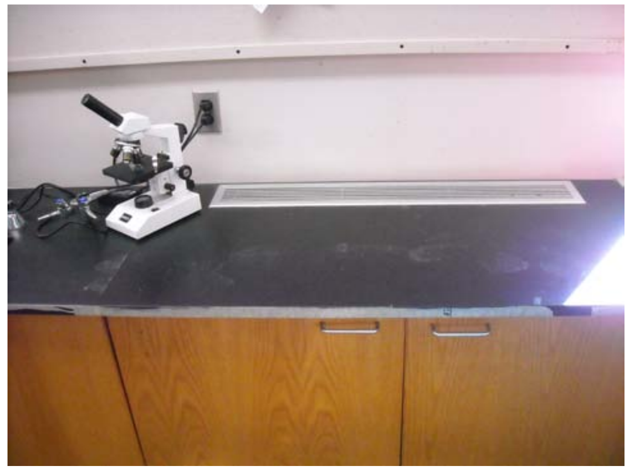
The library is served by an indoor central station air handling unit, HVAC-4, which is located in the Library mechanical room. The unit was installed in 1996 as manufactured by RACAN. The unit has a capacity of 25,000 cfm supply air, 30 HP supply fan motor with VFD, 888 MBH chilled water cooling capacity and 680 MBH heating capacity. The unit's associated inline return air fan, RAF-4, has a 15 HP motor with VFD and capacity of 22,500 cfm. The unit provides heating, ventilation and air conditioning to the library via an overhead supply and return air galvanized sheet metal distribution system. The air volume delivered to the library is controlled by fan powered variable air volume boxes with hot water heating coils which were also installed in 1996. The majority of the ductwork was installed in 1996, including VAV boxes and new registers, grilles and diffusers. However, portions of the ductwork installed are older as these were re-used during the 1996 renovation project. The library has supplemental hot water radiation heating which appears to be in fair condition.

Classroom Heating and Ventilation Systems

The majority of the classrooms in the High School are served by vertical type, heating only, unit ventilators. The majority of unit ventilators were installed during the 1992 and 1996 building renovation projects. In 1996, unit ventilators were added to classrooms in Building A. In 1992, unit ventilators were added to the classrooms in Building L, Building S and Building I. The unit ventilator intake louvers in the Building S courtyard are located very close to grade. This condition is undesirable as the unit ventilator intakes can be blocked due to vegetation growth and snow drifts and are also susceptible to entrainment of lawnmower exhaust fumes.

In addition to unit ventilators, some of the classrooms also have supplemental hot water fin tube radiation heating. The majority of unit ventilators appear to be in fair condition.

Typical Classroom Unit Ventilation



Typical Casework Register associated with Supplemental Fin Tube Radiation

Typical General Exhaust Ductwork Serving Classrooms

Typical Unit Ventilator Intake Louver

Each classroom building typically has a general exhaust system which exhausts air from the classrooms to roof mounted exhaust air fans via a galvanized sheet metal ductwork distribution system. The exhaust ductwork is typically routed exposed down the classroom corridors. The majority ductwork and associated fans appear to have been installed during the 1992 and 1996 renovations and appear be in good condition.

Core toilet areas are typically served by dedicated toilet exhaust fan systems. The majority of these systems were installed during the 1992 and 1996 renovations and appear to be in good condition. Many of the exhaust grilles located in restrooms appears to be in fair to poor condition. Many of the associated restroom door transfer make-up air grilles appear to be in poor/damaged condition.

Special Exhaust Systems

The fume hoods located in Building S are served by dedicated exhaust fans which appear to have been installed sometime after the 1996 renovation. The fume hoods, associated exhaust ductwork and fans appear to be in good condition.

Building S – Fume Hoods

Building S – Fume Hood Exhaust Fans

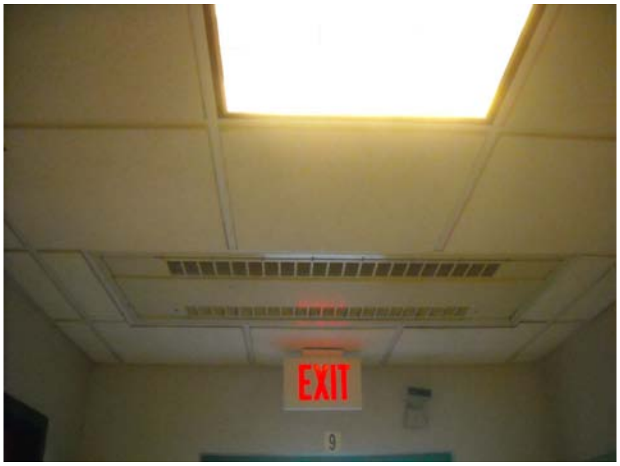
Vestibule, Entry and Supplemental Heating Systems

The majority of vestibule and entry ways are heated by hot water cabinet unit heaters. The cabinet unit heaters are either ceiling or wall mounted. The majority of these units appear to have been installed during the 1992 and 1996 renovation projects, and appear to be in fair to good condition.

Areas of the underground tunnel and mechanical/utility rooms are typically heated by horizontal hot water unit heaters. The majority of these units appear to be in good condition.

Storage rooms located within Classroom wings of the building are typically heated by hot water convectors of fin tube radiation heating.

Typical Wall Type Cabinet Unit Heater



Type Ceiling Mounted Cabinet Unit Heater

Automatic Temperature Controls

The automatic temperature control (ATC) system is a combination pneumatic and direct digital control system. The majority of the ATC system infrastructure was installed in 1992 during a building wide renovation project. The main front end workstation is an Invensys system which is located in the basement mechanical room of Building H. Various temperature control sub panels, which are networked to the front end workstation and main control panel, are located throughout the campus buildings.

The majority of the control system operates via pneumatic controls with minimal system integration and networking occurring via a basic direct digital control architecture. In general we would recommend that the existing pneumatic ATC control system is replaced with a new, state of the art, full direct digital control system for improved energy efficiency and control capability.

Typical Equipment Status Indicator Panel

Typical ATC Control Panel

Typical ATC Control Panel

The majority of the ATC system pneumatic air compressors appear to be in good operating condition. However, pneumatic controls are more expensive to operate and maintain than new direct digital control systems.

ATC System Compressor – Gym Mechanical Room

ATC System Compressor
Building H Basement Mechanical Room

Front End Workstation – Building H Mechanical Room

Concord Carlisle High School
Concord, MA
Electrical Existing Conditions Systems Report
J#320 003 00.00
L#29669/Page 1/November 18, 2009

ELECTRICAL

Executive Summary

In general, the electrical systems are original vintage with the exception of new panels that were installed in the 1990's to accommodate HVAC equipment. The electrical services are not adequate in capacity and the equipment is in poor condition. The service is capable of only 5 watts/sq.ft. New construction is designed for 10 watts/sq.ft. The trip unit rating on the main circuit breaker appears to be set at 1600 amps. These services are in need of replacement. Life safety lighting and exit signs are served through the existing emergency generator.

The life safety lighting, exit signs and electrical distribution are in some cases in violation of today's codes and would not be suitable for reuse under a renovation program. The fire alarm system can be extended to meet present building code requirements and should be re-used.

It is our recommendation, taking into consideration the age and general condition of the existing equipment, that all systems (except fire alarm system) be replaced with new energy efficient code compliant systems.

Electrical Distribution System

There is one service present at the facility. The service voltage is rated at 277/480V, 3Ø, 4W. The existing main switchboard appears to have a 1600 amp rated air circuit breaker. The trip unit could not be verified on the circuit breaker but appears to be 1600 amps. The original switchboard is manufactured by Westinghouse. The equipment is obsolete and in poor condition. The service equipment does not have adequate space for future expansion. The switchboard appears to have been modified in the 1973 renovation.

There is a pad mounted transformer present and is located outside. The original transformer vault has been eliminated and now serves the emergency generator. The site is on one secondary meter. The service is located near the loading dock. The service is underground to the building.

Main Circuit Breaker

1973 Modification to Main Switchboard

There are electrical sub-panels located throughout the facility generally in closets. The panels are circuit breaker type but are obsolete. The panels are in poor condition and should be replaced. There is corrosion present in panels located in the basement mechanical rooms. Original panelboards are manufactured by ITE.

Typical panelboard with live bus exposed.

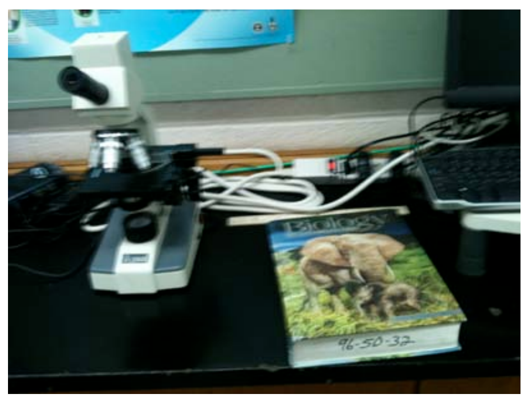
Typical Original Distribution Panel

Typical Panel replaced in the 1990's

Branch Circuits

In the classrooms there is one receptacle on each wall. The quantity of receptacles is minimum in classrooms. Extension cords are being used. Outlets have been added in science labs to accommodate computer equipment.

Science Lab added Receptacles



Extension Cords being used

Kitchen receptacles are not ground fault type, NEC 2009 Article 210.8(B)(2) GFCI receptacles are required in kitchens for all 15 and 20 amp 125 volt receptacles.

In the science labs, lab benches have duplex 120 volt, Receptacles with GFCI type.
All of the lab areas do not have emergency power off pushbuttons to shut down the power in case of an emergency. This is also the case in the kitchen area.

Interior Lighting System

Lighting in corridor varies but is generally pendant mounted linear fluorescent fixtures. The fixtures have been updated T-8 lamps with electronic ballasts. The project has gone through an energy efficiency program which included replacement of T-8 lamps and electronic ballasts.

Typical Corridor Lighting

Classroom lighting typically consists of pendant industrials with fluorescent lamps. The light levels appear adequate but the fixtures contribute a substantial amount of glare. These fixtures should be upgraded as the area is renovated.

Typical Classroom Lighting

The cafeteria lighting consists of fluorescent troffer fixtures. The lamps and ballasts have been replaced with T-8 lamps and electronic ballasts.

House lighting in the auditorium is obtained by the use of incandescent recessed down lights. There is stage lighting fixtures including border lights, and are in poor condition. These fixtures should be upgraded as the area is renovated. The light level is very low.

Auditorium Housing Lighting

Stage Electrics with Border Lights

There is an auditorium dimming system present which is in poor condition and should be replaced. There is a Lutron dimming system for house lighting. The dimming rack is located above a closet.

Library/Media Center Lighting

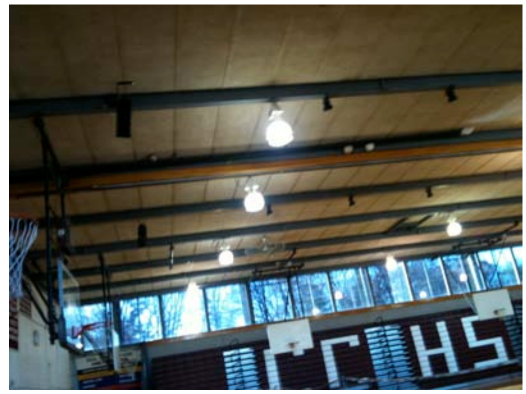
Auditorium House Dimming System

The administration/principal area has recessed fluorescent fixtures. These fixtures should be upgraded as the area is renovated.

The Library/Media Center has continuous row recessed fixtures with T5 lamps and acrylic lenses. There is no daylighting controls present.

The lower level gymnasium has high output industrial fluorescent fixtures present. The fixtures are in good condition and were replaced within the last few years. The upper level gym has metal halide high bay fixtures which should be replaced.

Lower Level Gymnasium



Upper Level Gymnasium

There is fluorescent lighting present in the mechanical areas. There is a gallery present with plug in track lighting.

Gallery Lighting

Mechanical Room Lighting

Emergency Lighting System

There is a 60kw, 75 kva, 3Ø, 4w natural gas fueled emergency generator manufactured by Onan present. The generator services corridors for egress lighting. The generator is located in the emergency electrical room which was the previous transformer vault. The transfer switch has been replaced. The emergency lighting system is not in compliance with NEC Article 700 the generator and life safety equipment needs to be isolated from normal power distribution equipment. It appears that the emergency power will be available to areas served only when total loss of building power occurs.

Emergency Generator

Remote Generator Annunciator

Site Lighting System

The lighting at the site consists of cobra head lighting which lights the parking area. The site lighting is not adequate. There are low level lights at the rear of the school.

Cobra-head lighting

Low Level Pole Lighting

Fire Alarm System

The fire alarm panel has been replaced approximately upgraded for the majority of the school. The panel is manufactured by Notifier. The system is ADA compliant. The existing system is in good condition.

The coverage of fire alarm devices appears adequate. Smoke and/or heat detectors are present in most rooms corridors have smoke detectors installed.

Main Fire Alarm Panel

Typical Heat Detector

The kitchen hood suppression system is tied into the fire alarm system.

Hood Suppression System

Report For
Indoor Air Quality Study
AT
Concord-Carlisle Regional High School
Art Wing
Concord, MA

Study Dates:
October 16 and 19, 2009

Project# 29184.00

STUDY CONDUCTED BY:

UNIVERSAL ENVIRONMENTAL CONSULTANTS
12 Brewster Road
Framingham, Massachusetts

November 16, 2009

Mr. David Anderson
Concord Public Schools
120 Meriam Road
Concord, MA 01742

Reference: **Indoor Air Quality Study (IAQS)**
Concord-Carlisle Regional High School, Art Wing, Concord, MA

Dear Mr. Anderson:

Thank you for the opportunity for Universal Environmental Consultants (UEC) to provide professional services.

Enclosed please find the report for Indoor Air Quality Study at the Concord-Carlisle Regional High School, Art Wing, Concord, MA conducted on Friday, October 16 and Monday, October 19, 2009.

Please do not hesitate to call should you have any questions.

Very truly yours,

Universal Environmental Consultants

Ammar M. Dieb
President

UEC:\29184\IAQreport.Doc

Enclosure

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1.0 Scope:

UEC was contracted to perform an Indoor Air Quality testing at the Concord-Carlisle Regional High School, Art Wing, Concord, MA.

Testing was performed on Friday, October 16 and Monday, October 19, 2009. On October 16, 2009 the average outside temperature was 41 and the average relative humidity was 75%. The wind was out of the N at 16 MPH with gusts of up to 37 MPH. The sky was overcast with periods of light rain.

On Monday, October 19, 2009 the average outside temperature was 46 and the average relative humidity was 71%. The wind was out of the NW at 9 MPH with gusts of up to 23 MPH. The sky was mostly sunny.

The school was occupied with some staff and students over the course of the testing period.

Most windows and exterior doors were closed during the testing period.

There are local area ventilation systems, fume hoods and filtration units in where particulate and/or vapors would be anticipated.

2.0 Methodology:

Testing for Total Volatile Organic Compounds (***TVOCs***) was performed by Rae Systems "PPB Rae" Photo-ionization Detector (PID) utilizing a 10.7v lamp. This is a state of the art instrument capable of detecting total VOCs in the parts per billion range. The instrument is a direct read and provides continuous results over an extended time.

Volatile organic compounds are a broad class of chemicals with diverse applications which are frequently emitted by new carpets, furniture, pressboards, varnishes, adhesives and high gloss finishes. Other common household products which may emit VOCs include: paints, paint strippers, other solvents, wood preservatives, aerosol sprays, cleansers, disinfectants, moth repellents, air fresheners, stored fuels and automotive products, hobby supplies, and dry-cleaned clothing. High levels of VOCs are a common Indoor Air Quality problem, especially in newly constructed, recently renovated, or currently being renovated buildings.

Carbon monoxide (***CO***) and nitrogen dioxide (***NO_2***) were measured by Toxic Gas Monitor (PGM-35) which is a direct read instrument manufactured by ToxiRAE. The unit is calibrated prior to use and serviced by an independent vendor annually.

Carbon Dioxide (***CO_2***) was measured by means of TSI Corp.'s Model 8732 detector manufactured by TSI Incorporated and confirmed with a Bacharach detector. Both units utilize IR Technology to quantify ***CO_2***. The instrument was calibrated on site prior to testing and serviced annually by an independent vendor.

Airborne particulates were tested by MIE Corp.'s PDR-1000, Direct Read instrument. The instrument was calibrated immediately prior to testing. The machine is serviced annually by an independent vendor who is certified for maintenance and repairs by the manufacturer. Airborne particles were counted and sized by Kanomax Laser Particle Counter Model 3887. The instrument is capable of counting airborne particles in real time and sorts them by a variety of size options. On this project we are breaking out the particle into sizes of 0.3, 0.5 and 5 microns.

Temperature (**°F**) and Relative Humidity (**RH %**) were collected by Sper Scientifics Model 850070 instrument and verified in at least one location by sling psychrometer.

Noise was measured by Tes Corps. Tes-1350A Sound level Meter.

Airborne particles were counted and sized by Kanomax Laser Particle Counter Model 3887. The instrument is capable of counting airborne particles in real time and sorting them by a variety of size options. On this project we are breaking out the particle into sizes of 0.3, 0.5 and 5 microns.

Hydrogen sulfide (***H_2S***) was measured by Industrial Scientific's M50 direct read meter. The meter was calibrated prior to the site visit for all parameters.

Respirable silica was sampled and analyzed by the NIOSH 7500 Method. The sample was collected using a cyclone attached to a 37 MM cassette. Analysis was performed by X-Ray diffraction in accordance with the method.

Samples results can be found in Section 1.

The asbestos air sample was collected in accordance with 453 CMR 6.00 and 40CFR Part 763. The sample was analyzed by the NIOSH 7401 method for Transmission Electron Microscopy (TEM).

Samples results can be found in Section 2.

Airborne mold testing was performed utilizing Zefon International Incorporated's Air-O-Cell® sampling device following all manufacturer supplied recommended sampling procedures.

The Air-O-Cell® is a direct read total particulate air sampling device. It works using the inertial impaction principle similar to other spore trap devices. It is designed for the rapid collection and analysis of airborne particulate including bioaerosols. The particulate includes fibers (e.g. asbestos, fiberglass, cellulose, clothing fibers) opaque particles (e.g. fly ash, combustion particles, copy toner, oil droplets, paint), and bioaerosols (e.g. mold spores, pollen, insect parts, skin cell fragments).[1]

The method involves drawing a known quantity of air through a sterile sampling cassette. Subsequent to sampling, the cassette is sealed and transferred to a microbiology laboratory under chain of custody protocol for microscopic analysis. This method counts both viable and nonviable mold spores.

Samples results can be found in Section 3.

[1] Zefon International Inc. <www.zefon.com>

3.0 Results:

TOTAL VOLATILE ORGANIC COMPOUNDS by PID, CARBON MONOXIDE, CARBON DIOXIDE, TOTAL AIRBORNE PARTICULATE, NITROGEN DIOXIDE, NOISE

Location	TVOCs (PPB)	CO (PPM)	CO_2 (PPM)	Total Particulates (mg/M^3)\	NO_2 (PPM)	Noise (dB)
Ceramics, West	<20	ND	420-780	0.014	ND	48
Ceramics, East	<20	ND	520	0.018	ND	50
Ceramics, Center	<20	ND	620	0.021	ND	48
Photo	20-40	ND	525	0.011	ND	49
Dark Room	30-50	ND	440	0.009	ND	49
Outside	ND	ND	365	0.006	ND	50

AIRBORNE PARTICLES BY LASER COUNTER OXYGEN, HYDROGEN SULFIDE

Location	>.3 Micron Particles/CM	>.5 Micron Particles/CM	>5 Micron Particles/CM	O_2 (PPM)	H_2S (PPM)
Ceramics, West	5290000	765000	15500	20.9	ND
Ceramics, East	17200000	6930000	346000	20.9	ND
Photo	6590000	963000	28300	20.9	ND
Outside	10800000	1260000	30400	20.9	ND

TEMPERATURE & RELATIVE HUMIDITY

Location	Temperature (F)	% RH
Ceramics, West	71	26
Ceramics, East	70	26
Ceramics, Center	71	26
Photo	70	25
Dark Room	70	28
Outside	45	38

RESPIRABLE SILICA BY XRD (NIOSH 7500)

Location	Respirable Dust (mg/CM)	Silica (mg/CM)
Ceramics, West	<0.121	Quartz <0.012 Cristobalite <0.049 Tridymite <0.049
Photo	<0.111	Quartz <0.011 Cristobalite <0.044 Tridymite <0.044

Asbestos by TEM

Sample ID	Location	Type	Structures/MM²
C-1	Ceramics	Ambient	NSD

AIRBORNE MOLD and PARTICULATE

Lab ID #	Location	Total Mold Counts/M³	Pollen	Insect Fragment	Hyphal Fragments
130904362-00001	Photography	1,130	ND	ND	22
130904362-00002	Ceramics	Present	ND	ND	ND
130904362-00003	Outside	8,110	ND	ND	111

AIRBORNE MOLD and PARTICULATE (Subjective Scales)

Lab ID #	Location	Skin Fragment Density (SFD)	Fibrous Particulates (FP)	Total Background Particulate (TBP)
130904362-00001	Photography	2	ND	2
130904362-00002	Ceramics	ND	1	5
130904362-00003	Outside	1	ND	2

Legend:

ND – Not Detected

CO - OSHA PEL is 30 PPM, ACGIH TLV is 25 PPM.

CO_2 - OSHA PEL is 5000 PPM, Mass DOH Guideline is 800 PPM

TVOC – Suggested Guideline of 100 PPB

Particulates - OSHA PEL is 15 mg/m³, ACGIH TLV is 3 mg/m³

Skin Fragment Density: 1 - 4 scale where 1 is low and 4 is high

Background Particulate Density: 1 - 5 scale where 1 is low and 5 is high

4.0 Observations and Interpretation of Results:

Temperature and Relative Humidity

Temperature and relative humidity were within the acceptable summer range in nearly all of the areas tested according the American Society of Heating, Refrigeration and Air-conditioning Engineers' ANSI/ASHRAE 55-1992 **"Thermal Environmental Conditions for Human Occupancy**" guideline. The (RH) was slightly low in the Photography classroom.

Airborne Particulate

Total airborne particulates were well below the OSHA limit of 15 mg/M^3 and the ACGIH guideline of 3 mg/M^3. Yet, the foregoing guidelines are more applicable to industrial settings and therefore have limited value in accessing office, hospital and school type environments. In those few jurisdictions which have particulate guidelines for schools, they are generally in the 0.050 to 0.100 mg/cubic meter range. We have therefore adopted the 0.100 mg/cubic meter guideline.

All Particulate samples collected in the school were below our guideline, as well as the regulatory guidelines and limits. The levels encountered on this day are typically of a non-problematic interior environment.

Laser particulate counts of course, intermediate and fine particles were above outdoor levels. Outdoor air is generally superior in quality to indoor air. There are no guidelines or standards for airborne particle counts. The information is provided for comparative and informational purposes only. Levels in the east end of the ceramics area rose rapidly when class was in session, as compared to the unoccupied area.

TVOCs

All ***TVOC*** levels collected on this day were below 100 PPB (0.1 PPM). These levels are considered average when compared the historical data we have collected for buildings of similar age, design and utilization and recent samples.

Neither OSHA nor The American Conference of Governmental Industrial Hygienists promulgates an exposure standard for Total VOCs both instead opting for limits on each individual compound. The OSHA PEL for the majority of compounds with common construction applications is in the 25 - 100 PPM range. The PEL for some of the more exotic compounds are as low as .5 PPM. Assuming a worst case scenario, ***TVOC*** levels should not exceed .5 PPM (500 PPB).

100 PPB is roughly equivalent (there are variations based upon molecular weights of individual volatile organic compounds) to the Seifert "Target Guideline Value" of 0.3 mg/M^3. The Seifert TGV is a widely recognized ***TVOC*** guideline and has been adopted by ASHRAE.

All ***TVOC*** levels encountered in the school were below both the ASHRAE guideline as well as the implied OSHA limit.

Carbon Monoxide

CO was not detected on this day. The limit of detection for the method is 1 PPM. The OSHA limit for comparison purposes is 30 PPM and the ACGIH TLV is 25 PPM. We assume a safety factor of 10 for schools (2.5 PPM).

Housekeeping

Housekeeping was assessed as "good" overall inside the school. No problem areas were noted on this day. Housekeeping is a relevant factor in terms of air quality as poor housekeeping could lead to microbial amplification and generally poor air quality.

Carbon Dioxide

Many CO_2 levels were generally within the acceptable range in all areas tested. For comparative purposes, fresh outdoor air has approximately 360 PPM of CO_2. All areas were well below the OSHA/NIOSH limit of 5000 PPM as well as the Massachusetts Department of Health guideline of 800 PPM for publicly occupied buildings. Massachusetts DOH recommends an optimal level of below 600 PPM. Exposure to high levels of CO_2 for prolonged periods could cause building occupants to become lethargic and generally uncomfortable. CO_2 levels will rise over the course of the day especially in those areas which have a high occupancy. CO_2 levels would be considerably higher in the winter months when windows are closed and the building is fully occupied. CO_2 levels were collected when the areas were unoccupied. When students occupied the east ceramics room the CO_2 level rose rapidly, approaching 800 PPM in short order. This tends to indicate that fresh outdoor air is not being introduced into these areas.

Nitrogen Dioxide

The OSHA PEL for NO_2 is a ceiling limit of 5 PPM the NIOSH short term limit is 1 PPM. The limit of detection for our test method was 0.2 PPM. NO_2 was not detected on this day.

Hydrogen Sulfide

H_2S was not detected in the samples collected on this day. The OSHA limit for H_2S is a ceiling limit of 20 PPM and the NIOSH limit is also a ceiling limit of 10 PPM. The LOD for the method is 1 PPM.

Oxygen

Oxygen levels were consistent with fresh outdoor air in all areas - 20.9%. In some instances when carbon dioxide is very high it will displace oxygen, lower the percentage.

Lower Explosive Limit

Petroleum and natural gases which could pool and cause an explosion if exposed to an ignition source were not detected on this day.

Noise

Noise was measured in decibels using the A Weighted Scale as defined by a standard sound level meter having characteristics defined by the American National Standards Institute, Publication ANSI s1.4-1971 with a slow response time. There are no standards for noise exposure in schools. The OSHA and ACGIH standards are geared more toward hearing conservation. Those standards as well as international standards are generally in the 85 dB range for sustained noise and 115 dB range for a ceiling limit. These standards to not take into account nuisance or distraction issues which would be problems in a school environment. Mass DEP Air Quality Regulations 310 CMR 7.00, do address nuisance noise. The DEP standard is applicable to construction activity and equipment. In accordance with the regulation, the ambient sound level is collected in a location where the offending sound cannot be heard. Further, the noise is recorded on the A weighted scale with a slow response time. Violations of the DEP's Community Sound Criteria would include either of the following:

1. An increase in the broad band noise level in excess of 10 dBs above ambient, or;
2. A pure tone condition (i.e. a continuous squeak).

All levels were within the acceptable range on this day.

Respirable Silica

Respirable silica was tested due to it being a component of clay. Respirable silica levels were below the method Limit of Detection on the 19th as well as below regulatory limits.

Asbestos

Airborne asbestos as tested by the TEM method was not detected on the 19th.

Mold

There are currently no guides or standards promulgated by a government agency or widely recognized scientific organization for the interpretation of surface or airborne mold spore levels. The most commonly employed tool for interpreting airborne mold results is to compare indoor airborne spore levels and species to outdoor airborne mold spore levels and species.

Indoor airborne mold spore levels were well below outdoor levels. Generally, all species of mold found inside the building were also found outside the building. The most represented mold both indoors and outdoors were Basidiospores - a common environmental molds. This type of mold is not considered hazardous.

Very low levels of Hyphal fragments were found in Photo. Hyphal fragments at these levels are not considered significant.

It is not uncommon, during summer months, for outdoor airborne mold spore counts to exceed 10,000 spores per cubic meter and, in fact, this past summer outdoor spore counts exceeded 40,000 spores per cubic meter. Mold is ubiquitous in the environment and we are constantly exposed to mold. No definitively hazardous molds were detected in the indoor samples. Although there are no mold standards or guidelines indoor environments with less than 2000 spores per cubic meter are often presumed to be non problematic.

5.0 Conclusions and Recommendations:

All IAQ parameters tested were within the acceptable ranges.

Local ventilation systems, fume hoods and filtration systems appear to be working as designed. They are rapidly removing VOCs and particulate which are associated with photo dark room and ceramic operations.

The ambient air in these areas appears to be free of the hazards which would be suspected to be present.

The only concern is that fresh outdoor air does not seem to be getting into the classrooms and that the make up air from the local ventilation systems is most likely coming from inside the building. Most unit ventilators can be reset to allow a greater ratio of fresh outdoor air. This will adversely affect heating cost but will improve overall air quality.

The Massachusetts Building Code requires a minimum ventilation rate of 20 cubic feet per minute (cfm) per occupant of fresh outside air or has operable windows in each room (SBBRS, 1997; BOCA, 1993). The ventilation must be on at all times that the room is occupied. Providing adequate fresh air ventilation with open windows and maintaining the temperature in the comfort range during the cold weather season is impractical. Mechanical ventilation is usually required to provide adequate fresh air ventilation.

6.0 Limitations and Conditions:

This report has been completed based on visual and physical observations made and information available at the time of the site visits, as well as an interview with the Owner's representatives. This report is intended to be used as a summary of available information on existing conditions with conclusions based on a reasonable and knowledgeable review of evidence found in accordance with normally accepted industry standards, state and federal protocols, and within the scope and budget established by the client. Any additional data obtained by further review must be reviewed by UEC and the conclusions presented herein may be modified accordingly.

This report and attachments, prepared for the exclusive use of Owner for use in an environmental evaluation of the subject site, are an integral part of the inspections and opinions should not be formulated without reading the report in its entirety. No part of this report may be altered, used, copied or relied upon without prior written permission from UEC, except that this report may be conveyed in its entirety to parties associated with Owner for this subject study.

REFERENCES:

1. ACGIH, Threshold Limit values and Biological Exposure Indices, 2007.
2. AIHA, 2700 Prospect Ave., Fairfax, VA. IAQ Paper #130 June 23, 1999.
3. Seifert, B. Regulation Indoor Air. In: Indoor Air '90, Proceedings of the 5th International Conference on Indoor Air Quality and Climate, Volume V, p. 35. Toronto1990.
4. American Society of Heating, Refrigeration and Air-conditioning Engineers' ANSI/ASHRAE 55-1992 **"Thermal Environmental Conditions for Human Occupancy."**
5. BOCA, 1993. The BOCA National Mechanical Code 1993 8th edition Building Officials and Code Administrators International., Inc., Country Club Hills, Ill
6. SBBRS, 1997. Mechanical Ventilation, State Board of Building Regulations and Standards Code of Massachusetts Regulations 780 CMR 1209.0
7. Field Guide for the Determination of Biological Contaminants in Environmental Samples. (2005)

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Environmental Chemistry
Chain of Custody

EMSL Order Number (*Lab Use Only*): 040926209

EMSL ANALYTICAL, INC.
3 COOPER ST.
WESTMONT, NJ 08108
PHONE: (856) 858-4800
FAX: (856) 858-3899

Report To Contact Name: Amar Dieb	Bill To Company: Universal	Sampled By (Signature): [signature]
Company Name: Universal	Attention To: Same	Number of Samples in Shipment: 2
Address 1: Brewster rd, Framingham Ma	Address 1:	Date of Shipment: 10-23-09
Address 2:	Address 2:	U.S. State where Samples Collected: MA
Phone : Fax :	Phone: Fax:	Purchase Order:
Email Results To: Ammar	Project Name: Concord High School	

Standard Turnaround Time: ☐ 2 Weeks — The following TAT's are subject to lab approval: ☐ 1 Week ☐ 4 Days ☐ 3 Days ☐ 2 Days ☐ 1 Day → ASAP

Failure to complete will hinder processing of samples

5 day
Per Amer

Client Sample ID	Comp	Grab	Date/Time	Matrix W=Water S=Soil A=Air SL=Sludge O= Other	Preservative 1=HCL 2=HNO3 3=H2SO4 4=ICE 5=Other	List Test(s) Needed								Comments
601			10-21											412 L
6[illegible]			10-21											450 L

Photography
Ceramics
Cillica

09 OCT 26 AM 9:
RECEIVED
EMSL
WESTMONT, NJ

Released By (Signature)	Date & Time	Received By	Date & Time
[signature]	10-23-09 @ 3:36		

Please indicate reporting requirements: ☐ Results Only ☐ Results and QC ☐ Reduced Deliverables ☐ Disk Deliverable ☐ Other ____

Instructions or Comments:

SAMPLES ACCEPTED FOR ANALYSIS BY EMSL ANALYTICAL INC. [initials]

RECEIVED
OCT 23 2009
SA 1535

040926209

EMSL.Relinquish Form
Revision 1
September 2005

EMSL Analytical, Inc.
Relinquish Form

040926208

Initial Lab:	EMSL Boston	Phone Number:	781.933.8411
		Fax Number:	781.933.8412
Relinquished to:	EMSL Westmont	Phone Number:	856.858.4800
		Fax Number:	856.858.4571
Does new Lab hold equivalent or additional accreditation*			Yes/No

Client Name:	Universal Environmental Consultants (UEC63) Contact: Jason Becotte
Client Project:	Silica
Date Received:	10/223/09
Date Relinquished:	10/23/09
Date Due:	ASAP TAT from Date/Time Received in NJ
Special Instructions:	Please email results to adieb@uec-env.com

Relinquished by (Signature): Stephanie Anderson	Date: 10/23/09	Received by (Signature) KW Fx 920	Date: 10/26
Relinquished by (Signature):	Date:	Received by (Signature)	Date:

09 OCT 26 AM 9:51
RECEIVED
EMSL
WESTMONT, NJ

Client Notification- Please sign this form and fax to the original laboratory. By signing below you agree to allow the above named laboratory to relinquish the samples to a new laboratory with equivalent or additional certification.

Name (please Print)	Signature	Agent of:	Date:

If this is a reoccurring project or sample type that will require samples to be relinquished on a regular basis please sign below and the laboratory will keep this form on file.

Name (please Print)	Signature	Agent of:	Date:

* All accreditation information and certificates can be found at www.emsl.com.

SAMPLES ACCEPTED
FOR ANALYSIS BY
EMSL ANALYTICAL INC.

EMSL Analytical, Inc.
107 Haddon Ave. Westmont, NJ 08108
Phone: (856) 858-4800 Fax: (856) 858-4960 Web: http://www.emsl.com Email:westmontasblab@EMSL.com

Attn:	Ammar Dieb Universal Environmental Consultants 12 Brewster Road Framingham, MA 01702	**Customer ID:**	UEC63
		Customer PO:	
		Date Received:	10/26/2009 9:20:00AM
		EMSL Order ID:	040926209
Phone:	508-628-5486	**EMSL Project ID:**	
Fax:	508-628-5488	**Date Analyzed:**	10/30/2009
Proj:	CONCORD HIGH SCHOOL		

Test Report: Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

Sample ID	Location	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Analytical Sensitivty (mg/m³)	Silica	Weight (mg)	Conc. (mg/m³)	% Silica
601		412	<0.050	<0.121	0.012	α-Quartz	<0.005	<0.012	N/A
040926209-0001					0.049	Cristobalite	<0.020	<0.049	N/A
					0.049	Tridymite	<0.020	<0.049	N/A
644		450	<0.050	<0.111	0.011	α-Quartz	<0.005	<0.011	N/A
040926209-0002					0.044	Cristobalite	<0.020	<0.044	N/A
					0.044	Tridymite	<0.020	<0.044	N/A
			N/A	N/A	N/A	α-Quartz	<0.005	N/A	N/A
Method Blank					N/A	Cristobalite	<0.020	N/A	N/A
					N/A	Tridymite	<0.020	N/A	N/A

			Silica	Weight (mg)	Conc. (mg/m³)	% Silica
Reference Standards	Quartz250 (0.250 mg)	0.250	α-Quartz	0.251	N/A	N/A
	Quartz5 (0.005 mg)	0.005	α-Quartz	0.005	N/A	N/A
	STD 3 (0.020 mg)	0.020	Cristobalite	0.017	N/A	N/A

Analyst(s)

Jian Hu

Stephen Siegel

Stephen Siegel, CIH, Laboratory Manager
or other Approved Signatory

Samples analyzed by EMSL Analytical, Inc.
Westmont 107 Haddon Ave., Westmont NJ
AIHA IHLAP 100194

The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-laboratory personnel. This report only relate to the samples submitted. The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-Laboratory Personnel. "<" means less than the stated value. The lowest reportable value is equivalent to the Analytical Sensitivity that is calculated from the lowest reproducible amount of specific mineral detectable by the instrument. Samples received in good condition unless otherwise noted.

In the absence of a bulk dust sample, neither the specific forms of crystalline silica nor the interfering species can be fully determined. Hence, the amount for each phase, if anticipated, will be analyzed based on primary, secondary, and/or tertiary peak data with comparison to calibration curves of known standards. It should be noted that air samples are meant for only quantifying silica (or a mineral phase) which must first be identified from a bulk dust sample.

130904363

EMSL ANALYTICAL, INC.
LABORATORY•PRODUCTS•TRAINING

Asbestos Chain of Custody

EMSL Order Number *(Lab Use Only)*:

130904363

EMSL ANALYTICAL, INC.
7 CONSTITUTION WAY
SUITE 107
WOBURN, MA 01801
PHONE: (781) 933-8411
FAX: (781) 933-8412

Company: Universal	**EMSL-Bill to:** ☐ Same ☐ Different If Bill to is Different note instructions in Comments**
Street: 12 Brewster rd	*Third Party Billing requires written authorization from third party*
City: Framingham **State/Province:** Ma	**Zip/Postal Code:** **Country:**
Report To (Name): Amar Dieb	**Fax #:**
Telephone #:	**Email Address:**
Project Name/Number: Concord High school	
Please Provide Results: ☐ Fax ☐ Email **Purchase Order:**	**U.S. State Samples Taken:**

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hours ☐ 6 Hours ☒ 24 Hrs ☐ 48 Hrs ☐ 3 Days ☐ 4 Days ☐ 5 Days ☐ 10 Days

*For TEM Air 3 hours/6 hours, please call ahead to schedule.*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.*

PCM - Air	TEM - Air	TEM- Dust
☐ NIOSH 7400	☑ AHERA 40 CFR, Part 763	☐ Microvac - ASTM D 5755
☐ w/ OSHA 8hr. TWA	☐ NIOSH 7402	☐ Wipe - ASTM D6480
PLM - Bulk (reporting limit)	☐ EPA Level II	☐ Carpet Sonication (EPA 600/J-93/167)
☐ PLM EPA 600/R-93/116 (<1%)	☐ ISO 10312	**Soil/Rock/Vermiculite**
☐ PLM EPA NOB (<1%)	**TEM - Bulk**	☐ PLM CARB 435 - A (0.25% sensitivity)
Point Count	☐ TEM EPA NOB	☐ PLM CARB 435 - B (0.1% sensitivity)
☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ NYS NOB 198.4 (non-friable-NY)	☐ TEM CARB 435 - B (0.1% sensitivity)
Point Count w/Gravimetric	☐ Chatfield SOP	☐ TEM CARB 435 - C (0.01% sensitivity)
☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ TEM Mass Analysis-EPA 600 sec. 2.5	☐ EPA Protocol (Semi-Quantitative)
☐ NYS 198.1 (friable in NY)	**TEM – Water:** EPA 100.2	☐ EPA Protocol (Quantitative)
☐ NYS 198.6 NOB (non-friable-NY)	Fibers >10µm ☐ Waste ☐ Drinking	**Other:**
☐ NIOSH 9002 (<1%)	All Fiber Sizes ☐ Waste ☐ Drinking	☐

☐ **Check For Positive Stop – Clearly Identify Homogenous Group**

Samplers Name: **Samplers Signature:**

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
C-1.	Ceramics	1200 L	10-22-09

Client Sample # (s): -		**Total # of Samples:**
Relinquished (Client): [signature]	**Date:** 10-23-09	**Time:** 3:30
Received (Lab):	**Date:**	**Time:**

Comments/Special Instructions:

RECEIVED
OCT 23 2009
BY: SA 1535

EMSL Analytical, Inc.
7 Constitution Way, Suite 107, Woburn, MA 01801
Phone: (781) 933-8411 Fax: (781) 933-8412 Email: bostonlab@emsl.com

Attn: **Nicholas Gravallese**
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Fax: (508) 628-5488 Phone: (508) 628-5486
Project: **Concord High School**

Customer ID: UEC63
Customer PO:
Received: 10/23/09 3:35 PM
EMSL Order: 130904363
EMSL Proj:
Analysis Date: 10/26/2009
Sampling Date:

Test Report: Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) Performed by EPA 40 CFR Part 763 Appendix A to Subpart E

Sample	Location	*Volume (Liters)*	*Area Analyzed (mm²)*	*Non Asb*	*Asbestos Type(s)*	*# Structures* $\geq 0.5\mu < 5\mu$	$\geq 5\mu$	*Analytical Sensitivity (S/cc)*	*Asbestos Concentration (S/mm²)*	*(S/cc)*
C-1 *130904363-0001*	Ceramics	1200.00	0.0650	0	None Detected			0.0049	**<15.00**	**<0.0049**

Analyst(s)

Allison Small (1)

Renaldo Drakes
or other approved signatory

130904362

EMSL
EMSL ANALYTICAL, INC.
LABORATORY•PRODUCTS•TRAINING

Microbiology Chain of Custody

EMSL Order Number *(Lab Use Only)*:

130904362

EMSL ANALYTICAL, INC.
7 CONSTITUTION WAY
SUITE 107
WOBURN, MA 01801
PHONE (781) 933-8411
FAX (781) 933-8412

Company: Universal

Street: 12 Brewster rd

City: Framingham **State/Province:** Ma

EMSL-Bill to: ☐ Same ☐ Different
If Bill to is Different please note in Comments
Third Party Billing requires written authorization from third party

Zip/Postal Code: **Country:**

Report To (Name): Amar Dieb **Fax #:**

Telephone #: **E-mail Address:**

Project Name/ Number: Concord High School.

Please Provide Results: ☐ Fax ☐ E-mail **PO#** **State Samples Taken:**

Turnaround Time (TAT) Options* - Please Check

☐ 3 Hours ☐ 6 Hours ☒ 24 Hours ☐ 48 Hours ☐ 3 Days ☐ 4 Days ☐ 5 Days ☐ 10 Days ☐ 2 Weeks

**Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide. TATs are subject to methodology requirements*

Non Culturable Air Samples (Spore Traps)

- **M001** Air-O-Cell
- **M049** BioSIS
- **M030** Micro 5
- **M173** Allegro M2
- **M003** Burkard
- **M174** MoldSnap
- **M004** Allergenco
- **M043** Cyclex
- **M176** Relle Smart
- **M032** Allergenco-D
- **M002** Cyclex-d
- **M130** Via-Cell
- **M172** Versa Trap

Other Microbiology Test Codes

- **M041** Fungal Direct Examination
- **M005** Viable Fungi ID and Count
- **M006** Viable Fungi ID and Count (Speciation)
- **M007** Culturable Fungi
- **M008** Culturable Fungi (Speciation)
- **M009** Gram Stain Culturable Bacteria
- **M010** Bacterial Count and ID – 3 Most Prominent
- **M011** Bacterial Count and ID – 5 Most Prominent
- **M013** Sewage Contamination in Buildings
- **M014** Endotoxin Analysis
- **M015** Heterotrophic Plate Count
- **M180** Real Time Q-PCR-ERMI 36 Panel
- **M018** Total Coliform (Membrane Filtration)
- **M020** Fecal *Streptococcus* (Membrane Filtration)
- **M210-215** *Legionella* Detection
- **M026** Recreational Water Screen
- **M027** Mycotoxin Analysis
- **M029** *Enterococci*
- **M019** Fecal Coliform
- **M133** MRSA Analysis
- **M028** *Cryptococcus neoformans* Detection
- **M120** *Histoplasma capsulatum* Detection
- **M033-39** Allergen Testing
- **M044** Group Allergen (Cat, Dog, Cockroach, Dustmites)
- Other See Analytical Price Guide

Preservation Method (Water):

Name of Sampler: **Signature of Sampler:**

Sample #	Sample Location	Sample Type	Test Code	Volume/Area	Date/Time Collected
695	Photography	M004		150 L	10.22-09
697	Ceramics	M004		150 L	10-22-09
703	Outside	M004		150 L	10-22-09

Client Sample # (s): - **Total # of Samples:**

Relinquished (Client): [signature] **Date:** 10-23-09 **Time:** 3:30.

Received (Client): **Date:** **Time:**

Comments: RECEIVED
OCT 23 2009
BY: SA 1535

Asbestos • Lead • Environmental • Materials & Indoor Air Analysis

EMSL Analytical, Inc.

7 Constitution Way, Suite 107 Woburn, MA 01801

Phone: (781) 933-8411 Fax: (781) 933-8412 Web: Email:bostonlab@emsl.com

Attn: Nicholas Gravallese
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

EMSL Order: 130904362
Customer ID: UEC63
Collected:
Received: 10/23/2009
Analyzed: 10/26/2009

Proj: Concord High School

Test Report: Allergenco-D(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (EMSL Method 05-TP-003)

Lab Sample Number:	130904362-0001			130904362-0002			130904362-0003		
Client Sample ID:	695			697			703		
Volume (L):	150			150			150		
Sample Location:	Photography			Ceramics			Outside		
Spore Types	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total
Alternaria	-	-	-	-	-	-	4	89	1.1
Ascospores	-	-	-	Present	Present	-	21	467	5.8
Aspergillus/Penicillium	8	178	15.8	-	-	-	-	-	-
Basidiospores	34	755	66.8	Present	Present	-	270	6000	74
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	5	111	9.8	-	-	-	60	1330	16.4
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	4	89	7.9	Present	Present	-	9	200	2.5
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	Present	Present	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Polythrincium	-	-	-	-	-	-	1	22	0.3
Total Fungi	**51**	**1130**	**100**	**-**	**-**	**-**	**365**	**8110**	**100**
Hyphal Fragment	1	22	-	-	-	-	5	111	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	22	-	-	22	-	-	22	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	2	-	-	-	-	-	1	-
Fibrous Particulate (1-4)	-	-	-	-	1	-	-	-	-
Background (1-5)	-	2	-	-	5	-	-	2	-

Sample Comments: 130904362-0002 Overloaded with particulate matter. Overloaded

Bipolaris++ = Bipolaris/Dreschlera/Exserohilum Myxomycetes++ = Myxomycetes/Periconia/Smut

No discernable field blank was submitted with this group of samples.
Samples analyzed by EMSL Analytical, Inc. Woburn 7 Constitution Way, Suite 107, Woburn MA
Samples received in good condition unless otherwise noted.
High Levels of background particulate can obscure spores and other particulates leading to underestimation.
Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification.
The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment.
Present= Spores found during additional scan at lower mag. This report relates only to the samples reported and may not be reproduced,
except in full, without written approval by EMSL. Results have not been adjusted for field or laboratory blank unless otherwise noted.

Renaldo Drakes
or Other Approved Signatory

For Information on the fungi listed in this report please visit the Resources section at www.emsl.com

Report For
Indoor Air Quality Study
AT
Concord-Carlisle Regional High School
Concord, MA

Study Dates:
March 8, 2010

Project# 210 046.00

STUDY CONDUCTED BY:

UNIVERSAL ENVIRONMENTAL CONSULTANTS
12 Brewster Road
Framingham, Massachusetts

UEC

March 10, 2010

Ms. Jeanne Kuespert Roberts, AIA
The Office of Michael Rosenfeld, Inc., Architects
543 Massachusetts Avenue
West Acton, MA 01720

Reference: **Indoor Air Quality Study (IAQS)**
Concord-Carlisle Regional High School, Concord, MA

Dear Ms. Roberts:

Thank you for the opportunity for Universal Environmental Consultants (UEC) to provide professional services.

Enclosed please find the report for basic Indoor Air Quality Study at the Concord-Carlisle Regional High School, Concord, MA conducted on Monday, March 8, 2010.

Please do not hesitate to call should you have any questions.

Very truly yours,

Universal Environmental Consultants

Ammar M. Dieb
President

UEC:\210 046\IAQreport.Doc

Enclosure

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1.0 Scope:

UEC was contracted to perform a basic Indoor Air Quality testing at the Concord-Carlisle Regional High School, Concord, MA.

Testing was performed on March 8, 2010. On this day the average outside temperature was 51 and the average Relative Humidity (RH) was 41%. At the time of testing RH was in the low to mid 30% range and was trending higher. The wind was out of the W at an average of 12 MPH with gusts of up to 33 MPH. The sky was partly cloudy.

The school was fully occupied at the time of testing. Samples were collected mainly in common areas so as not to disturb classes in progress. All windows and exterior doors were closed during the testing period.

The heating system is basically unit ventilators in the original portion of the building and dedicated ductwork AHUs in specialty areas, the modular's and H Wing. The majority of these are roof mounted.

2.0 Methodology:

Testing for Total Volatile Organic Compounds (***TVOCs***) was performed by Rae Systems "PPB Rae" Photo-ionization Detector (PID) utilizing a 10.7v lamp. This is a state of the art instrument capable of detecting total VOCs in the parts per billion range. The instrument is a direct read and provides continuous results over an extended time.

Volatile organic compounds are a broad class of chemicals with diverse applications which are frequently emitted by new carpets, furniture, pressboards, varnishes, adhesives and high gloss finishes. Other common household products which may emit VOCs include: paints, paint strippers, other solvents, wood preservatives, aerosol sprays, cleansers, disinfectants, moth repellents, air fresheners, stored fuels and automotive products, hobby supplies, and dry-cleaned clothing. High levels of VOCs are a common Indoor Air Quality problem, especially in newly constructed, recently renovated, or currently being renovated buildings.

Carbon monoxide (***CO***) and nitrogen dioxide (NO_2) were measured by Toxic Gas Monitor (PGM-35) which is a direct read instrument manufactured by ToxiRAE. The unit is calibrated prior to use and serviced by an independent vendor annually.

Carbon Dioxide (CO_2) was measured by means of TSI Corp.'s Model 8732 detector manufactured by TSI Incorporated and confirmed with a Bacharach detector. Both units utilize IR Technology to quantify CO_2. The instrument was calibrated on site prior to testing and serviced annually by an independent vendor.

Airborne particulates were tested by MIE Corp.'s PDR-1000, Direct Read instrument. The instrument was calibrated immediately prior to testing. The machine is serviced annually by an independent vendor who is certified for maintenance and repairs by the manufacturer. Airborne particles were counted and sized by Kanomax Laser Particle Counter Model 3887. The instrument is capable of counting airborne particles in real time and sorts them by a variety of size options. On this project we are breaking out the particle into sizes of 0.3, 0.5 and 5 microns.

Temperature (**°F**) and Relative Humidity (**RH %**) were collected by Sper Scientifics Model 850070 instrument and verified in at least one location by sling psychrometer.

Noise was measured by Tes Corps. Tes-1350A Sound level Meter.

Airborne particles were counted and sized by Kanomax Laser Particle Counter Model 3887. The instrument is capable of counting airborne particles in real time and sorting them by a variety of size options. On this project we are breaking out the particle into sizes of 0.3, 0.5 and 5 microns.

Hydrogen sulfide (***H_2S***) was measured by Industrial Scientific's M50 direct read meter. The meter was calibrated prior to the site visit for all parameters.

3.0 Results:

TOTAL VOLATILE ORGANIC COMPOUNDS by PID, CARBON MONOXIDE, CARBON DIOXIDE, TOTAL AIRBORNE PARTICULATE, NITROGEN DIOXIDE, NOISE

Location	TVOCs (PPB)	CO (PPM)	CO_2 (PPM)	Total Particulates (mg/M^3)\	NO_2 (PPM)	Noise (dB)
Main Office	<20	ND	820	0.034	ND	51
Hallway by A2	<20	ND	750	0.026	ND	52
Band Room	<20	ND	735	0.018	ND	53
Auditorium	ND	ND	500	0.079	ND	49
Hallway by A7	<20	ND	740	0.031	ND	52
Guidance Modular	24	ND	1190	0.024	ND	52
Modular Classroom #1	89	ND	925	0.017	ND	52
Hallway by S1	180	ND	930	0.031	ND	51
Hallway by S16	130	ND	930	0.041	ND	51
Hallway by L1	75	ND	1020	0.036	ND	52
Hallway by L6	140	ND	1030	0.054	ND	53
Hallway by L13	66	ND	405	0.056	ND	50
Hallway by S20	104	ND	1150	0.041	ND	51
Hallway by S28	33	ND	1050	0.054	ND	48
Hallway by I2	48	ND	950	0.039	ND	49
Hallway by I1	66	ND	1120	0.057	ND	50
Hallway by I15	47	ND	1060	0.041	ND	50
Hallway by I18	37	ND	1080	0.031	ND	49
Hallway by S5	54	ND	1120	0.047	ND	50
Hallway by S10	56	ND	1130	0.049	ND	52
Hallway by S1	21	ND	1120	0.046	ND	49
Main Lobby	23	ND	740	0.070	ND	50
Library LL	<20	ND	810	0.033	ND	50
Library ML	<20	ND	825	0.067	ND	49
Library UL	<20	ND	833	0.043	ND	49
Hallway by H1	<20	ND	621	0.028	ND	51
Hallway by H23	<20	ND	593	0.070	ND	52
Hallway by H8	<20	ND	630	0.053	ND	52
Hallway by H12	<20	ND	620	0.054	ND	51
Hallway by H15	<20	ND	800	0.024	ND	51
CRC	<20	ND	650	0.018	ND	49
Cafeteria	<20	ND	710	0.023	ND	54

Location	TVOCs (PPB)	CO (PPM)	CO_2 (PPM)	Total Particulates (mg/M^3)\	NO_2 (PPM)	Noise (dB)
Kitchen	<20	ND	710	0.029	ND	54
Lower Gymnasium	<20	ND	600	0.037	ND	51
Upper Gymnasium	<20	ND	670	0.023	ND	50
Health Modular	<20	ND	1170	0.031	ND	47
Outside	ND	ND	389	0.021	ND	51

AIRBORNE PARTICLES BY LASER COUNTER
OXYGEN, HYDROGEN SULFIDE

Location	>.3 Micron Particles/CM	>.5 Micron Particles/CM	>5 Micron Particles/CM	O_2 (PPM)	H_2S (PPM)
Main Office	18400000	3310000	244000	20.9	ND
Band Room	29200000	5060000	282000	20.9	ND
Auditorium	21500000	2410000	28800	20.9	ND
Guidance Modular	26100000	3340000	108000	20.9	ND
Hallway by S17	25600000	4090000	186000	20.9	ND
Hallway by I6	25200000	5270000	297000	20.9	ND
Hallway by H13	23800000	3960000	173000	20.9	ND
CRC	23500000	2790000	66100	20.9	ND
Library, ML	26700000	4710000	310000	20.9	ND
Cafeteria	25300000	3100000	65500	20.9	ND
Upper Gymnasium	18000000	1690000	19300	20.9	ND
Outside	29900000	3630000	7070	20.9	ND

TEMPERATURE & RELATIVE HUMIDITY

Location	Temperature (F)	% RH
Administration Suite	73.2	23
Auditorium	71.5	22
Main Lobby	73.3	27
Hallway by L2	73.6	22
Hallway by I 2	74.1	22
Library	73.3	22
CRC	72.1	19
Hallway by S 6	70.9	23
Cafeteria	70.3	27
Upper Gymnasium	68.7	19
Guidance Modular	70.1	19

Legend:
ND – Not Detected
CO - OSHA PEL is 30 PPM, ACGIH TLV is 25 PPM.
CO_2 - OSHA PEL is 5000 PPM, Mass DOH Guideline is 800 PPM
TVOC – Suggested Guideline of 100 PPB
Particulates - OSHA PEL is 15 mg/m^3, ACGIH TLV is 3 mg/m^3

4.0 Observations and Interpretation of Results:

Temperature and Relative Humidity

Temperature was within the acceptable winter range in all of the areas tested according the American Society of Heating, Refrigeration and Air-conditioning Engineers' ANSI/ASHRAE 55-1992 **"Thermal Environmental Conditions for Human Occupancy"** guideline. Relative Humidity (RH) was low in virtually all areas. The low RH at this time was attributed to outdoor conditions (low relative humidity which is common in colder air). The problem should correct itself with the arrival of warmer temperatures.

Airborne Particulate

Total airborne particulates were well below the OSHA limit of 15 mg/M³ and the ACGIH guideline of 3 mg/M³. Yet, the foregoing guidelines are more applicable to industrial settings and therefore have limited value in accessing office, hospital and school type environments. In those few jurisdictions which have particulate guidelines for schools, they are generally in the 0.050 to 0.100 mg/cubic meter range. We have therefore adopted the 0.100 mg/cubic meter guideline.

All Particulate samples collected on this day were below our guideline as well as the regulatory guidelines and limits. The levels encountered, however, were slightly above typical levels of a non-problematic interior environment. The Auditorium had some recent light carpentry which had resulted in the production of dust, which had not been cleaned.

Laser particulate counts of course, intermediate and fine particles were above outdoor levels. Outdoor air is generally superior in quality to indoor air. There are no guidelines or standards for airborne particle counts. The information is provided for comparative and informational purposes only. The areas which had the lowest course particle (dust) levels were those which had roof mounted AHU systems.

TVOCs

Several ***TVOC*** levels collected on this day were well above 100 PPB (0.1 PPM). These levels are considered above average when compared the historical data we have collected for buildings of similar age, design and utilization and recent samples. The exact source of ***VOCs*** is unknown but seemed to be concentrated near the "S" wing. ***VOCs*** were also detectable in "L" Wing. The source may be the use of chemicals in the science classrooms in "S" Wing.

Neither OSHA nor The American Conference of Governmental Industrial Hygienists promulgates an exposure standard for Total VOCs both instead opting for limits on each individual compound. The OSHA PEL for the majority of compounds with common construction applications is in the 25 - 100 PPM range. The PEL for some of the more exotic compounds are as low as .5 PPM. Assuming a worst case scenario, ***TVOC*** levels should not exceed .5 PPM (500 PPB).

100 PPB is roughly equivalent (there are variations based upon molecular weights of individual volatile organic compounds) to the Seifert "Target Guideline Value" of 0.3 mg/M³. The Seifert TGV is a widely recognized ***TVOC*** guideline and has been adopted by ASHRAE.

TVOC levels encountered in "S" and some of "L" Wings exceeded the ASHRAE guideline but was below the implied OSHA limit.

TGV predicts that some people will experience discomfort from ***TVOC*** levels as those encountered in "S" and "L" Wings. The levels were at the lower end of the TGV scale. Again, ***TVOCs*** at this level are generally considered a comfort as opposed to a health concern.

Carbon Monoxide

CO was not detected on this day. The limit of detection for the method is 1 PPM. The OSHA limit, for comparison purposes, is 30 PPM and the ACGIH TLV is 25 PPM. We assume a safety factor of 10 for schools (2.5 PPM).

Housekeeping

Housekeeping was assessed as "good" overall inside the school. The only problem area noted on this day was the Auditorium, in which some carpentry is being performed.

There was some water damage noted outside the hall to the lower gym, in the hall outside the Media Center and possibly in the auditorium. Since classes were in session not all areas could be surveyed completely. None of the water damage appeared to be active.

Housekeeping is a relevant factor in terms of air quality as poor housekeeping could lead to microbial amplification and generally poor air quality.

Carbon Dioxide

Most CO_2 levels were above the acceptable range. For comparative purposes, fresh outdoor air has approximately 387 PPM of CO_2. All areas were well below the OSHA/NIOSH limit of 5000 PPM but most areas were above the Massachusetts Department of Health guideline of 800 PPM for publicly occupied buildings. Massachusetts DOH recommends an optimal level of below 600 PPM. Exposure to high levels of CO_2 for prolonged periods could cause building occupants to become lethargic and generally uncomfortable. CO_2 levels will rise over the course of the day especially in those areas which have a high occupancy.

CO_2 levels were significantly lower in the specialty (non classroom) areas where roof mounted AHUs and dedicated ductwork are employed. Also, CO_2 levels in the "H" Wing were lower than the other wings.

Most samples were collected between 10:30 and 11:30 AM in common areas (Hallways). Inside classrooms, especially later in the day levels would be anticipated to be well above 1200 PPM. CO_2 levels such as these are comfort as opposed to health concerns. Yet, factors such as alertness and concentration will undoubtedly suffer at these levels.

High CO_2 levels are an indication of poor air exchange, which, aside from CO_2, would be a problem in and of itself. Poor air exchange often results in lingering particulates (dust), ***VOCs*** and microbial agents. During flu outbreaks, microbial transmission person to person via air would increase as a result of poor air exchange. Virtually all air quality parameters suffer with poor indoor to outdoor air exchange.

All Unit Ventilator were visually examined at the intake grills on the exterior of the building. Significant vegetation abutted the intakes in the music classroom areas, outside classrooms A-1 and 2. Yet, there was at least one (1) foot of room between the intakes and the shrubs. It is unlikely that the vegetation is the main cause/obstruction of fresh air intake.

The air flow entering each air intake grill could be tested to quantify the amount of air entering each classroom. The majority of Univents have dampers which are adjustable as to allow more or less fresh outdoor air. The downside of increased fresh outdoor air, at least in winter, is higher heating costs.

Nitrogen Dioxide

The OSHA PEL for $\boldsymbol{NO_2}$ is a ceiling limit of 5 PPM and the NIOSH short term limit is 1 PPM. The limit of detection for our test method was 0.2 PPM. $\boldsymbol{NO_2}$ was not detected on this day.

Hydrogen Sulfide

$\boldsymbol{H_2S}$ was not detected in the samples collected on this day. The OSHA limit for $\boldsymbol{H_2S}$ is a ceiling limit of 20 PPM and the NIOSH limit is also a ceiling limit of 10 PPM. The LOD for the method is 1 PPM.

Oxygen

Oxygen levels were consistent with fresh outdoor air in all areas - 20.9%. In some instances when $\boldsymbol{CO_2}$ is very high it will displace oxygen, lower the percentage.

Lower Explosive Limit

Petroleum and natural gases which could pool and cause an explosion if exposed to an ignition source were not detected on this day.

Noise

Noise was measured in decibels using the A Weighted Scale as defined by a standard sound level meter having characteristics defined by the American National Standards Institute, Publication ANSI s1.4-1971 with a slow response time. There are no standards for noise exposure in schools. The OSHA and ACGIH standards are geared more toward hearing conservation. Those standards as well as international standards are generally in the 85 dB range for sustained noise and 115 dB range for a ceiling limit. These standards to not take into account nuisance or distraction issues which would be problems in a school environment. Mass DEP Air Quality Regulations 310 CMR 7.00, do address nuisance noise. The DEP standard is applicable to construction activity and equipment. In accordance with the regulation, the ambient sound level is collected in a location where the offending sound cannot be heard. Further, the noise is recorded on the A weighted scale with a slow response time. Violations of the DEP's Community Sound Criteria would include either of the following:

1. An increase in the broad band noise level in excess of 10 dBs above ambient, or;
2. A pure tone condition (i.e. a continuous squeak).

Non-school activity related noises (such as construction or traffic related noises) above baseline would be considered a violation of the DEP policy.

All levels were within the acceptable range on this day.

5.0 Conclusions and Recommendations:

Many ***TVOC*** levels over a large area of "S" and "L" Wings were considered elevated. The exact source of the ***VOCs*** is unknown but the science labs are suspect.

Relative humidity was low in virtually all areas. This is believed to be due to outdoor conditions.

CO_2 levels were elevated in all wings where Univents are the primary source of heating. ***CO_2*** levels were far lower in areas with roof mounted AHU systems.

Particulates (dust) were slightly higher than predicted but did not exceed and well established standard or guideline.

All other IAQ parameters tested were within the acceptable ranges.

6.0 Limitations and Conditions:

This report has been completed based on visual and physical observations made and information available at the time of the site visits, as well as an interview with the Owner's representatives. This report is intended to be used as a summary of available information on existing conditions with conclusions based on a reasonable and knowledgeable review of evidence found in accordance with normally accepted industry standards, state and federal protocols, and within the scope and budget established by the client. Any additional data obtained by further review must be reviewed by UEC and the conclusions presented herein may be modified accordingly.

This report and attachments, prepared for the exclusive use of Owner for use in an environmental evaluation of the subject site, are an integral part of the inspections and opinions should not be formulated without reading the report in its entirety. No part of this report may be altered, used, copied or relied upon without prior written permission from UEC, except that this report may be conveyed in its entirety to parties associated with Owner for this subject study.

REFERENCES:

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ENGINEERING ECONOMIC ANALYSIS
FOR
Concord Carlisle Regional High School

Concord, MA

December 16, 2009

Prepared for: 

Prepared by: Garcia, Galuska & DeSousa
Consulting Engineer, Inc.

EXECUTIVE SUMMARY

Section 1.0: Executive Summary

The goal of the lifecycle engineering economic analysis is to asses the performance of a displacement ventilation system against a replacement in kind HVAC system. Initially the displacement ventilation system is studied with an upgraded envelope in comparison to the existing mechanical system and existing envelope.

It is recommend that a displacement ventilation system be installed in a newly constructed building. An additional analysis compares the displacement ventilation system (option one) against the same HVAC "standard" system in a newly constructed building (baseline). The envelope of the new construction building is identical to the proposed upgraded existing building envelope. Further improvements to the new construction building's roof area, which would not be feasible as part of the envelope improvement project, are simulated with the displacement ventilation system as option two.

Each option is compared to the baseline system to determine the total savings over a 25 year cycle considering electrical costs, gas costs, maintenance costs, and initial construction costs.

In addition to lifecycle savings, the displacement ventilation system is studied as it further enhances controllability, year round temperature control and comfort, and increased ventilation.

Section 1.1: Mechanical System Analysis

1.1.A: Existing/Baseline Mechanical System – Replacement in Kind Unit Ventilator System

- Chilled/hot water coil classroom unit ventilators serving the academic and support areas
- Chilled/hot water coil air handling units with variable air volume boxes with hot water reheat coils serving administration areas of Building H and I
- Chilled/hot water coil air handling units with fan-powered variable air volume boxes with hot water reheat coils serving the Library
- Chilled/hot water coil air variable air volume handling unit serving the auditorium
- Chilled/hot water coil fan coil units serving the administration areas of Building A
- Hot water coil heating and ventilating units serving the cafeteria, upper gymnasium, lower gymnasium, and support areas for each building
- Limited use of fintube radiation and unit heaters
- (2) 6092 MBH and (1) 5217 MBH Standard efficiency gas-fired boilers power plant
- (2) 120 ton standard-efficiency air-cooled chillers power plant
- Chilled and hot water primary pumping
- Direct digital controls throughout

1.1.B: Mechanical System Option One and Two – Displacement Ventilation System

- Multiple low wall-mounted displacement diffusers at approximately 200-250 CFM (2 per classroom, 1 per support area) each for each academic and support area

- Dedicated overhead galvanized ventilation distribution system feeding each displacement diffuser

- 100% outside air chilled/hot water coil rooftop units with energy recovery wheel providing ventilation to the academic, support, and administration areas. One unit serving each building.

- Wall-mounted fintube radiation located along exterior wall between displacement diffusers

- Two-pipe hot water distribution system serving air handling units and fintube radiation

- Two-pipe chilled water distribution system serving air handling units

- (4) 3,000 MBH high efficiency gas-fired condensing boilers

- Limited use of fintube radiation and unit heaters serving non-academic/administration areas

- (1) 280 ton high-efficiency air-cooled chillers power plant

- Chilled and hot water primary pumping with VFD's

- Direct digital controls throughout

Section 1.2: Envelope Analysis

In addition to the displacement system upgrade, the existing envelope requires upgrades and replacements that are studied in Option 1.

1.2.A: Existing – Existing Envelope

- Wall Insulation (Buildings A, H, S, Cafeteria, Upper Gym): 6" Fiberglass Batt insulation (R-20)

- Wall Insulation (Buildings I, L, Library, Lower Gym): 1" Rigid insulation (R-5)

- Roof Insulation (Buildings A, H, S, Cafeteria, Upper Gym): 2" Rigid insulation (R-10)

- Roof Insulation (Buildings I, L, Library, Lower Gym): 3" Rigid insulation (R-15)

- Glazing: Aluminum Frame Single Pane Glass Windows

1.2.B: Baseline/Option One – Upgraded/New Construction Envelope

- Wall Insulation: 2" Polystyrene continuous insulation (R-12.5) and 6" Fiberglass Batt insulation (R-20)

- Roof Insulation: 3" Polyurethane insulation (R-20)

- Glazing: Low E Argon Filled Glass Windows (0.25 U-Value, 0.37 SHGC)

1.2.C: Option Two – New Construction Envelope with Improved Roof Insulation

- Wall Insulation: 2" Polystyrene continuous insulation (R-12.5) and 6" Fiberglass Batt insulation (R-20)
- Roof Insulation: 6" Polyisocyanurate insulation (R-42)
- Glazing: Low E Argon Filled Glass Windows (0.25 U-Value, 0.37 SHGC)

Section 1.3: Lifecycle System Analysis Conclusion

A replacement in kind of the existing hot HVAC system is selected as the baseline system since it represents the currently installed system. Unfortunately, the selection results in overall ownership costs that are higher when compared to the alterative system relating to the increased annual operating costs while also compromising the thermal comfort of the building. The option comparison to the baseline assesses the benefits of an improved system with reduced combined operating costs and improved thermal comfort with the goal of yielding ownership savings over the 25 year study period.

Annual electrical and gas consumption is calculated thru the results of a thermal dynamic heat transfer analysis utilizing Department of Energy (DOE-2)/eQuest software with all architectural data provided by The Office of Michael J. Rosenfeld Architects.

Utility cost data for electricity and gas were obtained from the actual utility bills for the existing building.

The “Building Life-Cycle” analysis includes future worth of each option considered using standard industry discount, inflation, and interest rates.

Our observations of the Mechanical System and Envelope Upgrade Payback Summary suggest that option one, a displacement ventilation system, yields an approximate negative $524,625 savings over the 25 year study period with an 18 year payback. This is due to the extensive work required to upgrade the existing envelope. The “Building Life-Cycle” analysis takes escalation, inflation, and interest as well as annual maintenance costs into account when calculating the total life-cycle savings. The simple payback is "the measure of the length of time required for the cumulative savings from a project to recover the Investment Cost and other accrued costs, without taking into account the Time Value of Money." The simple payback results in an 18 year payback but when accounting for escalation, inflation, and interest as well as annual maintenance costs the total the life cycle savings over a 25 year study period results in a negative $524,625 for this system.

It is preferred to install a displacement ventilation system in a new construction building where envelope upgrades would not have such a significant cost implication. This is why a lifecycle comparison of option one and option two is conducted against the baseline system in a newly constructed building. By assuming that all the envelope upgrades to the new building are standard costs reflective of new construction, the only premium cost for the envelope would be to further insulate the roof with 6" of polyisocyanurate insulation under option two. These comparisons have an instant payback as the displacement ventilation system capital investment is less than the replacement in kind system of the baseline. Over a 25 year study period option one results in a $4,185,099 savings and option two results in a $3,719,205 savings. Considering displacement ventilation anticipated for the academic, administration, and support areas, the ventilation systems are provided by 100% outside air indoor air handling units with hot water heating and chilled water cooling served by central plants, with modulating control, refrigerant heat recovery heat pipes, and exhaust air energy recovery for preheating and pre-cooling all outside air. The supply air vapor pressure will be depressed to approximately 50 grains/lb of air and reheated by a supply air stream hot-gas reheat coil to achieve a 68ºF discharge air temperature to each occupied space.

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Consulting Engineers Inc.

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MECHANICAL SYSTEM AND ENVELOPE UPGRADE PAYBACK SUMMARY

Existing	System	GROSS CAPITAL INVESTMENT*	ANNUAL ELEC. CONS. (KWH)	ANNUAL GAS CONS. (MBTU)	ANNUAL ELECTRIC COST	ANNUAL GAS COST	COMBINED UTILITY COST	$/S.F.	ANNUAL MAINT. COST	COMBINED ANNUAL EXPENSE	COMBINED EXPENSE SAVINGS**	TOTAL LIFE-CYCLE SAVINGS***	SIR	SIMPLE PAYBACK (YEARS)****
-	**1. Classroom hot water coil unit ventilators 2. Hot water heat/chilled water cooling RTU's with terminal VAV's with hot water reheat coils 3. Standard efficiency cast-iron gas-fired boiler 4. Standard efficiency air cooled chiller 5. Existing building envelope**	$6,873,950	2,707,500	17,664.0	$270,222	$270,149	$540,371	$2.37	$46,600	$586,971	-	-	-	-

Option	System	GROSS CAPITAL INVESTMENT*	ANNUAL ELEC. CONS. (KWH)	ANNUAL GAS CONS. (MBTU)	ANNUAL ELECTRIC COST	ANNUAL GAS COST	COMBINED UTILITY COST	$/S.F.	ANNUAL MAINT. COST	COMBINED ANNUAL EXPENSE	COMBINED EXPENSE SAVINGS**	TOTAL LIFE-CYCLE SAVINGS***	SIR	SIMPLE PAYBACK (YEARS)****
1	**1. Displacement ventilation diffusers and perimiter hot water fintube radiation 2. Hot water heat/chilled water cooling 100% O.A. ventilating units with energy recovery 3. High efficiency gas-fired condensing central boiler plants 4. High efficiency air cooled chiller 5. Improved building envelope.**	$10,852,700	2,373,300	8,283.8	$236,866	$126,693	$363,559	$1.60	$16,000	$379,559	$207,412	-$524,625	0.87	18

* Gross capital investment based upon in-house cost estimate utilizing cost data from similar past projects and industry standard estimating references for mechanical systems. Costs have been estimated for system comparison purposes only and do not incorporate all supplemental/independent HVAC system costs which would be required for all systems studied (i.e. kitchen exhaust, sallyport HVAC systems, overhead and profit). Architectrual cost estimates provided by The Office of Michael J. Rosenfeld.
**Combined expense savings is the difference between the combined annual expense of the baseline and system in comparison.
***Total life-cycle savings is based on a 25 year study period.
****Simple payback years is based upon BLCC5 Life Cycle Analysis.
*****Simple payback never reached within 25 year study period.
******Simple payback never reached because system is more efficient and/or less expensive than baseline system.

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370 Faunce Corner Road, Dartmouth, MA 02747-1217

MECHANICAL SYSTEM (NEW CONSTRUCTION) PAYBACK SUMMARY

Baseline	System	GROSS CAPITAL INVESTMENT*	ANNUAL ELEC. CONS. (KWH)	ANNUAL GAS CONS. (MBTU)	ANNUAL ELECTRIC COST	ANNUAL GAS COST	COMBINED UTILITY COST	$/S.F.	COMBINED ANNUAL EXPENSE	COMBINED EXPENSE SAVINGS**	TOTAL LIFE-CYCLE SAVINGS***	SIR	SIMPLE PAYBACK (YEARS)****
-	1. Displacement ventilation diffusers and perimiter hot water fintube radiation 2. Hot water heat/chilled water cooling 100% O.A. ventilating units with energy recovery 3. High efficiency gas-fired condensing central boiler plants 4. High efficiency air cooled chiller 5. New construction envelope.	$6,873,950	2,680,800	15,143.0	$267,556	$231,599	$499,155	$2.19	$499,157	-	-	-	-

Option	System	GROSS CAPITAL INVESTMENT*	ANNUAL ELEC. CONS. (KWH)	ANNUAL GAS CONS. (MBTU)	ANNUAL ELECTRIC COST	ANNUAL GAS COST	COMBINED UTILITY COST	$/S.F.	COMBINED ANNUAL EXPENSE	COMBINED EXPENSE SAVINGS**	TOTAL LIFE-CYCLE SAVINGS***	SIR	SIMPLE PAYBACK (YEARS)****
1	1. Displacement ventilation diffusers and perimiter hot water fintube radiation 2. Hot water heat/chilled water cooling 100% O.A. ventilating units with energy recovery 3. High efficiency gas-fired condensing central boiler plants 4. High efficiency air cooled chiller 5. New construction envelope.	$5,458,600	2,373,300	8,283.8	$236,866	$126,693	$363,559	$1.60	$363,561	$135,597	$4,185,099	N/A******	N/A******
2	1. Displacement ventilation diffusers and perimiter hot water fintube radiation 2. Hot water heat/chilled water cooling 100% O.A. ventilating units with energy recovery 3. High efficiency gas-fired condensing central boiler plants 4. High efficiency air cooled chiller 5. New construction envelope with additional roof insulation.	$6,004,652	2,377,400	7,924.9	$237,268	$121,204	$358,472	$1.58	$358,474	$140,684	$3,719,205	N/A******	N/A******

* Gross capital investment based upon in-house cost estimate utilizing cost data from similar past projects and industry standard estimating references for mechanical systems. Costs have been estimated for system comparison purposes only and do not incorporate all supplemental/independent HVAC system costs which would be required for all systems studied (i.e. kitchen exhaust, sallyport HVAC systems, overhead and profit). Architectrual cost estimates provided by The Office of Michael J. Rosenfeld.
**Combined expense savings is the difference between the combined annual expense of the baseline and system in comparison.
***Total life-cycle savings is based on a 25 year study period.
****Simple payback years is based upon BLCC5 Life Cycle Analysis.
*****Simple payback never reached within 25 year study period.
******Simple payback never reached because system is more efficient and/or less expensive than baseline system.

COST ESTIMATES

GARCIA • GALUSKA • DESOUSA
Consulting Engineers Inc.

370 Faunce Corner Road, Dartmouth, MA 02747-1217

PROJECT:	Concord Carlisle		
JOB NO:	32000300		
CLIENT:	The Office of Michael J. Rosenfeld		
DATE:	12/15/2009	**BY:**	KL

Baseline - Unit Ventilator System

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
Unit Ventilators	75	$6,500			$ 487,500.00
Bldg. H VAV's w/ hot water reheat coil	16	$1,500			$ 24,000.00
Library FPB's w/ hot water reheat coil	6	$1,900			$ 42,500.00
Chilled/hot water coil Fan Coil Units	11	$3,500			$ 38,500.00
(3) Gas-Fired Cat Iron Boilers – (Total 17,400 MBH)	1	$280,000			$ 280,000.00
Pumps (CHW & HHW) including VFD's	5	$5,500			$ 27,500.00
HHW Piping & Insulation			227,600 ft²	$4/ft²	$ 910,400.00
CHW Piping & Insulation			227,600 ft²	$4/ft²	$ 910,400.00
Ductwork including GRD's, Dampers, & General Exhaust Systems			227,600 ft²	$10/ft²	$ 2,276,000.00
Exhaust Fans (for UV ventilation)	15,000 CFM	$3/CFM			$ 45,000.00
(2) 120 Ton Air-Cooled Chiller	240 tons	$1,000 ton			$ 240,000.00
Cafeteria HV-3, HV-8A, HV-8B	22,000 CFM	$7/CFM			$ 154,000.00
Lower Gym HV-1, HV-2, HV-4	19,200 CFM	$7/CFM			$ 134,400.00
Upper Gym HV-6A, HV-6B, HV-7	21,000 CFM	$7/CFM			$ 147,000.00
Bldg. A HVAC-3	16,400 CFM	$10/CFM			$ 164,000.00
Radio RTU	2,000 CFM	$6/CFM			$ 12,000.00
Bldg. I HVAC-2	18,625 CFM	$10/CFM			$ 186,250.00
Bldg. I Shop HV	2,000 CFM	$7/CFM			$ 14,000.00
Bldg. H HVAC-1	25,000 CFM	$10/CFM			$ 250,000.00
Controls (DDC/EMS)			227,600 ft²	$2.5/ft²	$ 569,000.00
				TOTAL	$ 6,912,450.00

Cost estimates have been derived for system comparison purposes only. Estimates do not necessarily include HVAC systems and equipment that would typically be required for all system options studied; example: supplemental cooling systems for elevator machine rooms, tel/data rooms, etc. and radiation heating for unoccupied areas such as storage rooms, corridors, vestibules etc. Estimates do not include project general system costs; example: testing and balancing, commissioning, coordination, as built drawings etc.

GARCIA • GALUSKA • DESOUSA
Consulting Engineers Inc.

370 Faunce Corner Road, Dartmouth, MA 02747-1217

PROJECT:	Concord Carlisle
JOB NO:	32000300
CLIENT:	The Office of Michael J. Rosenfeld
DATE:	12/15/2009 BY: KL

Displacement Ventilation System

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
Bldg. A DOAS w/ ERV	10,000 CFM	$10/CFM			$ 100,000.00
Library DOAS w/ ERV	8,000 CFM	$10/CFM			$ 80,000.00
Cafeteria A DOAS w/ ERV	4,000 CFM	$10/CFM			$ 40,000.00
Gym DOAS w/ ERV	15,000 CFM	$10/CFM			$ 150,000.00
Bldg. H DOAS w/ ERV	11,000 CFM	$10/CFM			$ 110,000.00
Bldg. I DOAS w/ ERV	6,500 CFM	$10/CFM			$ 65,000.00
Bldg. L DOAS w/ ERV	5,000 CFM	$10/CFM			$ 50,000.00
Bldg. S DOAS w/ ERV	11,000 CFM	$10/CFM			$ 110,000.00
Ductwork including GRD's, Dampers, & General Exhaust Systems			227,600 ft²	$8/ft²	$ 1,820,800.00
High Efficiency Gas-Fired Condensing Boilers (3,000 MBH ea.)	4	$50,000			$ 200,000.00
280 Ton Air-Cooled Chiller	280 tons	$1,100 ton			$ 308,000.00
CHW Piping & Insulation			227,600 ft²	$4/ft²	$ 910,400.00
HHW Piping & Insulation (including supplemental fintube radiation)			227,600 ft²	$4/ft²	$ 910,400.00
Controls			227,600 ft²	$2.5/ft²	$ 569,000.00
Inline pumps (HHW) including VFD's	8	$3,000			$ 24,000.00
Pumps (CHW) including VFD's	2	$5,500			$ 11,000.00
Envelope Upgrades (Refer to Envelope Upgrade Cost Estimate Attached)					$ 5,394,100.00
				TOTAL	$ 10,852,700.00

Cost estimates have been derived for system comparison purposes only. Estimates do not necessarily include HVAC systems and equipment that would typically be required for all system options studied; example: supplemental cooling systems for elevator machine rooms, tel/data rooms, etc. and radiation heating for unoccupied areas such as storage rooms, corridors, vestibules etc. Estimates do not include project general system costs; example: testing and balancing, commissioning, coordination, as built drawings etc.

GARCIA • GALUSKA • DESOUSA
Consulting Engineers Inc.

370 Faunce Corner Road, Dartmouth, MA 02747-1217

PROJECT:	Concord Carlisle
JOB NO:	32000300
CLIENT:	The Office of Michael J. Rosenfeld
DATE:	12/16/2009
BY:	KL

Envelope Upgrade

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
Wall and Window Upgrade/Replacement			60,300	$55	$ 3,316,500.00
New Roof with R-20 Insulation			190,400	$9	$ 1,713,600.00
(8) 700 s.f. Mechanical Penthouses			5,600	$65	$ 364,000.00
				TOTAL	$ 5,394,100.00

Cost estimates have been derived for life-cycle comparison purposes only. Envelope cost data has been provided by The Office of Michael J. Rosenfeld.

LIFE CYCLE ANALYSES

NIST BLCC 5.3-08: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

Base Case: Existing (R.I.K.)

Alternative: Option 1 (Displacement)

General Information

File Name:	C:\Program Files (x86)\BLCC5\projects\Concord Carlisle.xml
Date of Study:	Wed Dec 16 20:50:56 GMT 2009
Project Name:	Concord Carlisle
Project Location:	Massachusetts
Analysis Type:	FEMP Analysis, Energy Project
Analyst:	Keith Lane
Base Date:	January 1, 2010
Service Date:	January 1, 2010
Study Period:	25 years 0 months(January 1, 2010 through December 31, 2034)
Discount Rate:	4.9%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$6,873,950	$10,852,700	-$3,978,750
Future Costs:			
Energy Consumption Costs	$8,844,222	$5,920,493	$2,923,729
Energy Demand Charges	$0	$0	$0
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$807,727	$277,331	$530,396
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	------------	------------	------------
Subtotal (for Future Cost Items)	$9,651,949	$6,197,824	$3,454,125
	------------	------------	------------
Total PV Life-Cycle Cost	$16,525,899	$17,050,524	-$524,625

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$3,454,125
- Increased Total Investment	$3,978,750

Net Savings	-$524,625

Savings-to-Investment Ratio (SIR)

SIR = 0.87

SIR is lower than 1.0; project alternative is not cost effective.

Adjusted Internal Rate of Return

AIRR = 4.31%

AIRR is lower than your discount rate; project alternative is not cost effective.

Payback Period

Estimated Years to Payback (from beginning of Service Period)

Discounted Payback never reached during study period.

Simple Payback occurs in year 18

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy Type	-----Average Base Case	Annual Alternative	Consumption----- Savings	Life-Cycle Savings
Electricity	2,707,500.0 kWh	2,373,300.0 kWh	334,200.0 kWh	8,353,856.3 kWh
Natural Gas	176,640.0 Therm	82,838.0 Therm	93,802.0 Therm	2,344,729.0 Therm

Energy Savings Summary (in MBtu)

Energy Type	-----Average Base Case	Annual Alternative	Consumption----- Savings	Life-Cycle Savings
Electricity	9,238.4 MBtu	8,098.0 MBtu	1,140.3 MBtu	28,504.5 MBtu
Natural Gas	17,664.1 MBtu	8,283.8 MBtu	9,380.2 MBtu	234,473.8 MBtu

Emissions Reduction Summary

Energy Type	-----Average Base Case	Annual Alternative	Emissions----- Reduction	Life-Cycle Reduction
Electricity				
CO_2	2,057,171.53 kg	1,803,244.76 kg	253,926.77 kg	6,347,300.18 kg
SO_2	3,470.22 kg	3,041.87 kg	428.35 kg	10,707.19 kg
NO_x	2,914.75 kg	2,554.97 kg	359.78 kg	8,993.32 kg
Natural Gas				
CO_2	933,074.98 kg	437,579.63 kg	495,495.35 kg	12,385,688.08 kg
SO_2	7,530.21 kg	3,531.41 kg	3,998.80 kg	99,956.41 kg
NO_x	130.47 kg	61.19 kg	69.29 kg	1,731.92 kg
Total:				
CO_2	2,990,246.51 kg	2,240,824.38 kg	749,422.12 kg	18,732,988.26 kg
SO_2	11,000.43 kg	6,573.28 kg	4,427.15 kg	110,663.60 kg
NO_x	3,045.23 kg	2,616.16 kg	429.07 kg	10,725.24 kg

NIST BLCC 5.3-08: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

Base Case: Baseline (R.I.K.)

Alternative: Option 1 (Displacement) New Construction

General Information

File Name:	C:\Program Files (x86)\BLCC5\projects\Concord Carlisle.xml
Date of Study:	Wed Dec 16 20:52:09 GMT 2009
Project Name:	Concord Carlisle
Project Location:	Massachusetts
Analysis Type:	FEMP Analysis, Energy Project
Analyst:	Keith Lane
Base Date:	January 1, 2010
Service Date:	January 1, 2010
Study Period:	25 years 0 months(January 1, 2010 through December 31, 2034)
Discount Rate:	4.9%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$6,873,950	$5,458,600	$1,415,350
Future Costs:			
Energy Consumption Costs	$8,159,846	$5,920,493	$2,239,353
Energy Demand Charges	$0	$0	$0
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$807,727	$277,331	$530,396
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	------------	------------	------------
Subtotal (for Future Cost Items)	$8,967,573	$6,197,824	$2,769,749
	------------	------------	------------
Total PV Life-Cycle Cost	$15,841,523	$11,656,424	$4,185,099

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$2,769,749
- Increased Total Investment	-$1,415,350

Net Savings	$4,185,099

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy Type	-----Average Base Case	Annual Alternative	Consumption----- Savings	Life-Cycle Savings
Electricity	2,680,800.0 kWh	2,373,300.0 kWh	307,500.0 kWh	7,686,447.6 kWh
Natural Gas	151,430.0 Therm	82,838.0 Therm	68,592.0 Therm	1,714,565.3 Therm

Energy Savings Summary (in MBtu)

Energy Type	-----Average Base Case	Annual Alternative	Consumption----- Savings	Life-Cycle Savings
Electricity	9,147.3 MBtu	8,098.0 MBtu	1,049.2 MBtu	26,227.2 MBtu
Natural Gas	15,143.1 MBtu	8,283.8 MBtu	6,859.2 MBtu	171,457.2 MBtu

Emissions Reduction Summary

Energy Type	-----Average Base Case	Annual Alternative	Emissions----- Reduction	Life-Cycle Reduction
Electricity				
CO2	2,036,884.74 kg	1,803,244.76 kg	233,639.98 kg	5,840,199.90 kg
SO2	3,436.00 kg	3,041.87 kg	394.12 kg	9,851.77 kg
NOx	2,886.01 kg	2,554.97 kg	331.04 kg	8,274.83 kg
Natural Gas				
CO2	799,906.84 kg	437,579.63 kg	362,327.21 kg	9,056,940.33 kg
SO2	6,455.50 kg	3,531.41 kg	2,924.09 kg	73,092.37 kg
NOx	111.85 kg	61.19 kg	50.67 kg	1,266.45 kg
Total:				
CO2	2,836,791.58 kg	2,240,824.38 kg	595,967.19 kg	14,897,140.23 kg
SO2	9,891.50 kg	6,573.28 kg	3,318.22 kg	82,944.14 kg
NOx	2,997.86 kg	2,616.16 kg	381.70 kg	9,541.28 kg

NIST BLCC 5.3-08: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

Base Case: Baseline (R.I.K.)

Alternative: Option 2 (Displacement) New Construction Improved Roof

General Information

File Name:	C:\Program Files (x86)\BLCC5\projects\Concord Carlisle.xml
Date of Study:	Wed Dec 16 20:52:46 GMT 2009
Project Name:	Concord Carlisle
Project Location:	Massachusetts
Analysis Type:	FEMP Analysis, Energy Project
Analyst:	Keith Lane
Base Date:	January 1, 2010
Service Date:	January 1, 2010
Study Period:	25 years 0 months(January 1, 2010 through December 31, 2034)
Discount Rate:	4.9%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$6,873,950	$6,004,652	$869,298
Future Costs:			
Energy Consumption Costs	$8,159,846	$5,840,335	$2,319,511
Energy Demand Charges	$0	$0	$0
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$807,727	$277,331	$530,396
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	------------	------------	------------
Subtotal (for Future Cost Items)	$8,967,573	$6,117,666	$2,849,907
	------------	------------	------------
Total PV Life-Cycle Cost	$15,841,523	$12,122,318	$3,719,205

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$2,849,907
- Increased Total Investment	-$869,298

Net Savings	$3,719,205

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	2,680,800.0 kWh	2,377,400.0 kWh	303,400.0 kWh	7,583,961.7 kWh
Natural Gas	151,430.0 Therm	79,429.0 Therm	72,001.0 Therm	1,799,778.6 Therm

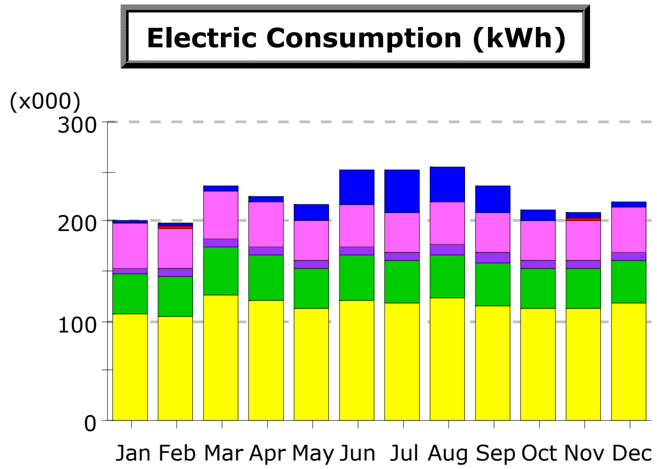
Energy Savings Summary (in MBtu)

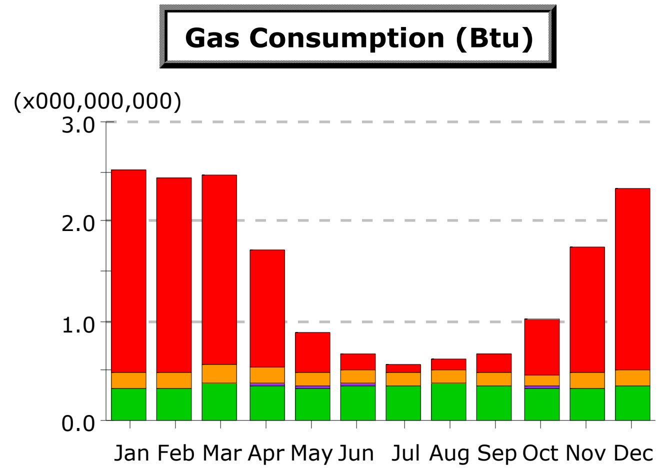
Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	9,147.3 MBtu	8,112.0 MBtu	1,035.2 MBtu	25,877.5 MBtu
Natural Gas	15,143.1 MBtu	7,942.9 MBtu	7,200.1 MBtu	179,978.5 MBtu

Emissions Reduction Summary

Energy	-----Average	Annual	Emissions-----	Life-Cycle
Type	Base Case	Alternative	Reduction	Reduction
Electricity				
CO_2	2,036,884.74 kg	1,806,359.96 kg	230,524.78 kg	5,762,330.57 kg
SO_2	3,436.00 kg	3,047.13 kg	388.87 kg	9,720.41 kg
NO_x	2,886.01 kg	2,559.38 kg	326.62 kg	8,164.49 kg
Natural Gas				
CO_2	799,906.84 kg	419,572.08 kg	380,334.76 kg	9,507,067.30 kg
SO_2	6,455.50 kg	3,386.08 kg	3,069.42 kg	76,725.03 kg
NO_x	111.85 kg	58.67 kg	53.18 kg	1,329.39 kg
Total:				
CO_2	2,836,791.58 kg	2,225,932.04 kg	610,859.54 kg	15,269,397.87 kg
SO_2	9,891.50 kg	6,433.21 kg	3,458.29 kg	86,445.45 kg
NO_x	2,997.86 kg	2,618.05 kg	379.81 kg	9,493.89 kg

ENERGY PROFILES





Electric Consumption (kWh x000)

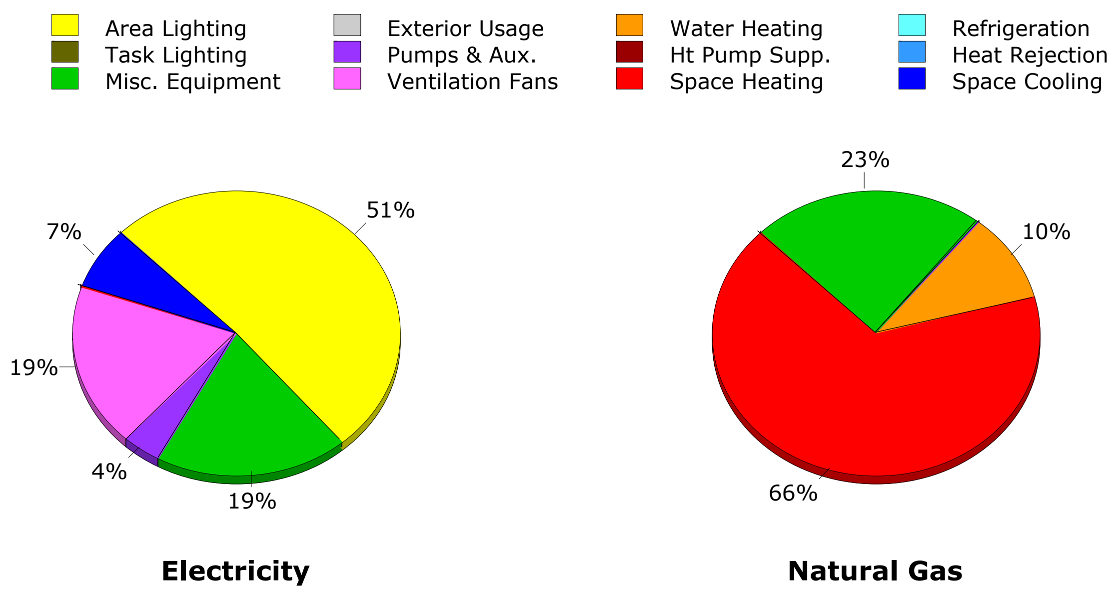
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	3.9	3.7	4.8	5.8	15.8	33.8	41.1	36.5	25.9	11.0	5.9	4.9	193.1
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.9	0.9	0.9	0.6	0.2	0.1	0.1	0.1	0.1	0.3	0.6	0.9	5.7
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	43.1	41.1	47.2	43.4	38.7	42.8	41.4	43.0	40.6	38.7	41.3	44.7	505.8
Pumps & Aux.	7.8	7.8	9.5	9.1	8.2	9.0	8.6	9.0	8.6	8.2	8.2	8.6	102.7
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	39.3	38.9	46.7	44.7	41.2	44.7	42.9	44.9	42.9	41.1	41.0	43.0	511.3
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	106.8	105.7	126.8	121.4	112.0	121.4	116.6	122.0	116.4	111.6	111.4	116.8	1,388.8
Total	201.9	198.0	235.8	224.9	216.1	251.7	250.8	255.4	234.5	210.9	208.5	219.0	2,707.5

Gas Consumption (Btu x000,000,000)

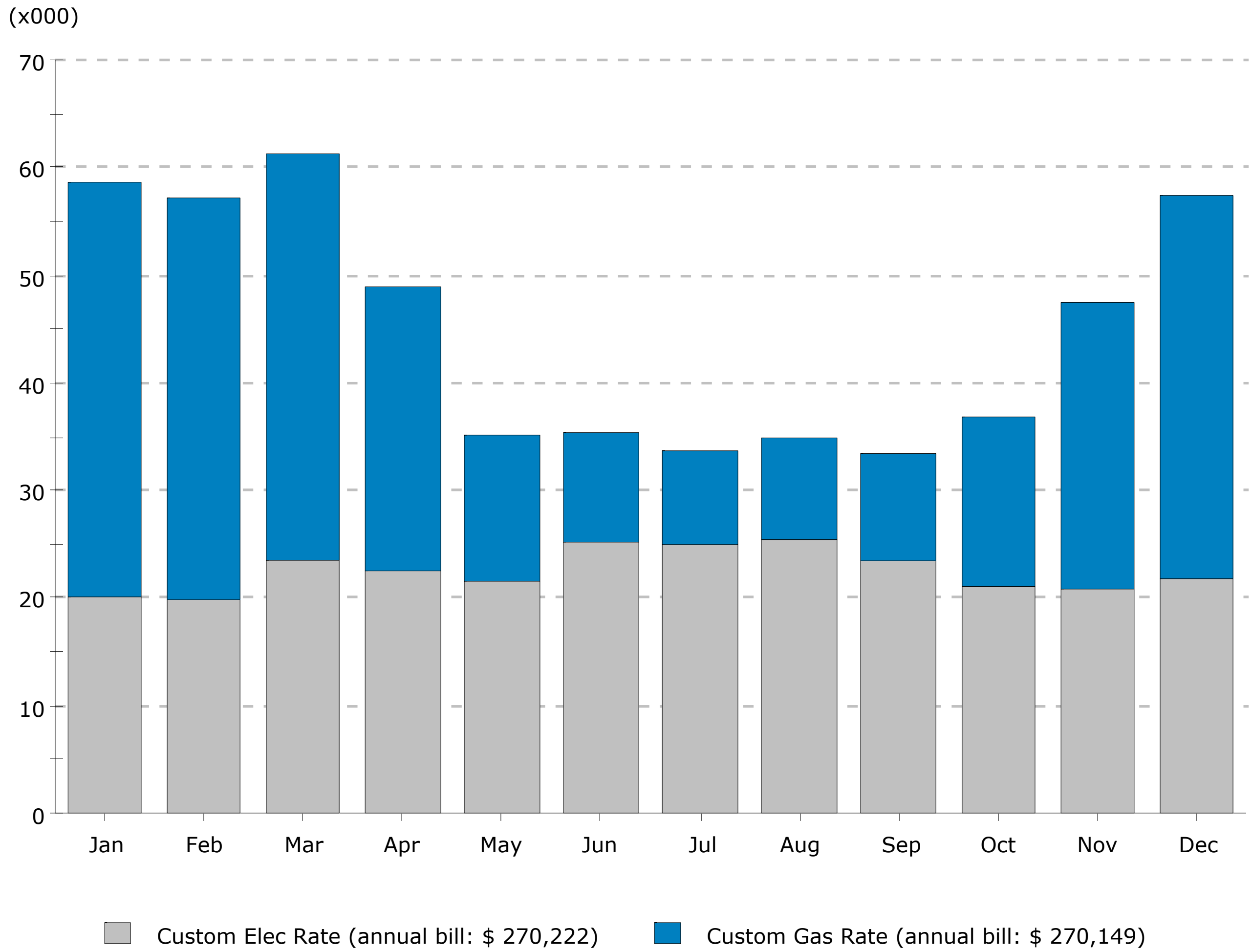
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	2.04	1.98	1.91	1.19	0.41	0.16	0.08	0.12	0.18	0.56	1.27	1.83	11.72
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.15	0.15	0.18	0.17	0.15	0.15	0.14	0.14	0.13	0.13	0.14	0.15	1.78
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	0.32	0.31	0.38	0.36	0.33	0.36	0.35	0.36	0.35	0.33	0.33	0.35	4.13
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	2.52	2.45	2.47	1.72	0.89	0.67	0.57	0.62	0.66	1.02	1.74	2.33	17.66

Annual Energy Consumption by Enduse

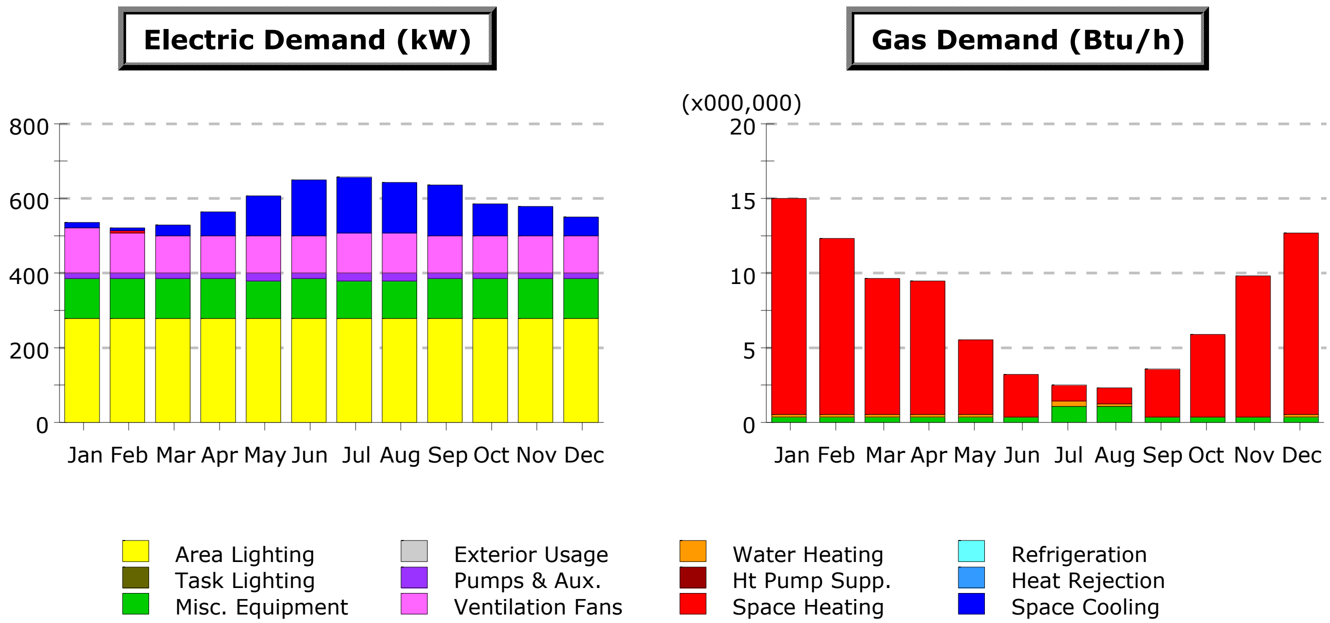
	Electricity kWh (x000)	Natural Gas MBtu	Steam Btu	Chilled Water Btu
Space Cool	193.1	-	-	-
Heat Reject.	-	-	-	-
Refrigeration	-	-	-	-
Space Heat	5.7	11,724	-	-
HP Supp.	-	-	-	-
Hot Water	-	1,784	-	-
Vent. Fans	505.8	-	-	-
Pumps & Aux.	102.7	21	-	-
Ext. Usage	-	-	-	-
Misc. Equip.	511.3	4,134	-	-
Task Lights	-	-	-	-
Area Lights	1,388.8	-	-	-
Total	2,707.5	17,664	-	-



Monthly Utility Bills ($)



Total Annual Bill Across All Rates: $ 540,371



Electric Demand (kW)

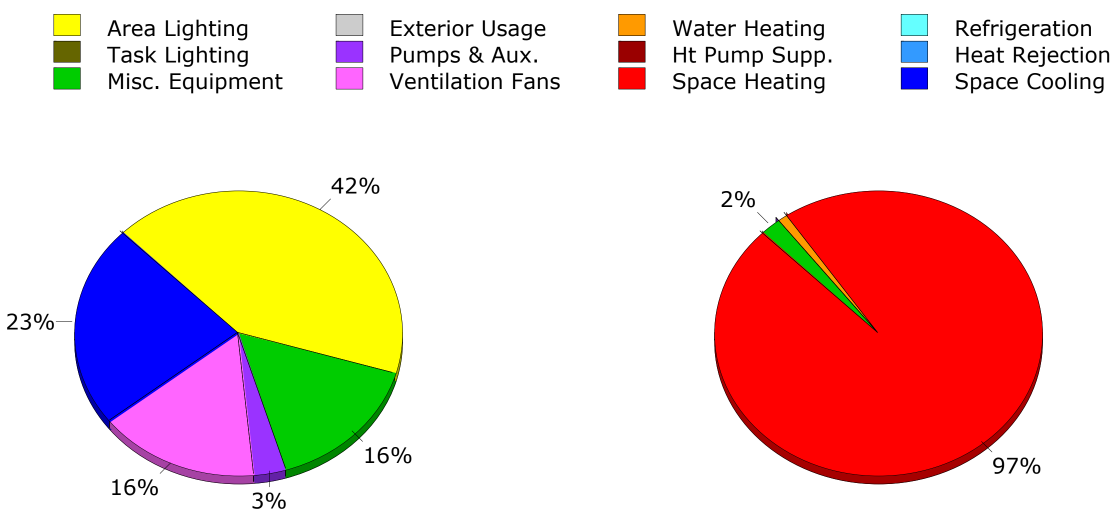
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	9.3	9.3	29.7	64.7	106.2	145.2	154.4	139.7	131.2	83.4	80.5	52.4	1,006.1
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	3.7	3.1	0.6	0.2	0.1	-	-	-	-	0.2	0.3	0.6	8.8
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	118.0	105.4	95.7	95.8	97.4	100.3	104.1	102.2	99.8	96.3	95.7	95.8	1,206.5
Pumps & Aux.	20.6	20.6	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	246.1
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	103.5	103.5	103.5	103.3	102.0	103.3	102.6	102.0	103.3	103.5	103.5	103.5	1,237.5
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	279.1	279.1	279.1	279.1	279.1	279.1	279.1	279.1	279.1	279.1	279.1	279.1	3,348.6
Total	534.1	521.0	529.1	563.6	605.3	648.4	660.7	643.4	633.8	583.0	579.5	551.8	7,053.8

Gas Demand (Btu/h x000,000)

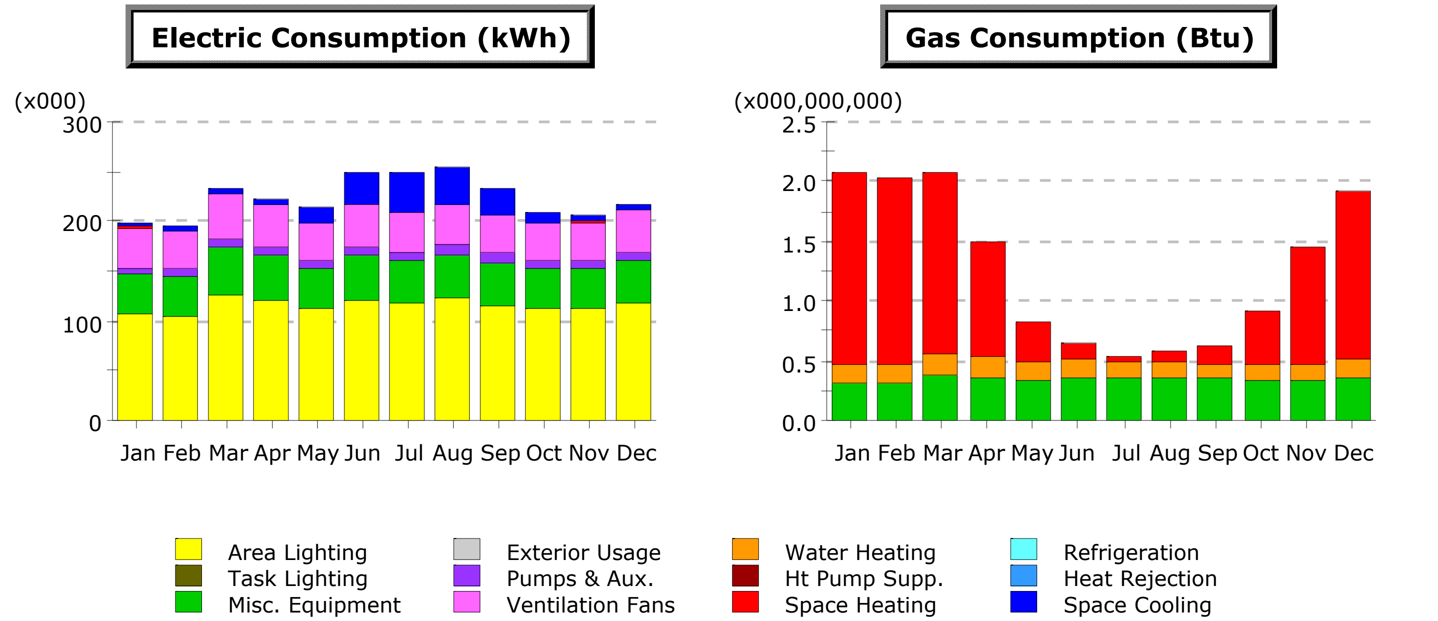
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	14.58	11.87	9.21	8.98	5.05	2.76	1.16	1.16	3.07	5.44	9.46	12.25	84.98
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.16	0.16	0.16	0.16	0.15	0.14	0.33	0.19	0.12	0.13	0.14	0.15	1.98
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	0.31	0.31	0.31	0.31	0.31	0.31	1.08	1.01	0.31	0.31	0.31	0.31	5.16
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	15.04	12.34	9.67	9.45	5.51	3.20	2.57	2.37	3.50	5.88	9.91	12.70	92.15

Annual Peak Demand by Enduse

	Electricity kW	Natural Gas Btu/h (x000)	Steam Btu/h	Chilled Water Btu/h
Space Cool	154.44	-	-	-
Heat Reject.	-	-	-	-
Refrigeration	-	-	-	-
Space Heat	-	14,576	-	-
HP Supp.	-	-	-	-
Hot Water	-	157	-	-
Vent. Fans	104.08	-	-	-
Pumps & Aux.	20.50	2	-	-
Ext. Usage	-	-	-	-
Misc. Equip.	102.63	306	-	-
Task Lights	-	-	-	-
Area Lights	279.05	-	-	-
Total	660.71	15,042	-	-



Electricity **Natural Gas**



Electric Consumption (kWh x000)

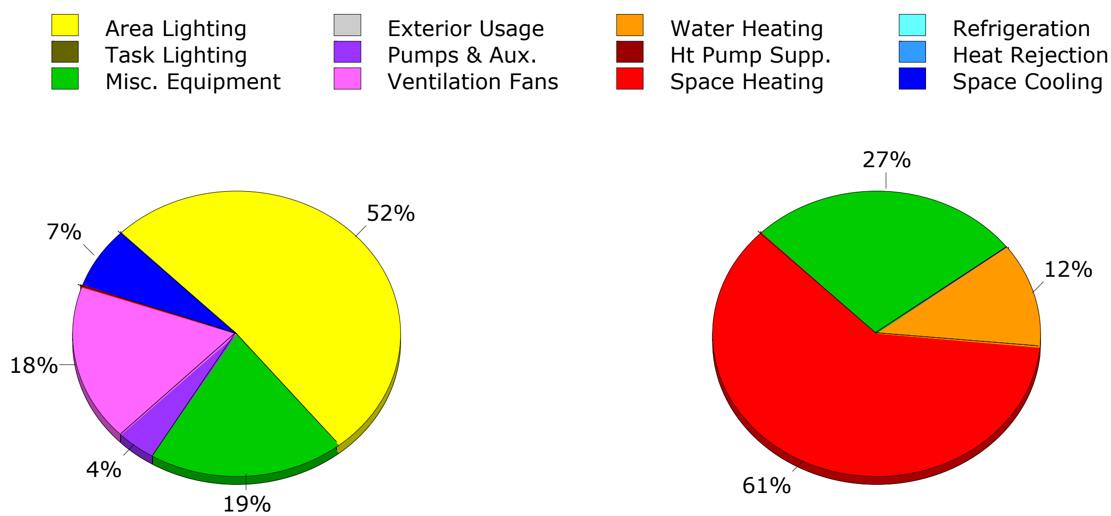
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	3.9	3.7	4.8	5.8	15.7	33.2	40.2	35.8	25.8	11.0	5.9	4.9	190.6
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.8	0.8	0.8	0.5	0.2	0.1	0.0	0.1	0.1	0.3	0.6	0.8	5.2
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	40.2	38.1	44.4	41.6	37.6	41.5	40.1	41.7	39.4	37.5	38.6	41.9	482.6
Pumps & Aux.	7.8	7.8	9.4	9.0	8.2	9.0	8.6	9.0	8.6	8.2	8.2	8.6	102.4
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	39.3	38.9	46.7	44.7	41.2	44.7	42.9	44.9	42.9	41.1	41.0	43.0	511.3
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	106.8	105.7	126.8	121.4	112.0	121.4	116.6	122.0	116.4	111.6	111.4	116.8	1,388.8
Total	198.8	195.0	232.9	223.1	214.8	249.8	248.4	253.4	233.2	209.7	205.7	216.0	2,680.8

Gas Consumption (Btu x000,000,000)

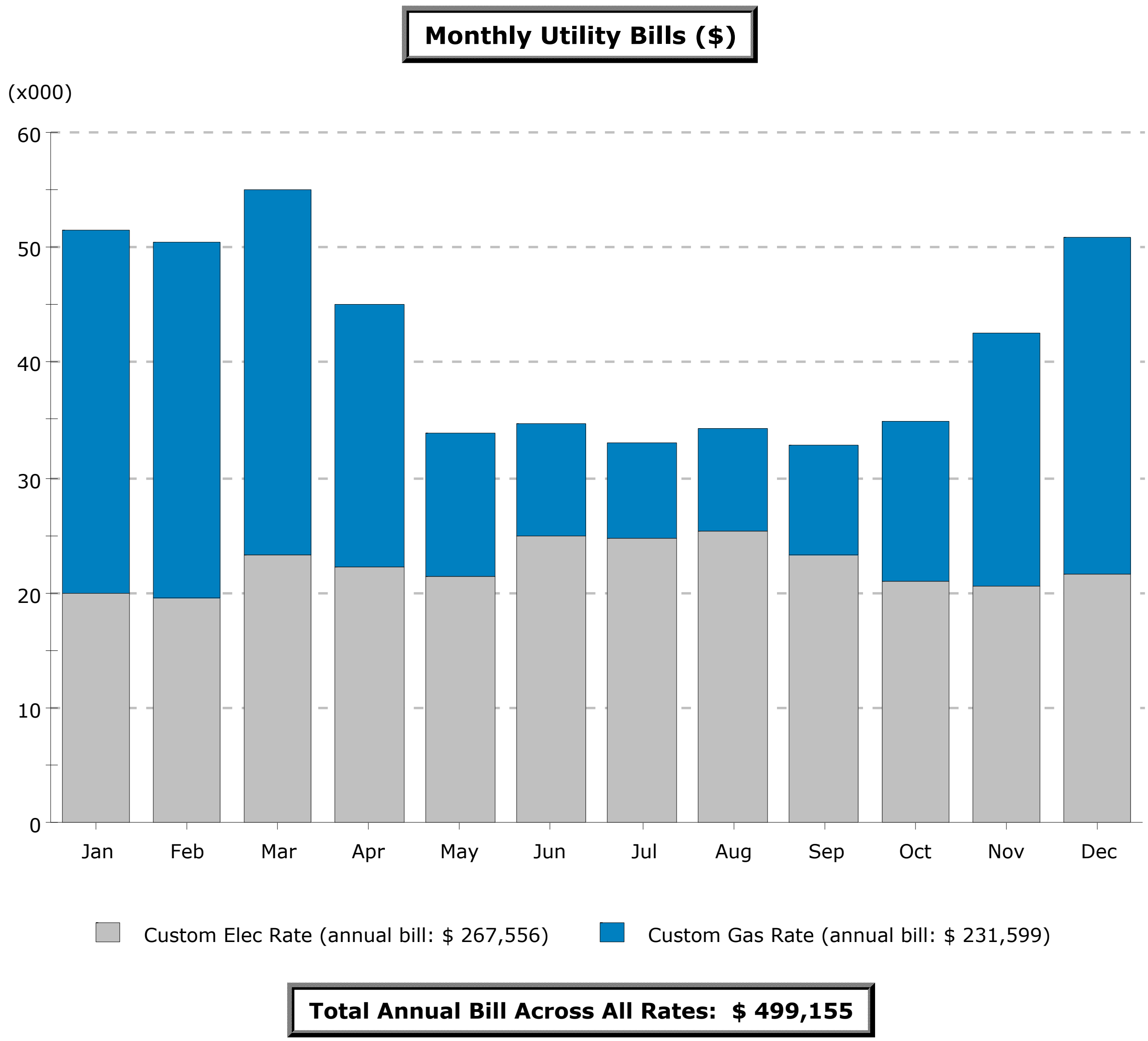
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	1.60	1.55	1.51	0.95	0.33	0.13	0.06	0.09	0.15	0.44	0.98	1.42	9.20
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.15	0.15	0.18	0.17	0.15	0.15	0.14	0.14	0.13	0.13	0.14	0.15	1.78
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	0.32	0.31	0.38	0.36	0.33	0.36	0.35	0.36	0.35	0.33	0.33	0.35	4.13
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	2.07	2.02	2.07	1.49	0.82	0.64	0.54	0.59	0.62	0.91	1.45	1.92	15.14

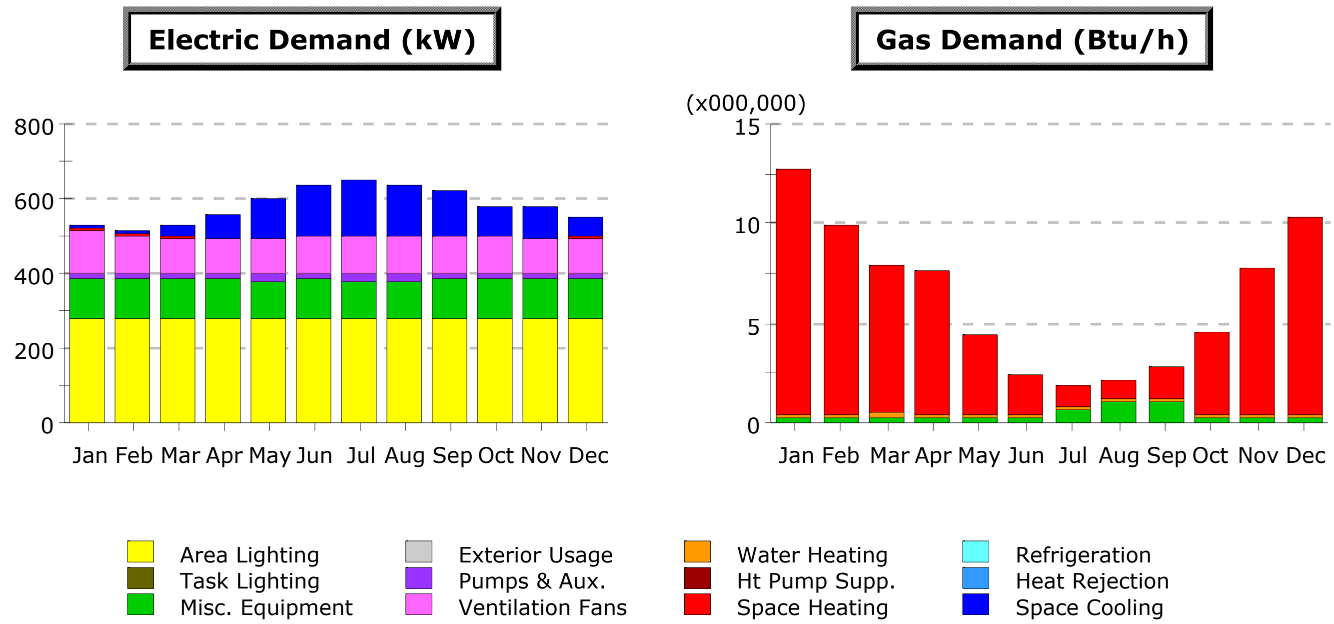
Annual Energy Consumption by Enduse

	Electricity kWh (x000)	Natural Gas MBtu	Steam Btu	Chilled Water Btu
Space Cool	190.6	-	-	-
Heat Reject.	-	-	-	-
Refrigeration	-	-	-	-
Space Heat	5.2	9,204	-	-
HP Supp.	-	-	-	-
Hot Water	-	1,784	-	-
Vent. Fans	482.6	-	-	-
Pumps & Aux.	102.4	21	-	-
Ext. Usage	-	-	-	-
Misc. Equip.	511.3	4,134	-	-
Task Lights	-	-	-	-
Area Lights	1,388.8	-	-	-
Total	2,680.8	15,143	-	-



Electricity **Natural Gas**


Monthly Utility Bills ($)
(x000)
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Custom Elec Rate (annual bill: $ 267,556)
Custom Gas Rate (annual bill: $ 231,599)
Total Annual Bill Across All Rates: $ 499,155



Electric Demand (kW)

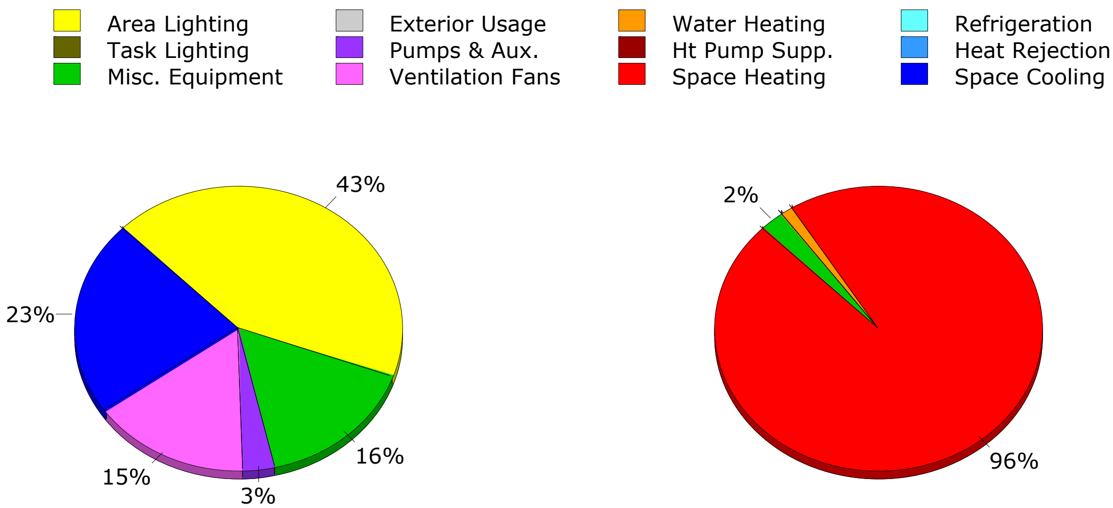
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	9.3	9.3	29.5	63.7	103.7	139.7	147.3	133.6	125.2	83.2	80.4	51.8	976.8
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	3.4	2.9	0.6	0.2	0.1	-	-	-	-	0.2	0.3	0.5	8.1
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	112.7	100.0	92.9	93.2	94.5	96.0	99.8	98.1	96.1	93.8	93.1	92.9	1,163.2
Pumps & Aux.	20.5	20.5	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	245.3
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	103.5	103.5	103.5	103.3	102.0	103.5	102.6	102.0	103.3	103.5	103.5	103.5	1,237.8
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	279.1	279.1	279.1	279.1	279.1	279.1	279.1	279.1	279.1	279.1	279.1	279.1	3,348.6
Total	528.5	515.2	526.0	559.9	599.9	638.7	649.3	633.1	624.1	580.2	576.8	548.2	6,979.8

Gas Demand (Btu/h x000,000)

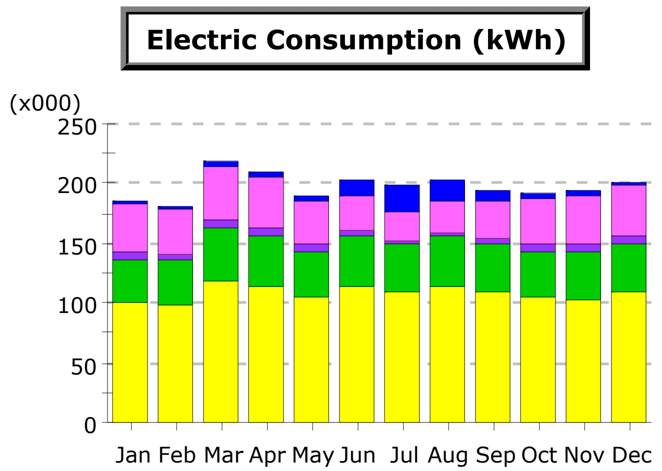
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	12.26	9.39	7.45	7.17	3.97	2.01	1.09	0.98	1.64	4.18	7.37	9.85	67.37
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.16	0.16	0.16	0.16	0.15	0.14	0.18	0.19	0.19	0.13	0.14	0.15	1.90
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	0.31	0.31	0.31	0.31	0.31	0.31	0.64	1.01	1.01	0.31	0.31	0.31	5.43
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	12.73	9.86	7.92	7.64	4.42	2.46	1.91	2.19	2.85	4.62	7.82	10.31	74.73

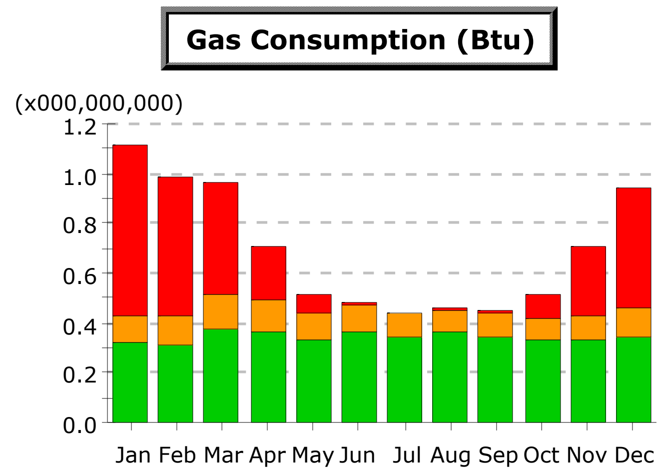
Annual Peak Demand by Enduse

	Electricity kW	Natural Gas Btu/h (x000)	Steam Btu/h	Chilled Water Btu/h
Space Cool	147.32	-	-	-
Heat Reject.	-	-	-	-
Refrigeration	-	-	-	-
Space Heat	-	12,263	-	-
HP Supp.	-	-	-	-
Hot Water	-	157	-	-
Vent. Fans	99.85	-	-	-
Pumps & Aux.	20.43	2	-	-
Ext. Usage	-	-	-	-
Misc. Equip.	102.63	306	-	-
Task Lights	-	-	-	-
Area Lights	279.05	-	-	-
Total	649.29	12,729	-	-



Electricity **Natural Gas**





Electric Consumption (kWh x000)

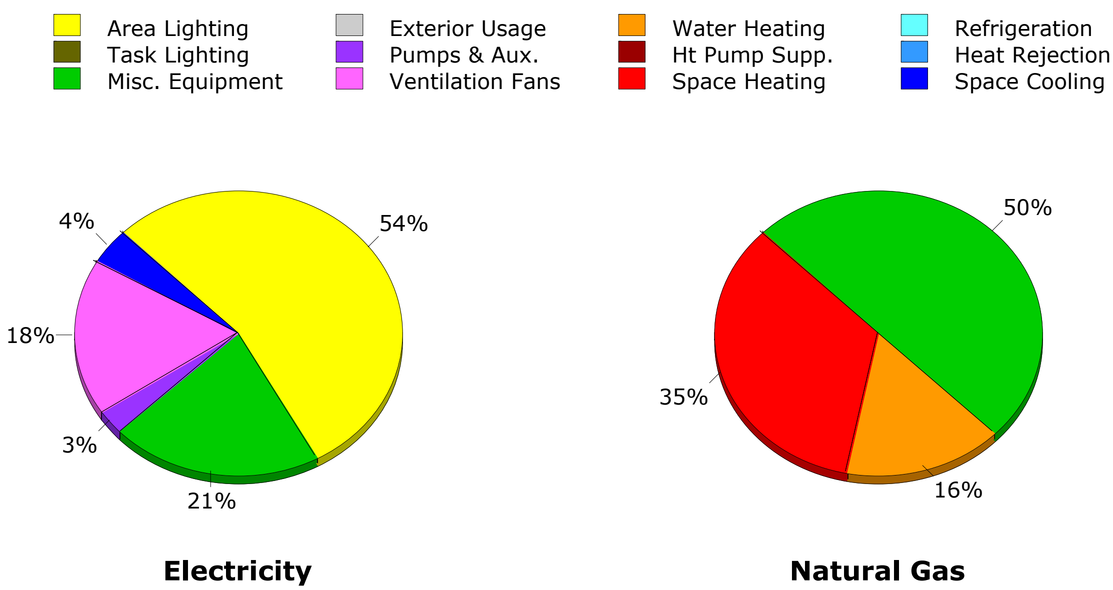
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	2.4	2.3	4.2	5.3	5.7	14.7	23.7	17.8	8.9	4.2	4.5	3.5	97.3
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.3	0.2	0.2	0.1	0.0	0.0	-	0.0	0.0	0.1	0.2	0.2	1.4
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	38.8	37.5	44.1	42.0	35.8	29.2	22.9	25.0	31.8	38.7	39.4	41.5	426.7
Pumps & Aux.	6.7	6.1	6.9	6.5	5.5	4.1	2.7	3.2	4.4	6.2	6.4	6.8	65.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	37.7	37.3	44.7	42.8	39.5	42.8	41.2	43.0	41.1	39.4	39.3	41.2	490.0
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	99.5	98.3	117.9	112.9	104.2	112.9	108.6	113.4	108.3	104.0	103.7	108.7	1,292.4
Total	185.2	181.8	218.1	209.7	190.7	203.8	199.1	202.4	194.5	192.6	193.5	201.9	2,373.3

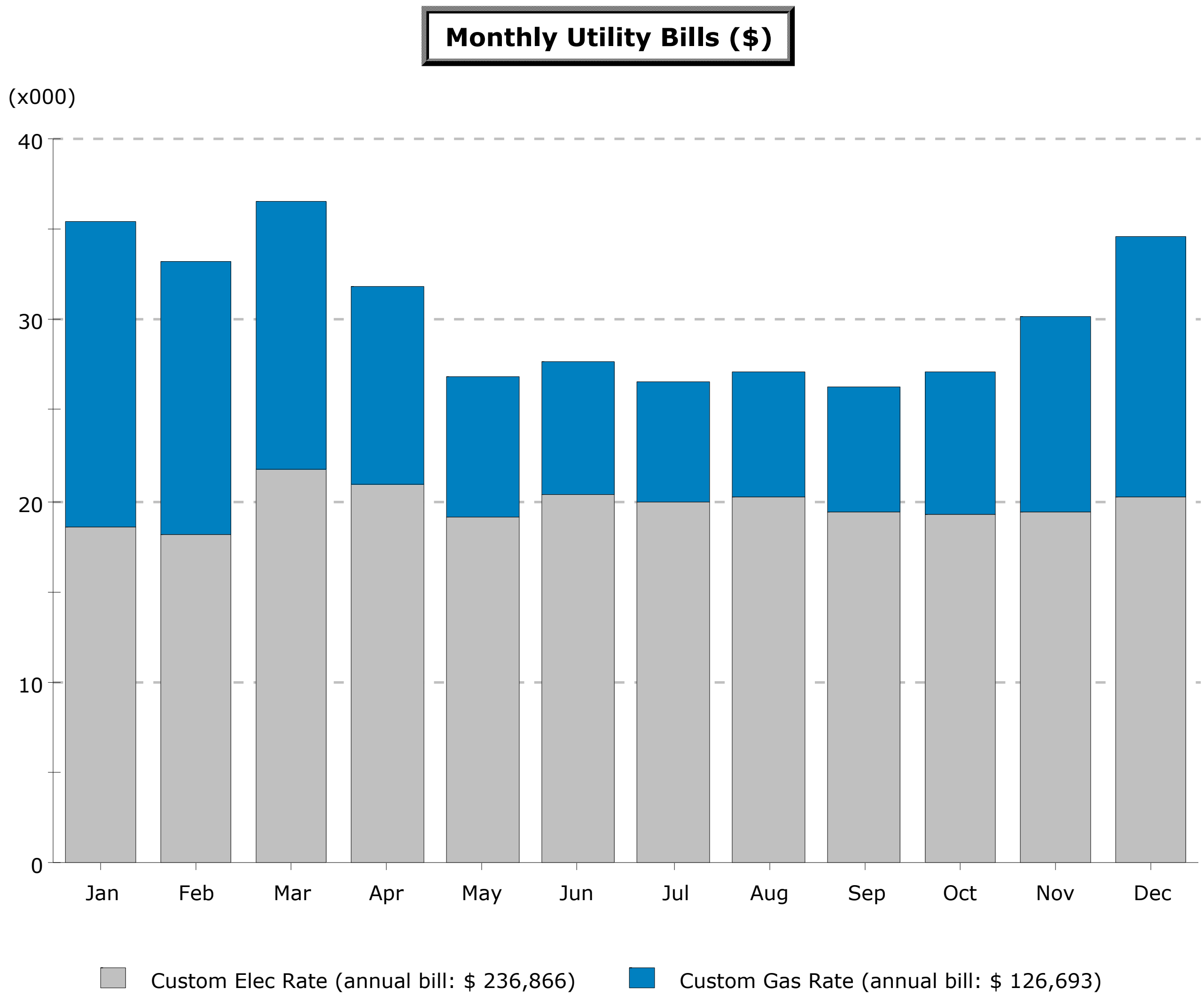
Gas Consumption (Btu x000,000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.68	0.55	0.45	0.22	0.07	0.01	0.00	0.00	0.02	0.09	0.28	0.49	2.86
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.11	0.11	0.14	0.13	0.11	0.11	0.09	0.09	0.09	0.09	0.10	0.11	1.29
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	0.32	0.31	0.38	0.36	0.33	0.36	0.35	0.36	0.35	0.33	0.33	0.35	4.13
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.11	0.98	0.96	0.71	0.51	0.48	0.44	0.46	0.45	0.51	0.71	0.95	8.28

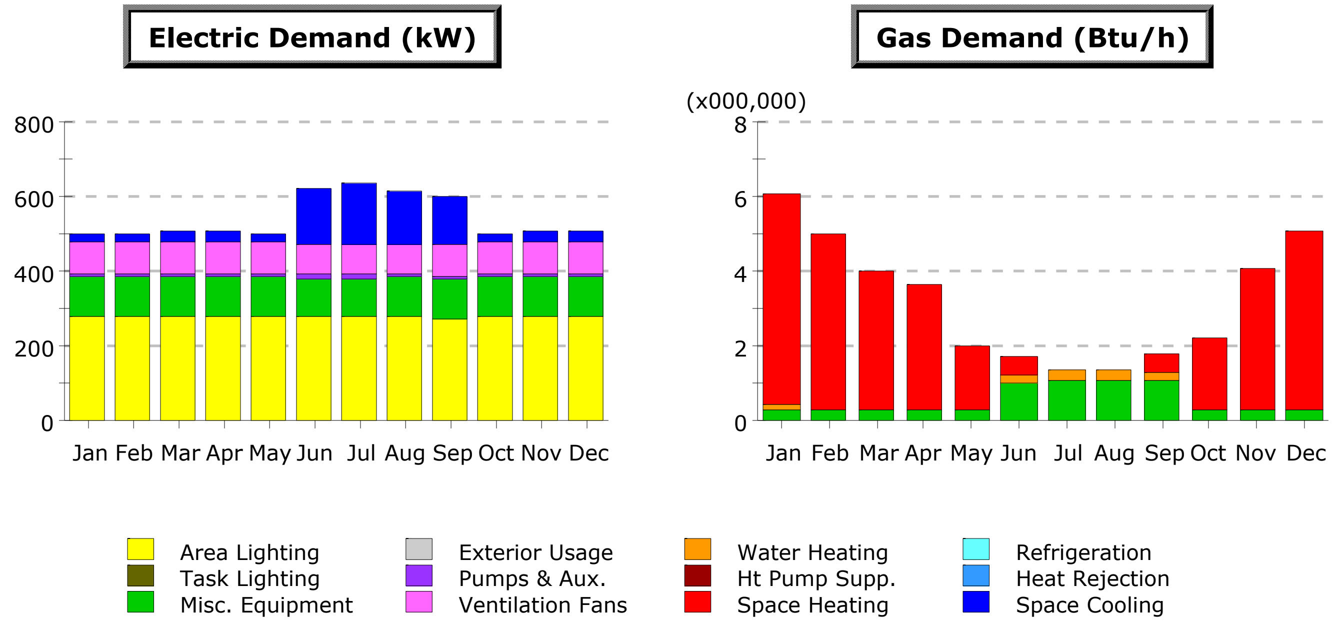
Annual Energy Consumption by Enduse

	Electricity kWh (x000)	Natural Gas MBtu	Steam Btu	Chilled Water Btu
Space Cool	97.3	-	-	-
Heat Reject.	-	-	-	-
Refrigeration	-	-	-	-
Space Heat	1.4	2,864.0	-	-
HP Supp.	-	-	-	-
Hot Water	-	1,285.7	-	-
Vent. Fans	426.7	-	-	-
Pumps & Aux.	65.6	-	-	-
Ext. Usage	-	-	-	-
Misc. Equip.	490.0	4,134.1	-	-
Task Lights	-	-	-	-
Area Lights	1,292.4	-	-	-
Total	2,373.3	8,283.8	-	-





Total Annual Bill Across All Rates: $ 363,559



Electric Demand (kW)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	23.9	23.8	28.5	28.3	24.6	144.0	162.0	145.3	133.4	22.6	30.4	31.6	798.2
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.8	0.5	0.3	0.3	0.2	-	-	-	-	0.4	0.5	0.5	3.4
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	85.1	85.1	85.1	85.1	85.1	83.0	83.0	78.6	83.0	85.1	85.1	85.1	1,008.1
Pumps & Aux.	10.3	10.3	10.1	10.1	10.2	9.3	9.3	8.9	9.3	10.3	10.1	10.0	118.4
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	103.5	103.5	103.5	103.5	103.5	103.4	103.4	103.5	102.0	103.5	103.5	103.5	1,240.5
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	279.3	279.3	279.3	279.3	279.3	278.7	278.7	279.3	273.7	279.3	279.3	279.3	3,344.7
Total	502.9	502.5	506.8	506.6	502.9	618.3	636.4	615.6	601.4	501.2	508.9	510.0	6,513.4

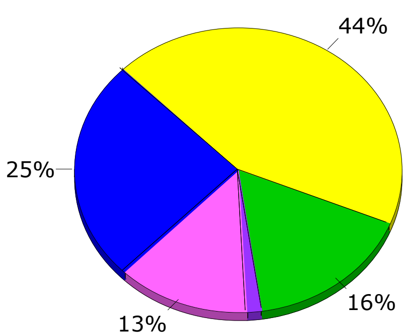
Gas Demand (Btu/h x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	5.62	4.69	3.69	3.33	1.69	0.49	-	-	0.48	1.88	3.74	4.80	30.41
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.15	-	-	-	-	0.18	0.29	0.28	0.22	-	-	-	1.13
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	0.31	0.31	0.31	0.31	0.31	1.01	1.08	1.08	1.08	0.31	0.31	0.31	6.71
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	6.07	5.00	4.00	3.64	1.99	1.69	1.37	1.36	1.78	2.19	4.05	5.11	38.24

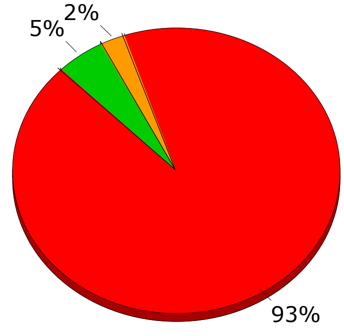
Annual Peak Demand by Enduse

	Electricity kW	Natural Gas Btu/h (x000)	Steam Btu/h	Chilled Water Btu/h
Space Cool	161.99	-	-	-
Heat Reject.	-	-	-	-
Refrigeration	-	-	-	-
Space Heat	-	5,617.8	-	-
HP Supp.	-	-	-	-
Hot Water	-	149.0	-	-
Vent. Fans	82.99	-	-	-
Pumps & Aux.	9.35	-	-	-
Ext. Usage	-	-	-	-
Misc. Equip.	103.36	306.4	-	-
Task Lights	-	-	-	-
Area Lights	278.67	-	-	-
Total	636.36	6,073.2	-	-

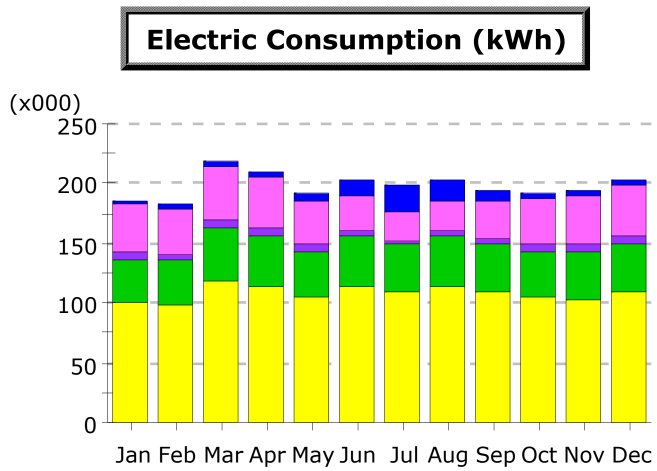
Area Lighting
Task Lighting
Misc. Equipment
Exterior Usage
Pumps & Aux.
Ventilation Fans
Water Heating
Ht Pump Supp.
Space Heating
Refrigeration
Heat Rejection
Space Cooling

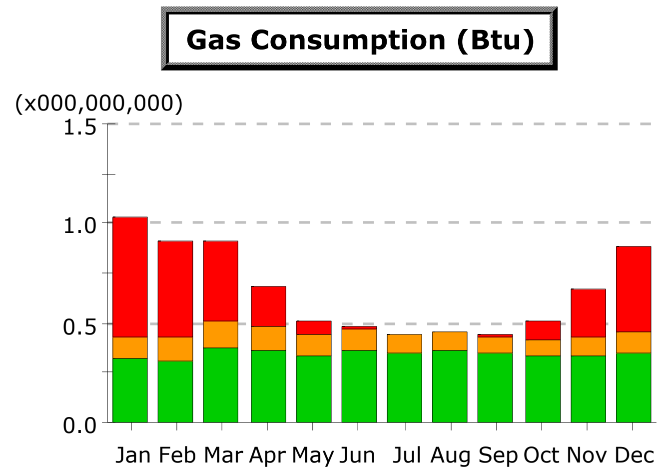


Electricity



Natural Gas





Area Lighting
Task Lighting
Misc. Equipment
Exterior Usage
Pumps & Aux.
Ventilation Fans
Water Heating
Ht Pump Supp.
Space Heating
Refrigeration
Heat Rejection
Space Cooling

Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	2.9	2.9	4.6	5.5	5.8	14.8	23.6	17.8	9.3	4.7	4.9	4.1	101.0
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.2	0.2	0.2	0.1	0.0	0.0	-	0.0	0.0	0.1	0.1	0.2	1.3
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	38.8	37.5	44.1	42.0	35.8	29.3	23.1	25.1	31.9	38.7	39.4	41.5	427.1
Pumps & Aux.	6.7	6.1	6.9	6.5	5.5	4.1	2.8	3.2	4.4	6.2	6.4	6.7	65.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	37.7	37.3	44.7	42.8	39.5	42.8	41.2	43.0	41.1	39.4	39.3	41.2	490.0
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	99.5	98.3	117.9	112.9	104.2	112.9	108.6	113.4	108.3	104.0	103.7	108.7	1,292.4
Total	185.7	182.4	218.5	209.9	190.9	203.9	199.1	202.6	195.0	193.1	193.9	202.4	2,377.4

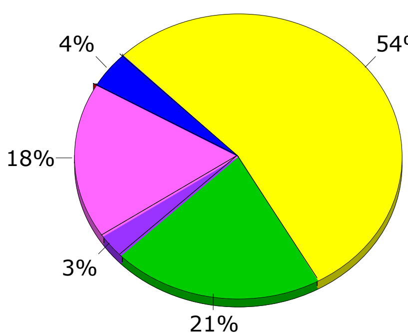
Gas Consumption (Btu x000,000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.60	0.49	0.40	0.20	0.07	0.01	0.00	0.00	0.01	0.08	0.25	0.42	2.53
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.11	0.11	0.14	0.13	0.11	0.11	0.09	0.09	0.09	0.09	0.09	0.11	1.26
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	0.32	0.31	0.38	0.36	0.33	0.36	0.35	0.36	0.35	0.33	0.33	0.35	4.13
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.03	0.91	0.91	0.69	0.51	0.48	0.44	0.45	0.45	0.50	0.68	0.88	7.92

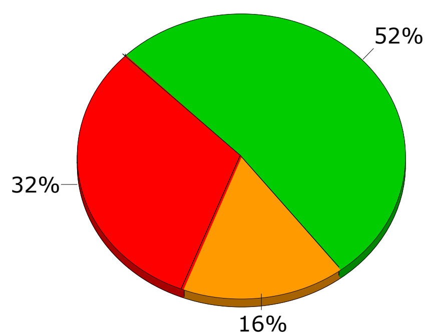
Annual Energy Consumption by Enduse

	Electricity kWh (x000)	Natural Gas MBtu	Steam Btu	Chilled Water Btu
Space Cool	101.0	-	-	-
Heat Reject.	-	-	-	-
Refrigeration	-	-	-	-
Space Heat	1.3	2,531.1	-	-
HP Supp.	-	-	-	-
Hot Water	-	1,259.7	-	-
Vent. Fans	427.1	-	-	-
Pumps & Aux.	65.6	-	-	-
Ext. Usage	-	-	-	-
Misc. Equip.	490.0	4,134.1	-	-
Task Lights	-	-	-	-
Area Lights	1,292.4	-	-	-
Total	2,377.4	7,924.9	-	-

Area Lighting
Task Lighting
Misc. Equipment
Exterior Usage
Pumps & Aux.
Ventilation Fans
Water Heating
Ht Pump Supp.
Space Heating
Refrigeration
Heat Rejection
Space Cooling

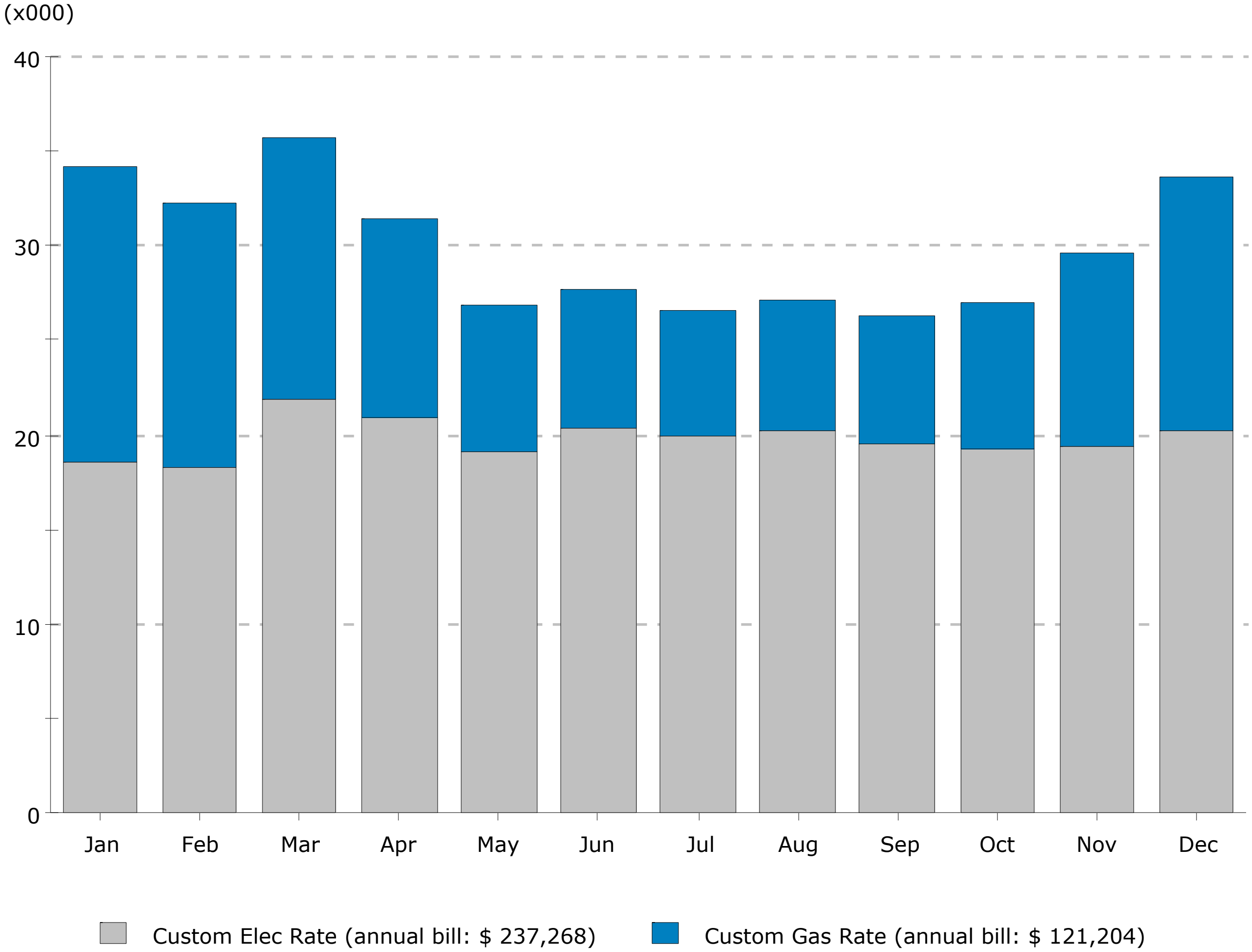


Electricity

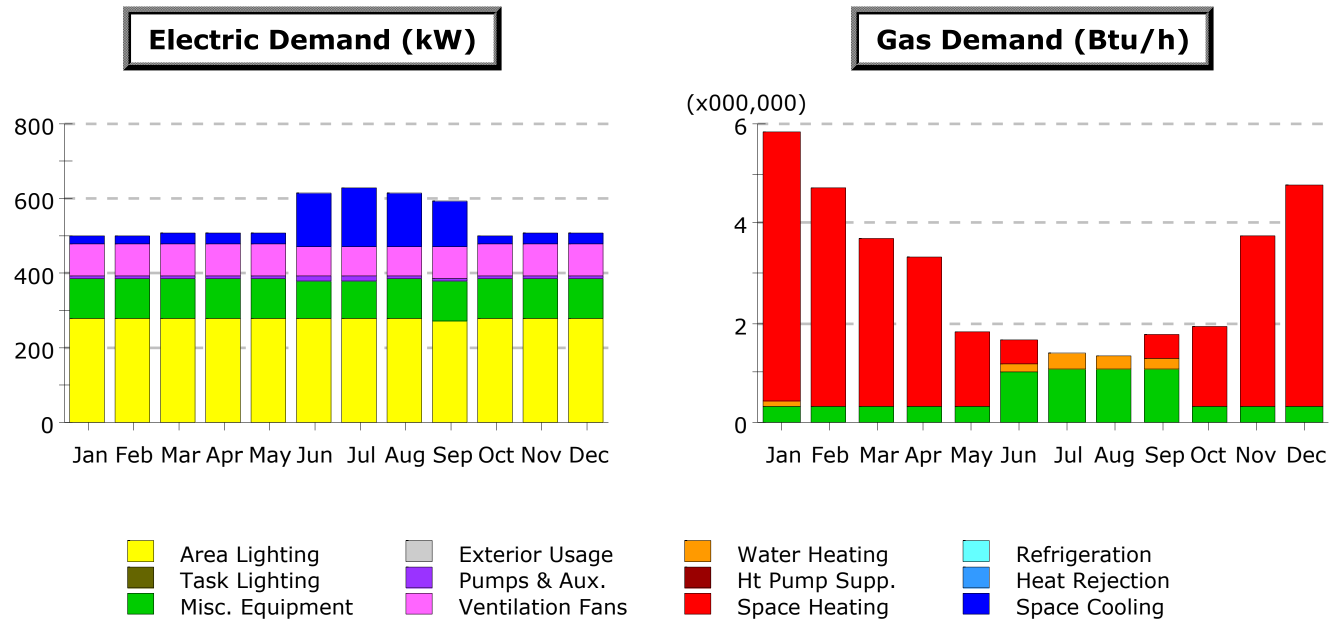


Natural Gas

Monthly Utility Bills ($)



Total Annual Bill Across All Rates: $ 358,472



Electric Demand (kW)

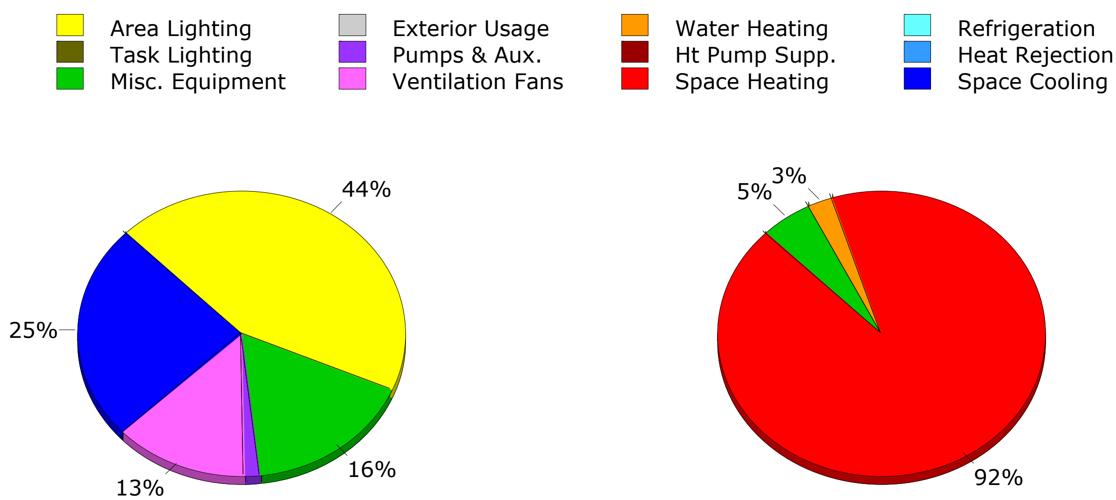
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	23.6	25.1	28.1	28.2	27.5	137.6	156.6	143.9	126.9	24.8	27.9	27.9	778.1
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.8	0.3	0.3	0.3	0.3	-	-	-	-	0.3	0.3	0.6	3.3
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	85.1	85.1	85.1	85.1	85.1	83.0	83.0	78.6	83.0	85.1	85.1	85.1	1,008.1
Pumps & Aux.	10.3	10.2	10.1	10.1	10.1	9.3	9.3	8.9	9.3	10.2	10.1	10.2	118.4
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	103.5	103.5	103.5	103.5	103.5	103.4	103.4	103.5	102.0	103.5	103.5	103.5	1,240.5
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	279.3	279.3	279.3	279.3	279.3	278.7	278.7	279.3	273.7	279.3	279.3	279.3	3,344.7
Total	502.6	503.5	506.5	506.5	505.7	612.0	631.0	614.3	594.9	503.2	506.2	506.6	6,493.1

Gas Demand (Btu/h x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	5.39	4.41	3.40	3.01	1.52	0.49	-	-	0.47	1.63	3.45	4.46	28.23
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.15	-	-	-	-	0.18	0.29	0.28	0.22	-	-	-	1.11
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	0.31	0.31	0.31	0.31	0.31	1.01	1.08	1.08	1.08	0.31	0.31	0.31	6.71
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	5.85	4.72	3.70	3.32	1.83	1.68	1.37	1.36	1.77	1.93	3.76	4.77	36.05

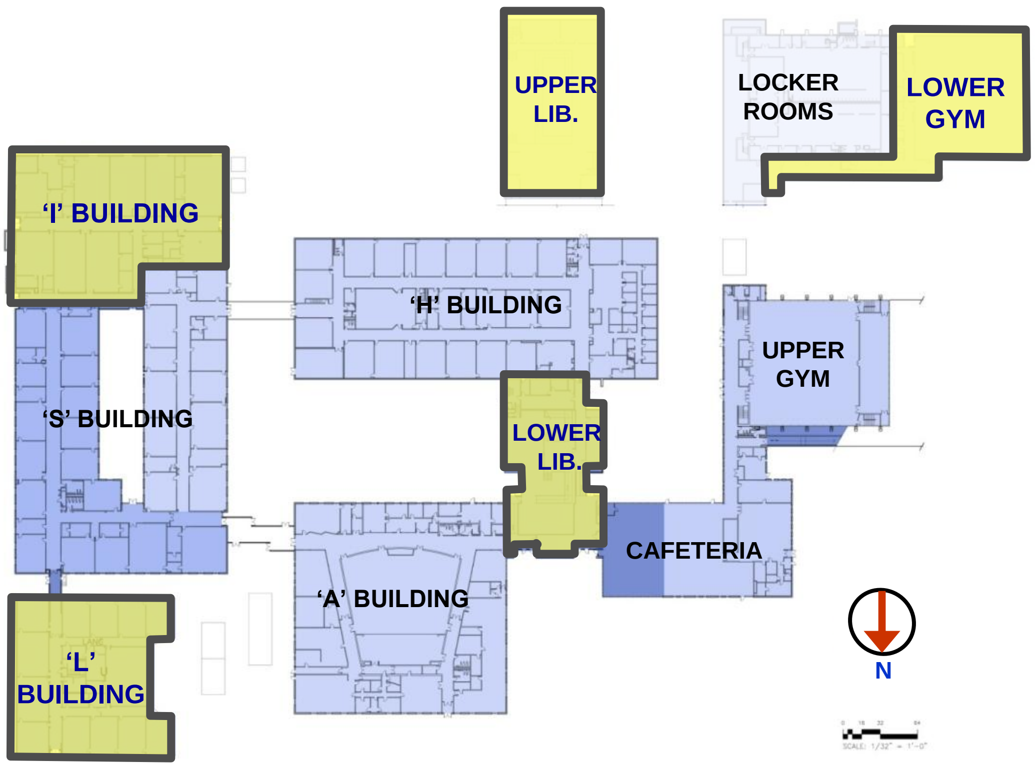
Annual Peak Demand by Enduse

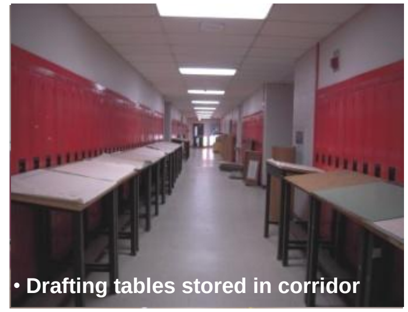
	Electricity kW	Natural Gas Btu/h (x000)	Steam Btu/h	Chilled Water Btu/h
Space Cool	156.63	-	-	-
Heat Reject.	-	-	-	-
Refrigeration	-	-	-	-
Space Heat	-	5,392.2	-	-
HP Supp.	-	-	-	-
Hot Water	-	147.5	-	-
Vent. Fans	82.99	-	-	-
Pumps & Aux.	9.35	-	-	-
Ext. Usage	-	-	-	-
Misc. Equip.	103.36	306.4	-	-
Task Lights	-	-	-	-
Area Lights	278.67	-	-	-
Total	631.00	5,846.0	-	-



Electricity **Natural Gas**

Existing Building: *I, L, Library and Lower Gym*




• Drafting tables stored in corridor


• Non-compliant ramp in library


• Out-dated mechanical system


• Inaccessible chorus risers


• Poor classroom lighting


• Non compliant ramp

Positive Features:

- Door hardware meets ADA/MAAB
- New hooked on science classroom
- Some toilet rooms have been renovated to be accessible

Facilities Deficiencies:

- Ongoing deferred maintenance
- MEP systems exceed life span
- Congested tunnels
- EPDM roof in poor condition
- No vapor barrier in exterior walls
- Single pane exterior glazing
- Outdated rubber floor in gymnasium

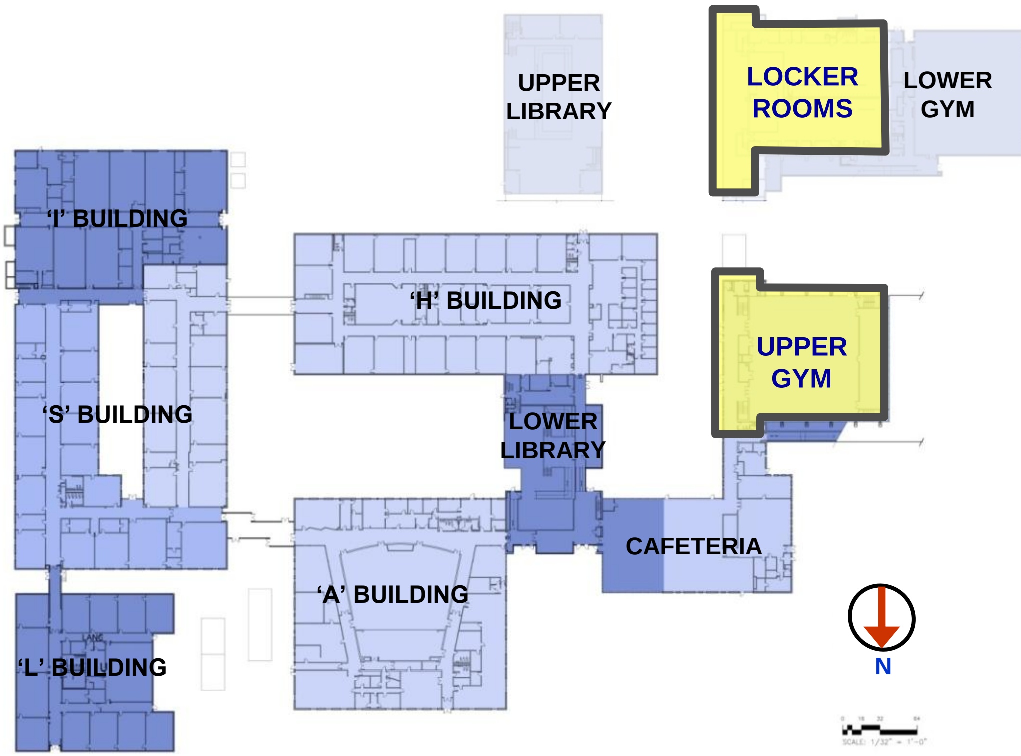
Code Deficiencies:

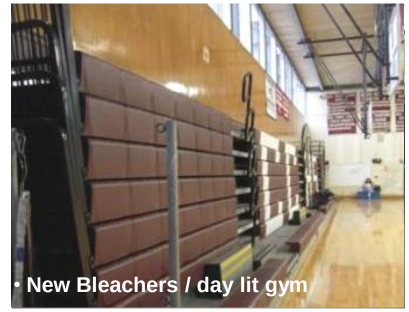
- Structural lateral, seismic and snow loads
- Inaccessible door clearances, ramps, and some toilet rooms
- No sprinklers in public space
- Egress doors from gym are not accessible

Educational Deficiencies:

- Library is in transition to information commons
- Classrooms do not support interdisciplinary teaching and learning
- Lack of presentation space
- Classrooms are remote
- Core spaces have no natural light or views

Existing Building: *Upper Gym and Locker Rooms*




• New Bleachers / day lit gym


• Temporary classroom module


• Exposed exterior structure


• Shower area used for st


• Signal pane storefront system


• Gymnasium entry / trophies display

Positive Features:

- Gymnasium floor in good condition
- Most door hardware meets ADA/MAAB
- New bleachers in gym
- New lockers in locker rooms

Facilities Deficiencies:

- Ongoing deferred maintenance
- Hazardous materials
- MEP systems exceed life span
- Thermal bridge at exposed exterior gymnasium structure
- Single pane exterior curtain wall
- Folding partition is inoperable

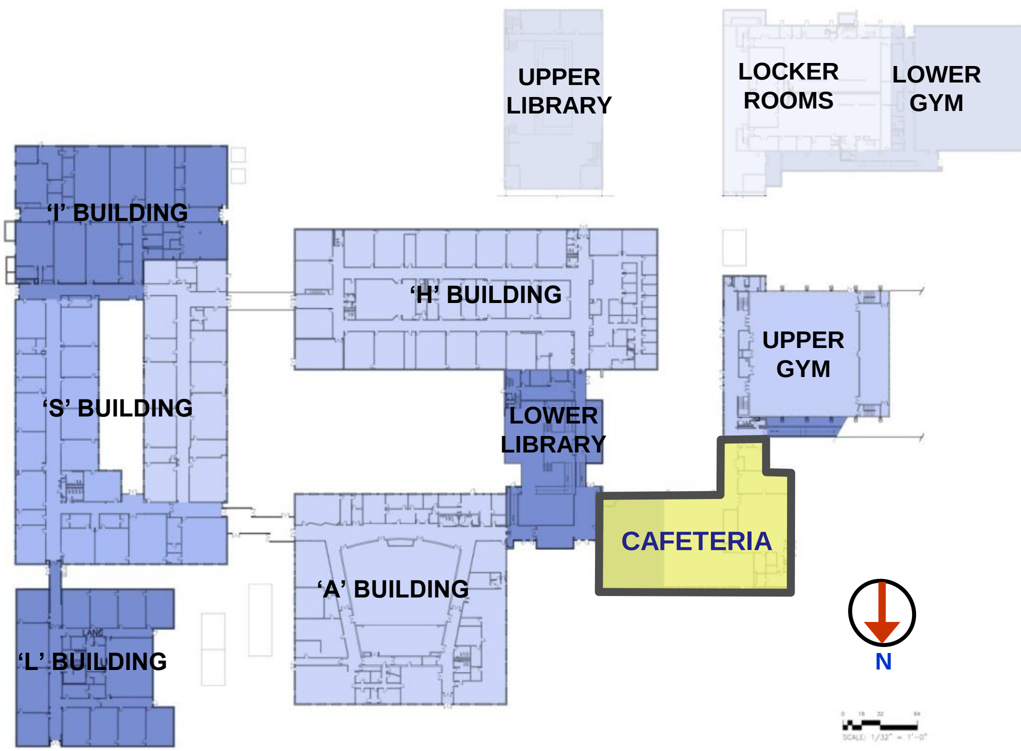
Code Deficiencies:

- Structural lateral, seismic and snow loads
- Inaccessible door clearances, weight room and P.E. offices
- Non-code compliant stairs
- No sprinklers in public areas

Educational Deficiencies:

- No coed spaces for P.E. teachers to meet with students
- Health classroom in trailer
- Lack of team meeting space
- Current space does not meet athletic program requirements

Existing Building: *Cafeteria*



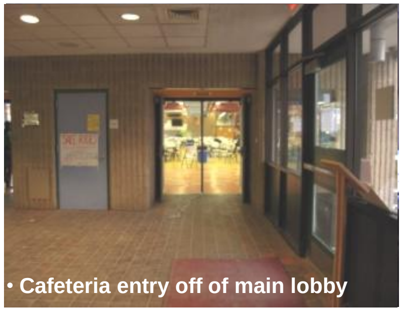
• Signal pane storefront system

• Recycling area at drop-off loop

• Plywood panel infill

• Loading area

• Transition at reno. And original wall



• Cafeteria entry off of main lobby

Positive Features:

- Masonry walls in relatively good condition on renovated part of cafeteria
- Door hardware meets ADA/MAAB

Facilities Deficiencies:

- Ongoing deferred maintenance
- Kitchen hoods outdated / not code compliant
- 2 out of 3 walk-ins are old and out dated
- Dishwasher does not function
- Half of the exterior walls have no vapor barrier
- Half of the exterior walls are single pane curtain wall
- Beams not thermally broken at new roof/wall interface

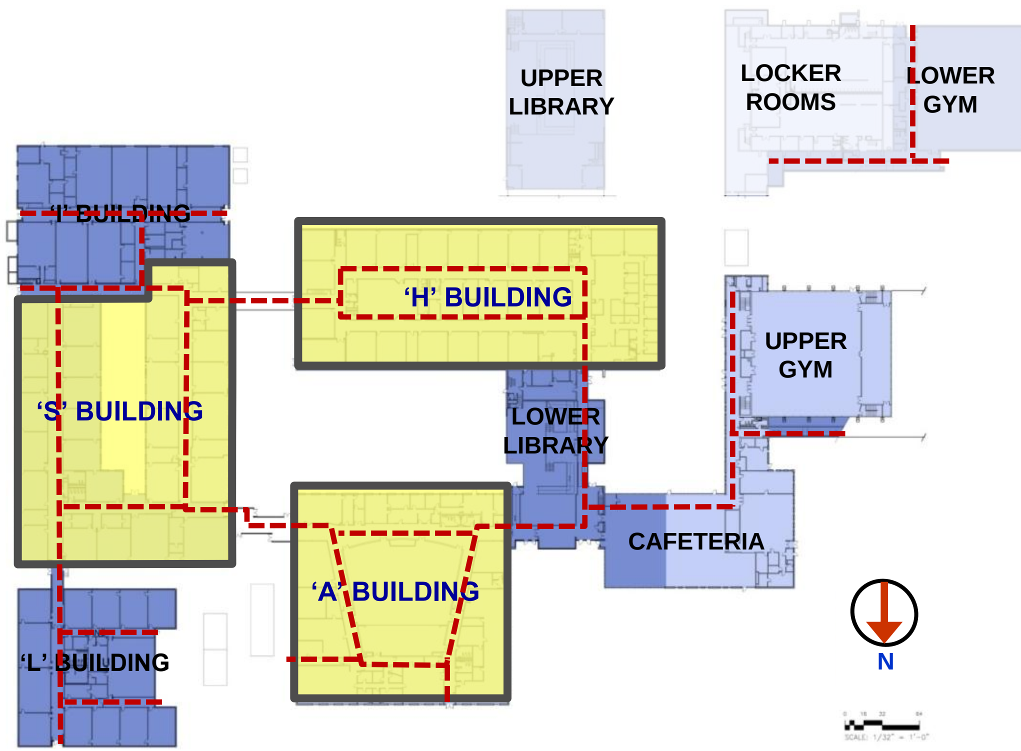
Code Deficiencies:

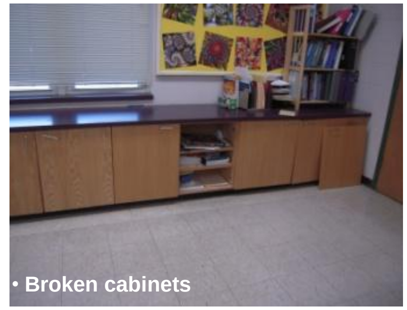
- Structural lateral, seismic and snow loads
- Inaccessible kitchen toilet room (two are required per code)
- Not enough hand washing sinks
- Serving equipment does not meet Board of Health regulations

Space Deficiencies:

- Inadequate and congested serving area (low participation)
- Dumpster and recycling area

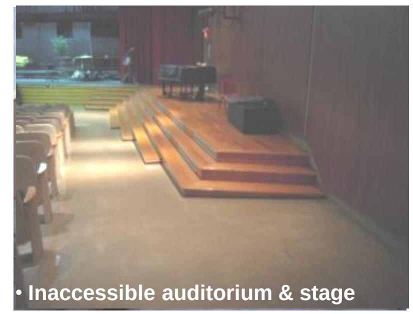
Existing Building: *A, H, and S*



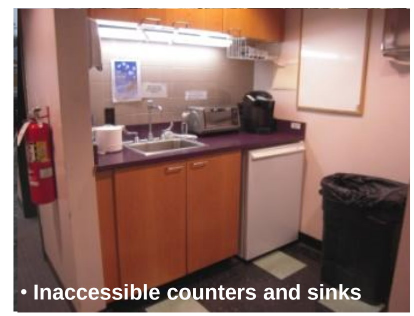

• Broken cabinets


• Outdated and inaccessible labs


• Broken and inaccessible fixtures


• Inaccessible auditorium & stage


• Cluttered corridors


• Inaccessible counters and sinks

Positive Features:

- Structure is satisfactory
- Masonry walls relatively good
- 1" insulated windows/thermally broken frames
- Door hardware meets ADA/MAAB

Facilities Deficiencies:

- Ongoing deferred maintenance
- Hazardous materials
- MEP systems exceed life span
- Tunnels are difficult to access
- Broken underground piping
- Ponding on PVC roof
- Roof beams not thermally broken

Code Deficiencies:

- Structural lateral, seismic and snow loads
- Inaccessible door clearances, ramps, toilets, labs and stage
- Partial sprinkler system in bldg. H and mech. rooms
- Non compliant emergency showers

Educational Deficiencies:

- Science labs are outdated
- Classrooms do not support interdisciplinary education
- Lack of presentation space
- Building is sprawling

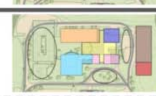
5 Development and Evaluation of Alternatives

- Alternative Options
- Evaluation Factors, Matrices and Ranking
- Estimated Conceptual Project Costs

5 Development and Evaluation of Alternatives

Using a series of assumptions, OMR developed nine different alternative schemes focused on Basic Repair, Major Renovation/ Minor Addition, Major Renovation/ Major Addition, Minor Renovation/ Major Addition, All New Phased Building, and an All New Building. The agreed upon assumptions were:

- These are *Approaches* not Designs
- Each is working towards optimizing the following:
  - Value (Fiscal, Physical, and Natural Resources)
  - Phasing (Time, Feasibility, Ease, and Safety)
  - Program (21st Century Learning and Appropriate Adjacencies)
  - Integration (Site and Building Relationships)
  - Sustainability (Solar Orientation, Compactness, Efficiency, and Reuse)
- Mix and Match
- Find the Right Balance
- Evolving Process
- All approaches meet program net/gross square footage

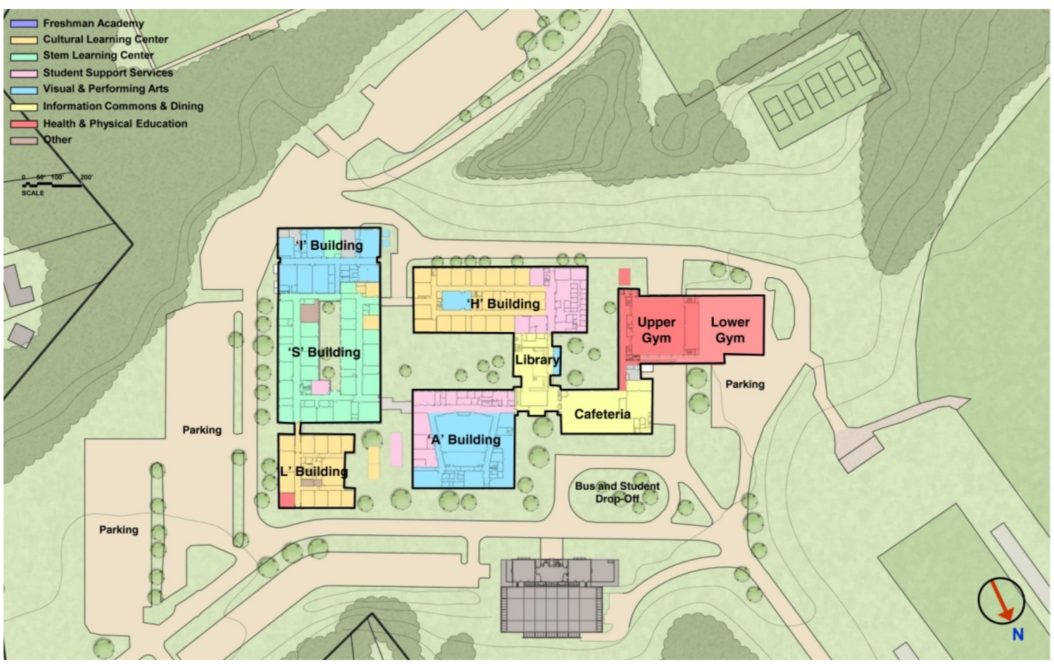
		Value	Phasing	Organization	Program	Integration	Sustainability	
	Just Repair (0.6)							
A	Major Renovation Minor Addition	1	1	1	1	1	1	
B	Major Renovation Major Addition	2	2	3	2	2	2	
C	Major Renovation Major Addition	3	2	4	3	3	3	
D	Minor Renovation Major Addition	4	3	4	4	4	4	
E	Minor Renovation Major Addition	3	3	3	3	3	3	
F	Minor Renovation Major Addition	4	4	5	4	4	5	
G	All New Phased	4	4	5	5	4	5	
	All New (1.0)							

The all new scheme was compared against SMMA's new scheme in their 2005 Feasibility Study and all costs were escalated to today's dollars. The other eight alternative approaches were presented as shown below.

Option: Basic Repair of Existing Building

The basic repair approach would keep the current layout of the school the same. New MEP systems would be installed and the building envelope would need to be replaced on many of the existing structures. There would be minor changes made to the interiors but accessibility issues would need to be addressed. A stand alone athletic center could be added to the site to fulfill the athletic program and community needs.

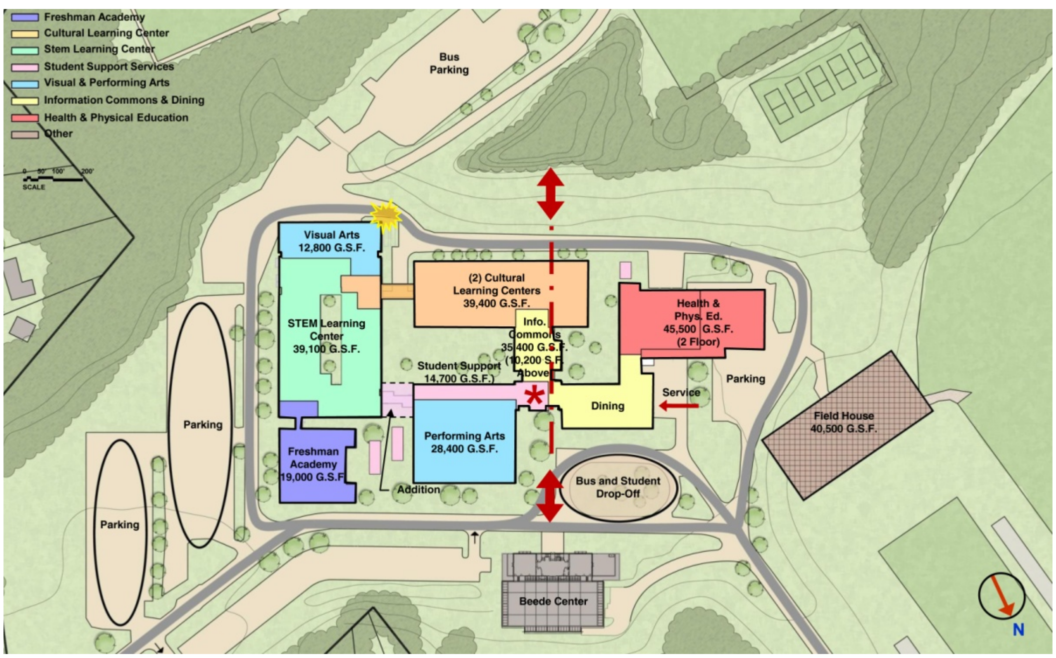
+/- Economical approach (but not a long term solution)
- Does not promote 21st century learning
- Building will feel the same
- Sprawling building issues would not be resolved
- Will not meet current programmatic needs
- Building security will remain an issue
- Building envelope will need to be repaired and/or replaced



<u>Option A: Full Renovation, Minor addition</u>
1 Story, North Entry

The full renovation approach rearranges the current spaces within the existing school. This option would require major renovations of the interiors to design a space for 21st century learning. A small addition would need to be added to the building to provide all of the required space in the proposed program. New MEP systems would be installed and the building envelope would need to be replaced in many locations. A stand alone athletic center would also be added to the site to fulfill the athletic program and community needs.

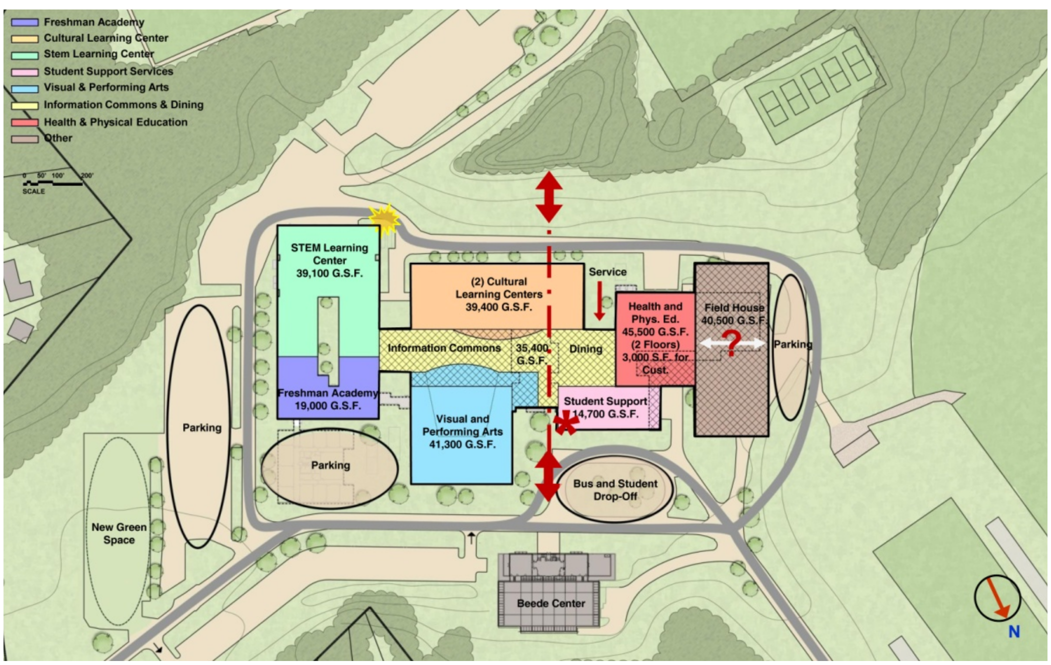
- + Economical approach
- + Encouraged by MSBA
- +/- Maintains all of the existing building
- \- Sprawling building issues would not be resolved
- \- Limited flexibility within existing structure
- \- Educational clusters would be compromised between buildings
- \- Classrooms in “I”, “S” and “L” building are poorly oriented
- \- Building envelope will need to be repaired and/or replaced



<u>Option B: Full Renovation/ Major Additions</u>
Remove “L” Building, Library and Lower Gymnasium
1 story, North Entry, Infill Courtyard

Option B is a full renovation and major addition approach that creates better connections between the existing buildings. The existing two story library is removed and the courtyard is infilled with a new one story space. The “L” building is demolished and the lower gym is replaced by a new athletic center. The STEM program expands into the “I” building and all of the arts are located together in building “A”. The information commons and dining will fill the center of the building and connect the core academics with the arts and student support. This option would require major renovations of the existing building to provide a more flexible space for 21st century learning. New MEP systems would be installed and the existing building envelope would need to be repaired and/or replaced.

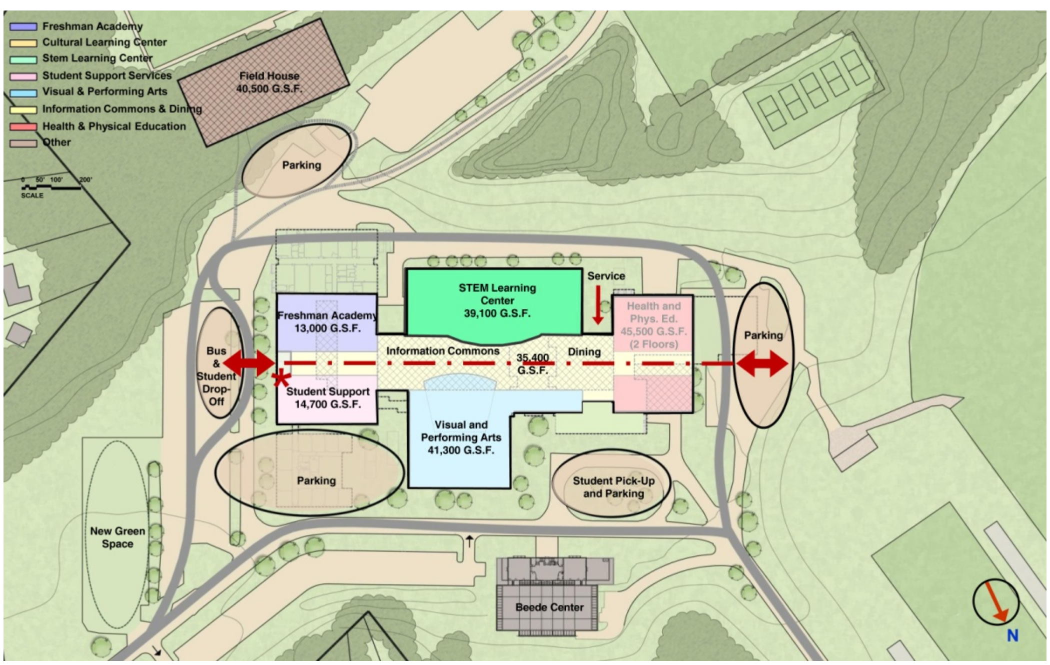
- \+ Economical approach
- \+ Better connections between the buildings
- \+ Moves administration to main entry of the building
- +/- Maintains a majority of the existing building
- \- Limited flexibility within existing structure
- \- Building envelope will need to be repaired and/or replaced
- \- Classrooms in “S” building are poorly oriented



<u>Option C: Full Renovation/ Major Additions</u>
Remove “I” and “L” Buildings, Cafeteria, Library and Lower Gymnasium
2 Story, East entry, Infill Courtyards

Option C is a full renovation and major addition approach that begins to minimize the sprawling nature of the existing school and reduces the overall building footprint. The existing two story library is removed and the courtyards are infilled with a one story information commons and dining area. The Cafeteria, “L” and “I” buildings are demolished and the lower gym is removed and replaced with a stand-alone athletic center. A second story is added above building “H” for STEM, and the new entry is located on the east side of building “S”. The information commons fills the center of the building connecting the core academics with the arts and student support. This option would require major renovations of the existing building to provide a more flexible space for 21st century learning. New MEP systems would be installed and the existing building envelope would need to be repaired or replaced.

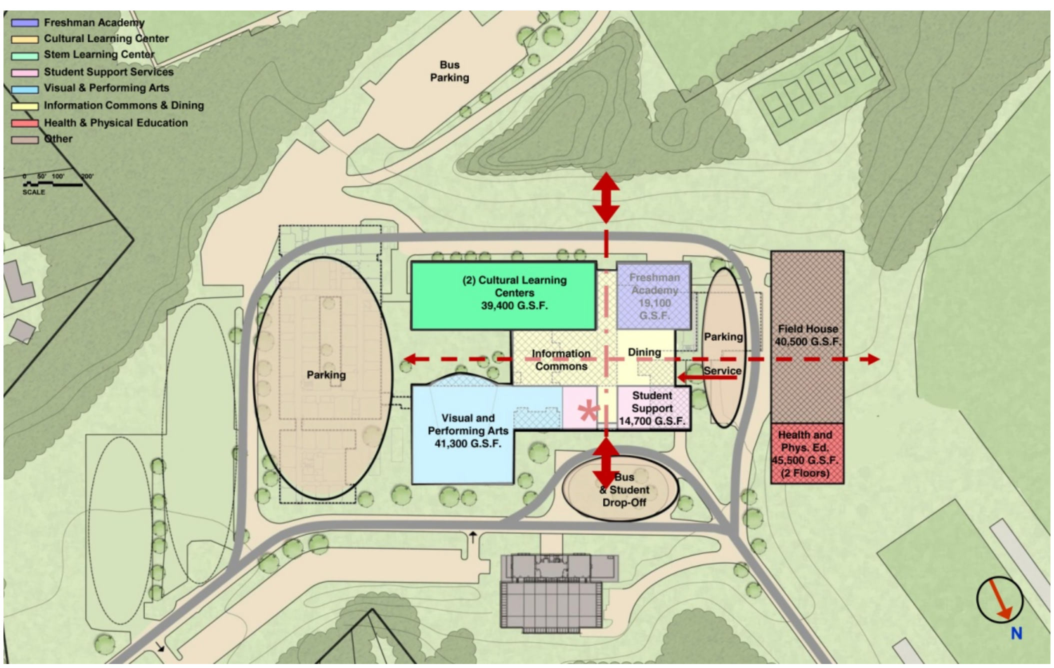
+	Building is more compact
+	Moves administration to main entry of the building (on east side)
+	Two story academic wing has southern orientation
+	Moves service to the back of the school
+/-	Maintains buildings “S”, “A”, “H” and the upper gym
+/-	Builds over “H” Building
-	Limited flexibility within existing structure
-	Building envelope will need to be repaired and/or replaced



<u>Option D: Major Additions/ Minor Renovation</u>
Retain “A” and “H” Buildings and Cafeteria
2 Story, Cross Axis, Partial Infill Courtyards

Option D is a major addition and minor renovation approach that minimizes the sprawling nature of the existing school and reduces the overall building footprint. The existing two story library is removed and replaced with a new one story information commons and dining area. “S”, “L” and “I” buildings are demolished and the lower gym is removed and replaced with a stand-alone athletic center and performance gym. A second story is added above building “H” for STEM. The existing upper gym is removed and a new academic wing is constructed in this location. The information commons is central and has views out to the east. New MEP systems would be installed and the existing building envelope would need to be replaced and/or repaired

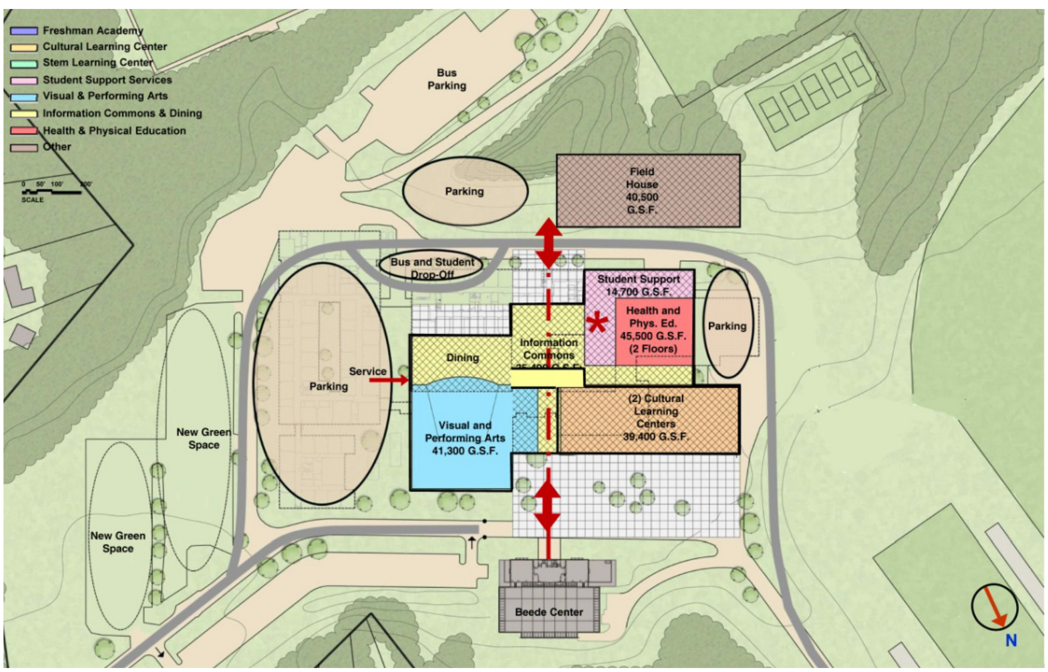
+	Building is more compact
+	Moves administration to main entry of the building
+	Two story academic wing has southern orientation
+	Provides more green space
+/-	Maintains buildings “A”, “H” and the cafeteria
+/-	Builds over “H” Building
-	Limited flexibility within existing structure
-	Building envelope will need to be repaired and/or replaced



<u>Option E: Major Additions/ Minor Renovation</u>
Retain “A” and Upper Gymnasium
2 Story, South Entry, Beede Center Plaza

Option E is a major addition and minor renovation approach which only retains the upper gym and building “A”. The existing two story library is removed and replaced with a new information commons. “H”, “S”, “L” and “I” buildings are demolished and the lower gym is removed and replaced with a stand-alone athletic center. A new two story academic wing is built in place of the existing cafeteria. The main entry is relocated to the south side of the building and a new addition for student support is added around the existing gym. A new dining area is added to the south side of building “A”. The dining and information commons have views out to the south.

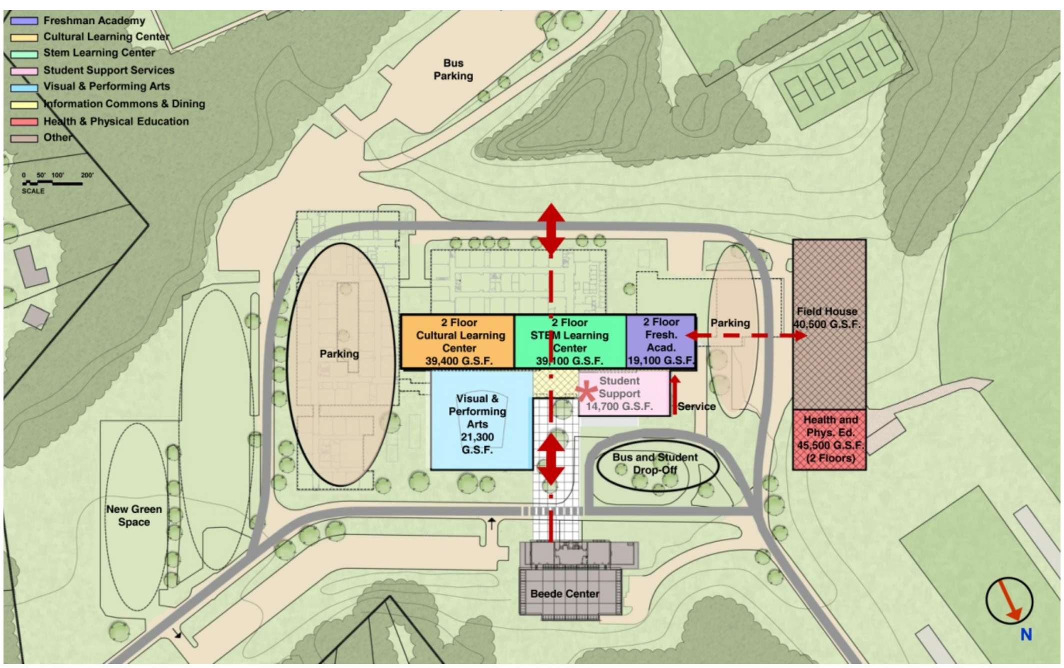
+	Building is compact
+	Moves administration to main entry of the building
+	Provides more green space
+/-	Retains only two existing buildings
-	Two story academic wing has north orientation
-	Service is adjacent to auditorium entry



<u>Option F: Major Additions/ Minor Renovation</u>
Retain “A” and Cafeteria
3 Story, North Entry

Option F is a major addition and minor renovation approach which only retains the cafeteria and building “A”. The two story library is removed and a new three story academic wing with dining and information commons is constructed in the courtyards between buildings “H”, “A” and the cafeteria. The academics spaces are on the second and third story. The existing gyms are removed and replaced with a stand-alone athletic center and performance gym. Buildings “H”, “L”, “S”, and “I” are removed and turned into green space or new parking.

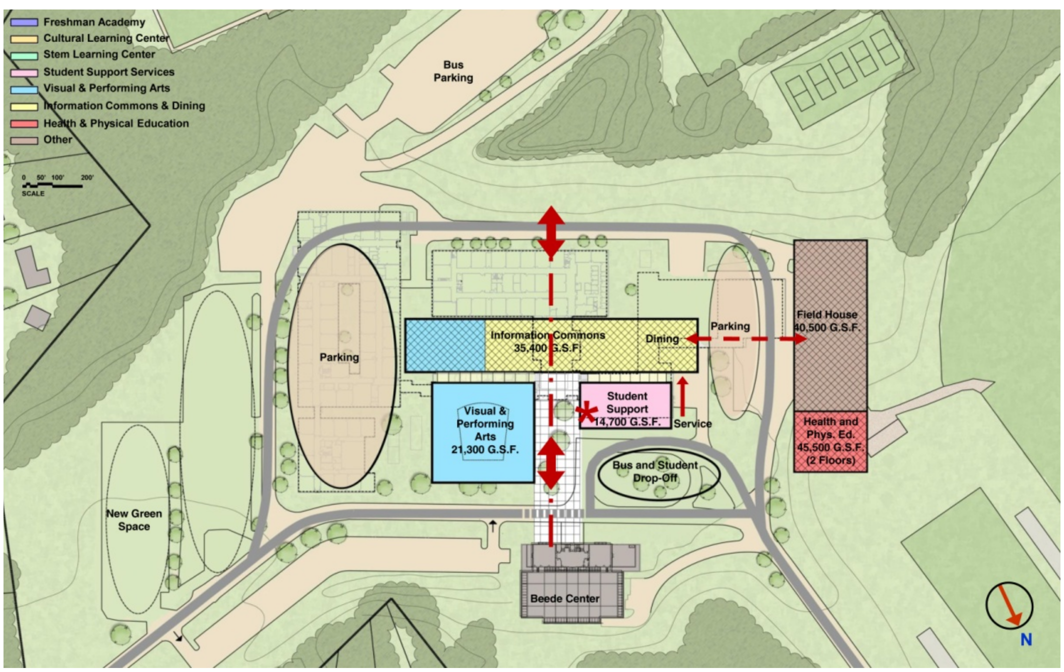
- \+ Building is compact
- \+ Moves administration to main entry of the building
- \+ Provides more green space on south and east side
- \+ Academic, dining, and Info commons have exterior views and south orientation
- +/- Retains only two existing buildings
- \- Service is in the front of the building



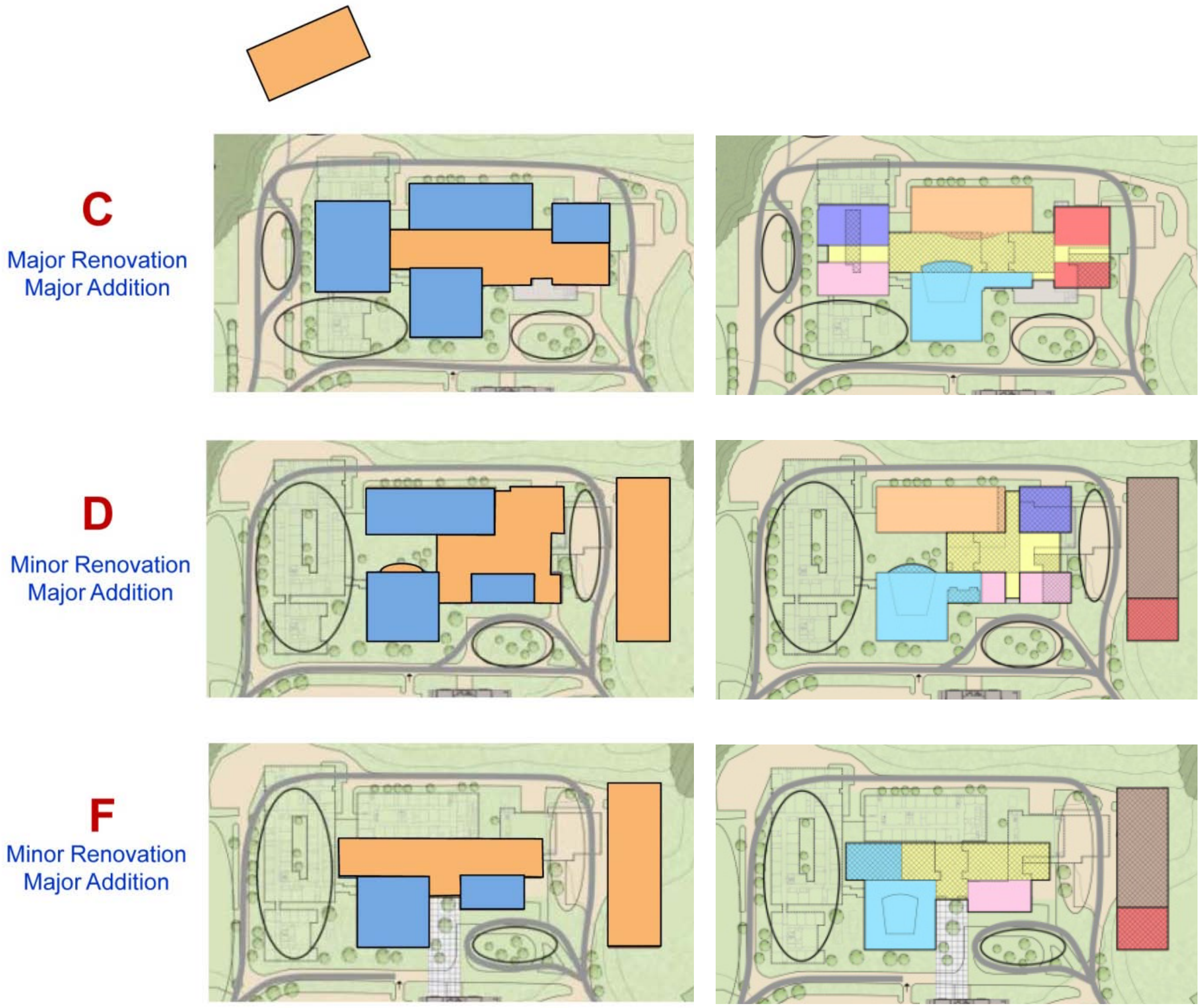
Option G: Phased New Building
3 Story, North Entry

Option G is a phased new building approach, similar to option F, but builds a new Arts building and student support wing. The two story library is removed and a new three story academic wing with dining and information commons is constructed in the courtyards between buildings "H", "A" and the cafeteria. The academic spaces are on the second and third story. The existing gyms are removed and replaced with a stand-alone athletic center and performance gym. Buildings "H", "L", "S", and "I" are removed and turned into green space or new parking.

- \+ Building is compact
- \+ Moves administration to main entry of the building
- \+ Provides more green space on south and east side
- \+ Academic, dining, and Info commons have exterior views and south orientation
- +/- Retains only two existing buildings
- \- Service is in the front of the building



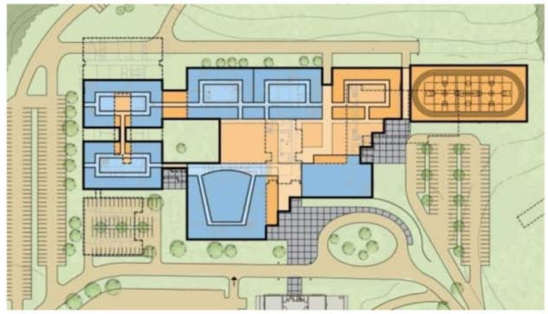
After much evaluation by the Facilities Master Planning Committee, Approaches C, D and F were chosen for further study. The FMPC comments for developing these approaches further are shown below.



- Make main entrance visible
- Look into ways to appropriately integrate entries from the north, south, east and west.
- Link the school both horizontally and vertically, using the information commons to actively and vibrantly link students, teachers and the program.
- Create an interior connection between the field house and the rest of the school.
- Connect to the Beede Center and develop appropriately located paved plaza areas.
- Protect the sledding hill.
- Maximize solar orientation.
- Landscape the parking.

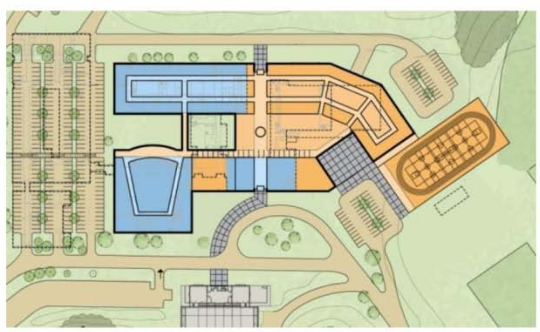
Further detailed design studies were provided on Approach Options C, D and F. They are summarized below.

C (.9)
5 Phases
(5+ years)



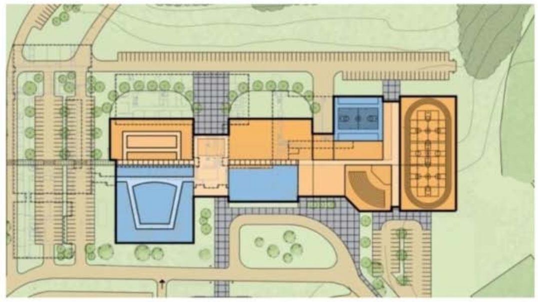
- \+ Meaningfully improves the coherence of the building/school organization
- \+ Good adaptive reuse of cafeteria
- +/- Only 1 of the 5 clusters is in new construction
- +/- The info commons is well located but feels too vast and might cause the overall school to feel too dense
- +/- The entries and axial movement through the building are all along the east west axis.
- +/- Nice to be reusing so much of the old; but the long term value doesn't feel substantive
- +/- Marginally improves the site organization
- +/- Cost is marginally less than new
- \- Doesn't feel like it strikes the right balance
- -/- Phasing is unacceptable

D (.9)
3 Phases
(4 years)



- \+ Significantly improves the coherence of the building/school organization
- \+ Significantly improves the site organization and coherence
- \+ Has appropriate entries and cross axial circulation
- \+ Good adaptive reuse of cafeteria
- \+ The info commons is well located and the school feels less dense
- +/- Phasing feels manageable
- +/- Cost is marginally less than new
- +/- 3 of 5 clusters in new construction
- \- Part of new clusters have poor orientation.

F (.9)
3 Phases
(4 years)



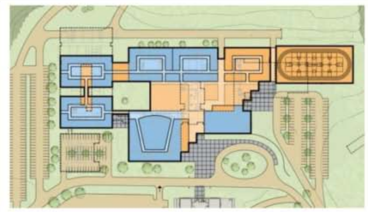
- \+ Significantly improves the coherence of the building/school organization
- \+ Significantly improves the coherence and organization of the site
- \+ Close to ideal entries and cross axial circulation
- \+ Opens up the south side of the site
- \+ Potential to be most compact and efficient
- \+ All new classrooms, new theater and new field house feels like the right balance
- \+ No new or infilled courtyards
- \+ Good adaptive reuse of "a" building, the cafe and the lower gym (though the height is a bit low)
- \+ Clusters have the potential to be more linear and less dense.
- +/- Phasing feels manageable
- +/- Cost is marginally less than new
- +/- 2 or 3 story potential

The following concepts were analyzed and optimized in the course of the design, each providing for noticeable improvement over the current facility's features.

- Safety and security
- Educational objectives
- Reduction in sprawling facility
- Energy efficiency
- Indoor air quality
- Faculty communication
- Green construction potential
- Student connections
- Community access
- Ease of phasing

Attached herein are the detailed design studies for each of the Approach Options C, D and F which are shown in the Summary above. Information on the slides includes gross square footage, exterior building entries, all floor levels, a massing study, comparative cost ratios, and potential phasing analysis.

A comparison matrix was developed for the Committee to compare solutions.

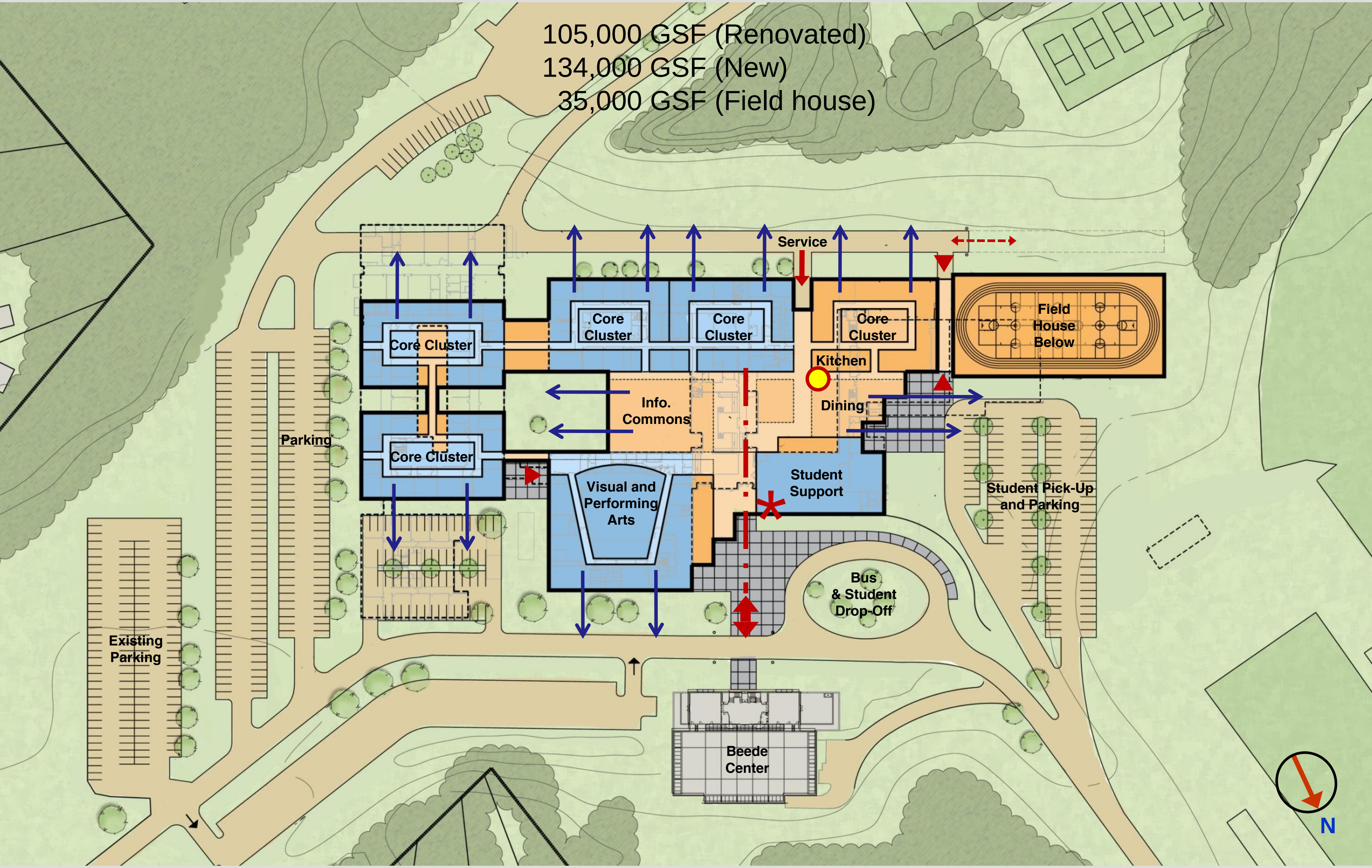
Costs Ratio	# of Phases (Years of Cons		Value	Phasing	Organization	Program	Integration	Sustainability	Transformatio	Operational Cost / Mainten	"Sellability"	
.9	5 (5+)	**C** Major Renovation Major Addition	3	1	4	3	3	4	3	3		
.9	3 (4)	**D** Minor Renovation Major Addition	4	3	4	4	4	4	4	3		
.9	3 (4)	**F** Minor Renovation Major Addition	5	3	4	5	5	4	5	4		

After review of the existing conditions reports balanced with discussions related to future energy efficiency needs for the facility, and the educational and community programmatic space needs balanced with discussions related to 21st century teaching and learning, the FMPC voted to move ahead with the F Option with the following comments:

- Optimize value: balance the costs of building new and renovating
- Optimize use of the site
- Provide more openness and exposure to the south
- Consider the implications of the sledding hill
- Make sure a three story building feels comfortable on the site
- Improve building orientation and incorporate sustainable design strategies
- Make the facility as resource and energy efficient as possible
- Theater and field house should be anchors
- Reduce the number of construction phases to lessen disruption to the school and to minimize cost
- Demonstrate phasing flexibility with or without MSBA participation
- Engage MSBA in partnership

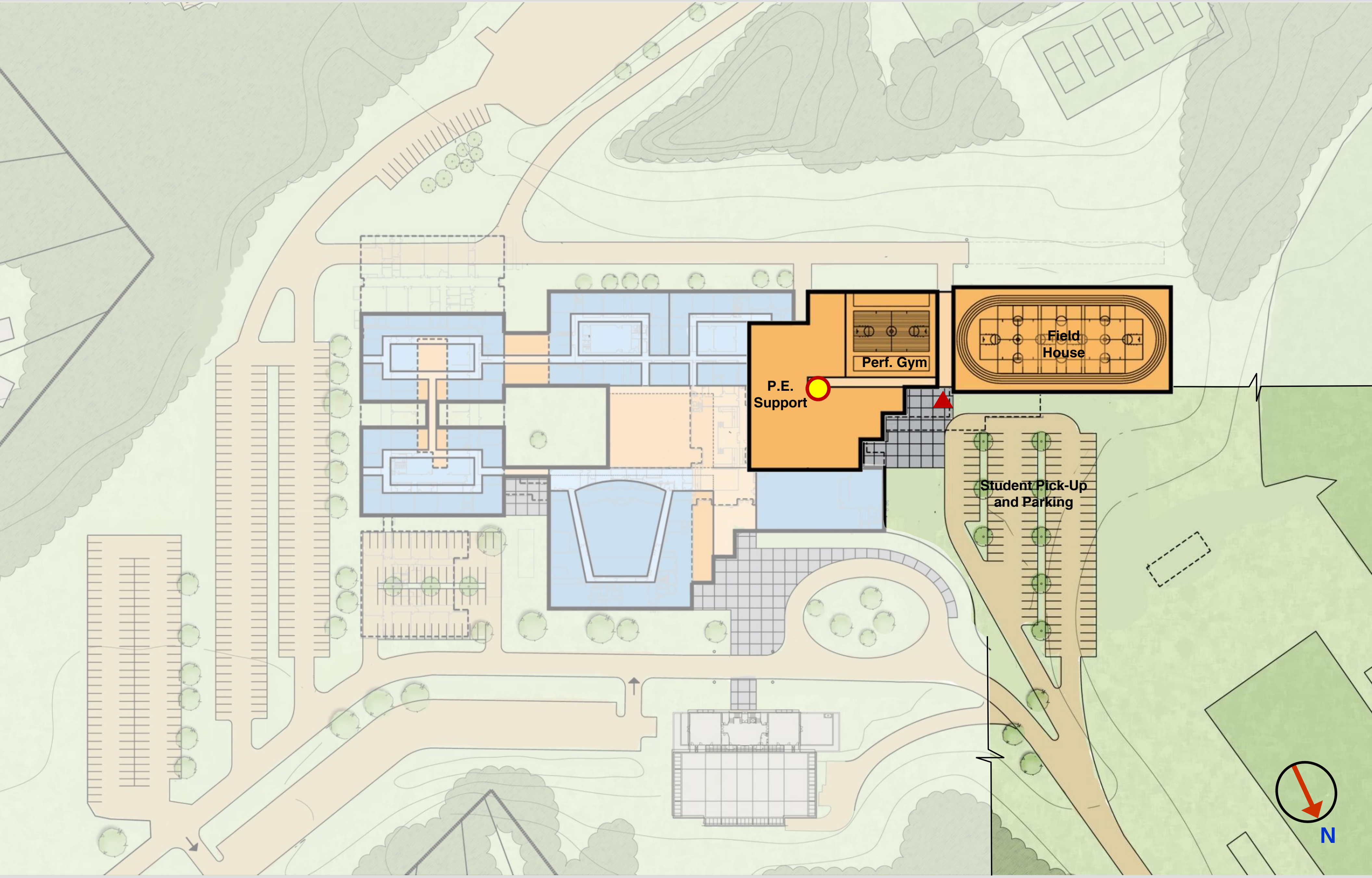
Approach C : Full Renovation/Major Additions

Keeps Building 'A' , 'H', 'S' and Cafeteria - Main Level



Approach C : Full Renovation/Major Additions

Keeps Building 'A' , 'H', 'S' and Cafeteria - Lower Level (-14)

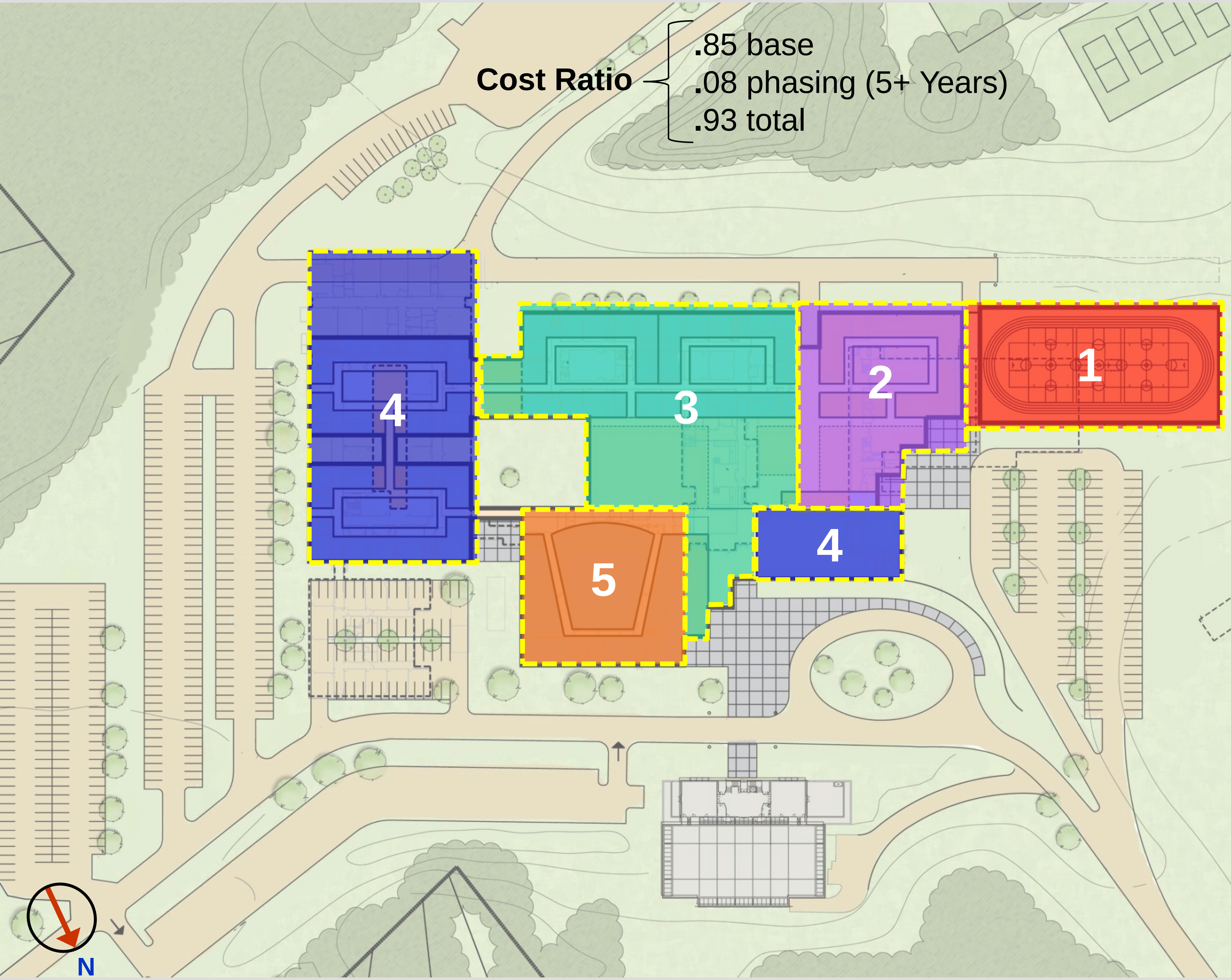


Approach C : Full Renovation/Major Additions

Keeps Building 'A' , 'H', 'S' and Cafeteria

Approach C : Full Renovation/Major Additions

5 Phases



Phase 1:
Demo lower gym
Construct field house

Phase 2:
Move athletics to field house

Demo perf. gym & lockers

Construct new cluster & perf. gym
Construct new dining infill

Phase 3:
Move library to cafe.
Move 'H' classrooms to new cluster and perf. gym (temp.)

Demo library building

Construct info. commons
Renovate 'H' building

Phase 4:
Move library into info. commons
Move 'S' classrooms into renovated 'H' (STEM)

Demo 'I' building

Renovate 'S' building and cafeteria for student support

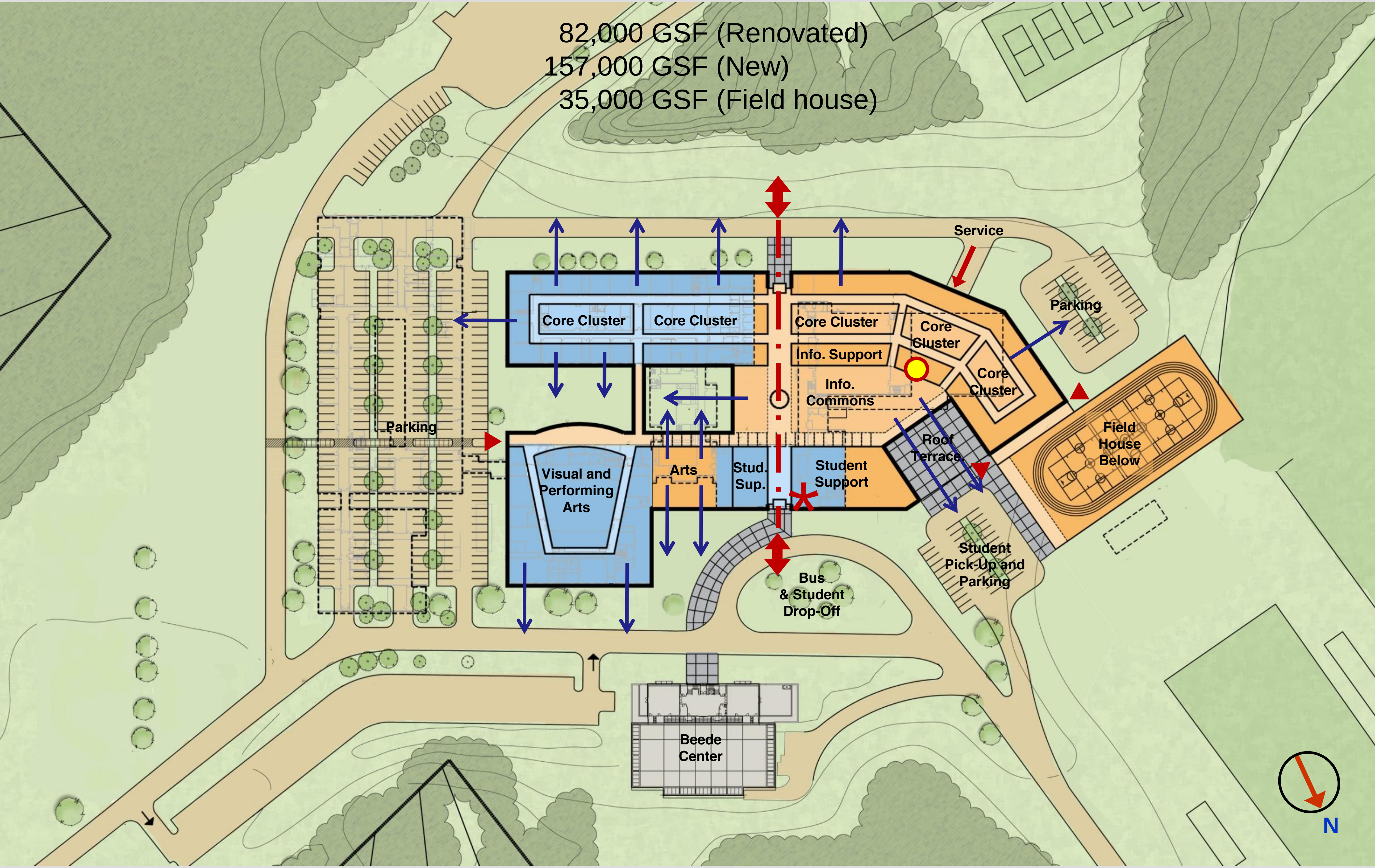
Phase 5:
Move 'L' and temp. cluster in perf. Gym to 'S' building
Move admin to student support
Move perf. / visual arts to 'L' building and move Auditorium to perf. Gym

Demo 'L' building after 'A' building is complete

Renovate 'A' building

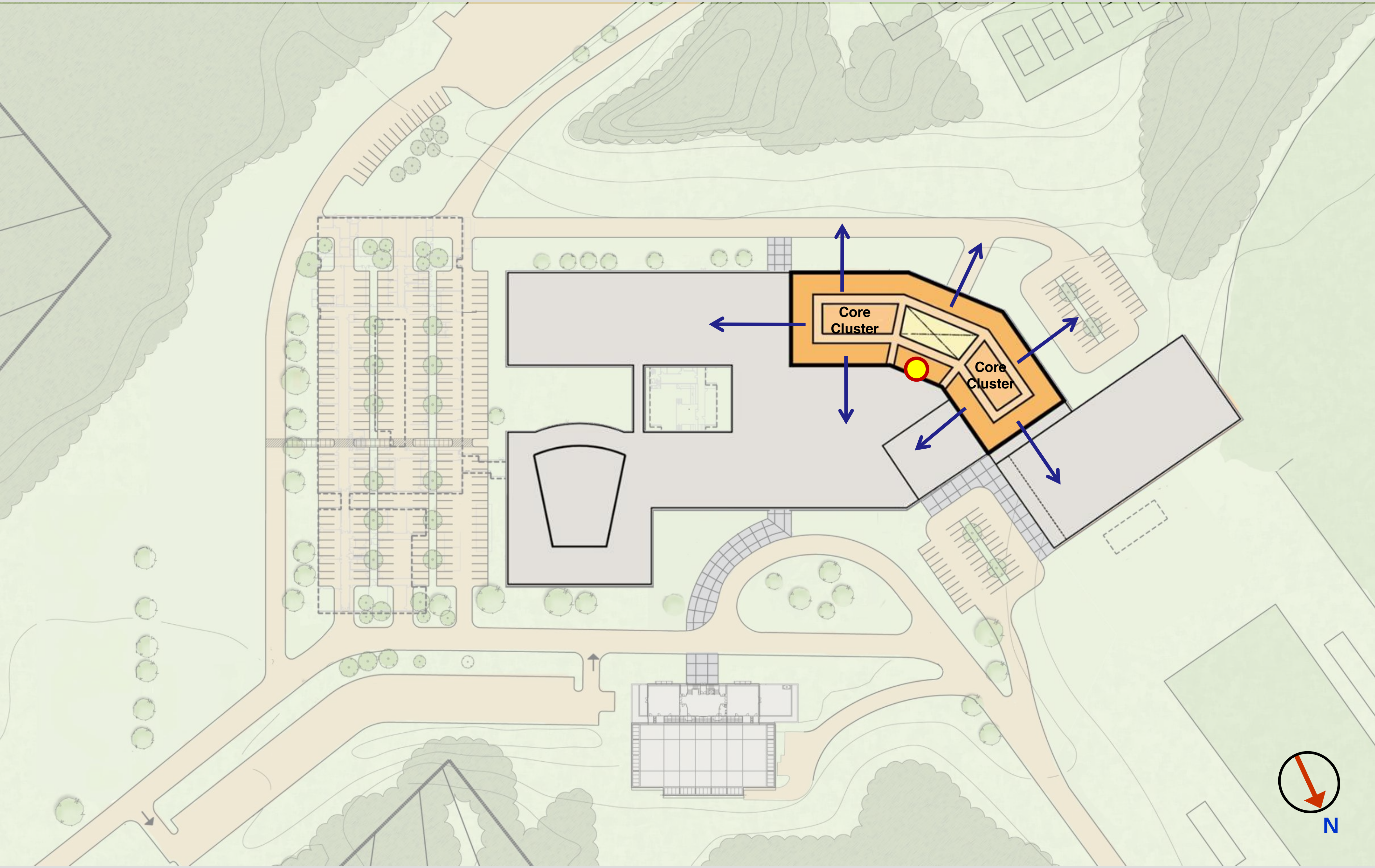
Approach D : Full Renovation/Major Additions

Keeps Building 'A' , 'H', and Cafeteria - Main Level



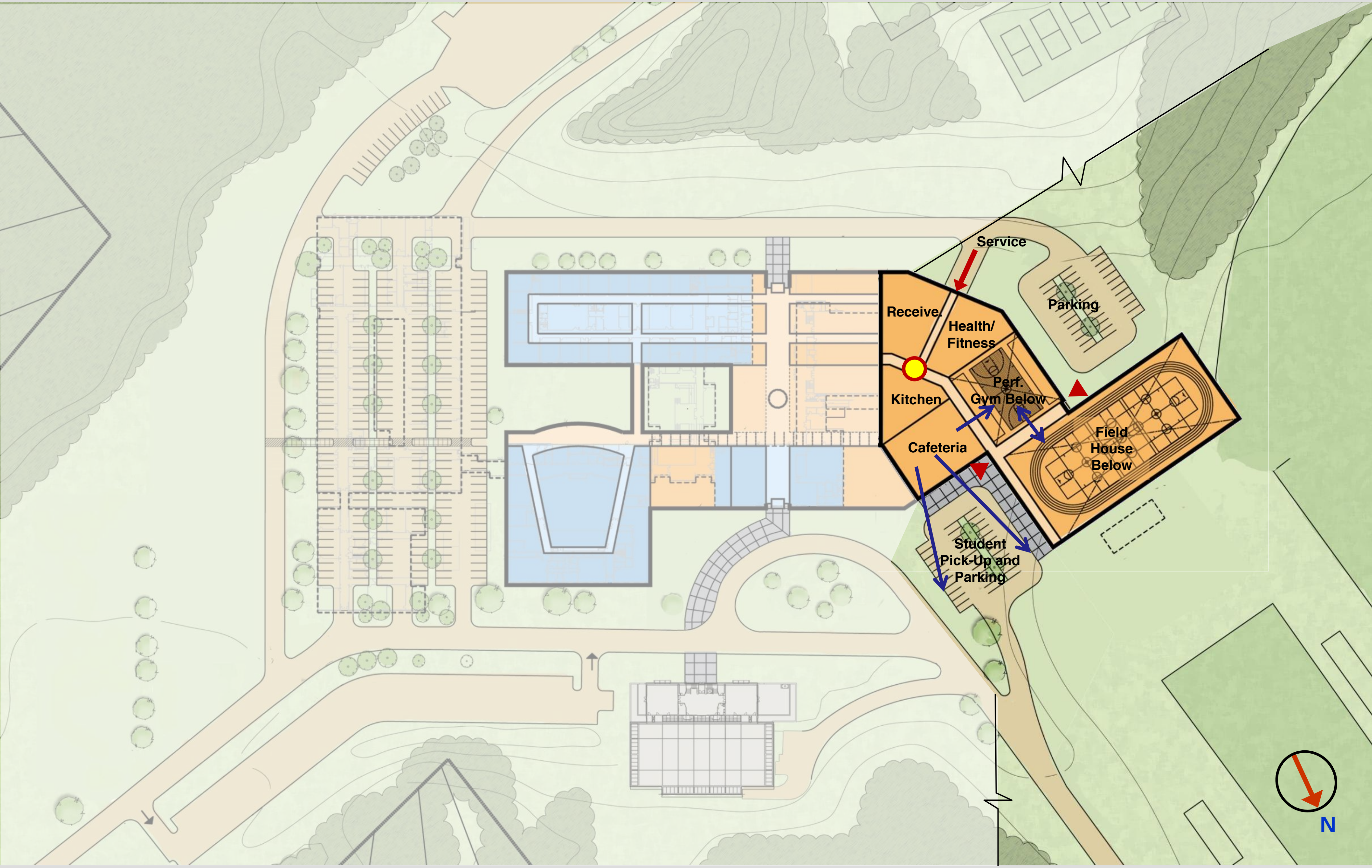
Approach D : Full Renovation/Major Additions

Keeps Building 'A' , 'H', and Cafeteria - Upper Level (+14)



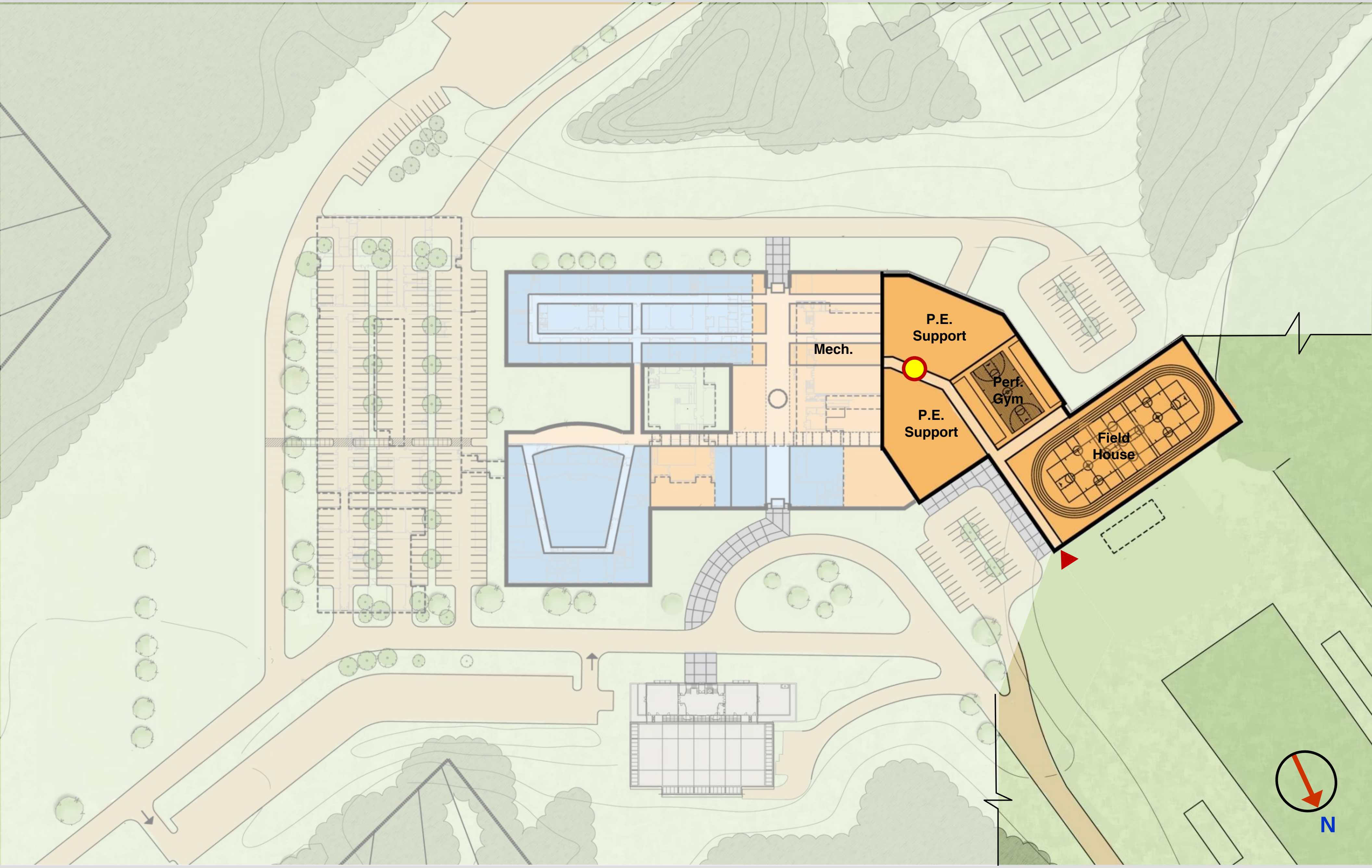
Approach D : Full Renovation/Major Additions

Keeps Building 'A' , 'H', and Cafeteria - Lower Level (-14)



Approach D : Full Renovation/Major Additions

Keeps Building 'A' , 'H', and Cafeteria - Field Level (-30)

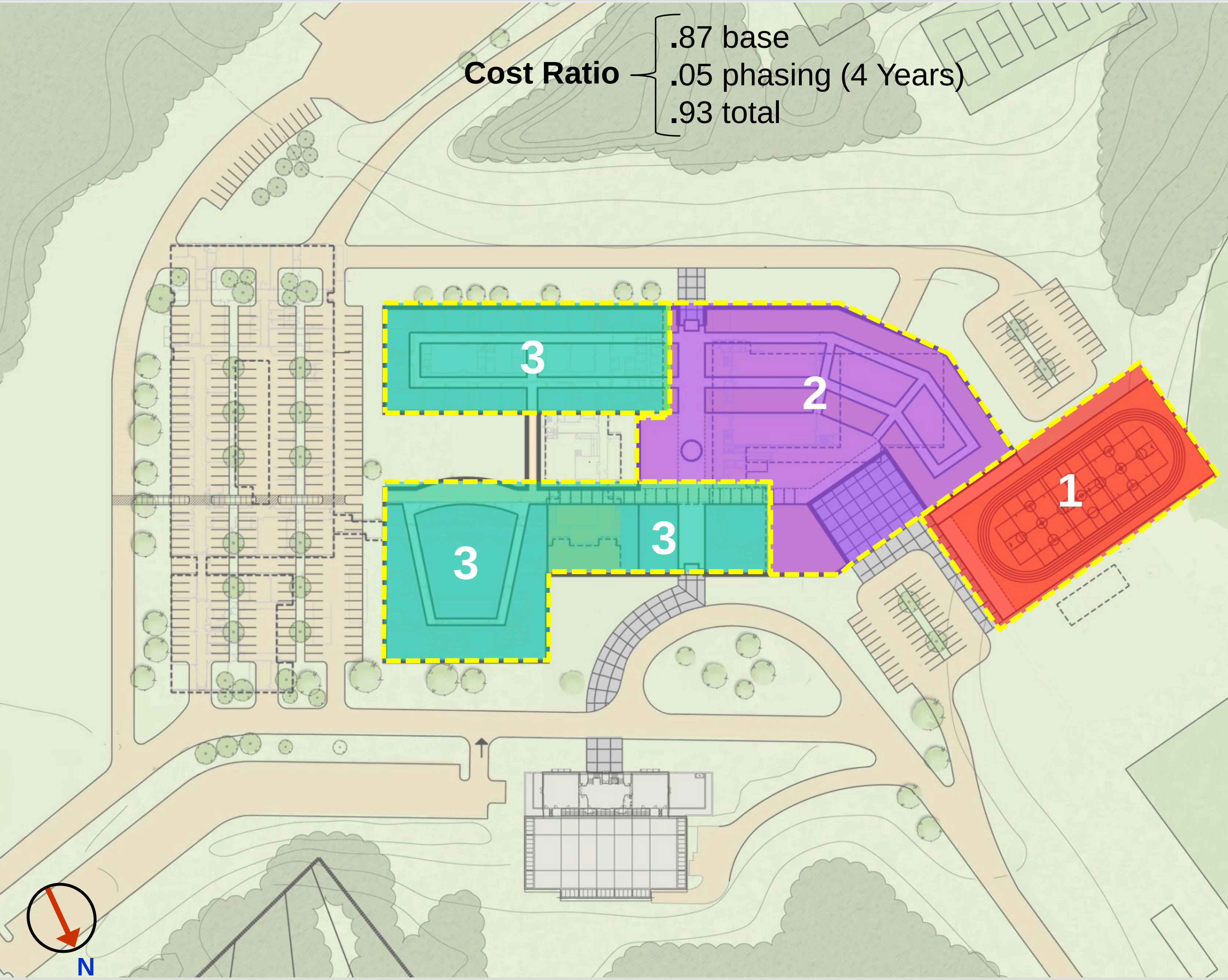


Approach D : Full Renovation/Major Additions

Keeps Building 'A' , 'H', and Cafeteria

Approach D : Full Renovation/Major Additions

3 Phases



Phase 1:
Construct field house

Phase 2:
Move athletics into field house
Demo lower gym, perf. gym & lockers

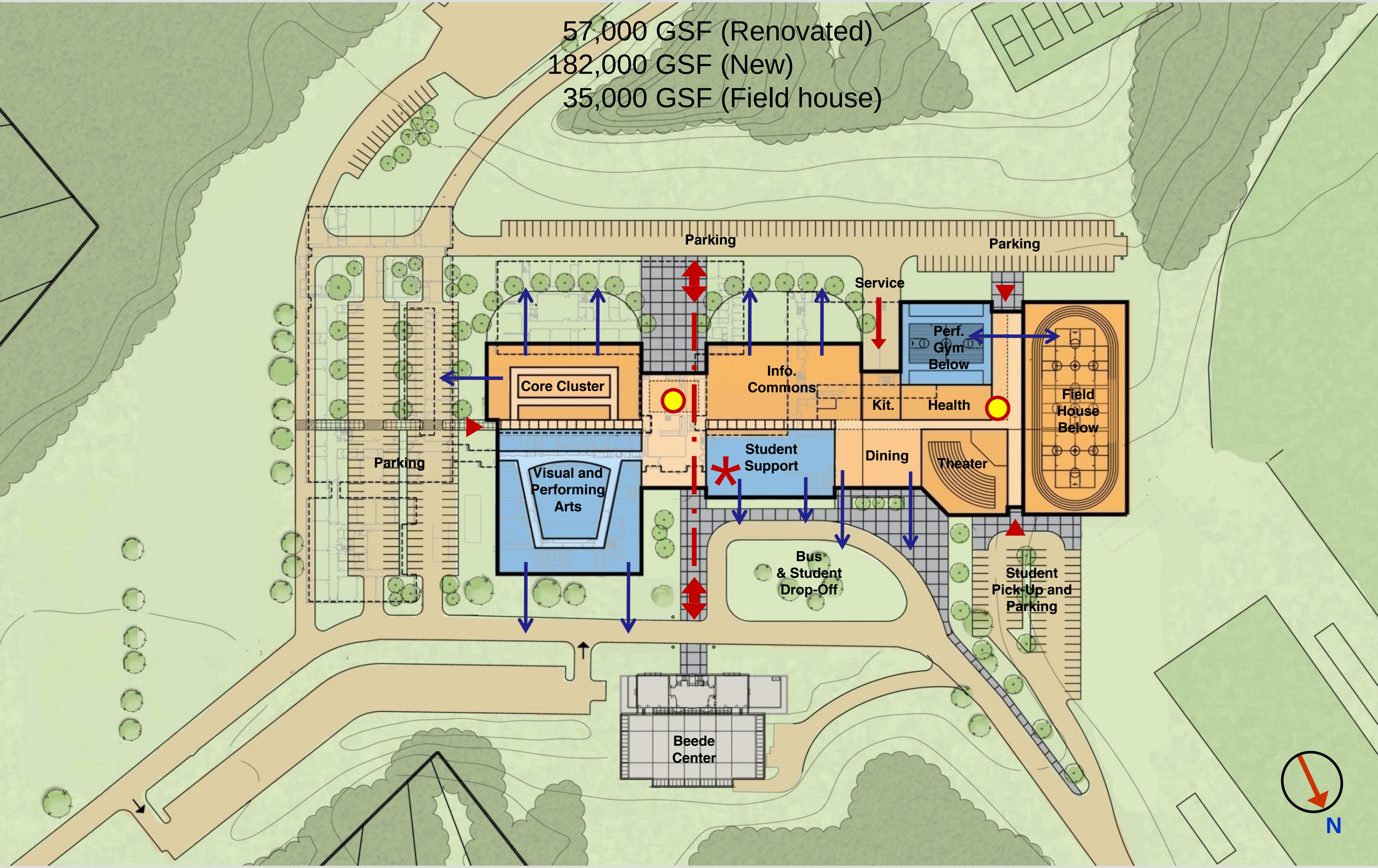
Construct 3 new cluster, info commons, dining, perf. gym and P.E. support

Phase 3:
Move 'H' and 'L" into 3 new clusters, move library and cafeteria into new info commons and dining
Move admin. Into 'L', move perf./visual arts into 'I' and move auditorium into perf. Gym.

Renovate 'A' , 'H' and cafeteria

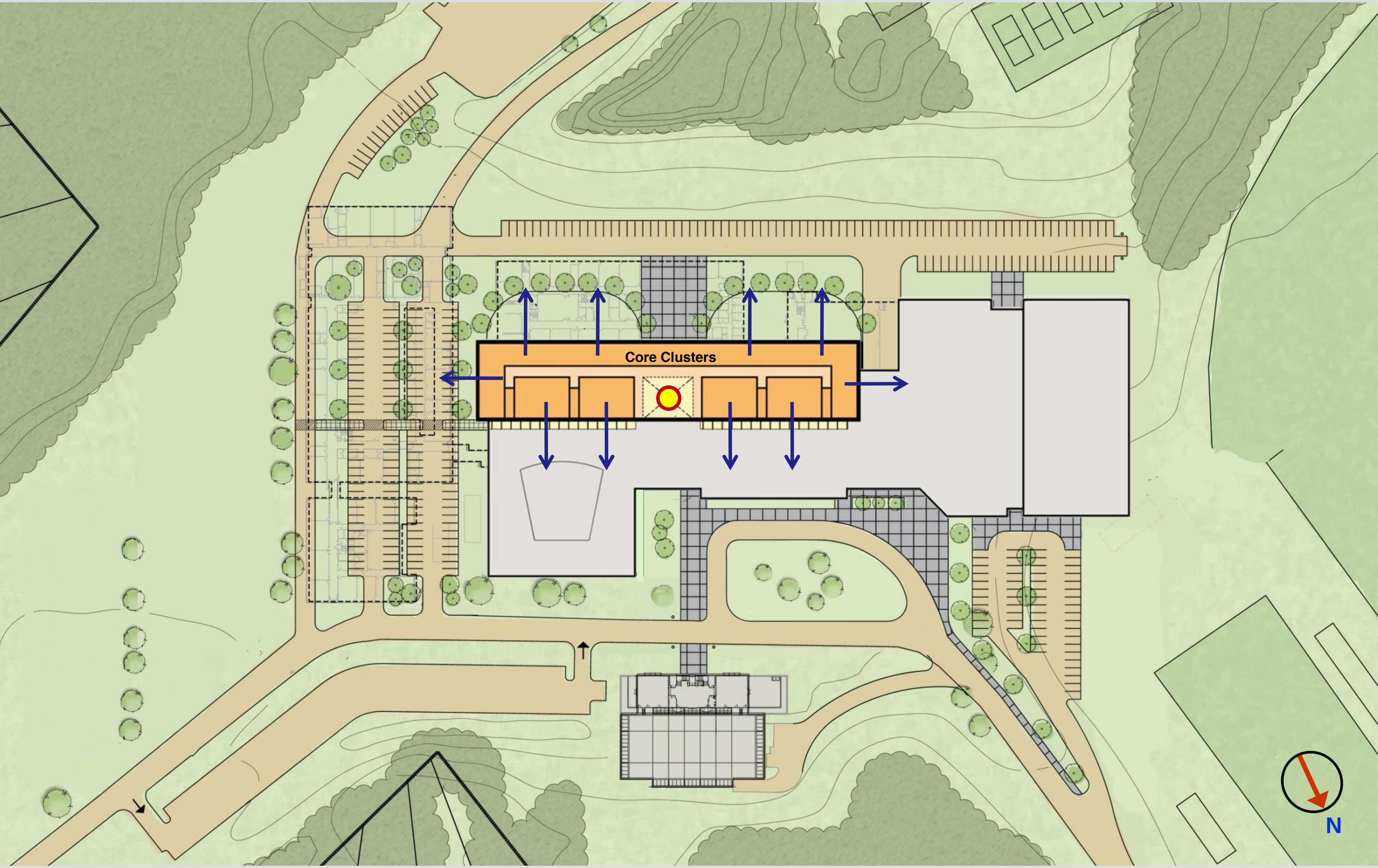
Approach F : Full Renovation/Major Additions

Keeps Building 'A' ,Cafeteria, and Lower Gym - Main Level



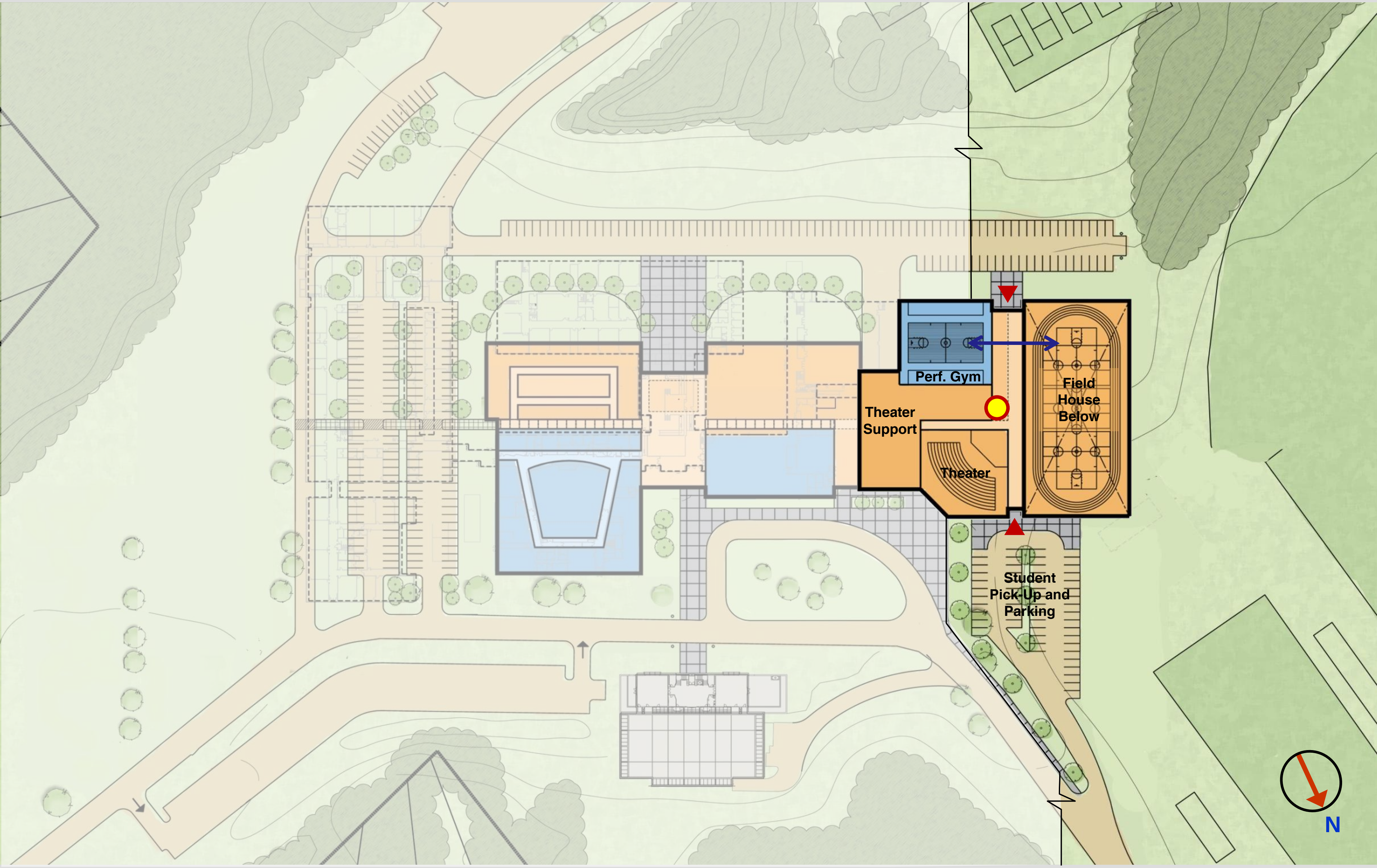
Approach F : Full Renovation/Major Additions

Keeps Building ‘A’ ,Cafeteria, and Lower Gym - Second & Third Level (+14, +28)



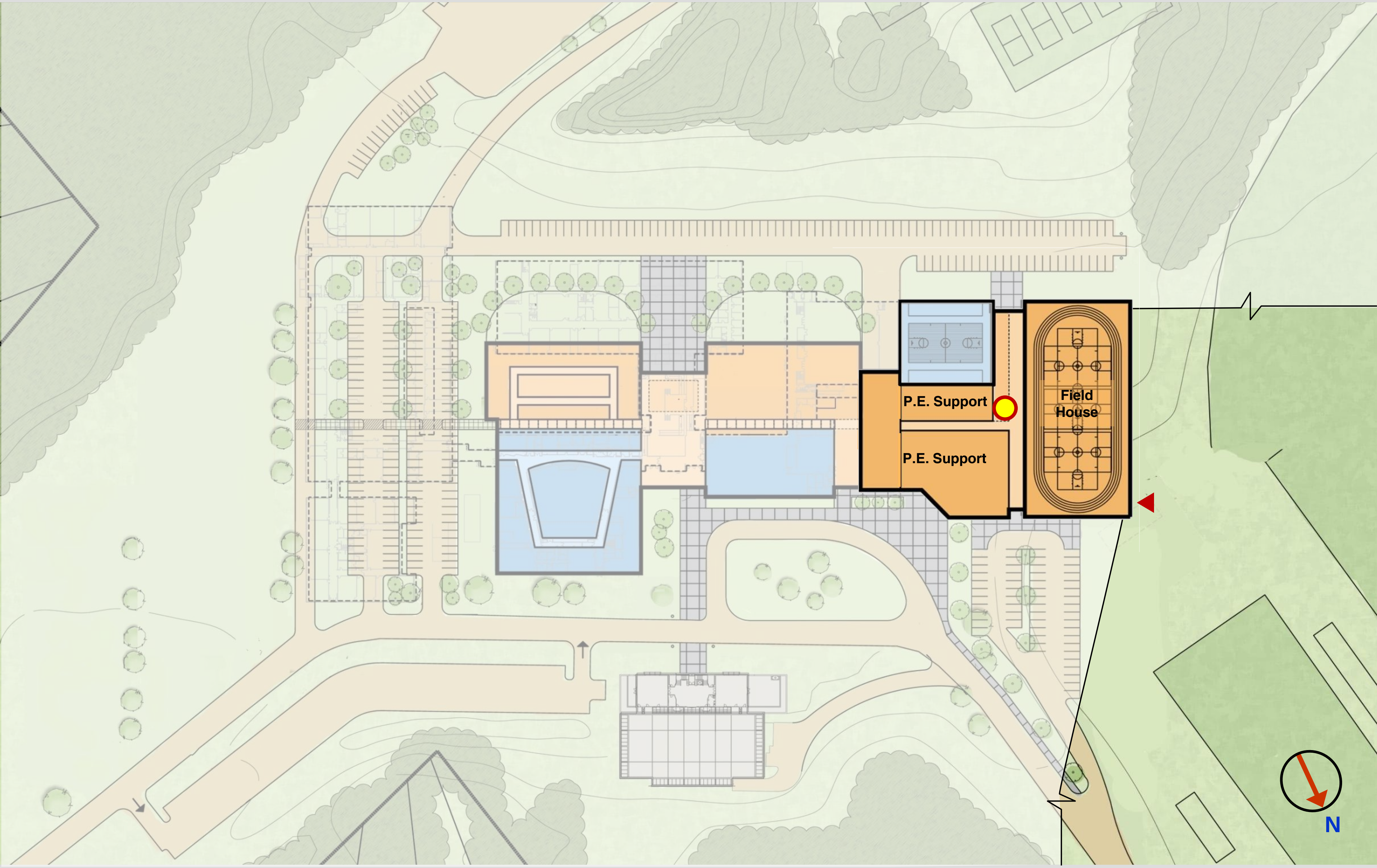
Approach F : Full Renovation/Major Additions

Keeps Building 'A' ,Cafeteria, and Lower Gym - Lower (-14)



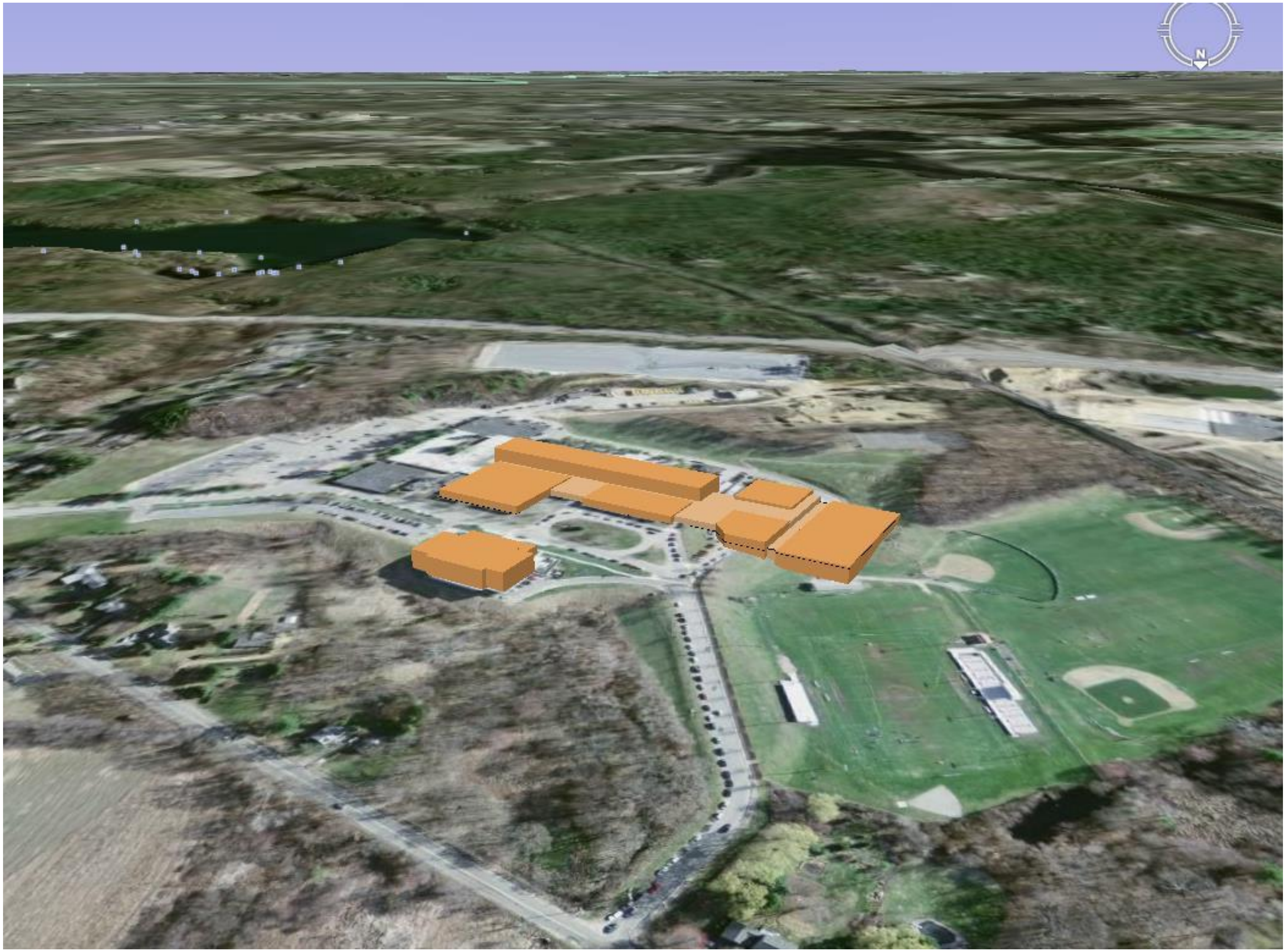
Approach F : Full Renovation/Major Additions

Keeps Building 'A' ,Cafeteria, and Lower Gym - Field Level (-30)



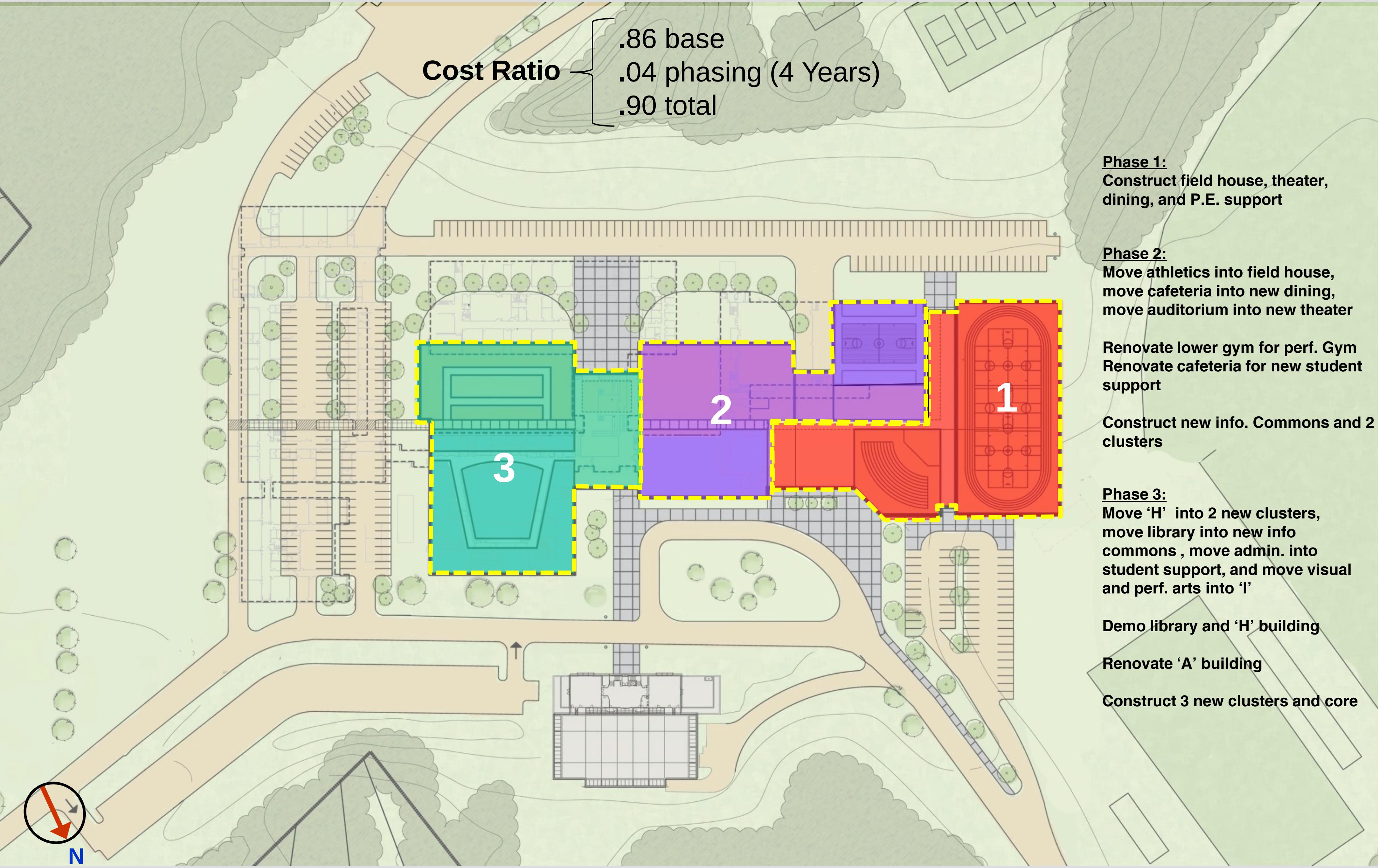
Approach F : Full Renovation/Major Additions

Keeps Building 'A' ,Cafeteria, and Lower Gym



Approach F : Full Renovation/Major Additions

3 Phases



Cost Ratio
- .86 base
- .04 phasing (4 Years)
- .90 total

<u>Phase 1:</u>
Construct field house, theater, dining, and P.E. support

<u>Phase 2:</u>
Move athletics into field house, move cafeteria into new dining, move auditorium into new theater

Renovate lower gym for perf. Gym Renovate cafeteria for new student support

Construct new info. Commons and 2 clusters

<u>Phase 3:</u>
Move 'H' into 2 new clusters, move library into new info commons , move admin. into student support, and move visual and perf. arts into 'I'

Demo library and 'H' building

Renovate 'A' building

Construct 3 new clusters and core

6 Preferred Alternative

- Preferred Option Summary
- Site Analysis
- Conceptual Site and Floor Plans
- Building Massing Images
- Phasing Analysis
- Expansion Analysis
- Code Analysis
- Building Systems Narratives/ Outline Specifications
- Sustainable Design Goals
- Conceptual Project Costs
- Project Schedule

6 Preferred Alternative

The Concord-Carlisle High School Facilities Master Plan Committee voted to move forward with Option F. Further study allowed the team to understand the relationship required between the Auditorium, Cafeteria and Gymnasiums as seen below in Options F, F1 and F2.

F
New Auditorium by Athletics

- \+ Large assembly spaces all together
- \+ Service in rear
- +/- Cafeteria doubles as auditorium lobby and athletics viewing
- \- Auditorium remote from performance gym, visual arts and biggest parking area
- \- Footprint extends into fields

F1
New Auditorium by Building 'A'

- \+ Auditorium provides new face to the school on the east side
- \+ Auditorium located with the arts
- \+ Arts and athletics anchor each end of facility
- +/- Athletics footprint pulls out of fields but into entry
- +/- Cafeteria at front with service
- \- Guidance/ sped/ admin. more internal
- \- Long end to end circulation
- \- Longer construction time

F2
New Auditorium in Building 'A'

- \+ Auditorium located with the arts
- \+ Arts and athletics anchor each end of facility
- \+ Less expensive than building new
- \+ Athletics footprint pulls out of fields and back from the entry
- \+ Cafeteria animates the south lawn
- \+ Most compact and efficient
- +/- New arts classrooms/ renovated auditorium

After analyzing these sub-designs, **Option F2** was chosen as the Preferred Option to study further. Modifications to pursue included:

- Stacking STEM spaces on the second and third floors
- Presentation space adjacent to the auditorium to have operable walls on both sides allowing it to serve as an auxiliary lobby space for functions.
- Conference room for community use to be provided at front lobby.

Option F2- Building Design Summary

Proposed in Sub-design Options F, F1, and F2 is 233,500 GSF of additions and 55,300 GSF of renovation at the existing 'A' Building, Cafeteria Building, and Lower Gymnasium. Although each Sub-design Option addresses all building envelope deficiencies for these existing buildings, the planning approach to the Preferred Option reduces the amount of work required at the existing building envelopes. By building new additions on all four sides of the existing Lower Gymnasium, the 1973 exterior block walls would now function as interior walls, thus eliminating the need to rebuild these walls and limiting the scope of envelope work at this location to new roof and flashings. The addition to the south side of the existing cafeteria building (proposed Student Support Services space) converts the original 1958 north wall from a low-efficient exterior wall, which did not receive the 1992 building envelope upgrades, to an interior wall. Likewise, given that the 'A' Building did receive building envelope upgrades in 1992, the proposed new additions on only two sides of the existing structure will require work at the wall to roof interface in order to improve the thermal deficiencies at this transition.

The Preferred Option proposes all new academic classroom spaces as well as a new Information Commons (Library/ Media Center) within a compact and efficient three-story addition. This new addition maximizes north and south solar exposure while providing views to the exterior from all classroom spaces. A proposed skylight running east-west for the length of the three-story addition while bridging space between new and existing, provides an opportunity to bring north light into the smaller interior spaces on the first floor which back up to the renovated existing building and do not have direct views to the exterior.

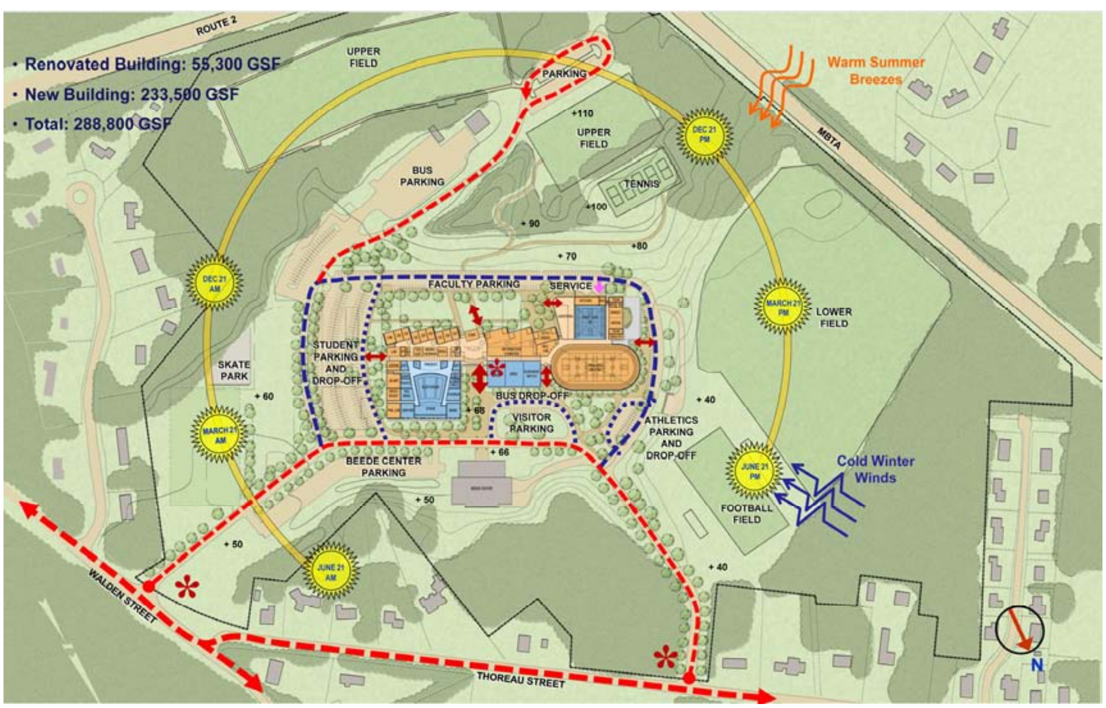
Along the primary circulation spine, the 'A' Building, which currently houses a majority of the visual and performing arts spaces, will have an addition on the east side and renovation to fulfill the arts program, which will include a 750 seat auditorium. Located in the basement of this addition are mechanical spaces which are essential to supporting the systems and utilities to the school through the duration of construction. The existing Cafeteria Building is to be renovated for Student Support Services, a logical choice of program given the existing long open spans, the central location, and the proximity to the main entrance of the school. Beyond the Student Support Services to the west towards the Athletic Center, a second entrance will allow the school to shut off access into the academic wing during athletic and community related events.

The west side of the site maintains a lower level connection to athletics while improving and expanding the parking and drop-off areas. The east side of the site includes a new parking and student drop off area, located over the demolished 'I', 'S' & 'L' building footprints, and within the primary access roadway circling the school. By moving the primary access roadway outside of the parking area, vehicular traffic to the upper fields and bus parking area will no longer have to cross the path of the students. The existing parking and paved area further to the east is now proposed to be green space. The distribution of parking around the site and the shift of the building towards the west will create a larger buffer between the proposed parking area and the Bristers Hill Road neighborhood.

Option F2- Site Analysis Summary

Attached below is the Site Analysis for the F2 solution. Key points to the integrated site include:

- Existing location of primary access roadway connecting Thoreau Street and Walden Street are maintained with a new connection around the parking to the existing roadway and the upper fields.
- New parking located at all sides of the building with separate bus and student drop-off areas; new student parking located further from neighbors to the east with new green space in lieu of existing parking lots.
- New parking and drop-off at lower level entry area re-graded for flat transition onto primary access roadway.
- Storage shed tucked into hill with handicap parking and accessible route to the area of the lower fields.
- New entry plaza at north side between school and Beede Center with removable bollards for temporary prevention of vehicular traffic between bus drop-off and Beede Center parking area.
- New exterior court at south side of 3-story addition provides a space between the building and hill for student activities and outdoor education.
- New outdoor eating plaza at cafeteria addition on south side.
- Lower fields stripped and re-graded.
- New way-finding signage at entries off Thoreau Street and Walden Street.
- Upper bus parking area to remain in place with new natural screening at roadway to the upper fields.
- Current Skate Park is preserved.



Conceptual Site and Floor Plans

Attached in this section are conceptual site and floor plans for the F2 solution. Following is a summary of proposed program elements at each floor level including proposed new and renovated gross square footage:

Proposed Main Level Plan
New = 81,800 GSF
Renovated = 45,300 GSF

Entering from the north, on axis with the Beede Center entry, is the Student Support Services consisting of administrative, guidance, SPED, and METCO offices and associated support spaces, all residing in the renovated, existing cafeteria space. Within the new lobby space, at the crossroad of the primary east-west axis, is an open stair and elevator vertically connecting the three-story south facing academic wing addition, and a large flexible conference space for school or community use. To the east is the Information Commons (Library/ Media Center), a series of open spaces and small presentation rooms. Adjacent to the Information Commons is the school radio station and CCTV, both with direct access to the exterior. To the west is one Core Cluster consisting of eight typical classrooms, two science labs, break-out and presentation space, and integrated SPED, Guidance, and teacher support spaces. The 'A' Building is renovated for the arts program including a 750 seat auditorium with a new stage and fly space, and the supporting drama and music spaces. An addition to the west side of the 'A' Building includes visual arts spaces as well as a fabrication lab with direct access to the exterior. Along the primary east-west axis between the Information Commons and the athletic spaces is a new cafeteria space with long views across the south facing court, plaza and green space. Circulation space connecting to the upper level of the two-story athletic support addition provides ample viewing space down into the Athletic Center addition and Performance Gymnasium, the renovated, existing Lower Gymnasium. If desired, the school would have the ability to secure this entire wing from the rest of the school during athletic events and for community use.

Proposed Lower Level Plan
New = 65,700 GSF
Renovated = 10,000 GSF

Entering the lower level from the west, the new Athletic Center is open to the viewing and circulation space, Performance Gymnasium (located in the renovated existing Lower Gymnasium) and athletic support spaces. The Athletic Center houses a 180 meter indoor track and provides ample assembly space for community events. The athletic director and offices maintain visual control at the entry point and are adjacent to a new weight and fitness room, locker and team rooms, and the trainer's office which has direct access to the exterior and a paved way to the lower field level. New mechanical and electrical rooms are provided at this level and at the lower level of the ‘A’ Building. Building these spaces in the early phases of construction will establish the new infrastructure initially and will provide substantial, useful system upgrades to the existing buildings used throughout the duration of construction.

Proposed Second Level Plan
New = 43,000 GSF

Integrated into the second floor of the three-story, south facing, academic wing are a Core Cluster and half of the STEM program. Joined by the Language Lab opposite the primary vertical circulation, the Core Cluster includes English, Social Studies, and Foreign Language classrooms, integrated presentation and breakout spaces, SPED and teacher support spaces along the west side of the academic wing, while the east side houses STEM program spaces including Math classrooms, Science Labs, integrated presentation and breakout spaces, SPED and teacher support spaces. South facing classrooms are angled in plan towards due south to allow for better daylight contribution. Stairs at the east and west ends of the clusters connect academic program spaces above and below and promote the integration and connection of students between classes.

Proposed Third Level Plan
New = 43,000 GSF

The third floor of the Academic wing is of a similar layout. Joined by a Fabrication Lab opposite the primary vertical circulation, the other half of the STEM program is stacked above to promote efficiency in mechanical systems and integration with the adjacent Core Cluster to the west as desired by the FMPC. Long views from the north facing spaces look out towards the Concord Town Center while long views from the south facing spaces look out towards the recently constructed synthetic athletic fields.

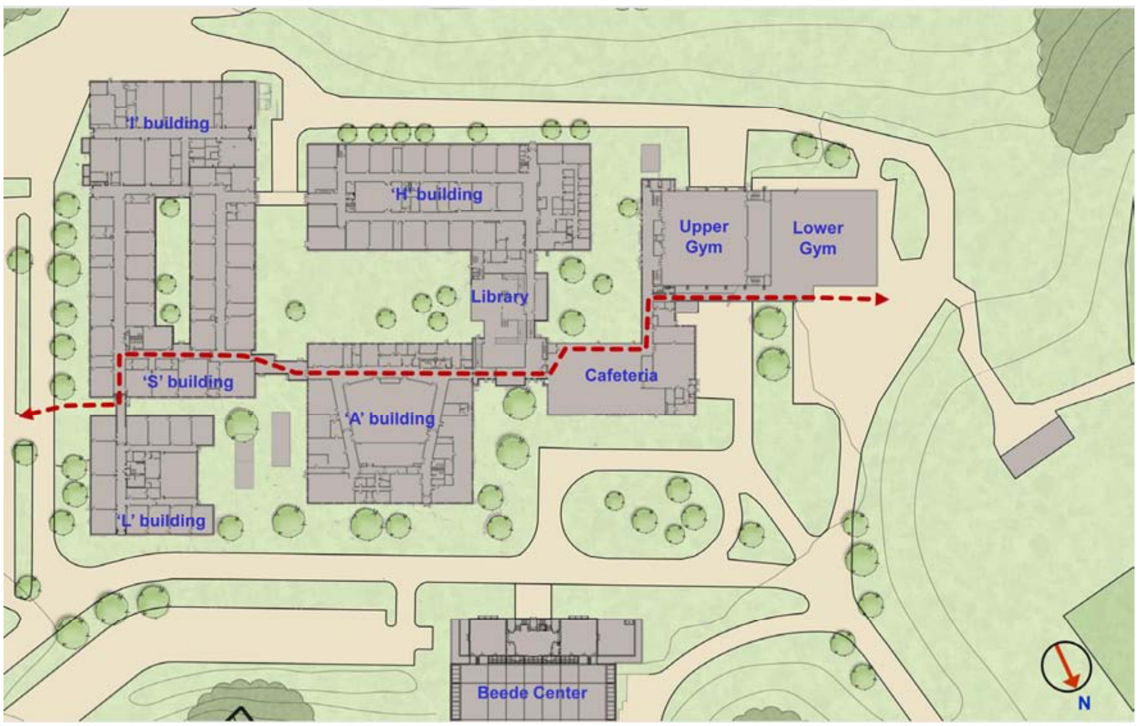
Building Massing Images

Attached herein are building massing images for the F2 solution, views taken from the north and south side of the proposed concept. The design approach to the massing of the F2 solution considers the scale of the Beede Center and existing buildings which have been retained and renovated while also creating compact and efficient building additions.

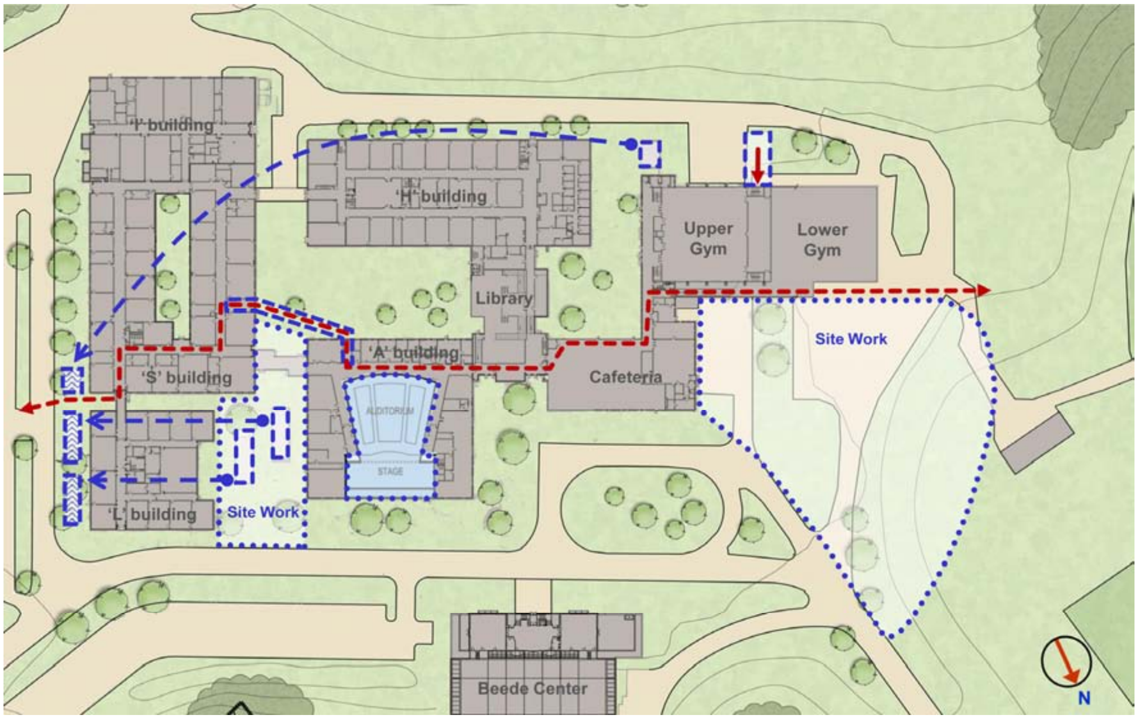
Phasing Analysis

Following is the Phasing Analysis for the F2 solution. These images demonstrate how the school will function at critical points throughout the rolling phase of construction. The red arrow indicates the primary circulation through the school from east to west on each drawing.

<u>Existing School</u>

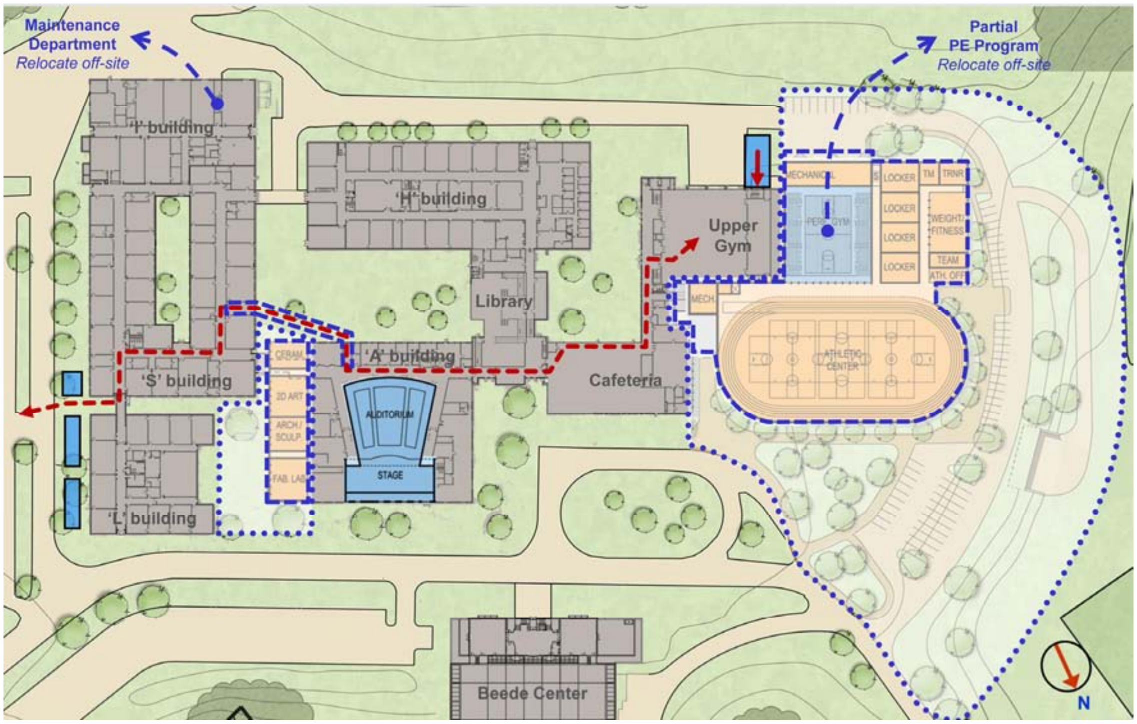


Phasing – Spring 2012



- Provide temporary connection from 'S' Building to 'A' Building
- Provide temporary HC access to lockers
- Relocate portable classrooms
- Renovate for new auditorium: Late Spring 2012
- Begin rough site work

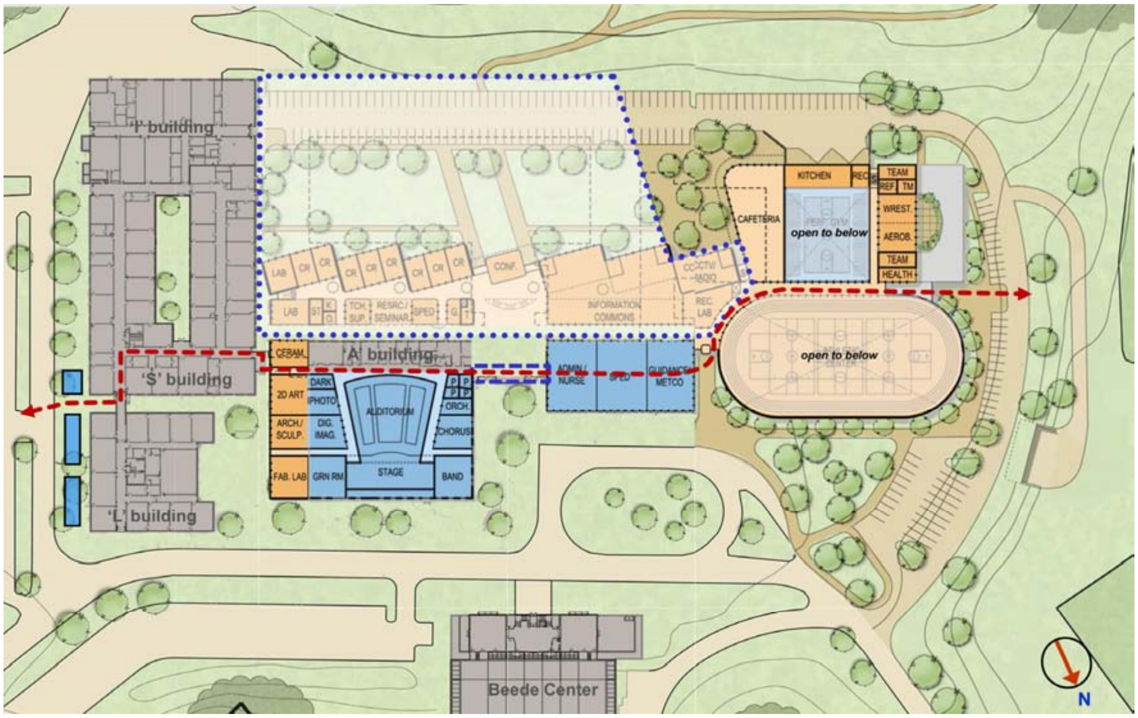
Phasing – September 2012



- Occupy renovated auditorium: Summer 2012
- Occupy relocated portable classrooms: Summer 2012
- Relocate Maintenance Department off-site & occupy 'I' Building: Summer 2012

- Partial PE program relocated off-site
- Build addition to 'A' Building
- Build Athletic Center addition to Lower Gymnasium & related site work
- Renovate Lower gymnasium

Phasing – September 2013

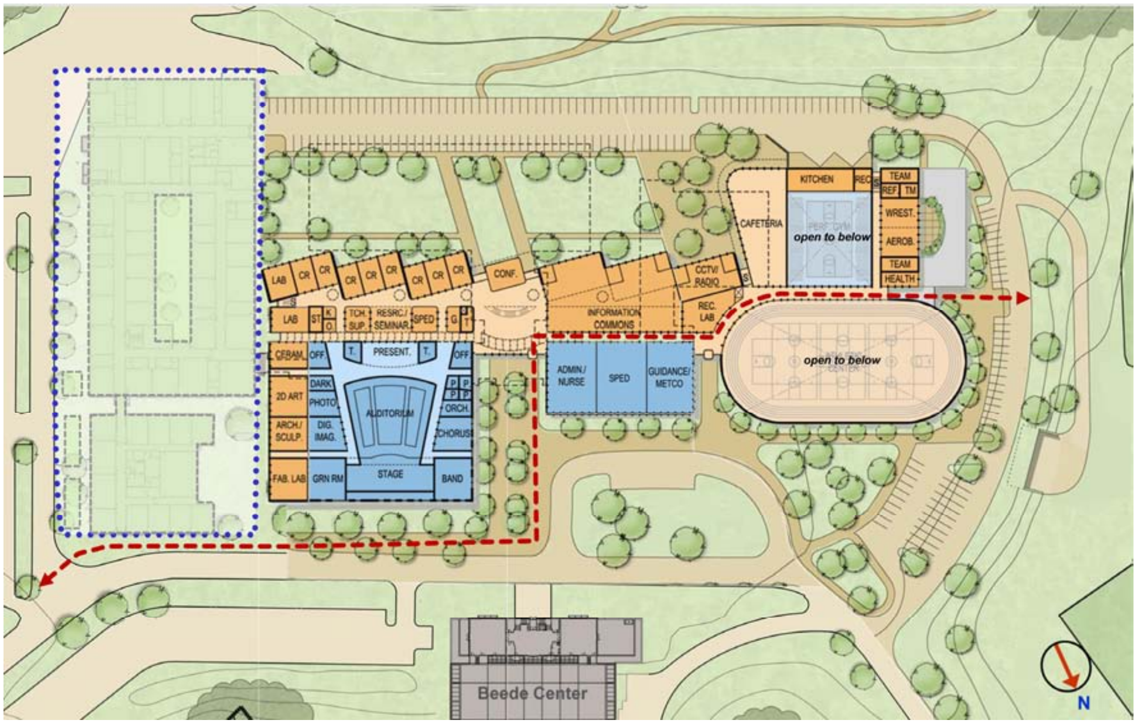


- Occupy new additions & renovations: Spring 2013
- Abate & demolish Upper Gymnasium and Lockers: Spring 2013

- Build & occupy new Cafeteria: Spring thru Summer 2013
- Renovate & occupy partial 'A' Building: Summer 2013
- Renovate new Student Support area & occupy: Summer 2013
- Relocate 'H' Building & Library to swing space: Summer 2013
- Abate & demolish 'H' Building and Library: Summer 2013

- Provide temporary connection from 'A' Building to Student Support
- Build new 3-story addition & related site work

Phasing – September 2014



- Occupy new 3-story addition: Summer 2014
- Renovate & occupy remainder of 'A' Building: Summer 2014
- Complete site work at north

- Complete site work at south
- Demo 'I', 'S', and 'L' Buildings
- Complete site work at east

Expansion Analysis

Shown below is the expansion analysis for the F2 solution. Red arrows indicate direction in which the building could be expanded in the future if additional program space is necessary.

Code Review

Attached in this section is the Code Analysis for the F2 solution. Generally, it is proposed to be:

- Type 1B construction
- Use Group E, A1 and B
- Fully sprinklered building
- Unlimited floor area
- 2 hour rated structural frame and floor construction
- 1 hour rated roof structure

Building Systems Narratives & Outline Specifications

Attached in this section are conceptual level Outline Specifications and/ or Building Narratives from the full Consultant team based on the Preferred Alternative. Also included are Room Data Sheets which provide a more detailed scope of the contents and finishes within the spaces which are outlined in the Space Program Summary. Energy Conservation Measures are in this section.

Sustainable Design Goals

An important goal of the project is to provide a facility that is sustainable; educationally, economically and socially. In this regard, the project plans to maximize the energy efficiency incentive and reimbursement rate established by the MSBA. The project team will work with the MSBA to achieve the Massachusetts Collaborative for High Performance Schools (MA-CHPS) criteria for 34 points or similar criteria with the Leadership in Environmental Engineering and Design (LEED) for Schools program of the United States Green Building Council (USGBC). This point total will allow the CCHS project to obtain 2% financing of MSBA's maximum allowable cost for reimbursement credits relative to sustainability. In addition, the team will provide a buffer of additional credits in the MA-CHPS point tally to ensure that the final credit number is achievable. A draft MA-CHPS and LEED for Schools Scorecard showing potential points is included in this section and will also be submitted in the Schematic Design phase.

When the Schematic Design phase begins, we will meet again with the representatives of the Concord Carlisle High School, the Concord and Carlisle Communities, the Green Team, the Project OPM and the Design Team to educate and inform all parties about sustainable design, MA-CHPS and LEED for Schools programs and update them on any changes in the MSBA's position relative to the two programs. We will identify sustainable design strategies and opportunities and develop sustainable design goals.

The project team will continue to actively integrate elements of the MA-CHPS and LEED for Schools with goals generated in the educational visioning process and with the participation of administrators, faculty, students and town representatives. OMR is dedicated to creating integrated, resource- efficient, and environmentally responsible designs which we feel forms harmonious and efficient structures for the community. With the introduction of specific sustainable strategies, advanced energy modeling tools and early consultant inclusion, an even higher level of excellence can be achieved.

Applicable prerequisites of the MA-CHPS and LEED for schools criteria will be met along with practical and applicable credits. Innovative design strategies including using the school as a teaching tool will be emphasized. Sustainable strategies that reduce loads on public utilities and minimize operating costs will be encouraged. The Concord Carlisle High School will comply with either MACHPS or LEED for Schools and could attain MACHP's or LEED certification by achieving the following possible credits. Further possible credits can be developed as we move into the design phases of the project.

Under the category for sustainable sites the new building will achieve a credit in development density & community connectivity because it is being constructed on the existing school site. A credit in site development could be gained by the creation of high quality wetland habitat in a site storm water basin. The basin flora and supported fauna could also serve as a learning experience for the students. We can further develop a sustainable site by implementing a storm water system that will reduce impervious covers, manage run-off and increase on-site infiltration. After portions of the existing building and parking lots are demolished new plantings can be added to achieve a credit in site development. The new facility could be designed to incorporate a vegetated roof on 50% of the building or a solar reflective roof surface can be specified to achieve a credit in heat island effect. Light pollution reduction can be accomplished by using full cut off exterior light fixtures and automatically controlled interior lighting. Additional credits can also be achieved under sustainable sites by designating parking space for low emitting and fuel-efficient vehicles, providing access to public transportation, having safe walkways for pedestrians and bicycles and sharing playing field use with the community.

Water efficiency can help to decrease life cycle cost by using methods to conserve water use. Eliminating irrigation systems and using plants that are native to the area will also add points in water efficient landscaping. Water conserving plumbing fixtures would be used to reduce water use by 20 or potentially 30 percent.

Advanced energy and atmosphere technologies can be used to establish energy efficiency. The buildings envelope will meet or exceed the performance required by the Massachusetts Energy Code. In addition we will work with our engineers to achieve increasing levels of energy performance by designing a building that will reduce the environmental and economic impacts of excessive energy use. Computer modeling will be used to determine the performance of the building; these computer models are also life cycle cost analysis tools. During the design development phase the computer modeling will serve as an initial check on how energy efficient the building design will be. A design component analysis will evaluate individual energy conservation measures that may be considered for the project including building orientation, building envelope components, HVAC and lighting options. There are a wide variety of high efficient systems that are environmentally conscious, cost effective, and have supported achievement of our clients' LEED certification goals at other projects.

An additional credit for enhanced commissioning can be obtained through the review of a third party agent who can assess the plans and the submittals, confirm the building staff is knowledgeable in the operation of the system, provide a manual indicating the system operation, and rechecking the system ten months after the system has been operational. The buildings energy consumption can be monitored by metering equipment, which would gain a credit in measurement & verification.

The use of renewable energy may also have a possible life cycle cost savings for the school. Small roof-mounted wind turbines or photovoltaic panels are energy conservation options that would generate on-site renewable energy. Small wind turbines generate visible, clean, and low-cost energy. On-site renewable energy generated by wind turbines can reduce electric costs and would make a bold statement about a communities' commitment to sustainability. Small turbines might be mounted on poles or on the roof of the building. Single or multiple units of wind turbines work in tandem with the electric utility to power the facility. The turbines provide electricity directly to the building, and only resort to the electrical grid when additional power is required. The enclosed maps identify the potential wind power at the Concord Carlisle High School Campus for 30, 50, 70 and 100 meter high wind turbines. A commercial wind turbine would need to be mounted at 70 to 100 meters to achieve the required minimum wind speed of 12mph. Smaller turbines (roof mounted versions) could also be used and would require less wind speed to produce power, but would also generate a lower energy output. Further studies would need to be performed to better estimate the amount of wind power that could be generated on the school campus.

Building materials and resources are an important factor in sustainable design. We can specify products and materials that are manufactured within a 500 mile radius. These products would include a wide range of materials such as gypsum wallboard, concrete, brick, piping, light fixtures, etc. We would also specify building products that incorporate recycled content, bio-based and certified wood materials on the project. Durability and cost will also be a factor in selecting these materials. In addition, we will specify that the contractors provide proper disposal of construction and demolition waste. There are many other existing materials that could be salvaged, recycled and reused on-site, thereby reducing waste and demands for virgin materials.

Indoor environmental air quality is one of the most important factors in providing a healthy environment for children to learn. CO2 sensors can be used to monitor outdoor air delivery. The outdoor air ventilation to the building can be increased by the minimum set point of 30% though the design of the mechanical system. A construction IAQ management plan can be met during construction per the requirements of the SMACNA guidelines and before occupancy by operating the system with the outdoor air through the units prior to the occupancy of the building. We will specify low emitting materials throughout the project to reduce the quantity of indoor air contaminates. Indoor chemical pollutant source control can be gained by designating special ventilated rooms for photo copying and housekeeping, providing slotted entry mat systems that will capture dirt and particles, and providing an air infiltration media prior to occupancy. Controllability of systems can be met by the installation and design of lighting and thermostat control for individual classrooms as well as the other areas in the building. Thermal Comfort can be achieved by designing a system in accordance with ASHRAE standard 55-2004, which supports the productivity and well being of the building occupants. The careful orientation of the building on the site will help to achieve maximum day lighting to all occupied spaces. The design will also provide the faculty and students with a visual connection between the indoor and outdoor space through day lighting features. Careful placement of exterior windows will provide views for all occupied spaces.

Additional innovative design credits can be gained though high-performance acoustical interiors that meet the CHPS standards, implementing green house keeping, creating teaching tools throughout the school, and providing educational space within the storm water wetland habitat. Having in-house LEED accredited professionals will also add a LEED credit to the project total.

Conceptual Project Costs

Conceptual Project Costs were prepared by D G Jones International, Inc. for the Preferred Alternative Option F selected. Further analysis of these project costs and the costing process leading to this Option can be found in Section 8. Attached is the complete conceptual estimate.

In Summary:

Building Construction Cost	$ 55,807,098	
Site Construction Cost	$ 5,342,800	
Sub Total Construction Cost	$ 61,149,898	
Total Construction Cost (includes General Conditions, Escalation, Contingencies)		$ 83,000,000
Total Project Cost (includes all Soft Costs such as Fees, FF&E, Technology Equipment, Owner's Contingencies -- an average of 30% of Total Construction Cost\)		**$ 108,000,000**

Note: These conceptual costs are based on a 2Q2012 construction start, are escalated to the midpoint of our assumed construction period, and do not account for fluctuations in market conditions, or latent / unforeseen conditions.

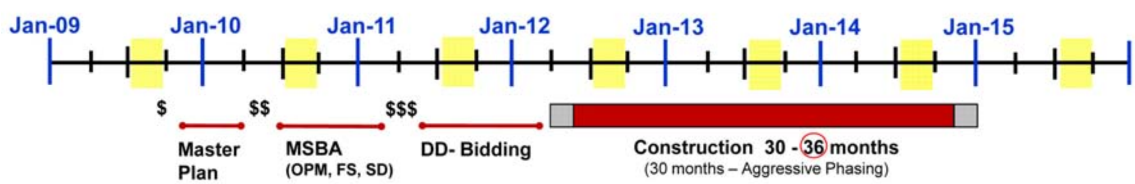
Assumed Project Schedule

The Design team will work together to meet all requirements for the completion of the Concord Carlisle High School Project. We have developed a Project Schedule, based on assumptions of deadlines and deliverables related to current MSBA trends and known Town functions — all to provide the community with an efficient and effective approach.

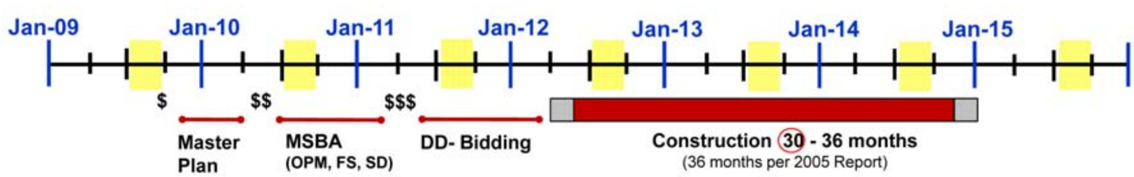
Major milestone assumptions shown in the Project Schedule include:

• Master Plan Complete	March 2010
• Town Meeting Vote	May/ June 2010
• Finalize Enrollment Projections with MSBA	Summer 2010
• Advertise for OPM via MSBA	Early Summer 2010
• Hire OPM and Architect through MSBA	August 2010
• Begin Feasibility Study	August 2010
• Submit Feasibility Study to MSBA	Early October 2010
• MSBA Board Vote to Proceed to Schematic Design	Late November 2010
• Submit Schematic Design to MSBA	Early February 2011
• MSBA Board Vote on Final Scope & Budget	Late March 2011
• Special Town Meetings	May/ June 2011
• Town Debt Exclusion Votes	June 2011
• Design Development begins	Summer 2011
• Construction Documentation begins	Fall 2011
• Bidding (Filed sub bids and general bids)	First Quarter 2012
• Construction commencement	Spring 2012
• Phased School Move-in	Ongoing

Master Plan: ***Renovation and Additions***



New Construction



Building Outline Specifications

Division 1 – General Requirements

01010 – General

1. The scope of work is as follows:
   Additions and major renovations to the existing high school building. Selective demolition will be performed in building A, cafeteria building and the lower gymnasium building. General demolition of the remaining buildings will take place according to phasing.
2. Comply with the requirements of all governing codes, including the 7th edition of the Massachusetts State Building Code, Massachusetts Architectural Access Board, and Concord Zoning Bylaws
3. Protect large trees in the Building "S" court yard and east parking lot

Division 2 – Sitework

02000 Demolition

02070 Selective Demolition

1. Existing High School selective demolition
   a. Building A
   b. Cafeteria Building
   c. Lower Gymnasium
2. Salvage brick for re-use if necessary

02200 Earthwork - Refer to civil narrative

02620 Foundation Drainage

1. Pipes and fittings ASTM D2729 polyvinyl chloride, solid and perforated
2. 6" continuous drain pipe at perimeter of foundation walls
3. Non woven, synthetic, non biodegradable filter fabric
4. No. 6 crushed stone
5. Under slab drainage system (if required)

02900 Landscaping

1. Native plantings

Division 3 – Concrete

03310 – Concrete work

1. Refer to structural narrative
2. Provide footings, foundation walls, slab on grade, and poured concrete decking.
3. Provide fibermesh reinforcing in slab on grade
4. Provide 15 mil reinforced polyolefin vapor retarder under slab on grade (griffolyn 15 green by reef industries or similar 15 mil product by Stego)
5. Finish interior slabs: steel trowel
6. Sealers, hardeners, dust proofers appropriate for mechanical rooms spaces, janitor closets…any treatments required for successful finished floor installation

03452 Precast Architectural Concrete

1. Cement ASTM C150, Type I Portland cement, aggregate ASTM C33
2. Steel reinforcing ASTM A615, welded wire fabric ASTM A185
3. Fabrication MNL 117 PCI Precast/Prestressed concrete

4. Color and texture not selected at this time, assume a similarity to granite

Division 4 – Masonry

04064 – Masonry Mortar and Grout

1. Portland cement ASTM C150, Type 1
2. Lime ASTM C207, hydrated, Type S
3. Mortar Aggregate ASTM C144 well grades\d sharp natural sand
4. Grout aggregate ASTM C404
5. Water clean and drinkable

04080 – Masonry Anchors and Reinforcing

1. Masonry veneer to light gauge framing
    a. DW-10 Hohmann & Barnard
    b. Wall anchor – 12 gage 300 series stainless steel
    c. Adjustable ties 0.1875 inch diameter, 300 series stainless steel, trapezoid without drip
    d. Wall anchor waterproofing: 40 mil thick rubberized asphalt and poly tape
    e. Need wall anchoring to concrete wall also “Tie 2R system?”

04212 - Brick

1. Modular face brick

Division 5 – Metals

05080 Factory Applied Metal Coatings

1. High performance paints: polyvinylidene fluoride Kynar 500, Hylar 5000
2. AAMA 2605 and ASCA 96
3. Three coats

05085 Hot Dip Galvanizing

1. Zinc ASTM B6, prime western grade or high grade
2. Touch-up paint: zinc rich paint for repairs or hot dip galv. Coatings
3. ASTM A780, min. 65% zinc dust

05120 - Structural - Steel Refer to Structural Drawings

05300 – Metal Decking

1. Refer to Structural Drawings

05405 – Structural Light Gauge Framing

1. 6” metal stud at all exterior walls – ASTM A653, structural quality

05512 – Steel Stairs

1. Steel stair assembly, tube shapes ASTM A500, Plates and others ASTM A36
2. Minimum 3,500 psi compressive strength concrete with coarse aggregate

05522 – Steel Railings

1. Steel railings – pipes ASTM A53 (Schedule 40, 0.140 wall thickness
2. Steel shapes ASTM A36
3. Glass guard rail panels

05530 Gratings

1. Bar grating
2. G90 hot dipped galvanized steel with min 1.25 ounces of zinc per s.f.

Division 6 – Woods and plastics

1X6 western red cedar over p.t. furring, s.s fasteners

06062 Interior Wood Types

1. Type 1: Hard maple with transparent finish, plain cut, select white sap wood
2. Type 2: Paint grade hardwood

06066 – Plastic Laminates

1. Type 1 NEMA LD-3 Grade GP50
2. Type 2 Chemical resistant Wilson Art Chemsurf 390-90

06105 – Wood Blocking

1. Exterior blocking no. 2 or construction grade, product standard 20
    a. Species: southern yellow pine or spruce pine fir
    b. Preservative treated required for blocking in contact with roofing, masonry, concrete, and sheet dampproofing & window rough openings

2. Interior blocking product standard 1, fire retardant treated

06210 – Exterior Finish Carpentry

1.

06410 – Custom Casework

1. AWI Quality Standard for materials and fabrication
2. Type 1 – visible wood types – maple veneer with solid maple edging
3. Type 2 – painted medium density fiberboard ANSI 208.2 and NPA 4, min 44 pounds per cubic foot density
4. Fire retardant MDF
5. Provide class A or B fire retardant panels and casework in all classrooms and corridors.
6. Toe space grills and pencil proof sill grills for cabinets with fin tube radiation
7. Concealed hinges and stainless steel wire pulls

06416 Interior Standing and Running Trim

1. Wood base (hard maple with transparent finish)
2. Wood trim (hard maple with transparent finish)
3. Transom glass with wood stop frames and trim (hard maple with transparent finish)
4. Door jambs and trim: (hard maple with transparent finish)

06605 – Solid Surfacing

1. .5 inch Dupont Corian (at all vanities and serving area), layered to desired thickness

06618 Epoxy Resin Fabrications

1. 1” thick epoxy resin with tensile strength of 8000 psi ASTM D651 and compressive strength of 28,000 psi ASTM D695
2. Epoxy Resin Sinks: rimless under mount (seamless)
3. Sink support trapeze – epoxy coated steel Unistrut 16 gage

Division 7 thermal and Moisture Protection

07100 – Liquid Applied Dampproofing

1. Asphalt Dampproofing ASTM D1227 Type IV or Type II nonasbestos fibers

2. Provide primer crack filler, fiberglass fabric reinforcing, rubberized flashing
3. Drainage board CCW Miradrain 6000 with CCW drain grip adhesive

07210 – Building Insulation
1. Insulation Type 1 – Fiberglass Batt and Blanket: ASTM C553 or ASTM C665; @ R19 in walls, R30 in ceilings
2. Insulation Type 2 Semi-Rigid Fiberglass: ASTM C612; 2 inches @ R8.7 (density 3.0 lbs per cubic foot
3. Insulation Type 3 – sloped roof insulation: 5" Vented nailable insulation panels "Cool vent" by hunter Panels
4. See single ply roof system

07260 – Vapor Retarders
1. Sheet vapor retarder type 1 – ASTM D4397 clear 6 mil. Polyethylene
2. Sheet vapor retarder type 2ASTM E96 reinforced sheet with special fire performance
3. Under slab vapor retarder ASTM E1745 15 mil (see concrete spec)

07535 – Single Ply roof System
1. Sarnafil intensive green roof system 3000
2. Provide complete system by sarnafil, to also include, but not limited to:
   a. saranclad flashings and roof edges
   b. provide Geonet B for drainage/protection layer to assist in EFVM for leak detection
   c. 24"x24" precast Hanover paver with pedestals
   d. Galvanized metal railing with powder coat finish

07602 Sheet Metal Types
1. Sheet Metal Type 1 – Copper ASTM B370
2. Sheet Metal Type 2 – Tin Zinc alloy Coated Copper – Freedom Grey
3. Sheet metal Type 3 – Aluminum at aluminum windows, entrances, and louvers

07610 – Standing Seam Metal Roof
1. Standing seam metal roof – Tin Zinc Alloy coated copper roof

07652 Flashing Built into Walls
1. Flexible Flashing – self adhesive, 32 mil of rubberized asphalt w/ copper edge
2. Sheet metal flashing - copper

07242 Direct Applied Finish System
1. Cement Board Sheathing – ½" Durock exterior cement board
2. Fiberglass reinforced mesh
3. Base coat: Structural Skin + K-88 (Conproco Corp.)
4. Finish Coat: Conpro-Flex, fine texture (Conproco Corp.)

07714 External Rain Drainage
1. Freedom grey copper gutters, downspouts and fittings, smooth elbows
2. Cast iron drainage shoe ASTM A48 class 35B gray cast iron
3. Modify existing downspouts at Centennial

07720 Roof Specialties
1. Alpine Snow Guards

07842 – Fire Stops and Smoke Stops
1. Provide non combustible fire stop materials
2. Fire Stopping systems
   a. Building Systems "F" rating

b. Floors and ceilings – “T” rating
c. Through penetrations – “L” rating

07900 – Joint sealer

1. Type 1 Interior dry no traffic
2. Type 2 Interior wet no traffic
3. Type 3 Exterior no traffic
4. Type 4 Traffic Bearing

Division 8 Doors and Windows

08110 – Steel Doors and Frames

1. Non rated doors and frames – ANSI A250.8
2. Fire rated doors and frames ANSI/UL 10B and NFPA 252
3. Exterior steel doors and frames – ANSI A250.8 (at service spaces)

08212 – Flush Wood Doors

1. Transparent finished flush wood doors
2. Grade A maple veneer
3. ANSI A208.1 LD2, 32 pound density fiber board

08305 – Access Doors

1. Conceal framed and flush door face at drywall walls and ceilings
2. 1” wide frame and flush door at masonry

08405 – Aluminum Entrances

1. Kawneer aluminum storefront (use a 6" system with a thermal brake) “Heavy Wall Door”
2. Kawneer – aluminum doors

08710 – Finish Hardware

1. To be determined, see allowances
2. Provide magnetic hold opens and closers on all classroom and science lab doors leading to the corridor.

08800 – Interior Glass and Glazing

1. Interior safety glass – ASTM C1036 Type 1 transparent flat glass quality q3 glazing select
2. Interior Fire Rated wire glass – ANSI Z97 and ASTM C1036, Type II patterned and wire glass polished both sides quality q3 UL listed fire rated
3. Interior Frosted glass – tempered safety glass, frosted surface one side of glass
4. Laminated glass – STC 35 or higher, ANSI Z97

08810 – Exterior Glazing

1. Low E Glass
   a. Transmittance: Visible: 70 percent, Solar: 33 percent, UV: 10 percent
   b. Reflectance: Visible out 11 percent, Visible In: 12 percent, Solar: 31 percent
   c. U value Winter: 0.29
   d. Shading Coefficient: 0.44
   e. SHGC: 0.38

08832 Mirrors

1. Provide .25 inch frameless mirrors with square edges in all bathrooms

08911 – Metal Framed Curtain Wall and Windows

1. EnCore Thermal Framing System, Kawneer, frame size 1.75” x 6”

2. Kawneer 1600 curtain wall system

Division 9 – Finishes

09105 – Interior Light Gauge Steel Framing
1. Studs and runners ASTM C845, min 20 gage, galvanizing ASTM A653, G40
2. Furring ASTM C645 G40 (G60 at locations in contact with exterior walls)
3. Ceiling suspension system – Drywall grid system and Stucco/Plaster Grid system by Armstrong

09108 Metal Blocking
1. Cold rolled channels – Minimum 1.5 inch, 16gage
2. Steel stud or stud segments – Minimum 2.5 inch stud, 20 or 25 galvanized steel

09250 – Gypsum Drywall
1. 5/8" gypsum wallboard ASTM C36(Type X at fire rated assembly)
2. Joint Compound ASTM C475 ready mixed all purpose vinyl compound
3. Joint tape ASTM C475 perforated cross fiber paper

09253 Gypsum Sheathing
1. Glass mat gypsum sheathing ASTM C1177 “Dens Glass Gold Fiberguard” 0.625 inch thickness, Type X
2. Joint Sealant – Dow 795 Building Sealant or Pecora 895

09263 – Gypsum Shaft Wall
1. Provide shaft wall systems at all mechanical shafts

09390 Tile
1. 2x2 ceramic tile floors in the bathrooms – 2 colors
2. 4x4 ceramic wall tile in the bathroom. – 2 colors

09511 – Acoustical Ceilings
1. 2x2 ACT ceiling tiles (allow for 25% of ceilings area to have painted GWB
2. Ultima 1912 Armstrong 24x24 thickness .75
3. Suspension system – Armstrong 9/16” Silhouette XL W/ 1/8” reveal (shadow molding at perimeter)
4. 2X2 ceramaguard ceiling tiles w/ 15/16” suspension system at wet areas, Environmental Prep room

09520 – Metal Ceiling Panels
1. Perforated metal panels (slots) T.B.D.

09650 – Resilient Flooring
1. Armstrong Marmorette Linoleum flooring
2. Johnsonite Tight Lock rubber base
3. Johnsonite Rubber stair treads and risers (Square nose RET roundel smooth rubber tile)

09680 – Carpeting
1. Provide an allowance for Miliken carpet tiles t in offices

09822 - Acoustical Insulation
1. Sound attenuation blanket ASTM C665

09825 Acoustical Seals
1. Concealed acoustical seals

09842 Acoustical Panels

2. 1” thick 6 pound density semi rigid fiberglass panels
3. Maharam Tek Wall fabric facing
4. Class A fire performance

09900 – Painting

1. Sherwin Williams with zero VOC content
2. 1 coat primer, 2 coat finish
3. Paint system for architecturally exposed steel framing, primer covered in steel spec

Division 10 – Specialties

10100 – Visual Display Boards

1. Claridge White Boards: balanced, laminated, 3ply face sheet, core, and backing sheet (provide two white boards in each classroom) with Slim line frame
2. Claridge – sliding writing board (manual horizontal slide)
3. 4’x4’ white boards with graph lines in math classrooms
4. Tack boards – Laminated tack surface on core 6mm thick Krommenie Bulletin Board Cork by Forbo (seamless up to 5’ x 16’)

10170 – Plastic Toilet Compartments

1. High density polyethylene or polypropylene
2. 1” thick panels with eased corners
3. Stainless steel brackets and fittings

10210 – Wall Louvers

4. Exterior Louver – Extruded aluminum, high water resistance, 5 inch blade
5. Airolite SCH 501 (ref. product)
6. Provide bird screens
7. Provide insect screen only in those areas not connected to duct work
8. Provide insulated blank off panels, sill pans and flashings

10502 – Metal Lockers

1. Type 1: 16 gage metal lockers for students (corridor)
2. Type 2: 16 gage metal lockers for P.E. (locker rooms)
3. Type 3: 16 gage metal lockers for athletics (team rooms)

10522 – Fire Extinguisher Cabinets

4. Typical Extinguishers – Filled charged pressurized tagged, dated and rechargeable
5. Fire Extinguisher Cabinets – Satin stainless steel, fully recessed with white letters. “SS Occult Series”. Larsen’s
6. Fire Extinguisher with Blanket Cabinet – FB 3612-RM
7. Fire Blanket 62x80 Wool treated with Dupont X-12 fire retardant CS-191-53

10810 Toilet Accessories

1. Bobrick Washroom Equipment –300 series Stainless Steel with Satin finish #4
    a. Multi-roll toilet tissue dispenser – B4388
    b. Recessed paper towel dispenser – B4362
    c. Recessed napkin vendor – B4350OC
    d. Recessed napkin disposal – B4353
    e. Lavatory mounted soap dispenser – B822
    f. Grab bars with snap flange – B5806
    g. Swing up bar – B4948
    h. Electric hand dryer – Eclipse B-740 115V
2. Provide paper towel dispensers in all labs and prep rooms (hands free - electric)

10440 – Interior Signs
1. 6x6 acrylic signs for each room

Division 11 Specialties, Equipment

11132 – Projection Screens
1. Manual projection screens for typical classrooms: Model B DaLite 72"x96" Matte White

11452 Appliances
1. Under counter refrigerator – Summit FF7BIADA Stainless Steel
2. Under counter Freezer – Summit SCFF55ADA Stainless Steel
3. Under counter Dishwasher – Summit DW2432SSADA Stainless Steel

11640 – Miscellaneous Laboratory Items
1. Epoxy resin peg board
2. Acid Storage cabinet – Just Rite Model 24160
3. Flammable storage cabinet – Just Rite Model 893400

Division 12 – Furnishings

12320 – Wood Casework

12325 – Manufactured Wood Laboratory Casework
1. Lab casework – Kewaunee Signature Series Contemporary Full Overlay, maple cabinets (with black epoxy counter tops and sinks)
2. Kewaunee wood mobile (maple) tables with epoxy resin tops and open book compartments.
3. Custom toe space grills for base cabinets on exterior walls
4. Custom pencil proof grills at window sill on counters at exterior wall

12482 Entrance Mats
1. Recessed polypropylene entrance mat – solution dyed poly synthetic fiber w/ non slip polyvinyl chloride backing
2. Extruded aluminum frame SSF-125 Pawling Corp.

12495 – Window Shades
1. Window shade Type 1 – Manually operated translucent light filtering window shade 14% openness (environmental lab)
2. Window shade Type 2 – Motorized operated dual shades room darkening and translucent window shades (physics lab clerestory and computer labs)
3. Extruded aluminum ceiling pocket for single and dual shade pockets

Division 13 – Special Construction

Division 14 – Vertical Transportation

14240 – Hydraulic Elevator
1. Kone EcoSpace Elevator 2500 lbs. front opening elevator. 8'-0" car height (13'-0" overhead) with 5'-0" pit and 6.5 horse power motor

Division 15 – Mechanical - See Mechanical narrative

Division 16 – Electrical - See Electrical narrative

Core Academic Spaces

General Classrooms

Functional Criteria

Area (NSF):	850
Quantity:	36

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V Alarm/Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’ Front, 12’ Back
Tack Board:	8’ Front, 8’ Back
Casework:	Storage at Window Wall
Shading Devices:	Roller Shades
Furniture:	Classroom Furniture
Equipment:	
Other:	

Communication & Technology

Telephone:	1 Per
Clock:	1 Per
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1 Per
Smart Board:	TBD
Cable TV Outlets:	1 Per
Other:	

Core Academic Spaces

Science Labs

Functional Criteria

Area (NSF):	1200
Quantity:	12

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Sinks, Gas, Shower, Eye
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12' Front, 12' Back
Tack Board:	8' Front, 8' Back
Casework:	Lab Benches, Window Wall
Shading Devices:	Roller Shades
Furniture:	Classroom
Equipment:	Fume Hoods as required,
Other:	

Communication & Technology

Telephone:	1 per
Clock:	1 per
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1 per
Smart Board:	TBD
Cable TV Outlets:	1 per
Other:	Gas Shut-off, Electrical shut-off

Core Academic Spaces

Hooked on Science Lab

Functional Criteria

Area (NSF):	1500
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Sinks, Gas, Shower, Eye
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’ Front, 12’ Back
Tack Board:	8’ Front, 8’ Back
Casework:	Lab Benches, Window Wall
Shading Devices:	Roller Shades
Furniture:	Classroom
Equipment:	Fume Hoods as required,
Other:	Dust collection if required

Communication & Technology

Telephone:	1 per
Clock:	1 per
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1 per
Smart Board:	TBD
Cable TV Outlets:	1 per
Other:	Gas Shut-off, Electrical shut-off

Core Academic Spaces

Prep Rooms

Functional Criteria

Area (NSF):	80
Quantity:	10

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Lab Sinks, Gas, Emergency Shower and Eye Wash
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	4’ Front
Tack Board:	4’ Back
Casework:	Lab Bench(s)
Shading Devices:	None
Furniture:	Stool(s)
Equipment:	Fume Hoods as required
Other:	

Communication & Technology

Telephone:	1 per
Clock:	1 per
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Core Academic Spaces

Teacher Support Centers

Functional Criteria

Area (NSF):	1500
Quantity:	5

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Sink w/ H&C
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’
Tack Board:	12’
Casework:	Window Wall
Shading Devices:	Roller Shades, Blinds
Furniture:	Office
Equipment:	
Other:	

Communication & Technology

Telephone:	12
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Core Academic Spaces

Small Group Seminar

Functional Criteria

Area (NSF):	600
Quantity:	5

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	8’
Tack Board:	8’
Casework:	None
Shading Devices:	None
Furniture:	Classroom if required
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	1
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Core Academic Spaces

Foreign Language Small Group Seminar (with kitchenette)

Functional Criteria

Area (NSF):	650
Quantity:	3

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Sink, DW if required
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	8’
Tack Board:	8’
Casework:	Kitchenette cabinets
Shading Devices:	Roller shades if required
Furniture:	Classroom if required
Equipment:	Ref., microwave
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	1
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Core Academic Spaces

Large Seminar

Functional Criteria

Area (NSF):	1700
Quantity:	1

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’
Tack Board:	8’
Casework:	None
Shading Devices:	Roller Shades if required
Furniture:	Lecture room seating
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	1
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Core Academic Spaces

Foreign Language Lab (includes recording space & storage)

Functional Criteria

Area (NSF):	2300
Quantity:	1

Room Surfaces

Floor:	Carpet/Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’
Tack Board:	12’
Casework:	None
Shading Devices:	Roller Shades, Blinds
Furniture:	Classroom seating
Equipment:	Language lab stations
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	1
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Core Academic Spaces

Resource Room

Functional Criteria

Area (NSF):	850
Quantity:	4

Room Surfaces

Floor:	Carpet/Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	4’
Casework:	Window Wall
Shading Devices:	Roller Shades and Blinds
Furniture:	Office
Equipment:	None
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	1
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Special Education Spaces

Learning Center Classrooms

Functional Criteria

Area (NSF):	850 (Tutorial)
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12' Front, 8' Back
Tack Board:	12' Front, 8' Back
Casework:	Storage at Window Wall
Shading Devices:	Roller Shades if required
Furniture:	Classroom
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Special Education Spaces

Special Education Classrooms

Functional Criteria

Area (NSF):	500 (Tutorial)
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’ Front, 8’ Back
Tack Board:	12’ Front, 8’ Back
Casework:	Storage at Window Wall
Shading Devices:	Roller Shades if required
Furniture:	Classroom
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Special Education Spaces

Therapy Room OT/PT & SPED Classroom

Functional Criteria

Area (NSF):	1070
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’ Front, 12’ Back
Tack Board:	8’ Front, 8’ Back
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Classroom
Equipment:	As Req’d for OT/PT
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Special Education Spaces

Classrooms (Pathways/Life Skills)

Functional Criteria

Area (NSF):	1070 (Pathways/Life Skills)
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12' Front, 8' Back
Tack Board:	12' Front, 8' Back
Casework:	Window Wall, Kitchenette (Life Skills)
Shading Devices:	Roller Shades
Furniture:	Classroom
Equipment:	Appliances (Life Skills)
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Special Education Spaces

Offices and Admin. Spaces

Functional Criteria

Area (NSF):	Varies
Quantity:	11

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood w/ Gasketing
Interior Windows:	None
Other:	Acoustically Isolated

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	4' Front
Tack Board:	4' Back
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Desk, Table, Chairs
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1 (No Bells)
Speaker:	TBD
TV Monitor:	TBD
Projector/ Projection Screen:	None
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Art & Music Spaces

2D Art Classroom (with storage)

Functional Criteria

Area (NSF):	1500, 150
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Multiple Sinks, H&C
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’ Front, 8’ Back
Tack Board:	8’ Front, 12’ Back
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Tables and Stools
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Art & Music Spaces

Ceramics (with storage and kiln room)

Functional Criteria

Area (NSF):	1200, 300, 100
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Multiple Sinks, H&C
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’ Front, 8’ Back
Tack Board:	8’ Front, 12’ Back
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Tables and Stools
Equipment:	Kiln, pottery wheels
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Art & Music Spaces

Architecture/Sculpture (with storage)

Functional Criteria

Area (NSF):	1500, 150
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Multiple Sinks, H&C
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12' Front, 8' Back
Tack Board:	8' Front, 12' Back
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Tables, Stools, Drafting tables
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Art & Music Spaces

Photography (with dark room and storage)

Functional Criteria

Area (NSF):	760, 300, 50
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Multiple Sinks, H&C
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’ Front, 8’ Back
Tack Board:	8’ Front, 12’ Back
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Tables and Stools
Equipment:	Dark Room Equipment
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Art & Music Spaces

Art Gallery

Functional Criteria

Area (NSF):	750
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Multiple Sinks, H&C
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent Track Lighting

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	TBD
Casework:	None
Shading Devices:	Roller Shades if required
Furniture:	none
Equipment:	
Other:	rails for hanging frames

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Art & Music Spaces

Band Room

Functional Criteria

Area (NSF):	2000
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	Wall Panels
Doors:	Wood, Gasketed
Interior Windows:	Yes, Acoustic Glass
Other:	Acoustically Isolated

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Sink, H&C
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’ Front, 8’ Back w/ Staffs
Tack Board:	12’ Front, 8’ Back
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Music Seating
Equipment:	Portable Risers
Other:	Sound System

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	
Other:	

Art & Music Spaces

Chorus Room

Functional Criteria

Area (NSF):	1400
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	Wall Panels
Doors:	Wood, Gasketed
Interior Windows:	Yes, Acoustic Glass
Other:	Acoustically Isolated

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Sink, H&C
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12' Front, 8' Back w/ Staffs
Tack Board:	8' Front, 12' Back
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Music Seating
Equipment:	Portable Risers
Other:	Sound System

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Art & Music Spaces

Orchestra

Functional Criteria

Area (NSF):	500
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	Wall Panels
Doors:	Wood, Gasketed
Interior Windows:	Yes, Acoustic Glass
Other:	Acoustically Isolated

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Sink, H&C
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’ Front, 8’ Back w/ Staffs
Tack Board:	8’ Front, 12’ Back
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Music Seating
Equipment:	Portable Risers
Other:	Sound System

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Art & Music Spaces

Large Seminar

Functional Criteria

Area (NSF):	1700
Quantity:	1

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12'
Tack Board:	8'
Casework:	None
Shading Devices:	Roller Shades if required
Furniture:	Lecture room seating
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	1
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Art & Music Spaces

Practice Rooms

Functional Criteria

Area (NSF):	75
Quantity:	5

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	Panels (4) Walls
Doors:	Wood, Gasketed
Interior Windows:	No
Other:	Acoustically Isolated

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	None
Casework:	None
Shading Devices:	None
Furniture:	Music Seating
Equipment:	
Other:	

Communication & Technology

Telephone:	None
Clock:	1
Speaker:	1
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Art & Music Spaces

Music Library

Functional Criteria

Area (NSF):	100
Quantity:	1

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	None
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Office w/ Shelving
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Art & Music Spaces

Art & Music Teacher Support

Functional Criteria

Area (NSF):	Varies
Quantity:	2

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	8’
Tack Board:	8’
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Office w/ Shelving
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Art & Music Spaces

Music Storage

Functional Criteria

Area (NSF):	Varies
Quantity:	2

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	None
Casework:	None
Shading Devices:	None
Furniture:	
Equipment:	
Other:	

Communication & Technology

Telephone:	None
Clock:	None
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Vocations & Technology Spaces

Fabrication Lab

Functional Criteria

Area (NSF):	2000
Quantity:	2

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12' Front, 8' Back
Tack Board:	12' Front, 8' Back
Casework:	Lab Benches
Shading Devices:	Blinds
Furniture:	Classroom w/ Wire Mgmt
Equipment:	Ceiling hung power cords Dust collection system
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Health & Physical Education Spaces

Gymnasium (with storage room)

Functional Criteria

Area (NSF):	9,540, 500
Quantity:	1

Room Surfaces

Floor:	Wood Athletic Flooring
Walls:	Painted/GWB High Impact
Ceiling:	Acoustic Metal Deck
Acoustical:	Wall Panels, High
Doors:	Wood
Interior Windows:	Acoustic Glass

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Water Coolers, Outside
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	None
Casework:	None
Shading Devices:	None
Furniture:	None
Equipment:	Bleachers, 6 Backboards, Ropes, Etc.
Other:	Divider Curtain, Climbing Wall

Communication & Technology

Telephone:	None
Clock:	2 w/ Protective Cages
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	2
Other:	Sound System

Health & Physical Education Spaces

PE Alternatives (Aerobics/Wrestling)

Functional Criteria

Area (NSF):	3000
Quantity:	1

Room Surfaces

Floor:	Wood Athletic Flooring
Walls:	Painted/GWB High Impact
Ceiling:	None
Acoustical:	Wall Panels
Doors:	Wood
Interior Windows:	Yes, Acoustic Glass
Other:	Protective Wall Pads

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Water Coolers
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Indirect/Direct Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	None
Casework:	None
Shading Devices:	None
Furniture:	None
Equipment:	Wrestling Mat Hoist
Other:	Mirrors if required

Communication & Technology

Telephone:	None
Clock:	2 w/ Protective Guards
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	1
Other:	Sound System

Health & Physical Education Spaces

Weight/Fitness Center

Functional Criteria

Area (NSF):	3000
Quantity:	1

Room Surfaces

Floor:	Rubber Sport Flooring
Walls:	Painted/GWB High Impact
Ceiling:	None
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes, Acoustic Glass
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Water Cooler
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	8’
Tack Board:	8’
Casework:	None
Shading Devices:	None
Furniture:	None
Equipment:	As Required
Other:	Mirrors if required

Communication & Technology

Telephone:	1
Clock:	2
Speaker:	TBD
TV Monitor:	4
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	2
Other:	Sound System

Health & Physical Education Spaces

Locker Rooms

Functional Criteria

Area (NSF):	1400
Quantity:	4

Room Surfaces

Floor:	Colored Conc./Ceramic Tile
Walls:	Painted/GWB High Impact
Ceiling:	Painted/GWB
Acoustical:	None
Doors:	Wood
Interior Windows:	No
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Lavs, Toilets and Showers
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Recessed Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	8’
Tack Board:	8’
Casework:	None
Shading Devices:	None Required
Furniture:	Wood Benches (Fastened)
Equipment:	Metal Lockers
Other:	Polyethylene Partitions

Communication & Technology

Telephone:	None
Clock:	1 Each
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Health & Physical Education Spaces

Team Rooms

Functional Criteria

Area (NSF):	675 and (1) at 150
Quantity:	5

Room Surfaces

Floor:	Colored Conc.
Walls:	Painted/GWB High Impact
Ceiling:	Painted/GWB
Acoustical:	None
Doors:	Wood
Interior Windows:	No
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Recessed Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	8’
Tack Board:	8’
Casework:	None
Shading Devices:	None Required
Furniture:	Wood Benches (Fastened)
Equipment:	Metal Lockers
Other:	Polyethylene Partitions If required

Communication & Technology

Telephone:	None
Clock:	1 Each
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	TBD
Smart Board:	None
Cable TV Outlets:	None
Other:	

Health & Physical Education Spaces

Offices

Functional Criteria

Area (NSF):	Varies
Quantity:	3

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	4’
Tack Board:	4’
Casework:	None
Shading Devices:	Roller Shades, Blinds
Furniture:	Office
Equipment:	None
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	1
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Health & Physical Education Spaces

Trainer

Functional Criteria

Area (NSF):	600
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	4’
Tack Board:	4’
Casework:	None
Shading Devices:	Roller Shades, Blinds
Furniture:	Office
Equipment:	Ref., Ice Machine
Other:	Therapy equipment as req’d

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	1
TV Monitor:	TBD
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Health & Physical Education Spaces

P.E. Storage

Functional Criteria

Area (NSF):	500
Quantity:	2

Room Surfaces

Floor:	Conc. or Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	None
Casework:	None
Shading Devices:	None
Furniture:	None
Equipment:	None
Other:	

Communication & Technology

Telephone:	None
Clock:	None
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Health & Physical Education Spaces

Health Classroom

Functional Criteria

Area (NSF):	850
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’ Front, 12’ Back
Tack Board:	8’ Front, 8’ Back
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Classroom
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Media Center Spaces

Media Center and Support Spaces

Functional Criteria

Area (NSF):	10,750 (total)
Quantity:	12 (Sizes Vary)

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Sink H&C in work room
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	8' Front, (Project Rooms)
Tack Board:	8' Back (Project Rooms) 20' Display Tack Board
Casework:	Circulation Desk, Book Library Book Shelves, Etc
Shading Devices:	Blinds
Furniture:	Table, Chairs, Book Shelves, Etc.
Equipment	Security Device(s)
Other:	

Communication & Technology

Telephone:	Multiple
Clock:	Multiple
Speaker:	TBD
TV Monitor:	1
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	2
Other:	

Media Center Spaces

Recording Studio

Functional Criteria

Area (NSF):	1,100
Quantity:	5 (Sizes Vary)

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Sink in repair room
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’ Front, 12 Back
Tack Board:	8’ Back, 8” Front
Casework:	Storage at Window Wall Repair counters
Shading Devices:	Blinds
Furniture:	Computer Stations
Equipment	Security Device(s)
Other:	

Communication & Technology

Telephone:	Multiple
Clock:	Multiple
Speaker:	TBD
TV Monitor:	1
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	2
Other:	

Media Center Spaces

Radio Station

Functional Criteria

Area (NSF):	1,840
Quantity:	5 (Sizes Vary)

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	8’
Tack Board:	8’
Casework:	Broadcast Station
Shading Devices:	Blinds
Furniture:	Chairs
Equipment	Security Device(s)
Other:	Radio equipment by other

Communication & Technology

Telephone:	Multiple
Clock:	Multiple
Speaker:	TBD
TV Monitor:	1
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	2
Other:	

Media Center Spaces

Cable TV (CCTV)

Functional Criteria

Area (NSF):	1,600
Quantity:	5 (Sizes Vary)

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	8’
Tack Board:	8’
Casework:	Broadcast Station
Shading Devices:	Blinds
Furniture:	Chairs
Equipment	Security Device(s)
Other:	TV equipment by other

Communication & Technology

Telephone:	Multiple
Clock:	Multiple
Speaker:	TBD
TV Monitor:	1
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	as required
Other:	

Auditorium/ Drama Spaces

Auditorium (w/ control booth) & Stage

Functional Criteria

Area (NSF):	7500, 200, 2800
Quantity:	1 Each

Room Surfaces

Floor:	Carpet/Conc., Wood(stage)
Walls:	Painted/GWB
Ceiling:	Painted/GWB Exposed
Acoustical:	Panels, Back and Ceiling
Doors:	Wood
Interior Windows:	TBD
Other:	Stage Curtains

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	House and Stage Lighting

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	None
Casework:	None
Shading Devices:	Blackout as req'd
Furniture:	Theater Seating
Equipment:	Fire Curtain as req'd
Other:	Rigging, Music Risers

Communication & Technology

Telephone:	None
Clock:	2
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1, Powered
Smart Board:	None
Cable TV Outlets:	2
Other:	State of the Art A/V Systems

Auditorium/ Drama Spaces

Dressing Rooms & Storage

Functional Criteria

Area (NSF):	Varies
Quantity:	5

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Sink H&C (Dressing Room)
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	4' Front (Dressing Room)
Tack Board:	4' Back (Dressing Room)
Casework:	Make-up counters
Shading Devices:	Blinds
Furniture:	Changing Stations
Equipment	Security Device(s)
Other:	Mirrors

Communication & Technology

Telephone:	Multiple
Clock:	Multiple
Speaker:	TBD
TV Monitor:	1
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	2
Other:	

Dining & Food Service Spaces

Cafeteria and Staff Lunch Room

Functional Criteria

Area (NSF):	6250, 560
Quantity:	1 Each

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Metal Deck
Acoustical:	Wall Panels
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	12', Four Walls
Casework:	None
Shading Devices:	None
Furniture:	Cafeteria tables w/ Stools Tables & Chairs (staff)
Equipment:	Vending Machines
Other:	

Communication & Technology

Telephone:	1, Faculty Room Only
Clock:	2
Speaker:	TBD
TV Monitor:	2, Flat Screen
Projector/ Projection Screen:	1
Smart Board:	None
Cable TV Outlets:	1
Other:	

Dining & Food Service Spaces

Kitchen & Serving

Functional Criteria

Area (NSF):	3,790
Quantity:	Varies

Room Surfaces

Floor:	Epoxy or Resilient
Walls:	Epoxy Paint/GWB
Ceiling:	Acoustic Tile, Mylar
Acoustical:	None
Doors:	Wood
Interior Windows:	No
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	See Kitchen Report
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Recessed Fluor. w/ Lens

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	4’
Casework:	See Kitchen Report
Shading Devices:	Roller Shades as req’d
Furniture:	Office
Equipment:	Food Service
Other:	Metal Lockers

Communication & Technology

Telephone:	2
Clock:	2
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Medical Spaces

Health Suite

Functional Criteria

Area (NSF):	1,110
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Multiple Sinks H&C, Toilets
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Ceiling and Wall Fluor.

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	4’
Casework:	Recept. Desk, Work Station
Shading Devices:	Roller Shades
Furniture:	Misc. Medical Equipment
Equipment:	Privacy Curtains, Refrig.
Other:	Lock Box

Communication & Technology

Telephone:	4
Clock:	4
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	Nurse Call

Administration & Guidance Spaces

Offices and Support Spaces

Functional Criteria

Area (NSF):	5,930 (total)
Quantity:	Varies

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Sinks (H & C) as req'd
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	4' (Conf. Areas)
Tack Board:	4'
Casework:	Storage cabinet as req'd
Shading Devices:	Roller Shades
Furniture:	Office, Conf. Tables & Chairs
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	1
TV Monitor:	None
Projector/ Projection Screen:	Conf. Room
Smart Board:	TBD
Cable TV Outlets:	None
Other:	

Administration & Guidance Spaces

Career Resource Room

Functional Criteria

Area (NSF):	950
Quantity:	1

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	8’
Tack Board:	24’
Casework:	Book Shelving, cabinets
Shading Devices:	Roller Shades
Furniture:	Office
Equipment:	Computer Stations
Other:	

Communication & Technology

Telephone:	1
Clock:	1
Speaker:	1
TV Monitor:	1
Projector/ Projection Screen:	1
Smart Board:	TBD
Cable TV Outlets:	1
Other:	

Administration & Guidance Spaces

Compass Classroom

Functional Criteria

Area (NSF):	850
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V Alarm/Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	12’ Front, 12’ Back
Tack Board:	8’ Front, 8’ Back
Casework:	Storage at Window Wall
Shading Devices:	Roller Shades
Furniture:	Classroom Furniture
Equipment:	
Other:	

Communication & Technology

Telephone:	1 Per
Clock:	1 Per
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1 Per
Smart Board:	TBD
Cable TV Outlets:	1 Per
Other:	

Administration & Guidance Spaces

Challenge, Planning, Network, Post-Hospitalization

Functional Criteria

Area (NSF):	500
Quantity:	4

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	Yes
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V Alarm/Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	8’ Front, 8’ Back
Tack Board:	8’ Front, 8’ Back
Casework:	Storage at Window Wall
Shading Devices:	Roller Shades
Furniture:	Classroom Furniture Lounge Furn. As req’d
Equipment:	TBD
Other:	

Communication & Technology

Telephone:	1 Per
Clock:	1 Per
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	1 Per
Smart Board:	TBD
Cable TV Outlets:	1 Per
Other:	

Custodial & Maintenance Spaces

Offices and Work Spaces

Functional Criteria

Area (NSF):	2,800 (total)
Quantity:	7

Room Surfaces

Floor:	Resilient Flooring/Conc.
Walls:	Painted/GWB and CMU
Ceiling:	Acoustic Tile/Painted Struct.
Acoustical:	None
Doors:	Wood and Painted Metal
Interior Windows:	None
Other:	

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Sinks, H&C, Toilets
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Recessed/Surface Fluor.

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	4’
Casework:	Kitchenette w/ Sink
Shading Devices:	None
Furniture:	Office
Equipment:	Miscellaneous Custodial
Other:	Metal Lockers

Communication & Technology

Telephone:	2
Clock:	2
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Other

Athletic Center (w/ storage)

Functional Criteria

Area (NSF):	24,300
Quantity:	1

Room Surfaces

Floor:	Resilient Sports Flooring
Walls:	Painted/GWB High Impact
Ceiling:	Acoustic Metal Deck
Acoustical:	Wall Panels, High
Doors:	Wood
Interior Windows:	Acoustic Glass

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	Water Coolers, Outside
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	None
Casework:	None
Shading Devices:	None
Furniture:	None
Equipment:	Bleachers, 6 Backboards, Sleeves and covers for net posts
Other:	Divider Curtain

Communication & Technology

Telephone:	None
Clock:	2 w/ Protective Cages
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	2
Other:	Sound System

Other

Adult Education Offices

Functional Criteria

Area (NSF):	400, 200
Quantity:	2

Room Surfaces

Floor:	Carpet
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	None
Other:	Acoustically Isolated

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	4’ Front
Tack Board:	4’ Back
Casework:	Window Wall
Shading Devices:	Roller Shades
Furniture:	Desk, Table, Chairs
Equipment:	
Other:	

Communication & Technology

Telephone:	1
Clock:	1 (No Bells)
Speaker:	TBD
TV Monitor:	TBD
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

Other

School Store

Functional Criteria

Area (NSF):	100
Quantity:	1

Room Surfaces

Floor:	Resilient Flooring
Walls:	Painted/GWB
Ceiling:	Acoustic Tile
Acoustical:	None
Doors:	Wood
Interior Windows:	None
Other:	Acoustically Isolated

Building Services

Mechanical:	HVAC/Radiant
Plumbing:	None
Fire Protection:	A/V, Sprinklers
Electrical:	Numerous Outlets
Lighting:	Direct/Indirect Fluorescent

Furnishings, Fixtures & Equipment

Marker Board:	None
Tack Board:	4' Back
Casework:	Shelving
Shading Devices:	None
Furniture:	
Equipment:	
Other:	Slatwall

Communication & Technology

Telephone:	1
Clock:	1 (No Bells)
Speaker:	TBD
TV Monitor:	None
Projector/ Projection Screen:	None
Smart Board:	None
Cable TV Outlets:	None
Other:	

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CIVIL OUTLINE SPECIFICATIONS – CONCORD-CARLISLE HIGH SCHOOL

SITEWORK

SECTION 024113 UTILITY DEMOLITION (Excluding Building)

Provide labor, materials and equipment necessary to perform select site demolition as indicated on the plans.

Preparation
Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain. Utilize coverage, partitions, and weatherproofing to prevent soilage, damage, and spread of dust or fumes to areas and items outside demolition area. Locate, identify, cap off, and disconnect utility services that are not indicated to remain.

Demolition
Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on the Conceptual Drawings in accordance with demolition schedule and governing regulations.

Disposal of Demolished Materials
Remove from site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site.

Cleanup and Repair
Remove tools, equipment, and demolished materials from site upon completion of demolition work. Remove protections and leave interior areas broom clean.

SECTION 312000 EARTH MOVING

Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Preparing subgrades for buildings, structures, roadways, walkways, and landscaping.
2. Excavating and backfilling for buildings, structures, roadways, and walkways.
3. Sheeting, shoring, and dewatering of trenches and excavations.
4. Removal of underground utilities.
5. Drainage course for slabs-on-grade.
6. Subbase course for concrete pavements.
7. Subbase and base course for asphalt paving.
8. Subsurface drainage backfill for walls and trenches.
9. Excavating and backfilling for utility trenches.
10. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.

SECTION 312500 EROSION AND SEDIMENTATION CONTROLS

Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Control measures to prevent all erosion, siltation and sedimentation of wetlands, waterways, construction areas, adjacent areas and off-site areas.

2. Control measures will be accomplished at all areas subject to erosion adjacent to or in the following work areas:
   a. Soil stockpiles and on-site storage and staging areas.
   b. Cut and fill slopes and other stripped and graded areas.
   c. Constructed and existing swales and ditches.
   d. Drain inlets/Catch Basins
   e. At edge of wetlands areas, if applicable, as shown on Drawings.
3. Additional means of protection will be provided by the Contractor as required for continued or unforeseen erosion problems, at no additional cost to the Owner. The Conceptual Drawings indicate the minimum requirements for sedimentation control. The Contractor will install all measures needed to control sediment and erosion as required by the Contractor and Sub-contractor's construction methods and operations, the weather conditions, and as directed by the Engineer.
4. Periodic maintenance of all sediment control structures will be provided to ensure intended purpose is accomplished. Sediment control measures will be in working condition at the end of each day.
5. After any significant rainfall, sediment control structures will be inspected for integrity. Any damaged device will be corrected immediately.
6. Removal of all control measures after the completion of work and the establishment of lawns and plantings.

SECTION 321000 PAVING, WALKWAYS, CURBING AND EDGING

Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Bituminous Concrete Pavements.
2. Sidewalks.
3. Setting of Curb.
4. Installing Pavement Markings

Bituminous Pavement
Roadway pavement will consist of the following: 12-inch Gravel Borrow for Aggregate Base complying with Massachusetts Highway Department (MHD) Specifications Section M1.03.0 Type "B", 2-inch Type I-1 Bituminous Concrete Binder conforming to MHD Specification Section M3.11.03, and 2-inch Type I-1 Bituminous Concrete Top Course conforming to MHD Specification Section M3.11.03.

Porous Asphalt
Porous asphalt pavement may be used in parking lots, fire lanes, and pedestrian access applications. The porous asphalt will comply with any or all of the following specifications and guidelines as determined by the engineer of record: *General Porous Asphalt Bituminous Paving and Groundwater Infiltration Beds*, specification by UNH Stormwater Center, February, 2005, *Design, Construction, and Maintenance Guide for Porous Asphalt Pavements, Information Series 131*, National Asphalt Pavement Association (NAPA), 2003 (revised 2008), *Design, Construction, and Maintenance of Open-Graded Friction Courses, Information Series 115*, NAPA, 2002 or latest addition. The porous asphalt, from the top down, will rest on a choker course then a filter course, filter blanket and a reservoir course. Non-woven geotextile fabric will only be used for structural purposes as directed by the engineer.

Concrete Sidewalks
Concrete sidewalks will consist of the following: 6-inch Gravel Borrow for Aggregate Base complying with MHD Specifications Section M1.03.0 Type "B", 4-inch (minimum) poured-in-place air-entrained, 4,000 psi at 28 days concrete. Concrete Sidewalks will be a minimum of 6-feet wide and include an integral cast-in-place curb.

Vertical Granite Curb
Vertical Granite Curb will be of Massachusetts Department of Public Works (M.D.P.W) Granite Curb. Granite Curb will have a 6-inch reveal. Granite Curb will conform to Section 500 of the MHD Specifications for Curbing and Edging.

Driveways
Paved driveways will be of Bituminous Concrete conforming to MHD Specifications for 12-inches Gravel Borrow for Aggregate Base, 2 ½-inches Bituminous Concrete Binder, and 1 ½-inches Bituminous Concrete Top Course.

Wheelchair Ramps
Wheelchair Ramps will be provided at all pedestrian crossings in compliance with the Americans with Disabilities Act (ADA). Ramps and landings will be 4-inch concrete, air-entrained, 4,000 psi at 28 days. Ramps and landings will be a minimum of 4-feet and transition slopes will be a maximum of 12:1.

Pavement Marking
Marking paint for crosswalks and lane markings will be fast drying white traffic paint and fast drying yellow traffic paint as specified in MHD Standard Specifications under Sections M7.01.10, and M7.01.11, respectively. Work under this item will be in conformance with Section 860 of the Standard Specifications and the Manual on Uniform Traffic Control Devices. Paint will be applied with mechanical equipment to produce uniform straight edges, in two (2) coats, at manufacturer's recommended rates.

SECTION 331000 WATER UTILITIES

Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Installation of ductile iron pipe, fittings, accessories, and appurtenant work, at the locations and to the lines and grades indicated on the Conceptual Drawings.
2. The installation of hydrants, gate valves and boxes and concrete thrust blocks.
3. Furnishing and installation of all materials required to connect to new well, new water mains, replace existing services, new gate valves, tapping sleeves, removal of existing gate valves, corporation cocks, saddles, curb stops, service boxes, and abandoning of the existing water system (if applicable), all as shown on the Conceptual Drawings. All valves, twelve (12) inches and larger will be butterfly valves. All abandoned pipes will be plugged and capped with concrete.

Ductile Iron Pipe and Fittings for Water Distribution
Water distribution mains will be assumed to be 8-inch diameter. Fire service connections to buildings will be assumed to be 8-inch diameter and domestic water service connections to buildings will be assumed to be 4-inch diameter. All ductile iron water pipe will conform to American Water Works Association (AWWA) C150 and AWWA C151. Water distributions systems will be Class 52 ductile iron pipe with push-on or mechanical joints with gaskets conforming to AWWA C111. Ductile iron water pipe will be double cement lined inside and asphalt seal coated in accordance with AWWA C104. The pipe will be furnished with necessary materials and equipment recommended by the manufacturer for use in joining pipe lengths and fittings conforming to ANSI Specifications.

Disinfection of Water Mains and Appurtenances
All pipelines will be disinfected, after testing and prior to being placed into service, in accordance with the AWWA Standard C651.

SECTION 333000 -WASTEWATER COLLECTION

Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Sanitary sewage system piping, structures, pumps, guide rails, control system and appurtenances from a point ten (10) feet outside the building to the point of disposal.
2. Sanitary sewer ejector pumps and force mains.

Polyvinyl Chloride (PVC) Pipe for Sanitary Sewage Conveyance
Sanitary Sewage discharge pipes from buildings will be assumed to be a minimum of 6-inch diameter polyvinyl chloride (PVC) pipe. Sanitary Sewage mains will be assumed to be 8-inch diameter PVC pipe unless otherwise noted on the Conceptual Drawings. Sanitary Sewage pipe will be type PSM, SDR-35 PVC pipe conforming to the requirements of American Society for Testing and Materials (ASTM) D3034, current edition. Joints will be elastomeric, oil resistant gasket joints conforming to the requirements of ASTM D3212, current edition, push-on type. Tee branches, wyes, and fittings will be type PSM SDR-35 PVC pipe, conforming to ASTM D3034, current edition.

Tanks
Provide grease traps of dimensions and capacity as indicated on the Contract Drawings. Access hatches will be provided as shown on the Contract Drawings. Tanks will be tested and installed according to the Manufacturer's Guidelines in effect at time of installation.

Cleanouts
Cleanouts will be cast iron with a heavy-duty brass top. Cleanout frame and cover will be set in concrete 12 by 12 by 6-inches deep, except where location is in bituminous paving. Set top of cleanout 1-inch above surrounding earth grade or flush with grade when installed in paving.

Tap Connections
Branch connections to existing pipes will be made by installing a saddle or wye connection.

Sanitary Sewer Manholes
Precast reinforced concrete manhole structures will comply with material, design, and construction standards specified under ASTM C478. Manholes will be 4-foot diameter. Manhole tops will be precast concrete designed to meet American Association of Standard Highway and Transportation Officials (AASHTO) H20 loadings. Frames and covers will be of cast iron conforming to the requirements of ASTM A48, Class No. 30. Cement for manholes will be Type II and concrete will have a minimum strength of 4,000 psi. Joints between sections of concrete structures will be sealed with a self-sealing butyl rubber based flexible joint sealant gasket complying with ASTM C443. Manhole Steps and reinforcing rods will conform to ASTM A615. Manhole frames will be adjusted to finish course with brick masonry.

SECTION 334000 STORM DRAINAGE UTILITIES

Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Reinforced concrete pipe.
2. Corrugated polyethylene pipe.
3. Polyvinyl chloride pipe.
4. Utility structures.
5. Drainage catch basins and manholes.

Corrugated Polyethylene Pipe
Stormwater collected within catch basins on site and on rooftops will be conveyed through a closed drainage system using corrugated polyethylene pipe (CPP). The CPP pipe will be sized utilizing accepted engineering practices for closed drainage systems. CPP pipe will conform to AASHTO M-294, AASHTO M242, or AASHTO MP6, Type S depending upon the diameter of the pipe.

Storm Drain Manholes

Precast reinforced concrete manhole structures will comply with material, design, and construction standards specified under ASTM C478. Manholes will be 4-foot diameter. Manhole tops will be precast concrete designed to meet H20 loadings. Frames and covers will be of cast iron conforming to the requirements of ASTM A48, Class No. 30. Cement for manholes will be Type II and concrete will have a minimum strength of 4,000 psi. Joints between sections of concrete structures will be sealed with a self-sealing butyl rubber based flexible joint sealant gasket complying with ASTM C443. Manhole Steps and reinforcing rods will conform to ASTM A615. Manhole frames will be adjusted to finish course with brick masonry.

Catch Basins

Precast reinforced concrete catch basins will comply with material, design, and construction standards specified under ASTM C478. Frames and grates will be of 4-flange cast iron. Catch basins will have removable hoods and a minimum 4-feet deep sump.

Water Quality Structures

The water quality structure will have a proven record of having the capability to remove a minimum of 75% of the sediment load from the low-flow storm conditions from the total catchment area of the drainage system. The structure must be capable of removing the silt and clay-sized particles. The water quality structure will be installed underground as part of the stormwater system and be designed to accept AASHTO H-20 Loading. The water quality structure will be equipped with a high flow bypass and without backwater conditions so as to prevent resuspension of material. The structure will be maintainable from the surface

Underground Detention System

The Underground Detention System will be constructed from corrugated polyethylene pipe (CPP). Initial backfill will be free of particles larger than 1 1/2 inches in any dimension and placed above and below the piping to a height of 12 inches. The backfill will be carefully compacted under pipe haunches and compacted evenly up on both sides and along the full length of piping to avoid damage or displacement of piping.

Bio-retention System

The Bio-retention System will consist of a sand loam soil mixture that will infiltrate and treat runoff from parking lots, roofs, roadways and other impervious surfaces. The bio-retention system is a willow depression that will consist of the following materials, from top to bottom: plant materials (grasses, shrubs or trees), hard wood mulch, a mixture of sand, compost, and topsoil, then pea stone or coarse sand with a crushed stone layer surrounding a 4-inch minimum, perforated corrugated polyethylene pipe. A geotextile layer may be required as directed by the engineer under the crushed stone layer.

SECTION 434000 GAS AND LIQUID STORAGE (TIGHT TANK)

Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

Liquid Storage Tank will be a double-wall fiberglass reinforced plastic (FRP) Underwriters Laboratories-labeled underground storage tank as shown on the drawings. The tank size, fittings and accessories will be as shown on the drawings.

Tank will be tested and installed according to the Manufacturer's Manual and Operating Guidelines for Double-Wall Fiberglass Underground Storage Tanks in effect at time of installation.

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CONCORD - CARLISLE REGIONAL HIGH SCHOOL
Concord, MA

Master Plan Study - Structural Report
March 4, 2010 – **SECOND DRAFT**

INTRODUCTION

Foley Buhl Roberts & Associates, Inc. (FBRA) is collaborating with The Office of Michael Rosenfeld, Inc., *Architects* (OMR) on the Master Plan Study for the Concord – Carlisle Regional High School in Concord, MA. FBRA conducted a preliminary review of structural conditions and issues at the facility and has continued to work with OMR and the Project Team to evaluate potential alternatives for the renovation or replacement of various wings in the complex.

The purpose of this report is to identify and to describe the existing structural systems of the various sections of the school and to comment on the structural conditions/issues observed (**Sections I – III**). General comments relating to subsurface soils conditions are noted in **Section IV.** Structural systems for proposed, new construction are described **Section V** (along with quantity estimates) and the anticipated scope of structural work in the remaining sections of the existing building is summarized in **Section VI.** Finally, a Structural Outline Specification is presented in **Section VII**.

This Structural Report should be used in conjunction with the Master Plan Reports and documents of the other disciplines.

Structural conditions at the Concord Carlisle Regional High School were observed at the site on November 9, 2009.

The following documents were reviewed in the preparation of this Master Plan Structural Report:

- *Structural Drawings S-1 to S-13*, prepared by A. B. Onderdonk Consulting Engineer, Glastonbury, CT, dated July 7, 1958 (Includes soil boring logs on Drawing S-1).
- *Architectural Drawings A-1 to A-9,* prepared by Warren H. Ashley, AIA Architect, West Hartford, CT, dated August 31, 1964 (Science Building addition - Structural Drawings not available).
- *Structural Drawings S-1 to S-10,* prepared by Korslund, LeNormand & Quann, Inc. Architects and Engineers, Norwood, MA, dated October 11, 1973 (Includes soil boring logs on Drawing G-3).
- *Renovations to the Concord-Carlisle High School – Architectural Drawings,* prepared by HMFH Architects, Inc., Cambridge, MA, dated January 8, 1992.
- *Revised Phase II Renovations to the Concord-Carlisle High School – Structural Drawing S-1,* prepared by Foley & Buhl Engineering, Inc., Watertown, MA, dated February 1, 1996.
- *Concord Carlisle High School Existing Conditions Report* (Structural Section), prepared by Symmes Maini & McKee Associates, Cambridge, MA, dated March 18, 2005.
- *Preliminary Phase Geotechnical Studies,* prepared by The Geotechnical Group, Inc., Needham, MA, dated June 20, 2005.

The November 14, 2000, *Concord-Carlisle High School Space Utilization Study,* prepared by HMFH Architects, Inc. was not reviewed, as this particular report did not address structural issues.

No exploratory demolition or structural materials testing was conducted in conjunction with this existing conditions review.

I. GENERAL DESCRIPTION – EXISTING CONSTRUCTION

The Concord Carlisle Regional High School is located at 500 Walden Street in Concord, MA. The school has an enrollment of over 1260 students. The total area of the complex is approximately 228,550 gross square feet.

The original high school was constructed in 1960 and included a science building (S - Building), a humanities – administration building (H - Building), a theater arts building (A – Building (includes the Auditorium)), a dining building (Cafeteria) and a Gymnasium/Locker Room building.

A one-story addition to the original science building was constructed in 1965.

In 1975, several new buildings/wings were added to the complex. The I – Building (Industrial Arts) was constructed to the south of the original S – Building. The L – Building (Language) was constructed on the north side of the S – Building. A multi-level Library structure with a lobby was also constructed, providing an internal connection between the A – Building and the Cafeteria. The Cafeteria was expanded (to the east) at this time as well. An additional Gymnasium (the Lower Gym) was constructed to the west of the original gym.

All original buildings/wings and subsequent additions are one-story, with the exception of the (1960) Gymnasium and the (1975) Library. Buildings/wings in the complex are interconnected by interior or exterior walkways/corridors. The First (Main) Floor elevation of the buildings varies, in some cases. Internal ramps and exterior connecting links transition between buildings where the First Floor elevations do not align.

There are (partial) basement Mechanical Rooms below the First Floor in the A – Building, the H – Building, the I – Building (this mechanical room was actually constructed with the 1965 S – Building addition) and the Gymnasium.

A significant portion of the1960’s construction was re-clad in 1992, eliminating the areas of original, floor-to-ceiling glazing. In addition, there have been various repairs and renovations to the complex (in 1992 and in 1996), involving little or no structural work.

The original (1960) buildings and subsequent (1965 and 1975) additions are steel framed, as described below and as summarized in the 2005 Symmes Maini & McKee Associates report. Typical 1960 roof construction consists of manufactured, cementitious wood fiber (e.g. Tectum) roof decking with steel bulb tees (sub-purlins), supported by wide flange steel purlins spanning to steel beams that are supported by steel columns (“W”, “T”, “L” or Tube shape). The roof of the 1965 S – Building addition appears to be similarly framed (Structural Drawings not available). 1975 roof construction typically consists of 1½” deep steel roof deck spanning to open web steel joists. Steel joists are supported by steel beams and steel columns.

Second Floor construction at the (1975) Library is steel framed, with a concrete slab on open web steel bar joists, supported by steel beams and columns.

First (Main) Floor construction is typically a concrete slab on grade, except precast concrete plank was installed over MEP tunnels and basement Mechanical Rooms below the First Floor level. At the original Gymnasium building, the floor is structured with either precast concrete plank (over the Mechanical Room) or a reinforced concrete slab supported by steel beams and columns (over the Locker Rooms).

Foundations at all buildings/wings are conventional spread footings.

II. STRUCTURAL SYSTEMS DESCRIPTION – EXISTING CONSTRUCTION

Structural Materials:

Original Construction – 1960:

Concrete is noted to be 2,500 psi typically, with 3,000 psi used at the Gymnasium Building (structural slab at the First Floor). Structural Steel specifications are not noted on the Structural Drawings; however, structural steel is likely ASTM A7, with a minimum yield strength of 33,000 psi.

1975 Additions:

Concrete is noted to be 3,000 psi, generally. Reinforcing bars are typically intermediate grade (40,000 psi). Structural Steel is noted to be ASTM A36, with a minimum yield strength of 36,000 psi.

Allowable Soil Bearing Pressure:

Original Construction – 1960:

Spread footings were proportioned for a maximum allowable bearing pressure of two (2) tons per square foot (tsf). Representative structural calculations generally confirm this design bearing pressure. The bottom of exterior footings is typically a minimum of 4 feet below finished grade.

1975 Additions:

Spread footings were proportioned for a maximum allowable bearing pressure of two (2) tons per square foot (tsf). Representative structural calculations generally confirm this design bearing pressure. The bottom of exterior footings is typically a minimum of 4 feet below finished grade.

Design Roof and Floor Loads:

Original Construction – 1960:

Roof construction has typically been designed for a 40 psf live (snow) load. Representative structural calculations generally confirm this design load. The current building code would require that flat roofs be designed for a minimum snow load of 42.4 psf (based on a ground snow load of 55 psf in Concord). It does not appear that low roofs adjacent to higher roofs (e.g. surrounding the Auditorium) have been designed for increased loading due to snow drifting. These areas will need to be evaluated and reinforced (as appropriate) in conjunction with future renovations to the facility.

The design live loads for framed floor construction (over MEP tunnels and the First Floor of the Gymnasium Building) are not noted on the Structural Drawings. The determination of design live loads for framed floor construction is beyond the scope of this report.

1975 Additions:

Roof construction has typically been designed for a 40 psf live (snow) load. Representative structural calculations generally confirm this design load. Again, the current building code would require that flat roofs be designed for a minimum snow load of 42.4 psf (based on a ground snow load of 55 psf in Concord). It appears that low roofs adjacent to higher roofs (e.g. between the original and lower Gymnasiums) have been designed for increased loading due to snow drifting. Original low roof areas adjacent to the higher, 1975 Library construction were reinforced when the Library was built.

The design live loads are noted to be 50 psf at typical classrooms and laboratories, with a 100 psf live load at corridors and storerooms and 150 psf at the Library. With the exception of the Library Second Floor, most floor areas are slab on grade construction.

Roof Construction:

Original Construction – 1960:

Roof construction at the S – Building consists of a 2½" thick, manufactured cementitious wood fiber (Tectum) decking supported by steel bulb tees (sub purlins). Steel bulb tees are typically spaced at 2'-8" o.c. and span to wide flange steel purlins. Interior columns (typically 5" WF) are generally arranged in a double-loaded corridor fashion, with 28'-2", 10'-10" (corridor) and 32'-6" typical spans. Perimeter columns/mullions (typically structural tees) are spaced at 6'-6" o.c. and are integrated with the exterior wall construction. The top of steel is 10'-4½" above the floor. Roof construction at the 1965 addition to this building is likely similar.

Roof Construction at the H – Building is similar, with typical purlin spans of 26'-0" and beam spans varying across the width of the building. Interior columns are typically square tubes. Perimeter columns/mullions (typically structural tees) are spaced at 6'-6" o.c. and are integrated with the exterior wall construction. The top of steel is 10'-4½" above the floor.

The roof of the Gymnasium is suspended from six (6), external, 36" deep wide flange steel rigid frames, clear spanning the space (approximately 106 feet). The frames are spaced at 21'-1½" on centers. The roof is suspended from the frames by 3½" diameter steel pipes and consists of a 2½" deep Tectum deck with steel bulb tees, typically spanning 9'-9" to the suspended steel beams. Perimeter columns/mullions (typically structural tees) are spaced at 6'-6" o.c. and are integrated with the exterior wall construction. The top of steel beam is approximately 21'-10" above the floor below.

Roof construction at the Cafeteria consists of Tectum deck/steel bulb tees spanning to wide flange steel purlins. Purlins typically span 19'-6" and are supported by 27" deep, wide flange steel rigid frames. Steel frames clear span the space, approximately 79 feet. Perimeter columns/mullions (typically structural tees) are spaced at 6'-6" o.c. and are integrated with the exterior wall construction. The top of steel is 10'-4½" above the floor.

The roof of the A – Building is also constructed with Tectum decking and steel bulb tees. At the high roof, bulb tees span 6½ +/- feet to 52 inch deep longspan steel joists, which clear span the space. At the lower, surrounding roofs, Tectum Deck/steel bulb tee construction is supported by wide flange steel purlins and beams. Perimeter columns/mullions (typically structural tees) are spaced at 6'-6" o.c. and are integrated with the exterior wall construction. The top of low roof steel is approximately 13 feet above the floor; the top of high roof steel is approximately 9'-4½" higher.

1975 Additions:

1975 roof construction typically consists of a 1½" steel deck spanning to open web steel joists. Steel joists are supported by steel beams and steel columns.

At the L – Building, steel roof deck typically spans approximately 5 feet, to 20" deep, open web steel joists. Steel joists generally span 33'-6" and are supported by wide flange steel beams (14" to 21" deep). Interior and perimeter columns are typically 6" wide flange sections. Roof steel pitches to provide drainage; the high point is approximately 12'-10½" above the floor.

Roof construction at the I – Building is similar, with 14” or 16” deep steel joists spanning approximately 19 to 25 feet to wide flange steel beams (14” to 18” deep). Interior and perimeter columns are typically 6” wide flange sections. Roof steel pitches to provide drainage; the high point is approximately 13’-10½” above the floor.

At the Library, steel roof deck typically spans approximately 5 feet to 16” deep, open web steel joists. Steel joists typically span 26 feet and are supported by wide flange steel beams (16” to 18” deep). Beam spans vary from 25’-9” to 32’-6”. Interior and perimeter columns are typically 8” square tube and 8” wide flange sections, respectively. Roof steel slopes; the high point is approximately 13’-10½” above the Second Floor.

The roof of the Lower Gymnasium is framed with steel roof deck spanning 6’-6” to 48 inch deep, long span open web steel bar joists. Steel joists clear span the space (approximately 92’-5”) and are supported by W21 inch deep, wide flange steel beams. Steel beams span 19’-6” to 21’-6½” and are supported by wide flange steel columns.

The expanded Cafeteria roof matches the original roof construction, as described above.

Second Floor/Mezzanine Floor Construction:

1975 Additions:

The Second Floor of the Library is framed with a 3” concrete slab, on 26 gauge steel form deck, spanning 2’-0” to 16” or 18” deep open web steel bar joists. The joists typically span 26 feet and are supported by 24” deep, wide flange steel beams and square tubular steel columns. The top of steel beam is 11’-6½” above the First Floor. The design live load is 150 psf.

A small Mezzanine Floor (600+/- square feet) was constructed in the I – Building. Floor construction consists of a 5½” thick, one-way reinforced concrete slab spanning 11+/- feet to masonry bearing walls. The top of slab is approximately 7’-6” above the First Floor.

Typical First (Main) Floor Construction:

Original Construction - 1960:

Typical First Floor construction for all buildings (except at the Gymnasium) consists of a 4” thick, concrete slab on grade, reinforced with welded wire fabric.

First Floor construction over the various MEP tunnels consists of a 2” concrete topping slab on 6” thick, precast, prestressed concrete (Dox) plank. Tunnels are typically 5’-8” deep, with a 4” concrete slab on grade floor. Floor construction over the basement Mechanical Rooms in the A – Building, the H – Building and the Gymnasium is similar, with 8” thick precast plank.

At the east side of the Gymnasium, 8” thick Dox planks, with a 2” concrete topping slab spans 21+/- feet over the Mechanical Room below. The Gymnasium floor is framed with a one-way, reinforced concrete slab (5” to 7½” thick) typically supported by 12” deep wide flange steel beams.

1975 Additions:

Typical First Floor construction for all buildings (including the Lower Gymnasium) consists of a concrete slab on grade, reinforced with welded wire fabric. The slab thickness is 4” at the L - Building and at the northern half of the I – Building. Elsewhere, the slab is 5” thick. First Floor construction at the Library is split between a high and low level, with concrete walls retaining soil at the changes in elevation.

Typical Basement Floor Construction:

Original Construction – 1960:

Typical Basement Floor construction in the Mechanical Rooms consists of a 6” thick concrete slab on grade, reinforced with welded wire fabric. The Locker Room floor is a 4” thick slab.

Expansion Joints:

Original Construction – 1960:

Internal expansion joints were provided in the S – Building, the H – Building and the A – Building to reduce the overall length of the structural steel frame. The joints are typically 1” or 2” in width.

1975 Additions:

No internal expansion joints were provided in the 1975 Buildings; however, each building is separated from the original construction by an expansion joint (typically 1”).

Foundations:

Original Construction – 1960:

Foundations for all buildings are typically continuous strip footings at the perimeter and basement foundation walls and individual spread footings at interior column supports. As noted above, footings at all buildings have been proportioned on the basis of a 2+/- tsf allowable bearing capacity. Typical foundation walls are 10” thick, but wall thicknesses vary from 8” (tunnel walls) to 16” (Mechanical Room walls at the Gymnasium).

1975 Additions:

Foundations for all buildings are typically continuous strip footings at the perimeter and basement foundation walls and individual spread footings at interior column supports. As noted above, footings at all buildings have been proportioned on the basis of a 2+/- tsf allowable bearing capacity. Typical foundation walls are 10” thick, but wall thicknesses vary from 8” to 16”.

Drainage:

It does not appear that perimeter foundation drains or underslab drainage was provided for any of the original buildings or the 1965 and 1975 additions. Further review is required to determine if any drainage provisions were made. Facilities personnel report that there are no groundwater issues in the basements or in other areas. During the November 9, 2009 visit to the school, it was noted that sump pits have been provided in all basement Mechanical Rooms.

Exterior Wall Construction:

Original Construction – 1960:

Original exterior wall construction was brick veneer with an unreinforced masonry backup, or floor to ceiling glazing. Much of the 1960 facades were removed and replaced in 1992 with brick veneer cavity wall construction and new window units (1960 S – Building and 1965 addition, H – Building, A – Building and the front of 1960/1975 Cafeteria wing). Control joints and weep holes were provided. Details of the reconstructed exterior wall construction are shown in the above-referenced Architectural Drawings, prepared by HMFH Architects, Inc. in 1992.

1975 Additions:

Exterior wall construction typically consists of a 4" split face block veneer with a pumice block backup. An insulated cavity was provided. Control joints and weep holes are present in this construction.

Fire Resistance:

Steel framing at the original buildings and at the 1965 and 1975 additions is typically unprotected and has no fire resistance rating. The construction is classified as Type 2B, Non-Combustible, Unprotected.

Sprinklers have been installed in the H – Building only.

Fire rating issues will need to be evaluated in conjunction with potential, future additions and/or renovations to the complex. Fire protection of the existing floor and roof construction and/or the introduction of new building joints with fire walls may be required to meet current code requirements.

Lateral Load Resistance:

Original Construction – 1960:

The means by which lateral (wind and seismic) forces are resisted is not defined on the original (1958) structural drawings (typical for buildings of this era). However, the non load bearing masonry walls (at the building perimeter, at corridors and between classrooms, etc.) provide a degree of lateral force resistance. Rigid steel frames at the Cafeteria and the Gymnasium provide lateral stability in the direction of the frame spans. The original buildings do not meet the seismic requirements of the current building code.

1975 Additions:

The 1975 additions were also designed prior to the introduction of seismic codes; however, (per the Structural Drawings) these buildings were designed for a 20 psf wind load. The lateral (wind) force resisting system is not clearly defined on the Structural Drawings; it is expected that interior and perimeter (unreinforced) masonry walls serve as lateral load resisting shear walls. The additions do not meet the seismic requirements of the current building code.

III. STRUCTURAL CONDITION/COMMENTS – EXISTING CONSTRUCTION

Structural conditions at the Concord Carlisle Regional High School were reviewed (to the extent possible) during a visit to the site on November 9, 2009. Floor and roof construction was obscured by finishes (hard ceilings) and could not be viewed in a number of areas. However, the roof and floor construction of the original building and the subsequent (1965 and 1975) additions generally appears to be in satisfactory condition. Foundations appear to be performing adequately; there is no evidence of excessive, total or differential settlements.

It appears that the building has been constructed in general accordance with the original Structural Drawings.

Facilities personnel report that there are no structural problems/concerns and that there are no groundwater related issues in any of the buildings. There is evidence of moisture in the basement Mechanical Rooms; however it is not clear if this is related to equipment/piping or groundwater. Sump pumps have been provided, which presumably control peak groundwater levels.

Several areas of the slab on grade have settled over time. At the northwest corner of the S – Building, settlement was observed in the floor of the 1965 Chemistry Lab/Classroom. A similar condition was observed at the interface of the original S – Building and the 1975 I – Building. In each case, the settlement observed is likely related to inadequate soil material and/or compaction against the original S – Building foundation wall, prior to placing the new slab. There are no structural concerns related to this condition.

Existing roofs are adhered membrane and are in need of replacement, according to Facilities personnel. The condition of the Tectum roof decking should be examined, in areas where the roof has failed and moisture may have come into contact with the panels. Refer to the envelope consultant's report for further information regarding the condition of the existing roofs.

Exterior wall construction generally appears to be in satisfactory construction. Limited areas of the original (1960) wall construction still remain – the condition of these walls was not determined. Caulking and repointing if the split face block veneer of the 1975 additions facades is required in some areas. Refer to the envelope consultant's report for further information regarding exterior wall conditions.

Additional structural/structurally related conditions that should be reviewed and evaluated during Schematic Design and the subsequent design phases include the following (all buildings, unless otherwise noted):

1. Floor Live Loads: Additional structural calculations should be run to confirm the live load capacity of the structured floor in various areas of the complex. Based on our preliminary calculations, however, if the proposed use(s) of the buildings remain essentially the same throughout, floor live load capacity is not expected to be an issue.
2. Snow Load: Roof design loads are typically 40 psf (confirmed by representative structural calculations). The Seventh Edition of the Massachusetts State Building Code (780 CMR) currently requires that flat roof construction for new structures in Concord be designed for a 42.4 psf minimum snow load (plus drifting snow), based on a 55 psf Ground Snow Load (P_g). It does not appear that low roof areas surrounding the higher, Auditorium roof were designed for drifting snow. This issue will need to be evaluated and addressed in conjunction with future renovations to this building. Local reinforcing at potential snow drift areas will likely be required. Future additions (if planned) should be located and massed in a manner to minimize/avoid drifting snow on the existing roof construction.
3. As previously noted, fire resistance rating issues will need to be evaluated with respect to proposed, future renovations and/or additions to the complex.

IV. SUBSURFACE SOILS/FOUNDATION CONSIDERATIONS

Boring logs were included on the 1958 and 1973 Structural Drawings. Four (4) additional borings were taken by The Geotechnical Group in June, 2005. Subsurface conditions generally consist of loose to medium dense natural sands. Groundwater was encountered at the northern end of the site at a relatively shallow depth in two of the 2005 borings (approximately 5 feet below the existing ground surface). This finding may indicate liquefaction potential; however, additional explorations and evaluation will be required to make such a determination. If soil conditions are classified as liquefiable, either deep foundations or in-situ densification of soils will be required for any proposed additions. If the water table is found to be consistently high, perimeter/underslab drainage may also be required for new construction.

Earlier borings, referenced above, did not indicate the presence of high groundwater. FBRA recommends that additional/deeper borings be taken, once it is determined where new construction may be located.

V. PROPOSED NEW CONSTRUCTION – STRUCTURAL SYSTEMS DESCRIPTION

Option F2 includes 233,500 square feet of new construction, consisting of a new, three-story Main (Classroom) Wing (159,000+/-SF), new construction at the Lower and Main Levels, surrounding the existing Lower Gymnasium (63,000+/- SF – including a new Field House) and a new addition on the east side of the Auditorium. Approximately 55,000 SF of existing construction will remain, including the Auditorium (32,000+/- SF), the Cafeteria (13,000+/- SF) and the Lower Gymnasium (10,000+/- SF). The balance of the existing construction (175,000+/- SF) will be demolished and removed to accommodate the new wings; including the L, S, I and H – Buildings, as well as the Library and Upper Gymnasium.

The design population for the school is 1,250 students. Construction will be phased, to allow for continuous use of the school throughout the project duration.

An option to build an entire new facility to the south of the present school is also being considered.

Refer to the preliminary Architectural Drawings for additional information.

BASIS OF STRUCTURAL DESIGN

Codes and Design Standards:

Building Code:	Massachusetts State Building Code (780 CMR) - Seventh Edition.
Structural Steel:	AISC “Specification for Structural Steel Buildings” and AISC “Code of Standard Practice”.
Concrete:	ACI 318 and ACI 301; latest editions.

Design Loads/Parameters:

Live Loads

Classrooms (with partition allowance):	70 PSF
Corridors:	80 PSF
First Floor Corridors and Open Plan Areas:	100 PSF
Stairs:	100 PSF
Mechanical Areas:	150 PSF

Snow Loads

Basic Ground Snow Load (Concord):	55 PSF

Wind Loads

Wind Speed (Concord):	100 MPH

Seismic Parameters (Concord)

Short Period Spectral Response Acceleration(S_s):	0.29
1.0 Sec. Spectral Response Acceleration (S_1):	0.07
Seismic Use Group:	III
Seismic Design Category:	C
Site Class:	C (Preliminary)
Structural System:	Building Frame System

Lateral Load Resisting System:	Concentrically Braced Frames (*Not specifically Detailed for Seismic Resistance)*
Response Modification Factor (R):	3.0
System Overstrength Factor (Ω_0):	3.0
Deflection Amplification Factor (Cd):	3.0

Foundations:

The preliminary foundation design is based on an allowable bearing capacity of 4.0 kips per square foot (2.0 tsf) on natural soils or on compacted structural fill, based on the foundation design of the existing buildings. Refer to **Section IV** of this report for further information.

Construction Classification:

Construction type(s) for the new and existing wings are currently being evaluated. It is anticipated that all new construction will be Noncombustible, Protected; Type IB or IIA. The new Field House and additions around the Lower Gym will be Type IB Construction (including the Lower Gym). The balance of the construction (i.e. the Classroom Wing) will be Type IIA or possibly IIB (Noncombustible, Unprotected), depending on the location of fire wall. Presently, a fire wall is planned between the existing Auditorium and Cafeteria (south walls) and the new Classroom Wing. Classroom Wing construction would be Type IIA, in this scenario. For Types IB or IIA Construction, structural steel floor and roof framing, steel bracing and steel roof deck will require fire protection to achieve the necessary rating. Concrete floor slabs on steel deck do not require fire protection. Roof construction at the double-height, Field House will be at least 20 feet above most areas of the floor below and will generally not require protection. Columns which support this framing; however, will require protection (1 hour). The Auditorium is classified as Type IIB Construction and does not require fire protection.

Sustainable Design Considerations:

Sustainable design considerations will be incorporated into the building design; it is intended that the project will comply with the provisions of the Collaborative for High Performance Schools, *Massachusetts High Performance Green School Guidelines: Criteria.* A small green roof (500+/- SF, extensive system) is proposed for the roof of the Lower Level Locker Rooms.

GROUP A – SUBSTRUCTURE

A10 Foundations:

Previous borings indicate that subsurface soils consist of loose to medium dense natural sands. Foundations for the new additions will consist of individual spread footings (at columns) and continuous strip footings (at walls), similar to the existing foundation construction. All foundation walls and footings will be cast-in-place, reinforced concrete. The preliminary foundation design is based on an allowable bearing capacity of 4.0 kips per square foot (2.0 tsf) on natural soils or on compacted structural fill, similar to the foundations of the existing construction.

The Field House will be located at the Lower Level. Foundations for the existing Cafeteria wing at the Main Level will require temporary protection to accommodate the construction of the new Field House. ***Preliminary cost estimates should include an allowance for this work.***

Groundwater may be an issue during construction or in service; additional subsurface investigation and evaluation is required. ***Preliminary cost estimates should include an allowance for perimeter and underslab drainage systems at the Lower Level for all new construction (e.g. Field House, Locker Rooms, Mechanical and Phys. Ed. Storage).***

A1010 Standard Foundations:

- Typical perimeter frost walls: ***14" thick, with an 8" wide masonry shelf with horizontal and vertical reinforcing each face (4.0+/- psf). The outside surface of perimeter foundation walls should receive a trowelled-on bituminous mastic.***

- Typical perimeter frost wall continuous footing: ***2'- 0" wide, by 12" deep, with continuous reinforcing bars, plus dowels to the foundation wall (10.0+/- plf). The bottom of the footing will be placed 4'- 0" minimum below the exterior finish grade for frost protection.***

- Typical, average interior column footings at the Main (Classroom) Wing: ***9'- 0" x 9'- 0" x 2'- 2" deep, with 750 pounds of reinforcing. The bottom of the footing will be approximately 3'- 2" below the Main Level slab on grade.***

- Typical, average perimeter column footings at the Main (Classroom) Wing: ***7'- 6" x 7'- 6" x 1'- 10" deep, with 475 pounds of reinforcing. The bottom of the footing will be approximately 4'-10" below the exterior finish grade.***

- Typical, average perimeter column footings at the new Field House (spaced at approximately 25 feet on centers): ***6'- 6" x 6'- 6" x 1'- 8" deep, with 350 pounds of reinforcing. The bottom of the footing will be approximately 4'-8" below the exterior finish grade.***

- Typical, average interior column footings at the Lower Gym additions (Storage Rooms, Mechanical Room, Locker and Weight Rooms, etc.): ***7'- 6" x 7'- 6" x 1'- 10" deep, with 475 pounds of reinforcing. The bottom of the footing will be approximately 2 '- 10" below the Lower Level slab on grade.***

- Typical, average perimeter column footings at the Lower Gym additions (Storage Rooms, Mechanical Room, Locker and Weight Rooms, etc.): ***5'- 0" x 5'- 0" x 1'- 6" deep, with 165 pounds of reinforcing. The bottom of the footing will be approximately 4'-6" below the exterior finish grade.***

- Piers/pilasters at interior/perimeter columns: ***24 inches square, reinforced concrete with 40 plf reinforcing.***

- Anchor Bolts: Anchor bolts at column base plates shall conform to ASTM F1554 – Grade 36 and shall be headed type. ***Provide a minimum of four (4), ¾" diameter anchor bolts at all columns; additional bolts and/or larger diameter bolts will be required at bracing locations.***

A1020 Special Foundations:

- Elevator pits: ***Elevator pit construction (2 new elevators planned) will consist of 12" thick, reinforced concrete walls and an 18" thick, reinforced concrete foundation mat, with a sump pit. Waterstops will be provided at all construction joints and all interior surfaces of the elevator pit will be waterproofed. Elevator shaft walls will be 100% solid grouted, reinforced CMU construction (8" thick).***

- A partial, Mechanical Basement will be constructed with an addition to the east side of the existing Auditorium (A – Building). The western edge of the basement will be located approximately 12 feet away from the existing east wall of the Auditorium to eliminate the need for underpinning. ***The preliminary cost estimate should carry an allowance to provide temporary lateral earth support during the construction of the addition. The southern extent of the partial basement will be limited to avoid impacting the existing S – Building foundations, prior to its demolition.***

A1030 Slabs On Grade:

Typical, Main and Lower Level Floor Construction will be a *5" thick concrete slab on grade*, reinforced with welded wire fabric. The slab will be underlain by a vapor barrier, rigid insulation and 6" of compacted gravel fill. Saw cut control joints (1.25" deep) will be provided in each direction on each column line. Full depth isolation joints will be constructed around columns. Slabs in Mechanical Rooms and Phys. Ed. Storage spaces will be similar construction, with a 6" thick slab on grade. Perimeter and underslab drainage will be provided at the Lower Level, as previously noted.

- Slab on grade thickness: ***5" or 6", as noted above.***

- Welded wire fabric for slabs on grade: ***6x6-W2.9xW2.9.***

- Slab On Grade Thermal Insulation: ***R=5 extruded polystyrene foamed plastic board.***

- Slab On Grade Vapor Retarder: ***ASTM E1745 Standard for Specification for Water Vapor Retarders Used In Contact With Soil or Granular Fill Under Concrete Slabs; Class A.***

Main Level floor construction over the Locker Room, Mechanical Room and Phys. Ed. Storage spaces will be steel framed, as described in Section B1010.

A20 Basement Construction:

A2020 Lower Level Walls:

- Cantilever, Lower Level retaining walls (eastern side of the new Field House and the east and south foundation walls of the new additions to the existing Lower Gymnasium (future Performance Gym): ***14" thick, with horizontal and vertical reinforcing each face (8.5 +/- psf).***

- Cantilever, Lower Level retaining wall continuous footings: ***8'-0" wide, by 1'-8" deep, with 8.5 psf reinforcing. The bottom of the footing will be 4'-0" below the exterior finished grade.***

- Cantilever, Lower Level retaining wall dampproofing: ***ASTM D1227 Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing; Type II , Class I, non-asbestos fibers.***

GROUP B – SHELL

B10 Superstructure:

Structural Bays/Spans: Spans vary throughout each wing and between different wings. Structural bays will typically be rectangular, approximately 750 SF to 900 SF in area. Classrooms are roughly 25'-0" by 37'-6". The Field House roof has a clear span of approximately 135 feet.

Story Heights: The preliminary story height for each level of the Main (Classroom) Wing has been established at 14'-0", which is compatible with brick coursing. Elsewhere, roof elevations vary (e.g. approximately 26 feet clear to the underside of the Field House roof structure and approximately 36 feet clear to the underside of the roof structure for the new Fly space). Refer to the Architectural Drawings for roof heights at the new Kitchen, Cafeteria and Wrestling spaces at the Main Level.

Steel Framing Connections: Type 2 simple framing connections (shear only); double clip angles typically.

Columns: Typical columns will be rectangular steel tube (HSS) sections.

Lateral Force Resisting System: Lateral (wind and seismic) forces will be resisted by steel bracing, for reasons of economy, stiffness, reduced structural depth and smaller column sizes. Bracing members will be square or rectangular HSS sections. Brace configurations may include chevrons, inverted chevrons ("V"), or single diagonals in short bays, as required by architectural considerations.

Expansion (Seismic) Joints: As previously noted, an expansion joint will be provided between the Classroom wing and the existing Auditorium and Cafeteria wings scheduled to remain. The classroom wing will also have one (1) internal expansion joint, located at approximately mid-length of the building. New construction on the east, west and south sides of the existing Lower Gymnasium will be separated from the Gymnasium and from each other by an expansion joint. An expansion joint will also be provided along the south edge of the Field House, structurally separating it from the new/existing construction to the south.

Fire Protection: As previously noted, construction type(s) for the new and existing wings are currently being evaluated. It is anticipated that all new construction will be Noncombustible, Protected; Type IB or IIA. The new Field House and additions around the Lower Gym will be Type IB Construction (including the Lower Gym). The balance of the construction (i.e. the Classroom Wing) will be Type IIA or possibly IIB (Noncombustible, Unprotected), depending on the location of fire wall. Presently, a fire wall is planned between the existing Auditorium and Cafeteria (south walls) and the new Classroom Wing. Classroom Wing construction would be Type IIA, in this scenario. For Types IB or IIA Construction, structural steel floor and roof framing, steel bracing and steel roof deck will require fire protection to achieve the necessary rating. Concrete floor slabs on steel deck do not require fire protection. Roof construction at the double-height, Field House will be at least 20 feet above most areas of the floor below and will generally not require protection. Columns which support this framing; however, will require protection (1 hour). The Auditorium will be classified as Type IIB Construction and does not require fire protection.

All new and existing construction is considered to be *restrained.* Sprinklers will be provided throughout the new/renovated facility.

B1010 Floor Construction:

Second and Third Level Floor Construction (Classroom Wing) and Main Level Floor Construction (surrounding the Lower Gym and over the partial basement in the addition to the west side of the Auditorium): Composite structural steel framing: 4½" thick (minimum), normal weight concrete topping slab on a 2" deep, 18 gauge, composite type, galvanized steel floor deck (6½" minimum total slab thickness), reinforced with welded wire fabric. Floor framing will consist of composite structural steel members with a typical beam spacing of 8+/- feet on centers. All composite steel framing will be *unshored.* Composite action will be achieved by field welding ¾" diameter x 5" long headed shear studs through the deck, to the top flanges of the beams and girders. To avoid compromising composite action, conduit or other, similar embedded items *should not* be placed in the concrete slab on steel deck construction. Slabs on composite steel floor deck will be placed at the required elevation, adding concrete to compensate for the deflection of the (unshored) steel framing (assume an approximate *average* of .75" of additional concrete required over the structural bay). Openings in the Second and Third Level floors of the Classroom Wing will facilitate the introduction of natural light (through rooftop monitors) into the spaces below.

- Welded wire fabric for slabs on steel deck: ***6x6-W2.9xW2.9.***
- The estimated total weight of structural steel for the structured floors of the new additions (based on 123,000+/- gross square feet of total new framed floor and outdoor terrace/roof area), including beams, columns, bracing, plates, angles, relieving angles, miscellaneous frames, connections, etc. is ***795+/- Tons****.*
- Headed Shear Connectors (shear studs): ***Assume 23 shear connectors per 100 square feet of concrete slab on steel deck floor area.***

B1020 Roof Construction:

Typical, flat roof construction for the additions will consist of a 1½" deep, Type WR, 18 gauge galvanized steel roof deck spanning 8+/- feet (maximum) to wide flange steel beams. Steel beams are typically supported by wide flange steel girders and steel tube columns (HSS).

At the Field House, steel roof deck will be the cellular acoustic type (3" deep, 20/20 gauge), spanning 8'-6"+/- to 16" deep, wide flange steel beams. The steel beams span approximately 25 feet to steel trusses (8'-6"+/- deep), which span 135+/- feet in the north-south direction. Steel framing for the Field House roof will be Architecturally Exposed Structural Steel (A.E.S.S.). Light monitors may be proposed for the roof, located along the perimeter edges of the building. Monitors would be framed with a 1½" deep, 20/20 gauge cellular acoustic steel roof deck supported by light steel HSS frames spaced at 8'-6"+/- on centers. If monitors are provided on all four sides, either scuppers (extending from the roof area, through the monitors to building exterior) or an independently piped system of overflow roof drains would be required to minimize the potential depth of ponded rainwater. A continuous, east-west skylight (15+/- foot span) will be provided along the northern edge of the new Classroom Wing, to the south of the existing, remaining construction. As this linear skylight will cannot function as a diaphragm, horizontal steel rod bracing will be required at selected locations to interconnect the Second Level floor and skylight construction across the opening. Light monitors in the roof of the Classroom Wing will facilitate the introduction of natural light into the spaces below.

The new fly space over the stage in the Auditorium will extend above the existing Auditorium roof and be framed with steel beams and steel deck. ***The preliminary cost estimate should carry an allowance for reinforcing the adjacent, remaining roof structure (snow drifting) – refer to comments in the next section.***

Wherever practical, roof drainage will be achieved by sloping the steel. Some areas of tapered insulation should be anticipated where it is not practical to slope the steel. Continuous, bent steel plates will be installed around the entire roof perimeter to support the roof edge and blocking.

The roof will be designed to support the weight of rooftop HVAC equipment (with screens) and/or prefabricated Mechanical Penthouses with equipment (4 required at the roof of the new Classroom Wing).

Roofing will be a lightweight, adhered membrane system, except a stone ballast will be applied on the Main Level roof to the west of the Wrestling Rooms.

- The estimated total weight of structural steel for the various roof areas of the new building (based on 110,500+/- gross square feet of total new framed roof area), including beams, columns, bracing, plates, angles, relieving angles, miscellaneous frames, connections, etc., but excluding entry canopies is ***610+/- Tons***.

- The estimated weight of steel trusses and bracing, etc. for the Field House roof is ***195+/- Tons***.

B20 Exterior Enclosure:

B2010 Exterior Walls:

Exterior walls of the new additions will be a mixture of glazing and steel stud/brick veneer cavity wall construction. Continuous, galvanized steel relieving angles will be provided at the heads of continuous and/or long windows below the Roof , Third and Second Level floors, to support the brick veneer above. Elsewhere, at smaller punched openings, galvanized steel loose lintels will be provided.

Vertical steel tubes (approximately 2'-8" high), spaced at 6'-0" o.c. and integrated with the steel stud backup wall, will be bolted to the perimeter frost wall at the First Floor to laterally support the brick veneer below the continuous windows.

The steel stud backup will be 16 gauge minimum, designed for an H/600 deflection limitation. Vertical slip joints will be provided in the metal stud backup system at each level. A sunscreen element, integrated with the window system, may be provided at the south-facing exterior walls of the new Classroom Wing.

VI. PROPOSED RENOVATIONS and ALTERATIONS – ANTICIPATED STRUCTURAL SCOPE

General comments relating to renovations, alterations and additions to the Concord - Carlisle Regional High School are presented below. Renovations, alterations, repairs and upgrades to the complex will be subject to the provisions of 780 CMR 34.00 (*Existing Structures*) of the Massachusetts State Building Code (7th Edition), as currently amended. Comments relating to the anticipated scope of structural work at the remaining, existing construction (Auditorium, Cafeteria and the Lower Gym) are also included in this section.

Renovations:

If the facility is partially or fully renovated, additional structural work may be required per the provisions of 780 CMR 34.00. Five (5) levels of structural work are defined in the code. More extensive renovations and alterations to buildings/wings which have minimal, existing lateral load resistance are classified as higher level renovations and require considerably more structural work/cost.

If renovations to the buildings are architectural in nature, additions are structurally separated, existing masonry walls remain in place and no new, major openings in floor or roof diaphragms are made, the renovations would be classified as *Level 1.* Minimal structural work would be required by code; however, FBRA recommends that each remaining building be evaluated to ensure that a minimum lateral load resistance capacity exists (e.g. approximately 2/3 the current code required wind load). A preliminary review of the existing construction scheduled to remain suggests that this level of capacity likely exists, with the exception of the Cafeteria, where steel bracing in each direction will be required.

If significant structural alterations to a particular building are proposed (removal/modification of over 25% of the existing masonry walls in either direction, openings in the floor or roof exceeding 5% of the area, an increase in building mass and/or area greater than 10%, etc.), the renovations would be classified as *Level 2 (or higher).* In this case, the extent of structural work required by the code increases significantly:

- A structural survey/investigation of each building will be required, to confirm the as-built details of roof, floor and foundation construction (Section 3408.6.2.1).
- Soil explorations and a geotechnical evaluation will be required per Sections 3408.6.2.2.1 and 3408.6.2.2.2.
- A complete evaluation of the total service load capacity of the roof and floor construction will be required, per Section 3408.6.2.3.3. Presently, FBRA does not believe that there are any floor loading issues; however, if the use in a particular area were to change, the floor structure would need to be reviewed to confirm that adequate live load capacity exists.
- Key details of the existing construction will need to be determined and evaluated per Section 3408.6.2.4; including the connectivity of structural elements, anchorage of floor and roof construction to masonry walls, etc. Existing masonry walls/partitions scheduled to remain, will need to be laterally restrained at the top (e.g. steel angle restraints bolted to the underside of the slab above will be required).
- An Existing Conditions Structural Report will need to be submitted to the Building Department, as a condition for the building permit (Section 3408.6.3).
- Each existing building will need to be evaluated for wind and seismic (lateral) loads and structurally upgraded per Section 3408.7 for the appropriate renovation level. New bracing and/or shear walls (with foundations) may be necessary to meet code requirements.
- Connections of the existing floor and roof diaphragms to the existing lateral force resisting elements will need to be evaluated per Section 3408.9.5.
- Basic snow loads and drifting snow loads will need to be further evaluated per Section 3408.8.2. Note that 780 CMR 34.00 allows a 15% reduction in the design ground snow

load for this evaluation. As previously noted, it does not appear that typical flat roof areas (designed for a 40 psf snow load) will be a significant issue; however, local reinforcing at potential snow drift areas will likely be required (e.g. at the Auditorium).

A detailed investigation and evaluation of each remaining wing is beyond the scope of this Master Plan Structural Report; however, we recommend that the preliminary cost estimate include the following scope of work:

Auditorium:

Renovations will likely be classified as *Level 2.* ***The preliminary cost estimate should include temporary shoring to facilitate the construction of the new Fly space. The roof of the Fly space will be steel framed (included in the estimated steel tonnage) and the supporting walls will be 8" thick, 100% solid grouted, reinforced CMU walls with new foundations at the Main (ground) Level. The preliminary cost estimate should also carry an allowance for miscellaneous structural work in this wing ($20,000+/-), as well as an allowance to reinforce the existing roof structure (for snow drifting) surrounding the new Fly space ($30,000+/-).***

Cafeteria:

Renovations will likely be classified as *Level 1.* ***As there is no identified lateral load resisting system, new steel bracing in each direction is recommended. The preliminary cost estimate should carry an allowance for 4 bays of bracing (two in each direction; 7.5+/- Tons of steel), with new foundations, plus an allowance for miscellaneous structural work ($10,000+/-).***

Lower Gymnasium:

Renovations will likely be classified as *Level 1-* openings in the existing masonry walls will be minimized (north wall only – punched windows, less than 25% of the length of the wall). ***The preliminary cost estimate should carry an allowance for miscellaneous structural work in this wing ($15,000+/-)***

Additions:

As previously noted, new additions to the Concord - Carlisle Regional High School will be structurally separated from the existing construction by an expansion (seismic) joint and be proportioned/massed to avoid/minimize drifting snow on the adjacent, existing lower roof construction.

VII. STRUCTURAL OUTLINE SPECIFICATIONS

Concrete:

- All concrete shall be normal weight, 4,000 psi at 28 days, except foundation walls and footings, which shall be normal weight, 3,000 psi and exterior (exposed) concrete (paving) which shall be normal weight, 4,500 psi.

- Portland Cement: ASTM C150, Type I or II.

- Fly Ash: ASTM C618, Class F. Replacement of cement content with fly ash is limited to 20% (by weight). Fly ash is not permitted in exterior, exposed concrete.

- All concrete shall be proportioned with 3/4" maximum aggregate, ASTM C 33, except 3/8" maximum aggregate shall be used at toppings less than 2" thick (e.g. metal pan stairs).

- All reinforcing shall be ASTM A 615 deformed bars, Grade 60.

- All welded wire fabric shall conform to ASTM A 185.

- Reinforcing bars, steel wire, welded wire fabric, and miscellaneous steel accessories shall contain a minimum of 25% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with Submittal Requirements.

- Concrete products manufactured within 500 miles (by air) of the project site shall be documented in accordance with Submittal Requirements.

- Cure all concrete by moisture retention methods, approved by Architect; curing compounds shall not be used.

Reinforced Concrete Masonry (New Elevator Shaft and New Fly Space Walls):

- Masonry construction (elevator shaft) shall conform to ACI 530/ASCE 5/TMS 402 "Building Code Requirements for Masonry Structures", latest edition.

- Masonry strength, f'm shall not be less than 1350 psi.

- Requirements for load bearing block strength shall be as required for specified masonry strength (f'm) but shall not be less than 2000 psi on the net area of the block.

- Grout shall conform to ASTM C476, Type Fine, and shall be of strength required for specified masonry strength (F'm) but not less than 3000 psi.

- Mortar for reinforced masonry shall conform to ASTM C 270 Type S and shall be of strength required for specified masonry strength (f'm) but not less than 1800 psi.

- Reinforcing bars shall conform to ASTM A 615 Grade 60 deformed bars. Lap all continuous bars 48 diameters.

- Joint reinforcing shall be 9 gauge ladder type conforming to ASTM A 82. Provide prefabricated corners and tees. Walls shall be reinforced horizontally with joint reinforcing at 16 inches on centers unless otherwise noted.

- Reinforcing bar, steel wire, welded wire fabric, and miscellaneous steel accessories shall contain a minimum of 25% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with Submittal Requirements.

- Masonry products manufactured within 500 miles (by air) of the project site shall be documented in accordance with Submittal Requirements.

- Elevator shaft walls shall be 100% solid grouted (all cores).

***Structural Steel*:**

- Structural steel shapes shall conform to ASTM A 992, Fy = 50 ksi.

- Steel tubes (HSS) shall conform to ASTM A 500, Grade B, Fy=46 ksi.

- Structural steel plates and bars shall conform to ASTM A 36, Fy = 36 ksi.

- Steel members shall contain a minimum of 25% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.

- Steel manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.

- Anchor Bolts: Anchor bolts at column base plates shall conform to ASTM F1554 – Grade 36 and shall be headed type. Provide a minimum of four (4), ¾" diameter anchor bolts at all columns; additional bolts and/or larger diameter will be required at bracing locations.

- Bolted connections shall be ASTM A 325, Type N (bearing) bolts, except slip-critical bolts shall be used at lateral brace beam connections.

- Shop and field welding shall be AWS D1.1 E70XX electrodes.

- Shear connectors shall be ¾" diameter, 5" long, headed Nelson studs conforming to ASTM A 108.

- Surface treatment for typical structural steel: SSPC Surface Preparation No. 3 (Power Tool Cleaning). Structural steel shall receive one (1) shop coat of rust inhibitive primer, except those areas to be fireproofed and surfaces to receive field welded shear connectors.

- Structural steel for the Gymnasium Roof shall be Architecturally Exposed Structural Steel (A.E.S.S.) and shall meet the requirements of Section 10 of the AISC manual.

- Surface treatment for Architecturally Exposed Structural Steel: SSPC Surface Preparation No. 6 (Commercial Blast Cleaning). Exposed structural steel shall be primed with a premium architectural primer.

- All exterior, exposed structural steel shall be hot-dip galvanized (e.g. brick relieving angles).

***Steel Deck*:**

- Typical steel roof deck shall be 1½" deep, 18 Gauge, Type WR, conforming to ASTM A 653, Grade 33 (minimum), galvanized in accordance with ASTM A 653, coating class G-60. Exposed steel roof deck above the Field House shall be cellular acoustic deck and shall have a factory applied primer on the exposed bottom surface.

- Steel floor deck shall be 2" deep, 18 Gauge, composite type, conforming to ASTM A 653, Grade 33, galvanized in accordance with ASTM A 653, coating class G-60.

- All steel floor deck and roof deck accessories (pour stops, finish strips, closures, etc.) shall be the same finish as the deck; 18 gauge minimum.

- Steel deck shall contain a minimum of 25% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.

- Steel deck manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.

- Provide 14 gauge sump pans at roof drains.

END OF MASTER PLAN STUDY STRUCTURAL REPORT

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. The work of Section 210000 is shown on the drawings and specifications. 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 748 CMR, a school building of greater than 12,000s.f. must be protected with an automatic sprinkler system.

4. DESCRIPTION

   A. System will include a new fire service, double check valve assembly, wet alarm valve complete with electric bell, and a 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 13-2007. 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 14-2007, shall be provided in the egress stairwells in the 3-story classroom wing and in the Stage.

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

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

   E. Fire department valves including 50 foot hose racks and cabinets will be provided on each side of the Stage.

5. BASIS OF DESIGN

A. The mechanical rooms, kitchen, science classrooms, and storage rooms are considered Ordinary Hazard Group 1; library stack areas and stage are 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.

6. PIPING

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

7. FITTINGS

A. Fittings on fire service piping, 2" 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" 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.

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.

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. The work of Section 220000 is shown on the drawings and specifications. 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, 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. The grease interceptor is provided under Division 33 scope.

   C. Storm Drainage system is provided to drain all flat 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 damps for above grade 2” and larger. Waste and vent piping 1-1/2” and smaller will be type ‘L’ copper.

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

5. WATER SYSTEM

A. New 4" domestic water service from the yard water system will be provided into a dedicated water service room. 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 by gas fired, high efficiency, condensing water heaters 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 loop. Water temperature will be 140° to serve the kitchen and 120° to serve general use fixtures.

E. Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder. All piping will be insulated with 1" 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, and roof top equipment.

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

7. FIXTURES

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. Supports shall be Zurn, Smith or Josam. All fixtures shall be white. Faucets shall be Speakman or Chicago.

D. Fixtures shall be as scheduled on drawings.

1. <u>Water Closet</u>: Toto high efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Toto EcoPower sensor operated 1.28 gallon per flush-flush valve.

2. Urinal: Eco-Tech waterless urinal, wall hung, vitreous china.

3. Lavatory: Toto wall hung/countertop ADA lavatory. Toto EcoPower infra-red, sensor mixing faucet.

4. Sink: Elkay ADA stainless steel countertop sink with Chicago 201A faucet.

5. Drinking Fountain: Halsey Taylor hi-low wall mounted electric water cooler, stainless steel basin.

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

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 all directions. Drains shall be Smith, Zurn or Josam.

9. VALVES

A. Locate all valves so as to isolate all parts of the system. Shutoff valves 3” 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 Certainteed 850 System.

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.

11. CLEANOUTS

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

12. ACCESS DOORS

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

13. WATER HEATER

A. Kitchen Servery & Locker Rooms: One natural-gas fired, high efficiency, condensing, sealed combustion unit water heater with thermostatically controlled mixing device to control water temperature to sinks.

B. Science Wing: One non-potable natural-gas fired, high efficiency, condensing, sealed combustion water heater with thermostatically controlled mixing device to control water temperature to sinks.

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.

1. CODES

All work installed under Division 230000 shall comply with the Town of Concord Building Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

The work of Division 230000 is described within the narrative report and outline specification. 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 Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

3. BASIS OF DESIGN: (MASS CODE)

Massachusetts Code values are listed herein based on Middlesex County values as determined from table 1305.1 chapter 13.

Outside: Winter 7°F, Summer 87°F DB 74°F WB

Inside: 72° for heating 75°F (50% RH) for cooling. Unoccupied temperature setback will be provided.

Generally outside air is provided at the rate of 15 cfm/person in all classrooms and large group spaces, and 15 cfm/person for the combination auditorium, gymnasium and cafeteria. In all cases ASHRAE guide 62.1-2004 and the International Mechanical Code will be met as a minimum. All occupied areas will be designed to maintain 1,000 PPM carbon dioxide maximum.

4. SYSTEM DESCRIPTION

A. Central Heating Plants:

Heating for the entire building will be through the use of (3) high efficiency gas-fired condensing boiler plants. One boiler plant with (3) 2000 MBH output boilers and (2) end suction base mounted pumps with a capacity of 400 gpm each will be located in the Auditorium-Gym Building mechanical room. The second boiler plant will be located in the Information Technology Building and shall consist of (2) 800 MBH boilers and (2) end suction base mounted pumps with a capacity of 110 gpm each. The third boiler plant will be located in the Building A mechanical room and shall consist of (2) 1500 MBH output boilers and (2) end suction base mounted pumps with a capacity of 200 gpm each. Each boiler plant will supply heating hot water to all heating apparatus located throughout the adjacent building areas through a two-pipe fiberglass insulated schedule 40 black steel piping system. The boiler plants shall supply a maximum hot water temperature of 190 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.

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 between 6 feet to 12 feet above the roof level depending on the located of building intake air locations.

Phasing:

The Auditorium-Gym Building Boiler Plant shall be installed as part of Phase I of the project and shall serve the entire Phase I building area. A temporary hot water boiler and heating and ventilation unit will be required to serve the existing Cafeteria and Kitchen areas during Phase I. The existing hot water boiler plant located in existing Building H shall be operational during Phase I and shall be demolished during Phase II of the project. During Phase I, prior to demolishing Building H, the Building A boiler plant shall be installed and shall provide heating hot water to the existing Building I, S & L air handling and terminal heating equipment via temporary hot water piping distribution system.

B. Central Cooling Plant:

A chilled water power plant will be located in the Gym-Auditorium Building mechanical equipment room. The chilled water plant shall consist of (2) 215 ton water cooled chillers that will be connected to a remote air cooled cooling tower located on the building roof or at grade level. It is proposed that the chiller will be of the high-efficiency design and will distribute between 44° and 54° chilled water to all areas of the building provided with air conditioning and dehumidification equipment (i.e. fan coil units, indoor and roof mounted air handling units). The chilled water distribution piping will be of the fiberglass insulated schedule 40 steel type and will be completely separate from the hot water distribution piping system. Primary and standby vertical split case base mounted chilled water pumps at 1030 GPM each with a variable frequency drive (which will control down to maintain a minimum flow to the chiller) will be provided for overall water system distribution.

Primary and standby vertical split case base mounted condenser pumps with a capacity of 1290 gpm each with variable frequency drives will be provided to distribute condenser water from the chillers to the remote cooling towers.

C. Classroom Heating: (Refer to note 1 at end of System Description)

It is proposed that a continuous length of fin tube radiation will be installed along the entire length of the exterior wall in each classroom. The fin tube radiation in each classroom will be controlled by a space mounted thermostat to maintain overall space temperature control.

D. Classroom Ventilation: (Refer to note 1 at end of System Description)

Each classroom will be provided with two individual wall mounted displacement diffusing units between 200 and 300 CFM each (depending on room size). Exhaust air at the same rate as supply air to the space will be returned from each classroom at the center through a central return air system back to the main distribution air handling unit where it will pass through an energy recovery coil.

E. Classroom Wing Ventilation Equipment: (Refer to note 1 at end of System Description)

The primary mechanical ventilation system for the classroom wing will include three roof mounted air handling units of the 100% outside air design. The units shall be located in a factory pre-fabricated penthouse enclosure for improved service maintenance access. Two of the units will each have a capacity of 10,500 CFM, 40 Tons and 550 MBH heating. One of the units, which will serve the science classroom areas, will have a capacity of 14,000 CFM, 50 Tons and 700 MBH heating. All of the units will include a supply fan and exhaust fan with VFDs, hot water heating coil, chilled water cooling coil, MERV 13 filtration, heat pipe for dehumidification and additional control of supply air temperature, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each classroom which will satisfy building code requirements at a fixed temperature of 68°F (adj.) year-round.

Science Classrooms: Science classrooms with fume hoods shall be provided with dedicated exhaust air fan systems. Lab exhaust air fans shall be located on the roof and a minimum of 25'-0" away from intake air locations. Exhaust air and supply air systems serving science classrooms with fume hoods shall have supply and exhaust air volume damper controls to control the amount of exhaust air and ventilation air provided to these classrooms in order to maintain negative pressurization and to provide increased energy savings.

F. Field House:

The field house will be provided with two roof mounted air handling units of the recirculation design. Each unit will be approximately 17,500 CFM and will include supply and return fan with VFDs, 750 MBH hot water heating coil, cooling coil with a capacity of 45 tons, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 1000 PPM. Supply air ventilation will be provided to the space through a galvanized steel round supply duct which will travel the length of the gymnasium over each court and will be provided with a series of duct mounted supply registers. As levels of carbon dioxide drop generally relating to a reduction in population a variable frequency drive located in each rooftop unit will modulate to reduce air flow and ventilation while always maintaining a maximum of 1000 ppm. Return air will be drawn back to each rooftop unit by a low wall return air registers.

G. Performance Gymnasium:

The performance gymnasium will be provided with an indoor air handling unit of the recirculation design. The unit will be approximately 10,500 CFM and will include supply and return fan with VFDs, 400 MBH hot water coil with modulating hot water valve, chilled water cooling coil with a capacity of 30 tons, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 1000 PPM. Supply air ventilation will be provided to the space through a galvanized steel supply duct which will travel the length of the gymnasium over each court and will be provided with a series of duct mounted supply registers. As levels of carbon dioxide drop generally relating to a reduction in population a variable frequency drive located in each rooftop unit will modulate to reduce air flow and ventilation while always maintaining a maximum of 1000 ppm. Return air will be drawn back to each rooftop unit by a low wall return air registers.

H. Locker Rooms:

The locker rooms will be provided with two indoor air handling units of the 100% outside air design. Each unit will be approximately 2500 CFM and will include a supply and exhaust fan with VFDs, 200 MBH hot water coil with modulating hot water valve, MERV 13 filtration, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space through a galvanized supply duct which will travel throughout each locker room area to a series of ceiling mounted supply registers.

I. Team and Athletic Offices:

The Team and Athletic office areas will be provided with an indoor air handling unit of the recirculation design. The unit will be approximately 5,500 CFM and will include supply and return fan with VFDs, 400 MBH hot water coil with modulating hot water valve, chilled water cooling coil with a capacity of 30 tons, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 1000 PPM. Supply air ventilation will be provided to the space through a galvanized supply duct which will be connected to a series of duct mounted supply diffusers. As levels of carbon dioxide drop generally relating to a reduction in population the air handling unit outside air damper will modulate to reduce ventilation while always maintaining a maximum CO_2 level of 1000 ppm. Return air will be drawn back to the air handling unit by a combination of ceiling and low wall return air registers.

J. Fitness and Training Areas

The fitness and training areas rooms will be provided with an indoor air handling unit of the 100% outside air design. The unit will be approximately 5,500 CFM and will include supply fan and exhaust fan with VFDs, 175 MBH hot water coil with modulating hot water valve, chilled water cooling coil with 10 ton capacity, MERV 13 filtration, and exhaust air energy recovery wheel. Supply air ventilation will be provided to the space through a galvanized steel supply duct which will be connected to a series of duct mounted supply diffusers. As levels of carbon dioxide drop generally relating to a reduction in population the air handling unit outside air damper will modulate to reduce air flow and ventilation while always maintaining a maximum of 1000 ppm. Return air will be drawn back to the air handling unit by a combination of ceiling and low wall return air registers.

K. Cafeteria:

The Cafeteria, adjacent Lobby and communicating Corridor will be provided with one indoor air handling unit of the recirculation design. The unit will be approximately 7000 CFM and will include supply fan and return fan with VFDs, 300 MBH hot water coil with modulating hot water valve, MERV 13 filtration, 20 ton chilled water cooling coil. Supply air ventilation will be provided to the space through a galvanized steel supply duct which will be connected to a series of duct mounted supply diffusers. As levels of carbon dioxide drop generally relating to a reduction in population the air handling unit outside air damper will modulate to reduce ventilation while always maintaining a maximum of 1000 ppm. Return air will be drawn back to the air handling unit by a combination of ceiling and low wall return air registers. Variable air volume terminal boxes with hot water heating coils shall be provided for zone temperature and ventilation control.

L. Kitchen:

The kitchen will be provided with one roof mounted Make-up air handling unit of the 100% outside air design. The unit will be approximately 4,000 CFM capacity and will include a supply fan, and 600 MBH output hot water coil. Make-up supply air will be provided to the kitchen through galvanized supply duct which will travel above the ceiling to a series of ceiling mounted supply registers located adjacent to the kitchen exhaust hood.

A kitchen exhaust fan with a capacity of approximately 4200 cfm will be provided to serve the kitchen exhaust hood. Exhaust air ductwork constructed of black steel will be provided which will be routed above the ceiling to the kitchen exhaust hood .

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.

M. Auditorium:

The auditorium will be provided with a roof mounted air handling unit of the recirculation design, located within a factory fabricated penthouse enclosure. The unit will be approximately 14,500 CFM and 40 ton capacity chilled water cooling coil and will include supply and return fan with VFDs, 550 MBH output hot water coil with modulating hot water valve, and MERV 13 filtration. Supply air will be provided to the space through a galvanized steel supply duct distribution system which will travel above the ceiling to a series of duct mounted linear and square supply diffusers located at the ceiling or above the acoustical clouds. In addition, carbon dioxide controls will be installed which will monitor the overall level of carbon dioxide at a threshold level of 1000 ppm. As levels drop generally relating to a reduction in population the air handling unit outside air damper will modulate to reduce air flow and ventilation while always maintaining a maximum of 1000 ppm. Return air will be drawn back to the rooftop unit by low wall return air registers.

N. Stage:

The stage will be provided with one roof mounted HVAC air handling unit of the recirculation design located in a factory fabricated penthouse enclosure. The unit will be approximately 4000 CFM and and will include a supply and return fan with VFDs, 155 MBH output hot water coil with modulating hot water valve, MERV 13 filtration, chilled water cooling coil with a capacity of 15 tons. Supply air will be provided to the space through a galvanized steel supply duct which will travel above the structural framework supporting stage apparatus to a series of duct mounted supply registers. In addition, carbon dioxide controls will be installed which will monitor the overall level of carbon dioxide at a threshold level of 1000 ppm. As levels drop generally relating to a reduction in population a variable frequency drive located in the air handling unit outside air damper will modulate to reduce air flow and outside air ventilation while always maintaining a maximum of 1000 ppm. Return air will be drawn back to the rooftop unit by low wall return air registers.

O. Band, Music and Theater Support Areas:

The band and music area will be provided with a roof mounted air handling unit of the 100% outside air design located within a factory fabricated penthouse enclosure. The unit will be approximately 3000 CFM and will include supply and return fan with VFDs, 200 MBH output hot water coil with modulating hot water valve, MERV 13 filtration, and 12 ton chilled water cooling coil. Supply air will be provided to the space through a galvanized steel supply duct which will travel above the ceiling to a series of duct mounted supply registers. In addition, carbon dioxide controls will be installed which will monitor the overall level of carbon dioxide at a threshold level of 1000 ppm. As levels drop generally relating to a reduction in population the air handling unit outside air damper will modulate to reduce ventilation while always maintaining a maximum of 1000 ppm. Return air will be drawn back to the rooftop unit by ceiling and low wall return air registers.

P. Administration Area (including Guidance and Special Education Areas)

The Administration area offices will be provided with a roof mounted air handling unit capable of providing 100% outside air. The unit will be approximately 6000 CFM and will include supply and return fan with VFDs, 400 MBH hot water coil with modulating hot water valve, MERV 13 filtration, 12 ton capacity chilled water cooling coil supply air temperature, 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 perimeter zones will be provided by horizontal ceiling concealed type ducted 4-pipe heating and cooling fan coil units. Ventilation air to these perimeter areas will be provided by the associated rooftop ventilation unit, with hot water and chilled water for the fan coil unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants. Interior zones in this area will be provide with variable air volume boxes with temperature and CO2 controls.

Q. Information Commons

The Information Commons and adjacent CCTV/Radio areas will be provided with one air handling units of the 100% outside air design, located in a factory fabricated penthouse enclosure. The unit will be approximately 5500 CFM and will include a supply fan, 350 MBH hot water coil with modulating hot water valve, MERV 13 filtration, 15 ton air cooled condensing section with evaporator coil for cooling with hot gas reheat for dehumidification and control of supply air temperature, 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 perimeter zones will be provided by horizontal ceiling concealed type ducted 4-pipe heating and cooling fan coil units. Ventilation air to these perimeter areas will be provided by the associated rooftop air handling unit, with hot water and chilled water for the fan coil unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants. Interior zones in this area will be provide with variable air volume boxes with temperature and CO2 controls.

R. Building A

Building A will be provided with a roof mounted air handling unit capable of providing 100% outside air. The unit will be approximately 20,000 CFM and will include supply and return fan with VFDs, 1400 MBH hot water coil with modulating hot water valve, MERV 13 filtration, 40 ton capacity chilled water cooling coil supply air temperature, 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 perimeter zones will be provided by horizontal ceiling concealed type ducted 4-pipe heating and cooling fan coil units. Ventilation air to these perimeter areas will be provided by the associated rooftop ventilation unit, with hot water and chilled water for the fan coil unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants. Interior zones in this area will be provide with variable air volume boxes with temperature and CO2 controls.

S. Main Mechanical Room

The mechanical room and the loading dock area shall be provided with indoor hot water heater and ventilation units with a capacity of 5000 and 2500 CFM respectfully.

Note 1:

The proposed displacement ventilation system for the classroom wing is intended to provide a maximum cooling temperature during peak cooling periods of approximately 80°, however, the ventilation air provided will be extremely dry which will be the result of utilizing refrigeration equipment and hot gas reheat to reduce vapor pressure to an extremely low condition of approximately 40 grains of moisture per pound of air and reheating the air to a supply temperature of approximately 68° which will be distributed to each space. The extremely dry condition of the supply air provides the perception of a condition which 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 which should be considered.

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.

ELECTRICAL SYSTEMS

NARRATIVE REPORT

The following is the Electrical systems 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 ***MA-CHPS*** where indicated on this narrative.

1. CODES

   All work installed under Electrical Section shall comply with the Massachusetts State Building Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Electrical Section is as described in this Narrative. 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 “smart panels”, which is achieved through programming self-contained solenoid operated circuit breakers. The control of the circuit breakers shall be by automatic means such as an occupancy sensor in each classroom. The system will be interfaced with the DDC control system for schedule functions. The controllability shall be in conformance with credit ***MA-CHPS credit IEQC 4.2.***

   B. Exterior lighting will be controlled by photocell “on” and “smart panel” for “off” operation. The parking area lighting will be controlled by “zones”.

   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. The emergency lighting system will have time control so that lights are “on” only when building is occupied.

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 (1) 1600 amperes and (1) 2000 amperes with 100% rating at 277/480 volt, 3∅, 4wire. New lighting and power panels will be provided to accommodate respective loads. The equipment will be located in dedicated electric rooms or closets.

B. Interior Lighting System:

1. Classroom lighting fixtures consist of pendant mounted direct/indirect fluorescent luminaries with T5HO lamps and electronic ballasts. The fixtures will be pre-wired for daylight dimming control where natural daylight is available and also for multi-level switching. Two daylight zones will be provided in each classroom.

2. Office lighting fixtures will consist of pendant mounted direct/indirect fluorescent luminaries with T5HO lamps and electronic ballasts. Offices on the perimeter with windows will have daylight dimming controls similar to classrooms.

   In general lighting power density will be 30-40% less than IECC 2006. The power density reduction relates to ***MA-CHPS credit EC1.***

3. Lighting levels will be approximately 30 foot candles average in classrooms and offices. The daylight dimming footcandle level will be in compliance with ***MA-CHPS credit IEQC 1.2.***

4. Gymnasium and Field House lighting will be comprised of direct fluorescent fixtures with slots for an up light component with T5H0 lamps and electronic ballasts. 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.

5. Corridor lighting will be comprised of concealed cove mounted indirect lighting using T5HO lamps and electronic ballasts. The corridor light level will be designed for approximately 20 foot candles average. Corridor lighting will be on time clock control and only "ON" during occupied hours. The corridor lighting will have step dimming ballasts controlled by schedule on DDC system.

6. Cafeteria lighting will be pendant direct/indirect fluorescent fixtures with electronic ballasts. The light levels will be designed for approximately 30 foot candles. Daylighting controls will be provided on perimeter light fixtures with 15 feet of glazing

7. Theatrical lights with a theatrical dimming system will be provided for performances. Lighting located where daylighting can be accomplished shall be provided with dimming ballast and dimming controls when the space is used as a Lecture Hall. House lighting in Auditorium will be dimmable fluorescent and controlled by the house dimming system.

8. Kitchen and Servery lighting will consist of recessed 2'x4' acrylic lensed gasketed troffers with aluminum frame doors with (3) T5 lamps and electronic ballasts. Light levels will be approximately 50 foot candles average.

9. Information Commons lighting will consist of indirect fluorescent fixtures with T5HO lamps and electronic ballasts. Light levels will be approximately 30 foot candles average.

10. 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 control system will be in accordance with ***MA-CHPS credit IEQC 4.2.***

11. The entire school will be controlled with an automated lighting control system using the DDC control system for programming lights on & off. The purpose is to have a single schedule control building functions such as unoccupied times.

C. Emergency Lighting System:

1. Generators will be interior consisting of (1) 100kw and (1) 200kw natural gas units. 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, refrigeration equipment, communications systems, and areas designated as a shelter.

D. Site Lighting System ***MA-CHPS Credit SC5***

1. Fixtures for area lighting will be pole mounted cut-off and shielded 'LED' luminaries in the parking area and roadways. Pole heights will be 20 feet. The exterior lighting will be connected to the automated lighting control system for photocell on and timed off operation. The site lighting fixtures will be dark sky compliant. The illumination level is 0.5fc minimum for parking areas in accordance with Illuminating Engineering Society of North America (IES-NA).

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

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 with lockable enclosures will be installed at exterior doors.

5. A system of computer grade panelboards with double rated 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 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 intent is to re-use the existing Notifier addressable fire alarm panel.

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 and at each egress stairwell not located at grade level.

6. The system will be remotely connected to automatically report alarms to fire department via the existing system.

G. Uninterruptible Power Supply (UPS):

1. Two (2) 12kw, 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 Protection System:

1. A system of lightning protection devices will be provided.

2. The lightning protection equipment will include air terminals, 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.
- Lightning protection 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.

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 requirements of the Commissioning Section.

9. CCTV

A Closed Circuit TV system will consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The CCTV Storage 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 NVR's will record all cameras and store this information for 21days at 15 images per second (virtual real time).

The location of the cameras is generally in corridors and exterior building perimeter. The exterior cameras are pan-tilt-zoom type. The coverage on the exterior will include building perimeter and parking areas.

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.

10. INTRUSION SYSTEM

An intrusion system will consists 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 can be partitioned into several zones. Therefore, it is possible to use the Gym area while the remainder of the school remains alarmed.

The system will include a digital transmitter to summons the local police department in the event of an alarm condition

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

11. 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.

12. RENEWABLE ENERGY

A renewable energy system will consist of a 60 kw grid connected photovoltaic PV system intended to reduce the facilities demand for power. The photovoltaic system will operate in conformance with the green schools initiative. System will consist of roof mounted photovoltaic modules, weather station, data acquisition system and inverters. Interactive display terminals will be provided for students and for public awareness of the benefits of renewable energy. The renewable energy relates to ***MA-CHPS Credit EC3***.

13. PHASING

The Work will be conducted in phases to provide the least possible interference to the activities of the High School. The existing school will be occupied during the construction period.

The new emergency generator and electrical service will be installed as part of phase one. There will be duplicate services throughout the project up to the last phase.

Massachusetts Collaborative for High Performance Schools (MA-CHPS)

Project Name: Concord Carllisle High School Date

M A - C H P S   S C O R E C A R D

This matrix includes each point that is available. Please fill in the credits you are applying for with a numerical value for a **Total Project Score**. Prerequisites in light blue are required for all major renovation and new construction projects and those in green must be achieved by projects seeking green school funding.

38	26	3	**Total Project Score**	**Total Possible Points 89**

Yes	?	No	Points		SITE — Possible Points 16
11	4	1			
Y			---	SP 1	**Joint Use of Facilities**
Y			---	SP 2	**Joint Use of Parks**
1			1	SC 1.1	**Sustainable Site Selection**
1			1	SC 1.2	**No Development on Floodplains**
1			1	SC 1.3	**No Development Near Wetlands**
2			1-2	SC 1.4	**No Development on Greenfields**
1			1	SC 1.5	**Centrally Located Site/Smart Growth**
	1		1	SC 1.6	**Reduced Building Footprint**
1			1	SC 1.7	**Sustainable Site and Building Layout**
	1		1	SC 2.1	**Locate Near Public Transit**
1			1	SC 2.2	**Pedestrian/Bike Access**
		1	1	SC 2.3	**Minimize Parking**
	1		1	SC 3	**Post-Construction Stormwater Management**
	1		1	SC 4.1	**Design to Reduce Heat Islands,** Non-Roof
1			1	SC 4.2	**Design to Reduce Heat Islands,** Roof
2			2	SC 5	**Exterior Light Pollution Reduction**

Yes	?	No	Points		WATER — Possible Points 5
4	1	0			
Y			---	WP 1	**Indoor Water Use Reduction,** 20% Reduction
1			1	WC 1.1	**Indoor Water Use Reduction,** 30% Reduction
	1		1	WC 1.2	**Reduce Water Used for Sewage Conveyance**
1			1	WC 2.1	**No Permanent Irrigation For Landscaping**
1			1	WC 2.2	**Water Reduction and Sports Turf Management**
1			1	WC 2.3	**Irrigation System Commissioning**

Yes	?	No	Points		ENERGY — Possible Points 25
5	6	1			
Y			---	EP 1	**Elimination of CFC-based Refrigerants**
Y			---	EP 2	**Commissioning**
Y			---	EP 3	**Fundamental Building Systems,** Training
		N/A	---	EP 4	**Exceed Energy Code by 20%,** Prescriptive Approach
Y			---	EP 4	**Exceed Energy Code by 20%,** Performance Approach
		N/A	1-2	EC 1	**Superior Energy Performance,** Prescriptive Approach
4	2		1-10	EC 1	**Superior Energy Performance,** Performance Approach
	2		2	EC 2	**Minimize Air Conditioning**
	2		2-11	EC 3	**Renewable Energy**
1			1	EC 4.1	**Energy Management Systems**
		1	1	EC 4.2	**Submetering**

Yes	?	No	Points		MATERIALS — Possible Points 13
3	2	1			
Y			---	MP 1	**Storage & Collection of Recyclables**
Y			---	MP 2	**Site Waste Management,** 75% Diversion
1			1	MC 1	**Site Waste Management,** 90% Diversion
		1	1-4	MC 2.1	**Building Reuse,** Maintain 50-95% of Existing Shell
	1		1	MC 2.2	**Building Reuse,** Maintain 50% Interior
2	1		1-7	MC 3	**Combined Materials Attributes**

Yes	?	No	Points		IEQ — Possible Points 22
11	9	0			
Y			---	IEQP 1	**ASHRAE Standard 62.1-2004 Compliance**
Y			---	IEQP 2	**SMACNA IAQ Guidelines**
Y			---	IEQP 3	**Construction IAQ,** Duct Protection
Y			---	IEQP 4	**Pollutant Source Control,** Off-gassing
Y			---	IEQP 5	**Walk-Off Mats**
Y			---	IEQP 6	**Drainage**
Y			---	IEQP 7	**Irrigation Design**
Y			---	IEQP 8	**Mold Protection**
Y			---	IEQP 9	**Electric Ignitions,** Gas-Fired Equipment
Y			---	IEQP 10	**Air Intake Location**
Y			---	IEQP 11	**Duct Liners**
Y			---	IEQP 12	**Prohibit Fossil Fuel Burning Equipment,** Indoors
Y			---	IEQP 13	**Filter Requirements for HVAC Equipment**
Y			---	IEQP 14	**ASHRAE Standard 55-2004 Compliance**
Y			---	IEQP 15	**Access to Views,** 70%
	2		2	IEQC 1.1	**Access to Views,** 90%
2	2		1-4	IEQC 1.2	**Daylighting in Classrooms**
2	2		1-4	IEQC 2.1	**Low-Emitting Materials**
1			1	IEQC 2.2	**Pollutant Source Control,** Ducted HVAC Returns
1			1	IEQC 2.3	**Pollutant Source Control,** High Efficiency Filters
1			1	IEQC 2.4	**Construction IAQ,** HEPA Vacuuming
	1		2	IEQC 2.5	**Construction IAQ,** Building Flushout
1			1	IEQC 3.1	**Acoustical Performance in Classrooms,** Max 40 NC
1			1	IEQC 3.2	**Acoustical Performance in Classrooms,** Max 35 NC
	1		2	IEQC 3.3	**Acoustical Performance in Classrooms,** Max 30 NC
	1		1	IEQC 3.4	**Reducing Sound Transmission**
1			1	IEQC 4.1	**Controllability of Systems,** Operable Windows
1			1	IEQC 4.2	**Controllability of Systems,** Temperature/Light Control

Yes	?	No	Points		POLICY & OPERATIONS — Possible Points 8
4	4	0			
Y			---	P&OP 1	**Maintenance Plan**
Y			---	P&OP 2	**Anti-Idling Measures**
1			1	P&OC 1	**Maintenance Plan,** CMMS
	1		1	P&OC 2	**Indoor Environmental Management Plan**
1			1	P&OC 3	**Energy Star Equipment Performance**
	1		1	P&OC 4.1	**Clean Energy,** 50%
	1		1	P&OC 4.2	**Clean Energy,** 100%
2	1		1-3	P&OC 5	**Innovation**

Requirement for all schools

Requirement for green schools only

Point Thresholds

30 points - 1.5% Financing of Maximum Allowable Cost

34 points - 2.0% Financing of Maximum Allowable Cost

LEED 2009 for Schools New Construction and Major Renovations
Project Scorecard

Project Name: Concord Carlisle High School
Project Address: Concord, Massachusetts

Yes	?	No			
11	12	1	SUSTAINABLE SITES		24 Points
Y			Prereq 1	Construction Activity Pollution Prevention	Required
Y			Prereq 2	Environmental Site Assessment	Required
1			Credit 1	Site Selection	1
	4		Credit 2	Development Density and Community Connectivity	4
		1	Credit 3	Brownfield Redevelopment	1
	4		Credit 4.1	Alternative Transportation - Public Transportation Access	4
1			Credit 4.2	Alternative Transportation - Bicycle Storage and Changing Rooms	1
2			Credit 4.3	Alternative Transportation - Low-Emitting and Fuel-Efficient Vehicles	2
	2		Credit 4.4	Alternative Transportation - Parking Capacity	2
1			Credit 5.1	Site Development - Protect or Restore Habitat	1
1			Credit 5.2	Site Development - Maximize Open Space	1
1			Credit 6.1	Stormwater Design - Quantity Control	1
	1		Credit 6.2	Stormwater Design - Quality Control	1
	1		Credit 7.1	Heat Island Effect - Nonroof	1
1			Credit 7.2	Heat Island Effect - Roof	1
1			Credit 8	Light Pollution Reduction	1
1			Credit 9	Site Master Plan	1
1			Credit 10	Joint Use of Facilities	1

Yes	?	No			
9	2		WATER EFFICIENCY		11 Points
Y			Prereq 1	Water Use Reduction	Required
4			Credit 1	Water Efficient Landscaping	2 to 4
				50% Reduction	2
				No Potable Water Use or Irrigation	4
2			Credit 2	Innovative Wastewater Technologies	2
2	2		Credit 3	Water Use Reduction	2 to 4
				30% Reduction	2
				35% Reduction	3
				40% Reduction	4
1			Credit 4	Process Water Use Reduction	1

Yes	?	No			
5	14	9	ENERGY & ATMOSPHERE		33 Points
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	Required
Y			Prereq 2	Minimum Energy Performance	Required
Y			Prereq 3	Fundamental Refrigerant Management	Required
5	5	9	Credit 1	Optimize Energy Performance	1 to 19
				Improve by 12% for New Buildings or 8% for Existing Building Renovations	1
				Improve by 14% for New Buildings or 10% for Existing Building Renovations	2
				Improve by 16% for New Buildings or 12% for Existing Building Renovations	3
				Improve by 18% for New Buildings or 14% for Existing Building Renovations	4
				Improve by 20% for New Buildings or 16% for Existing Building Renovations	5
				Improve by 22% for New Buildings or 18% for Existing Building Renovations	6
				Improve by 24% for New Buildings or 20% for Existing Building Renovations	7
				Improve by 26% for New Buildings or 22% for Existing Building Renovations	8
				Improve by 28% for New Buildings or 24% for Existing Building Renovations	9
				Improve by 30% for New Buildings or 26% for Existing Building Renovations	10
				Improve by 32% for New Buildings or 28% for Existing Building Renovations	11
				Improve by 34% for New Buildings or 30% for Existing Building Renovations	12

LEED 2009 for Schools New Construction and Major Renovations
Project Scorecard

Project Name: Concord Carlisle High School
Project Address: Concord, Massachusetts

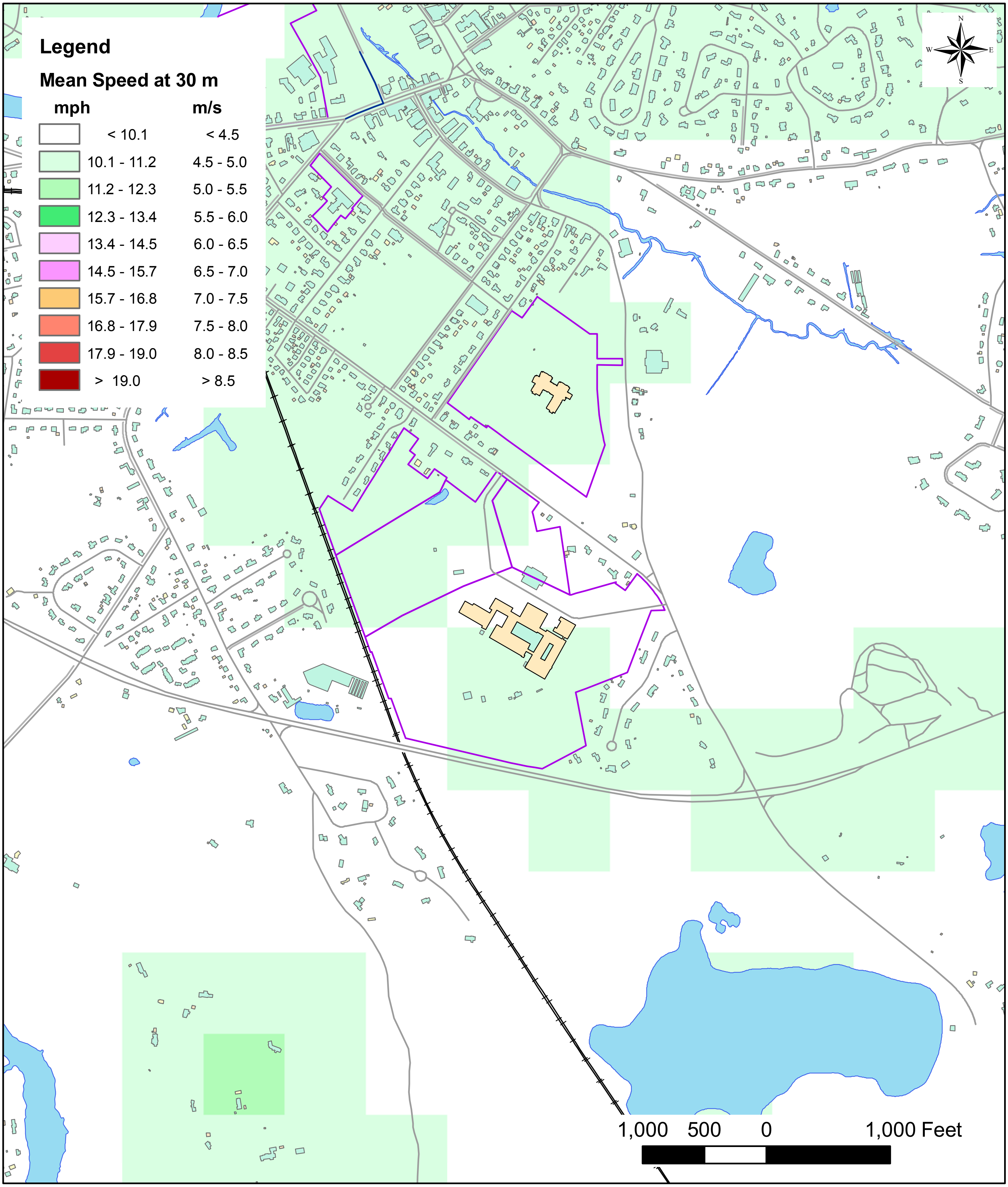
Yes	?	No			
				Improve by 36% for New Buildings or 32% for Existing Building Renovations	13
				Improve by 38% for New Buildings or 34% for Existing Building Renovations	14
				Improve by 40% for New Buildings or 36% for Existing Building Renovations	15
				Improve by 42% for New Buildings or 38% for Existing Building Renovations	16
				Improve by 44% for New Buildings or 40% for Existing Building Renovations	17
				Improve by 46% for New Buildings or 42% for Existing Building Renovations	18
				Improve by 48%+ for New Buildings or 44%+ for Existing Building Renovations	19
	2		Credit 2	On-Site Renewable Energy	1 to 7
				1% Renewable Energy	1
				3% Renewable Energy	2
				5% Renewable Energy	3
				7% Renewable Energy	4
				9% Renewable Energy	5
				11% Renewable Energy	6
				13% Renewable Energy	7
	2		Credit 3	Enhanced Commissioning	2
	1		Credit 4	Enhanced Refrigerant Management	1
	2		Credit 5	Measurement and Verification	2
	2		Credit 6	Green Power	2
Yes	?	No			
7	3	3		MATERIALS & RESOURCES	13 Points
Y			Prereq 1	Storage and Collection of Recyclables	Required
		2	Credit 1.1	Building Reuse - Maintain Existing Walls, Floors and Roof	1 to 2
				Reuse 75%	1
				Reuse 95%	2
		1	Credit 1.2	Building Reuse - Maintain Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
				50% Recycled or Salvaged	1
				75% Recycled or Salvaged	2
1	1		Credit 3	Materials Reuse	1 to 2
				5% Reuse	1
				10% Reuse	2
2			Credit 4	Recycled Content	1 to 2
				10% of Content	1
				20% of Content	2
1	1		Credit 5	Regional Materials	1 to 2
				10% of Materials	1
				20% of Materials	2
1			Credit 6	Rapidly Renewable Materials	1
	1		Credit 7	Certified Wood	1
Yes	?	No			
14	5			INDOOR ENVIROMENTAL QUALITY	19 Points
Y			Prereq 1	Minimum Indoor Air Quality Performance	Required
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	Required
Y			Prereq 3	Minimum Acoustical Performance	Required
1			Credit 1	Outdoor Air Delivery Monitoring	1
1			Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction Indoor Air Quality Management Plan - During Construction	1
1			Credit 3.2	Construction Indoor Air Quality Management Plan - Before Occupancy	1
3	1		Credit 4	Low-Emitting Materials	Up to 4

LEED 2009 for Schools New Construction and Major Renovations
Project Scorecard

Project Name: Concord Carlisle High School
Project Address: Concord, Massachusetts

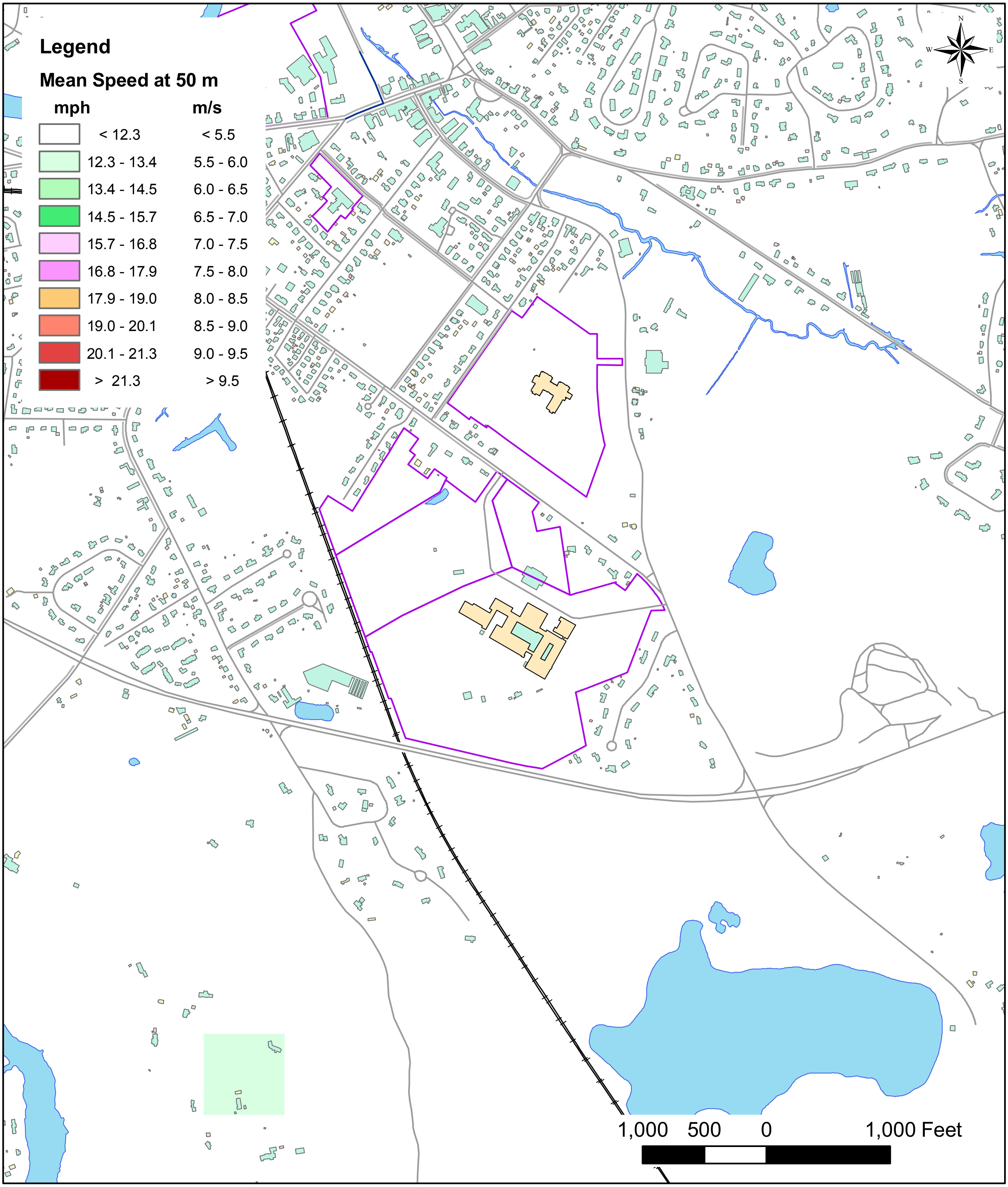
Yes	?	No	Credit	Description	Points
				4.1 - Adhesives & Sealants	1
				4.2 - Paints & Coatings	1
				4.3 - Flooring Systems	1
				4.4 - Composite Wood & Agrifiber Products	1
				4.5 - Furniture & Furnishings	1
				4.6 - Ceiling & Wall Systems	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems - Lighting	1
1			Credit 6.2	Controllability of Systems - Thermal Comfort	1
	1		Credit 7.1	Thermal Comfort - Design	1
	1		Credit 7.2	Thermal Comfort - Verification	1
1	2		Credit 8.1	Daylight and Views	1 to 3
				75% of classrooms	1
				90% of classrooms	2
				75% of other spaces	2 to 3
1			Credit 8.2	Daylight and Views - Views	1
1			Credit 9	Enhanced Acoustical Performance	1
1			Credit 10	Mold Prevention	1
Yes	**?**	**No**			
4	**2**			**INNOVATION IN DESIGN**	**6 Points**
2	2		Credit 1	Innovation in Design	1 to 4
				Innovation or Exemplary Performance	1
				Innovation or Exemplary Performance	1
				Innovation or Exemplary Performance	1
				Innovation	1
1			Credit 2	LEED® Accredited Professional	1
1			Credit 3	School as a Teaching Tool	1
Yes	**?**	**No**			
2	**2**			**REGIONAL PRIORITY**	**4 Points**
2	2		Credit 1	Regional Priority	1 to 4
				Regionally Defined Credit Achieved	1
				Regionally Defined Credit Achieved	1
				Regionally Defined Credit Achieved	1
				Regionally Defined Credit Achieved	1
Yes	**?**	**No**			
52	**40**	**13**		**PROJECT TOTALS (Certification Estimates)**	**110 Points**

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



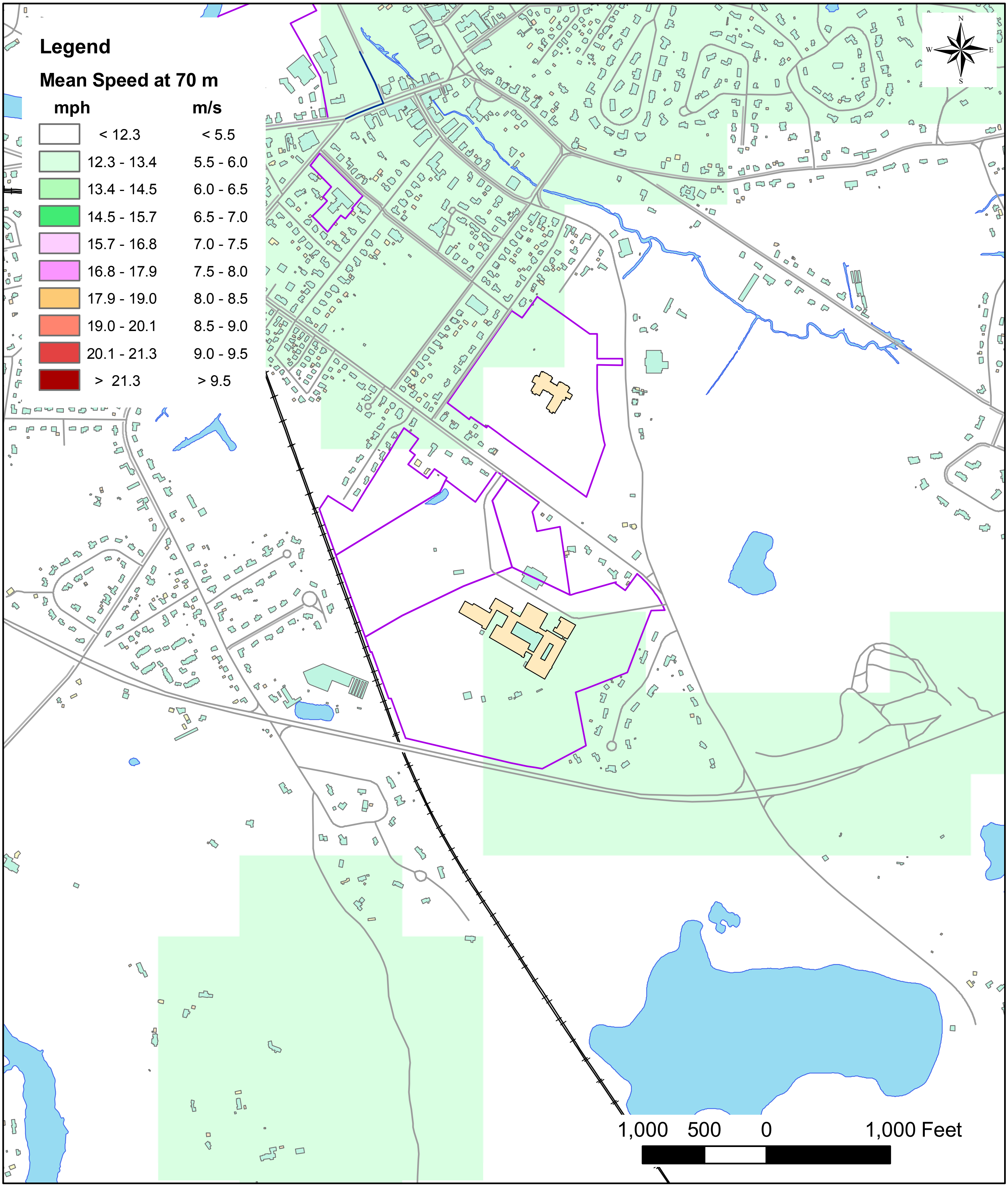
Concord Carlisle High School
Mean Speed at 30 m

Nitsch Engineering



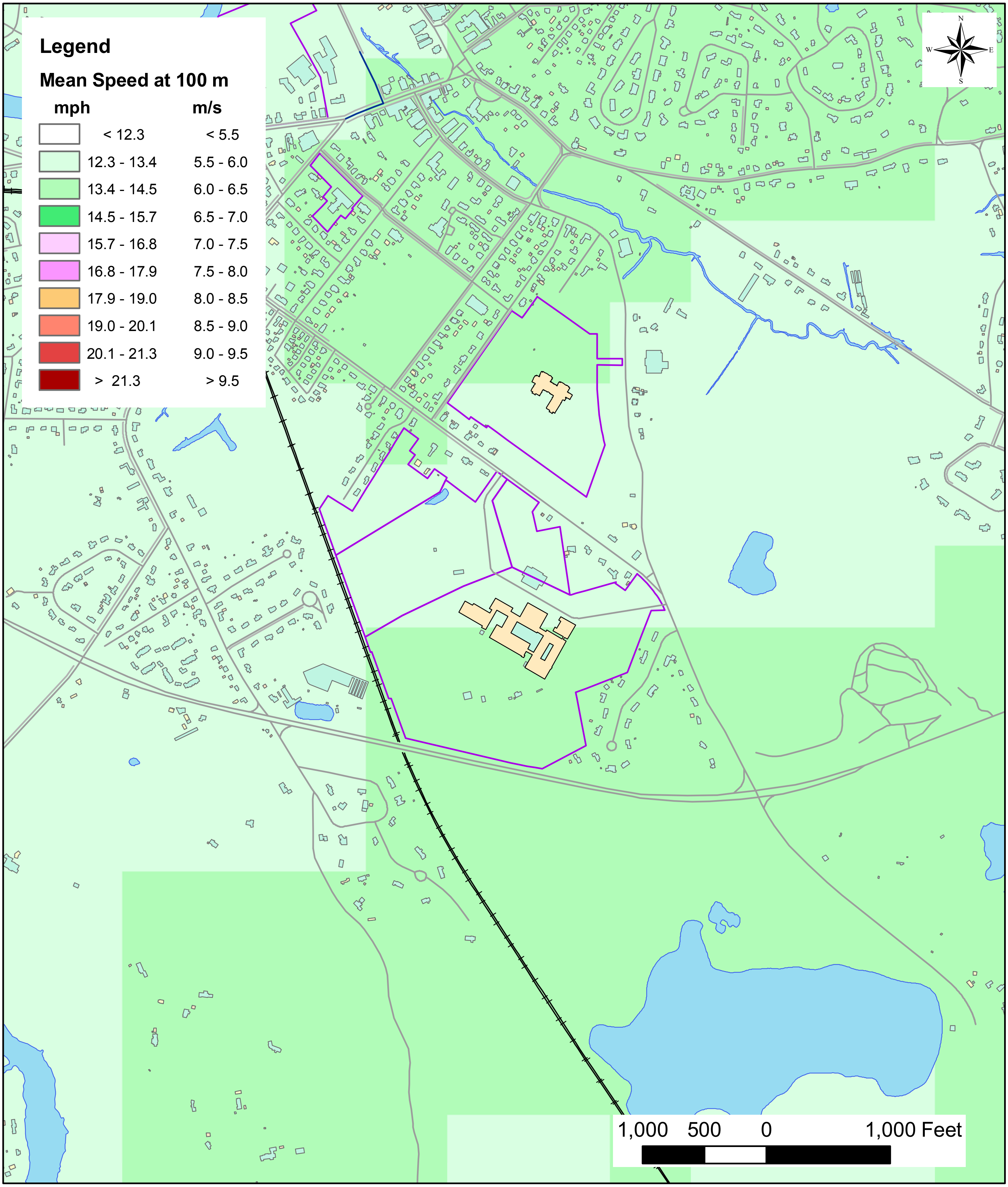
Concord Carlisle High School
Mean Speed at 50 m

Nitsch Engineering



Concord Carlisle High School
Mean Speed at 70 m

Nitsch Engineering



Concord Carlisle High School
Mean Speed at 100 m

Nitsch Engineering

GARCIA • GALUSKA • DESOUSA
Consulting Engineers Inc.

370 Faunce Corner Road, Dartmouth, MA 02747-1217

Concord-Carlisle High School
Concord, MA

MEP ENERGY CONSERVATION MEASURES

Water Conservation Measures

- Condensing gas fired water heater with electronic ignition.

HVAC Conservation Measures

- 100% Outside Air Central Ventilation Rooftop Units w/ Energy Recovery for displacement systems serving Classrooms. Resulting in decreased gas consumption.
- HVAC Rooftop Units w/ CO_2 demand ventilation serving the Auditorium, Stage, Band, Music, Cafeteria and Team & Athletics Offices. Resulting in decreased gas consumption.
- 100% Outside Air Central Ventilation Rooftop Units w/ Energy Recovery for fan coil unit systems serving the Administration and Media Center. Resulting in decreased gas consumption.
- Demand Ventilation for the Gymnasium and Field House limiting outdoor air during unoccupied hours reducing gas consumption.
- Gas Fired Boilers and Controls including hot water reset which varies hot water temperature.
- High Efficiency Chiller Plant
- Building Management System controlling HVAC and Lighting.
- VFDs for Hot Water/Chilled Water Pumps
- VFDs for all supply, return and exhaust fans of all air handling/rooftop units
- 100% Outside Air Hot Water Coil Heating Outdoor Air Handling Units with Energy Recovery for the locker rooms.

Electrical Conservation Measures

- Performance Lighting System utilizing high efficiency fixtures and ballasts.
- Daylight Harvesting System with dual zone control for classrooms, offices and spaces with daylight contribution utilizing fully dimmable ballasts.
- Daylight Harvesting System for gymnasium and field house where daylight is available.
- Occupancy sensors in classrooms, toilets, offices and large spaces.
- Time of day schedule control of corridor lighting through building management system.
- Dual level switch control of spaces with 2 step dimming ballasts.
- LED site lighting designed to meet but not exceed IES Guidelines with cut-off fixtures with dual level control.

TEL 508-998-5700 FAX 508-998-0883 email: info@g-g-d.com

HVAC SYSTEMS

INDOOR AIR QUALITY PROGRAM COMPARISON

The following HVAC IAQ narrative compares the existing building's and proposed building's HVAC systems in terms of indoor air quality features and in relationship to MA CHPS requirements and recommendations.

Item	Description	MA CHPS Reference
1	Ventilation Rates: The proposed building will provide current code required ventilation; whereas there may be over/under ventilation in areas of the existing building, which is typical for buildings of similar size and usage.	PREREQUISITE 1: ASHRAE STANDARD 62.1-2004 COMPLIANCE
2	SMACNA Guidelines: The proposed building air systems will be installed in accordance with industry recognized standards and will provide increased energy efficiency and performance in comparison to the majority of existing building ductwork systems.	PREREQUISITE 2: SMACNA IAQ GUIDELINES
3	Construction IAQ: The proposed building ductwork installation shall adhere to SMACNA IAQ Construction guidelines to ensure ductwork is kept clean during construction.	PREREQUISITE 3: CONSTRUCTION IAQ DUCT PROTECTION
4	Pollutant Source Control: The proposed building will provide an increased level of indoor air quality since all housekeeping, chemical use areas, science prep areas, etc. will be provided with negative pressurization exhaust and make-up air systems.	PREREQUISITE 4: POLLUTANT SOURCE CONTROL
5	Drainage: All HVAC systems containing drain pans shall be provided with condensate drainage systems. The proposed building will have increased floor to floor area, in turn, allowing for additional condensate drainage to occur by gravity. This will result in reduced maintenance costs (i.e. fewer condensate pumps).	PREREQUISITE 6: DRAINAGE
6	Electric Ignition for Gas Fired Equipment: All gas fired equipment in the proposed building will have electric ignition (i.e. no standing pilot lights); thereby improving system safety.	PREREQUISITE 9: ELECTRIC IGNITIONS FOR GAS-FIRED EQUIPMENT
7	Air Intake Location: The proposed building HVAC systems will be designed in accordance with current day codes, which require a greater distance between air intakes and noxious exhaust sources than older codes. Therefore there is a reduced potential for exhaust air re-entrainment and an increased level of IAQ. The existing building unit ventilators are located close to grade level which can result in exhaust fumes from automobiles and landscaping equipment entering the building.	PREREQUISITE 10: AIR INTAKE LOCATION

8	Duct Liners: In general the proposed HVAC system design will minimize the use of duct liners. However where duct liners and sound attenuators are required for sound attenuation purposes, materials will be of "hospital-grade" quality construction in accordance with nationally recognized standards (ASTM)	PREREQUISITE 11: DUCT LINERS
9	Filter Standards: The proposed building HVAC systems will have high efficiency filters, thereby improving indoor air quality levels in comparison to the existing building HVAC systems. The majority of classrooms in the existing building are served by Unit Ventilators which typically are fitted with MERV-7 (50-70% eff.) filters at best, versus the proposed air handling units which will have MERV-13 (90% eff.) filters.	PREREQUISITE 13: MINIMUM FILTER REQUIREMENTS FOR HVAC EQUIPMENT AND CREDIT 2.3: POLLUTANT SOURCE CONTROL, HIGH EFFICIENCY FILTERS
10	Thermal Comfort: The proposed building HVAC system will be designed in accordance with industry recognized standards for thermal comfort. In general today's standards and designs account for an improvement in occupant comfort levels in comparison to older HVAC system designs and installations.	PREREQUISITE 14: ASHRAE STANDARD 55-2004 COMPLIANCE
11	Ducted Returns: The proposed building HVAC systems will utilize a fully ducted return air system, thereby providing an improvement in indoor air quality levels, due to eliminating the potential of returning air from unwanted sources. In addition, there are reduced maintenance costs (due to less frequent filter changes) and improved energy performance (due to reduced filter loading).	CREDIT 2.2: POLLUTANT SOURCE CONTROL, DUCTED HVAC RETURNS

Concord-Carlisle High School
Concord, MA

Conceptual Cost Estimate
Update #1

Prepared for:
OMR Architects, Inc.
West Acton, MA

Prepared by:
D G Jones International, Inc.
3 Baldwin Green Common, #202
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March 9, 2010

Contents	**Page**

SUMMARY

	ADDITION/RENOVATION		NEW	
Gross Floor Area (sf) =		**288,800**		**288,800**
	Element ($)	$/sf	Element ($)	$/sf
A Substructure	3,260,767	11.29	4,321,817	14.96
A10 Foundations	3,260,767	11.29	4,321,817	14.96
A20 Basement Construction	0	0.00	0	0.00
B Shell	15,418,689	53.39	17,114,195	59.26
B10 Superstructure	6,947,500	24.06	8,381,235	29.02
B20 Exterior Enclosure	4,975,932	17.23	5,390,043	18.66
B30 Roofing	3,495,257	12.10	3,342,916	11.58
C Interiors	11,600,550	40.17	11,783,040	40.80
C10 Interior Construction	5,898,900	20.43	6,064,800	21.00
C20 Stairs	214,450	0.74	231,040	0.80
C30 Interior Finishes	5,487,200	19.00	5,487,200	19.00
D Services	19,214,970	66.53	19,214,970	66.53
D10 Conveying Systems	198,475	0.69	198,475	0.69
D20 Plumbing	2,599,200	9.00	2,599,200	9.00
D30 HVAC	8,967,240	31.05	8,967,240	31.05
D40 Fire Protection Systems	1,444,000	5.00	1,444,000	5.00
D 50 Electrical Systems	6,006,055	20.80	6,006,055	20.80
E Equipment and Furnishings	4,375,103	15.15	4,375,103	15.15
E10 Equipment	1,450,969	5.02	1,450,969	5.02
E 20 Furnishings	2,924,134	10.13	2,924,134	10.13
F Special Construction and Demolition	1,937,019	6.71	1,919,669	6.65
F10 Special Construction (Trailers)	45,000	0.16	0	0.00
F20 Selective/Building Demolition	1,469,768	5.09	1,497,418	5.18
F20 Asbestos Abatement	422,251	1.46	422,251	1.46
Sub Total Building Cost	55,807,098	193.24	58,728,794	203.35
G Building Sitework	5,342,800	18.50	5,776,000	20.00
G10 Site Preparation	1,444,000	5.00	1,588,400	5.50
G20 Site Improvements	2,454,800	8.50	2,599,200	9.00
G30 Site Civil/Mechanical Utilities	866,400	3.00	938,600	3.25
G40 Site Electrical Utilities	288,800	1.00	361,000	1.25
G90 Other Site Construction	288,800	1.00	288,800	1.00
Sub Total Construction	61,149,898	211.74	64,504,794	223.35
General Requirements/Conditions	5,982,650	20.72	5,478,425	18.97
Escalation to mid points of construction	7,875,521	27.27	7,636,429	26.44
Estimating Contingency	8,202,554	28.40	7,761,965	26.88
Permit Fee	Excluded		Excluded	
Construction Contingency	By Owner		By Owner	
Total Cost	83,210,623	288.13	85,381,613	295.64

ADDITION/RENOVATION

		Consolidated		New Construction		Renovations	
Gross Floor Area (sf) =			**288,800**		**233,500**		**55,300**
		Element ($)	**$/sf**	**Element ($)**	**$/sf**	**Element ($)**	**$/sf**
A Substructure		3,260,767	11.29	3,260,767	13.96	0	0.00
A10 Foundations		3,260,767	11.29	3,260,767	13.96	0	0.00
A20 Basement Construction		0	0.00	0	0.00	0	0.00
B Shell		15,418,689	53.39	13,837,135	59.26	1,581,554	28.60
B10 Superstructure		6,947,500	24.06	6,776,380	29.02	171,120	3.09
B20 Exterior Enclosure		4,975,932	17.23	4,357,947	18.66	617,985	11.18
B30 Roofing		3,495,257	12.10	2,702,808	11.58	792,449	14.33
C Interiors		11,600,550	40.17	9,526,800	40.80	2,073,750	37.50
C10 Interior Construction		5,898,900	20.43	4,903,500	21.00	995,400	18.00
C20 Stairs		214,450	0.74	186,800	0.80	27,650	0.50
C30 Interior Finishes		5,487,200	19.00	4,436,500	19.00	1,050,700	19.00
D Services		19,214,970	66.53	15,573,654	66.70	3,641,316	65.85
D10 Conveying Systems		198,475	0.69	198,475	0.85	0	0.00
D20 Plumbing		2,599,200	9.00	2,101,500	9.00	497,700	9.00
D30 HVAC		8,967,240	31.05	7,250,175	31.05	1,717,065	31.05
D40 Fire Protection Systems		1,444,000	5.00	1,167,500	5.00	276,500	5.00
D 50 Electrical Systems		6,006,055	20.80	4,856,004	20.80	1,150,051	20.80
E Equipment and Furnishings		4,375,103	15.15	3,189,884	13.66	1,185,219	21.43
E10 Equipment		1,450,969	5.02	1,052,700	4.51	398,269	7.20
E 20 Furnishings		2,924,134	10.13	2,137,184	9.15	786,950	14.23
F Special Construction and Demolition		1,937,019	6.71	0	0.00	1,937,019	35.03
F10 Special Construction (Trailers)		45,000	0.16	0	0.00	45,000	0.81
F20 Selective/Building Demolition		1,469,768	5.09	0	0.00	1,469,768	26.58
F20 Asbestos Abatement		422,251	1.46	0	0.00	422,251	7.64
Sub Total Building Cost		**55,807,098**	**193.24**	**45,388,240**	**194.38**	**10,418,858**	**188.41**
G Building Sitework		5,342,800	18.50	4,319,750	18.50	1,023,050	18.50
G10 Site Preparation		1,444,000	5.00	1,167,500	5.00	276,500	5.00
G20 Site Improvements		2,454,800	8.50	1,984,750	8.50	470,050	8.50
G30 Site Civil/Mechanical Utilities		866,400	3.00	700,500	3.00	165,900	3.00
G40 Site Electrical Utilities		288,800	1.00	233,500	1.00	55,300	1.00
G90 Other Site Construction		288,800	1.00	233,500	1.00	55,300	1.00
Sub Total Construction		**61,149,898**	**211.74**	**49,707,990**	**212.88**	**11,441,908**	**206.91**
General Requirements/Conditions		5,982,650	20.72	4,863,222	20.83	1,119,428	20.24
Escalation to mid point of construction 4Q2013	11.73%	7,875,521	27.27	6,401,913	27.42	1,473,608	26.65
Estimating Contingency		8,202,554	28.40	6,097,312	26.11	2,105,242	38.07
Permit Fee		Excluded		Excluded		Excluded	
Construction Contingency		By Owner		By Owner		By Owner	
Total Cost		**83,210,623**	**288.13**	**67,070,437**	**287.24**	**16,140,186**	**291.87**

NEW

		New Construction	
Gross Floor Area (sf) =			**288,800**
		Element ($)	**$/sf**
A Substructure		4,321,817	14.96
A10 Foundations		4,321,817	14.96
A20 Basement Construction		0	0.00
B Shell		17,114,195	59.26
B10 Superstructure		8,381,235	29.02
B20 Exterior Enclosure		5,390,043	18.66
B30 Roofing		3,342,916	11.58
C Interiors		11,783,040	40.80
C10 Interior Construction		6,064,800	21.00
C20 Stairs		231,040	0.80
C30 Interior Finishes		5,487,200	19.00
D Services		19,214,970	66.53
D10 Conveying Systems		198,475	0.69
D20 Plumbing		2,599,200	9.00
D30 HVAC		8,967,240	31.05
D40 Fire Protection Systems		1,444,000	5.00
D 50 Electrical Systems		6,006,055	20.80
E Equipment and Furnishings		4,375,103	15.15
E10 Equipment		1,450,969	5.02
E 20 Furnishings		2,924,134	10.13
F Special Construction and Demolition		1,919,669	6.65
F10 Special Construction (Trailers)		0	0.00
F20 Selective/Building Demolition		1,497,418	5.18
F20 Asbestos Abatement		422,251	1.46
Sub Total Building Cost		**58,728,794**	**203.35**
G Building Sitework		5,776,000	20.00
G10 Site Preparation		1,588,400	5.50
G20 Site Improvements		2,599,200	9.00
G30 Site Civil/Mechanical Utilities		938,600	3.25
G40 Site Electrical Utilities		361,000	1.25
G90 Other Site Construction		288,800	1.00
Sub Total Construction		**64,504,794**	**223.35**
General Requirements/Conditions		5,478,425	18.97
Escalation to mid point of construction 3Q2013	10.91%	7,636,429	26.44
Estimating Contingency	10.00%	7,761,965	26.88
Permit Fee		Excluded	
Construction Contingency		By Owner	
Total Cost		**85,381,613**	**295.64**

Notes

1. Brief project description:-
   - Renovations and additions to existing high school with associated site/utility work plus option for new construction.

2. The estimate is based on the following:-
   - Prevailing wage.
   - GC type project.
   - Receipt of 5# bona fide bids.
   - Single contract.
   - Rolling phased construction for Addition/Renovation option.
   - No phasing for New option.
   - Construction periods:-
     - Addition/Renovation - 36 months
     - New - 30 months
   - Construction start 2Q2012.
   - Mid points of construction:-
     - Addition/Renovation - 4Q2013
     - New - 3Q2013

3. The gross floor areas are based on the following:-
   - Measurement is taken to the outside face of the exterior wall, measured through all stair wells, elevator shafts and ducts.

4. Story heights:-
   - Varies.

5. General Requirements/Conditions are itemized and priced later in this document

6. Special Conditions for this project are included with General Requirements.

7. Escalation to mid points of construction is compounded per annum at the following:-
   - All years at 3%
   - Note: Escalation is taken on the sum of Sub Total Construction cost, General Requirements/Special Conditions.

8. Estimating Contingency is an allowance for future design modifications/additions, which alter the cost of the building as the design progresses, this percentage reduces as the design develops. It is based on a percentage of the sum of Sub-Total Construction, General Requirements/ Special Conditions and Escalation. For this level of estimate the following has been included:-
   - 10% for New Work.
   - 15% for Renovation Work.

Notes (Cont'd)

9. Construction Contingency is an allowance for scope/design modifications made by the owner during construction and also for any unforeseen circumstances. It is based on a percentage of the sum of Sub-Total Construction, General Requirements/Special Conditions, Escalation and Design Contingency. The following has been included:-
    - By Owner

10. This estimate has been prepared from the following design information:-
    - Preliminary sketch floor plans from OMR dated 10 March 2010.
    - MEP narrative dated March 2, 2010.
    - Structural narrative dated March 04, 2010.
    - Site visit on 02/18/2010 with OMR.
    - Meetings with OMR and sub-consultants.
    - Various emails from OMR.
    - Telecons with OMR.

11. The estimate includes the following:-
    Hazardous material abatement and removal.
    - Security (conduit & draw wire only)
    - Telephone/data wiring.

12. The estimate excludes the following:-
    - Utility company backcharges.
    - Sales tax.
    - Building permit fees.
    - Design consultants fees.
    - Excavation in rock.
    - Removal of water during excavation work.
    - Underpinning existing foundations.
    - Library stacks, shelving, etc.
    - Loose furniture, fittings and equipment.
    - Fixed furniture, fittings and equipment except work normally included in GC work.
    - Third-party building Commissioning.
    - Additional temporary trailers to house students during construction work.

13. Allowances:-
    - Estimate is based on allowances at this stage of the design.

14. Assumptions:-
    - To arrive at a $/sf cost reasonable assumptions have been made.

15. Estimates by other firms:-
    - Asbestos abatement allowance updated from SMMA report dated 2005.
    - Food Service equipment budget of $630,000.00 by Colburn & Guyette.

Description	Qty	% of Time Allocated	Unit	Rate	Amount
General Requirements/Conditions - Addition/Renovation					
Field personnel					
Field personnel:-					
- project manager	39.00	25%	week	3,350.00	130,650
- project superintendent	156.00	100%	week	2,950.00	460,200
- field engineer	156.00	100%	week	2,750.00	429,000
- MEP coordinator	156.00	100%	week	2,700.00	421,200
- laborer (2#)	312.00	200%	week	2,550.00	795,600
Main office staff	156.00	100%	week	2,650.00	413,400
Insurance & Bond Cost					
Insurances (includes):-					1,544,600
- builders risk					
- general liability					
- vehicle liability					
- pollution liability					
- workers compensation					Included in Labor
- umbrella coverage					
Performance bond.					772,300
Temporary Utilities & Services					
Temporary utilities & services:-					
- temporary water & sewer service & distribution	156.00		week	175.00	27,300
- temporary water consumed	156.00		week	175.00	27,300
- temporary toilet rental & service	156.00		week	175.00	27,300
- temporary electricity consumed	156.00		week	175.00	27,300
- temporary heating system	156.00		week	175.00	27,300
- temporary heating fuel consumed	156.00		week	175.00	27,300
- emergency diesel generator fuel consumed	156.00		week	175.00	27,300
Additional Categories					
Preparation of progress schedules.	36.00		mth	1,250.00	45,000
Compilation/preparation of site survey data.	1.00		ls	12,500.00	12,500
Preparation of shop drawings.	1.00		ls	15,000.00	15,000
Construction photographs.	36.00		mth	500.00	18,000
Temporary construction.	156.00		week	300.00	46,800
Construction aids (safety nets, personnel protection					
equipment, partial scaffolding, etc)	156.00		week	250.00	39,000
Barriers and enclosures.	156.00		week	450.00	70,200
Security.	36.00		mth	2,750.00	99,000
Access roads.	156.00		week	275.00	42,900
Temporary controls.	156.00		week	225.00	35,100
Project signs.	36.00		mth	150.00	5,400
Field offices and sheds	36.00		mth	3,250.00	117,000
Field office expenses.	156.00		week	350.00	54,600
Equipment rental	1.00		ls	15,000.00	15,000
Snow removal	24.00		ea	500.00	12,000
Winter protection	1.00		ls	85,000.00	85,000
Interim cleaning	156.00		week	600.00	93,600
Final cleaning	1.00		ls	15,000.00	15,000
Mockup, allow	1.00		ls	3,500.00	3,500
Overtime/weekend working to facilitate phasing and the					
daily operations of the hospital					Not Required
General Requirements/Conditions - Addition/Renovation		**Total**			**5,982,650**

Description	Qty	% of Time Allocated	Unit	Rate	Amount
General Requirements/Conditions - New					
Field personnel					
Field personnel:-					
- project manager	32.50	25%	week	3,350.00	108,875
- project superintendent	130.00	100%	week	2,950.00	383,500
- field engineer	130.00	100%	week	2,750.00	357,500
- MEP coordinator	130.00	100%	week	2,700.00	351,000
- laborer (2#)	260.00	200%	week	2,550.00	663,000
Main office staff	130.00	100%	week	2,650.00	344,500
Insurance & Bond Cost					
Insurances (includes):-					1,598,200
- builders risk					
- general liability					
- vehicle liability					
- pollution liability					
- workers compensation					Included in Labor
- umbrella coverage					
Performance bond.					799,100
Temporary Utilities & Services					
Temporary utilities & services:-					
- temporary water & sewer service & distribution	130.00		week	175.00	22,750
- temporary water consumed	130.00		week	175.00	22,750
- temporary toilet rental & service	130.00		week	175.00	22,750
- temporary electricity consumed	130.00		week	175.00	22,750
- temporary heating system	130.00		week	175.00	22,750
- temporary heating fuel consumed	130.00		week	175.00	22,750
- emergency diesel generator fuel consumed	130.00		week	175.00	22,750
Additional Categories					
Preparation of progress schedules.	30.00		mth	1,250.00	37,500
Compilation/preparation of site survey data.	1.00		ls	12,500.00	12,500
Preparation of shop drawings.	1.00		ls	15,000.00	15,000
Construction photographs.	30.00		mth	500.00	15,000
Temporary construction.	130.00		week	300.00	39,000
Construction aids (safety nets, personnel protection					
equipment, partial scaffolding, etc)	130.00		week	250.00	32,500
Barriers and enclosures.	130.00		week	450.00	58,500
Security.	30.00		mth	2,750.00	82,500
Access roads.	130.00		week	275.00	35,750
Temporary controls.	130.00		week	225.00	29,250
Project signs.	30.00		mth	150.00	4,500
Field offices and sheds	30.00		mth	3,250.00	97,500
Field office expenses.	130.00		week	350.00	45,500
Equipment rental	1.00		ls	15,000.00	15,000
Snow removal	24.00		ea	500.00	12,000
Winter protection	1.00		ls	85,000.00	85,000
Interim cleaning	130.00		week	600.00	78,000
Final cleaning	1.00		ls	15,000.00	15,000
Mockup, allow	1.00		ls	3,500.00	3,500
Overtime/weekend working to facilitate phasing and the					
daily operations of the hospital					Not Required
General Requirements/Conditions - New		**Total**			**5,478,425**

Gross Floor Areas

ADDITION/RENOVATION	New + Reno (sf)	Phase 1A			Phase 1B			Phase 2A			Phase 2B			Phase 3		
		New (sf)	Reno (sf)	Demo (sf)	New (sf)	Reno (sf)	Demo (sf)	New (sf)	Reno (sf)	Demo (sf)	New (sf)	Reno (sf)	Demo (sf)	New (sf)	Reno (sf)	Demo (sf)
Lower Level	65,700	58,600			7,100		21,012									
Main Level	137,100	20,850	10,000	1,500	7,100	13,000	18,540	43,000		48,320	10,850	32,300				75,500
2nd Level	43,000							43,000		10,200						
3rd Level	43,000							43,000								
Totals	**288,800**	**79,450**	**10,000**	**1,500**	**14,200**	**13,000**	**39,552**	**129,000**	**0**	**58,520**	**10,850**	**32,300**	**0**	**0**	**0**	**75,500**
Total New		**233,500**														
Total Reno		**55,300**														
Total Demo		**175,072**														

NEW	New + Reno (sf)	New (sf)	Reno (sf)	Demo (sf)
Lower Level	65,700	65,700	0	21,372
Main Level	137,100	137,100	0	143,500
2nd Level	43,000	43,000	0	10,200
3rd Level	43,000	43,000	0	0
Totals	**288,800**	**288,800**	**0**	**230,372**

7 Commonwealth of Massachusetts Requirements and Impacts

- MCPPO Requirements
- MSBA Program Requirements
- State Construction Laws
- Other Requirements or Impacts

7 Commonwealth of Massachusetts Requirements and Impacts

The Commonwealth of Massachusetts has a number of programs and requirements that the Concord- Carlisle High School project will need to address during the continued study and design phases. And as always, these program requirements and submission requirements are continually in flux. We will attempt to address a variety of the programs here.

After the completion of the Facilities Master Plan, for participation with the Massachusetts School Building Authority (MSBA) program, the next requirements are to work with the MSBA to validate the Enrollment Projections and to procure an Owner's Project Manager (OPM). This OPM is required to take part and be certified in the Massachusetts Certified Public Purchasing Official program (MCPPO) offered by the Office of the Inspector General (OIG). During this four day certification program, the future OPM is educated and tested on:

- Public Construction in Massachusetts
- Public Purchasing Objectives, Purchasing Controls and Legal Requirements for Public Contracts
- Procurement of Supplies and Services and Real Property Transactions under M.G.L. Chapter 30B
- The Massachusetts School Building Authority
- Procuring Building Design Contracts under M.G.L. Chapter 7
- Procuring Building Construction Contracts under M.G.L. Chapter 149
- Procuring Construction Contracts under M.G.L. Chapter 30: 39M
- Effective Design and Construction Contract Administration
- Prevailing Wage Laws
- Conflict of Interest Laws
- Public Records Laws
- Special Issues in Construction Bidding

According to the MSBA, "*The success of a school building project is dependent on the performance of the owner's project manager (the "OPM") and the OPM's ability to facilitate an effective working relationship with the owner, designer, contractor and others involved in the project. As a representative of the interests of both the Owner and the Massachusetts School Building Authority (the "MSBA"), the OPM is the focal point for accountability and must be independent of the other project participants."*

As your funding partner, the MSBA is part of the Team and "requires collaboration between the local district and the MSBA during all phases of the process." The MSBA collaborative team process involves: identifying the problem, validating the problem, evaluating potential solutions, confirming the solution and implementing the agreed upon solution. See the attached MSBA Project Flow Chart for more information on the process. Currently, the MSBA is reevaluating the space program guidelines, grossing factors, total allowable gross square feet per student for a building, and requirements for daylighting and views. These proposed revisions are attached herein and may affect the space program summary, design and costs included in this manual.

Additional MSBA program requirements and potential impacts include:

- The MSBA uses standard contracts for services procured through them for OPMs, designers, and general contractors.
- Designers selected for feasibility study may continue without independent peer review.
- The MSBA uses a “pay-as-you-build” progress payment system from feasibility study through construction, allowing for better cash flow in the cities and towns.
- The MSBA has strict guidelines for the size of allowable school and program elements, based on agreed upon enrollment criteria, all of which the MSBA will determine with the District.
- The MSBA Board typically meets the last Wednesday of odd numbered months.
- After the Feasibility Study has been submitted, the MSBA Board will vote before the District may move ahead with a Preferred Schematic Design. Once the Schematic Design is submitted, the Board will vote to move to Final Scope and Budget. Along the way, MSBA Board Facilities Subcommittee meetings will help to guide the Project.
- Before scope and budget meetings, the final MSBA reimbursement rate will be calculated. See attached information on this methodology. After the base rate and “ability-to-pay” factors are applied, incentive points may be obtained relative to maintenance practices, CM at risk, newly formed regional districts, major reconstruction or renovation/ reuse, energy efficiency (MA-CHPS scorecard), overlay zoning, and model school buildings.
- For budgeting purposes, the MSBA typically requires site costs not to exceed 8% of the approved building construction costs, as determined by the MSBA. Attached are their guidelines on this subject.
- The MSBA typically will not reimburse more than 20% of total construction costs to be used for soft costs.
- After the Final Scope and Budget have been approved by the MSBA, the Project must be taken to the Town Meetings for both Concord and Carlisle and the ballot question must be voted in the affirmative within 120 days of the MSBA Board’s vote of approval. This is followed by the Project Funding Agreement with the MSBA.
- The MSBA accepts either a traditional Design/ Bid/ Build delivery method or CM at Risk. CM at Risk is an allowable alternate procurement process for projects over $5,000,000, with pre-approval from the Office of the Inspector General. Under this process, the CM is brought on board during the design phases and is involved in “pre-construction” services.
- MSBA guidelines and regulations are being updated on a regular basis and should be reviewed for more detail.

MSBA Policy Statement Regarding Failed Local Votes

The following information is provided by the MSBA:

"Policy Statement regarding the impact on MSBA funding if a City, Town or Regional School District fails to vote to appropriate funding for a feasibility study. In the event that a school district fails to approve funding for a feasibility study, by no later than 10 business days following the failed vote, the school district must submit to the MSBA a plan that: (1) presents the vote results, (2) explains the school district's understanding of the reason(s) for the failed vote, and (3) sets forth the school district's plan to remedy the failed vote and a suggested timeline for such a remedy. The MSBA will review the plan and determine whether it can continue to set aside MSBA funds for the feasibility study. However, a failed local vote likely will result in the school district being required to submit a new Statement of Interest to the MSBA and await a second invitation from the MSBA to enter the feasibility study phase of the MSBA's process."

"Policy Statement regarding the impact on MSBA funding if a City, Town or Regional School District fails to vote to appropriate funding for the proposed project as defined in the Project Scope and Budget Agreement, within the deadlines established by the MSBA. The Project Scope and Budget Agreement, as approved by the MSBA's Board of Directors, defines the scope, cost and schedule of the agreed upon proposed project, and any variances from this Agreement require the written approval of the MSBA and may require an additional Board vote. Pursuant to the MSBA's regulations, a city, town or regional school district that has been approved by the Board for a proposed project has 120 days from the date of the Board's approval to obtain and certify local approval of an appropriation to fully fund the proposed project and all other local votes or approvals showing acceptance of the cost, site, type, scope and timeline for the proposed project.

The MSBA appreciates the challenges that school districts face, but the MSBA's regulations specifically include this 120-day deadline for a local appropriation to ensure that the MSBA's capital program funds are targeted toward projects and school districts that are ready and able to make the financial commitment and move forward in a timely manner. Given the overwhelming capital needs of school districts across the Commonwealth and the MSBA's limited capital program funds, the MSBA cannot indefinitely tie up funds allocated for a project that lacks local support.

In the event that a school district fails to approve funding for a proposed project within the 120-day deadline, by no later than 10 business days following the failed vote, the school district must submit to the MSBA a plan that: (1) presents the vote results, (2) explains the school district's understanding of the reason(s) for the failed vote, and (3) sets forth the school district's plan to remedy the failed vote and a suggested timeline for such a remedy. The MSBA will review the plan and determine whether it can continue to set aside MSBA funds for the proposed project. However, a failed local vote likely will result in the school district being required to submit a new Statement of Interest to the MSBA and await a second *invitation from the MSBA to enter the feasibility study phase of the MSBA's process."*

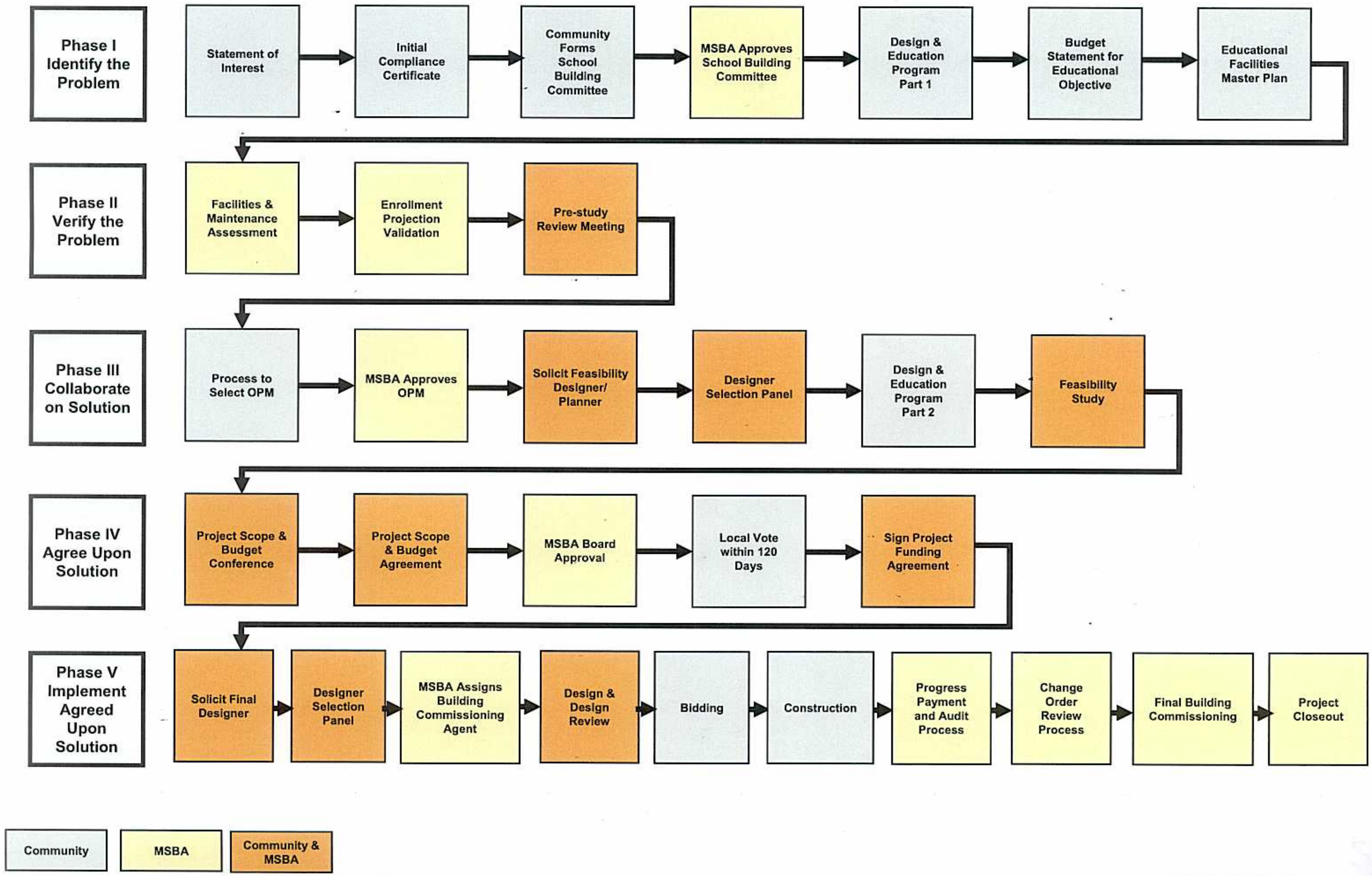
Construction Delivery Services

To promote fair competition for bidders, under Chapter 193 of the Acts of 2004, Construction Reform Legislation, the Commonwealth has developed Massachusetts General Laws for procurement. A synopsis of these is included in this manual and includes Building Construction Contracts under MGL c. 149, Public Works (non-building) Construction Contracts under MGL c. 30: 39M, Public Works (non-building) Construction Contracts under MGL c. 30B, Public Building Project Design Services under MGL c. 7, and Procurement of Supplies and Services under MGL c.30B.

A few key factors relative to Construction Delivery services of a project of this scale include:

- General Contractors and Sub Contractors require certification administered by DCAM and pre-qualification on all projects over $10,000,000.
- Seventeen filed sub bid categories shall be used in bidding unless work of that category will cost less than $20,000.
- Eligible filed sub bids shall be carried under the general bidders' bids to the Owner.
- Owner must award contract to the lowest responsible and eligible general bidder.
- Alternates must be listed in order of priority and considered in this numerical order.

MSBA Process Flow



MAY 2009

MEMORANDUM

TO: Board of Directors, Massachusetts School Building Authority
FROM: Katherine P. Craven, Executive Director
DATE: January 27, 2010
RE: Space Standards and Guideline Proposed Revisions

Since 2007, the Massachusetts School Building Authority has been collaborating with over 140 Districts invited into the capital pipeline to find the most cost-effective solution which meets the educational program resulting in Board approval of over 65 project scope and budget agreements. Of these 65 project scope and budget agreements, 10 have been high schools. Throughout these collaborations, the MSBA has listened to the space needs identified by the Districts to support their existing educational programs as well as their goals for additional programs. The MSBA remains committed to right-sizing projects which provide the most benefit for the school children that can be financially supported by the District as well as the MSBA.

Based upon this feedback, the MSBA has reviewed the educational program space standards and guidelines as described in 963 CMR 2.06 and the space summary template for high schools. The MSBA has been able to work with Districts to meet educational programs in the majority of situations by establishing evaluation parameters which look at the District's overall needs in relationship to these standards. These current evaluation parameters include:

- Addition/Renovations - A broader interpretation of guidelines for an addition/renovation project than would be applied for a new school;
- SPED - The provision of special education space above that allowed by the guidelines based on the District's substantiation of existing or anticipated program needs;
- Collaboratives - The request for identification followed by the provision of special education space as may be needed for Collaborative Spaces to which the District may belong;
- Art/Music/Vocational Spaces - A balance of overall square footage between the Arts/Music Programs and the Vocational Technical Spaces – allowing lower space need in one category to offset the greater space needs in the other;
- Core Classrooms - Flexibility in the core academic spaces to allow for varying sizes of general classrooms, higher number of classrooms than allowed by the guidelines and additional science labs as justified by the educational program.

Although, to date, the MSBA has been able to successfully reach agreement with Districts utilizing these parameters, the MSBA has identified common requests across many of the reviews and discussions about educational spaces. After detailed review of existing guidelines and the input from the Science Lab Task Force committee, the MSBA has prepared a recommendation for revisions to its regulations targeted to include the common elements from the work done to date. There have been additional requests for spaces larger than the current regulations and/or even the regulations noted below but the MSBA proposes the following revisions as an attempt to provide the standard needs of all and minimize the overall impact to the gross square foot of the building.

This review and proposed recommendations are based on comments provided by the Districts, their design teams and Owner's Project Managers, and input solicited by the MSBA. The MSBA looks forward to working during the public process with the BSA, the Districts, superintendents, school committee members, school business officials and other stakeholders as was done previously during the implementation of the 2006 regulations.

Highlights of the proposed revisions include the following changes in program areas as outlined below with the associated adjustment per category required :

Core Academic Spaces:

- Increase the minimum size of the science labs in accordance with National Science Teachers Association (NSTA) and as recommended by the MSBA's Science Lab Task Force;
    - Science classrooms would increase from 1200 nsf to 1440 nsf;
    - Science prep rooms will increase from 80 nsf per lab to 200 nsf per lab;
    - Central Chemical Storage Area will be added for 200 nsf;
- Change the range of the allowable net square footage for the general classrooms
  from 850 nsf - 950 nsf
  to 825 nsf - 950 nsf.
- The current Educational Space Template calculates allowable classroom space by using the upper bound of the classroom range (950 net square feet per classroom). We would propose changing the calculation to use 850 net square feet per classroom and allow the "extra" 100 nsf per classroom to be used as discretionary square footage within the core academic spaces to allow for teacher prep areas, storage, additional classrooms or work centers.

Art & Music:

- The current standards allow for one combination band/chorus room at 1500 net square feet.
- The proposed change would allow an additional 1500 nsf for a separate chorus room (as opposed to the current band & chorus combination).
- Add a 500 nsf music storage room.

Vocations & Technology:

- Reduce the number of technology classrooms / shop rooms (a reduction of one classroom and one shop per school). This saved space will be reallocated to the Core Academic Spaces category.

Health & Physical Education:

- Increase the size of the gymnasium from the current 10,000 nsf to a proposed 12,000 nsf.
- This will generally allow for a gym with three teaching stations and bleachers on one side of the main court.

Dining & Food Service:

- Add one 600 nsf scramble serving area to the dining & food service cafeteria area.

Based on a student enrollment of 1000 (typical high school student population), the following table shows the current MSBA total Gross Square Feet allowance and the MSBA proposed updates.

Proposed Gross Areas per Space Type for 1000 Student Enrollment HS

	Current Regulations	MSBA Proposal
Core Academic Spaces	65,805	73,815
Art & Music	7,050	10,050
Vocations & Technology	19,200	14,400
Health & Physical Education	29,700	32,700
Dining & Food Service	12,300	13,200

Based on a student enrollment of 1000 (a typical high school student population), the following table shows the current MSBA total Gross Square Feet allowance and the MSBA proposed updates.

Proposed Gross Square Feet Totals for 1000 Student Enrollment HS

	Current Regulations	MSBA Proposal
Total Gross Square Feet	185,000	195,110
Proposed Additional Gross Square Feet	-	10,110
Total Gross Square Feet per Student	185	195.1
Proposed Additional Gross Square Feet per Student	-	10.1

Revisions to Table 3 Gross Square Feet per Student – Academic High Schools

In order to address the space efficiencies inherent to larger high school buildings, Attachment A *Proposed Table 3 – Gross Square Feet pre Student – Academic High Schools* shows revisions to the Academic High School table in the current regulations. The current table shows enrollments from 600 to 1000 students and does not include an associated maximum grossing factor. The proposal is to extend the range of the table from 600 to 2000 students and to include a maximum grossing factor limit associated with each enrollment. The proposed revisions include providing a higher gross square footage allowance for smaller high schools with enrollments as low as 600 students, and lowering gross square feet per student as enrollment increases to 2000 students. This attachment shows current and proposed regulations, and includes the proposed space modifications listed above.

Attachment A - Guidelines Proposed Revisions Memo Jan 2010
Proposed Table 3 - Gross Square Feet per Student - Academic High Schools

Projected Enrollment	Current GSF per Student	Proposed GSF per Student	Maximum Grossing Factor
Less than 600	To be determined based on curriculum		1.50
Between 600 and 619	205	226	1.50
Between 620 and 639	204	226	1.50
Between 640 and 659	203	222	1.50
Between 660 and 679	202	219	1.50
Between 680 and 699	201	216	1.50
Between 700 and 719	200	214	1.50
Between 720 and 739	199	212	1.50
Between 740 and 759	198	210	1.50
Between 760 and 779	197	209	1.50
Between 780 and 799	196	207	1.50
Between 800 and 819	195	206	1.50
Between 820 and 839	194	205	1.50
Between 840 and 859	193	204	1.50
Between 860 and 879	192	202	1.50
Between 880 and 899	191	201	1.50
Between 900 and 919	190	200	1.50
Between 920 and 939	189	200	1.50
Between 940 and 959	188	198	1.50
Between 960 and 979	187	197	1.50
Between 980 and 999	186	195	1.50
Between 1000 and 1019	185 (1000 and greater)	195	1.50
Between 1020 and 1039		194	1.50
Between 1040 and 1059		193	1.49
Between 1060 and 1079		192	1.49
Between 1080 and 1099		190	1.48
Between 1100 and 1119		189	1.48
Between 1120 and 1139		188	1.48
Between 1140 and 1159		186	1.47
Between 1160 and 1179		185	1.47
Between 1180 and 1199		183	1.46
Between 1200 and 1219		182	1.46
Between 1220 and 1239		181	1.46
Between 1240 and 1259		180	1.45
Between 1260 and 1279		178	1.45
Between 1280 and 1299		177	1.44
Between 1300 and 1319		175	1.44
Between 1320 and 1339		174	1.44
Between 1340 and 1359		173	1.43
Between 1360 and 1379		172	1.43
Between 1380 and 1399		171	1.42
Between 1400 and 1419		171	1.42
Between 1420 and 1439		170	1.42
Between 1440 and 1459		169	1.41
Between 1460 and 1479		167	1.41
Between 1480 and 1499		166	1.40

Projected Enrollment				Current GSF per Student	Proposed GSF per Student	Maximum Grossing Factor
Between	1500	and	1519	185	165	1.40
Between	1520	and	1539	(1000 and greater)	165	1.40
Between	1540	and	1559		165	1.40
Between	1560	and	1579		164	1.40
Between	1580	and	1599		163	1.40
Between	1600	and	1619		162	1.40
Between	1620	and	1639		162	1.40
Between	1640	and	1659		162	1.40
Between	1660	and	1679		163	1.40
Between	1680	and	1699		162	1.40
Between	1700	and	1719		161	1.40
Between	1720	and	1739		160	1.40
Between	1740	and	1759		160	1.40
Between	1760	and	1779		160	1.40
Between	1780	and	1799		160	1.40
Between	1800	and	1819		160	1.40
Between	1820	and	1839		160	1.40
Between	1840	and	1859		159	1.40
Between	1860	and	1879		159	1.40
Between	1880	and	1899		159	1.40
Between	1900	and	1919		158	1.40
Between	1920	and	1939		158	1.40
Between	1940	and	1959		158	1.40
Between	1960	and	1979		158	1.40
Between	1980	and	2000		157	1.40
	Greater than		2000	To be determined based on curriculum		1.40

Proposed amendments and revisions to the Massachusetts School Building Authority's regulations, 963 CMR 2.00: SCHOOL BUILDING GRANT PROGRAM

2.06: Educational Program Space Standards

(1) General Provisions. The approved Design and Educational Program and the Project Scope and Budget Agreement shall be the basis for the design of an Approved Project, and the Approved Project shall not diverge from said Project Scope and Budget Agreement without the prior written consent of the Authority.

(2) Enrollment Projection. The Enrollment Projection, as determined by the Authority. An Eligible Applicant must submit to the Authority enrollment information and related documentation using the Authority's on-line enrollment projection system or as may otherwise be requested by the Authority. The Authority and the Eligible Applicant may have a Design Enrollment Conference to review the Enrollment Projection and discuss any supporting documentation that the Eligible Applicant may have provided. After the Design Enrollment Conference, if any, the Eligible Applicant shall sign an Enrollment Certification that documents the Enrollment Projection which shall be the basis for a potential project. No potential project shall progress though the Authority's capital pipeline process beyond this stage without the Eligible Applicant signing and submitting to the Authority the signed Enrollment Certification.

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(3) Prototypical Gross Square Foot Per Pupil Standards. The Authority may review the set of educational program space standards contained in the MSBA Educational Program Space Standards and Guidelines, which provide the basis for gross square foot per pupil allowances promulgated under 963 CMR 2.00. Pursuant to M.G.L. c. 70B, § 9(b), the MSBA Educational Program Space Standards and Guidelines may define prototype school design and space recommendations for each specified program activity eligible for funding from the Authority for new construction and said guidelines may also include space recommendations for reconstruction or renovations.

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(4) Per Student Space Allowance.

(a) The Authority shall not authorize design plans that exceed gross square foot per student allocations based upon the Certified Design Enrollment of the Proposed Project and the limitations in gross square footage established in 963 CMR 2.06: *Tables 1, 2 and 3*, except as provided in 963 CMR 2.00. These standards are reflective of realistic, future-oriented, and contemporary educational program goals and are based on the summation of square foot allocations for each itemized educational space. The gross square footage per student allowances promulgated herein are based upon the MSBA Educational Program Space Standards and Guidelines which are based upon model educational programs for facilities of smaller and larger enrollments in order to develop a variable gross square foot per student allowance that accommodates the differing needs and economies of scale in facilities of smaller and larger enrollments.

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(b) The space standards contained in 963 CMR 2.00 and in the MSBA Educational Program Space Standards and Guidelines may not necessarily be applicable to reconstruction, renovation or repair projects. These standards and guidelines were developed by the Authority for determining maximum size and costs related to new construction and should not be used for assessing safety standards or educational adequacy of existing facilities that were constructed in accordance with the standards and guidelines that prevailed at the time of construction. The Authority shall consider Proposed Projects on a case-by-case basis and in some cases different square footages may be determined at the discretion of the Authority.

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(c) Grossing Factor – The Grossing Factor is the net-to-gross square footage ratio of a school facility. The Authority shall not approve a Total Facilities Grant for any proposed project that includes design plans for a new school facility that have a Grossing Factor that exceeds 1.50.

The following tables establish the limitations in gross square footage per student allowable for the corresponding enrollment for elementary schools, middle school and high schools.

Table 1: Gross Square Feet per Student – Elementary Schools

Projected Enrollment	GSF per Student
Less than 300	180
Between 300 and 309	180
Between 310 and 319	179
Between 320 and 329	178
Between 330 and 339	177
Between 340 and 349	175
Between 350 and 359	174
Between 360 and 369	173
Between 370 and 379	172
Between 380 and 389	171
Between 390 and 399	170
Between 400 and 409	168
Between 410 and 419	167
Between 420 and 429	166
Between 430 and 439	165
Between 440 and 449	164

Projected Enrollment	GSF per Student
Between 450 and 459	163
Between 460 and 469	161
Between 470 and 479	160
Between 480 and 489	159
Between 490 and 499	158
Between 500 and 509	157
Between 510 and 519	156
Between 520 and 529	154
Between 530 and 539	153
Between 540 and 549	152
Between 550 and 559	151
Between 560 and 569	150
Between 570 and 579	149
Between 580 and 589	147
Between 590 and 599	146
600 and greater	145

Table 2: Gross Square Feet per Student – Middle and Junior High Schools

Projected Enrollment	GSF per Student
Less than 400	190
Between 400 and 409	190
Between 410 and 419	189
Between 420 and 429	188
Between 430 and 439	187
Between 440 and 449	187
Between 450 and 459	186
Between 460 and 469	185
Between 470 and 479	184
Between 480 and 489	183
Between 490 and 499	182
Between 500 and 509	181
Between 510 and 519	181
Between 520 and 529	180
Between 530 and 539	179
Between 540 and 549	178
Between 550 and 559	177
Between 560 and 569	176
Between 570 and 579	175

Projected Enrollment	GSF per Student
Between 580 and 589	175
Between 590 and 599	174
Between 600 and 609	173
Between 610 and 619	172
Between 620 and 629	171
Between 630 and 639	170
Between 640 and 649	169
Between 650 and 659	169
Between 660 and 669	168
Between 670 and 679	167
Between 680 and 689	166
Between 690 and 699	165
Between 700 and 709	164
Between 710 and 719	163
Between 720 and 729	163
Between 730 and 739	162
Between 740 and 749	161
750 and greater	160

Table 3: Gross Square Feet per Student – Academic High Schools

Projected Enrollment	GSF per Student	Maximum Grossing Factor Limit
Less than 600	*to be determined*	1.50
Between 600 and 619	226	1.50
Between 620 and 639	226	1.50
Between 640 and 659	222	1.50

Projected Enrollment	GSF per Student	Maximum Grossing Factor Limit
Between 1300 and 1319	175	1.44
Between 1320 and 1339	174	1.44
Between 1340 and 1359	173	1.43
Between 1360 and 1379	172	1.43

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Projected Enrollment ... [1]

Between 660 and 679	219	1.50
Between 680 and 699	216	1.50
Between 700 and 719	214	1.50
Between 720 and 739	212	1.50
Between 740 and 759	210	1.50
Between 760 and 779	209	1.50
Between 780 and 799	207	1.50
Between 800 and 819	206	1.50
Between 820 and 839	205	1.50
Between 840 and 859	204	1.50
Between 860 and 879	202	1.50
Between 880 and 899	201	1.50
Between 900 and 919	200	1.50
Between 920 and 939	200	1.50
Between 940 and 959	198	1.50
Between 960 and 979	197	1.50
Between 980 and 999	195	1.50
Between 1000 and 1019	195	1.50
Between 1020 and 1039	194	1.50
Between 1040 and 1059	193	1.49
Between 1060 and 1079	192	1.49
Between 1080 and 1099	190	1.48
Between 1100 and 1119	189	1.48
Between 1120 and 1139	188	1.48
Between 1140 and 1159	186	1.47
Between 1160 and 1179	185	1.47
Between 1180 and 1199	183	1.46
Between 1200 and 1219	182	1.46
Between 1220 and 1239	181	1.46
Between 1240 and 1259	180	1.45
Between 1260 and 1279	178	1.45
Between 1280 and 1299	177	1.44
Between 1380 and 1399	171	1.42
Between 1400 and 1419	171	1.42
Between 1420 and 1439	170	1.42
Between 1440 and 1459	169	1.41
Between 1460 and 1479	167	1.41
Between 1480 and 1499	166	1.40
Between 1500 and 1519	165	1.40
Between 1520 and 1539	165	1.40
Between 1540 and 1559	165	1.40
Between 1560 and 1579	164	1.40
Between 1580 and 1599	163	1.40
Between 1600 and 1619	162	1.40
Between 1620 and 1639	162	1.40
Between 1640 and 1659	162	1.40
Between 1660 and 1679	163	1.40
Between 1680 and 1699	162	1.40
Between 1700 and 1719	161	1.40
Between 1720 and 1739	160	1.40
Between 1740 and 1759	160	1.40
Between 1760 and 1779	160	1.40
Between 1780 and 1799	160	1.40
Between 1800 and 1819	160	1.40
Between 1820 and 1839	160	1.40
Between 1840 and 1859	159	1.40
Between 1860 and 1879	159	1.40
Between 1880 and 1899	159	1.40
Between 1900 and 1919	158	1.40
Between 1920 and 1939	158	1.40
Between 1940 and 1959	158	1.40
Between 1960 and 1979	158	1.40
Between 1980 and 1999	157	1.40
Greater than 2000	*to be determined*	1.40

(5) Vocational Technical Schools. Vocational Technical Schools and the Vocational Educational Space components of Comprehensive High Schools shall not exceed 225 gross square feet per pupil and any additional programmatic requirements may be considered on a case-by-case basis by the Authority in conformity with M.G.L. c. 74 requirements and a comparison of existing school facilities with similar vocational program requirements.

(6) Special Education Spaces. Spaces for special education classes/programs may receive special consideration at the discretion of the Authority. The gross square feet per student defined herein includes a baseline assumption that 8% of the total planned enrollment will be enrolled in separate special education programs. Notwithstanding the gross square footage maximum standards established herein, additional space consideration may be given, at the sole discretion of the Authority, if the Eligible Applicant documents and certifies to the Authority why there is a need to exceed the maximum gross square footage allowances.

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Collaborative Spaces. The Authority may, in its sole discretion, consider spaces for special education services provided through Collaboratives to be included within Special Education. For the Authority to consider Collaborative Space, the Eligible Applicant must (1) have executed a formal written agreement to be a member of the collaborative or to receive services from a collaborative, prior to filing a Statement of Interest with the Authority, and (2) certify that any space allowed by the Authority in a school facility for use by a Collaborative shall remain in use for the Collaborative for the useful life of the facility.

(7) Space Allowance by Program Activity. The approved Design and Educational Program and Project Scope and Budget Agreement shall be within the limitations as set forth in 963 CMR 2.06: *Table 4*:

Table 4

Net Square Feet[1]

	Minimum	**Maximum**
Elementary School		
Pre-Kindergarten and Kindergarten (including self-contained lavatory)	1,100	1,300
Core Classroom (grades 1-8)	900	1,000
Junior High School/Middle School		
Core Classroom	850	950
High School		
Core Classroom	850	950

[1]Measured from inside wall to inside wall.

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For all other spaces, the MSBA Educational Program Space Standards and Guidelines shall be followed in planning school facilities. Said Guidelines may also provide school designers and school building committees with prototype building programs for elementary, middle, and high schools, and other grade configurations as determined by the Authority. The Eligible Applicant may make reasonable departures from the MSBA Educational Program Space Standards and Guidelines with a prior written determination of the Authority, at their sole discretion, that such departures are consistent with the intent of 963 CMR 2.00 to provide adequate, safe, cost effective and programmatically sound school facilities. The space standards set forth in Table 4 and in the MSBA Educational Program Space Standards and Guidelines may not necessarily be applicable to reconstruction, renovation or repair projects. These standards and guidelines were developed by the Authority for determining maximum size and costs related to new construction and should not be used for assessing safety standards or educational adequacy of existing facilities that were constructed in accordance with the standards and guidelines that prevailed at the time of construction. The Authority shall consider Proposed Projects on a case-by-case basis and in some cases different square footages may be determined at the discretion of the Authority.

REGULATORY AUTHORITY

963 CMR 2.00: M.G.L. c. 70B and St. 2004, c. 208.

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Projected Enrollment	GSF per Student
Less than 600	205
Between 600 and 609	205
Between 610 and 619	205
Between 620 and 629	204
Between 630 and 639	204
Between 640 and 649	203
Between 650 and 659	203
Between 660 and 669	202
Between 670 and 679	202
Between 680 and 689	201
Between 690 and 699	201
Between 700 and 709	200
Between 710 and 719	200
Between 720 and 729	199
Between 730 and 739	199
Between 740 and 749	198
Between 750 and 759	198
Between 760 and 769	197
Between 770 and 779	197
Between 780 and 789	196
Between 790 and 799	196

Projected Enrollment	GSF per Student
Between 800 and 809	195
Between 810 and 819	195
Between 820 and 829	194
Between 830 and 839	194
Between 840 and 849	193
Between 850 and 859	193
Between 860 and 869	192
Between 870 and 879	192
Between 880 and 889	191
Between 890 and 899	191
Between 900 and 909	190
Between 910 and 919	190
Between 920 and 929	189
Between 930 and 939	189
Between 940 and 949	188
Between 950 and 959	188
Between 960 and 969	187
Between 970 and 979	187
Between 980 and 989	186
Between 990 and 999	186
1000 and greater	185

Proposed amendments and revisions to the Massachusetts School Building Authority's regulations, 963 CMR 2.00: SCHOOL BUILDING GRANT PROGRAM

2.04: General Site and School Construction Standards

The Eligible Applicant shall make all reasonable efforts to ensure that an Approved Project, including those for the expansion or renovation of an existing building, meet all applicable federal, state, local and regional building code requirements. It shall be the responsibility of the Eligible Applicant to ensure compliance with all such building code requirements, and the Authority shall bear no responsibility for an Eligible Applicant's failure to comply with said requirements.

(1) Design and Construction Standards: General.

(a) Projects shall reflect cost-effective design, material, and finish decisions consistent with good architecture and engineering practice, high quality construction, and the requirements of the Authority.

(b) To the extent possible, projects shall reflect attention to current and future-oriented technological practices for students, faculty, and school staff.

(c) The Authority prohibits an Eligible Applicant from utilizing chlorofluorocarbon-based (CFC) refrigerants in any new system for building heating, ventilating, air conditioning, or refrigeration.

(d) All new construction and reconstruction projects shall meet applicable local ordinances for recycling space and provide space within the building that is dedicated to the separation, collection, and storage of materials for recycling, including, at a minimum, paper (white ledger and mixed), cardboard, glass, plastics, aluminum cans, and metals.

(e) Construction of new school facilities shall, whenever possible, be oriented on the site in order for the building to maximize natural daylight for classroom spaces.

(f) The Authority may issue minimum and maximum guidelines and standards for the sustainability of Approved Projects, including school building design guidelines which provide guidelines for design, energy efficiency, materials, finishes, life cycle cost analysis, and systems selections.

(g) Approved Projects shall have a project identification sign on the construction site during the period of construction. Said sign shall be at least four feet by eight feet in size, shall be visible from the primary roadway adjoining the site, and shall include the following: "This project funded in part by the Massachusetts School Building Authority."

(h) On all Approved Projects involving the construction of a new school facility, the new school facility shall be designed and constructed to include: (i) interior daylighting and views in classrooms by locating all classrooms identified in the approved Design and Educational Program on exterior walls, except computer rooms, music rooms, digital art rooms, technology rooms, small resource rooms, small laboratories, and other classrooms where daylighting and location on an exterior wall are not appropriate or necessary because of the nature of the classroom; (ii) a glazed area for each classroom identified in the approved Design and Educational Program that is determined to require daylighting pursuant to subsection (i), totaling not less than five percent (5%) of the net floor area of the classroom and which shall be located to provide outdoor views at both standing and sitting heights; and (iii) glare control devices, where applicable, to avoid high-contrast conditions that could impede visual tasks, but such glare control devices shall be constructed only when necessary and if the Designer has determined that glare control devices are the only way to prevent glare.

(2) Design and Construction Standards: Indoor Air Quality. An Eligible Applicant shall make all reasonable efforts to ensure suitable indoor air quality in an Approved Project. Without regard to any other contract provisions, an Eligible Applicant shall meet the following indoor air quality requirements, to the extent that they apply to an Approved Project, as determined by the Authority.

(a) New heating, ventilating and air conditioning systems shall meet the minimum ventilation rate requirements of American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 62.1, Ventilation for Acceptable Indoor Air Quality, in effect at time of project approval.

(b) New heating, ventilating and air conditioning systems shall comply with ASHRAE standard 55 for thermal comfort within established ranges per climate zone, in effect at time of project approval, except that winter humidification and summer dehumidification shall not be required.

(c) Eligible Applicants shall implement containment procedures for dusts, gases, fumes, and other pollutants created during construction of an Approved Project if the building is occupied by students, teachers or school department staff while such renovation and construction is occurring. Such containment procedures shall be consistent with the "IAQ Guidelines for Occupied Buildings Under Construction" published by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), in effect at time of project approval. All bids and proposals received for an Approved Project shall include the cost of planning and execution of containment of construction/renovation pollutants consistent with such SMACNA guidelines.

(d) On all Approved Projects involving the installation of new ductwork, HVAC supply and the return openings shall be sealed to protect them from dust infiltration during construction. Procedures shall be consistent with the "Duct Cleanliness for New Construction Guidelines" published by SMACNA, in effect at the time of project approval relative to advanced levels of cleanliness which provide in part that ductwork shall be sealed when transported to the construction site; ductwork shall be stored in clean, dry conditions and kept sealed while stored; internal surfaces of ductwork shall be wiped-down immediately prior to installation to remove dust; open ends on completed ductwork and overnight work-in-progress shall be sealed; and uninstalled ductwork shall be protected from construction dust using surface wrapping.

(e) Filtration media in ventilation equipment shall be replaced with new media immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) such that mold spores and similarly sized particles are excluded from supply air intakes.

(f) In spaces where chemical use will occur, including housekeeping areas, chemical mixing areas, copying/print rooms, and vocational spaces, partitions shall extend from the top of finished floor to the underside of the floor or roof deck above and shall be provided with a dedicated outside exhaust at a rate of at least 0.50 cubic feet per minute per square foot, no air recirculation, and adequate make up air. These spaces shall have negative air pressure, providing an outside exhaust at a rate of at least 0.50 cubic feet per minute per square foot. The spaces shall maintain a negative pressure of at least 5 Pa (0.02 inches of water gauge) to a minimum of 1 Pa (0.004 inches of water) compared to their immediate environment, when their doors are closed.

(g) Each new building entrance shall be provided with a two-part walk-off mat system to capture dirt, particulates and moisture. Part one of the system shall include a drop through mat within the vestibule. Part two shall include a walk-off mat in the entranceway of a minimum length of 15 feet. The Eligible Applicant shall not install drain pans or traps in the vestibule.

(h) Electric ignitions shall be provided for all gas-fired equipment including water heaters, boilers, air-handling units, and cooking stoves.

(i) Where feasible, outside air intake openings shall be located a minimum of 25 feet from any hazard or noxious contaminants such as chimneys, plumbing vents, cooling towers, streets, alleys, parking lots and loading docks. The distance between exhaust air or vent outlets and air intakes shall be the greater of 25 feet or the distance as determined by 780 CMR: *Massachusetts State Building Code*, equation 2801.2.2.2, in effect at the time of project approval. When locating an air intake within 25 feet of a contaminant source is unavoidable, such opening shall be a minimum of two feet below the contaminant source and ten feet horizontally from the nearest edge of the air intake to the nearest edge of the contaminant source. All intakes shall be six feet above landscaped grade including soil, lawn, shrubs, or any plant life within 1.5 feet horizontally of intake.

(j) During construction of an Approved Project, building materials, especially gypsum wallboard, wood, porous insulation, paper, and fabric, shall be kept dry to prevent the growth of mold and bacteria. Stored materials shall be covered to prevent rain damage, and if resting on the ground, spacers shall be employed as necessary to allow air to circulate between the ground and the materials. Water damaged materials shall be dried within 24 hours. Materials that are damp or wet for more than 24 hours, except non-porous materials such as metal, shall be removed from the site. Materials showing signs of mold and mildew shall be immediately removed from the site and properly dispose of, including any with moisture stains. Moldy materials shall be replaced with new, undamaged materials.

(k) Eligible Applicants shall furnish permanent signage on the school site discouraging the idling of vehicles beyond a period of five minutes, in accordance with the statute governing stopped motor vehicles, M.G.L. c. 90, § 16A.

REGULATORY AUTHORITY

963 CMR 2.00: M.G.L. c. 70B and St. 2004, c. 208.

DRAFT SITE COST ALLOWANCE GUIDANCE

General Description

The MSBA site cost allowance is for basic site development costs related to an approved project. The Site Cost Allowance may cover a portion of site costs related to basic site work such as excavation, earthwork and site preparations, pedestrian walkways, basic site utilities, basic site drainage, basic play grounds/yards for elementary schools, fields for physical education and general student use, and basic landscaping. The goal of MSBA partially funding any site allowance is to fund basic, standard and common site needs for any school project pursuant to a building plan that the district and the MSBA agree upon in the Project Scope and Budget Agreement.

Allowance

The MSBA may provide a site cost allowance not to exceed [8%] eight percent of approved building construction costs, as determined by the MSBA, for basic site work subject to: (1) the district submitting a written site plan description accompanied by an itemized scope and budget document in detail sufficient for MSBA review of the proposed site plan and related costs, and (2) prior written agreement from the MSBA on the scope and budget for the site costs and site allowance. The MSBA will not reimburse for site costs that: (1) exceed 8% of the approved building costs of a project, (2) are categorically ineligible, (3) are not included within or are in excess of the MSBA agreed upon scope and budget document, and/or (4) are determined to be ineligible at any time by the MSBA including upon final audit pursuant to MSBA audit procedures.

Generally Eligible Site Costs, subject to submission of detailed budget/scope and approval by MSBA:

- Costs associated with basic landscaping.
- Costs associated with basic excavation and earthworks.
- Costs associated with basic site utilities.
- Cost associated with pedestrian walkways on the site.
- Costs associated with basic play yards for elementary schools.
- Costs associated with fields for physical education classes and general student use.

Potentially Ineligible Site Costs:

The following costs may be considered as eligible for reimbursement within the 8% site cost development allowance only upon prior written agreement by the MSBA as part of a Project Scope and Budget Agreement. The MSBA shall not consider any costs relative to the following site development items as reimbursable expenses if such items exceed the 8% site development cap:

- All costs associated with water/wastewater treatment and water/wastewater disposal systems including, but not limited to, septic systems, leaching facilities, treatment plants, water/wastewater lift stations, water or sewer pumping stations.
- All costs associated with non-hazardous site earthworks, including but not limited to, removal of rock or ledge.
- All costs associated with equipment for outdoor athletic facilities or outdoor athletic use.

Categorically Ineligible Site Costs:

- All costs associated with synthetic turf.
- All costs associated with athletic stadiums, including costs associated with excavation, earthworks, and pedestrian walkways within the stadium.
- All costs associated with off-site traffic improvements.
- All costs associated with spectator amenities such as concession stands, press boxes, and/or toilet facilities for outdoor athletic facilities.
- All costs associated with special waste and hazardous or contaminated materials remediation, removal and disposal.

Demolition and Building Abatement

Pursuant to 963 CMR 2.16 (5), all costs associated with the demolition of buildings are ineligible for reimbursement, unless such costs are deemed by the MSBA, in writing prior to said demolition, to be the most costs effective and educationally sound option. In certain circumstances, the MSBA may allow for an additional itemized allowance for building demolition and/or abatement to be in addition to the 8% site allowance, as determined by the MSBA and explicitly agreed upon in the Project Scope and Budget Agreement.

In order to be deemed to be eligible for reimbursement for building demolition, building abatement, or both building demolition and abatement within a building project, the MSBA may reimburse a community for a portion of the costs of building demolition and abatement only if: (i) the agreement is written in the Project Scope and Budget Agreement; (ii) the MSBA determines that the specific plan for building demolition and/or building abatement is necessary to complete the agreed-upon project scope; (iii) the building demolition and/or building abatement requested is not the result of a lack of routine capital investment or maintenance by the district, and (iv) the building demolition and/or building abatement is the most cost effective and educationally sound option. This policy only applies to the school facility itself, and applies only to the removal of hazardous materials within a building, as defined in the Project Scope and Budget Agreement.

In order for the MSBA to consider any potential reimbursement for building demolition or abatement to be included in a Project Scope and Budget Agreement, the Eligible Applicant who is seeking approval of a portion of demolition and building abatement costs must submit a written description of:

(1) a detailed scope of work, cost estimate, budget and schedule for any proposed demolition, abatement, or both, for which approval is sought;

(2) an assessment done by a registered professional on the type, amount, costs and schedule of abating hazardous materials contained within the building;

(3) a written description of the local decision making process that resulted in the decision to demolish an existing school facility, including minutes of meetings and votes of the appropriate local governing bodies, a detailed listing and description of other possible uses/reuses of the existing facility (e.g. continued use as an educational facility, or use as community space), and the reasons why demolition is the highest and best use of that facility;

(3) a vote of the local governing body approving any substantial demolition of a school building;

(4) any other information, reports or materials that may be requested by the MSBA to make a determination that demolition of the exiting school facility is the most cost effective and educationally sound alternative.

Depending upon the agreed upon scope of work for a project as outlined in the Project Scope and Budget Agreement, the MSBA may make a determination that demolition and/or abatement costs may be considered as eligible for partial reimbursement within the 8% guideline allowance.

Model School Program

If an Approved Project has been voted by the Board of Directors to be in the Model School Program, demolition and building abatement costs may be considered an allowable project expense, subject to submission of plan, scope, budget, and schedule by applicant and approval of such by the MSBA.

Preliminary Report on District Site Development Costs

Date: Draft January 12, 2009

Prepared for: Massachusetts School Building Authority
40 Broad Street, Suite 500 Boston, MA 02109
Prepared By: STV Incorporated

Table of Contents

1. Introduction

Site costs can be broadly defined as: (1) costs directly associated with the construction of a school facility (e.g., basic earthworks, pedestrian access to the facility), (2) site work related to infrastructure improvements in direct proximity to the facility (e.g., water, sewer, utilities) and (3) extraordinary costs which result from special circumstances (e.g., ledge, environmental issues such as wetlands or contamination).

Site costs are affected by factors relating to community characteristics. For example, urban districts generally lack open space for new construction, building sites free from environmental issues, and space for parking or athletic/playing fields. However, urban districts do generally have readily available utilities which minimize connection costs (water, sewer, power), existing structures that can be converted to educational use, access to public transportation and synergies to share space with existing community resources (library, gym, fields). Rural districts, on the other hand, generally lack existing infrastructure (water, sewer, power) which often requires substantial additional costs to develop, and tend not to have many nearby community spaces available to share (library, gym). Rural districts do, however, generally have open space for potential school facility projects and space for athletic/playing fields.

Further complicating the issue of site costs is the site itself. Potential sites require study to determine their suitability and to gauge the potential costs associated with their development as a site for a school facility. Some sites are clean and flat, with no drainage or environmental issues, with suitable subsoil conditions to support foundations, and do not require extensive utility upgrades. Other sites are physically constrained, lack access to utilities, have adverse subsoil conditions that require extensive earthworks or blasting, have sensitive environmental conditions such as wetlands, or have environmental contamination which requires special considerations which can significantly increase the costs of site development.

Given the different types of site costs, the characteristics of the community and of the specific site, site costs can be an extremely variable component in overall project costs. The MSBA has stated that a key element of its grant program for school construction and renovation projects is the focus on core academic spaces. Given this important component of its mission, the MSBA has identified the need for a site cost policy that ensures funding does not get diverted away from core academic spaces to support extraordinary site costs or site improvements that are not necessary for the core academic program, such as spectator related amenities.

This preliminary report documents a number of recommendations by STV which help lay the ground work for determining which site costs are typical for a school construction project and those site costs that should be considered extraordinary.

2. Site Costs

This section of the report provides an overview of the key issues affecting site development costs. Comparable projects of similar size, enrollment and scope often have different total project budgets based on the variations related to site costs. The development of a policy that clearly sets forth the MSBA's position on extraordinary site issues would help ensure that funding does not get diverted from the creation of core educational space to pay for extensive site work or site work that is not integral to the core academic mission. This policy will help ensure optimal use of both the MSBA's and the local district's scarce resources. It could also have the added benefit of assisting districts in making better choices for the location of school building projects. In cases where there are multiple site options for new school construction, for example, a clear MSBA site cost policy would allow districts to identify the costs of building on each site and make appropriate decisions based on the limited funds available.

Typical Site Costs

STV has developed a list of site considerations for school construction. These considerations fall broadly into five categories: at-grade costs, utilities service costs, programmatic costs, costs related to sustainable development, and costs related to environmental issues. Of these five categories, costs that typically occur on most school construction projects fall into the first three categories. That is, most school construction projects require some level of pedestrian and vehicular access, earthwork to clear the site and prepare the ground for foundations, erosion control during construction, utilities, playgrounds and/or fields to support physical education instruction. A more detailed list of typical costs is listed below.

<u>At-Grade (within property line) – Typical Costs:</u>

- Pedestrian access to the site via pathways, walkways and bikeways
- Curbs, curb-cuts, & ramps, etc.
- Pavement Markings
- Concrete Pads
- Basic Exterior Fixtures (e.g. benches, bollards, fences, etc.)
- Basic Earthworks (e.g. clearing, grading)
- Erosion Sediment and Control issues
- Stormwater Control
- Basic Landscaping
- Trashholding

<u>Utilities Service (within property line) – Typical Costs:</u>

- Gas
- Domestic and Fire Water
- Electrical
- Telecommunication
- Sanitary Sewer
- Stormwater Management

<u>Educational Program Issues – Typical Costs:</u>

- Fields supporting Physical Education instruction
- Playgrounds for elementary schools
- Bicycle parking

Extraordinary Site Costs

In addition to typical site costs, site specific environmental and sustainability issues may exist, and often add considerably to the overall project cost. Moreover, district preferences for site improvements that are not necessary to support the core academic program, such as turf fields and other spectator related amenities, can greatly increase a project's costs. These extraordinary costs do not occur on all projects and in many instances can be avoided by selection of a different site for potential development or through reprioritization of a district's preferences. When no alternative site exists, performing an in-depth site study as part of a feasibility study is critical in gaining a more thorough knowledge of existing site conditions and the resulting costs to remediate. A more detailed list of extraordinary site costs is listed below.

Sustainable Issues – Special Costs

- Stormwater collection
- Reduced imperviousness
- Energy (wind, solar, etc.)

Environmental Issues – Special Costs

- Contaminated soil requiring soil remediation
- Extensive Earthworks
- Wetlands
- Ledge
- Extensive Drainage issues
- Poor soil quality requiring removal, hauling and replacement
- Extraordinary site access (e.g., extensive roadway access/improvements)
- Extraordinary utilities (e.g., water/sewer pumping stations)
- Sustainable site practices
- Extraordinary storm water detention/ treatment
- Rainwater collection

Some of the items that appear in the typical site cost list may also appear on the extraordinary site cost list. For example, utilities appears on both lists. A typical site cost related to utilities would be a connection to an existing utility system that is in direct proximity to the site, does not require extensive new piping/cabling and has a minimal cost. An extraordinary site cost related to utilities would be the installation of a new water or sewer pumping station or running extensive lengths of new piping to reach an existing system.

3. Recommendations

In summary, site costs can be an extremely variable component in overall project costs. To avoid unnecessary or excessive site development costs, the MSBA needs to develop a clear site cost policy that contains the following elements:

- The MSBA should consider a site cost reimbursement policy that includes as eligible for reimbursement a portion of typical site costs that support the core academic spaces in a school. Typical site costs would include a portion of at-grade earthwork costs, utility service, and core programmatic costs. These costs are generally considered typical of school building projects and necessary to support the core academic program. Accordingly, reasonable support might include some level of reimbursement from the MSBA for school projects with site costs in these areas. Further study may be required to determine the precise appropriate level or portion of funding support. Thought should be given to setting a percentage cap for typical site work that the MSBA would reimburse with costs over the cap being born by the local district.

- STV recommends that the MSBA exclude site costs related to extraordinary site development issues or costs related to site improvements that are not necessary to support the core academic program, such as spectator amenities, sewer/water pumping stations, excessive earthworks, ledge removal or abatement of hazardous materials. These types of costs often add considerable amounts to the total project budget and have the potential to divert funds away from core academic educational programming. These costs are generally not considered typical to a project and often can be avoided with the selection of more appropriate sites.

- Finally, criteria should clearly articulate those site costs that are eligible and ineligible for reimbursement by the MSBA. Clear articulation of which site costs are eligible for reimbursement may have the added benefit of assisting districts in making better choices for the location of school building projects. In cases where there are multiple site options for school construction, a clear site cost policy would allow districts to identify the costs of building on each site, and to make appropriate decisions based on the limit of funds available.

One last note, STV recommends that the MSBA consider continuing to study site costs issues on an on-going basis to better understand and to help clarify the MSBA's polices concerning typical and extraordinary site issues and their impact on project budgets.

Future studies should develop precise means to address the possible impact of limiting support for extraordinary site issues on rural or remote sites where access to utility infrastructure is not available, as well as the impact on smart growth strategies and the development of urban brownfield sites. Future studies might also consider specific criteria for project types, and mechanisms for funding site development costs.

The development of a policy providing clear direction concerning MSBA's position on extraordinary site issues would help ensure that funding does not get diverted from the creation of core educational space to pay for extensive site work. This process helps ensure optimal use of MSBA resources, while at the same time assisting districts in making better choices for the location of school building projects. In cases where there are multiple site options for new school construction, this policy would allow districts to clearly identify the costs of building on each site, and to make appropriate decisions based on the limit of funds available.

Some level of funding involvement should be considered as part of the MSBA's overall strategy for supporting school construction. The purpose of STV's recommendations is to develop a baseline of information for making decisions concerning the MSBA's possible future involvement in the funding of site development costs.

Of these categories, at-grade costs, utility service, and programmatic costs are considered typical of school building projects, and reasonable support might include some level of funding for projects in these areas. Further study is required to determine the precise appropriate level of funding.

Definitions

<u>Building Area:</u> area of building to approximately 5' beyond building footprint.
<u>Site Area:</u> area within the property line, exclusive of building area.

Massachusetts School Building Authority (“MSBA”) – Reimbursement Rate Calculation

- Reimbursement rates for MSBA approved, eligible school construction and renovation projects are calculated pursuant to a formula that is established in Massachusetts General Law, Chapter 70B section 10 (M.G.L. c. 70B § 10).
- The statutory formula starts **all districts** at a Base Rate of 31 percentage reimbursement points.
- The Base Rate of 31 percentage reimbursement points may be adjusted based on three socioeconomic factors:
    - **Community Income Factor**: the district’s per capita income as a percent of statewide average per capita income. This data is provided by the Department of Revenue. Pursuant to statute, there is a sliding scale for the allocation of percentage points for this category based on community’s relationship to the statewide average.
    - **Community Property Wealth Factor**: the district’s per capita equalized property valuations as a percent of statewide average per capita valuations. This data is provided by the Department of Revenue. Pursuant to statute, there is a sliding scale for the allocation of percentage points for this category based on the community’s relationship to the statewide average.
    - **Community Poverty Factor**: measured by the district’s proportion of low income students, as defined by federal eligibility for free or reduced price lunch, as a percent of the statewide average proportion of low income students. This data is provided by the Department of Education. Pursuant to statute, there is a sliding scale for the allocation of percentage points for this category based on community’s relationship to the statewide average.
- The last step in the reimbursement rate calculation process is for the MSBA, in its sole discretion, to review if a district is eligible for Incentive Points. Statute dictates that no district shall be eligible for more than 18 Incentive Points in total, and that no one category of Incentive Points can be more than 6 points. Current categories of Incentive Points are:
    - Model School Program (up to 5 points)
    - Newly Formed Regional School District (up to 6 points)
    - High Efficiency Green School Program (up to 2 points)
    - Best Practices for Routine and Capital Maintenance (up to 2 points)
    - Overlay Zoning (MGL 40R or 40S) (up to 2 points)
    - Use of CM-at-Risk (up to 1 point)
    - Renovation/Re-use of Existing Facilities (up to 5 points)
    - Establishing a Maintenance Trust (up to 1 point with district match)
- The sum of the Base Rate, plus additional points, if any, from the three socioeconomic factors, plus Incentive Points, if any, results in the MSBA’s reimbursement rate for a project.

  Base Rate (31 points)
+ Community Income Factor *(if any)*
+ Community Property Wealth Factor *(if any)*
+ Community Poverty Factor *(if any)*
<u>+ Incentive Points *(if any, in the sole discretion of MSBA)*</u>
= MSBA Reimbursement Rate

- It should be noted that regional school district reimbursement rates are calculated using the same data and factors, but each socioeconomic factor is weighted to reflect each municipality’s representation of the total regional district enrollment.

The Commonwealth of Massachusetts
Office of the Inspector General

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Dear Local Official:

The following charts were created by the Office of the Inspector General for local officials to use as a quick reference guide on public procurement procedures that must be followed pursuant to the Massachusetts General Laws. Your local rules may establish stricter or additional requirements that you must follow. Contact your chief procurement officer (CPO) or legal counsel for advice on your local rules and procurement procedures.

The charts highlight particular areas which may require compliance depending on the cost or the nature of your procurement. For example, the charts highlight, where applicable, the requirement for a ten-hour course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA). Pursuant to M.G.L. c.30, §39S, any person submitting a bid for, or signing a contract to work on, a public building or public works project estimated to cost more than $10,000, must certify under the pains and penalties of perjury that he or she is able to furnish labor in harmony with all other elements of labor employed in the work and that all employees employed on the worksite, or in work subject to the bid, have successfully completed at least ten hours of OSHA approved training. The charts are meant to provide a general overview of the principal public procurement statutes, and are not a substitute for the advice of legal counsel.

Any suggestions for the charts or questions concerning M.G.L. c.30B may be directed to this Office by calling 617.722.8838. Questions concerning M.G.L. c.149, M.G.L. c.30, §39M, and M.G.L. c.7 may be directed to the Office of the Attorney General by calling 617.727.2200 or your legal counsel.

Prevailing wage rate sheets may be requested online at http://www.mass.gov/dos/pwrequest or by calling the Division of Occupational Safety at 617.727.3492.

Central Register advertisements may be submitted online at http://www.sec.state.ma.us/spr/sprcentral/infosubmit.htm to the Secretary of the Commonwealth. The submission deadline is 4:00 pm on Tuesday.

Goods and Services Bulletin advertisements may be submitted online at http://www.sec.state.ma.us/sprpublicforms/GSSubmissionform.aspx to the Secretary of the Commonwealth. The submission deadline is 4:00 pm on Wednesday.

Sincerely,

Gregory W. Sullivan

Gregory W. Sullivan
Inspector General

M.G.L. c. 149
BUILDING CONSTRUCTION CONTRACTS

Estimated Contract Amount	Under $10,000	$10,000 to $24,999	$25,000 to $100,000	Over $100,000	Over $10,000,000
Procurement Procedure	Solicit three written price quotes.	Solicit written price quotes.	Sealed bids (using M.G.L. c.30, §39M procedure).	Sealed bids.	Solicit statements of qualifications.
Advertising Requirements	No.	Advertise once in the *Central Register* and post a notice on your jurisdiction's bulletin board for at least two weeks before bids are due. Posting on your website or Comm-PASS is optional.	Advertise once in the *Central Register* and newspaper at least two weeks before bids are due, **and** post on your jurisdiction's bulletin board or website for one week before bids are due.	Advertise once in the *Central Register* and newspaper at least two weeks before bids are due, **and** post on your jurisdiction's bulletin board or website for one week before bids are due.	Advertise the request for qualifications once in the *Central Register,* newspaper, and Comm-PASS at least two weeks before bids are due.[1]
DCAM Certification	No.	No.	No.	Required for general bidders and filed sub-bidders.	Required for general bidders and filed sub-bidders.
OSHA Training	No.	Yes.	Yes.	Yes.	Yes.
City/Town Prequalification	No.	No.	No.	Optional.[2]	Yes.
Filed Sub-bids	No.	No.	No.	Yes ($20,000 and over).	Yes ($20,000 and over).
Bid Deposit	No.	No.	5% of the value of the total bid.	5% of the value of the total bid, or sub-bid.	5% of the value of the total bid, or sub-bid.
Payment Bond	50% payment bond, if project cost is more than $2,000.	50% payment bond.	50% payment bond.	100% payment bond.	100% payment bond.
Performance Bond	No.	No.	No.	100% performance bond.	100% performance bond.
Prevailing Wage	Yes.	Yes.	Yes.	Yes.	Yes.
Contractor Evaluation	No.	No.	No.	Yes.	Yes.

[1] The advertising procedures listed pertain only to the request for qualifications. Within 14 days of the completion of the prequalification evaluation process, you are required to post a notice in your jurisdiction, and on Comm-PASS listing those general and sub-bidders who have been prequalified. A copy of the notice must be sent via first class mail, postage pre-paid to all prequalified general and sub-contractors along with an invitation to bid. The invitation to bid must have a deadline of at least two weeks. You may only solicit bids from those contractors that have been prequalified.

[2] If you decide to use the optional prequalification process for projects over $100,000, follow the procedures listed in the "Over $10,000,000" column.

M.G.L. c. 30, §39M
PUBLIC WORKS (NON-BUILDING) CONSTRUCTION

Estimated Contract Amount	$10,000 and under	Over $10,000
Procurement Procedure	No.	Sealed bids.
Advertising Required	No.	Advertise once in the *Central Register* and your local newspaper at least two weeks before bids are due, **and** post a notice on your jurisdiction's bulletin board for one week before bids are due.
DCAM Certification	No.	No.
OSHA Training	No.	Yes.
City/Town Prequalification	No.	No.[1]
Filed Sub-bids	No.	No.
Bid Deposit	No.	5% of the value of the total bid.
Payment Bond	50% payment bond, if project cost is more than $2,000.	50% payment bond.
Performance Bond	No.	No.
Prevailing Wage	Yes.	Yes.

[1] Although M.G.L. c.30, §39M does not mandate a contractor prequalification process, prequalification of bidders by the Massachusetts Highway Department is required for contracts of $50,000 or more where the awarding authority receives State Aid funds under M.G.L. c.90, §34, or the work is on a state road, regardless of whether the awarding authority receives State Aid funds under M.G.L. c.90, §34.

M.G.L. c.30B alternative procurement procedure referenced from M.G.L. c.30, §39M(d).

PUBLIC WORKS (NON-BUILDING) CONSTRUCTION

Estimated Contract Amount	Over $10,000 up to $25,000
Procurement Procedure	Sealed bids.
Advertising Required	Advertise once in your local newspaper at least two weeks before bids are due, **and** post a notice on your jurisdiction's bulletin board for at least two weeks before bids are due. M.G.L. c.9, §20A requires an advertisement in the *Central Register*.
DCAM Certification	No.
OSHA Training	Yes.
City/Town Prequalification	No.
Filed Sub-Bids	No.
Bid Deposit	No.
Payment Bond	50% payment bond.
Performance Bond	No.
Prevailing Wage	Yes.

M.G.L. c.7, §§38A½-O PUBLIC BUILDING PROJECTS DESIGN SERVICES

Cities, Towns, Regional School Districts, and Horace Mann Charter Schools[1,2,3]

Estimated Construction Cost Design Fee*	$100,000 or less *	Over $100,000*
Procurement Procedure	No. Recommend soliciting qualifications and prices from at least three designers.	Qualifications-based selection process. Jurisdiction must either set the design fee or set a not-to-exceed fee limit and negotiate the fee with the top-ranked designer within the fee limit.
Advertising Required	No.	Advertise once in the *Central Register* **and** your local newspaper at least two weeks before the deadline for filing applications.
Designer Selection Board	No.	Application.
Designer Evaluation (Submit to DCAM and Designer Selection Board)	No.	Yes.
Registration	No.	Yes, by Board of Registration in the appropriate discipline.
Insurance	No.	10% of the total cost of the project or $1 million, whichever is less.
Prevailing Wage	No.	No.

*** Design Fee: The Designer Selection Board recommends that when there is no estimated cost of construction, the designer selection procedures should be followed if the design fee is $10,000 or more. For practical purposes, the design fee should not exceed 10% of the estimated cost of construction.**

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[1] Cities, Towns, School Districts, and Horace Mann Charter Schools are required to adopt their own procedures for selecting designers for building projects. These procedures must conform to the purposes and intent of the designer selection process as outlined in M.G.L. c.7, §§38A½-O and noted herein. See the *Model Designer Selection Procedures for Municipalities and Other Local Public Agencies* developed by this office at http://www.mass.gov/ig/publ/dsbguide.htm.

[2] Housing Authorities must follow the procedures established by the Department of Housing and Community Development for design of state-funded housing.

[3] Executive Departments of the Commonwealth and Commonwealth Charter Schools are subject to the jurisdiction of the Designer Selection Board when the design fee is $10,000 or more and the construction project is estimated to cost $100,000 or more.

M.G.L. c.30B Procurement of Supplies and Services

Estimated Contract Amount	Under $5,000	$5,000 to $24,999	$25,000 and over
Procurement Procedure	Sound business practices.[1]	Solicit three written or oral quotes.	Sealed bids or proposals. (M.G.L. c.30B, §§5 or 6).
Advertising Required	No.	No.	Advertise once in a newspaper of general circulation at least two weeks before bids or proposals are due, **and** post a notice on your jurisdiction's bulletin board or website for two weeks before bids or proposals are due. If $100,000 or more, advertise once in the *Goods and Services Bulletin*.
Award contract to:	Responsible[2] person offering a competitive price.	Responsible person offering the lowest price.	Under §5, the responsive[3] and responsible bidder offering the lowest price. Under §6, the most advantageous proposal from a responsive and responsible proposer taking into consideration price and evaluation criteria.
Written Contract[4]	No.	Yes.	Yes.
Maximum Contract Term[5]	Three years, unless majority vote authorizes longer.	Three years, unless majority vote authorizes longer.	Three years, unless majority vote authorizes longer.

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1 This office interprets sound business practices to mean periodically checking price lists or seeking price quotes to ensure that you are receiving a competitive price for the supply or service.

2 M.G.L. c.30B, §2 defines a responsible bidder or offeror as "a person who has the capability to perform fully the contract requirements, and the integrity and reliability which assures good faith performance."

3 M.G.L. c.30B, §2 defines a responsive bidder or offeror as "a person who has submitted a bid or proposal which conforms in all respects to the invitation for bids or request for proposals."

4 M.G.L. c.30B, §17(a) states "All contracts in the amount of [$5,000] or more shall be in writing, and the governmental body shall make no payment for a supply or service rendered prior to the execution of such contract."

5 M.G.L. c.30B, §12(b) states "Unless authorized by majority vote, a procurement officer shall not award a contract for a term exceeding three years, including any renewal, extension, or option."

8 Financial Analysis

- Cost Implications
- Pre-Construction Maintenance Cost Summary
- Comparisons of New Construction relative to 2005 Study
- Potential MSBA Reimbursement Summary

8 Financial Analysis

Cost Implications

Cost estimates are key elements in any Master Plan or Feasibility Study process and assist the Facilities Master Plan Committee, the District School Committee, and School's administration, the Architect, and ultimately the voters of Concord and Carlisle in making informed decisions. Cost information must be consistent with the development stage of various ideas and concepts. Starting with general information and a "broad brush" approach, probable costs are progressively updated as more information is known or is developed about the project.

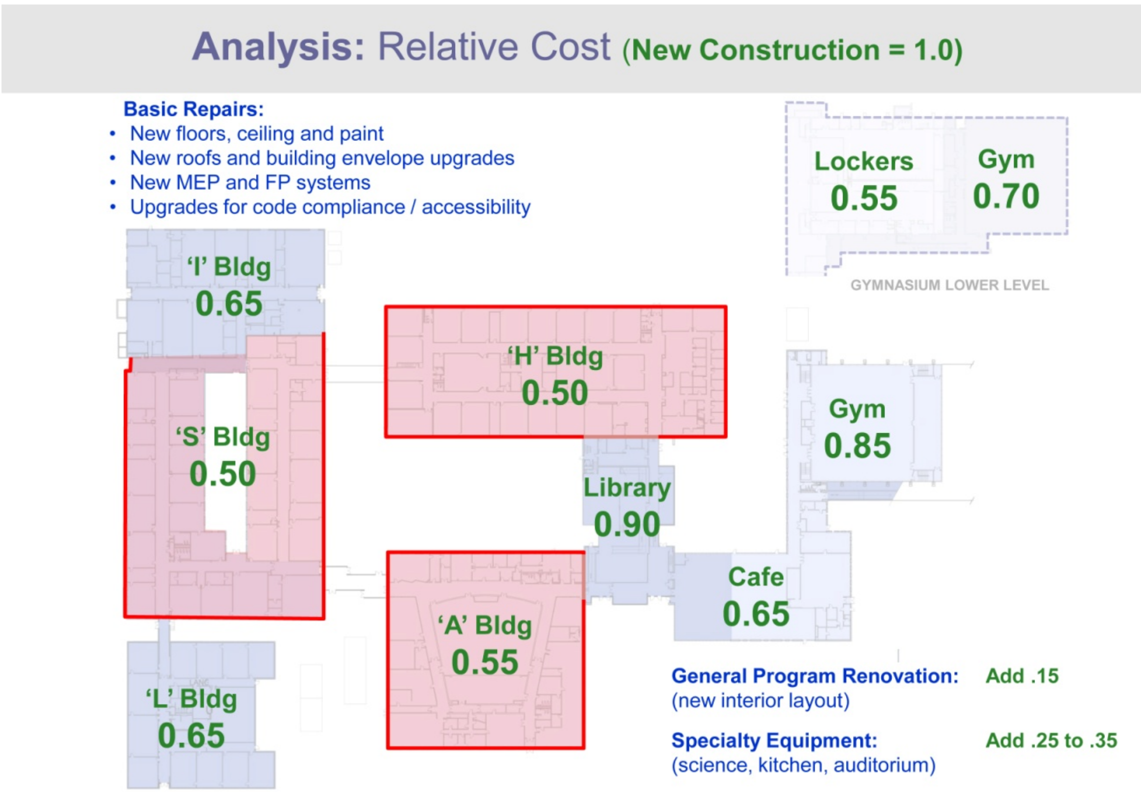
Each Town in the district will use the cost estimates from the Master Plan to estimate the potential impact on taxes and thus the viability of any project. Cost estimates and comparisons are used throughout the planning process to evaluate options and alternatives.

The Massachusetts School Building Authority (MSBA) has expressed interest in the project and will look carefully at various cost factors to determine if a repair only, addition/renovation, or completely new project would qualify for State reimbursement and, if qualified, what reimbursement rate could be obtained. MSBA will require a Feasibility Study and Schematic Design conducted under their guidelines and procedures which are beyond the scope of this Master Plan; however, the Master Plan can form a strong basis for the MSBA Feasibility Study.

Comparative Cost Ratios

In the very earliest stages, basic information such as the Educational Specification, the overall project size, the nature and quality and performance level of its construction and whether the project will be completely new, or consist of additions, renovations or a combination, is not entirely known. We do understand the size and condition of the existing facility and have developed that information very early in the process. We also know that several prior studies had been completed for CCHS over the last decade. This information formed the basis for the first cost analysis, a relative cost comparison of repair costs to a "generic" new high school.

Working with our cost estimator, D. G. Jones, International, Inc., we developed a hypothetical unit construction cost per square foot for a new, Massachusetts "generic "high school based on recently completed project data from known in-process high school projects. For comparison purposes we defined this "generic" construction cost ($255/gsf) as "1.0" and began developing comparative ratios for basic repairs and various alternatives to portions of the existing facility based on existing conditions and prior repairs, renovations, and upgrades. Basic repairs included those needed to repair and maintain the existing educational program and facilities within the confines of the current building and layout. Alternatives included potential upgrades to address educational program deficiencies (providing adequately sized and equipped classrooms and Science Classroom/Labs, or other spaces) or to meet other goals established by the FMPC (better building envelope thermal performance, ensure long term durability, provide more energy efficient mechanical and electrical systems and equipment, etc.). The cost ratio to provide basic repairs to the entire existing building was determined to be an average of 0.61.



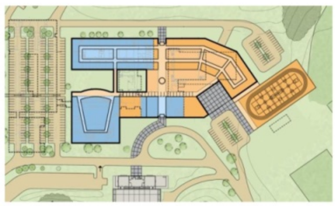
As planning options and alternative approaches were developed, ratios were updated and applied at each stage. After considering eight options, the Committee selected three options for further development. On January 27, 2010, updated Addition/Renovation Options C, D, and F were reviewed with the Committee. The amount of renovated space was progressively less in Options C, D, and F. The cost ratios established were .93, 0.95, and 0.95 respectively. At this stage of development, comparative ratios included consideration of phasing costs and demolition costs. Because all three ratios were similar and approximate, the FMPC determined that the cost variation was not significant in selecting the Preferred Alternative. After further study of C, D, and F, Option F was selected as the approach to develop. Option F was further studied which led to the selection of the F2 Approach as the Preferred Alternative, leading to the Master Plan Option. Cost implications were considered at each step.

Option Summary

C (.9)
5 Phases
(5+ years)

+ Meaningfully improves the coherence of the building/school organization
+ Good adaptive reuse of cafeteria
+/- Only 1 of the 5 clusters is in new construction
+/- The info commons is well located but feels too vast and might cause the overall school to feel too dense
+/- The entries and axial movement through the building are all along the east west axis.
+/- Nice to be reusing so much of the old; but the long term value doesn't feel substantive
+/- Marginally improves the site organization
+/- Cost is marginally less than new
\- Doesn't feel like it strikes the right balance
-/- Phasing is unacceptable

D (.9)
3 Phases
(4 years)



+ Significantly improves the coherence of the building/school organization
+ Significantly improves the site organization and coherence
+ Has appropriate entries and cross axial circulation
+ Good adaptive reuse of cafeteria
+ The info commons is well located and the school feels less dense
+/- Phasing feels manageable
+/- Cost is marginally less than new
+/- 3 of 5 clusters in new construction
\- Part of new clusters have poor orientation.

F (.9)
3 Phases
(4 years)

+ Significantly improves the coherence of the building/school organization
+ Significantly improves the coherence and organization of the site
+ Close to ideal entries and cross axial circulation
+ Opens up the south side of the site
+ Potential to be most compact and efficient
+ All new classrooms, new theater and new field house feels like the right balance
+ No new or infilled courtyards
+ Good adaptive reuse of "a" building, the cafe and the lower gym (though the height is a bit low)
+ Clusters have the potential to be more linear and less dense.
+/- Phasing feels manageable
+/- Cost is marginally less than new
+/- 2 or 3 story potential

Construction Costs

The original Request for Proposal (RFP) requested an update to the 2005 “New School” option to compare with the Master Plan’s Addition/Renovation Option. The 2005 “New School” option however was based on a significantly different program and projected enrollment with different educational goals and energy performance criteria. After discussion, it was agreed that the Master Plan would include a cost estimate for a “New School” on the campus based on a program and energy performance criteria used for the Master Plan Addition/Renovation plan. The “New School” cost estimate was prepared in the same manner as the Master Plan Option and is included in the same construction estimate document. See attached D G Jones’ construction cost summary sheet.

After an additional round of alternatives were refined and considered, two conceptual construction cost estimates were provided in the Master Plan: the Preferred Alternative addition/renovation project and a “New School” project designed to meet similar performance standards. The originally conceived idea of comparing the Preferred Alternative with the 2005 “New School” study was set aside because the two concepts are of different sizes, are based on different projected enrollments, educational programs, and different community goals. The Master Plan’s “New School” is based on the same projected enrollment and educational program, and performance criteria but would be built on another site on the campus.

Conceptual construction cost estimates were organized in Construction Specifications Institute (CSI) Divisions and were based on input from the entire design team, including systems description narratives and preliminary specifications. Consideration was given to demolition costs, hazardous materials abatement and removal, contractor's general requirements, the anticipated construction duration, prudent contingencies, and the construction costs were escalated to the anticipated mid-point of construction. The total estimated Construction Cost for the Preferred Alternative is approximately $83.2 Million dollars and the cost for the "New School" is approximately $85.4 Million dollars (Refer to the attached D. G. Jones Conceptual Cost Estimate, Update #1 dated March 9, 2010).

"Preferred Alternative" Construction Cost	$83.2 Million Dollars
"New School" Construction Cost	$85.4 Million dollars

<u>Project Costs</u>

An estimated Project Cost is necessary to establish the funding requirements for Concord and Carlisle. Project Costs include "hard" Construction Costs and "soft" costs such as architectural, engineering and owner's project representative fees, and miscellaneous legal, printing, or other expenses necessary for the project. At this level of development, soft costs are assumed to be 30% of construction costs. For comparison purposes, the rounded Project Costs are:

"Preferred Alternative" Project Cost	$108 Million Dollars
"New School" Project Cost	$111 Million dollars

<u>Pre-construction Maintenance Costs</u>

Maintenance and Operating costs associated with the existing building will continue until the proposed new project is completed and occupied. Projections of this type are very difficult to make when buildings and systems have outlasted their anticipated life expectancy; they could fail at any moment or could continue for years, albeit with ever increasing maintenance costs.

Maintenance Staff

Staffing requirements depend on a number of factors. The Preferred Alternative plan is larger than the existing building; however, maintenance requirements will be less for a larger, new or updated facility planned to last decades.

Maintenance costs prior to implementation of a major construction project.

The existing must be maintained properly to provide safe adequate and educationally functional facilities for students, faculty, staff, and the community. These are the people whose day to day experience will be impacted by a major construction project, especially an addition or renovation project. It is important to repair and maintain existing facilities to ensure a positive educational environment and to judiciously avoid undertaking work that may be removed or replaced in a few years time.

In the Master Plan, projects that are intended to improve, reconfigure or otherwise alter the existing educational environment, such as altering a floor plan, or adding new furnishings or equipment to change the use of a space, are not considered maintenance items. Generally, "grandfathered" facilities that do not meet current code standards will retain their "grandfathered" status and not be brought up to code unless required for health or safety or triggered by the overall cost or scope of work; however, all systems, equipment, and facility repairs and replacements will meet current code requirements.

It is important to know that maintenance and repair work is not considered to be an alteration or renovation project under the State Building Code. If they are, they could "trigger" costly additional code compliance provisions beyond the scope of the original work. The Massachusetts Architectural Access Board (MAAB) normally exempts maintenance and repair costs; however, cost related "trigger" provisions exist if the project is considered an alteration or renovation. The first "trigger" requires basic access provisions: at least one accessible entrance, toilet facility, telephone, and drinking fountain, must be provided normal to the project and if the addition or renovation project costs exceed $100,000 of the equalized assessed value of the building in any 36 month period of the project. If the project costs exceed 30% of the full equalized assessed value of the building within a three year period, a second "trigger" requires that fully compliant access be provided to all facilities (buildings and grounds) that are open to and used by the public. In addition, when calculating the value of addition and renovation projects over the three year period, MAAB includes the project costs of all work undertaken in that period including repair and replacement projects.

The Town is clarifying the high school facilities' assessed value at this time. It is prudent; however, that projects that might be considered an addition or renovation project be carefully considered and included in the scope of a long-term solution if possible.

Cost benefit of new systems and equipment

The Master Plan envisions that a major construction project will begin within five years, although many factors could impact the start date of such a project. Regardless of when any such project might begin, the Master Plan is intended to minimize the duration of the construction and lessen disruption to the daily school activities. It is also intended to bring building envelope improvements and new energy efficient systems and equipment "on line" as soon as possible thus minimizing the costs of maintaining outdated facilities and inefficient systems and maximizing the cost saving benefits of a high performance building and systems.

Operational Costs and Life Cycle Analysis

The mechanical engineering consultant, Garcia Galuska DeSousa, Consulting Engineer, Inc., prepared an Engineering Economic Analysis dated December 16, 2009. The purpose of the analysis was to study various systems and envelope upgrades that would provide a cost effective mechanical (HVAC) system to replace the outdated current system. A computer model was created based on the existing building configuration, materials, and performance characteristics and options were studied to understand the relative cost effectiveness of potential mechanical system and building envelope upgrades. An analysis of the final Master Plan Option is beyond the scope of this project and would require more thorough information based on a preliminary design; however, it gives an indication of potential mechanical systems, building envelope performance criteria, and energy savings for the Master Plan Option.

The existing conditions investigation found that the existing mechanical system has exceeded its expected usable life and needs to be replaced. A study of the existing building envelope identifies inefficient and otherwise deficient existing conditions. The study compared two potential replacement mechanical systems solutions and variations for thermal envelope upgrades. Replacement systems considered included an in-kind replacement system and a displacement ventilation system.

Study #1 compares an in-kind replacement system and improved existing building envelope with the existing mechanical system and building envelope. It represented the highest Owner costs over a 25-year period due to the high costs of building envelope improvements. Due to its lack of cost efficiency, this alternative was not used in further comparisons.

Study #2 compares the in-kind replacement system without an improved building envelope to the existing system and envelope. It resulted in a $524,625 Owner savings over 25 years. This system was shown to save money over the existing system, however, it could not provide a durable, sustainable, long-term facility and mechanical system that would improve thermal comfort for occupants and reduce energy consumption, main goals of the project. Two additional studies were undertaken and the in-kind replacement system without envelope upgrades became the basis of comparison for the Studies #3 and #4.

Study #3 compares a new displacement ventilation system with significant envelope improvements as part of a major construction addition/renovation project. In this study, costs for upgrading the exterior envelope were dispersed over the entire project. This study may most closely resemble conditions of the Preferred Alternative in which most exterior walls and roofs are significantly improved or new. Anticipated Owner savings were about $4,185,000 over 25 years.

Study #4 assumes that the displacement ventilation system is part of a newly constructed building and that additional thermal performance can be achieved most easily, particularly at the roof. In this instance, Owner savings were about $3,719,000, actually less than the prior study based on current energy cost assumptions.

A computer model and energy study is recommended at the Feasibility Study phase of the project and is required of any future MSBA Feasibility Study. It would study a preliminary design reflecting a preferred alternative as defined in the MSBA process. It will also meet MA-CHPS and LEED for Schools requirements and provide a life-cycle cost benefit analysis based on the approved MSBA Preferred Alternative.

Cost benefit of new systems and equipment

Regardless of when a potential major construction project might begin, the Master Plan Preferred Alternative is intended to minimize the duration of the construction and lessen disruption to the daily school activities. It also is intended to bring new energy efficient systems "on line" as soon as possible to maximize the cost saving benefits of more efficient building systems.

Potential MSBA Reimbursements

The Massachusetts School Building Authority (MSBA) invited CCHS to participate in a "repair" project just as the Master Plan project was initiated. MSBA is the agency that approves reimbursements for public school projects in the State. Representatives of the Concord-Carlisle Regional School District and the Facilities Master Plan Committee (FMPC) have met with MSBA to discuss the process for establishing the eligible value of any project and any potential reimbursement rates.

MSBA first requires an Agreement with the School District that further requires the District to follow the MSBA process and procedures. Initially, MSBA requires completion of a Feasibility Study and the Schematic Design and the District is required to complete both. Two MSBA approvals are required, one following the Feasibility Study and a second following completion of the Schematic Design. The second MSBA approval includes the portions of the project MSBA will fund, the total value of the eligible portions, and the reimbursement rate they will use. MSBA recognizes that the Master Plan, while not meeting all requirements of their process, will be valuable in their Feasibility Study phase and encouraged the District and FMPC to continue with the Master Plan process. Unfortunately, a full MSBA Feasibility Study and Schematic Design will be required before the final funding and reimbursement rates can be established.

OMR, together with the FMPC, has worked to maximize the value of the Master Plan in the context of the MSBA Feasibility Study and Schematic Design requirements; however, additional funding will be required from Concord and Carlisle to complete the Feasibility Study and Schematic Design. The District has requested that funding articles be placed on the upcoming Town Meeting Warrants in both communities.

CCHS Repair vs New Costs Ratio Comparison Date: 1/13/2010
Proj. # 0906 Rev 2/10/2010
Base Ratio (new construction) **1.00** = $255 Based on average current bids

Permanent Buildings	**Repair Ratio**	**Base Cost/sf**	**Adjusted Cost/sf**	**Building Area gsf**	**Building Cost**
I Building	0.65	255	165.75	20,000	$3,315,000
S Building	0.5	255	127.50	38,500	$4,908,750
L Building	0.65	255	165.75	16,850	$2,792,888
H Building	0.5	255	127.50	37,000	$4,717,500
A Building	0.55	255	140.25	32,400	$4,544,100
Library	0.85	255	216.75	21,900	$4,746,825
Cafeteria	0.65	255	165.75	13,900	$2,303,925
Upper Gym	0.8	255	204.00	17,600	$3,590,400
Lower Gym	0.65	255	165.75	10,000	$1,657,500
Lockers	0.55	255	140.25	21,900	$3,071,475
Sub-total			$154.96	230,050	$35,648,363
Temporary Trailers (not included in gsf)				3,750	
Total Building Area (incl. trailers)				233,800	
Average Repair Ratio	**0.61**		$154.96	230,050	$35,648,363

Assumptions

Basic Repair costs include: New roofs, new MEP systems, and new floor, wall, and ceiling finishes
0.5 to 0.55 Repairs for required ADA/MAAB upgrades
Repairs required for health and safety

Basic Repair costs exclude: Escalation
Project Soft Costs
Additions to existing building (program)
Additions/replacement to temporary trailers or accessory storage containers
Demolition of existing buildings (required for new construction)
Building envelope improvements (sustainability goals)

Alternatives upgrades: Fully gut building; provide new partitions, doors, etc. (program upgrades): add 0.15
(add to base repair ratio) Add for extensive equipment (Science, Kitchen, Theater Equipment, etc.), changes of use, and program changes: add 0.25 to 0.35

Base New Building Cost Ratio		**1.00**
Assumptions	$255 psf construction cost is based on new high schools currently being bid in Massachusetts	
	Includes site work for non-difficult sites	
	Excludes Owner's project soft costs (A/E and OPM fees, moving expenses, printing, legal costs, etc.)	

Complete Buildings Demolition Costs (required for new construction)		**1.05**
Assumptions:	Unrestricted single phase demolition of all existing buildings	
	All new construction is remote from existing buildings	
	No special requirements related to demolition proximity to other buildings	
	Escalation not included	
	Slabs on grade assumed except as noted	
	Excludes Project Soft Costs	

Complete repair of existing Buildings costs		**0.61**
Assumptions		
Basic Repair costs include:	New roofs, new MEP systems, and new floor, wall, and ceiling finishes	
0.5 to 0.55	Repairs for required ADA/MAAB upgrades	
	Repairs required for health and safety	
	Excludes Project Soft Costs	
Basic Repair costs exclude:	Escalation	
	Additions to existing building (program)	
	Additions/replacement to temporary trailers or accessory storage containers	
	Demolition of existing buildings (required for new construction)	
	Building envelope improvements to meet long-term sustainability goals	
	Plan modifications to meet program objectives	
Alternatives upgrades:	Fully gut building; provide new partitions, doors, etc. (program upgrades): add 0.15	
(add to base repair ratio)	Add for extensive equipment (Science, Kitchen, Theater Equipment, etc.),	
	changes of use, and program changes: add 0.25 to 0.35	

Preliminary Options Cost Ratios		
Assumptions	Renovations and additions to provide programmed educational space requirements	
	Building Envelope upgrades to meet sustainability goals for existing buildings	
	Construction meeting sustainability goals for new construction	
	Includes ration for phased construction (duration per Option requirements)	
	Includes ratio for full or partial demolition of existing buildings	
	Includes new Field House	
	Excludes Project Soft Costs	
Option C	Refer to Presentation dated 1/27/10	
Addition / Renovation and New Field House		0.82
Demolition		0.02
Phasing		0.09
Total		0.93
Option D	Refer to Presentation dated 1/27/10	
Addition / Renovation and New Field House		0.86
Demolition		0.03
Phasing		0.06
Total		0.95
Option F	Refer to Presentation dated 1/27/10	
Addition / Renovation and New Field House		0.87
Demolition		0.03
Phasing		0.04
Total		0.95

CCHS Repair vs New Costs Ratio 2/10/2010

Proj. # 0906

Revised Base Ratio **1.00** $255 Base Cost Assumption

Assumptions $255 per gsf for average new high school construction in Massachusetts

Complete new high school including minimum site work

Based on current bids for variety of new construction high school projects

Permanent Buildings	**Repair Ratio**	**Base Cost/sf**	**Adjusted Cost/sf**	**Building Area gsf**	**Building Cost**
I Building	0.65	255	165.75	20,000	$3,315,000
S Building	0.5	255	127.50	38,500	$4,908,750
L Building	0.65	255	165.75	16,850	$2,792,888
H Building	0.5	255	127.50	37,000	$4,717,500
A Building	0.55	255	140.25	32,400	$4,544,100
Library	0.85	255	216.75	21,900	$4,746,825
Cafeteria	0.65	255	165.75	13,900	$2,303,925
Upper Gym	0.8	255	204.00	17,600	$3,590,400
Lower Gym	0.65	255	165.75	10,000	$1,657,500
Lockers	0.55	255	140.25	21,900	$3,071,475
Sub-total			$154.96	230,050	$35,648,363
Average Repair Ratio	**0.61**		$154.96	230,050	$35,648,363

CCHS Demolition Costs Ratio 2/10/2010
Proj. # 0906
New Construction Ratio = 1.0 $255 Base Cost Assumption

Complete Buildings Demolition Costs (required for new construction)

Assumptions:
- Unrestricted single phase demolition of all existing buildings
- All new construction is remote from existing buildings
- No special requirements related to demolition proximity to other buildings
- Escalation not included
- Slabs on grade assumed except as noted

Demolition		**Slab Removal**			**Volume Removal**			**Perimeter**	**Perimeter**	
	Area	**Cost per SI**	**Cost**	**hgt**	**volume (cf)**	**Cost per cf**	**Cost**	**LF**	**Cost per LF**	Cost
Building I	20,000	$5.00	$100,000	14	280,000	0.40	$112,000	390	$35.00	$13,650
Building S	38,500	$5.00	$192,500	12	462,000	0.40	$184,800	707	$35.00	$24,745
Building L	16,850	$5.00	$84,250	12	202,200	0.40	$80,880	590	$35.00	$20,650
Building H	32,400	$5.00	$162,000	12	388,800	0.40	$155,520	870	$35.00	$30,450
Building A (avg hgt)	37,000	$5.00	$185,000	16	592,000	0.40	$236,800	740	$35.00	$25,900
Library (2 - stories)	9,900	$5.00	$49,500	30	146,025	0.40	$58,410	410	$35.00	$14,350
Library elevated slab	12,000	$5.00	$60,000							
Cafeteria	13,900	$5.00	$69,500	30	417,000	0.40	$166,800	410	$35.00	$14,350
Lower Gym	17,600	$5.00	$88,000	30	528,000	0.40	$211,200	340	$35.00	$11,900
Up Gym elevated slab	10,000	$5.00	$50,000	30	300,000	0.40	$120,000	850	$35.00	$29,750
Lockers incl. ramp	21,900	$5.00	$109,500	14	306,600	0.40	$122,640	850	$35.00	$29,750
	230,050		$1,150,250		3,622,625		$1,449,050			$215,495

Total Demo Base Cost	**$2,814,795**	total costs of slab removal, volume debris removal, and perimeter foundation costs
Demo Base Cost per s.f.	**$12.24**	per demolished building area
New Building Ratio (cost)	**$255.00**	
New Building + full demolition (cost)	**$267.24**	per square foot incl. demo costs
Ratio: New Bldg + full demo	**1.05**	or 4.80%

CCHS Demolition Costs Per Option 2/10/2010
Proj. # 0906
New Construction Ratio = 1.0 $255 Base Cost Assumption

Option C Demolition Ratio

Assumptions: Buildings A, H, S and Cafteria renovated
Building I, Lower Gym, Upper Gym, Lockers and Library demolished adjacent to existing construction 6.00/slab; .55 cf; $40/lf perimeter
Building I complete demolished not next to existing building
Selective Demolition included in renovation costs

Option C Building Area: **274,200 gsf** $255 Base Cost Assumption

			Slab removal						Perimeter Foundation		
Demolition	**Modifiers**	**Area**	**Cost per SF**	**Cost**	**hgt**	**volume (cf)**	**Cost per cf**	**Cost**	**LF**	**Cost per LF**	**Cost**
Building H		0	$5.00	$0	12	0		$0	0	$35.00	$0
Building I	Proximity	20,000	$6.00	$120,000	14	280000	0.50	$140,000	390	$40.00	$15,600
Building S	Incl in add/reno	0	$5.00	$0	12	0		$0	0	$35.00	$0
Building L		16,850	$5.00	$84,250	12	202200	0.40	$80,880	590	$35.00	$20,650
Building A			$5.00	$0		0	0.40	$0		$35.00	$0
Auditorium Expansion	Proximity	12,600	$6.00	$75,600				$0			$0
Cafeteria			$5.00	$0		0	0.40	$0		$35.00	$0
Library (2 - stories)	Proximity	9,900	$6.00	$59,400	15	148,500	0.40	$59,400	410	$35.00	$14,350
Library elevated slab	Proximity	12,000	$6.00	$72,000	15	174,000	0.40	$69,600			$0
Lower Gym	Proximity	10,000	$6.00	$60,000	30	300000	0.50	$150,000	340	$40.00	$13,600
Up Gym elevated slab	Proximity	17,600	$6.00	$105,600	30	528000	0.50	$264,000	850	$40.00	$34,000
Lockers incl. ramp	Proximity	11,900	$6.00	$71,400	14	166600	0.50	$83,300	850	$40.00	$34,000
		110,850		$648,250				$847,180			$132,200

Option C Demo Area (gsf)	**110,850**	gsf
Option C Building Area (gsf)	**274,200**	gsf
Option C Total Demo costs	**$1,627,630**	
Cost per Building Area	**5.94**	

Demo Ratio Option C **0.02** Demo cost Ratio per Option C Building Area **2.33%**

CCHS Demolition Costs Per Option 2/10/2010
Proj. # 0906
New Construction Ratio = 1.0 $255 Base Cost Assumption

Option D Demolition Ratio

Assumptions: Buildings A, H, and Cafteria renovated
Lower Gym, Upper Gym, Lockers and Library demolished adjacent to existing construction 6.00/slab; .55 cf; $40/lf perimeter
Buildings I, S, and L completely demolished not next to existing building
Selective Demolition included in renovation costs
Opt. Area: 274,100 gsf

			Slab removal						Perimeter Foundation		
Demolition		**Area**	**Cost per Sf**	**Cost**	**hgt**	**volume (cf)**	**Cost per cf**	**Cost**	**LF**	**Cost per LF**	**Cost**
Building H			$5.00	$0	12	0	0.40	$0		$35.00	$0
Building I		20,000	$5.00	$100,000	14	280000	0.40	$112,000	390	$35.00	$13,650
Building S		46,800	$5.00	$234,000	12	561600	0.40	$224,640	707	$35.00	$24,745
Building L		16,850	$5.00	$84,250	12	202200	0.40	$80,880	590	$35.00	$20,650
Building A			$5.00	$0	16	0	0.40	$0		$35.00	$0
Auditorium Expansion	Proximity	12,600	$6.00	$75,600				$0			$0
Cafeteria			$5.00	$0	16	0	0.40	$0		$35.00	$0
Library (2 - stories)	Proximity	9,900	$6.00	$59,400	15	148,500	0.40	$59,400	410	$35.00	$14,350
Library elevated slab	Proximity	12,000	$6.00	$72,000	15	174,000	0.40	$69,600			$0
Lower Gym	Proximity	10,000	$6.00	$60,000	30	300000	0.50	$150,000	340	$40.00	$13,600
Up Gym elevated slab	Proximity	17,600	$6.00	$105,600	30	528000	0.50	$264,000	850	$40.00	$34,000
Lockers incl. ramp	Proximity	21,900	$6.00	$131,400	14	306600	0.50	$153,300	850	$40.00	$34,000
		167,650		$922,250				$1,113,820			$154,995

Option D Demo Area (gsf)	**167,650**	gsf
Option D Building Area (gsf)	**274,100**	gsf
Option D Total Demo costs	**$2,191,065**	
Cost per Building Area	**7.99**	

Demo Ratio Option D **0.03** Demo cost Ratio per Option D Building Area **3.13%**

CCHS Demolition Costs Per Option **2/10/2010**
Proj. # 0906
New Construction Ratio = 1.0 255

Option F Demolition

Assumptions: Building A, Lockers, and Cafteria renovated
Building H, Lower Gym, Upper Gym, and Library demolished adjacent to existing construction 6.00/slab; .55 cf; $40/lf perimeter
Buildings I, S, and L completely demolished not next to existing building
Selective Demolition included in renovation costs
Opt. Area: 274,000 gsf $255 Base Cost Assumption

			Slab removal						Perimeter Foundation		
Demolition		**Area**	**Cost per SF**	**Cost**	**hgt**	**volume (cf)**	**Cost per cf**	**Cost**	**LF**	**Cost per LF**	**Cost**
Building H	Proximity	37,000	$6.00	$222,000	12	444000	0.50	$222,000	870	$40.00	$34,800
Building I		20,000	$5.00	$100,000	14	280000	0.40	$112,000	390	$35.00	$13,650
Building S		46,800	$5.00	$234,000	12	561600	0.40	$224,640	707	$35.00	$24,745
Building L		16,850	$5.00	$84,250	12	202200	0.40	$80,880	590	$35.00	$20,650
Building A		0	$5.00	$0	16	0	0.40	$0	740	$35.00	$25,900
Auditorium floor only	Proximity	8,000	$6.00	$48,000				$0			$0
Cafeteria		0		$0				$0			$0
Library (2 - stories)	Proximity	9,900	$6.00	$59,400	15	148,500	0.40	$59,400	410	$35.00	$14,350
Library elevated slab	Proximity	12,000	$6.00	$72,000	15	174,000	0.40	$69,600			$0
Lower Gym	Proximity	10,000	$6.00	$60,000	30	300000	0.50	$150,000	340	$40.00	$13,600
Up Gym elevated slab		17,600	$6.00	$105,600	30	528000	0.40	$211,200	850	$35.00	$29,750
Lockers (New Perf. Gym)	incl. ramp	9,900	$5.00	$49,500	14	138600	0.40	$55,440	850	$35.00	$29,750
		188,050		$1,034,750				$1,185,160			$207,195

Option F Demo Area (gsf)	**188,050**	gsf
Option F Building Area (gsf)	**274,000**	gsf
Option F Total Demo costs	**$2,427,105**	
Cost per Building Area	**8.86**	

Option F Demo Ratio **0.03** Demo cost Ratio per Option D Building Area **3.47%**

CCHS Renovation Costs Ratio **2/10/2010**
Proj. # 0906
Revised Ratio (New Construction Including Demo of existing building) = 1.0
Base Cost (per gsf) $255.00

Option C Item	Description	Ratio w/demo	Base	Adjusted cost/sf	Area (gsf)	Total cost	Comments
New Const.					Area (gsf)	Total	
Main Level	Infill 'A'	1.00	$255.00	$255.00	31,000	$7,905,000	
Main Level	Infill 'B'	1.00	$255.00	$255.00	29,500	$7,522,500	
Main Level	Bldg 'H' to 'S' connector	1.00	$255.00	$255.00	3,780	$963,900	
Main Level	Bldg 'S' connectors	1.00	$255.00	$255.00	1,020	$260,100	
Main Level	Bldg 'S' courtyard	1.00	$255.00	$255.00	6,000	$1,530,000	
Field Main Level	PE/Athletics connect	0.50	$255.00	$127.50	8,000	$1,020,000	Connectors only
Field Level	PE/Athletics connect	0.50	$255.00	$127.50	8,000	$1,020,000	
Lower Level	PE/Athletics, bldg sppt	1.00	$255.00	$255.00	42,700	$10,888,500	
Sub-total					130,000	$31,110,000	
Renovation							
Building H	Science; sci. support	0.90	$255.00	$229.50	17,000	$3,901,500	base repair .55 (MEP), program .15, .25 Science Equip.
Building H	Math; support area	0.65	$255.00	$165.75	19,000	$3,149,250	base repair .5, program .15
Building S		0.65	$255.00	$165.75	27,700	$4,591,275	incl. reno, new walls, and connectors
Building A	Auditorium Expansion	0.95	$255.00	$242.25	12,600	$3,052,350	base repair .55, program .15, .25 Theater Expansion/Equipment
Building A		0.65	$255.00	$165.75	19,800	$3,281,850	base repair .55, program .15
Cafeteria		0.65	$255.00	$165.75	13,000	$2,154,750	less ell, base .50, program .15
Sub-total					109,100	$20,130,975	
Field House	Field House	0.67	$255.00	$170.00	35,100	$5,967,000	
Total C		**0.82**	$255.00	$208.64	**274,200**	$57,207,975	program calculation: 274,040 gsf
Other Factors	(add to base cost / gsf)						
Phasing		**0.09**		$21.04		$5,768,483	.75 Gen Req x (normal length vs phased)
Demolition		**0.02**		$5.94		$1,627,630	
Total Ratio (Option C/New)		**0.93**		$235.61		$64,604,088	

Phasing Ratios				Gen Req (10%)	cost / month	Premium /mo (> 30 months)
Option F Floor Area		**Base CC**		**30 months**	**30**	**0.75**
274,200		$69,921,000		$6,992,100	$233,070	$174,803
Option D	**Base Duration (months)**	**Option C mos**		**delta (mos)**	**total cost**	**Ratio: phasing cost/(Base CC -Gen Req.)**
	30	63		**33**	$5,768,483	**0.0917**
Escalation	**Not Included**					

CCHS Renovation Costs Ratio **2/10/2010**

Proj. # 0906

Revised Ratio (New Construction Including Demo of existing building) = 1.0

Base Cost (per gsf) $255.00

Option D Item	Description	Ratio w/Demo	Base	Adjusted $/sf	Area (gsf)	Total Cost	Comments
New Const.					Area (gsf)	Total	
Main Level		1.00	$255.00	$255.00	72,000	$18,360,000	Info Commons; 1/2 (3) Clusters
Main Level	Infill and connectors	1.00	$255.00	$255.00	5,000	$1,275,000	Bldg 'A' to café and Bldg 'H'
Upper Level		1.00	$255.00	$255.00	36,000	$9,180,000	1/2 (3) Academic Clusters
Lower Level		1.00	$255.00	$255.00	10,800	$2,754,000	Dining/Food Service
Field Level		1.00	$255.00	$255.00	27,000	$6,885,000	Lockers, Mech, etc.
Field Level		1.00	$255.00	$255.00	5,800	$1,479,000	Field House circulation & support
Sub-total					156,600	$39,933,000	
Renovation							
Building A	Auditorium Expansion	0.90	$255.00	$230.71	12,600	$2,907,000	base repair .55, program .15, .25 Theater Expansion/Equipment
Building A		0.67	$255.00	$170.00	19,800	$3,366,000	base repair .55, program .15
Building H		0.62	$255.00	$157.86	37,000	$5,840,714	base .50, program .15
Cafeteria		0.62	$255.00	$157.86	13,000	$2,052,143	less ell, base .50, program .15
Sub-total					82,400	$14,165,857	
Field House	Field House	0.67	$255.00	$170.00	35,100	$5,967,000	
Total D		**0.86**	$255.00	$219.14	**274,100**	$60,065,857	program calculation: 274,040 gsf
Other Factors	(add to base cost / gsf)						
Phasing		**0.06**		$13.39		$3,669,514	.75 Gen Req x (normal length vs phased)
Demolition		**0.03**		$7.99		$2,191,065	
Total Ratio (Option D/New)		**0.95**		$240.52		$65,926,436	

Phasing Ratios			Gen Req (10%)	cost / month	Premium /mo (> 30 months)
Option F Floor Area		**Base CC**	**30 months**	**30**	**0.75**
274,100		$69,895,500	$6,989,550	$232,985	$174,739
Option D	**Base Duration (months)**	**Option D mos**	**delta (mos)**	**total cost**	**Ratio: phasing cost/(Base CC -Gen Req.)**
	30	51	**21**	$3,669,514	**0.0583**
Escalation	**Not Included**				

CCHS Renovation Costs Ratio **2/10/2010**
Proj. # 0906
Revised Ratio (New Construction Including Demo of existing building) = 1.0
Base Cost (per gsf) $255.00

Option F Item	Description	Ratio w/ demo	Base	Adjusted $/sf	Area (gsf)	Total Cost	Comments
New Const.					Area (gsf)	Total	
Top Floor		1.00	$255.00	$255.00	40,000	$10,200,000	(2) Academic Clusters (STEM)
Upper Floor		1.00	$255.00	$255.00	40,000	$10,200,000	(1) Academic Cluster and Info Commons
Main Level		1.00	$255.00	$255.00	76,000	$19,380,000	(2) Academic Clusters; Entry; Info Com.
Field Level		1.00	$255.00	$255.00	8,000	$2,040,000	Field house circulation and support
Field Level		1.00	$255.00	$255.00	19,500	$4,972,500	Perf. Gym; Lockers
Sub-total					183,500	$46,792,500	
Renovation							
Lower Gym	Convert to Perf. Gym	0.85	$255.00	$216.75	10,000	$2,167,500	base .55, program .15, Seating/Equip .25
Building A		0.70	$255.00	$178.50	32,400	$5,783,400	base repair .55, program .15
Cafeteria		0.65	$255.00	$165.75	13,000	$2,154,750	less ell, base .50, program .15
Sub-total					55,400	$7,938,150	
Field House	Field House	0.67	$255.00	$170.00	35,100	$5,967,000	
Total F		**0.87**	$255.00	$221.52	**274,000**	$60,697,650	program calculation: 274,040 gsf
Other Factors	(add to base cost / gsf)						
Phasing		**0.04**		$9.56		$2,620,125	.75 Gen Req x (normal length vs phased)
Demolition		**0.03**		$8.86		$2,427,105	
Total Ratio (Option F/New)		**0.95**		$239.94		$65,744,880	

Phasing Ratios			**Gen Req (10%)**	**cost / month**	**Premium /mo (> 30 months)**	
Option F Floor Area		**Base CC**	**30 months**	**30**		**0.75**
274,000		$69,870,000	$6,987,000	$232,900		$174,675
Option F	**Base Duration (months)**	**Option F mos**	**delta (mos)**	**total cost**	**Ratio: phasing cost/(Base CC -Gen Req.)**	
	30	45	**15**	**$2,620,125**		**0.0417**
Escalation	**Not Included**					

ENGINEERING ECONOMIC ANALYSIS
FOR
Concord Carlisle Regional High School

Concord, MA

December 16, 2009

Prepared for: 

Prepared by: Garcia, Galuska & DeSousa
Consulting Engineer, Inc.

EXECUTIVE SUMMARY

Section 1.0: Executive Summary

The goal of the lifecycle engineering economic analysis is to asses the performance of a displacement ventilation system against a replacement in kind HVAC system. Initially the displacement ventilation system is studied with an upgraded envelope in comparison to the existing mechanical system and existing envelope.

It is recommend that a displacement ventilation system be installed in a newly constructed building. An additional analysis compares the displacement ventilation system (option one) against the same HVAC "standard" system in a newly constructed building (baseline). The envelope of the new construction building is identical to the proposed upgraded existing building envelope. Further improvements to the new construction building's roof area, which would not be feasible as part of the envelope improvement project, are simulated with the displacement ventilation system as option two.

Each option is compared to the baseline system to determine the total savings over a 25 year cycle considering electrical costs, gas costs, maintenance costs, and initial construction costs.

In addition to lifecycle savings, the displacement ventilation system is studied as it further enhances controllability, year round temperature control and comfort, and increased ventilation.

Section 1.1: Mechanical System Analysis

1.1.A: Existing/Baseline Mechanical System – Replacement in Kind Unit Ventilator System

- Chilled/hot water coil classroom unit ventilators serving the academic and support areas
- Chilled/hot water coil air handling units with variable air volume boxes with hot water reheat coils serving administration areas of Building H and I
- Chilled/hot water coil air handling units with fan-powered variable air volume boxes with hot water reheat coils serving the Library
- Chilled/hot water coil air variable air volume handling unit serving the auditorium
- Chilled/hot water coil fan coil units serving the administration areas of Building A
- Hot water coil heating and ventilating units serving the cafeteria, upper gymnasium, lower gymnasium, and support areas for each building
- Limited use of fintube radiation and unit heaters
- (2) 6092 MBH and (1) 5217 MBH Standard efficiency gas-fired boilers power plant
- (2) 120 ton standard-efficiency air-cooled chillers power plant
- Chilled and hot water primary pumping
- Direct digital controls throughout

1.1.B: Mechanical System Option One and Two – Displacement Ventilation System

- Multiple low wall-mounted displacement diffusers at approximately 200-250 CFM (2 per classroom, 1 per support area) each for each academic and support area

- Dedicated overhead galvanized ventilation distribution system feeding each displacement diffuser

- 100% outside air chilled/hot water coil rooftop units with energy recovery wheel providing ventilation to the academic, support, and administration areas. One unit serving each building.

- Wall-mounted fintube radiation located along exterior wall between displacement diffusers

- Two-pipe hot water distribution system serving air handling units and fintube radiation

- Two-pipe chilled water distribution system serving air handling units

- (4) 3,000 MBH high efficiency gas-fired condensing boilers

- Limited use of fintube radiation and unit heaters serving non-academic/administration areas

- (1) 280 ton high-efficiency air-cooled chillers power plant

- Chilled and hot water primary pumping with VFD's

- Direct digital controls throughout

<u>Section 1.2: Envelope Analysis</u>

In addition to the displacement system upgrade, the existing envelope requires upgrades and replacements that are studied in Option 1.

1.2.A: Existing – Existing Envelope

- Wall Insulation (Buildings A, H, S, Cafeteria, Upper Gym): 6" Fiberglass Batt insulation (R-20)

- Wall Insulation (Buildings I, L, Library, Lower Gym): 1" Rigid insulation (R-5)

- Roof Insulation (Buildings A, H, S, Cafeteria, Upper Gym): 2" Rigid insulation (R-10)

- Roof Insulation (Buildings I, L, Library, Lower Gym): 3" Rigid insulation (R-15)

- Glazing: Aluminum Frame Single Pane Glass Windows

1.2.B: Baseline/Option One – Upgraded/New Construction Envelope

- Wall Insulation: 2" Polystyrene continuous insulation (R-12.5) and 6" Fiberglass Batt insulation (R-20)

- Roof Insulation: 3" Polyurethane insulation (R-20)

- Glazing: Low E Argon Filled Glass Windows (0.25 U-Value, 0.37 SHGC)

1.2.C: Option Two – New Construction Envelope with Improved Roof Insulation

- Wall Insulation: 2" Polystyrene continuous insulation (R-12.5) and 6" Fiberglass Batt insulation (R-20)

- Roof Insulation: 6" Polyisocyanurate insulation (R-42)

- Glazing: Low E Argon Filled Glass Windows (0.25 U-Value, 0.37 SHGC)

Section 1.3: Lifecycle System Analysis Conclusion

A replacement in kind of the existing hot HVAC system is selected as the baseline system since it represents the currently installed system. Unfortunately, the selection results in overall ownership costs that are higher when compared to the alterative system relating to the increased annual operating costs while also compromising the thermal comfort of the building. The option comparison to the baseline assesses the benefits of an improved system with reduced combined operating costs and improved thermal comfort with the goal of yielding ownership savings over the 25 year study period.

Annual electrical and gas consumption is calculated thru the results of a thermal dynamic heat transfer analysis utilizing Department of Energy (DOE-2)/eQuest software with all architectural data provided by The Office of Michael Rosenfeld Architects.

Utility cost data for electricity and gas were obtained from the actual utility bills for the existing building.

The “Building Life-Cycle” analysis includes future worth of each option considered using standard industry discount, inflation, and interest rates.

Our observations of the Mechanical System and Envelope Upgrade Payback Summary suggest that option one, a displacement ventilation system, yields an approximate negative $524,625 savings over the 25 year study period with an 18 year payback. This is due to the extensive work required to upgrade the existing envelope. The “Building Life-Cycle” analysis takes escalation, inflation, and interest as well as annual maintenance costs into account when calculating the total life-cycle savings. The simple payback is "the measure of the length of time required for the cumulative savings from a project to recover the Investment Cost and other accrued costs, without taking into account the Time Value of Money." The simple payback results in an 18 year payback but when accounting for escalation, inflation, and interest as well as annual maintenance costs the total the life cycle savings over a 25 year study period results in a negative $524,625 for this system.

It is preferred to install a displacement ventilation system in a new construction building where envelope upgrades would not have such a significant cost implication. This is why a lifecycle comparison of option one and option two is conducted against the baseline system in a newly constructed building. By assuming that all the envelope upgrades to the new building are standard costs reflective of new construction, the only premium cost for the envelope would be to further insulate the roof with 6" of polyisocyanurate insulation under option two. These comparisons have an instant payback as the displacement ventilation system capital investment is less than the replacement in kind system of the baseline. Over a 25 year study period option one results in a $4,185,099 savings and option two results in a $3,719,205 savings. Considering displacement ventilation anticipated for the academic, administration, and support areas, the ventilation systems are provided by 100% outside air indoor air handling units with hot water heating and chilled water cooling served by central plants, with modulating control, refrigerant heat recovery heat pipes, and exhaust air energy recovery for preheating and pre-cooling all outside air. The supply air vapor pressure will be depressed to approximately 50 grains/lb of air and reheated by a supply air stream hot-gas reheat coil to achieve a 68ºF discharge air temperature to each occupied space.

- Appendix

- Final Master Plan Presentation
- Interim NEASC Reports
- Community Visioning Summary
- Additional Option Designs
- CD Rom of Master Plan Report

- Final Master Plan Presentation

Concord-Carlisle Regional School District

omr architects

Facilities Master Plan Committee

Michael Fitzgerald
Chairperson

Diana Rigby
Superintendent of Schools

John Flaherty
Dep. Supt. - Finance & Operations

Dave Anderson
Facilities Manager

Jerry Wedge
Concord School Committee

Louis Salemy
Carlisle School Committee

Elise Woodward
Concord Board of Selectman

Bill Tice
Carlisle Board of Selectman

Peter Badalament
CCHS Principal

Brian Miller
CCHS Teacher

Margaret Waterman
CCHS Student

Brian Crounse
Comprehensive Sustainable Energy Comm.

Joseph Morahan
Police Sergeant

John Boynton
Concord Citizen

Michelle Ernst
Concord Citizen

Karla Johnson
Carlisle Citizen

Charlie Sample
Concord Citizen

Eileen Curtin
Business Analyst, CCRSD

Design Team

Michael Rosenfeld
Design Principal

Whitney Granger
Principal in Charge

Lisa Pecora-Ryan
Project Architect

Jeanne Roberts
Project Manager

Leland Koehler/Rice
Project Designer

Consultant

Nitsch Engineering, Inc.
Civil Engineer

Brown / Sardina, Inc.
Landscape Architect

Foley Buhl Roberts & Associates Inc.
Structural Engineer:

Garcia Galuska DeSousa Consulting Engineers Inc.
MEP/FP Engineer

Colburn & Guyette Consulting Partners Inc.
Kitchen Consultants

Wiss, Janney, Elstner Associates, Inc.
Building Envelope Consultant

Frank Locker Educational Planning
Visioning Consultant

Kessler McGuinness & Associates, LLC
Accessibility Consultant

Harold R. Cutler, PE
Code Consultant

Universal Environmental Consultant
Indoor Air Quality Consultant

D.G. Jones International, Inc.
Cost Estimator

Work Plan

Groundwork

- *Prepare contract*
- *Obtain all available/ pertinent documents*
- *Prepare draft of schedule and work plan*
- *Review existing conditions information*
- *Review all documents including SOI, NEASC*
- *Begin preparing base drawings*

Meeting # 1 — Project Start-Up

10/28/09

Objectives

- Review schedule and process
- Discuss goals, values, priorities
- Discuss space needs and deficiencies
- Discuss visioning

Follow-up

- Site walk thru with engineers and Facilities Manager
- Develop site analysis
- Develop existing conditions reports
- Meet with school representatives, as appropriate

Meeting # 2 — Goals and Values / Vision and Program

11/12/09

Objectives

- Review goals and values
- Discuss visioning and program

Follow-up

- Prepare draft program
- Conduct User Group Meetings

Meeting # 3 — Finalize Goals and Values / Draft Space Program

11/18/09

Objectives

- Discuss visioning and program
- Review and finalize goals and values

Follow-up

- Develop building analysis and space utilization
- Prepare final program

Meeting # 4 — Space Program / Building Organizational Analysis

12/09/09

Objectives

- Review space utilization
- Review program
- Review Building organizational diagrams

Follow-up

- Refine program
- Refine Building organizational diagrams

Meeting # 5 — Existing Conditions Site & Building Analysis

12/16/09

Objectives

- Discuss Existing Conditions with Engineers
- Discuss Goals for Sustainability/ Building Systems

Follow-up

- Prepare Preliminary Approaches

Meeting # 6 — Alternative Approaches

1/13/10

Objectives

- Review Preliminary Approaches
- Select Approach(s) to further develop

Follow-up

- Revise selected Approach(s)
- Prepare Approach(s) Phasing and budgets

Meeting # 7- 9 — Conceptual Designs

1/27/10, 2/24/10 3/10/10*

* Up to three meetings as necessary

Objectives

- Review revised Approach(s)
- Compare with "New School Approach"
- Select Preferred Approach

Follow-up

- Prepare Final Master Plan Report
- Prepare Final Cost Information, as appropriate

Meeting # 10 — Final Master Plan Report

*

3/24/10

Objectives

- Review Final Master Plan Report
- Vote to approve report

Follow-up

- Present to School Committee
- Prepare for Town Meetings

Goals & Values

GOALS: Process

- **Proactively manage the process** with foresight and insight
- **Communicate clearly, convincingly, strategically and sensitively** regarding the issues and challenges intrinsic to building momentum for this project at this time
- **Model and reflect our Communities' values** with a design that fosters civic pride and garners social, financial and political support
- **Qualitatively and Quantitatively solve the new school vs. renovation- addition conundrum**
- **Explore financial options** with MSBA and public/private partnerships and develop innovative ways to generate project funding and sustainable income

GOALS: Project

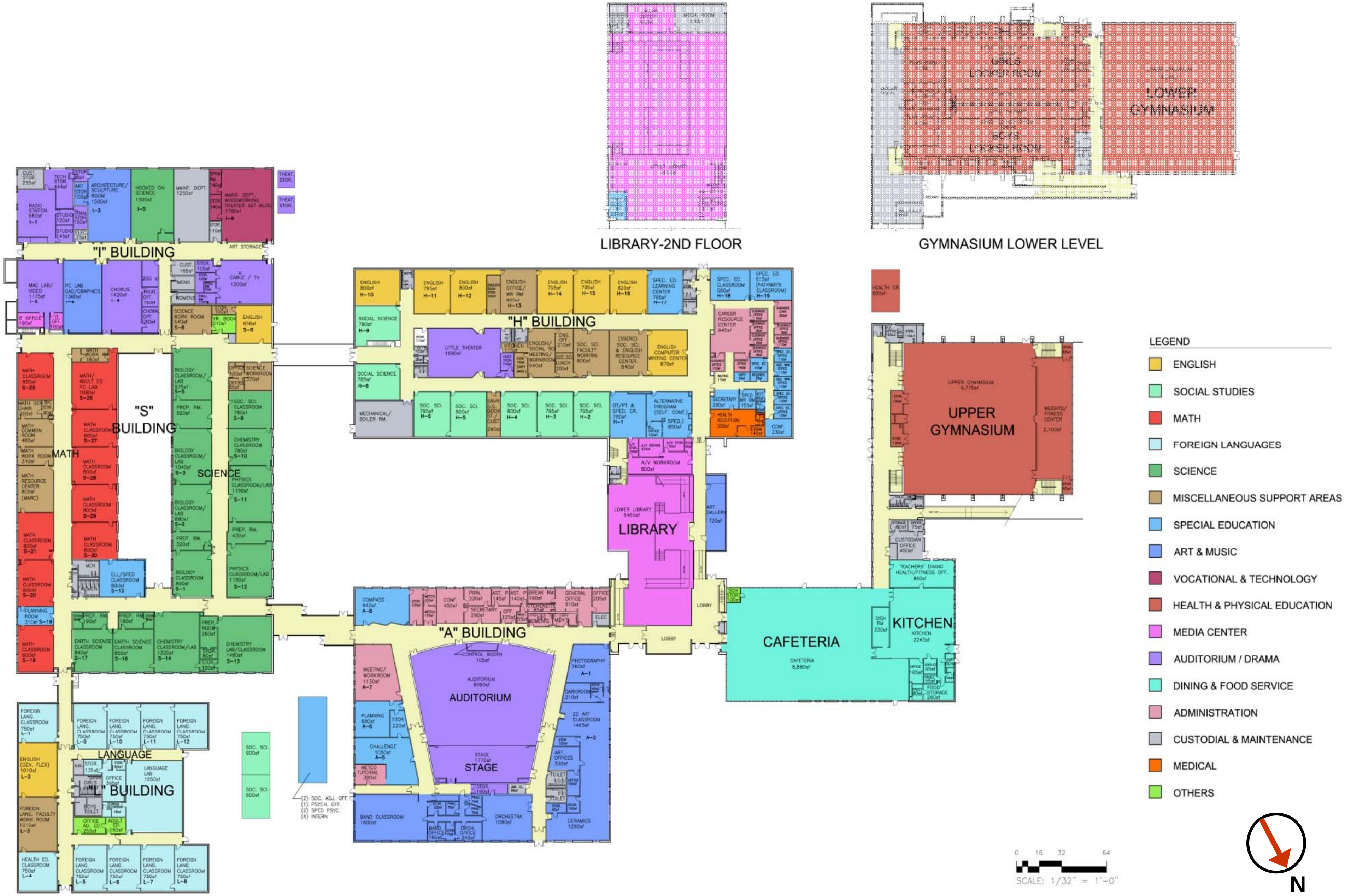
- Develop a project which is **fiscally, academically, environmentally and socially responsible and sustainable**
- Design a facility which is **flexible, adaptable, affordable and achievable**
- Create a facility that is **fully accessible, highly functional, cost effective, energy efficient, and easy to maintain**
- Plan for a fully integrated campus that **promotes 21st century learning, educational excellence, high performance and shared intergenerational community and recreational use**
- **Actively engage our communities** in this ongoing and exciting opportunity for teaching and learning
- **Holistically integrate all campus elements** into a practical and inspiring new and transformed CCHS

GOALS: Product

- Create a campus which is **safe and secure**
- Provide **state-of-the-art facilities** with the full and appropriate array of **formal and informal learning, gathering, and performance spaces**
- Provide **state-of-the-art building systems** in an environment with an abundance of **natural light, clean healthy air, and practical and sustainable** design strategies
- Integrate and maximize the current and future use of **effective, cutting-edge technologies**
- Develop intuitively clear, **logical and efficient organizational and circulation patterns**
- Build an engaging center for **"24/7" community use**
- **Minimize the impact of the design and construction** on the students, teachers, parents, neighbors and the greater community

Space Utilization and Program

Existing Space Utilization

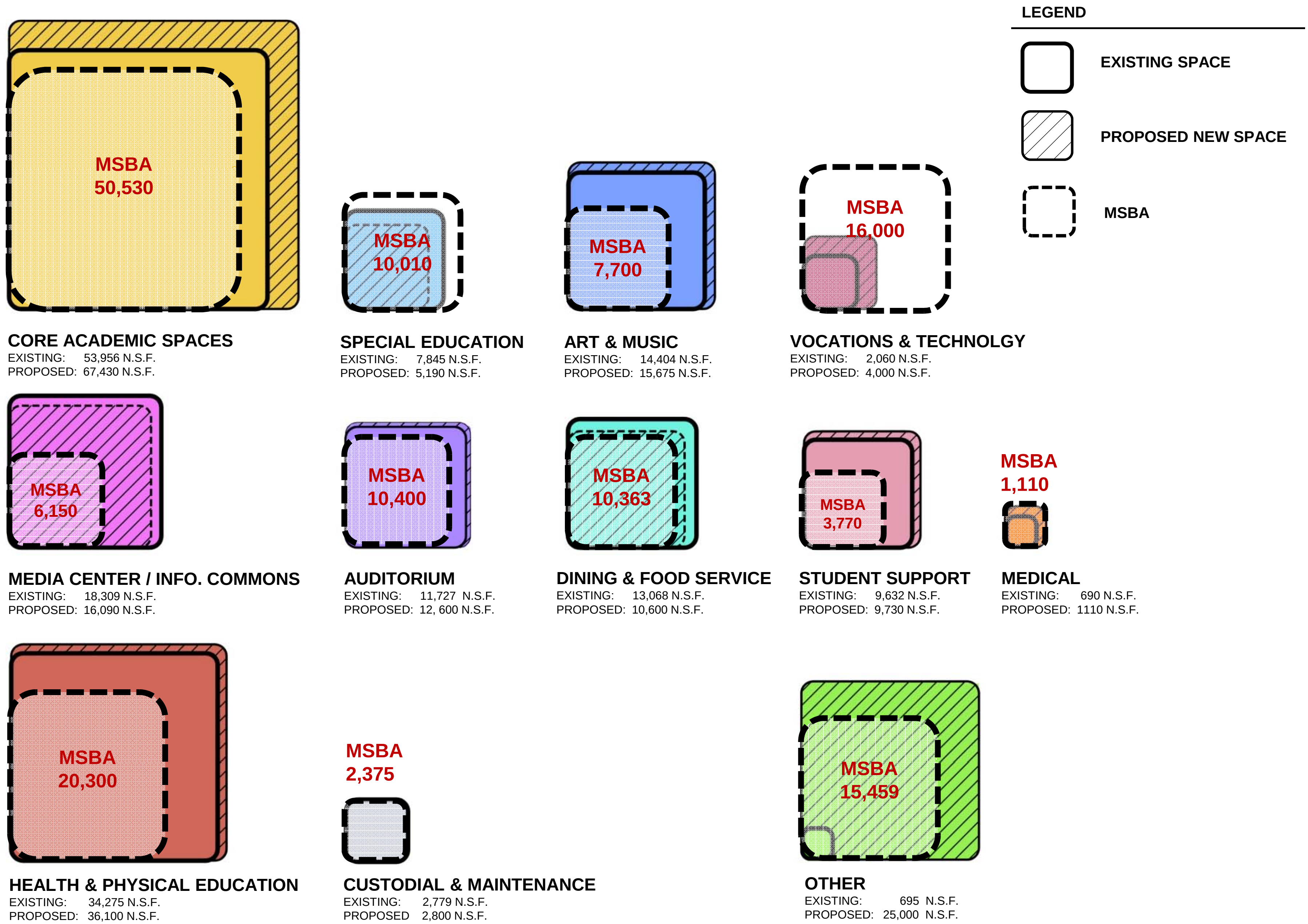


Program: Final Numeric

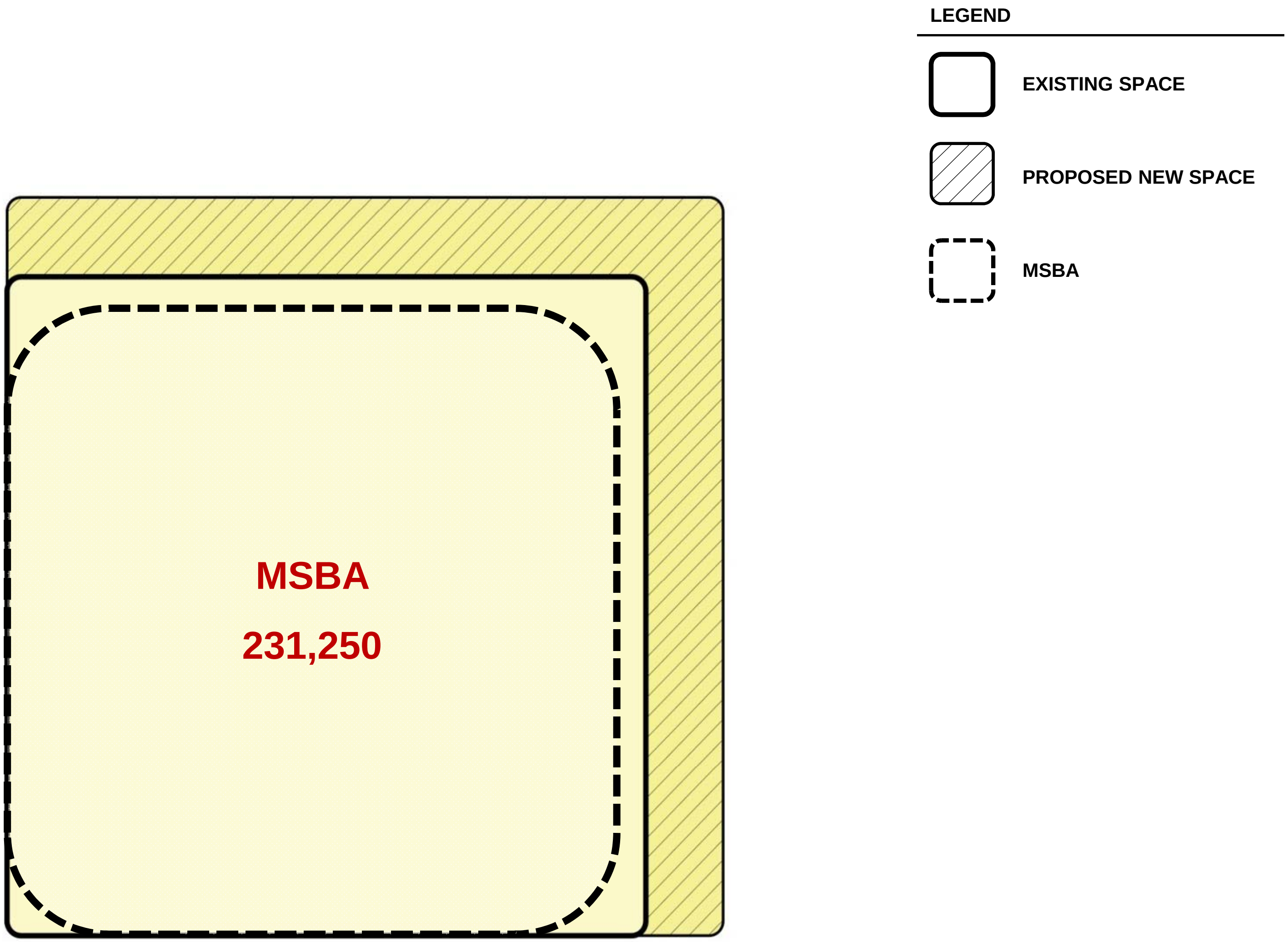
Preliminary Space Summary Comparison

Description	Existing Program Projected Enrollment:1250	Draft Proposed Program PROJECTED ENROLLMENT: 1250 (NEEDS TO BE CONFIRMED W/ MSBA)	SMMA Program (2005) Projected Enrollment:1350	MSBA Guidelines Projected Enrollment:1250 Estimated MSBA areas
CORE ACADEMIC SPACES	53,956	67,400	72,400	50,530
SPED	7,845	5,190	9,670	10,010
Art & Music	14,400	15,675	22,150	7,700
Vocations & Technology	2,060	4,000	3,500	16,000
Health & Physical Education	34,275	36,100	32,500	20,300
Media-Library/Information Commons	18,309	16,090	19,500	6,150
Auditorium	11,727	12,600	12,050	10,400
Dining & Food Service	13,068	10,600	11,660	10,363
Medical/Nurse	690	1,110	1,240	1,110
Student Support (Adm. & Guidance)	9,632	9,730	8,560	3,770
Custodial & Maintenance	2,779	2,800	2,200	2,375
Other	695	25,000	16,000	15,459
Total Net Area (nsf) Not updated to 1/21/10	169,440	206,295	211,430	154,167
TOTAL (NET) GROSS/NET RATIO	1.38 233,800	206,295 NSF (1.4) 288,813 GSF	1.4 296,002	154,167 NSF (1.5) 231,250 GSF

Graphic Program

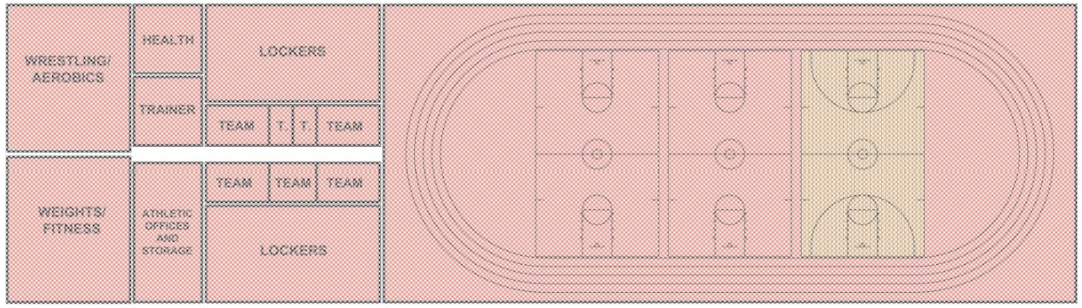


Graphic Program

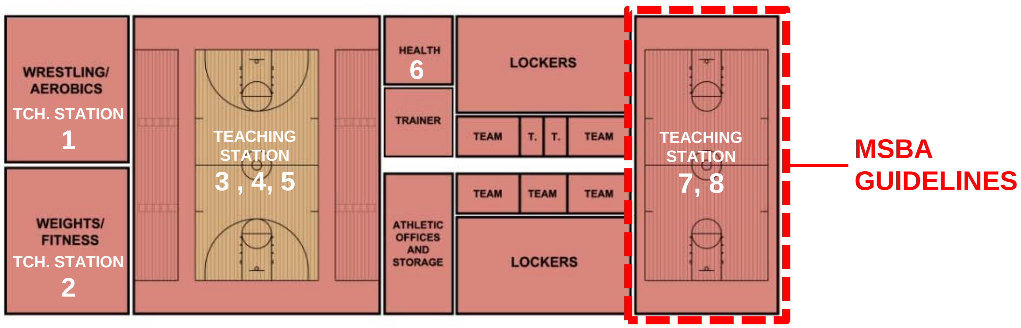


TOTAL BUILDING GROSS FLOOR AREA
EXISTING: 233,800 G.S.F.
PROPOSED: 288,813 G.S.F.

Athletics

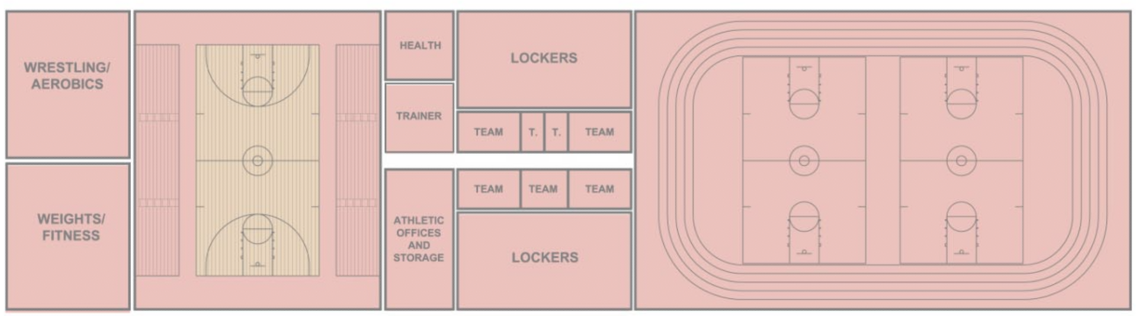


ATHLETIC CENTER: 180 YARD TRACK AND 1 WOOD AND 2 SYNTHETIC COURT



PERFORMANCE GYM

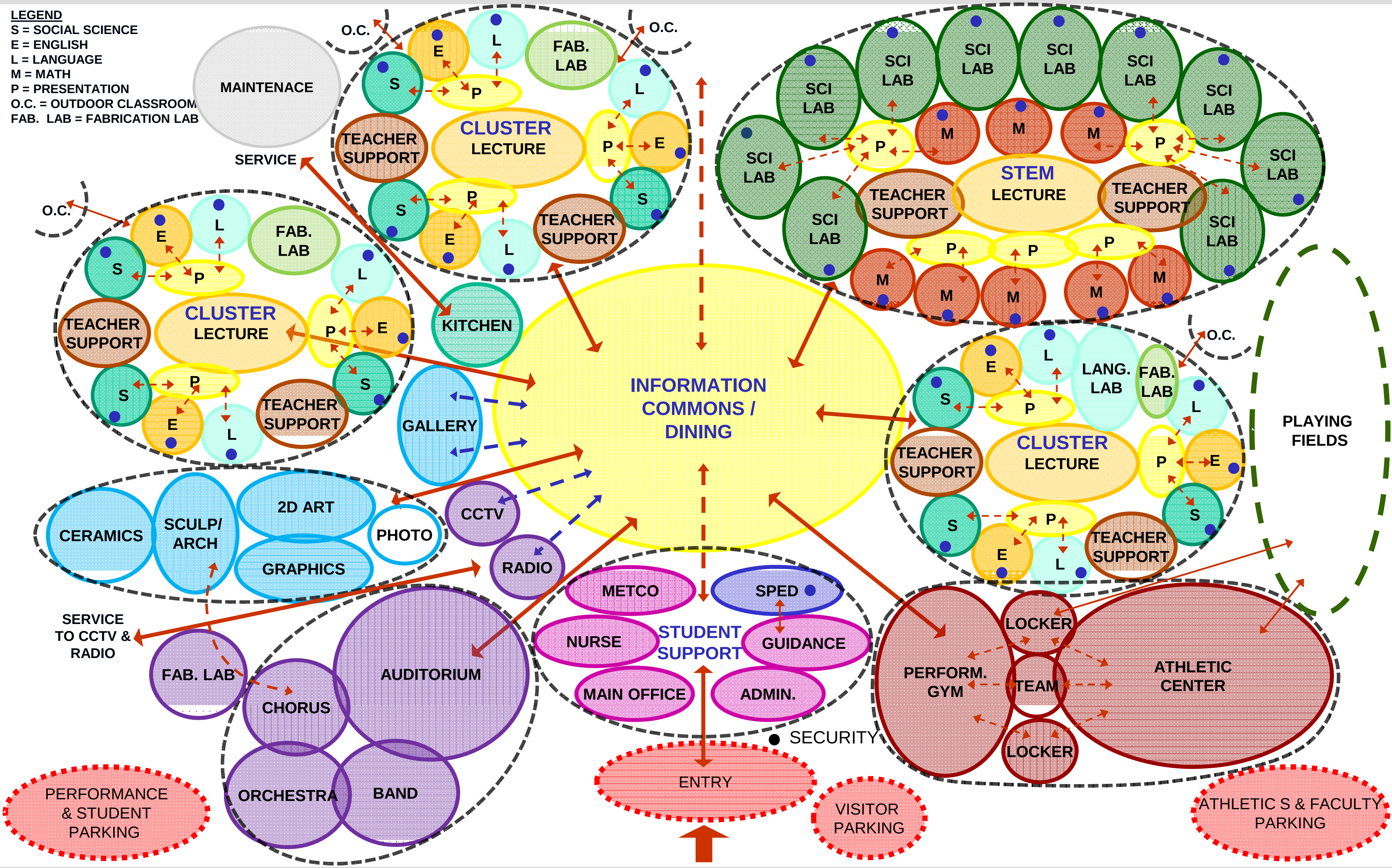
SMALL GYM



PERFORMANCE GYM

ATHLETIC CENTER: 140 YARD TRACK AND 3 COURTS

Organizational Diagram



Existing Conditions Summary

Existing Conditions: *Roof*

PONDING ON ROOF / EXPOSED PIPING

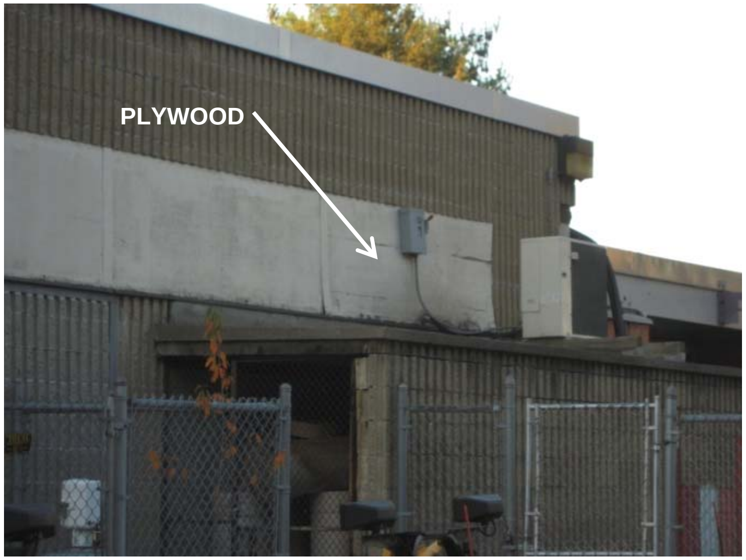
DETERIORATING ROOF TOP UNITS / MINIMAL ROOF DRAINS

OPEN SEAMS IN EPDM ROOFING

PONDING ON ROOF / DETERIORATING WOOD PLANK WALKING PADS

Existing Conditions: *Building Envelope*

1960's NONINSULATED STOREFRONT SYSTEM WITH PEELING PAINT ON METAL PANELS



DELAMINATING PLYWOOD PANELS

1990'S BUILDING ENVELOPE RENOVATION / LOUVERS TOO CLOSE TO GROUND

POORLY INSULATED MASONRY WALLS WITH WEAK AIR BARRIER SYSTEM

Existing Conditions: *Miscellaneous Exterior Conditions*

STAND ALONE CLASSROOM TRAILER OUTSIDE OF UPPER GYMNASIUM

DETERIORATING SITE ELEMENTS

NEWER WINDOWS HAVE SILLS PITCHING BACK TO BUILDING

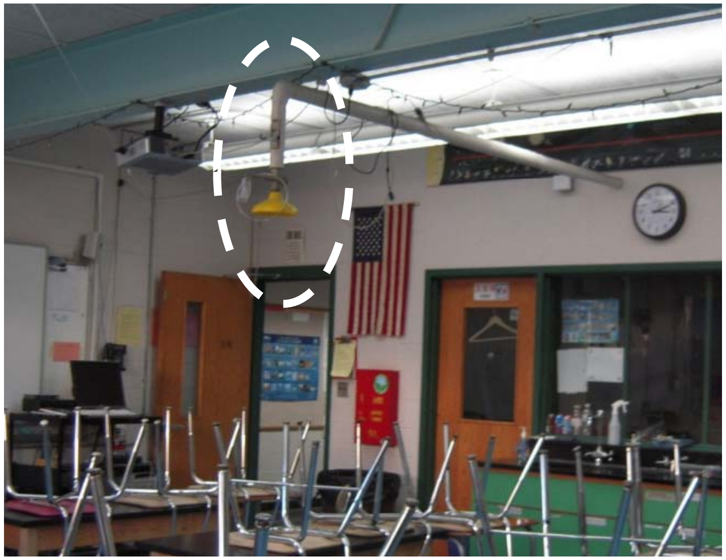
EXPOSED UTILITY LINES

Existing Conditions: *Code Compliance*

NONCOMPLIANT GUARDRAILS AND RAILINGS IN STAIRWELLS / DRINKING FOUNTAINS DO MEET CODE REQUIREMENTS

OUTDATED AND DETERIORATING ELECTRICAL PANELS

NONCOMPLIANT GUARDRAILS IN LIBRARY



NONCOMPLIANT EMERGENCY SHOWERS IN SCIENCE LABS

Existing Conditions: *Accessibility*

NONCOMPLIANT RAMP IN LIBRARY

INACCESSIBLE AUDITORIUM STAGE AND
NONCOMPLIANT SLOPED FLOOR

NONCOMPLIANT RAMP DOWN TO LOWER GYM

INACCESSIBLE PLYWOOD RISERS IN CHORAL ROOM

Existing Conditions: *Miscellaneous Interior Conditions*

60'S CASEWORK: OUTDATED AND NONCOMPLIANT

HIGH MAINTENANCE AND INEFFICIENT PLUMBING / INACCESSIBLE TOILET ROOMS

90'S CASEWORK: BROKEN HINGES ON MANY CABINET UNITS

UNIT VENTILATORS IN CLASSROOMS ARE NOISY, INEFFICIENT AND HARD TO MAINTAIN

Analysis: Existing *Building* Conditions Summary

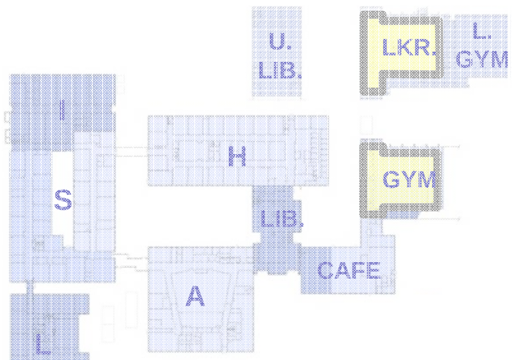
I, L, Library and Lower Gym

1970's

+ Door hardware meets ADA/MAAB
+ New hooked on science classroom

- Ongoing deferred maintenance
- Outdated rubber floor in gymnasium
- Inaccessible door clearances, ramps, and toilet rooms
- Classrooms are remote, Lack of presentation space
- Core spaces have no natural light or views
- EPDM roof in poor condition
- No vapor barrier in exterior walls/single pane exterior glazing
- Congested tunnels
- MEP systems exceed life span
- No sprinklers in public space
- Structural lateral, seismic & snow loads do not meet current code
- Classrooms do not support interdisciplinary teaching and learning

Upper Gym & Locker Rooms

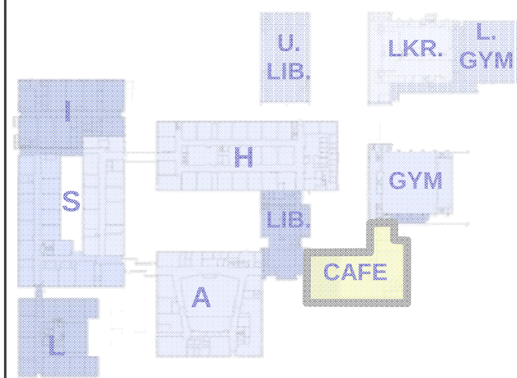


1960's

+ Gymnasium floor in good condition
+ Most door hardware meets ADA/MAAB
+ New bleachers in gym
+ New lockers in locker rooms

- Ongoing deferred maintenance
- Hazardous materials
- Inaccessible door clearances in weight room and P.E. offices
- PVC roof in poor condition
- Thermal bridge at exposed exterior gymnasium structure
- Single pane exterior curtain wall
- Non-code compliant stairs
- MEP systems exceed life span
- No sprinklers in public areas
- Structural lateral, seismic & snow loads do not meet current codes
- Health classroom in trailer
- Current space does no meet athletic program requirements

Cafeteria

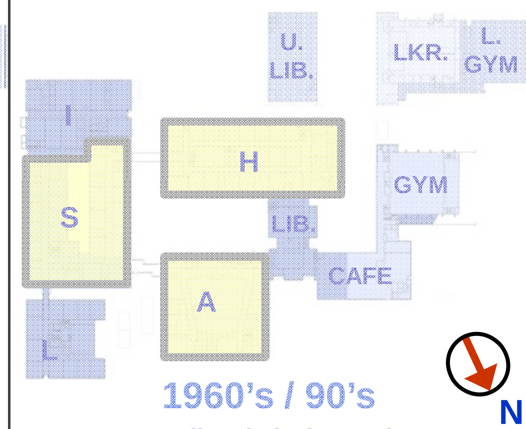


1960's / 90's

+ Masonry walls in relatively good condition on renovated part of cafeteria
+ Door hardware meets ADA/MAAB

- Ongoing deferred maintenance
- Kitchen hoods outdated / not code compliant
- Dishwasher does not function
- Inaccessible kitchen toilet room (two are required per code)
- Dumpster and recycling area
- PVC roof in poor condition
- Half of the exterior walls have no vapor barrier and are single pane glass
- Beams not thermally broken at new roof/wall interface
- Structural lateral, seismic & snow loads do not meet current code
- Serving equipment does not meet Board of Health regulations
- Inadequate and congested serving area (low participation)

A, H, and S

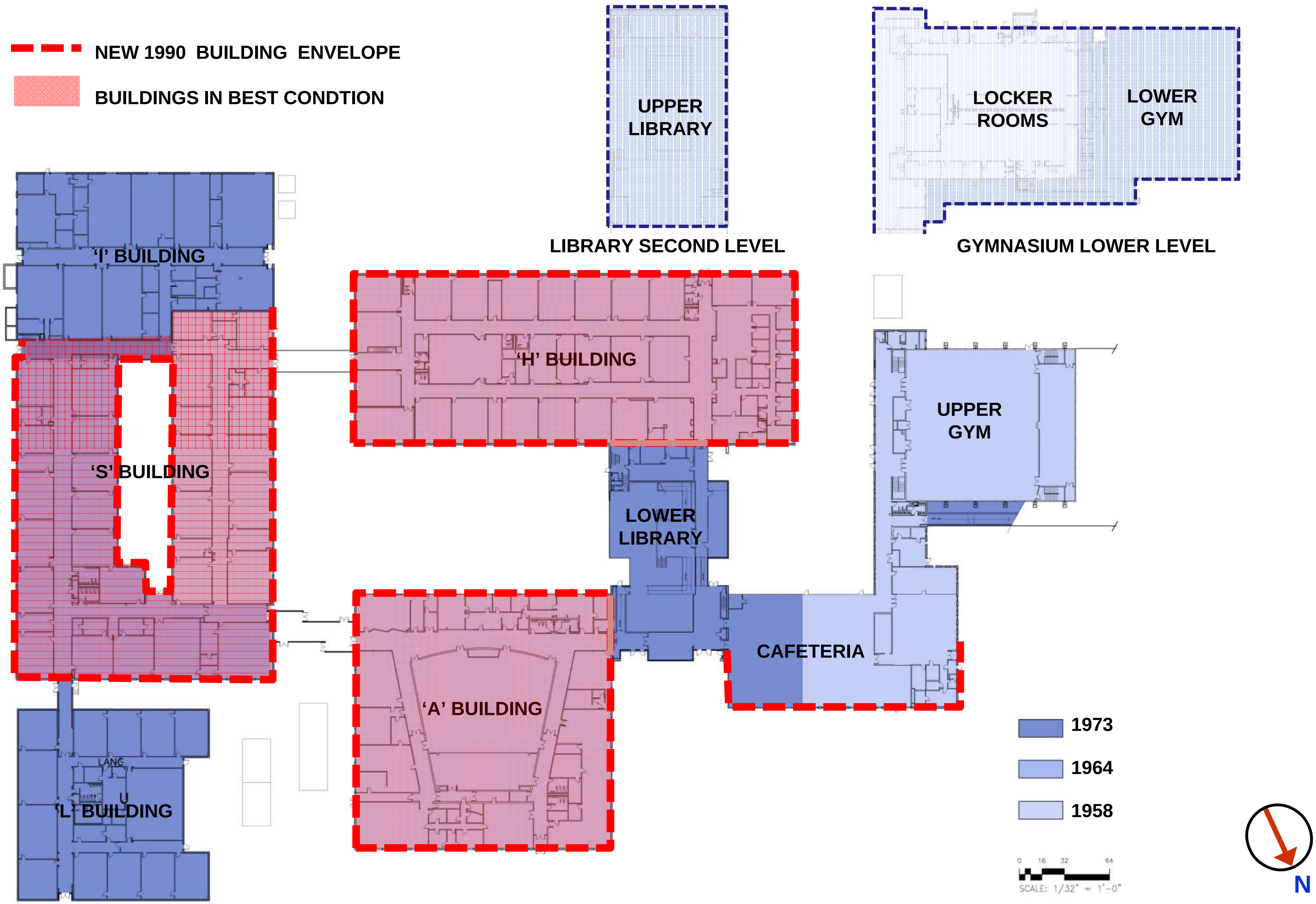


1960's / 90's

+ Masonry walls relatively good
+ 1" insul. win. /thermally broken frames
+ Door hardware meets ADA/MAAB
+ New fire panel and alarm system
+ Structure is satisfactory

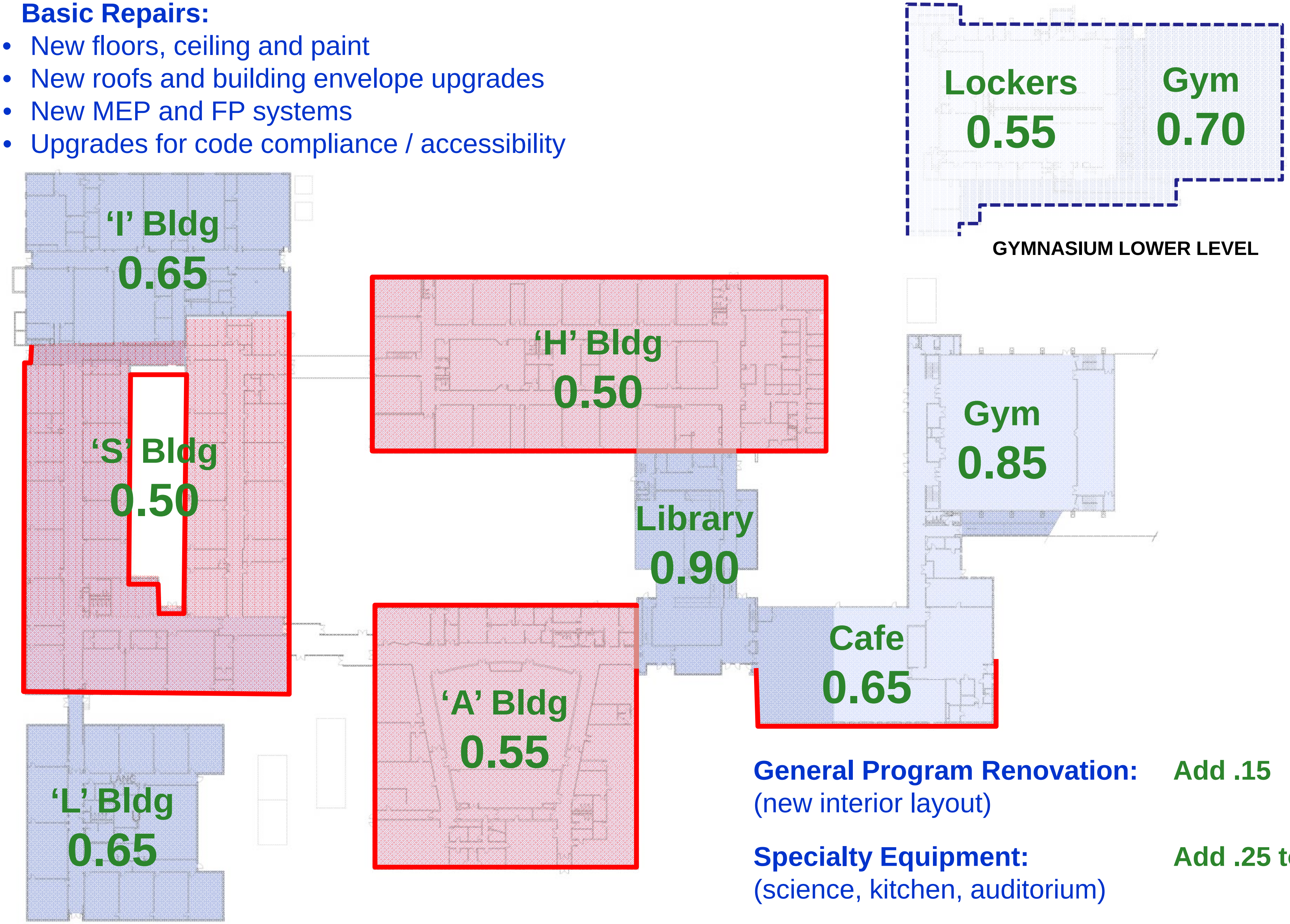
- Ongoing deferred maintenance
- Hazardous materials
- Inaccessible door clearances, ramps, toilets, labs and stage
- Roof beams not thermally broken
- Tunnels are difficult to access
- PVC roof in poor condition
- MEP systems exceed life span
- Minimal sprinkler system
- Structural lateral, seismic & snow loads do not meet current codes
- Science labs are outdated, non compliant emergency showers
- Classrooms do not support interdisciplinary education

Analysis: Existing *Building* Conditions Summary



Analysis: Relative Cost **(New Construction = 1.0)**

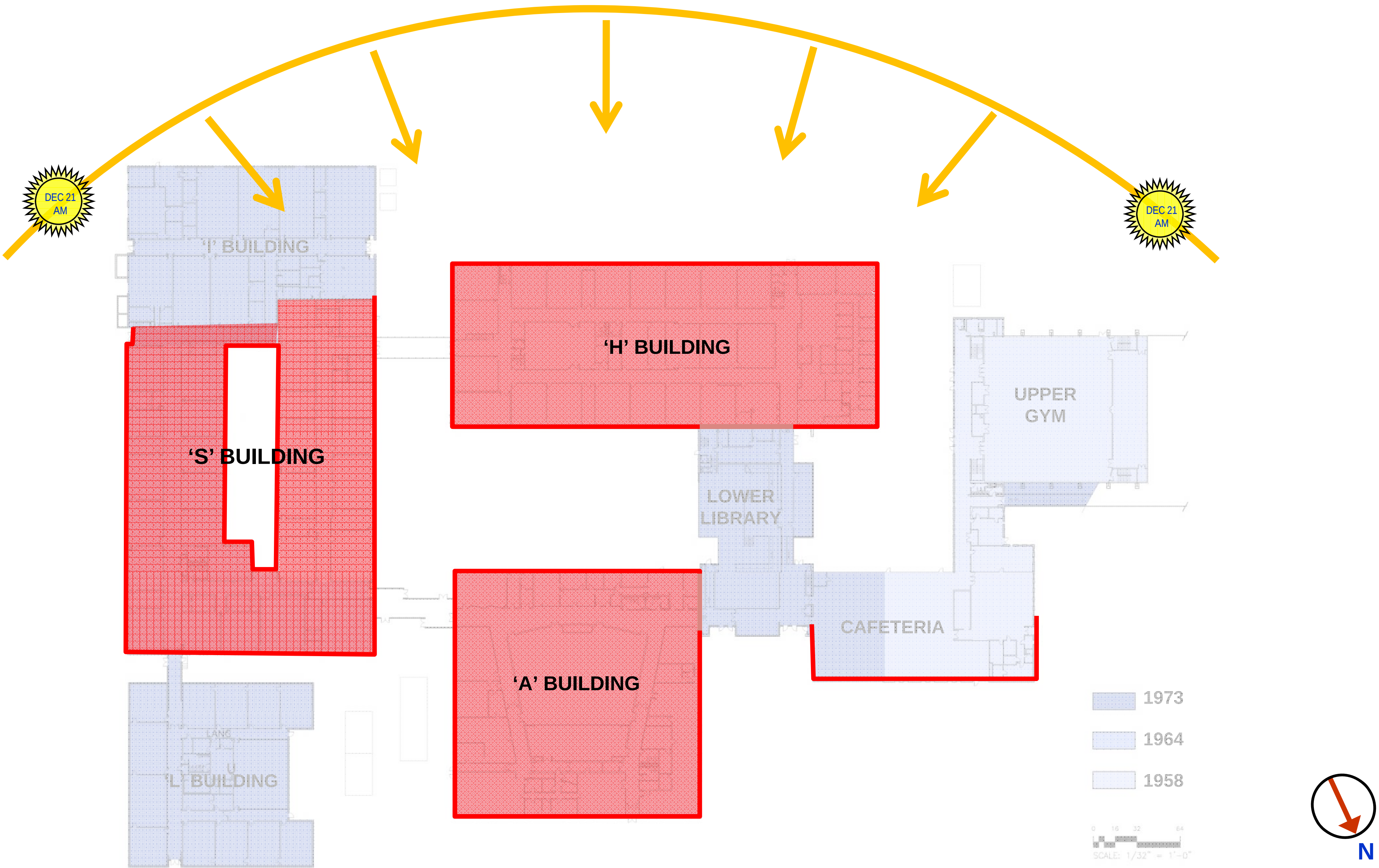
Basic Repairs:
- New floors, ceiling and paint
- New roofs and building envelope upgrades
- New MEP and FP systems
- Upgrades for code compliance / accessibility



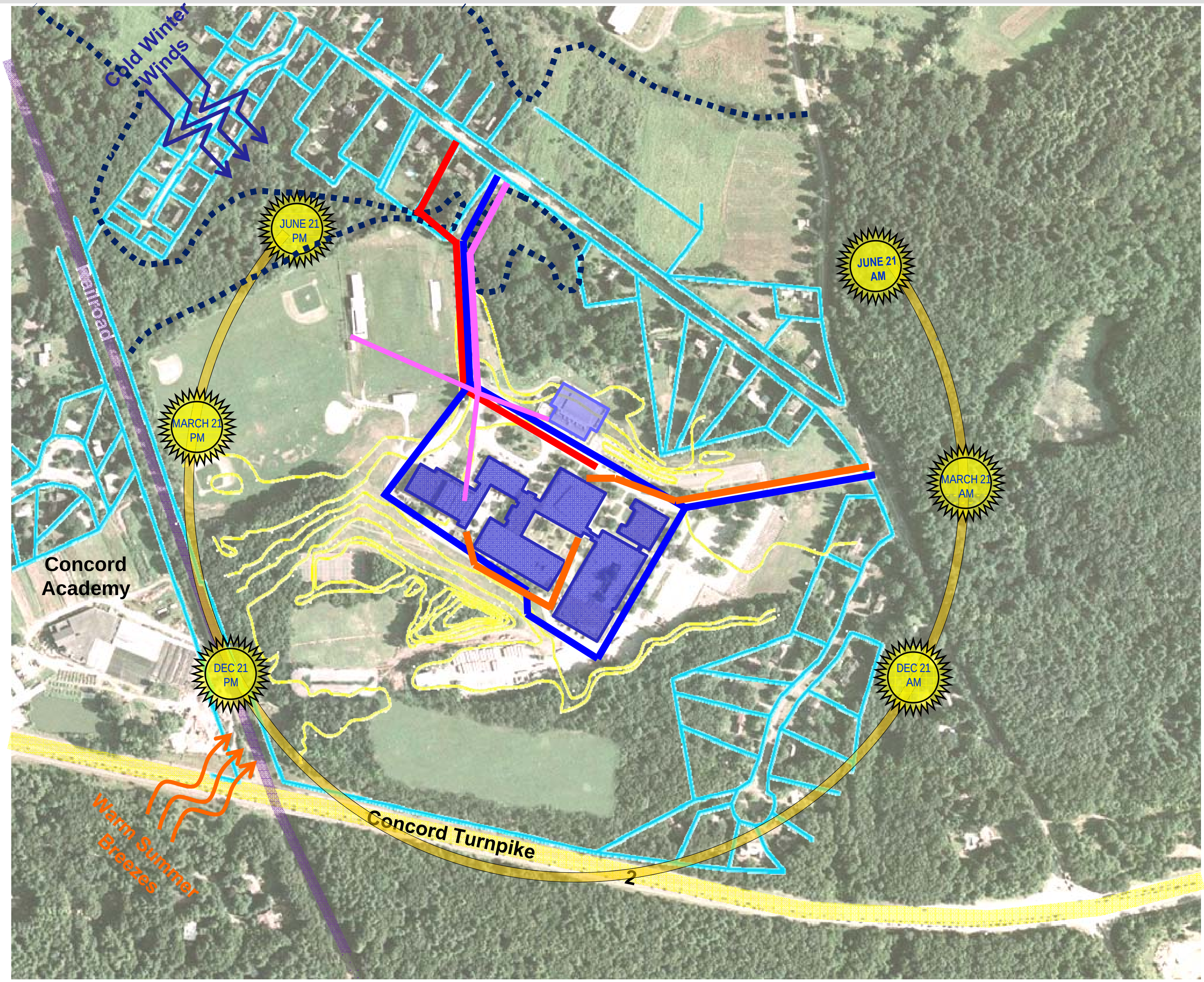
General Program Renovation: (new interior layout) **Add .15**

Specialty Equipment: (science, kitchen, auditorium) **Add .25 to .35**

Analysis: Solar Orientation

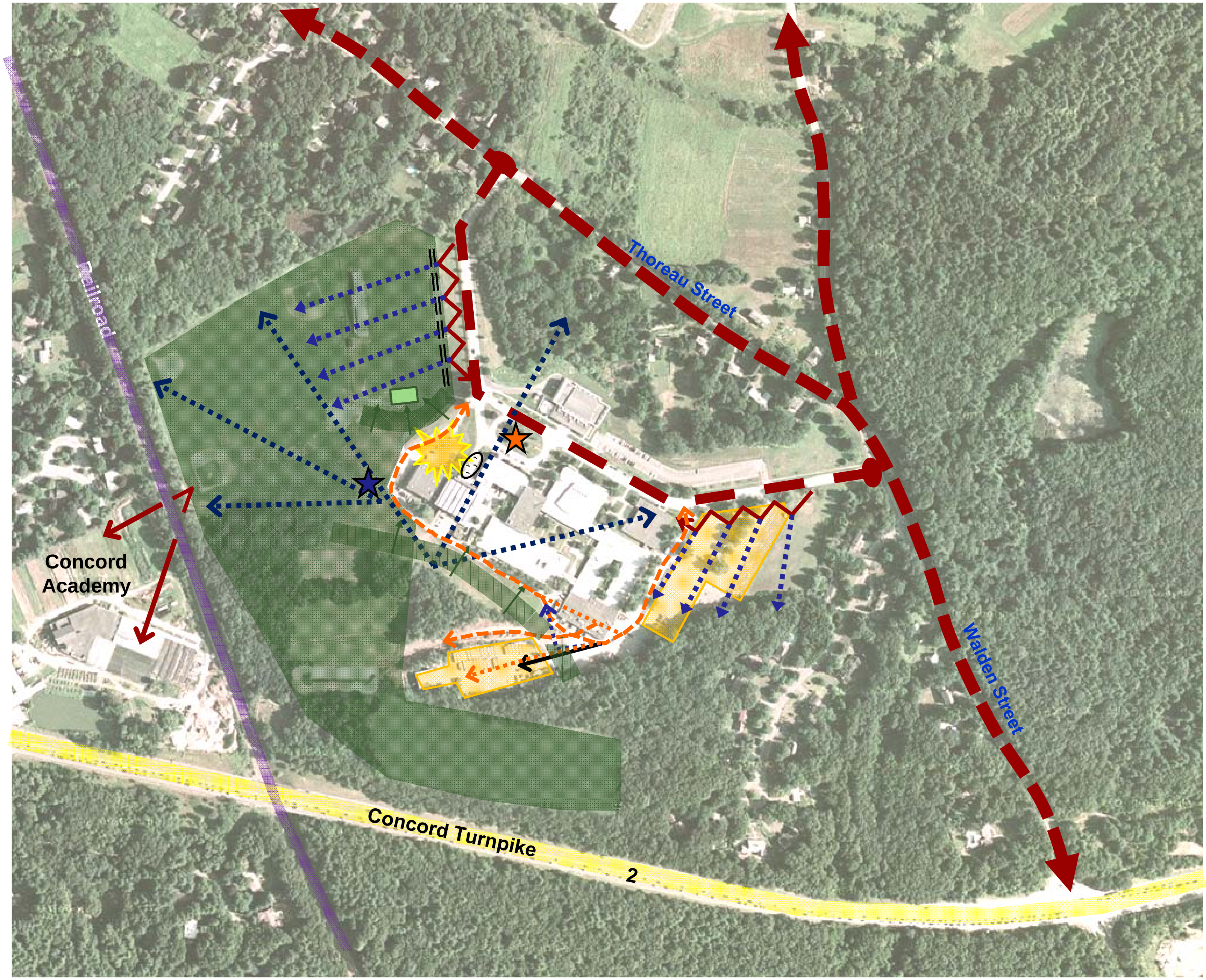


Analysis: Site Overview



- Sun
- Wind
- Topography
- Wetlands
- Neighbors
- Water
- Sewer
- Gas
- Data

Analysis: Site Overview



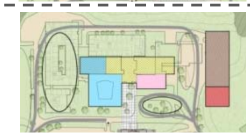
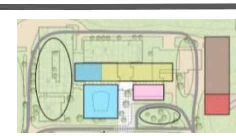
- Primary Access
- Main Entry
- Parking
- Visual Integration
- Views
- Possible Connection
- Fields
- Safety
- Services

Alternative Approaches

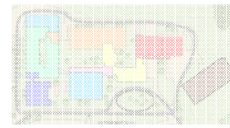
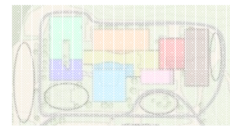
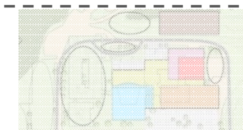
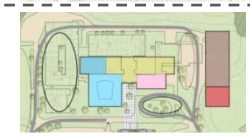
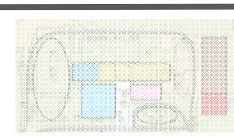
Assumptions

- These are *Approaches* not Designs
- Working towards optimizing the following:
  - Value (Fiscal, Physical, and Natural Resources)
  - Phasing (Time, Feasibility, Ease, and Safety)
  - Program (21st Century Learning and Appropriate Adjacencies)
  - Integration (Site and Building Relationships)
  - Sustainability (Solar Orientation, Compactness, Efficiency, and Reuse)
- Mix and Match
- Find the Right Balance
- All approaches meet program net/gross square footage
- Approaches revised to reflect your comments

Approaches

		Value	Phasing	Organization	Program	Integration	Sustainability	
	Just Repair (0.6)							
A	Major Renovation Minor Addition	1	1	1	1	1	1	
B	Major Renovation Major Addition	2	2	3	2	2	2	
C	Major Renovation Major Addition	3	2	4	3	3	3	
D	Minor Renovation Major Addition	4	3	4	4	4	4	
E	Minor Renovation Major Addition	3	3	3	3	3	3	
F	Minor Renovation Major Addition	4	4	5	4	4	5	
G	All New Phased	4	4	5	5	4	5	
	All New (1.0)							

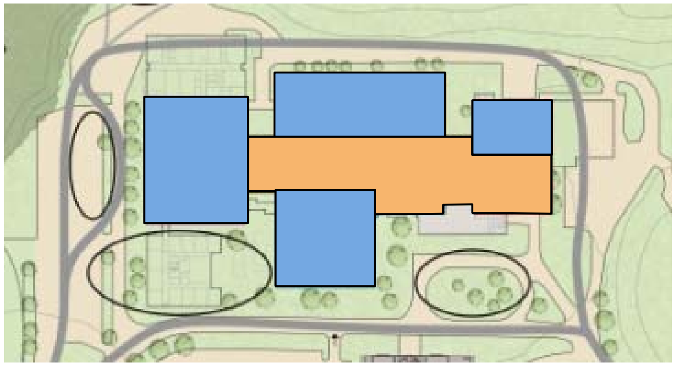
Selected Approaches

		Value	Phasing	Organization	Program	Integration	Sustainability	
	Just Repair (0.6)							
A	Major Renovation Minor Addition	1	1	1	1	1	1	
B	Major Renovation Major Addition	2	2	3	2	2	2	
C	Major Renovation Major Addition	3	2	4	3	3	3	
D	Minor Renovation Major Addition	4	3	4	4	4	4	
E	Minor Renovation Major Addition	3	3	3	3	3	3	
F	Minor Renovation Major Addition	4	4	5	4	4	5	
G	All New Phased	4	4	5	5	4	5	
	All New (1.0)							

Summary of Selected Approaches

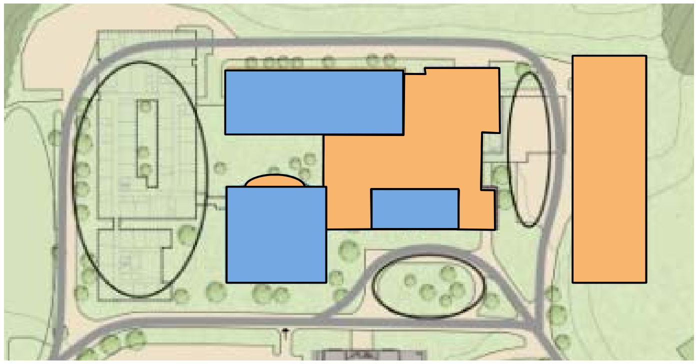
C

Major Renovation
Major Addition



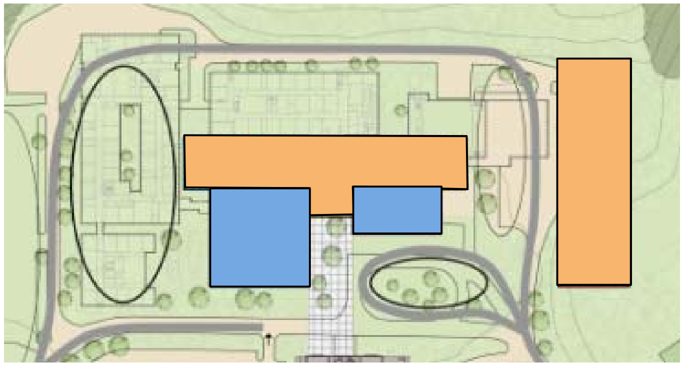
D

Minor Renovation
Major Addition



F

Minor Renovation
Major Addition



Your Comments

Make main entrance visible

Look into ways to appropriately integrate entries from the north south east and west.

Link the school both horizontally and vertically, using the information commons to actively and vibrantly link students, teachers and program.

Create an interior connection between the field house and the rest of the school.

Connect to the Beede Center and develop appropriately located paved plaza areas.

Protect the sledding hill.

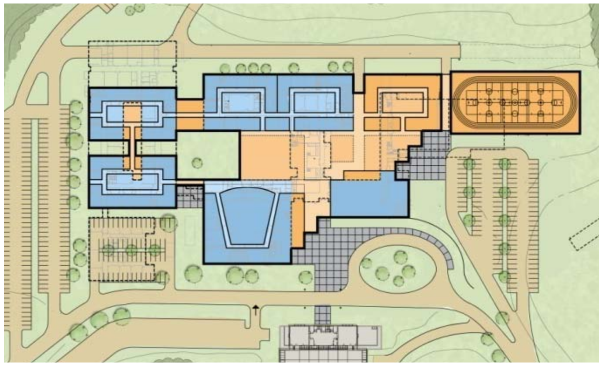
Maximize solar orientation

Landscape the parking

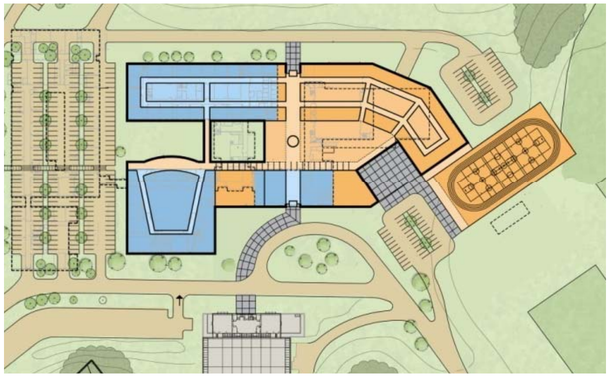
N

Detailed Options C, D, and F

C (.9)
5 Phases
(5+ years)

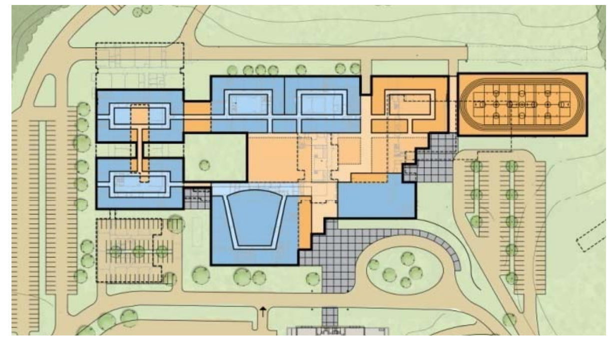
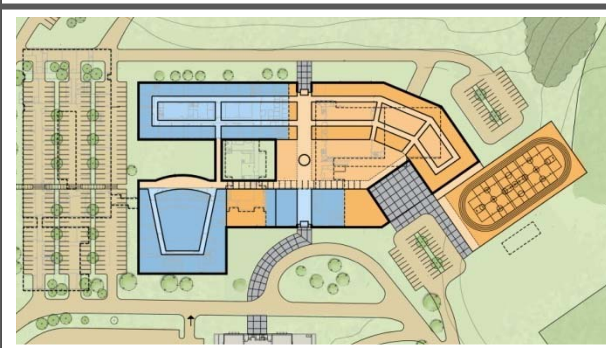
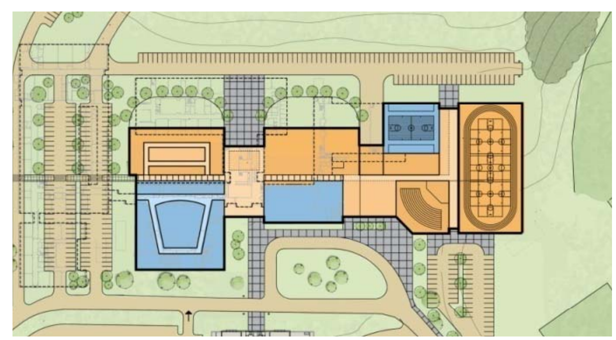


D (.9)
3 Phases
(4 years)



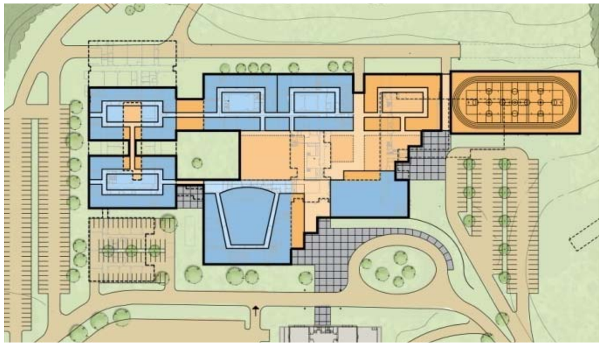
F (.9)
3 Phases
(4 years)

Comparison of Options C, D, and F

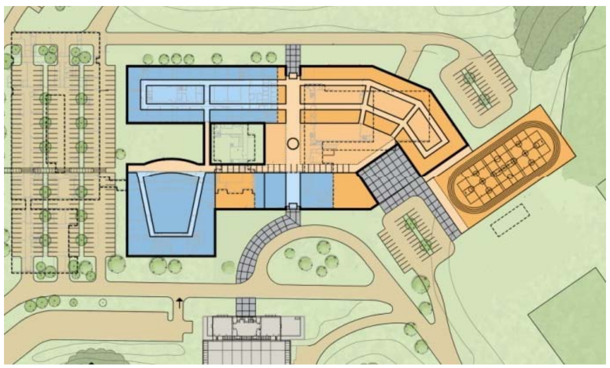
Costs Ratio	# of Phases (Years of Const).		Value	Phasing	Organization	Program	Integration	Sustainability	Transformation	Operational Cost / Mainten.	**"Achievability"**		Comments
.9	**5** **(5+)**	**C** Major Renovation Major Addition	**3**	**1**	**4**	**3**	**3**	**4**	**3**	**3**			
.9	**3** **(4)**	**D** Minor Renovation Major Addition	**4**	**3**	**4**	**4**	**4**	**4**	**4**	**3**			
.9	**3** **(4)**	**F** Minor Renovation Major Addition	**5**	**3**	**4**	**5**	**5**	**4**	**5**	**4**			

Summary of Options C, D, and F

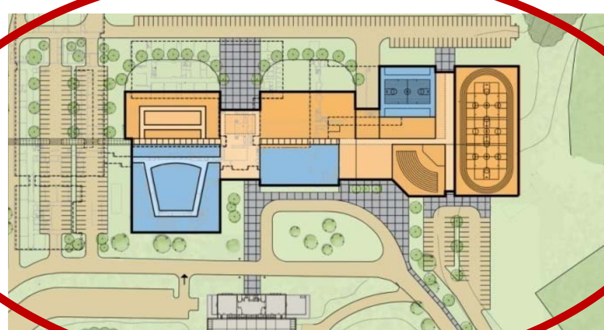
C (.9)
5 Phases
(5+ years)



D (.9)
3 Phases
(4 years)



F (.9)
3 Phases
(4 years)



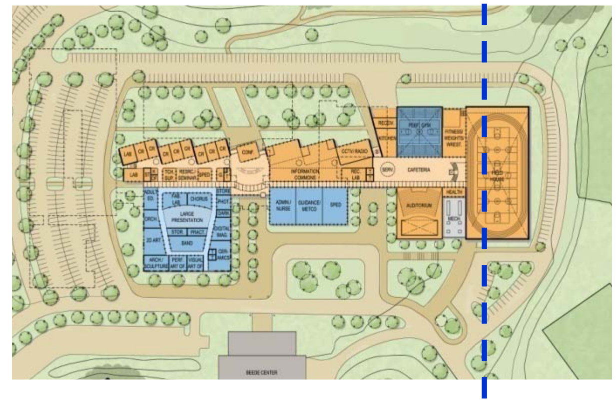
Your Comments

- Optimize value: balance costs of building new and renovating
- Optimize use of the site
- Provide more openness and exposure to the south
- Consider the implications of the sledding hill
- Make sure a three story building feels comfortable on the site
- Improve building orientation and incorporate sustainable design strategies
- Make the facility as resource and energy efficient as possible
- Theater and field house should be anchors
- Reduce the number of construction phases to lessen disruption to the school and minimize cost
- Demonstrate phasing flexibility with or without MSBA participation
- Engage MSBA in partnership

Detailed Options F, F1 and F2

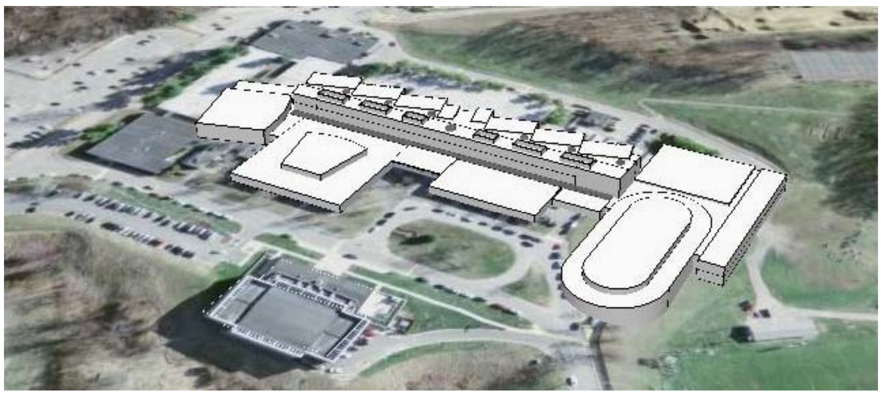
F

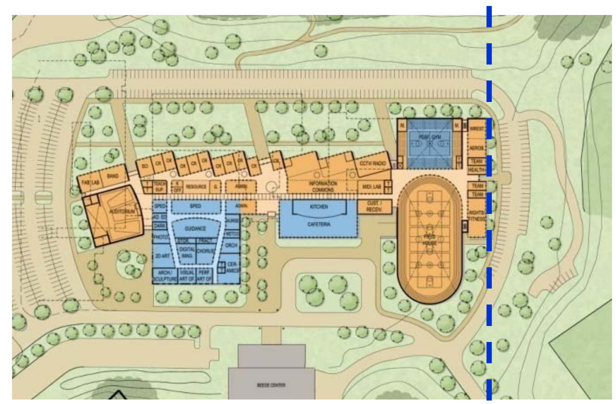
New Auditorium by Athletics



F1

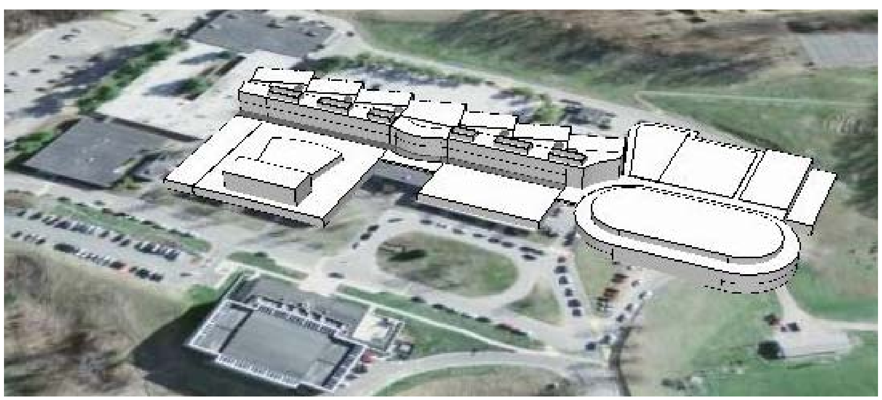
New Auditorium by Building 'A'

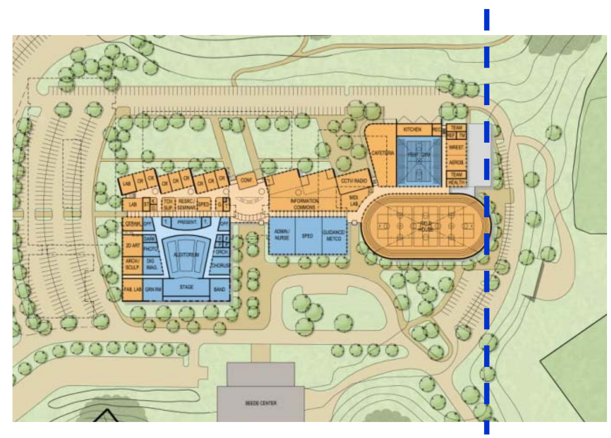




F2

New Auditorium in Building 'A'





Summary of Options F, F1 and F2

F

New Auditorium by Athletics

F1

New Auditorium by Building 'A'

F2

New Auditorium in Building 'A'

Your Comments

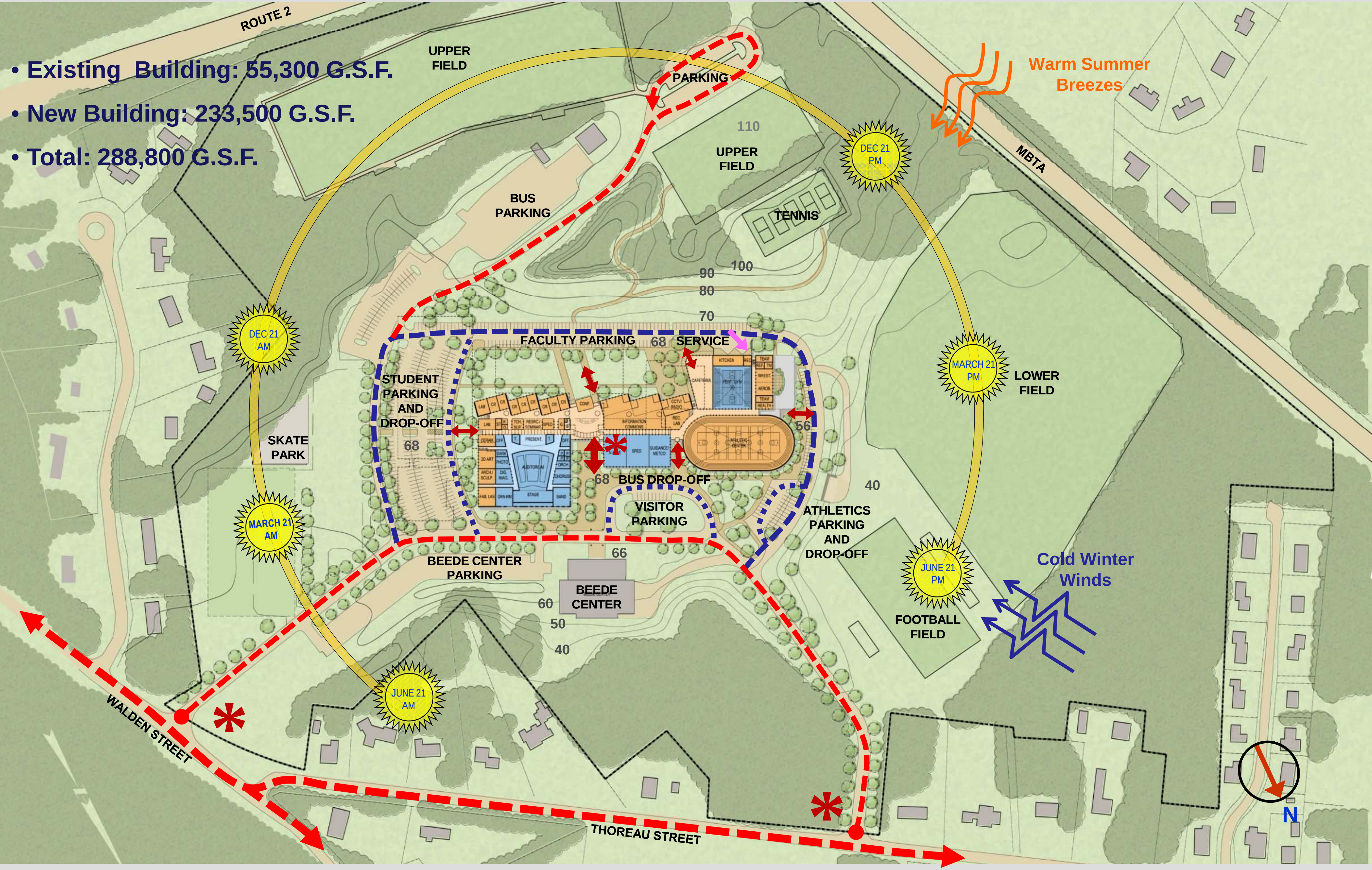
- **Stack STEM on the second and third floor**
- **Presentation space adjacent to auditorium should be open on both sides to serve as a lobby**
- **Conference room for community use**

Master Plan

Master Plan: Site Plan

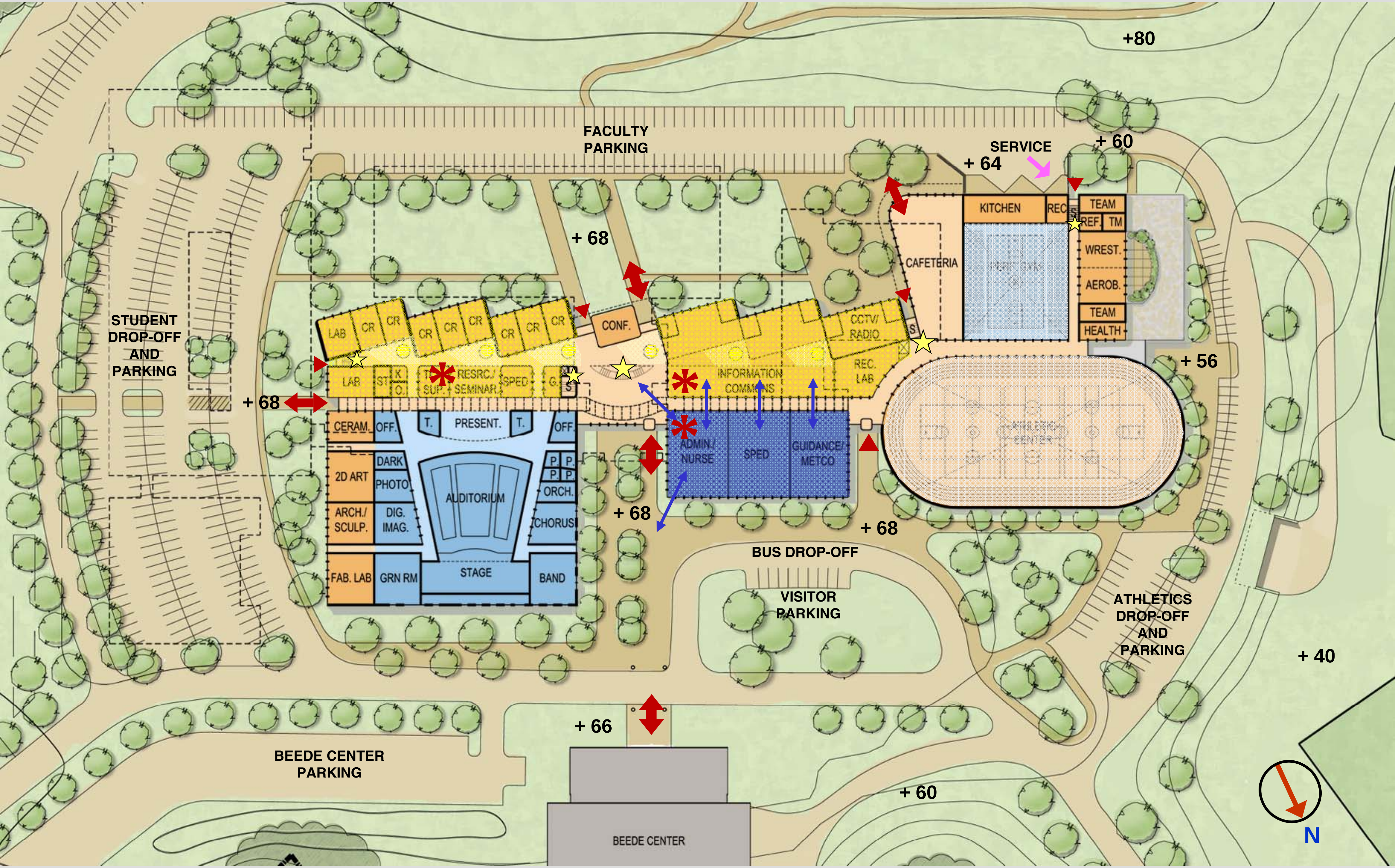
Renovations and Additions

- **Existing Building: 55,300 G.S.F.**
- **New Building: 233,500 G.S.F.**
- **Total: 288,800 G.S.F.**



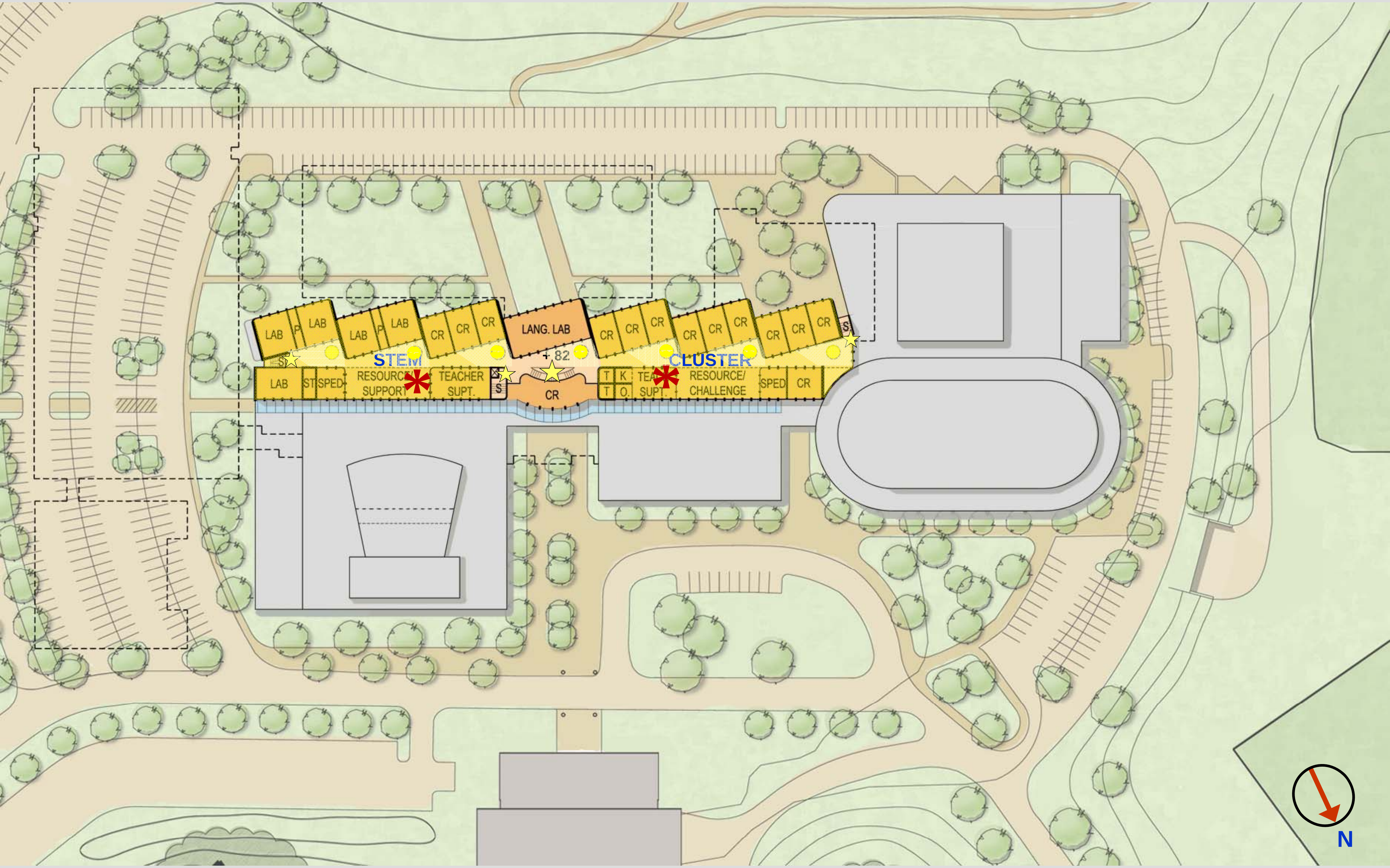
Master Plan: Main Level

Renovations and Additions



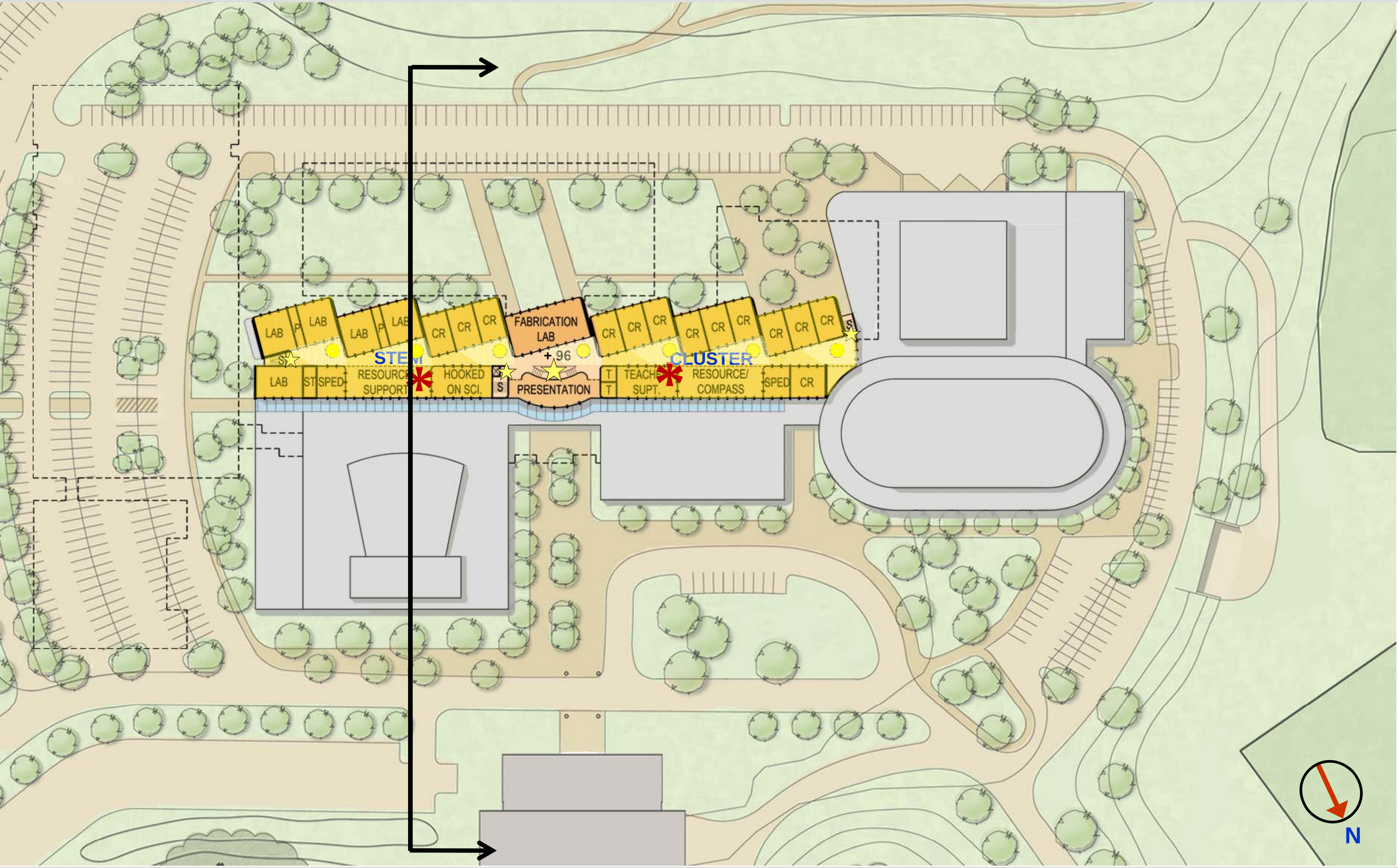
Master Plan: Second Level

Renovations and Additions

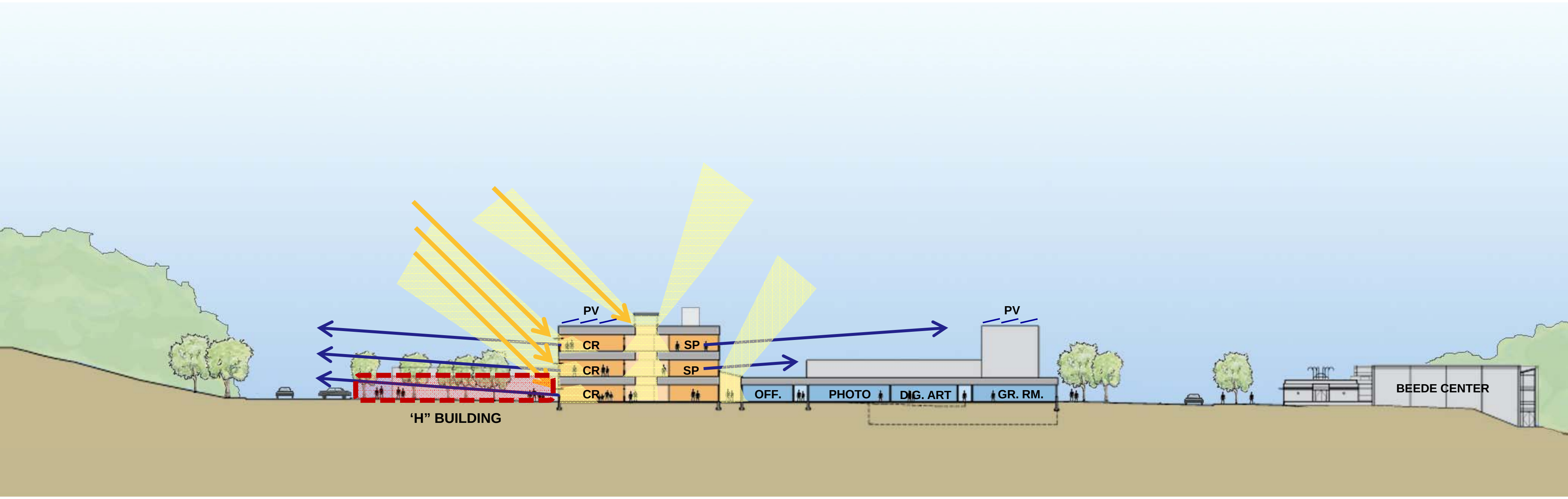


Master Plan: Third Level

Renovations and Additions

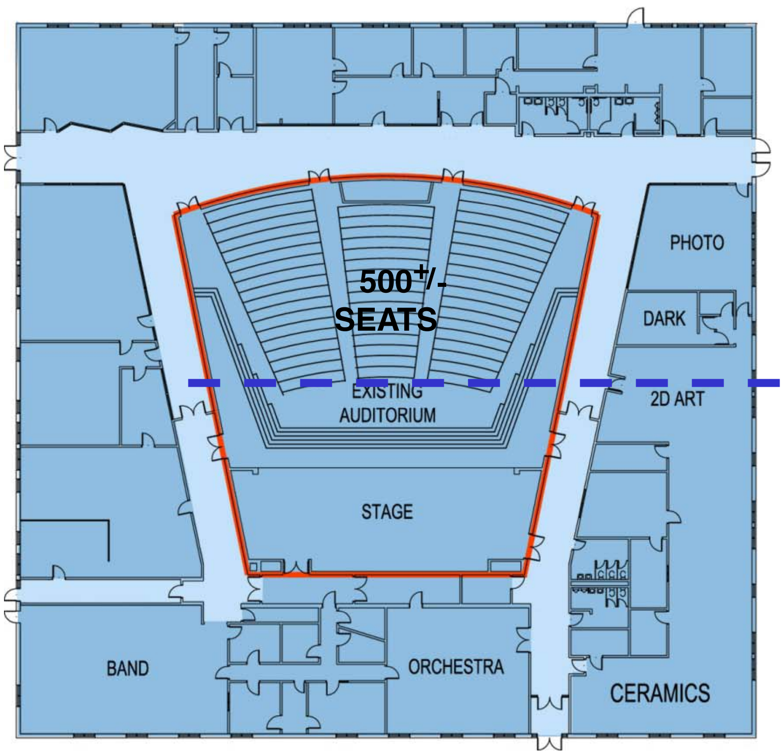


Master Plan: *Section thru 'A' and new Academic Clusters*



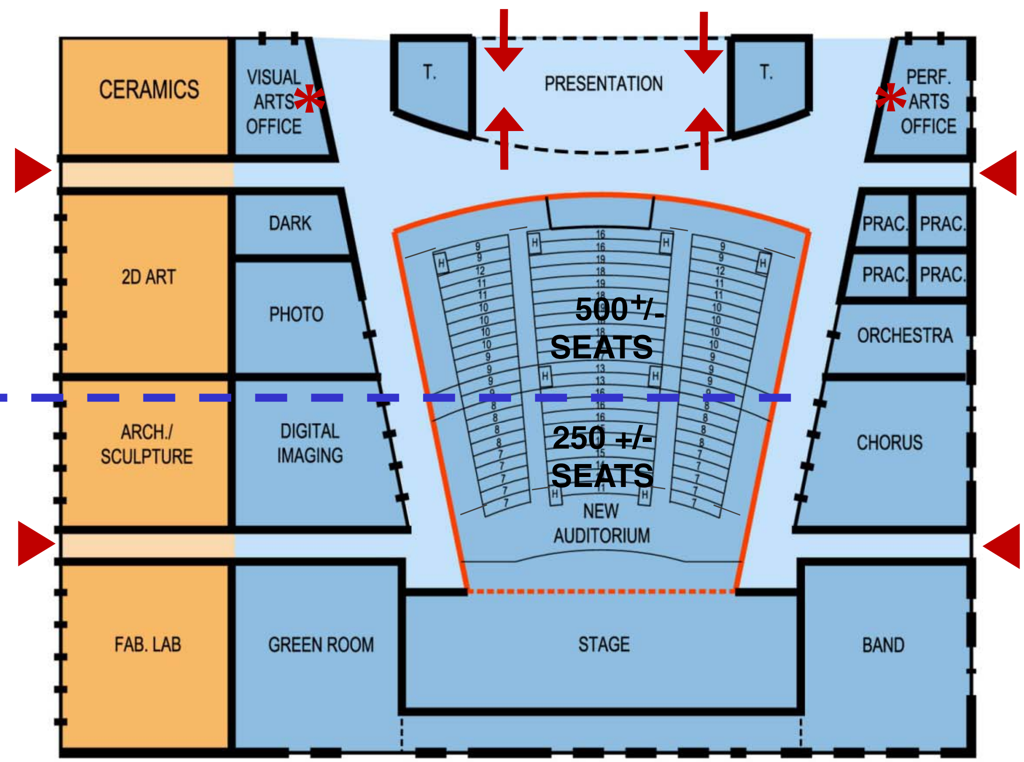
Master Plan: Main Level

Renovations and Additions



EXISTING AUDITORIUM

SEATING = 500 +/-



NEW AUDITORIUM

SEATING = 750

Master Plan: Main Level

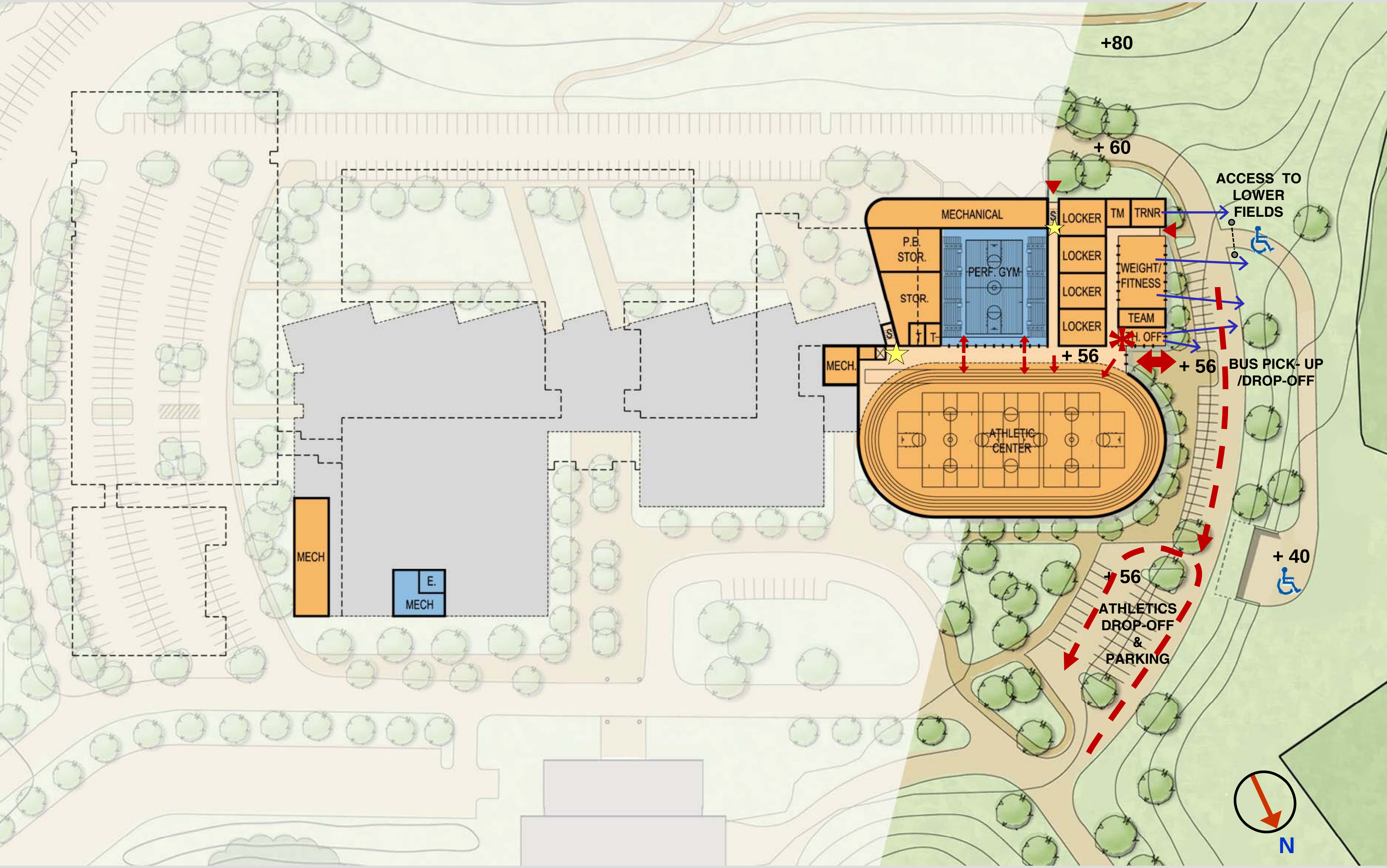
Renovations and Additions

24 March 2010

omr architects

Master Plan: Lower Level

Renovations and Additions



Master Plan: Site Model (North Side)

Renovations and Additions

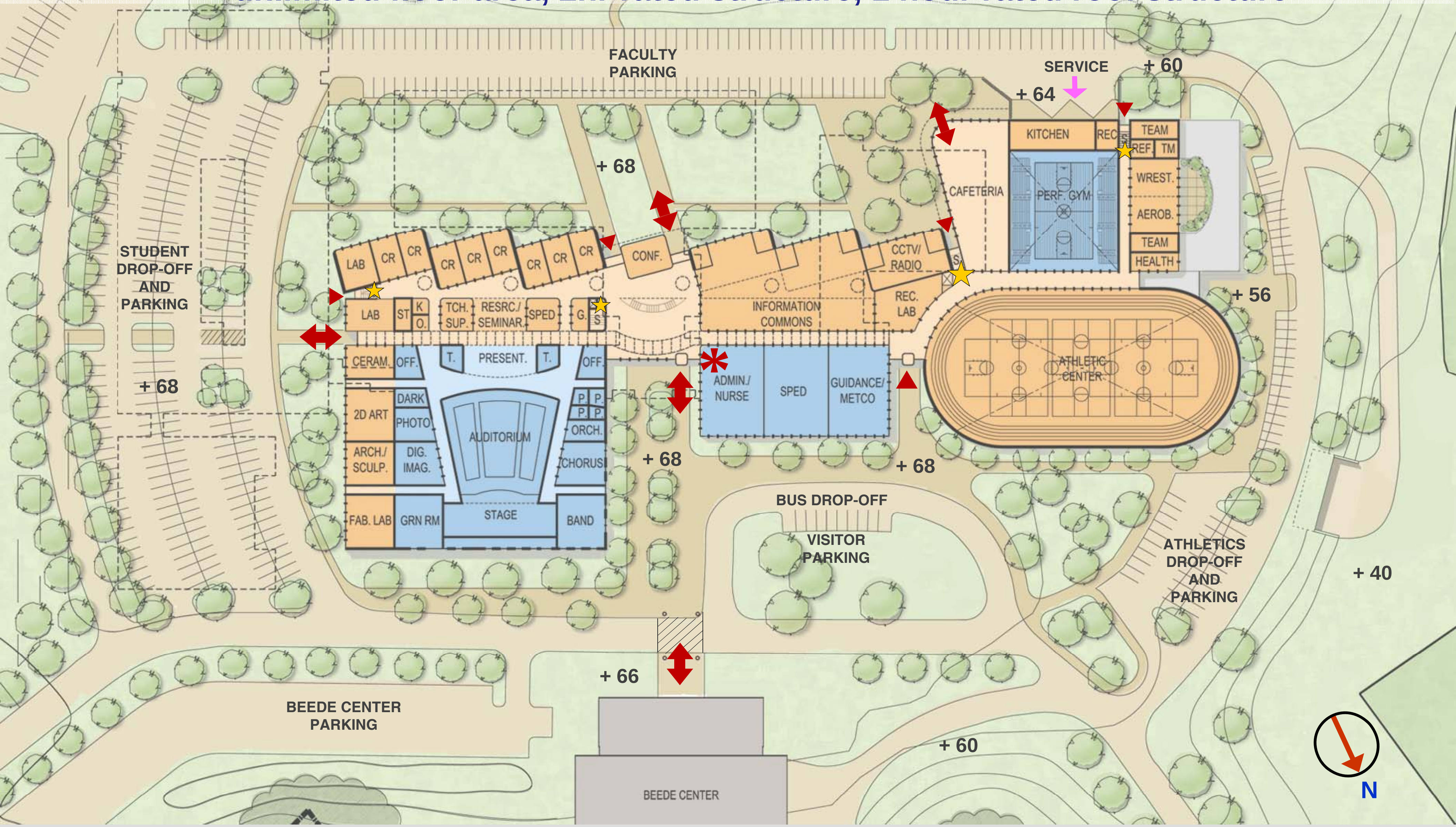
Master Plan: Site Model (South Side)

Renovations and Additions

Master Plan: Code Review

Renovation / Addition

Construction Type IB / mixed use group E, A1, & B, fully sprinklered building, unlimited floor area, 2hr rated structure, 1 hour rated roof structure



Sustainability

Green Building Features

- **Sustainable Site Features**

  Maximize open space
  Minimize the building footprint
  Preserve existing trees

  Maximize the building's southern exposure
  Sheltering from winter winds

- **Pedestrian and Bike Access**
- **Joint Use of Parks -Locating town recreational facilities on school land**
- **Outdoor Classroom with naturally landscaped areas**
- **Walk off mats**
- **Water fountains: fresh drinking water**
- **High efficiency plumbing fixtures**
- **Optimize Energy Performance: Displacement air ventilation, enhanced building envelope system, & solar orientation**
- **Temperature and lighting controls, energy efficient light fixtures, and Energy Star equipment**
- **Linoleum Floors: Made from natural materials (durable, healthy, and easy to clean)**
- **Recycled content and rapidly renewable building materials.**
- **Recycle Demolition Waste (brick, metal, gypsum wall board, asphalt, and ceiling tiles)**
- **Green cleaning**
- **Recycling Areas**
- **Daylighting: Natural light reduces reliance on artificial lighting, minimize energy costs & improves student performance**

MA CHPS (2006)

Massachusetts Collaborative for High Performance Schools (MA-CHPS)

Project Name: Concord Carllisle High School **DRAFT**

M A - C H P S S C O R E C A R D

This matrix includes each point that is available. Please fill in the credits you are applying for with a numerical value for **Total Project Score**. Prerequisites in light blue are required for all major renovation and new construction projects and those in green must be achieved by projects

38 26 3 Total Project Score

Total Possible Points 89

Yes	?	No	Points		SITE — Possible Points 16
11	4	1			
Y			---	SP 1	Joint Use of Facilities
Y			---	SP 2	Joint Use of Parks
1			1	SC 1.1	Sustainable Site Selection
1			1	SC 1.2	No Development on Floodplains
1			1	SC 1.3	No Development Near Wetlands
2			1-2	SC 1.4	No Development on Greenfields
1			1	SC 1.5	Centrally Located Site/Smart Growth
	1		1	SC 1.6	Reduced Building Footprint
1			1	SC 1.7	Sustainable Site and Building Layout
	1		1	SC 2.1	Locate Near Public Transit
1			1	SC 2.2	Pedestrian/Bike Access
		1	1	SC 2.3	Minimize Parking
	1		1	SC 3	Post-Construction Stormwater Management
	1		1	SC 4.1	Design to Reduce Heat Islands, Non-Roof
1			1	SC 4.2	Design to Reduce Heat Islands, Roof
2			2	SC 5	Exterior Light Pollution Reduction

Yes	?	No	Points		WATER — Possible Points 5
4	1	0			
Y			---	WP 1	Indoor Water Use Reduction, 20% Reduction
1			1	WC 1.1	Indoor Water Use Reduction, 30% Reduction
	1		1	WC 1.2	Reduce Water Used for Sewage Conveyance
1			1	WC 2.1	No Permanent Irrigation For Landscaping
1			1	WC 2.2	Water Reduction and Sports Turf Management
1			1	WC 2.3	Irrigation System Commissioning

Yes	?	No	Points		ENERGY — Possible Points 25
5	6	1			
Y			---	EP 1	Elimination of CFC-based Refrigerants
Y			---	EP 2	Commissioning
Y			---	EP 3	Fundamental Building Systems, Training
		N/A	---	EP 4	Exceed Energy Code by 20%, Prescriptive Approach
Y			---	EP 4	Exceed Energy Code by 20%, Performance Approach
		N/A	1-2	EC 1	Superior Energy Performance, Prescriptive Approach
4	2		1-10	EC 1	Superior Energy Performance, Performance Approach
	2		2	EC 2	Minimize Air Conditioning
	2		2-11	EC 3	Renewable Energy
1			1	EC 4.1	Energy Management Systems
		1	1	EC 4.2	Submetering

Yes	?	No	Points		MATERIALS — Possible Points 13
3	2	1			
Y			---	MP 1	Storage & Collection of Recyclables
Y			---	MP 2	Site Waste Management, 75% Diversion
1			1	MC 1	Site Waste Management, 90% Diversion
		1	1-4	MC 2.1	Building Reuse, Maintain 50-95% of Existing Shell
	1		1	MC 2.2	Building Reuse, Maintain 50% Interior
2	1		1-7	MC 3	Combined Materials Attributes

Yes	?	No	Points		IEQ — Possible Points 22
11	9	0			
Y			---	IEQP 1	ASHRAE Standard 62.1-2004 Compliance
Y			---	IEQP 2	SMACNA IAQ Guidelines
Y			---	IEQP 3	Construction IAQ, Duct Protection
Y			---	IEQP 4	Pollutant Source Control, Off-gassing
Y			---	IEQP 5	Walk-Off Mats
Y			---	IEQP 6	Drainage
Y			---	IEQP 7	Irrigation Design
Y			---	IEQP 8	Mold Protection
Y			---	IEQP 9	Electric Ignitions, Gas-Fired Equipment
Y			---	IEQP 10	Air Intake Location
Y			---	IEQP 11	Duct Liners
Y			---	IEQP 12	Prohibit Fossil Fuel Burning Equipment, Indoors
Y			---	IEQP 13	Filter Requirements for HVAC Equipment
Y			---	IEQP 14	ASHRAE Standard 55-2004 Compliance
Y			---	IEQP 15	Access to Views, 70%
	2		2	IEQC 1.1	Access to Views, 90%
2	2		1-4	IEQC 1.2	Daylighting in Classrooms
2	2		1-4	IEQC 2.1	Low-Emitting Materials
1			1	IEQC 2.2	Pollutant Source Control, Ducted HVAC Returns
1			1	IEQC 2.3	Pollutant Source Control, High Efficiency Filters
1			1	IEQC 2.4	Construction IAQ, HEPA Vacuuming
	1		2	IEQC 2.5	Construction IAQ, Building Flushout
1			1	IEQC 3.1	Acoustical Performance in Classrooms, Max 40 NC
1			1	IEQC 3.2	Acoustical Performance in Classrooms, Max 35 NC
	1		2	IEQC 3.3	Acoustical Performance in Classrooms, Max 30 NC
	1		1	IEQC 3.4	Reducing Sound Transmission
1			1	IEQC 4.1	Controllability of Systems, Operable Windows
1			1	IEQC 4.2	Controllability of Systems, Temperature/Light Control

Yes	?	No	Points		POLICY & OPERATIONS — Possible Points 8
4	4	0			
Y			---	P&OP 1	Maintenance Plan
Y			---	P&OP 2	Anti-Idling Measures
1			1	P&OC 1	Maintenance Plan, CMMS
	1		1	P&OC 2	Indoor Environmental Management Plan
1			1	P&OC 3	Energy Star Equipment Performance
	1		1	P&OC 4.1	Clean Energy, 50%
	1		1	P&OC 4.2	Clean Energy, 100%
2	1		1-3	P&OC 5	Innovation

Requirement for all schools
Requirement for green schools only

Point Thresholds - MSBA
30 points - 1.5% Financing of Maximum Allowable Cost
34 points - 2.0% Financing of Maximum Allowable Cost

LEED for Schools

DRAFT

LEED 2009 for Schools New Construction and Major Renovations
Project Scorecard

Project Name: New Science and Technology Center
Project Address: Promfret School, Pomfret, CT

Yes	?	No			Points
11	**12**	**1**	**SUSTAINABLE SITES**		**24 Points**
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
Y			Prereq 2	**Environmental Site Assessment**	Required
1			Credit 1	**Site Selection**	1
	4		Credit 2	**Development Density and Community Connectivity**	4
		1	Credit 3	**Brownfield Redevelopment**	1
	4		Credit 4.1	**Alternative Transportation** - Public Transportation Access	4
1			Credit 4.2	**Alternative Transportation** - Bicycle Storage and Changing Rooms	1
2			Credit 4.3	**Alternative Transportation** - Low-Emitting and Fuel-Efficient Vehicles	2
	2		Credit 4.4	**Alternative Transportation** - Parking Capacity	2
1			Credit 5.1	**Site Development** - Protect or Restore Habitat	1
1			Credit 5.2	**Site Development** - Maximize Open Space	1
1			Credit 6.1	**Stormwater Design** - Quantity Control	1
	1		Credit 6.2	**Stormwater Design** - Quality Control	1
	1		Credit 7.1	**Heat Island Effect** - Nonroof	1
1			Credit 7.2	**Heat Island Effect** - Roof	1
1			Credit 8	**Light Pollution Reduction**	1
1			Credit 9	**Site Master Plan**	1
1			Credit 10	**Joint Use of Facilities**	1
9	**4**		**WATER EFFICIENCY**		**11 Points**
Y			Prereq 1	**Water Use Reduction**	Required
4			Credit 1	**Water Efficient Landscaping**	2 to 4
				50% Reduction	2
				No Potable Water Use or Irrigation	4
2			Credit 2	**Innovative Wastewater Technologies**	2
2	4		Credit 3	**Water Use Reduction**	2 to 4
				30% Reduction	2
				35% Reduction	3
				40% Reduction	4
1			Credit 4	**Process Water Use Reduction**	1
5	**13**	**6**	**ENERGY & ATMOSPHERE**		**33 Points**
Y			Prereq 1	**Fundamental Commissioning of Building Energy Systems**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**Fundamental Refrigerant Management**	Required
5	4	6	Credit 1	**Optimize Energy Performance**	1 to 19
				Improve by 12% for New Buildings or 8% for Existing Building Renovations	1
				Improve by 14% for New Buildings or 10% for Existing Building Renovations	2
				Improve by 16% for New Buildings or 12% for Existing Building Renovations	3
				Improve by 18% for New Buildings or 14% for Existing Building Renovations	4
				Improve by 20% for New Buildings or 16% for Existing Building Renovations	5
				Improve by 22% for New Buildings or 18% for Existing Building Renovations	6
				Improve by 24% for New Buildings or 20% for Existing Building Renovations	7
				Improve by 26% for New Buildings or 22% for Existing Building Renovations	8
				Improve by 28% for New Buildings or 24% for Existing Building Renovations	9
				Improve by 30% for New Buildings or 26% for Existing Building Renovations	10
				Improve by 32% for New Buildings or 28% for Existing Building Renovations	11
				Improve by 34% for New Buildings or 30% for Existing Building Renovations	12

LEED 2009 for Schools New Construction and Major Renovations
Project Scorecard

Project Name: New Science and Technology Center
Project Address: Promfret School, Pomfret, CT

Yes	?	No			Points
				Improve by 36% for New Buildings or 32% for Existing Building Renovations	13
				Improve by 38% for New Buildings or 34% for Existing Building Renovations	14
				Improve by 40% for New Buildings or 36% for Existing Building Renovations	15
				Improve by 42% for New Buildings or 38% for Existing Building Renovations	16
				Improve by 44% for New Buildings or 40% for Existing Building Renovations	17
				Improve by 46% for New Buildings or 42% for Existing Building Renovations	18
				Improve by 48%+ for New Buildings or 44%+ for Existing Building Renovations	19
	2		Credit 2	**On-Site Renewable Energy**	1 to 7
				1% Renewable Energy	1
				3% Renewable Energy	2
				5% Renewable Energy	3
				7% Renewable Energy	4
				9% Renewable Energy	5
				11% Renewable Energy	6
				13% Renewable Energy	7
	2		Credit 3	**Enhanced Commissioning**	2
	1		Credit 4	**Enhanced Refrigerant Management**	1
	2		Credit 5	**Measurement and Verification**	2
	2		Credit 6	**Green Power**	2
7	**3**	**3**	**MATERIALS & RESOURCES**		**13 Points**
Y			Prereq 1	**Storage and Collection of Recyclables**	Required
		2	Credit 1.1	**Building Reuse** - Maintain Existing Walls, Floors and Roof	1 to 2
				Reuse 75%	1
				Reuse 95%	2
		1	Credit 1.2	**Building Reuse** - Maintain Interior Non-Structural Elements	1
2			Credit 2	**Construction Waste Management**	1 to 2
				50% Recycled or Salvaged	1
				75% Recycled or Salvaged	2
1	1		Credit 3	**Materials Reuse**	1 to 2
				5% Reuse	1
				10% Reuse	2
2			Credit 4	**Recycled Content**	1 to 2
				10% of Content	1
				20% of Content	2
1	1		Credit 5	**Regional Materials**	1 to 2
				10% of Materials	1
				20% of Materials	2
1			Credit 6	**Rapidly Renewable Materials**	1
	1		Credit 7	**Certified Wood**	1
14	**5**		**INDOOR ENVIROMENTAL QUALITY**		**19 Points**
Y			Prereq 1	**Minimum Indoor Air Quality Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
Y			Prereq 3	**Minimum Acoustical Performance**	Required
1			Credit 1	**Outdoor Air Delivery Monitoring**	1
1			Credit 2	**Increased Ventilation**	1
1			Credit 3.1	**Construction Indoor Air Quality Management Plan** - During Construction	1
1			Credit 3.2	**Construction Indoor Air Quality Management Plan** - Before Occupancy	1
3	1		Credit 4	**Low-Emitting Materials**	Up to 4

LEED 2009 for Schools New Construction and Major Renovations
Project Scorecard

Project Name: New Science and Technology Center
Project Address: Promfret School, Pomfret, CT

Yes	?	No			Points
				4.1 - Adhesives & Sealants	1
				4.2 - Paints & Coatings	1
				4.3 - Flooring Systems	1
				4.4 - Composite Wood & Agrifiber Products	1
				4.5 - Furniture & Furnishings	1
				4.6 - Ceiling & Wall Systems	1
1			Credit 5	**Indoor Chemical and Pollutant Source Control**	1
1			Credit 6.1	**Controllability of Systems** - Lighting	1
1			Credit 6.2	**Controllability of Systems** - Thermal Comfort	1
	1		Credit 7.1	**Thermal Comfort** - Design	1
	1		Credit 7.2	**Thermal Comfort** - Verification	1
1	2		Credit 8.1	**Daylight and Views**	1 to 3
				75% of classrooms	1
				90% of classrooms	2
				75% of other spaces	2 to 3
1			Credit 8.2	**Daylight and Views** - Views	1
1			Credit 9	**Enhanced Acoustical Performance**	1
1			Credit 10	**Mold Prevention**	1
4	**2**		**INNOVATION IN DESIGN**		**6 Points**
2	2		Credit 1	**Innovation in Design**	1 to 4
				Innovation or Exemplary Performance	1
				Innovation or Exemplary Performance	1
				Innovation or Exemplary Performance	1
				Innovation	1
1			Credit 2	**LEED® Accredited Professional**	1
1			Credit 3	**School as a Teaching Tool**	1
2	**2**		**REGIONAL PRIORITY**		**4 Points**
2	2		Credit 1	**Regional Priority**	1 to 4
				Regionally Defined Credit Achieved	1
				Regionally Defined Credit Achieved	1
				Regionally Defined Credit Achieved	1
				Regionally Defined Credit Achieved	1
52	**41**	**10**	**PROJECT TOTALS (Certification Estimates)**		**110 Points**

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

Yes	?	No		Points
52	41	10	PROJECT TOTALS (Certification Estimates)	110 Points

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

LEED Platinum ?

Bioswale

Photovoltaic Array

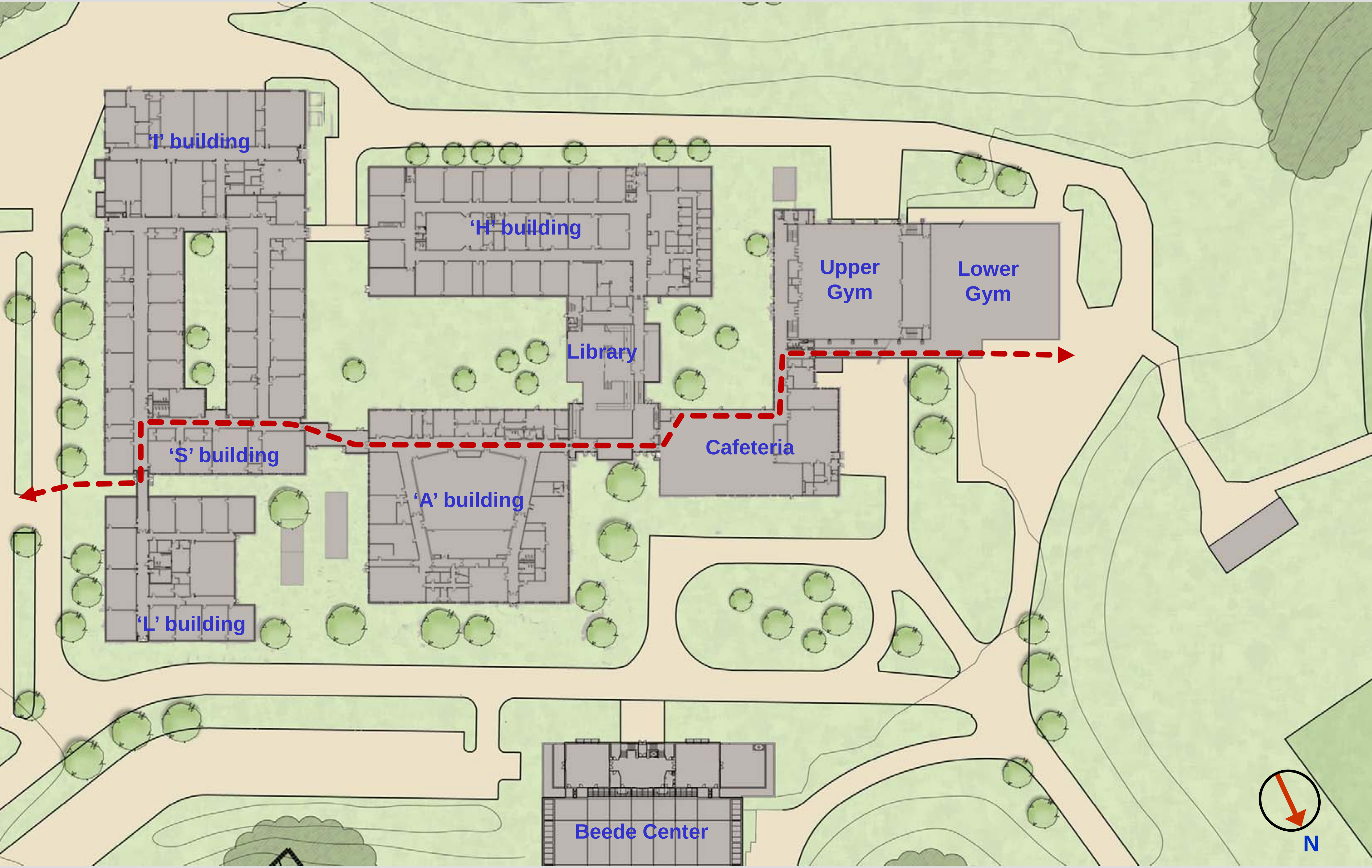
Geothermal

Rain Water Cistern

Phasing

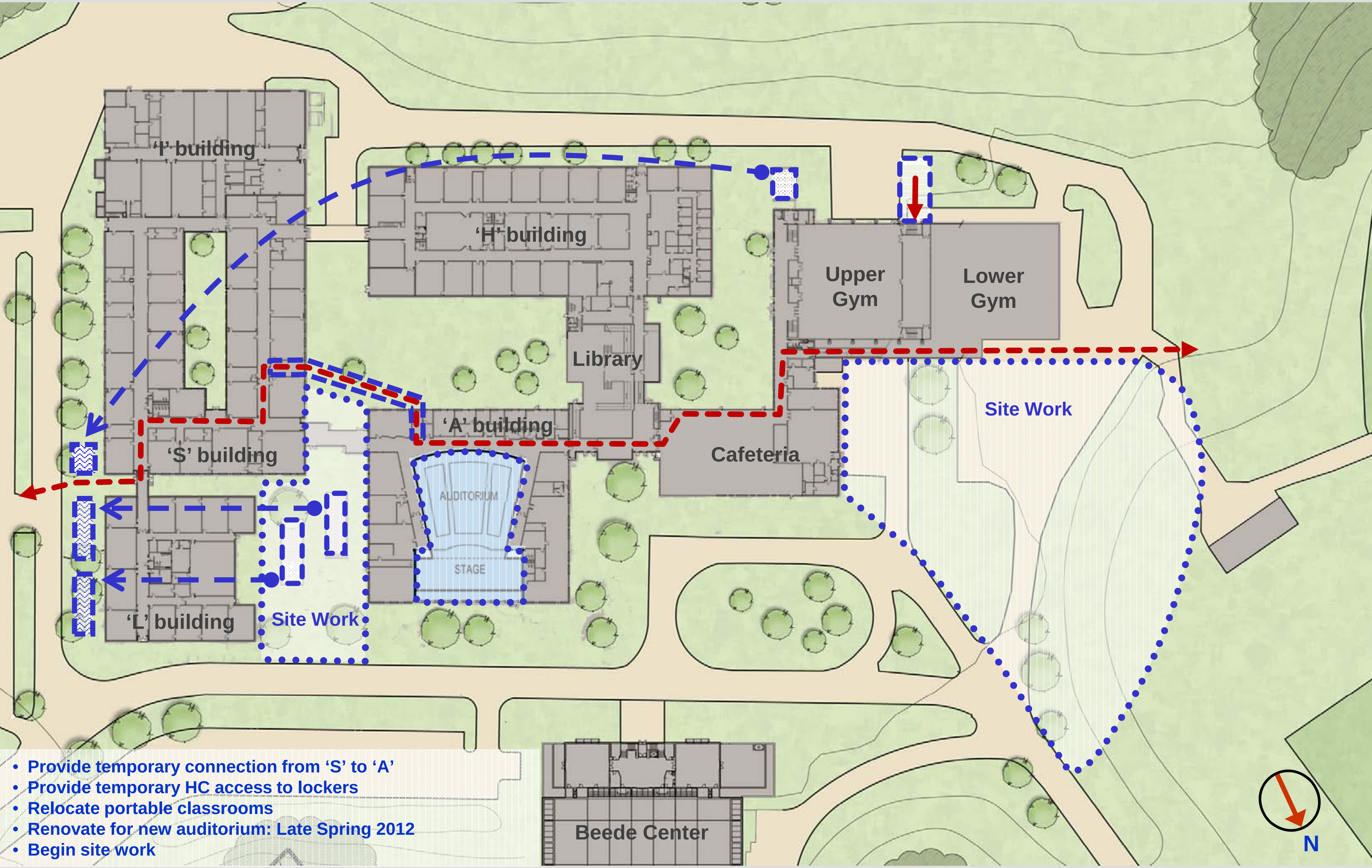
Master Plan: Phasing – Existing School

Renovations and Additions



Master Plan: Phasing – Spring 2012

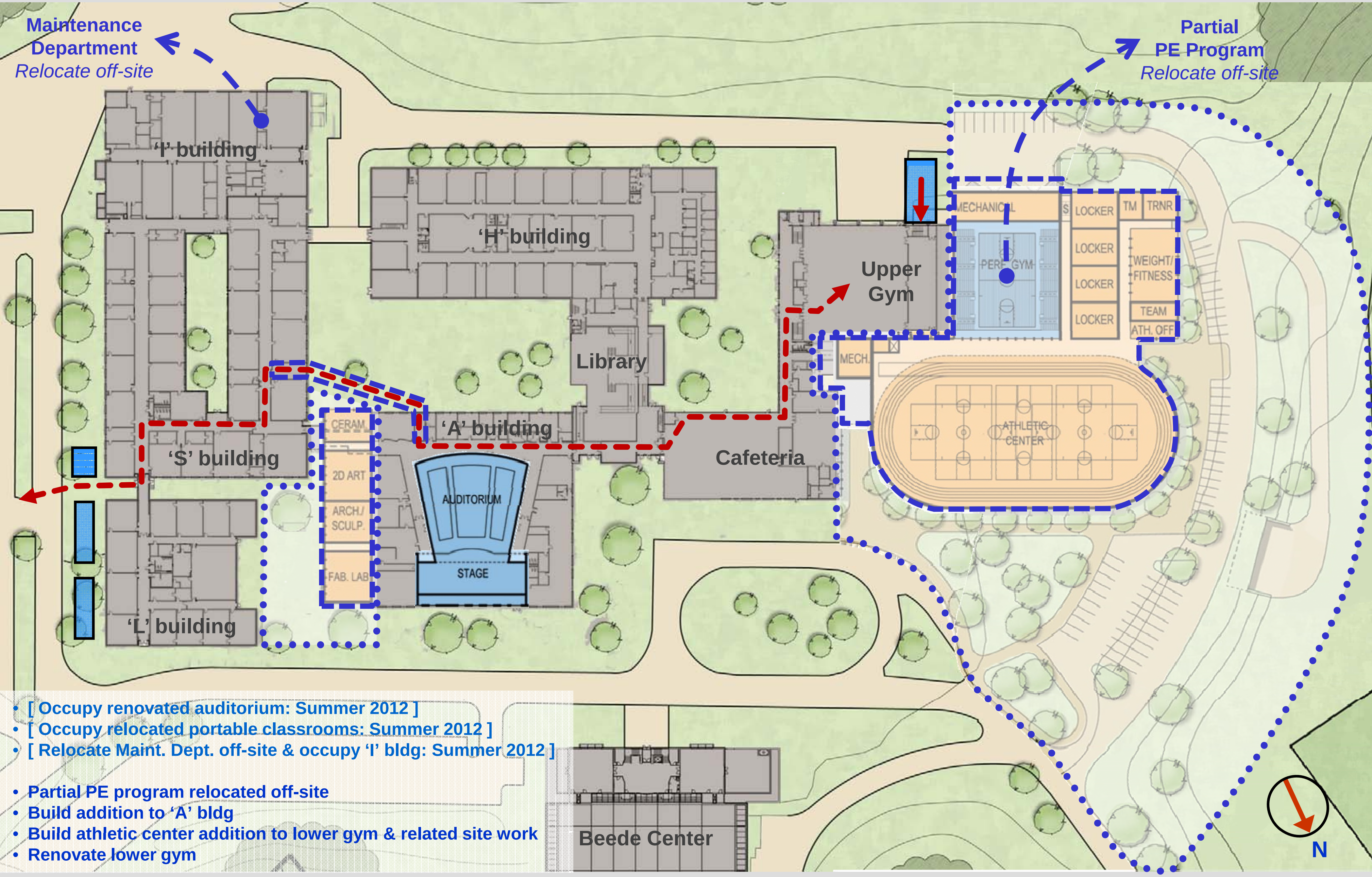
Renovations and Additions



- Provide temporary connection from 'S' to 'A'
- Provide temporary HC access to lockers
- Relocate portable classrooms
- Renovate for new auditorium: Late Spring 2012
- Begin site work

Master Plan: Phasing – September 2012

Renovations and Additions

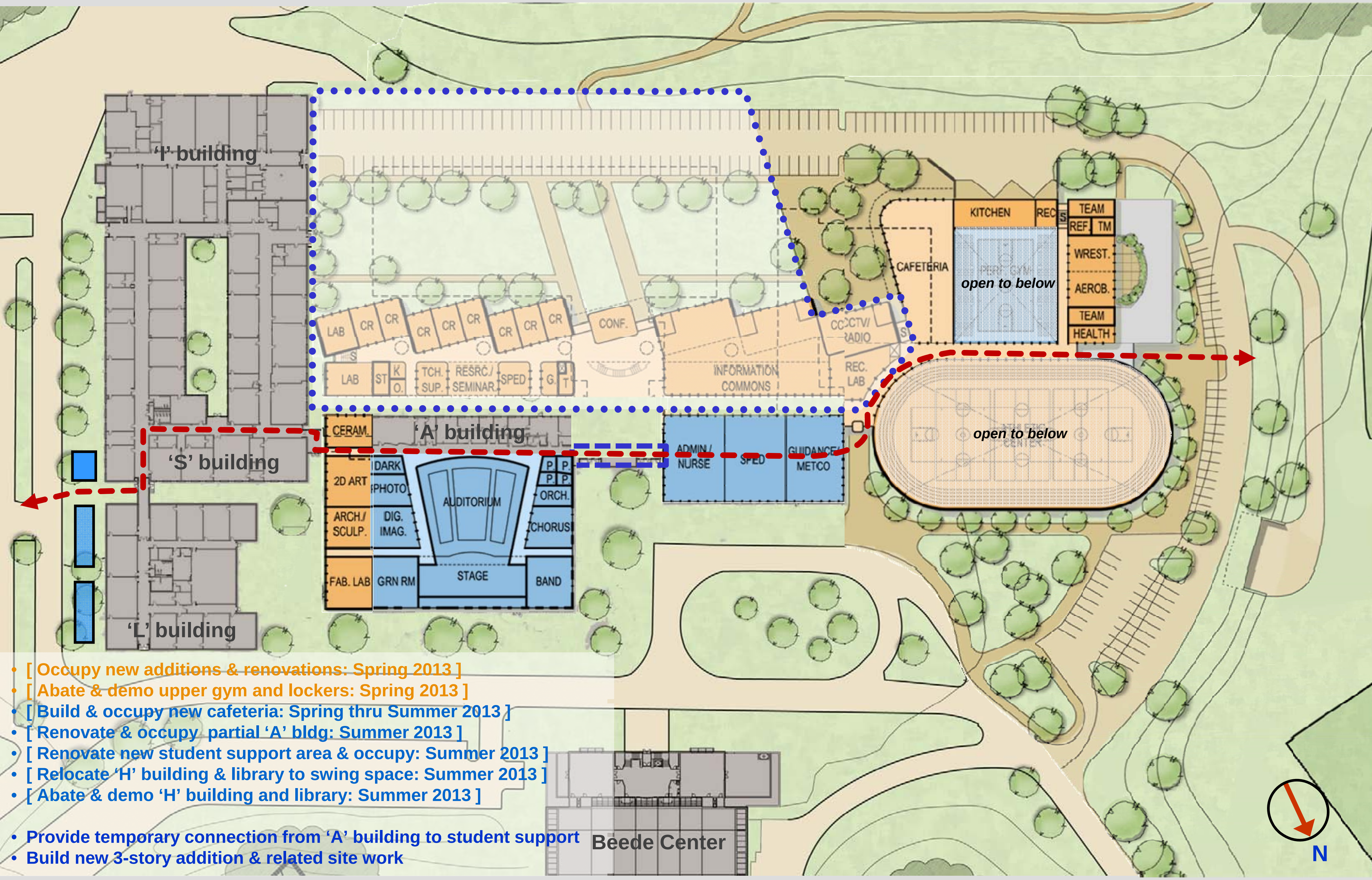


- [Occupy renovated auditorium: Summer 2012]
- [Occupy relocated portable classrooms: Summer 2012]
- [Relocate Maint. Dept. off-site & occupy 'I' bldg: Summer 2012]

- Partial PE program relocated off-site
- Build addition to 'A' bldg
- Build athletic center addition to lower gym & related site work
- Renovate lower gym

Master Plan: Phasing – September 2013

Renovations and Additions

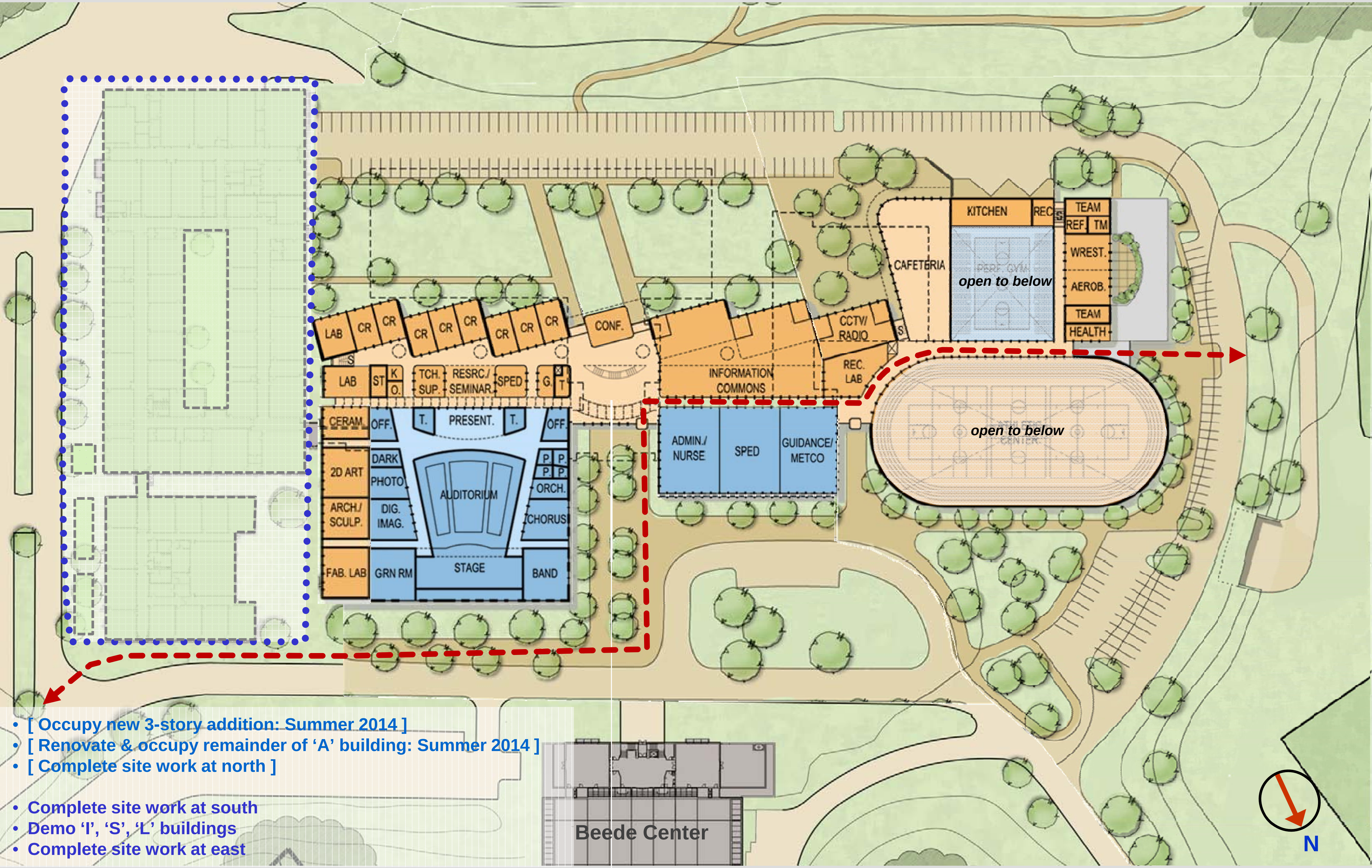


- [Occupy new additions & renovations: Spring 2013]
- [Abate & demo upper gym and lockers: Spring 2013]
- [Build & occupy new cafeteria: Spring thru Summer 2013]
- [Renovate & occupy partial 'A' bldg: Summer 2013]
- [Renovate new student support area & occupy: Summer 2013]
- [Relocate 'H' building & library to swing space: Summer 2013]
- [Abate & demo 'H' building and library: Summer 2013]

- **Provide temporary connection from 'A' building to student support**
- **Build new 3-story addition & related site work**

Master Plan: Phasing – September 2014

Renovations and Additions



- [Occupy new 3-story addition: Summer 2014]
- [Renovate & occupy remainder of 'A' building: Summer 2014]
- [Complete site work at north]

- Complete site work at south
- Demo 'I', 'S', 'L' buildings
- Complete site work at east

Master Plan: Phasing Complete – Fall 2014

Renovations and Additions

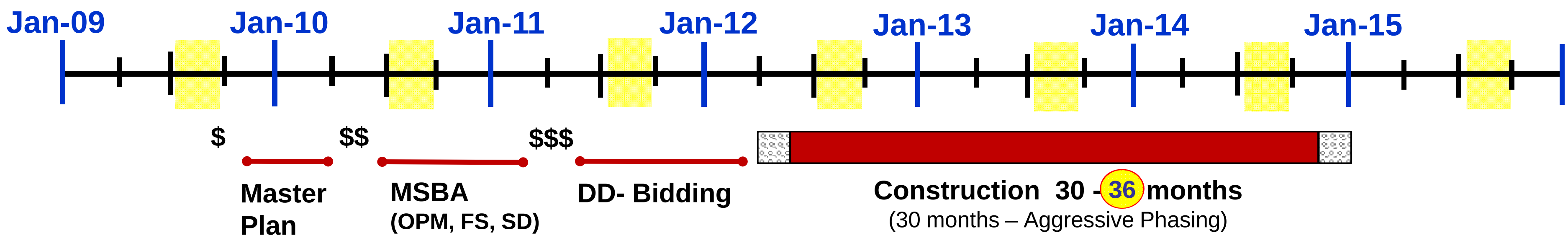
Master Plan: Site Model (North Side)

Renovations and Additions

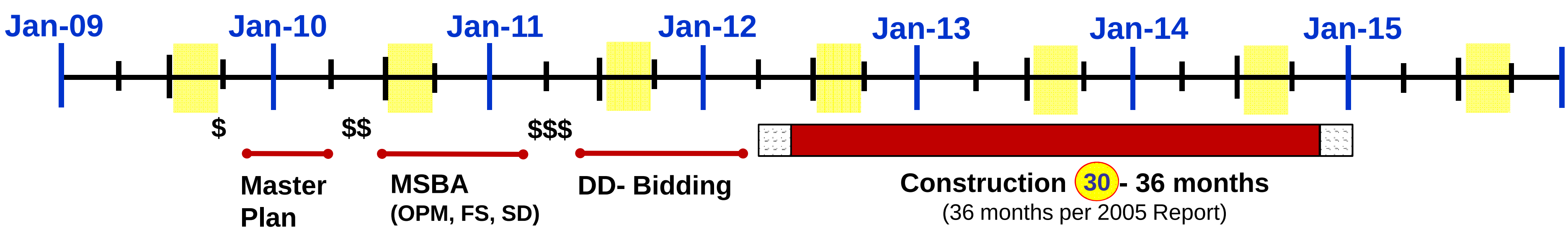
Comparing Master Plan Option & New School

Phasing Timeline

Master Plan: *Renovation and Additions*



New Construction



Budget Comparison

Concord – Carlisle High School, Concord, MA
Conceptual Cost Estimate Summary

	MASTER PLAN OPTION Renovations and Additions		NEW SCHOOL	
Gross Floor Area (sf) =		288.800 sf		288,800 sf
	Element ($)	$/sf	Element ($)	$/sf
Sub Total Building Cost	55,807,098	$193.24	58,728,794	$203.35
Building Sitework	5,342,800	$18.50	5,776,000	$20.00
Sub Total Construction Cost	61,149,898	$211.74	64,504,794	$223.35
Total Construction Cost (Includes: General Conditions, Escalation & Contingencies)	$83M	$288.13	$85M	$295.64
Total Project Cost (Soft cost average = 30%) (Includes: Fees, FF&E, Technology, Owner's Contingency)	$108M		$111M	

* Before MSBA Participation

Note: These costs are based on a 2Q2012 construction start and do not account for fluctuations in the construction market or for latent / unforeseen conditions.

Comparative Construction Cost

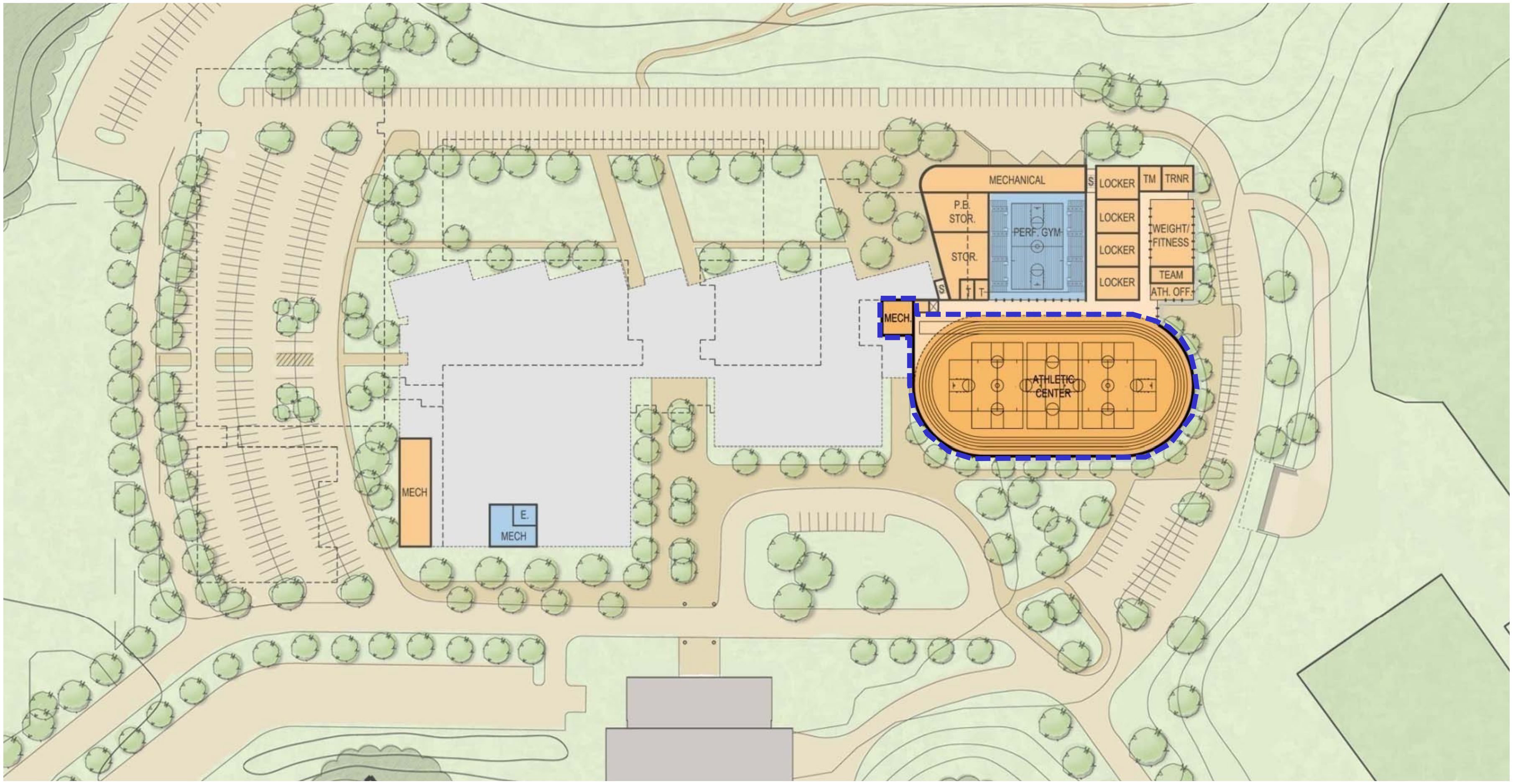
Concord-Carlisle High School - New School	**$295.64/SF**
Concord-Carlisle High School - Renovations & Additions	**$288.13/SF**
Longmeadow High School Longmeadow, MA	**$284.10/SF**
Plymouth North High School (demo not included) Plymouth, MA	**$283.21/SF**
North High School (demo not included) Worcester, MA	**$268.63/SF**

* Escalation to 4th quarter 2013 (D G Jones International, Inc., Cost Estimator)

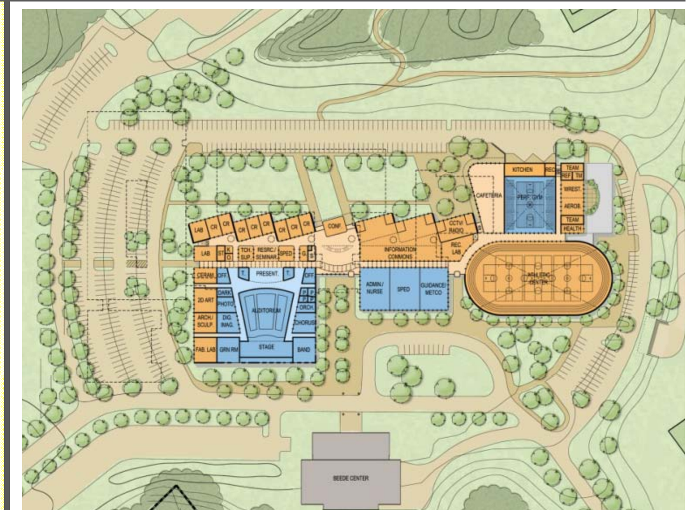
Athletic Center *Total Project Cost*

Athletic Center Only (assume no MSBA reimbursement) **35,800 GSF** ***$13.5M***

Includes :
- New Day-lit Athletic Center
- New MEP Systems w/ Mechanical Room



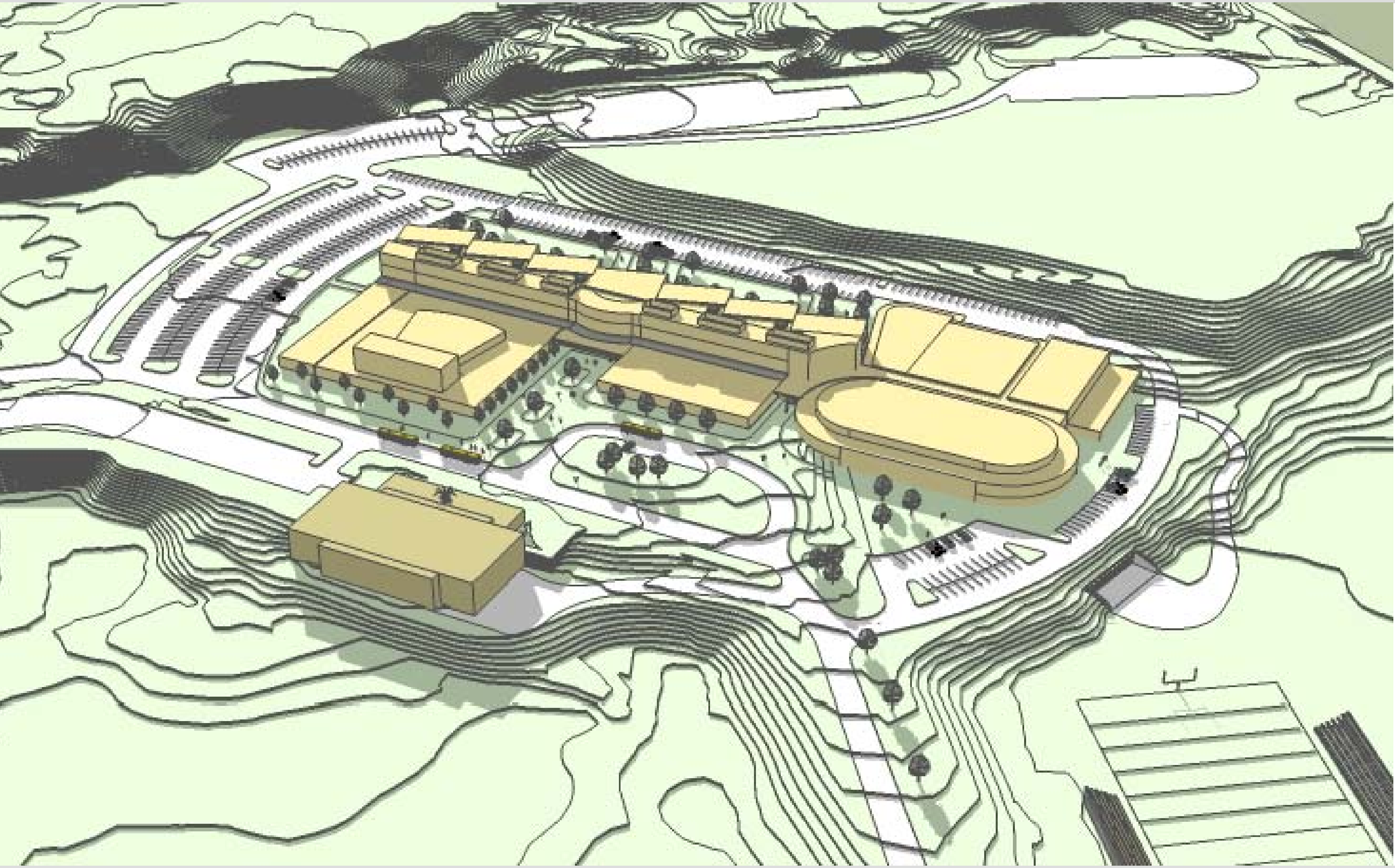
Master Plan Option and New School Comparison

Cost	# of Phases (Years of Const).		Value	Phasing	Program	Integration	Sustainability	Transformation	Operational Cost / Maintenance	Siting	MSBA Funding	"Achievable"	
$108M	**1** **30-36 months**	Master Plan (Renovation/ Addition)	**5**	**3**	**5**	**5**	**5**	**5**	**5+**	**5**	**3**		
$111M	**1** **30-36 months**	New School	**4**	**5**	**5**	**4**	**4**	**4**	**5**	**4**	**1**		?

omr architects

Sun Exposure at Noon

Winter Solstice



- Interim NEASC Reports

NEASC Findings & Recommendations:

1. July 10, 2008 – Letter from NEASC to Peter Badalament
2. June 3, 2008 – Special Progress Report to NEASC from Peter Badalament in response to April 22, 2008 letter from NEASC
3. April 22, 2008 – Letter from NEASC to Peter Badalament
4. Special Progress Report to NEASC from Peter Badalament in response to the November 20, 2007 letter from NEASC
5. November 20, 2007 – Letter from NEASC to Peter Badalament
6. Special Progress Report to NEASC from Peter Badalament in response to July 10, 2007 letter from NEASC
7. July 10, 2007 – Letter from NEASC to Peter Badalament
8. March 19, 2007 Letter from NEASC to Arthur Dulong
9. Special Progress Report to NEASC from Arthur Dulong in response to March 19, 2007 letter from NEASC
10. June 18, 2007 Letter from NEASC to Arthur Dulong

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dswilson@neasc.org

July 10, 2008

Peter A. Badalament
Principal
Concord-Carlisle Regional High School
500 Walden Street
Concord, MA 01742

Dear Mr. Badalament:

The Commission on Public Secondary Schools, at its June 22-23, 2008 meeting, reviewed the Deferred Special Progress Report of Concord-Carlisle Regional High School and continued the school's accreditation, but placed the school on warning for concerns regarding its adherence to the Commission's Standards for Accreditation on Curriculum and Community Resources for learning.

The concerns prompting the warning status, many of which have been identified in previous correspondence, include the following:

Curriculum

- the limited classroom space resulting in a limited number of classrooms available during some periods in the school day
- the number of overcrowded classrooms
- the significant space constraints in the science department as evidenced by the fact that classes are relocated/rotated on a regular basis in order to provide lab time for all courses
- the school's inability to increase the number of physics and chemistry classes due to lack of space

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www.neasc.org

Community Resources for Learning

- the space constraints placed on the delivery of special education programs and services resulting in the inability to offer in-school services and thus necessitating out-of-district placements
- the lack of running water and restrooms in the portable buildings
- the electrical system which remains in need of updating
- the limited number of electrical outlets
- storage constraints throughout the facility
- the ongoing HVAC issues
- the continuing issues with roof leaks
- the steep slope of the ramp leading to the lower gymnasium
- the number of doors (80) within the facility which present serious safety and security concerns

As school officials are aware, it is the Commission's expectation that all recommendations in a member school's decennial evaluation report should be completed or be in the final stages of implementation at the time the Five-Year Progress Report is submitted. In the case of Concord-Carlisle High School the Commission has been monitoring cited facilities and space concerns for four years At this point in time not only has little progress been made resolving these concerns, but there is also no formal plan, including funding sources, nor a timeline to ensure their resolution. Lacking such assurance, the Commission voted to place the school on warning. The school will not be removed from warning until such time as all concerns have been fully resolved.

The Commission wishes to remind school officials that the required Five-Year Progress Report is due March 1, 2009. The report should provide detailed responses to the five (5) recommendations highlighted in the Commission's notification letter dated March 19, 2007. In addition, the report should include responses to the following highlighted recommendations:

- submit firm plans to resolve both on a short-term and long-term basis all identified space and facilities concerns, to include timelines for seeking voter approval of funding
- explain how the two new general education programs scheduled to be implemented in Fall 2008 have fully resolved the school's past inability to provide appropriate services for some out-of-district placements
- confirm that the portable classrooms are connected to the school's public address system and do not isolate teachers, teachers, students, or programs

While the Commission remains concerned about the identified issues, it wished to acknowledge the planned implementation of two general education programs designed specifically to provide increased services to students who need additional academic support in therapeutic environments.

The school's warning status will be reviewed when the Commission considers the Five-Year Progress Report. Consistent with the Commission's follow-up procedures, the Five-Year Progress Report should be signed by the principal and chair of the Follow-Up Committee and sent to the Commission office in duplicate by certified mail, return receipt requested.

Sincerely,

Pamela Gray-Bennett

PGB/mms

cc: Brenda Finn, Superintendent, Concord-Carlisle Regional School District
Michael Fitzgerald, Chairperson, Concord-Carlisle Regional School Committee
Thomas R. Moore, Chair, Commission on Public Secondary Schools

SPECIAL PROGRESS REPORT
to the NEASC
Concord-Carlisle High School
Concord, MA
June 3, 2008

I am writing this Special Report in response to the letter dated April 22, 2008 which requested additional information on the state of our building project.

To date we have no new information from the Massachusetts School Building Authority. As a district we have attended requested meetings and provided all requested data, and are awaiting a response to our request for a meeting with MSBA to discuss the implications of the "Hold" rating as of the writing of this letter. As I noted in my last letter dated March 1, 2008, the MSBA informed the district of its the status following the submission of our Statement of Interest – our project was placed in the "Hold" category. This means that at this time the State is currently not moving forward on providing funds for either a renovation or a new construction project. The Concord-Carlisle Regional School Committee is waiting for the MSBA to provide greater clarity on their funding plans before proceeding with building plans.

As I also noted in my last letter, the School Committee will continue its ongoing partnerships with organizations in the town and with the MSBA. Once the state funding issue has been resolved, the District will work with these groups to start addressing Concord-Carlisle High School's facility needs. Given the fact that we are still waiting to learn more about what the State's intentions are, there are no current improvement plans on the table at this time. If state funding is not forthcoming, the School Committee will have to make plans to address both the short-term and long-range issues.

Currently, there are no plans for major capital improvements for the 2008-09 school year. In order to address most of the concerns listed in your April 22 letter the school would require a major renovation to the existing facility or the construction of a new building. The renovation versus new building decision will be a difficult decision for the School Committee because the cost differential estimated in the July 2005 feasibility study identified a cost premium to new construction of less than 10%. The costly infrastructure remediation required to make the building efficient for the next fifty years is somewhat obscure, and the expansion required to make the building educationally viable will require further analysis by all stakeholders.

If neither of those scenarios comes to pass in the near future, we would undertake as many of these projects as we could as major capital improvements funded by debt exclusions subject to voter approval.

The Commission's concerns are listed below followed by commentary that might prove helpful:

- the limited classroom space resulting in the lack of any classrooms available during some periods of the day
    - Major renovation or new building.
- the number of overcrowded classrooms
    - Our new modular classrooms have taken significant pressure off of our building utilization rate.
- the lack of running water and restrooms in any of the portable buildings

- This is not currently possible. People in the modular offices are able to access both water and restrooms in nearby school facilities. They are typically no farther from facilities than other teachers in the building.

- the significant space constraints in the science department as evidenced by the fact that classes are relocated on a regular basis in order to provide lab time for all courses
  - Major renovation or new building.
- the school's inability to increase the number of physics and chemistry classes due to lack of space
  - We are looking to increase the number of chemistry classes we are offering next year - available lab space will be a factor.
- the special education classrooms that are located in various areas of the school
  - Most of our special education classrooms are located near one another in the H-building. We have done are best to make sure we are in full compliance with state regulations regarding the location of these rooms and to ensure that they are equitable facilities.
- the space constraints placed on the delivery of special education programs and services related to the school's inability to offer in-school services which are currently provided for some students in out-of-district placements
  - We are currently developing two in-school general education programs designed to provide services to students in need of more support and therapeutic environments.
- the electrical system which remains in need of updating
  - Major renovation or new building.
- the limited number of electrical outlets
  - Capital improvement, major renovation or new building.
- the limited storage space throughout the facility
  - Major renovation or new building.
- the ongoing HVAC issues
  - Capital improvement, major renovation or new building.
- the continuing issues with roof leaks
  - The remaining life expectancy of the roof is approximately 3 years. We will need to make a determination as to whether of not we are going to replace the roof at that time based on the plan for renovation or a new building.
- the steep slope of the ramp leading to the lower gymnasium
  - Capital improvement, major renovation or new building.
- the number of doors (80) within the facility which present serious safety and security concerns
  - Major renovation or new building.

As previously outlined in my August 31, 2007 Special Progress Report and as noted in a recent CPSS response letter, the District has put in significant resources to maintain the current facility. We are indeed at a crossroads with regard to whether or not we embark on a major project or attempt to address our issues in another fashion. We appreciate the Commission's recognition of the difficult position we are in at this time.

If the Commission has any questions regarding this report, please feel free to contact me at (978) 341-2490 x. 7110.

Sincerely,

P. Badalament

Peter Badalament
Principal
Concord-Carlisle High School
Concord, MA

Brad McGrath

Brad McGrath
Director of Guidance
NEASC Follow-up Committee Co-chair

Cc Brenda Finn, Superintendent, Concord-Carlisle Regional School District
Jerry Wedge, Chairperson, Concord-Carlisle Regional School Committee

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dswilson@neasc.org

April 22, 2008

Peter A. Badalament
Principal
Concord-Carlisle Regional High School
500 Walden Street
Concord, MA 01742

Dear Mr. Badalament:

The Commission on Public Secondary Schools, at its March 30-31, 2008 meeting, reviewed the Special Progress Report of Concord-Carlisle Regional High School and voted to defer action pending receipt of additional information.

The Commission requests that school officials submit updated information by May 15, 2008 related to the placement by MSBA of the school's Statement of Interest in the "hold" category resulting from the anticipated meeting between the superintendent and school committee. Further, the Commission seeks specific information related to immediate plans, including a timeline, to address identified space, facility and health and safety concerns which have been cited in previous correspondence.

The Commission reiterated its most serious concerns related to the following unresolved issues:

- the limited classroom space resulting in the lack of any classrooms available during some periods during the school day
- the number of overcrowded classrooms
- the lack of running water and restrooms in any of the portable buildings
- the significant space constraints in the science department as evidenced by the fact that classes are relocated on a regular basis in order to provide lab time for all courses
- the school's inability to increase the number of physics and chemistry classes due to lack of space
- the special education classrooms that are located in various areas of the school
- the space constraints placed on the delivery of special education programs and services related to the school's inability to offer in-school services which are currently provided for some students in out-of-district placements
- the electrical system which remains in need of updating
- the limited number of electrical outlets
- the limited storage throughout the facility
- the ongoing HVAC issues

- the continuing issues with roof leaks
- the steep slope pf the ramp leading to the lower gymnasium
- the number of doors (80) within the facility which present serious safety and security concerns

School and system officials and members of the local governing body should understand that the demonstration of ongoing progress in resolving the identified concerns is necessary to maintain the school's accreditation status.

The school's accreditation status will be reviewed when the Commission considers the additional information requested as part of the Special Progress Report. Consistent with the Commission's follow-up procedures, the report should be signed by the principal and chair of the Follow-Up Committee and sent to the Commission office by certified mail, return receipt requested.

Sincerely,

Janet D. Allison

Janet D. Allison

JDA/mms

cc: Brenda Finn, Superintendent, Concord-Carlisle Regional School District
Michael Fitzgerald, Chairperson, Concord-Carlisle Regional School Committee
Thomas Moore, Chair, Commission on Public Secondary Schools

SPECIAL PROGRESS REPORT
to the NEASC
Concord-Carlisle High School
Concord, MA
March 1, 2008

I am writing this Special Report in response to the letter dated November 20, 2007 which requested additional information on the state of our building project.

On behalf of the Concord-Carlisle High School community, I want to thank the Commission for continuing the school's accreditation. While we still face the challenges posed by our facility, it is comforting to know that the work that the District has put into the building over the past few years has improved many of the conditions outlined in the Report of the Visiting Committee. I also want to thank Janet Allison, the Deputy Director, for conducting her thorough Directed-Visit in the September of 2007.

As was already outlined in my August 31, 2007 Special Progress Report and as was noted in recent CPSS response letter, the District has put in significant resources to maintain the current facility. We are indeed at a crossroads with regard to whether or not we embark on a major project or attempt to address our issues in another fashion. We appreciate the Commission's recognition of the difficult position we are in at this time.

The MSBA recently informed the district of its the status following the submission of our Statement of Interest – our project was placed in the "Hold" category. This means that at this time the State is currently not moving forward on providing funds for either a renovation or a new construction project. That said, the Concord-Carlisle Regional School Committee cannot implement a plan until the MSBA provides greater clarity on our funding status. School Committee members and the Superintendent will be meeting with the MSBA in the next few weeks, and it is our hope that they will able to give us a better picture of where we stand.

The School Committee will continue its ongoing partnerships with organizations in the town and with the MSBA. Once the state funding issue has been resolved, the District will work with these groups to start addressing Concord-Carlisle High School's facility needs. Given the fact that we are still waiting to learn more about what the State's intentions are, there are no current improvement plans on the table at this time. If state funding is not forthcoming, the School Committee will have to make plans to address both the short-term and long-range issues.

If the Commission has any questions regarding this report, please feel free to contact me at (978) 341-2490 x. 7110.

Sincerely,

Peter Badalament
Principal
Concord-Carlisle High School
Concord, MA

Brad McGrath
Director of Guidance
NEASC Follow-up Committee Co-chair

Cc Brenda Finn, Superintendent, Concord-Carlisle Regional School District
Michael Fitzgerald, Chairperson, Concord-Carlisle Regional School Committee

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November 20, 2007

Peter A. Badalament
Principal
Concord-Carlisle Regional High School
500 Walden Street
Concord, MA 01742

Dear Mr. Badalament:

The Commission on Public Secondary Schools, at its September 30-October 1, 2007 meeting, reviewed the combined deferred Special Progress Report and Report of a Commission Directed-Visit of Concord-Carlisle Regional High School and continued the school's accreditation.

The Commission was pleased to learn of the allocation of $3.5 million over the past two years from the school system's operating budget to support the resolution of some identified facilities and health and safety concerns including, but not limited to, the following:

- the upgrading of the fire alarm system in all public areas of the facility
- the installation of new energy efficient fluorescent ballasts and lighting in 80% of the facility
- the installation of two portable classrooms and an additional portable for office space
- the installation of a new floor in the cafeteria
- the purchase of all new furniture for the cafeteria
- the refinishing of the gymnasium floor
- the installation of new fume hoods in the science classrooms/labs
- the installation of new lab benches in some science classrooms/labs
- the close working relationship between school and system personnel and the chief of the fire department to ensure safety of all building occupants and the resolution of identified issues

In addition, the Commission acknowledged the school district's submission of the Statement of Interest Form to the Massachusetts School Building Authority seeking funding to address identified facilities and space issues and the school committee's acceptance of the Facility Study Committee's report.

Finally, the Commission commended the quality of instruction observed during the Commission visit, including the extent to which students are engaged as active learners, as well the availability of state-of-the art technology in classrooms and the new language lab to support teaching and learning.

However, following a thorough and thoughtful discussion of the school's report and the report resulting from the directed visit, the Commission expressed its ongoing serious concerns related to facilities and space issues. Included among those concerns were the following:

- the limited classroom space resulting in the lack of any classrooms available during some periods during the school day
- the number of overcrowded classrooms
- the lack of running water and restrooms in any of the portable buildings
- the significant space constraints in the science department as evidenced by the fact that classes are relocated on a regular basis in order to provide lab time for all courses
- the special education classrooms that are located in various areas of the school
- the space constraints placed on the delivery of special education programs and services related to the school's inability to offer in-school services which are currently provided for some students in out-of-district placements
- the electrical system which remains in need of updating
- the limited number of electrical outlets
- the limited storage throughout the facility
- the ongoing HVAC issues
- the continuing issues with roof leaks
- the number of doors (80) within the facility which present serious safety and security concerns

Further, the Commission recognized that Concord-Carlisle Regional High School is at a crossroads given the fact that there is very limited additional facilities work that can be completed in addressing these concerns unless a major renovation/addition project is undertaken at a time when the local governing body's priority is to construct a new high school facility on land that the school system owns.

Accordingly, the Commission requested an additional Special Progress Report by February 1, 2008 which provides detailed responses to the following:

- report the status of the school district's Statement of Interest Form to the MSBA and the ranking determination contained in the state's fiscal report
- report the school committee's decision related to the Facilities Study Committee's recommendation to construct a new high school facility which has been delayed pending receipt of information from the Massachusetts Department of Education
- submit any additional short-range and long-range plans to address/resolve the identified facilities and space issues, if state funding is not forthcoming

The Commission will review the school's accreditation status when it considers the Special Progress Report. Consistent with the Commission's follow-up procedures, the Special Progress Report should be signed by the principal and chair of the Follow-Up Committee and sent to the Commission office in duplicate by certified mail, return receipt requested.

Sincerely,

Janet D. Allison

Janet D. Allison

JDA/mms

cc: Brenda Finn, Superintendent, Concord-Carlisle Regional School District
Michael Fitzgerald, Chairperson, Concord-Carlisle Regional School Committee
Thomas R. Moore, Chair, Commission on Public Secondary Schools

SPECIAL PROGRESS REPORT
to the NEASC
Concord-Carlisle High School
Concord, MA
August 2007

I am writing this Special Report in response to the letter dated July 10, 2007 which requested additional information on the state of our building. That letter asked that the school submit "more specific, detailed information related to facilities and space needs by individual department as well as main service areas to supplement" our May 2007 Facilities Update list. I was also made aware of the fact that Janet Allison and a member of the Commission will conduct a Directed Visit at Concord-Carlisle High School in September. I have been in contact with Mrs. Allison and we have established a date for the visit.

The District has made efforts over the course of the past two years to remediate critical situations associated with our building. The bulk of these building improvements were outlined in the May 2007 letter. This summer several of the updates referenced in that letter have been made, including:

- Upgrading the fire alarm system in all public spaces
- Installing new energy florescent ballasts and lighting in 80% of the building
- Adding two portable classrooms and a portable for office space
- Installing a new floor and replacing outdated furniture in the cafeteria
- Stripping and refinishing the gym floor
- Replacing old and installing new fume hoods in science labs
- Replacing lab benches in several science rooms

In response to your recent letter, each department chair and main service area manager has provided specific information on the current state of the building and how it impacts student learning. These reports break out the issues into five categories: Infrastructure, Technology, Space Needs, Furniture and Miscellaneous. In order to facilitate an orderly overview of these issues, the reports are attached to this letter in chart form (see Appendix A.)

As one reads the department-based reports, there are common items that emerge on several of the lists. There is clearly a need for:

- Additional classroom spaces
- Large group instructional areas (i.e. – kiosks)
- Additional tutorial and resource areas
- Additional science labs
- Reconfigured and expanded student support service areas
- Appropriate teacher work areas
- Improved heating and ventilation system
- Infrastructure to incorporate technology in the classroom (electrical outlets)
- Storage
- Spaces for students to gather informally
- New furniture

Also attached to this letter is the District's Statement of Interest Form that was submitted to the Massachusetts School Building Authority in January, 2007 (see Appendix B.) The information contained in the MSBA report is helpful in that it provides the reader with detail about the school's infrastructure issues and great specificity on the building's systemic shortcomings. Areas of significant concern highlighted in the report include:

- Handicap accessibility
- Major building components (i.e. – roof, windows, ventilation)
- Water system
- Sprinklers
- HVAC
- Electrical and lighting
- Security
- Over utilization of classrooms
- Overcrowding in hallways
- Lack of storage space
- Lack of teacher work space
- Undersized auditorium
- Energy efficiency

In light of these significant issues and as what was reported in the May 2007 letter, the School Committee accepted the report of our local Facility Study Committee. However the School Committee has not accepted the recommendation that a new school be constructed as it awaits the MSBA rankings determination contained in the state fiscal report. When that data is published and when the MSBA provides the District with a response to the Statement of Interest form, all parties involved plan to move forward on this issue.

If the Commission has any questions regarding this report, please feel free to contact me at (978) 341-2490 x. 7110.

Sincerely,

Peter Badalament

Peter Badalament
Principal
Concord-Carlisle High School
Concord, MA

Cc Brenda Finn, Superintendent, Concord-Carlisle Regional School District
Michael Fitzgearld, Chairperson, Concord-Carlisle Regional School Committee

APPENDIX A:
DEPARTMENT AND MAIN SERVICE AREA REPORTS

Administration

Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
Ideally, the administration and guidance suites would be in closer proximity in order to best support students.		Lack of conference room areas – need for at least one additional space		Mailbox system inadequate due to space
		More room for clerical support workers		
		Lack of room for potential expansion of administration		

Art

AREA:	Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
Photography	Limited wet and dry work stations in both classroom and darkroom limits the variety and amount of alternative processes that can be done in classes. The classroom is an adapted home economics room. A door directly from the classroom to the outside is needed to support both basic and advanced exercises outside. Picnic tables in a courtyard outside of classroom would facilitate hands on outside learning of light, optics and group work.	The hardware we have is good, though we need 3-5 computer work stations outfitted with very large hard drive storage and scanners for a variety of student projects to be done at all times…currently no space in room for such stations.	Classroom is too small to accommodate 20+ students, equipment, storage and needed work stations. We need more drawers for storage of student work (approx 80), equipment and materials storage, built in print and film drying racks. Both classroom and darkroom needs to be larger. We need 2 film loading closets, and a separate small darkroom (ventilated) for film development and advanced techniques. All the classrooms are overcrowded as everyone is falling over each other, their work spaces and the projects	All free-standing cabinets and bookcases have been gathered when they were discarded by other departments. All furniture is in poor condition and needs replacement	Black out blinds are needed for both the viewing of slides as well as the exploration of camera obscura principles.
Ceramics/2-D (Rooms A2/3) and I-3 (sculpture and ceramics)	Too hot in fall and spring, often too cold in winter. Students distracted by temp fluctuations, often going to get more layers. There is little fresh air,		Storage space is our big issue. No good space to store projects, especially large or ambitious projects, this severely limits the scope of	All furniture is old and all the cabinets barely work, may makes students feel like no one cares and causes apathy.	Redesign of space would enable for easier cleaning procedures.

	and students get lethargic, although the venting is much better, than it was. This impacts us all with allergens.		projects we would like to offer the students. It is also difficult to store student examples. There is also limited display space in the classrooms, this makes critique and reflection processes limited for students.	The teachers need new office chairs.	
Architecture				Drafting tables are old, jagged, wobbly, rusty and often students get nicked.	

Drama & Theater Arts

	Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
Auditorium	Acoustically inadequate	Will not accommodate "flying" scenery	Inadequate seating for assemblies and school-wide functions	Broken seats cannot be replaced with new ones as company no longer manufactures them	Inadequate floodlight fixtures for stage
	No orchestra pit – loss of seats in space when used	House lighting inadequate – some fixtures not functioning and irreparable	Need for deeper wings on sides of stage		Curtains falling apart; fire curtain may be asbestos
			Inadequate storage space for classroom supplies – this impacts how lessons can be planned as the room is used by multiple groups throughout the day		
			No dressing room space.		
Little Theater	Inadequate storage space for classroom supplies – this impacts how lessons can be planned as the room is used by multiple groups throughout the day		Currently used as classroom several periods a day – unavailable for large group instruction		

English

Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
Rooms do not have enough electrical outlets.		Not enough classrooms to house department in contiguous area. English classes are taught in three different buildings and modular.	Teachers' desks are old. Many have draws that do not open.	Copiers are over-stressed.
		Space lost when building remodeled twenty-odd years ago to computer labs and resource areas. Most recently, special education is using rooms that were traditionally English rooms	Students sit at two-person tables that break frequently.	
		Department work area used to house 11 teachers, but now hosts 16 professionals.		
		Difficult for students and teachers to meet as all classroom space is used almost all of the time and teachers are constantly moving rooms.		

Guidance

Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
Lack of soundproofing in offices can compromise confidentiality		Lack of office space has led to the use of a modular office area. Modular is located on opposite side of building from rest of department.		
HVAC does not exchange air properly, leading to poor air quality for staff and studnets				

Foreign Language

Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
Old heating vents and inadequate AC for language lab- conditions impact focus of students and teachers and longevity of technology	CCHS needs an electric monitor with scrolling information so that announcements can be read by students rather than having notes that interrupt classes	Building is overcrowded during passing time- this can cause students to be late or not have time to go to restroom	More lockers are needed for students since not all are able to store their materials in the building, giving students less time between classes to get needed materials	Too hot in rooms during warm days, impacts student concentration
There is no good place for several classes to get together to hear a common lecture or have a larger group discussion.		The cafeteria is unable to accommodate the size of the school in three lunch shifts, thus impacting scheduling options for students.	Teacher desks and file cabinets are becoming worn thus decreasing the security of Foreign Language Departmental paperwork (exams)	There were animals that nested in the ceiling in the L Building causing distractions during class.
There is no good place for classes to go where they can prepare food together in a clean, safe environment				Some locks on doors to classrooms in L Building are difficult to use which can result in wasted instructional time
The roof leaks during high rainfall thus causing disruption and unsafe conditions				

Health & Fitness

Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
We get 5 sections of students during 2 blocks and have only 4 teaching spaces for activity.		Fitness Center was created by opening a wall space and using old closet space.		Lack of storage space in the gyms. Equipment stored in hallways and in various locker room storage areas. Difficult to get equipment during day.
The upper gym dividing wall is obsolete which does not allow for creation of 2 teaching stations		A limitation of Fitness Center is that it is maxed out with equipment.		Showers are broken and in need of repair.
Our second health class is at the opposite end of the facility.		Lack of space limits creation of a separate cardiovascular room, which is common with new schools.		
		The Fitness Center is a poor learning environment. Our fitness classes lack a local classroom setting to teach the academics parts of our fitness program.		

Health Office

Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
Lack of private areas for assessment, intervention, or conference. The student is more vulnerable, has greater potential for miscommunication and limits opportunity for open, honest communication and emotional support.	No laptop means double documentation of screenings and assessments done at bedside.	Need private assessment area, private conference area, handicapped rest area and bathroom that would allow transfers with hoyer lift, and chemical exposure shower.	Reupholster beds.	Need individual cabinets by each bed for supplies.
			Desk face is coming off.	Small lockable individual cabinets in handicapped bathroom to store toiletries for Pathways students working on life skills.
			Poor lighting in assessment area.	

Library

Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
Ramps are out of ADA code and hinder movement through the library. Difficult to adequately monitor library, and dangerous in the event of an evacuation or lock-down event.	Re-design wireless coverage to allow for more WiFi access and redistribution of computers throughout space. More access for more students needed.	Redesigned tech floor plan and library seating plan to give students working on computers more room.	Remove old and excess furniture. The removal of clutter makes the space feel bigger and provides a more comfortable environment for students.	Reduce and consolidate signage in the library. Student learning would benefit by streamlining signed communication and avoiding "sign fatigue".
Add specialized tutorial space for small groups, SPED tutors working with students, or small collaborative groups.	Addition of mobile wireless laptop cart (18 laptops) to increase number of students who can have access to web and server, provide computers for small class groups, and encourage collaboration.	Designate spaces within the library for collaborative work, to support students working on group projects.	Purchase new upholstered furniture to replace old, unsightly furniture in casual reading areas. This will create comfortable spaces for study, reading, and group collaboration.	Décor – replace current posters / art with student created work. Students would benefit by seeing the space reflect their achievement, their values, and their aesthetic. Would also provide additional display space for Art students.
Professional Development Library – add technology points to space. Remove excess furniture and out of date collection.	Addition of ActivBoard to library for classes, group demonstrations, display of student work and other uses.	Add tutorial area for technology rich support for students. Databases, research, multimedia support.	Desks and carols are extremely heavy and make it difficult to move furniture for easy flexible student seating.	Paint – library is dingy and depressing. New color will enliven the space and make it more appealing to students as a destination, increasing patron visits and reinforcing life-long learning behavior patterns.
	Digital displays to post special library events, school notices, and community building information.		Many desks have warped/bubbled /cracked laminate. This makes for an uneven workspace for students.	

	Encourages students to view library and library services as integral to community and learning.			
			Insufficient number of chairs for student seating.	

Math

Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
Inadequate informal gathering spaces for students. Students sit in hallway by S-20. This is disruptive to teaching and learning.	Lack of TV monitors throughout the school to inform students of schedules and other important information.	No single place for Math teacher workspace (with room for desks and all files) so collaboration and collegiality is difficult	Need for furniture (desks) conducive to being arranged in small groups for small group instruction.	There is no large testing room for exams and college board test administration.
Can't run printer and microwave at same time or fuses blow. This affects teacher and student productivity – they use the printer as well.		Math Resource Center combined with SPED Math area. Both are over utilized. Space too small for the many needs of students. Need a bigger space so that kids can take makeup tests and get extra help and tutoring all at the same time.	Need for lecture hall for guest speakers and larger classes to meet. The Little Theatre has no chairs with note-taking fold-down writing surfaces.	
Heavy leaking inside the S-A enclosed causeway whenever it rains. This affects students' getting to class on time and dry.		Book room too small to contain all our books over the summer. It makes access difficult and organization for fall startup inefficient		
Separate defined kitchen and eating space in department for cleanliness and defined lunch blocks.		More storage for files, books, exams, and supplies (eliminating the Chair's office as a storage room and passageway to the Book Room).		
		No private area for personal phone calls and calls to parents.		

		Conference Room for the department for meetings of pedagogy and curriculum development.		
		Individual desks in larger workspace for teachers and personal and paper storage space with more windows (natural light). This increases productivity and morale when working in a well-lit place.		
		Adequate Secretary's workspace to receive students and parents.		

Science

Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
No fully equipped biology labs, which means that biology teachers are not able to perform all of the labs they would like to.		Not enough lab classrooms for chemistry. With only 2 chemistry labs for 16 sections of chemistry students only get one day a week in a lab environment. This lab day is scheduled which means that labs are frequently performed before or after they would optimally make sense.	Outdated.	

Social Studies

Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
	Not enough electrical outlets for Activeboards.	Teachers from Department spread around building.	A half dozen teacher desks need replacement in the office area as well as seven desks in classrooms.	
	Some electrical outlets were taken out and never replaced, so we are forced to use long extension cords.	Out of classroom space. Using modular classroom next year.	The built in bookshelf/filing cabinets need replacing. They are almost 50 years old and are showing their age.	

Special Education

Infrastructure	Technology	Space Needs	Furniture	Miscellaneous
Sped/Handicapped Bathroom: current bathroom is not big enough for lift to transfer student. Student currently toileted in H-1 which has privacy issues.		Lack of office space for professional staff (parent conferences, phone calls, student crisis)		
		Lack of private space can delay time sensitive IEP/504 testing deadlines and impacts the ability to offer optimum testing conditions for MCAS accommodations		
		Lack of sufficient conference space can impact timelines for required meetings and limit time within the meeting and effect meeting climate		
		Lack of classroom space because of increased SPED enrollment for 2007-08. 4 sections of SPED classes will be taught outside of area in non-classroom space.		

APPENDIX B:
CONCORD-CARLISLE HIGH SCHOOL'S MASSACHUSETTS SCHOOL BUILDING AUTHORITY STATEMENT OF INTEREST FORM

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NEW ENGLAND ASSOCIATION OF SCHOOLS & COLLEGES, INC.
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July 10, 2007

Peter A. Badalament
Principal
Concord-Carlisle Regional High School
500 Walden Street
Concord, MA 01742

Dear Mr. Badalament:

The Commission on Public Secondary Schools, at its June 24-25, 2007 meeting, reviewed the Special Progress Report of Concord-Carlisle Regional High School and voted to defer action pending a Commission Directed Visit and receipt of additional information by August 30, 2007.

The Commission requests that school officials submit more specific, detailed information related to facilities and space needs by individual departments as well all main services areas to supplement the Facilities Update list submitted in the Special Progress Report. Following receipt of the information that has been requested Janet Allison, Deputy Director, and a member of the Commission will conduct a Directed Visit to learn first-hand of all facilities and space concerns and any impact they have on teaching and learning. Mrs. Allison will contact you shortly to establish a date for the visit which will be scheduled in early September 2007 prior to the Commission's upcoming September 30-October 1, 2007 meeting.

The school's accreditation will be reviewed when the Commission considers the findings of the Directed Visit and the additional information requested as part of the deferred Special Progress Report. Consistent with the Commission's follow-up procedures, the report should be signed by the principal and chair of the Follow-Up Committee and sent to the Commission office by certified mail, return receipt requested.

Sincerely,

Pamela Gray-Bennett

PGB/mv

cc: Brenda Finn, Superintendent, Concord-Carlisle Regional School District
Patrick Sinnott, Chairperson, Concord-Carlisle Regional School Committee
Thomas Moore, Chair, Commission on Public Secondary Schools

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March 19, 2007

Arthur DuLong
Principal
Concord-Carlisle Regional High School
500 Walden Street
Concord, MA 01742

Dear Mr. DuLong:

The Commission on Public Secondary Schools, at its January 21-22, 2007 meeting, reviewed the Two-Year Progress Report of Concord-Carlisle Regional High School and continued the school's accreditation.

While the report featured many positive aspects of the school, the Commission was particularly pleased to learn of the following:

- the ongoing revision to the narrative portion of the school's mission and expectations
- the increased communication between the superintendents in Concord and Carlisle related to curriculum coordination and student transition between levels
- the progress made by the teaching faculty in the use of the school-wide rubrics
- the professional development programs focused on differentiated instruction, the use of assessment results, and the examination of student work
- the concerted efforts to close the achievement gap as evidenced by the establishment of academic resource centers staffed by certified professional staff in all major subject areas to support student learning needs, including an after school program
- the addition of several new co-curricular activities
- the addition of several new courses to provide increased educational opportunities for non-college bound students
- the school committee's submission of a plan to both communities detailing the need for the construction of a new high school facility
- the completion of a complete ADA review of the facility
- the use of grant monies to purchase new technology to support science lab experiments

- the allocation of funding to hire additional 0.25 F.T.E. positions in the chorus, drama, and art departments
- the additional course offerings in aquatics, AP Physics and project-based physics
- the installation of a new state-of-the-art foreign language lab
- the replacement of bleachers both inside and outside of the building
- the increased technology throughout the school to support classroom learning activities
- the numerous awards and recognitions of student accomplishments and achievements in a wide range of activities
- the monies raised by the student body to support charitable causes in the country and in other areas of the world

In its notification letter dated April 11, 2005 the Commission identified a number of facilities, space, and health and safety concerns based on the school's 2004 decennial evaluation report. Following the review of the school's recent Two-Year Progress Report, the Commission acknowledged the resolution of several of those concerns. However, the school has reported that a number of those concerns will not be resolved until a new high school facility is constructed. Accordingly, the Commission requested that school officials submit an additional Special Progress Report by June 1, 2007 providing detailed information on action taken to address the following highlighted recommendations:

- report the results of plans to seek town meeting approval of funding for the development of a design for a new high school facility
- report by individual department and all main service areas all unresolved facilities and/or space issues

The Special Progress Report should also include responses to the following:

- submit a sample of the common curriculum template
- submit the school's revised mission statement

All accredited schools are required to submit a Five-Year Progress Report, which in the case of Concord-Carlisle Regional High School is due March 1, 2009. The report should provide detailed responses to the highlighted recommendations listed below:

- cite ways in which assessment results, including data gathered from the school-wide rubrics have been used in the review and/or revision of the mission and expectations
- report the addition of any new interdisciplinary course offerings
- describe the school's formal plan to provide an adult member of the school community who serves to personalize each student's educational experience, knows the student well, and assists the student in achieving the school-wide expectations for student learning
- describe the school's process to assess school-wide and individual student achievement of the academic expectations in the mission
- submit a sample report provided to an individual student documenting achievement of each of the academic expectations in the mission based on assessment using school-wide rubrics

School officials are reminded that all valid recommendations in the evaluation report should have been completed or be in the final stages of implementation when the school submits its Five-Year Progress Report. Inadequate progress to complete valid recommendations could result in a request for additional Progress Reports, a warning, or probationary status for the school. The Commission requests that it be kept apprised of any substantive changes in the school no later than sixty (60) days following their occurrence. For your convenience, we have enclosed a copy of the Substantive Change Policy. As well, please notify the Commission office immediately of any changes in the names of the principal and/or superintendent along with their corresponding e-mail addresses by submitting electronically to cpss-air@neasc.org.

The Commission will review the school's accreditation status when it considers the Special Progress Report. Consistent with the Commission's follow-up procedures, the Special Progress Report should be signed by the principal and chair of the Follow-Up Committee and sent to the Commission office in duplicate by certified mail, return receipt requested.

Sincerely,

Janet D. Allison

Janet D. Allison

JDA/mms
Enclosure

cc: Brenda Finn, Superintendent, Concord-Carlisle Regional School District
Patrick Sinnott, Chairperson, Concord-Carlisle Regional School Committee
Thomas R. Moore, Chair, Commission on Public Secondary Schools

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NEW ENGLAND ASSOCIATION OF SCHOOLS & COLLEGES, INC.
COMMISSION ON PUBLIC SECONDARY SCHOOLS

SUBSTANTIVE CHANGE POLICY

Principals of member schools must report to the Commission within sixty (60) days of occurrence any substantive change in the school which has a *negative impact* on the school's ability to meet any of the Commission's Standards for Accreditation. The report of a substantive change must describe the change itself as well as detail the impact on the school's ability to meet the Standards. The following are potential areas where there might be negative substantive changes which must be reported:

- elimination of fine arts, practical arts and student activities
- diminished upkeep and maintenance of facilities
- significantly decreased funding
- cuts in the level of administrative and supervisory staffing
- cuts in the number of teachers and/or guidance counselors
- cuts in the number of support staff
- decreases in student services
- cuts in the educational media staffing
- increases in student enrollment that cannot be accommodated
- takeover by the state
- inordinate user fees
- changes in the student population that warrant program or staffing modification(s) that cannot be accommodated, e.g., the number of special needs students or vocational students or students with limited English proficiency

(8/06)

Special Progress Report
To the NEASC
Concord-Carlisle High School
Concord, MA
May 2007

I am writing this in response to the letter dated March 19, 2007, which requested additional information. In that letter there were four specific requests made. I have separated the four requests and responded to each.

Report the results of plans to seek town meeting approval of funding for the development of a design for a new school facility.

As mentioned in the two-year response to NEASC, the School Committee has gratefully accepted the unanimous recommendation of the Facility Study Committee that a new Concord-Carlisle High School be constructed. The rough estimate of the cost of a new facility included in the recommendations is in the vicinity of $100,000,000. You may not be aware that Concord has recently built and opened two new elementary schools and has a third in the design phase with construction expected to begin soon. In light of that and with respect to the estimated cost, the School Committee has not yet held a specific vote to determine the timetable for requesting design funds and building funds. However, the School Committee has vigorously solicited response from MSBA, in an effort to determine potential state reimbursement of costs for the new building. This past winter the School Committee and Superintendent prepared a lengthy and detailed application to MSBA seeking approval of cost reimbursement. MSBA has established a time-table beginning this July during which they will review proposals and respond to the cities and towns which have submitted proposals. The School Committee has had planning meetings to discuss the various possible responses from MSBA. Their current plan is to immediately and vigorously pursue design funds if there is a positive response from MSBA.

Report by individual department and all main service areas all unresolved facilities and/or space issues.

The full report in data-base form is attached to this letter. However, there are some specific things you should know. Through a successful debt exclusion request we will be installing two temporary classrooms adjacent to CCHS and a temporary double-wide office building that will house seven offices plus meeting space. The two temporary classrooms will not be assigned to any particular department but will be used for overflow classes on an as needed basis. While we are still doing the master schedule for next school year, I expect that these temporary classrooms will be fully utilized. The temporary office space will be used to alleviate the overcrowded situation that has been noted with respect to the guidance and special education area. Also, the meeting space will add a great deal of flexibility to scheduling the various IEP and 504 meetings that we have on a regular basis.

We have also added two separate storage trailers to the school site. One of the trailers is used to store maintenance materials, especially those that might be considered hazardous. This trailer is located approximately 100 feet from the I Building heading towards the bus barn. The second trailer is used to store drama and music equipment. It is located between the I building and the H building. The addition of these two storage trailers has helped to alleviate storage problems.

Of a more specific nature, we have added special storage cabinets for chemicals in the science department, special storage cabinets for artwork (which allows for much more efficient storage in limited space), and fireproof storage cabinets throughout the main office for permanent records.

The attached reports list many additional space and building accommodations that have been completed or are scheduled for completion this summer.

While the efforts of the Superintendent, Business Manager, and Maintenance Manager have been creative, aggressive, and exhaustive, in my opinion there are still building issues that can only be addressed by a new structure.

Submit a sample of the common curriculum template.

The common curriculum template is attached. This template has been discussed by all department chairs and agreed to as the common template to be used for all curriculum documents.

Submit the school's revised mission statement.

Without doubt the visiting committee was under-whelmed by the school's mission statement. As explained at the time, the Mission Statement is a dual system mission statement that applies to the Concord K-8 system and the Concord-Carlisle High School 9-12 system. A committee of citizens, including educators, created this particular mission statement. This group sequestered themselves for a weekend, at taxpayer cost, with a specific direction to create a one-sentence mission statement for the Concord schools, including CCHS. We, at Concord-Carlisle High School, cannot unilaterally change this mission statement, nor can we unilaterally ignore it.

On the other hand, the visiting committee very much liked the acronym C.C.H.S. that we derived from the one sentence mission statement: Commitment, Citizenship, Harmony, and Scholarship. As a faculty we have been discussing a new statement of mission based on this acronym and on the mission statement of the Concord districts. We have discussed five different versions. No version has officially received the appropriate number of votes to be accepted. However, the attached version is the latest and will almost surely receive nearly a 100% unanimous vote either at our June faculty meeting or just prior to our official faculty meeting.

This statement uses the language of the system-wide mission and the acronym of our school based mission. During the faculty discussions to date it is very clear that this represents the desire of the faculty.

I sincerely hope that this letter and the attached documents will provide the NEASC with sufficient information to conclude that Concord-Carlisle High School is effectively progressing in our effort to address every recommendation from the visiting committee's report. I want to take this opportunity to inform you that I will be retiring as of June 30, 2007. Mr. Peter Badalament, currently Principal at Bellingham High School, will be assuming the position of Principal of Concord-Carlisle High School effective July 1, 2007. Future letters or questions should be directed to his attention.

Sincerely,

Arthur Dulong
Principal

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June 18, 2007

Arthur DuLong
Principal
Concord-Carlisle Regional High School
500 Walden Street
Concord, MA 01742

Dear Mr. DuLong:

Several months ago your school received a communication from us by fax about the need to complete our Annual Information Report and Substantive Change Information Form (AIR) by March 23rd. When we didn't hear back from you we sent another request by e-mail, which we copied to the superintendent, with a return date no later than May 30th. As of the date of this mailing, we still have not received your completed Annual Information Report form.

The information we seek is necessary for our data base as it provides us, among other things, with an accurate enrollment figure on which your school's membership dues are calculated, as well as with names of evaluators in your school who have agreed to serve on one of our visiting teams. Having the names of these evaluators is necessary in order for us to fulfill our function of providing visiting teams to member schools that have completed a self-study and are seeking to renew their accreditation.

We recognize that the spring and early summer are terribly busy times of the year for principals. However, our policies say that in order to continue NEASC membership a school must submit all required reports. The AIR is a required report.

Please call me should you have any question about the information we seek. And please send it along as soon as possible. Thank you and very best wishes for a terrific summer.

Sincerely,

Pamela Gray-Bennett

PGB/la

cc: Brenda Finn, Superintendent, Concord-Carlisle Regional School District

NEASC
Two-Year Report
September 2006

Submitted by:
Arthur Dulong, Principal
Concord-Carlisle High School
Concord, MA. 01742

NEASC Recommendations
Status of Initiatives
CCHS Responses

RECOMMENDATIONS FROM:
NEASC LETTER OF APRIL 11, 2005

To submit the results of the building needs study to both communities and report action taken, including the development of a formal plan and a timeline to resolve the longstanding facilities, space, storage, and health and safety concerns.

STATUS: STILL IN PROGRESS

In November of 2004 the School Committee and Superintendent, Brenda Finn, appointed a citizens committee consisting of representatives from both Concord and Carlisle to conduct a systematic and thorough review of the Concord-Carlisle High School facilities. This committee, named the Facility Analysis and Design Committee, but more commonly called the Feasibility Study Committee, was charged with "reviewing enrollment and programmatic needs at the school and recommending a construction option (new facility, renovation of existing facility, or renovation and expansion of existing facility) that will yield a school well equipped to house learning for CCHS students over the next half century." The committee included engineers, architects, members of select boards and finance boards, the Concord Police Chief, and educators. CCRSD also employed the services of Symmes, Maini & McKee Associates (SMMA), an architectural design firm, to supply the necessary professional analysis.

The committee met throughout the winter and spring. In June 2005 the committee, after considering all options, unanimously voted to recommend to the School Committee that a new CCHS facility should be constructed on the current campus, but not in the same location. The new facility, as envisioned, would address every facility issue. This recommendation was presented to the School Committee in July 2005.

The School Committee has considered the recommendation and appointed a second committee to prepare for presenting the rationale to the townspeople. At this time, there is an indication, though no formal vote taken, that design funds will likely be requested in the spring of 2007. The delay is due to Concord having recently built two new elementary schools and needing a third, whose design funds were approved at town meeting in the spring of 2006. In the School Committee's collective judgment there is more likelihood of gaining approval for the high school design with a one-year delay. Another factor in the delay is the continually perplexing decision making of the MSBA, as estimates for a new facility range in the $100 million range making reimbursement critical.

It is noteworthy that one of the District Goals, approved by the school committee for the 06-07 school year is "To develop a plan and timeline for meeting the facility needs of Concord-Carlisle High School; to begin to communicate the plan to the communities of Carlisle and Concord."

In sum, the school committee has submitted a plan to both communities. A significant amount of time, effort, and energy has gone into developing the plan and discussing the timeline. The timeline has not yet been specifically established due to local political considerations and Massachusetts's budgetary considerations.

To provide a physical plant that supports the needs of all students and occupants and fully implements the school's mission and expectations for student learning.

STATUS: STILL IN PROGRESS

Most of the details are reported on in highlighted recommendation above. It is also significant to note that during the summer of 2006 we did a complete ADA review for accessibility for all people with respect to every area of the building

To submit a formal plan including a timeline to provide, in the short term, adequate facilities and equipment in the auditorium, music room, locker rooms, art rooms, science rooms and laboratories, special education rooms, and guidance areas as identified in the listing of concerns on page two of this notification letter.

STATUS: COMPLETED (to the extent possible without a new building)

With reference to the auditorium, we have installed a new sound system, fireproofed the curtains, and installed new exit signs. We have temporarily repaired seating, but have no plans to install new seating at this time, as a new auditorium would be a part of either a renovation or a new building in the future. The auditorium now can safely hold less than half the student population. That cannot be remedied without renovation or expansion. One of the District Goals, approved by the school committee for the 06-07 school year is "To develop a plan and timeline for meeting the facility needs of Concord-Carlisle High School; to begin to communicate the plan to the communities of Carlisle and Concord." This information should be applied to several of the specifics below with reference to timelines.

With reference to the music room, we have installed all new instrument storage lockers, installed all new carpeting, and repainted the room. The music room is now 100% functional and secure.

With reference to the locker rooms, we have installed all new lockers, repainted the entire area, made modifications to the trainer's room to provide a more functional and healthful environment, added team rooms on the girl's side to create more equitable facilities between the boys and girls. As part of the locker room project we enhanced the lighting of the lower gym by installing new windows around the exterior of the gym, by repainting the area, and also by increasing the electrical light capacity. We also added new flooring to the lower gym and a new electric divider that allows the space to be used by more than one class or team at one time. The locker rooms are now adequate to our needs.

With respect to the art rooms, we have purchased new purposefully designed art and photo storage cabinets that allow more materials to be stored in a smaller space. Any modification of the rooms themselves to include more storage area will only be possible with a new facility. A new ventilation system that complies with all regulations has been installed and will completely alleviate the previous ventilation issues. In addition, we have redesigned the Ceramics room with particular attention to the kiln and pottery wheel area. The redesign includes substantial modification to the ventilation system in that area completely alleviating any health, safety, or ventilation issues. Still the art rooms are cramped and inefficient. They cannot be fully adequate without renovation or expansion.

With reference to the science rooms and laboratories, it is impossible to redesign the space itself. The actual design of the space is a driving force in the recommendation for a new building made by the Feasibility Study Committee to the School Committee. However, through a grant from the Concord Ed Fund, we have purchased and installed the following technology to enhance the laboratory experience for the students and to expand the instructional opportunities for the teachers:

11 Activboards/Ibooks/Projectors
12 14" Ibooks/Apple Care
7 InFocus Projectors
3 Laser Jet Printers
12 Inspiron 2200 Laptops
32 Optiplex MiniTower Computers
8 digital Microscopes

Also with reference to the science rooms, we have corrected the ventilation problems, provided fireproof storage for all explosive and corrosive chemicals, and conformed to all fire and health standards as certified by inspection of the Concord Fire Department.

With respect to the special education rooms, we have redesigned the sped tutorial center to provide quieter and more confidential workspace for tutors and students. We have made a third conference area available to special education staff in order to provide more meeting space and more confidential meeting space. To increase the office space, to increase the number of offices, or to increase special education student space is impossible within the current facility.

With respect to the guidance offices, the necessary addition of offices, creation of larger space, or creation of more offices with windows to the outside is not possible within the current facility.

To confirm the development and adoption of a long-range plan to address staffing and program needs as well as those related to the physical plant.

STATUS: COMPLETED

Last school year we were able to add staffing and program for the first time in recent memory. We added one chorus course (0.25FTE), four drama courses (0.50 FTE), two computer applications courses (0.25FTE), and two computer based art courses (0.25FTE). These system goals include an effort to continue adding program to our elective offerings. For this school year we added one additional Music course, two aquatic programs to our Health and Fitness offerings, a project based Physics course, an Advanced Physics course which includes calculus. The longer-range plan is to add more aquatic program, increase the drama offerings, and increase music offerings.

Our academic programs are contractually staffed at a student: teacher ratio of 90:1, with the provision that it can raise to 95:1 in difficult financial times. The long-term plans are that contractual provisions will prevail.

The school committee and administration are committed to providing a varied program with excellent staffing ratios.

To confirm progress made to resolve the following health and safety issues.

STATUS: COMPLETED

With respect to all of the issues listed below, I formed a committee including the Concord Police Chief, the Concord Fire Safety Inspector, Concord's building inspector, the CCHS Head Custodian, The CCRSD Facilities Manager, both CCHS Assistant Principals and myself. We worked together to clarify and resolve each issue.

A) To provide a two-way communication system between all classrooms and other areas of the facility and main office.

STATUS: COMPLETED

This past spring town meeting approved a sum of money to complete a variety of capital projects at Concord-Carlisle High School for the purposes of improving safety within the building. One of the projects was to install a phone in every room. Using this phone, every classroom is immediately connected to the office, the nurse's office, and any other room in the building. The communication can occur in either direction. An added feature is that whenever 911 is dialed from any phone in the building, in addition to the notification to the police and fire personnel, there is automatic notification to the front office and the nurse's office that 911 was dialed and from where it was dialed.

B) To ensure that the ramps in the media center meet ADA requirements.

STATUS: COMPLETED

John Minty, Concord's Building Inspector, informed me that the ramps do, in fact, meet all ADA requirements. When the school was built the builders sought and were granted a waiver to build and maintain the ramp system that exists. That waiver is still in effect and kept on file in the Building Inspector's office. Mr. Minty assures me that the ramps meet all ADA requirements as specified by the waiver.

C) To address the issues related to the doors currently in use to separate sections of the facility that fail to meet fire codes.

STATUS: IN PROGRESS BUT WILL BE COMPLETED BEFORE 10/15/06

This was one of the projects approved by the 2006 spring town meeting in both Concord and Carlisle. We have contracted with a firm that specializes in such work. Within the past week (early September) all the supplies and materials arrived on campus. Work is scheduled to begin before September 22 and be completed within a few weeks.

D) To repair/replace all non-operational exit signs.

STATUS: COMPLETED

We inspected every sign and found that many were beyond repair. However, we also found that it would be possible to replace every exit sign with a battery-powered model that meets all fire codes and regulations. The job was completed during the summer of 2005.

E) To repair/replace all non-operational water fountains.

STATUS: COMPLETED

This was strictly a plumbing issue. It required the replacement of a few pipes and a few faucets. All water fountains, faucets, and sinks are fully operational.

F) To correct ventilation issues in the Art and Science areas.

STATUS: COMPLETED

As mentioned above in highlighted recommendation #5, the ventilation problem in the photo room has been thoroughly investigated by Gordon Air Quality Consultants, Inc. They designed a new ventilation system that they are sure will completely alleviate the ongoing ventilation issues. The new ventilation system has been completed.

G) To document that the facilities comply with all federal, state, and local fire and safety standards and address all identified issues.

STATUS: COMPLETED

The Concord Fire Safety inspector was a member of the committee we formed to ensure compliance with regard to all of these issues. After receiving his recommendations of identified needs, we addressed each one individually. He conducted an inspection in August of 2005, made a few more recommendations, and conducted a second inspection in October and certified that we meet all federal, state, and local fire and safety standards with the exception of the repair of all fire doors, which may be completed before the Commission reads this document.

To update, fund, and implement the technology plan.

STATUS: COMPLETED

The technology plan was in the process of being written by Gene Warfel, our Technology Coordinator, at the time of the NEASC visit. Very shortly after the visit, the plan was completed and forwarded to the state DOE. As mentioned in the response to highlighted recommendation #3, there were significant updates made to our science technology. In addition to all that is listed above, we added several hundred thousand dollars of computers, Activboards, servers, printers, WIFI capabilities, new administrative software, and associated technology support. The longer-term plan requires consistent updating of equipment and software for the foreseeable future.

RECOMMENDATIONS FROM:
THE TEACHING AND LEARNING STANDARD # 1 – MISSION AND EXPECTATIONS FOR STUDENT LEARNING

Ensure that the Concord-Carlisle High School Mission Statement and Expectations For Student Learning reflects the fundamental values and beliefs of the high school as well as the values and expectations of the communities of Concord and Carlisle, the district mission, and state standards.

STATUS: IN PROGRESS

The response committee and the School Advisory Council have been considering the Mission Statement, particularly the Commitment, Citizenship, Harmony, and Scholarship distillation of the mission, and believe it does in fact reflect the values and expectation of the Communities of Concord and Carlisle, the district mission (which is the narrative statement referred to in #2), and state standards. It is in progress because we are still considering the narrative statement.

Make a decision if the narrative statement before the CCHS acronym reflects the mission of Concord-Carlisle High School.

STATUS: IN PROGRESS

The Faculty Steering Committee for response to the NEASC and the School Advisory Council have been reviewing the narrative and have tentatively rewritten it. However, a committee of educators and citizens from the two communities created this narrative and are invested in it. There are several more steps necessary before any change would be approved. These steps would include review by faculty as a whole, review by the Superintendent, review by the School Committee, and review by the Student Senate. We expect to be continuing the review this year.

Develop and implement a plan to review the Mission Statement on a regular basis by a group representing all members of the educational community.

STATUS: COMPLETED

The School Advisory Council, which consists of teachers, parents, students, and community members will be the vehicle for initial review of the Mission Statement. Comments and potential discussion items will be forwarded to the faculty as a whole for their consideration. Any actual change to the Mission Statement will require School Committee approval. This will be done at least every five years, or more frequently if desired by the SAC.

Analyze the data derived from the implementation of rubrics as a basis for reviewing the Mission Statement and expectations for student learning.

STATUS: PLANNED FOR THE FUTURE

We are still in the process of implementing the rubrics. At this time it is too early to collect and analyze data.

Review and strengthen the civic and social expectations for student learning.

STATUS: IN PROGRESS

The NEASC Response Committee and the School Advisory Council have been reviewing the civic and social expectations. Frankly, discussions to date have not concluded that there is any need to "strengthen" them. To date, people are convinced that the emphasis on citizenship as one of our four major principles, the interpretation of harmony meaning cooperative and respectful interaction between all members of the school community, the school rules supporting good citizenship and harmonious relationships, and the graduation requirement of 40 hours of community service are tangible evidence of the seriousness with which we regard the civic and social expectations reflected by statements eight and nine of the Student Learning Expectations. Discussions are ongoing.

We have engaged the services of several expert community members who have initiated a group called "2 Volunteer" which is helping us to expand our opportunities for community service, expand our advertising of community service, and create a new model for rewarding those students who excel at community service projects.

Ensure that common rubrics relating to the school's expectation for student learning are developed and implemented in all disciplines.

STATUS: IN PROGRESS

Every department has reviewed, discussed, and had an opportunity to offer edits to the school-wide rubrics. Every department has had significant discussion of standards of excellence and general academic expectations for student learning. The English, mathematics, and foreign language departments have been particularly active in looking at student expectations and achievement from a comprehensive view. It is fair to say that there is a great deal of agreement on these issues. It is also fair to say there are issues remaining to discuss. The conversations will continue.

RECOMMENDATIONS FROM:
THE TEACHING AND LEARNING STANDARD # 2 – CURRICULUM

Review and rewrite the curriculum guides to draw clear connections to learning expectations and spell out course content, suggest varying instructional strategies, and assessment strategies.

STATUS: IN PROGRESS

This has been and will continue to be part of the summer curriculum work that we are doing. Recent work includes rewriting the Health and Fitness curriculum for grade 9, rewriting the English curriculum for grade 9, rewriting the social studies curriculum for grade 9, working on the AP Physics curriculum and developing Physics for Everyday Life, working on the Honors Spanish program and Advanced Latin program, rewriting the Chinese 2, 3, & 4 curriculum, creating a new French curriculum, and rewriting two of our CPIII math courses.

Integrate inter-departmental and intra-departmental communication for curriculum sharing and for interdisciplinary work.

STATUS: IN PROGRESS

In fact, there is more intra-departmental communication for curriculum review than in any high school with which I am familiar. Every day departments are given a 45 minute lunch together. Some of these "lunches" are completely and formally devoted to curriculum review. Most lunches include informal curriculum review. In addition, each department meets at least twice per month after school for the purpose of conducting departmental business that includes curriculum review. This past year we began to devote some of the department meeting days to inter-departmental conversations. There were multiple instances of at least two departments meeting together to discuss curricular issues of mutual concern. Last year, we also encouraged, on a volunteer basis, the practice of members of one department supplementing the lessons of another by co-teaching certain topics, bringing specific and extensive expertise to these lessons.

Establish curriculum coordination with the public schools in Concord and Carlisle.

STATUS: IN PROGRESS

Within the past year the superintendents of Concord and Carlisle have established regular personal communication to discuss matters of importance to both systems. Included in these conversations is the need for improvement of curriculum coordination between Concord and Carlisle. Additionally, Dr. Brenda Finn, the Superintendent of Concord and Concord-Carlisle Regional High School has worked with principals to establish mechanisms that will improve curriculum coordination throughout the entire system. To that end we begin this year with four scheduled departmental meetings to include CCHS, Concord Middle School, and The Carlisle School. The purpose of these meetings is specifically to discuss curriculum coordination and student transition between levels.

Ensure that the necessary funds for equipment, materials, and supplies are sufficient to implement the expectations for student learning.

STATUS: IN PROGRESS

The school budget for the past few years has been able to accommodate almost all budgetary requests for textbooks, classroom supplies, technology needs, and specialty needs such as those for music and Health and Fitness. Taxpayers have generously voted to override the Proposition 2 ½ limits in order to grant us what we need. That has been great! However, the truth is that every year brings new challenges. This year's budget reflects some reductions in the supply and materials account. Because of the strong support we have received in the past two years we do not expect that this year's reductions will be a problem. However, ensuring necessary funds will always be "In Progress" because every year is a new budgetary cycle and because so much is dependent on the state support.

Develop and implement a plan for systematic review and evaluation of the curriculum.

STATUS: COMPLETED

The department chair group established a protocol whereby each year a segment of their department's curriculum is reviewed within their own department. About mid-spring the chairs, as a group, discuss the prioritization of future curriculum development. This allows individual departments to create an internal priority list and the school as whole to determine the allocation of resources to complete the projects most in need of attention. We have done this for two years. It works very well, allowing us to address the most significant issues and to create an awareness of impending issues. An added bonus is that it has created a vehicle for interdepartmental understanding of school-wide curriculum.

Develop and implement a common curriculum guide format that indicates curriculum alignment with the expectations for student learning and suggestions for a variety of instructional strategies and assessment strategies.

STATUS: IN PROGRESS

To date the curriculum revisions and curriculum guides are being written in the format we have been using. We are still working on details for the format for the "common guide".

Provide professional development opportunities to ensure the involvement of all teachers in curriculum related work.

STATUS: COMPLETED

During the 05-06 school year we created the District Professional Development Plan (DPDP). The plan includes district and system-wide goals, curriculum and instructional goals, a professional development overview, and many types of professional development opportunities available to staff. This year, 06-07, the plan has been disseminated and is being used. The plan includes making attendance at national pedagogical conferences available to teachers on a first come basis.

Over the past two years the school system has more than doubled the amount of money available for professional development opportunities as compared to the time of the site visitation. This has allowed us to greatly expand curriculum development, curriculum review, and attendance at subject matter specific workshops and conferences. We have also established a protocol by which our own staff, who possess particular expertise, might conduct appropriate professional development workshops for staff within their own department and to interested members of other departments.

Make professional development opportunities available that help the school use national and state standards and pedagogical research as a basis of assessment in all disciplines.

STATUS: COMPLETED

During the past year we have sent people to national conferences specific to their subject matter and to conferences specific to Advanced Placement. We have also embarked on training all department chairs and administrators in the latest methods of supervision and evaluation. A portion of the course we are all taking is devoted to assessment techniques. We have also increased the budget in the account allowing more subscriptions to educational magazines. Keeping up with national and state standards and pedagogical research is a full time job. This is another area that will always be "In Progress" yet always ongoing.

Additionally, during the 05-06 school year we created the District Professional Development Plan (DPDP). The plan includes district and system-wide goals, curriculum and instructional goals, a professional development overview, and many types of professional development opportunities available to staff. This year the plan has been disseminated and is being used. The plan includes making attendance at national pedagogical conferences available to teachers on a first come basis. To date, we have been able to send people to national and/or state standards conferences in nearly every discipline over the past year.

RECOMMENDATIONS FROM:
THE TEACHING AND LEARNING STANDARD # 3 – LEARNING

Use the developed school-wide student expectations for learning rubrics as part of instruction.

STATUS: IN PROGRESS

Every department has reviewed, discussed, and had an opportunity to offer edits to the school-wide rubrics. Every department has had significant discussion of standards of excellence and general academic expectations for student learning. The English, mathematics, and foreign language departments have been particularly active in looking at student expectations and achievement from a comprehensive view. Throughout the building teachers have used rubrics to bring clarity of expectation to individual assignments and to overall assessment of progress toward achievement at the highest level.

Evaluate the success of the various instructional strategies on a formal and regular basis.

STATUS: IN PROGRESS

Last spring we spent a professional development day learning how to collect data and collecting data that can inform teachers about different levels of student success with respect to different teaching and assessing strategies. This is and will be an ongoing project.

It was as a result of this project that we established the initiative to improve the performance of minority students, which is described in more detail in the section on reform initiatives at the end of this report.

Provide at least one computer with Internet access for every classroom.

STATUS: COMPLETED

During the past two years we have been installing Activboards in every classroom in the school. The process will be completed in October 2006. In each case the Activboard is connected to a computer, which can be laptop or desktop depending on the teacher's preference. All rooms are wired for Internet access, which gives every teacher and student access to the Internet in every space in the building, used for teaching purposes. Many classrooms have more than one computer available with Internet access.

Provide access to a computer lab for classroom teachers.

STATUS: COMPLETED

CCHS has four computer labs. Two, with between 24 and 30 computers, are dedicated to computer instruction and art classes. Both of these computer labs are also available to any teacher based on availability and/or arrangement with the assigned teacher. Mathematics teachers and guidance counselors conducting seminars regularly use both of these labs. CCHS also has a third computer lab with 24 computers that is dedicated to the English Department as a writing lab. This space is also available to other departments on an availability basis or by arrangement with the assigned teacher. The foreign language lab is equipped with 60 computers allowing two complete classes to use it at the same time for traditional language lab activities and for any other computer related activity including Internet access. These computers are available to any teacher on an availability basis. The school library, though not a computer lab, is equipped with a full classroom set of computers (30) and can be accessed by any teacher by reserving the space. Additionally there are two mobile computer labs consisting of 24 laptop computers, all of which have access to the Internet and to printers through a school wide WIFI system. These two mobile labs are available to any teacher.

Provide adequate audio-visual equipment.

STATUS: COMPLETED

Since the time of the NEASC site visit significant changes have occurred in the field of audio-visual equipment. The needs we had at the time included overhead projectors and TV/VCR players. We have purchased additional TV/VCR's in sufficient number such that in the past year there is no known instance of a teacher desiring such equipment and not having it available. The Activboards, in much of the school last year and throughout the school this year, have greatly reduced the need for a TV/VCR and completely eliminated the need for overhead projectors. Everything that can be done on an overhead can be done through the Activboard. Many of the movies, videos, or TV productions normally shown in class are available through the Internet or in a computer compatible format and therefore can be shown through the Activboard. With the completion of school-wide installation of Activboards this year CCHS has multiple audio-visual options available to teachers and no deficiency of equipment available for classroom use.

Provide professional development to train teachers to use the newest technology.

STATUS: IN PROGRESS

Several opportunities for Activboard training have been offered to teachers, including after school time, departmental meeting time, and summer workshops. Industry experts, that we hired through the Activboard manufacturer and paid as consultants, have conducted workshops to train our staff. Our teachers, who have become experts through these trainings and their own efforts, have also been hired to train other staff. Of course, a great deal of training has happened less formally between teachers. In every case the trainings have been well attended and valuable. Also, since the time of the NEASC visit, CCHS has incorporated a new administrative software package that has necessitated training the entire staff in the attendance procedures and the grading procedures. The new system required more extensive training for secretaries, counselors, and administrators. However, there is a continuing need for training and ongoing plans to continue the training available.

Develop and implement a long-term professional development plan for the entire faculty focusing on instructional strategies.

STATUS: IN PROGRESS

During the 05-06 school year we created the District Professional Development Plan (DPDP). The plan includes district and system-wide goals, curriculum and instructional goals, a professional development overview, and many types of professional development opportunities available to staff. We also developed the District Curriculum Accommodation Plan that includes numerous strategies for addressing individual student needs in and out of the classroom. We developed the English Language Development Plan that includes numerous strategies applicable to the needs of all students as well as the targeted ELL students. Each of these plans have been disseminated to all faculty and are extensively used.

The district also sponsors a Course, "Teaching the Diverse Learner" for all teachers new to the system and anyone else who would like to take it.

Infuse opportunities into lessons for student to be more self-directed learners.

STATUS: COMPLETED

Throughout the school, students are actively engaged in cooperative work, project based learning, presentation activities, and other types of activities that require them to be self-directed learners. In addition, within the past two years we have implemented new courses whose entire focus is on students becoming self-directed learners. These include the drama courses, a project based physics course, two advanced art courses, two new choral groupings, a redesigned CPIII Algebra I math course, a redesigned Analysis mathematics course, and a redesigned Advanced Topics in Math course. Additionally, we have decided to focus efforts on preparing freshmen to take more ownership of their high school academic career through our Freshman English and Freshman Social Studies courses as we rewrote the curriculum including various assessments and activities that require self-direction from students.

Develop a formal plan to use data from the assessment of student work as one basis for decisions regarding instruction.

STATUS: IN PROGRESS

Last spring we spent a professional development day learning how to collect data and collecting data that can inform teachers about different levels of student success with respect to different teaching and assessing strategies. This is and will be an ongoing project. We also gathered data to determine if there were segments of the CCHS student body that were being less well served than other segments. We were not surprised to find that there are "achievement gaps" when comparing our student body as a whole to our African-American and low income population. Although the gaps are smaller than reported nationally or statewide, we have created new tutoring and extra help opportunities for these students. We have also created a new mentoring program for these students. To a lesser extent the information was valuable in the curriculum revisions mentioned in the question #22 response. We have also been collecting data that directly relate to student achievement on a given assessment as it relates to the teaching strategies used in preparation for that assessment. This data is to date somewhat contradictory and not yet sufficient to inform meaningful decisions regarding instruction. Research is ongoing as we gather more data and analyze the results. This is one of our School Improvement Plan goals.

RECOMMENDATIONS FROM:
THE TEACHING AND LEARNING STANDARD # 4 – ASSESSMENT OF STUDENT LEARNING

Institute a more formal peer observation system.

STATUS: COMPLETED

Independent of the NEASC this was a department chair goal and a School Advisory Council goal. For teachers within their first three years at CCHS, peer observation is a required part of their mentoring and evaluation program. After the first three years, it is a yearly expectation.

Initiate a regular cyclical review of curriculum based on the assessment of student learning.

STATUS: COMPLETED

The department chair group established a protocol whereby each year a segment of their department's curriculum is reviewed within their own department. Then about mid-spring, the chairs as a group discuss the prioritization of future curriculum development. This allows individual departments to create an internal priority list and the school as whole to determine the allocation of resources to complete the projects most in need of attention. We have done this for two years. It works very well, allowing us to address the most significant issues and to create an awareness of impending issues. An added bonus is that it has created a vehicle for interdepartmental understanding of school-wide curriculum. Any proposed rewriting of the curriculum is based on demonstrated student achievement.

Develop and implement a plan to utilize groups of teachers, within and across disciplines, to look at student work as a means of assessing the expectations for student learning.

STATUS: IN PROGRESS

We spent an entire professional development day in March 2005 learning to do exactly this. We now have well trained people on the staff. One of our Assistant Principal's, Dr. Alan Weinstein, has been fully trained. This year, with Dr. Weinstein's help, we hope to increase faculty knowledge and more fully implement the process.

Examine the feasibility and implement the results of the study to extend common final examinations to departments with several sections of common courses.

STATUS: COMPLETED

Every department has examined the courses that include several sections of a common course, held discussions regarding the final examination, and made decisions regarding the practice of having a common exam. In most cases the decision is to have a common exam. This is true throughout the entire Mathematics, Science, and Foreign Language program, and for most Social Studies and English courses. There are still several courses in which the final exam is mostly a common exam, but there is some segment of the exam left for individual teacher discretion. The process and discussions were very valuable. The current model was implemented last year and worked very well.

RECOMMENDATIONS FROM:
THE TEACHING AND LEARNING STANDARD # 5 – LEADERSHIP AND ORGANIZATION

Develop and implement a common vision for student learning across the disciplines.

STATUS: COMPLETED

There is a formal program to ensure that every student, parent, and teacher has ample opportunity to understand the expectations for student learning at CCHS. Every year the school year begins with a faculty meeting during which the principal clearly speaks to the mission of the school, the school goals for the year, and the student expectations. The students' year begins with class meetings in which the Principal explains the same to them. Throughout the year the Principal addresses curricular expectations and student learning expectations to the parents through the monthly newsletters and the monthly parent coffee's hosted by the Principal. The school district goals, which help to shape the common vision, are included in the District Professional Development Plan and disseminated to faculty and the School Advisory Council. The message is clear, consistent, and emphatic.

Develop and implement interdisciplinary courses to support the school's mission and expectations for student learning.

STATUS: NO ACTION

The recommendation is valid but has not yet been addressed on a wide scale. It has been directly addressed in that our Student Transitional Education Program is implemented through interdisciplinary courses.

Identify scheduling options so that the schedule is driven by the school's mission and expectations for student learning rather than by space and staffing limitations.

STATUS: COMPLETED

To be more accurate the designation should be "complete for the time being". We carefully considered block scheduling, scheduling over six or eight days as opposed to five, scheduling outside of the school day, and tinkering with our current schedule. Keeping in mind the stated goal "schedule is driven by the school's mission and expectations…" we have concluded that no alternative allowed us to be free from "space and staffing limitations" being a driving force in our schedule. It is complicated, but the essence is that we do not currently have space in our building to educate all 1260 (current numbers) students simultaneously if we are intent on keeping low class size (22-23 per class). While it is true we do not have "extra staff" it is not staffing that is a limiting factor, it is space. Until we have a new and larger building our scheduling will be bound by the available space. Currently room usage is above 90%, with most of the "free room" time being due to lunchtime when a third of the students and teachers eat lunch each of the three blocks.

Analyze the current system of leveling in relation to recent studies of the effects of homogeneous grouping and the perceived achievement gap between students in the upper and lower level classes.

STATUS: COMPLETED

For clarity purposes it is important for the reader to remember that we only have leveled classes in Mathematics, Science, and Foreign Language. We studied the effects of homogeneous grouping at the high school as it relates to achievement gap issues and, more importantly, the achievement of all students. Our conclusions are that whatever gap exists was wider at the time students entered CCHS than it is at the end of their junior year. In fact, while we definitely do not have the magic cure for any achievement gap our students are well supported. We now have a Science Resource Center, a Foreign Language Resource Center, a Mathematics Resource Center, and a Social Studies/English Resource Center. Each of these Resource Centers is staffed by fully certified professional staff every block of every day. We also have a tutorial center for special education students. We have a mathematics tutorial program for students with an identified need. We have a tutorial program specifically for our Boston students. We have a program to assist students who have opted out of ELD services. We have three computer labs plus a library where students can go for expert assistance in technology use. We have also created an after school extra help center for any student, but specifically for minority/low income students who have achieved a D or F grade. This after school center is also staffed by fully certified professional staff. Using these support services we are working to increase the number of students enrolled in advanced and honors classes and to increase the rigor of every course we offer.

RECOMMENDATIONS FROM:
THE TEACHING AND LEARNING STANDARD # 6 – SCHOOL RESOURCES FOR LEARNING

Disseminate the crisis action procedures that address student security and safety needs to faculty and staff members, parents, and students.

STATUS: COMPLETED

We worked with the Chief of Police and the Fire Chief to create a crisis plan that meets all federal, state, and local guidelines. We have distributed the plan.

Account for students' whereabouts during "open campus" time.

STATUS: REJECTED

The recommendation is invalid. It seems that the committee misunderstood or never understood Open/Off Campus privilege at CCHS, its purpose both philosophically and practically, and its practice. Open/Off Campus is a privilege that students earn by virtue of their good citizenship and demonstrated responsibility. There are increasing levels of personal responsibility that they are allowed to earn with each level requiring increasing demonstration of good citizenship and responsibility. They can proceed from the point of being accountable to a teacher for every minute of every day, to being accountable to be in the building or in specific areas of the campus every minute of every day, to being accountable in the building or in specific areas of the building every minute except during lunch, to the ultimate privilege that might be earned by a senior that requires them to be accountable to a teacher only during assigned class time.

Philosophically, we believe as a school that it is essential to give students as many opportunities as possible to exercise responsible behavior. People learn to be responsible citizens when given an opportunity. This model fits our student population, adheres to community values, and seldom produces any cause for concern. There are many safe guards and checks. When a student mishandles the opportunity to act responsibly he/she loses the privilege. We completely understand why a visitor might view the Open/Off Campus privilege with concern, but it is an important aspect of what we believe is critical to creating the harmony within our building and the responsible citizen that our mission statement espouses. We strongly believe that requiring students to account to us for their whereabouts during the time period for which they are personally responsible would severely limit the learning opportunities inherent in Open/Off Campus as practiced at CCHS.

A practical aspect of this is that if we were to require every student to be accountable to a teacher every minute of every day, we would need at least several additional classrooms. At this time, the only time period during the week when every student is accountable to a teacher is during homeroom. We have a homeroom (20-24 per room) in every possible room in the school including 4 homerooms in the library. We could not find a place within the building to simultaneously educate and account for every student enrolled at CCHS.

Develop and implement a program so that each student has an adult member of the school community who serves to personalize that student's educational experience.

STATUS: NO ACTION

The recommendation is valid but has not yet been successfully addressed. We have reviewed several programs of this type that existed at CCHS within the past 25 years. We have studied former committee notes with regard to the development and implementation of the programs. The teachers who were here at these times speak of the programs as well intentioned but faulty on many levels. We will continue discussion and investigation.

The most recent attempt to implement a program so that each student has an adult member of the school community serving to personalize that student's experience began about 12 years ago and lasted a couple years. Faculty worked with small groups of students (less than 15) meeting regularly to discuss a variety of school related topics. The faculty found the model to be contrived and ineffective. The faculty discussed better ways to connect with students and decided that connecting based on common interests was more authentic and genuine, providing a better chance of success. Since that time we have added numerous clubs, activities, and interest groups to our school. Some of these include; Volleyball, Ice Hockey, Indoor Track and Field, Science Fiction Club, History Reading Group, Outdoor Club, Sailing, Psychology Reading Group, Squash, Dance Club, Teach Our Youth

Science (TOYS) group, Chickenscratch (a writing club), knitting, and Percussion Club. This list only represents activities added within the past seven or eight years but is not a complete listing of either the new additions or the entirety of opportunities for adult connection available to students. We know that the vast majority of students (at least 95%) are connected to an adult through the sports, clubs, and activities. We believe the connection formed in this format is very effective.

As mentioned, we will continue to investigate and discuss.

Implement the pilot Concord-Carlisle High School Regular Education Alternative Program.

STATUS: COMPLETED

The Student Transition Educational Program (STEP) was fully operational by the middle of the school year 04-05. It continued to be fully operational for the 05-06 school year. It has been successful enough that the school committee voted to increase the staffing for the program by adding a mathematics and science component for the 06-07 school year. To date, at least seven students have graduated from CCHS in the past two years who would not have graduated without the STEP program. It has been a terrific success.

Provide more educational opportunities to meet the needs of non-college bound students within the school day.

STATUS: COMPLETED

Can you ever have enough? We offer work study, internships with local businesses, the Senior Project course which allows students to pursue a personal interest, the Pathways Mentoring Program that helps students successfully transition to the next step beyond high school, the METCO Mentoring Program to help students transition to CCHS, the Student Transitional Education Program (S.T.E.P.) designed specifically for the non-college bound student challenged by graduation itself, and several college/career mini-fairs that offer occupational options as well as college information.

We have added Video production II, Theater I and II, Web Design, Computer Applications, and a project based Physics course. We plan to add elective science courses for seniors. All of the above courses that are being offered have proved to be popular.

Ensure that all student records are properly secured and backed up according to state standards.

STATUS: COMPLETED

This was accomplished by purchasing fire proof, secure file cabinets for the Registrar's Office. Many of our recent files are stored electronically as well as hard copy in the file cabinets.

Provide additional certified media personnel to increase the delivery of library and media services and student supervision.

STATUS: PLANNED FOR THE FUTURE

We have determined that our multi-leveled library works best with one head librarian and four well trained staff that would include a research specialist, a technology specialist, and two general assistants. We have been training the existing staff to become the specialists we need and will hire the additional staff when budgetary conditions allow.

Conduct a library facilities study to maximize utilization of space and meet existing ALA and AASL standards.

STATUS: COMPLETED

The library encompasses three levels, which provides a visually stunning venue, an abundance of space, and an opportunity for varied usage of the space. However, it is very difficult to maintain quiet because of the "echo" effect and difficult to meet all student research and technology needs because the library staff has no direct access from top floor to bottom floor. In fact, the library is well within ALA and AASL standards for number of volumes available, number of research vehicles available - both traditional and technological - and the timeliness of the books. Using ALA standards we did a major cleansing of the bookshelves discarding many boxes of old books, but had to be careful not to discard important books related to local history and Revolutionary War history despite their age. The library continues to be heavily used, sometimes forcing closure because of overcrowding. The library continues to prove to be generally adequate. The library will achieve maximum effectiveness only through a new building or a major renovation.

Provide adequate natural light and ventilation for counselors' offices.

STATUS: NO ACTION

It is not possible to correct the lighting and ventilation issues in the counselors' offices without either a renovation of the space or a new building. These issues will be addressed at the same time the larger facility issues are addressed.

Provide adequate space for special education staff offices.

STATUS: NO ACTION

It is not possible to provide additional space (adequate space) for special education staff offices without either a renovation of the space or a new building. We have been creative where possible dividing a conference room into two offices and creating an office from part of a reception area. These issues will be addressed at the same time the larger facility issues are addressed.

RECOMMENDATIONS FROM:
THE TEACHING AND LEARNING STANDARD # 7 – SCHOOL RESOURCES FOR LEARNING

Provide a physical plant that supports the needs of all students and fully implements the mission statement and expectations for student learning.

STATUS: IN PROGRESS

In November of 2004 the School Committee and Superintendent, Brenda Finn, appointed a citizens committee consisting of representatives from both Concord and Carlisle to conduct a systematic and thorough review of the Concord-Carlisle High School facilities. This committee, named the Facility Analysis and Design Committee, but more commonly called the Feasibility Study Committee, was charged with "reviewing enrollment and programmatic needs at the school and recommending a construction option (new facility, renovation of existing facility, or renovation and expansion of existing facility) that will yield a school well equipped to house learning for CCHS students over the next half century." The committee included engineers, architects, members of select boards and finance boards, the Concord Police Chief, and educators. CCRSD also employed the services of Symmes, Maini & McKee Associates (SMMA), an architectural design firm, to supply the necessary professional analysis.

The committee met throughout the winter and spring. In June 2005 the committee, after considering all options, unanimously voted to recommend to the School Committee that a new CCHS facility should be constructed on the current campus, but not in the same location. The new facility, as envisioned, would address every facility issue. This recommendation was presented to the School Committee in July 2005.

The School Committee has considered the recommendation and appointed a second committee to prepare for presenting the rationale to the townspeople. At this time, there is an indication, though no formal vote taken, that design funds will likely be requested in the spring of 2007. The delay is due to Concord having recently built two new elementary schools and needing a third, whose design funds were approved at town meeting in the spring of 2006. In the School Committee's collective judgment there is more likelihood of gaining approval for the high school design with a one-year delay. Another factor in the delay is the continually perplexing decision making of the MSBA, as estimates for a new facility range in the $100 million range making reimbursement critical.

It is also noteworthy that one of the District Goals, approved by the school committee for the 06-07 school year is "To develop a plan and timeline for meeting the facility needs of Concord-Carlisle High School; to begin to communicate the plan to the communities of Carlisle and Concord."

Provide a system of reciprocal instant communication between classrooms and the main office.

STATUS: COMPLETED

This past spring town meeting approved a sum of money to complete a variety of capital projects at Concord-Carlisle High School for the purposes of improving safety within the building. One of the projects was to install a phone in every room. Using this phone every classroom is immediately connected to the office, the nurse's office, and any other room in the building. The communication can occur in either direction. An added feature is that whenever 911 is dialed from any phone in the building, in addition to the notification to the police and fire personnel, there is automatic notification to the front office and the nurse's office that 911 was dialed and from where it was dialed.

Correct ventilation concerns in the art and science areas.

STATUS: COMPLETED

We had been working on this in stages for the past two years. This past spring town meeting approved a sum of money to complete a variety of capital projects at Concord-Carlisle High School for the purposes of improving safety within the building. One of the projects was to completely correct all ventilation issues in the art and science areas. The project is complete, conforms to all federal, state, and local regulations. It has also brought a great deal of pleasure to the art and science teachers.

Comply with all federal, state, and local fire and safety standards.

STATUS: COMPLETED

We have worked very closely with the fire department, including having the fire chief or his designee as a part of our NEASC response committee. We are fully in compliance with all fire regulations and have been visited for inspection on a regular basis, including this past summer.

Implement a system that addresses the protocol and prioritization for maintenance and repair of facilities and equipment.

STATUS: COMPLETED

Near the end of the 2004-05 school year Mr. David Anderson was hired to be maintenance supervisor for the Concord and Concord-Carlisle Regional School Districts. Mr. Anderson immediately established new protocols for reporting maintenance requests, prioritizing maintenance requests, tracking the progress of repair, and recording the satisfaction of the request. The process is thorough and complete. After one year of implementation it is working extremely well.

Update and implement the existing technology plan.

STATUS: COMPLETED

At the time of the site visit, the plan was in the final stages of preparation. A new technology plan was submitted to the state in a timely manner, approved, and implemented.

Provide adequate facilities and equipment in the auditorium, music room, locker rooms, art rooms, science rooms, and guidance/special education areas.

STATUS: COMPLETED (TO THE EXTENT POSSIBLE WITHOUT A NEW BUILDING)

With reference to the auditorium, we have installed a new sound system, fireproofed the curtains, and installed new exit signs. We have temporarily repaired seating, but have no plans to install new seating at this time, as a new auditorium would be a part of either a renovation or a new building in the future. The auditorium now can safely hold less than half the student population. That cannot be remedied without renovation or expansion.

With reference to the music room, we have installed all new instrument storage lockers, installed all new carpeting, and repainted the room. The music room is now 100% functional and secure.

With reference to the locker rooms, we have installed all new lockers, repainted the entire area, made modifications to the trainers room to provide a more functional and healthful environment, added team rooms on the girl's side to create more equitable facilities between the boys and girls. As part of the locker room project we enhanced the lighting of the lower gym by installing new windows around the exterior of the gym, by repainting the area, and also by increasing the electrical light capacity. We also added new flooring to the lower gym and a new electric divider that allows the space to be used by more than one class or team at one time. The locker rooms are now adequate to our needs.

With respect to the art rooms, we have purchased new purposefully designed art and photo storage cabinets that allow more materials to be stored in a smaller space. Any modification of the rooms themselves to include more storage area will only be possible with a new facility. A completely new ventilation system that complies with all regulations has been installed and will completely alleviate the previous ventilation issues. In addition, we have redesigned the Ceramics room with particular attention to the kiln and pottery wheel area. The redesign includes substantial modification to the ventilation system in that area completely alleviating any health, safety, or ventilation issues. Still the art rooms are cramped and inefficient. They cannot be fully adequate without renovation or expansion.

With reference to the science rooms and laboratories, it is impossible to redesign the space itself. The actual design of the space is a driving force in the recommendation for a new building made by the Feasibility Study Committee to the School Committee. However, through a grant from the Concord Ed Fund, we have purchased and installed the following technology to enhance the laboratory experience for the students and to expand the instructional opportunities for the teachers:

11 Activboards/Ibooks/Projectors
12 14" Ibooks/Apple Care
7 InFocus Projectors
3 Laser Jet Printers
12 Inspiron 2200 Laptops
32 Optiplex MiniTower Computers
8 digital Microscopes

Also with reference to the science rooms, we have corrected the ventilation problems, provided fireproof storage for all explosive and corrosive chemicals, and conformed to all fire and health standards as certified by inspection of the Concord Fire Department.

With respect to the special education rooms, we have redesigned the sped tutorial center to provide quieter and more confidential workspace for tutors and students. We have made a third conference area available to special education staff in order to provide more meeting space and more confidential meeting space. To increase the office space, to increase the number of offices, or to increase special education student space is impossible within the current facility.

With respect to the guidance offices, the necessary addition of offices, creation of larger space, or creation of more offices with windows to the outside is not possible within the current facility.

Implement a system for reciprocal instant communication throughout the entire building.

STATUS: COMPLETED

This past spring town meeting approved a sum of money to complete a variety of capital projects at Concord-Carlisle High School for the purposes of improving safety within the building. One of the projects was to install a phone in every room. Using this phone every classroom is immediately connected to the office, the nurse's office, and any other room in the building. The communication can occur in either direction. An added feature is that whenever 911 is dialed from any phone in the building, in addition to the notification to the police and fire personnel, there is automatic notification to the front office and the nurse's office that 911 was dialed and from where it was dialed.

MISSION STATEMENT

The mission of the Concord Public Schools and the Concord-Carlisle Regional School District, as partners with our families and communities, is to maximize each student's opportunities for intellectual and personal development, so as to perform effectively in and become productive citizens of a rapidly changing world, by providing a rigorous and varied educational experience as measured against best educational practices, guided by highly competent and caring staff in a supportive and safe environment consistent with the communities' historic commitment to social consciousness, mutual respect, intellectualism, and public education.

COMMITMENT

Investing in intellectual and personal development and participating in school and community

CITIZENSHIP

Working together for the common good

HARMONY

Contributing to a safe and respectful environment

SCHOLARSHIP

Learning in a varied and personally challenging academic program

Approved 10/7/02

Expectations

1. Reads analytically

2. Writes effectively

3. Uses problem solving skills, including the scientific method of inquiry

4. Expresses oneself through the arts

5. Has an understanding of other cultures and/or languages in addition to one's own

6. Understands how societies develop, function, and govern themselves

7. Uses technology to facilitate learning

8. Has the skills to make decisions and engage in activities that support a healthy and safe lifestyle

9. Participates in the life of the school community and the community at large

Significant Strengths and Achievements

Report on strengths/achievements that are significant.

This past year was an exciting and productive year at CCHS. Concord Carlisle High School added program to the Master Schedule, continued with noteworthy accomplishments, and continued to plan for the future. The annual enrollment has grown by about 20 between October 1, 2004 and October 1, 2006. The condition of the building remained substantially unchanged. Therefore, the School Committee continues to explore options for renovation or new building for the high school facilities. They will be setting specific timelines this year as stated in a District Goal.

In December of 2004 the School Committee charged a committee of citizens from both Concord and Carlisle with the task of completing a feasibility study by June 2005. The purpose of the feasibility study was to determine what actions would be fiscally responsible with regard to addressing building issues. They deliberated throughout the spring, considering the most recent building proposal, determining ongoing and predictable maintenance and safety issues for the building, and comparing relative costs of necessary renovation to the cost of building a new facility that addresses all programmatic needs. The Feasibility Committee was chaired by Nancy McJennett and employed the services of SMMA, a design and architectural firm. In June the committee presented a final report to the school committee with a unanimous recommendation that building a new facility, located on the current CCHS campus, was the most cost effective option in spite of the cost. A new facility would address all programmatic needs in addition to the actual facility needs. The School Committee gratefully accepted the recommendation but did not definitively establish their course of action.

In the meantime CCHS continues to address those needs whose correction will be transferable to a renovated or new building and/or those needs that are directly related to the health and safety of the students and faculty. As the year began the new Foreign Language Lab was fully installed and operational. The new lab is completely digital, offering many new opportunities for educational program enhancement for the languages. The new lab consists of technological hardware and software that could be moved to a different environment if necessary. Foreign Language teachers attended several training sessions and have made the new lab a regular feature of their lesson presentation. Another much needed project was the replacement of lockers in both boys and girls locker room areas and renovation of the lower gym. These projects have greatly enhanced the athletic facilities both in appearance and in functionality. An additional project approved by town meeting but not completed this fall is the replacement of both the outside and the inside bleachers. Again, these would be transferable to a new building. We expect the work to be done in the spring of 2006. Each of these projects is an example of prudent management of resources, addressing existing problems with an eye to the future. More importantly, every issue regarding student or building safety has been addressed.

There is a never-ending growth in the use of technology as a teaching tool. Through the generosity of the Concord Education Fund and Parents' Association Grants we added numerous Activboards, iBooks, InFocus Projectors, Laser jet Printers, digital microscopes, and many other items to classrooms throughout the school. The science department alone received a grant of almost $100,000 from the Concord Ed Fund. The Activboards are a recent invention that allows what used to be a blackboard to act as a computer, storing and retrieving information and accessing web sites. Many of the teachers have been trained and have been expanding their knowledge of the boards potential through constant classroom use. We will have every room in the school equipped with an Activboard before the end of October 2006. These teaching tools are revolutionizing the way students access information and the way teachers can present concepts.

The years 2005 and 2006 provided the first opportunity in several years to add to the program at CCHS. While the additions were very modest it was most gratifying to be able to add a Drama Program, a choral course, a computer skills course, a music course, two new Physics courses, two new aquatics courses, and two technology driven art courses to the academic offerings. Of course, the Concord-Carlisle High School staff continues to review and revise programs. Enrollment in the Chinese language program continues to grow. For the first time last spring CCHS sent a student group with Chinese language skills to visit China. Two of these students returned to China in March 2006 to spend a month teaching English to young children. The Freshman World Cultures course and the Freshman English course were revised. World Literature was taught for the first time. Special Education services offered through the SSERC and MARC were revamped to include more direct instruction by highly qualified staff. The special education tutorial room now represents a true Study Skills Center. Health and Fitness added Project Adventure to the curriculum and created a Yoga and Stress Management Club open to both faculty and students. They also implemented two water based fitness activities, taking advantage of the opening of the new swimming facility.

In addition to adding academic program we were able to add a variety of athletics, clubs, and activities. We added girl's Ice Hockey, Boy's and Girl's Indoor Track, and Freshman Girl's Volleyball. These sports beginning December

2005 and September 2006 have generated terrific student response. Clubs that were either added as a new program or funded for the first time include the Art Club, the Dance Club, the Third Wing, the History Reading Group, the Psychology Reading Group, the Teach Our Youth Science (TOYS) Club, the Multi-Cultural Reading Group, the Film Club, Interact (a community service group), the Knitting Club, Chickenscratch (a writing club), and a Book Pals Club. Each of these sports or activities helps in some way to keep our students connected to the school in a meaningful way.

It is a great pleasure to report that our students continue to excel. In fact they are excelling more than ever. The performance of CCHS students on the MCAS exams remains among the very best in the state. Every member of the class of 2005 achieved a passing grade, meeting the state graduation requirement. Every member of the class of 2006 received a passing grade, meeting the state graduation requirement. Every member of the class of 2007 already met state standards. The results of the class of 2008 have been even better, as our AYP Index Score continues to rise. Regardless, we remain committed to the extraordinarily small percentage of CCHS students who do not initially achieve passing scores. MCAS remediation will continue to be a factor in programming at the High School. This year we were able to continue an English Language Arts program for freshmen and sophomores that is specifically designed to preemptively address potential problems. We have strengthened our mathematics support in the MARC by adding a fully certified teacher working as a tutor and by adding support within selected classes. Additionally, department chairs and their staff analyze the scores to determine if programming and curriculum adjustments are necessary.

Among the special achievements was the selection of two CCHS seniors among the 600 national winners of the National Council of Teachers of English award for outstanding writing. This was the fifth consecutive year that the NCTE has honored at least one CCHS student, and the English Department. We were one of only two schools in Massachusetts that had two winners. In addition to that unique award, the School noted with pride the outstanding achievement of student groups. The Concert Band earned its 15th consecutive gold medal, and the Repertory Band earned its fourth gold medal at the annual music festival sponsored by the Massachusetts Instrumental and Choral Directors' Association. Meanwhile, in 2005 the Chorus traveled to Prague, Vienna, and Saltzburg performing at a variety of venues in each city, and absolutely wowing the audiences. As good will ambassadors and talented musicians they ably represented CCHS. The band travels to Japan in 2007 for the second time in three years. Drama was presented in its usual excellence. The students performed plays selected from very different dramatic forms. Their major musicals have included West Side Story and Barnam. The dramas included horror with a spine tingling production of Dracula and a side-splitting show titled Little Shop of Horror and tradition with a terrific performance of Hamlet. Each production played before enthusiastic audiences.

Students continued to impress in many already existing club or activity opportunities. Eight art students won Boston Globe Scholastic Art Awards, including Silver Key recipients; one was chosen to participate in the Art All State Program sponsored by the Worcester Art Museum; and student work was exhibited at the Concord Public Library, the Concord Art Association, the Anderson Photography Studio, and the Boston Center for the Arts. The Science Olympiad Team finished second in the State Championship Tournament. A record number of CCHS students qualified for the American Invitational Mathematics Exam. The Cheerleading Team entered competitive tournaments for the first time and produced trophy-winning results.

Our athletic program continues to be very successful. The Varsity Girls' Cross Country Team was DCL Champ and second in Emass Division II. Varsity Volleyball qualified for the tourney for only the third time. Boys Soccer qualified for the state tourney for the 23rd consecutive year. The Varsity Girls' Cross Country Ski Team finished 4th in the State Championships. The Girls' Alpine Ski Team was runners-up in the State Championships. The Varsity Girls' Fencing team romped through a championship season and won the State tournament. The Varsity Boys' Fencing Team finished 2nd. The Varsity Wrestlers were 20-2, their best record in many years, winning the Dual County League. The Varsity Softball Team, despite fielding a predominantly underclass squad, were DCL Champions for the sixth time in seven years. The Varsity Boys' Tennis Team were DCL Champs and Division One North champs. The Varsity Girls' Tennis Team won everything they could win in a dominating Division One State Championship run.

The students continue to perform well on all standardized measures of excellence. The class of 2005 had a median score of 611Verbal and 639 Math on the SAT's; both scores represent an improvement from last year. The Class of 2006 scored medians of 606 and 640. More than 70% of the students taking AP tests scored 4 or 5, with 92% scoring 3 or better. In fact, of the 245 students who took a mathematics AP exam in the past three years, 233 scored 4 or 5. Also, over the entire spectrum of exams CCHS students averaged 4.55 out of 5. The College acceptance rate continue to be very high as 88% of the Class of 2005 and 92.4% of the class of 2006 entered four-year colleges and universities, and 2% of each class entered two-year colleges or technical schools. Many of the students not attending college were accepted, but for personal reasons chose not to attend immediately following high school. See the attached information for more specifics.

In addition to all of the above, CCHS students distinguished themselves as caring community members in ways exceeding their previous generations of students. Working through clubs, activities, and on their own, students raised thousands of dollars to aid in the world efforts to fight child slavery and other human rights abuses, to assist UN efforts against the spread of AIDS in Africa, to fight poverty and hunger in Massachusetts, to build schools and orphanages in Cambodia, and to help victims of Katrina in Southeastern United States. They displayed compassion and sensitivity in record numbers. .

CCHS is a remarkable school that excels in every way but the facility that houses it.

POST SECONDARY PLACEMENTS

• CONCORD-CARLISLE HIGH SCHOOL • 500 Walden Street, Concord, Massachusetts 01742 •
Telephone: (978) 341-2490 • FAX (978) 318-1435

PLACEMENT OF RECENT GRADUATES (In Percentages)

Class	Four-Yr. College	Two-Yr. College	Tech School	Prep School	Armed Forces	Employment	Undecided
2003	87.0	6.0	.70	.70	.70	2.0	3.0
2004	89.9	2.6	--	1.1	.75	2.3	3.4
2005	87.9	1.4	--	.67	--	3.7	6.4
2006	92.4	1.9	--	0.6	--	0.3	3.5

POST-SECONDARY EDUCATION PLACEMENTS - CLASS OF 2006

Amherst College
Arizona State University
Assumption College
Babson College
Bard College
Barnard College
Bates College
Benjamin Franklin Institute of Technology
Bennington College
Bethune-Cookman College
Boston College
Boston University
Bowdoin College
Brandeis University
Bridgewater State College
Bryant College
Carleton College
Case Western Reserve University
Catholic University of America
Centenary College
Champlain College
Chester College of New England
Clemson University
Colby College
Colgate University
College of Mount Saint Vincent
Colorado College
Connecticut College
Cornell University
Curry College
Cushing Academy
Daniel Webster College
Dartmouth College
Dean College
Dickenson College
Drew University
Duke University
Earlham College
Eckerd College
Elmira College
Elon University
Emerson College
Emmanuel College
Fairfield University
Fitchburg State College
Fort Lewis College
Franklin & Marshall College
Franklin Pierce College
Georgetown University
Gettysburg College
Green Mountain College
Guilford College
Hampshire College
Hampton University
Hartwick College
Harvard College
Hobart & William Smith College
Hofstra University
Ithaca College
John Carroll University
Johns Hopkins University
Johnson & Wales University
Keene State College
Le Moyne College
Lehigh University
Lynchburg College
Lyndon State College
Massachusetts College of Liberal Arts
Massachusetts Institute of Technology
McGill University
Middlebury College
Middlesex Community College
Mount Holyoke College
New York University
Northeastern University
Northfield Mount Hermon
Northwestern University
Norwich University
Oberlin College
Old Dominion University
Pennsylvania State University
Pomona College
Pratt Institute
Princeton University
Providence College
Queen's University at Kingston
Quinnipiac University
Radford College
Regis College
Rensselaer Polytechnic Institute
Rhode Island School of Design
Roger Williams University
Rollins College
Sacred Heart University
Saint Anselm College
Saint John's University
Saint Joseph's University
Salem State College
Salve Regina University
Santa Clara Unversity
Sarah Lawrence University
Siena College
Simmons College
Skidmore College
Smith College
Spelman College
St. Anselm College
St. Lawrence University
Stanford University
Stonehill College
Suffolk University
SUNY-Cortland
SUNY- Delhi
SUNY-Purchase
Syracuse University
The American University
The George Washington University
Trinity College
Tufts University
Union College
University of Alabama-Birmingham
University of Arizona
University of Charleston
University of Chicago
University of Colorado at Boulder
University of Connecticut
University of Delaware
University of Denver
University of Georgia
University of Hartford
University of Massachusetts – Amherst
University of Massachusetts – Boston
University of Massachusetts – Dartmouth
University of Massachusetts – Lowell
University of Miami
University of Michigan
University of New Hampshire
University of North Carolina-Greensboro
University of Notre Dame
University of Oregon
University of Pennsylvania
University of Redlands
University of Richmond
University of Rochester
University of Southern California
University of Tampa
University of the Arts
University of Vermont
Vanderbilt University
Wake Forest University
Washington University in St. Louis
Wellesley College
Wesley College
Wesleyan University
Westfield College
Wheaton College
Williams College
Worcester Polytechnic Institute
Yale University

GPA RANGE - CLASS OF 2007

• CONCORD-CARLISLE HIGH SCHOOL • 500 Walden Street, Concord, Massachusetts 01742 •
Telephone: (978) 341-2490 • FAX (978) 318-1435

Beginning with the Class of 1997, rank in class information will no longer appear on transcripts. Histograms will be included to provide comparative information about achievement. The distribution of unweighted and honors weighted GPAs in both chart and histogram format appears below.

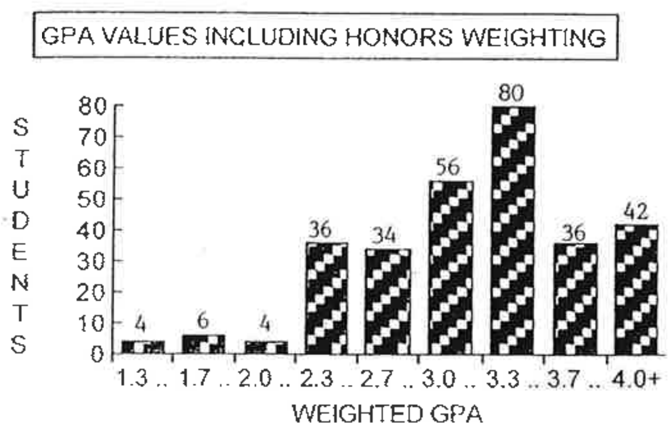
WEIGHTED VALUE takes into consideration those grades received for **HONORS COURSES ONLY.** A conversion table is provided below to indicate the value assigned to grades earned in honors courses. A grade of "P" (Pass) is NOT considered in grade point average computation

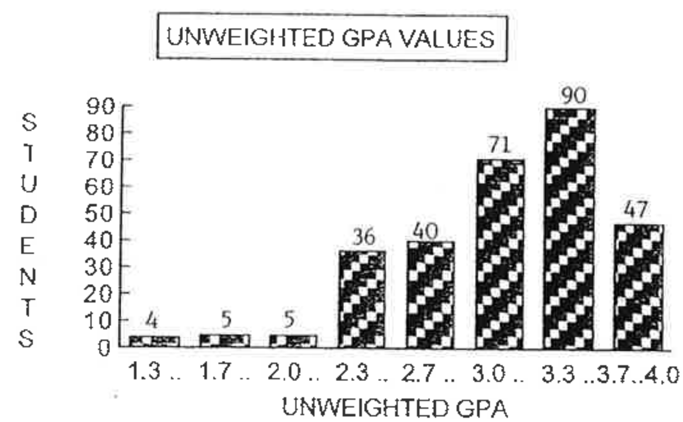
CHART FORMAT

Unweighted GPA Range	# of Students	Weighted GPA Range	# of Students
3.7 - 4.0	47	4.0+	42
3.6 - 3.3	90	3.9 - 3.7	36
3.2 - 3.0	71	3.6 - 3.3	80
2.9 - 2.7	40	3.2 - 3.0	56
2.6 - 2.3	36	2.9 - 2.7	34
2.2 - 2.0	5	2.6 - 2.3	36
1.9 - 1.7	5	2.2 - 2.0	4
1.6 - 1.3	4	1.9 - 1.7	6
		1.6 - 1.3	4

GRADE	UNWEIGHTED VALUE	WEIGHTED VALUE
A+, A	4.00	4.66
A-	3.66	4.33
B+	3.33	4.00
B	3.00	3.66
B-	2.66	3.33
C+	2.33	3.00
C	2.00	2.66
C-	1.66	2.00
D+	1.33	1.66
D	1.00	1.00
D-	0.66	0.66
F	0.00	0.00

HISTOGRAM FORMAT – CLASS OF 2007





CLASS PROFILE

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NATIONAL MERIT SCHOLARSHIP PROGRAM – 2006

2 Scholarships - 4 Finalists – 4 Semifinalists - 28 Letters of Commendation

SUMMARY OF COLLEGE BOARD SCORES BY CLASS

	2004					2005					2006		
	SAT I		SAT II			SAT I		SAT II			SAT I		
	V	M	WR	MIC	M2C	V	M	WR	MIC	M2C	CR	M	W
750-800	08	20	14	01	18	17	36	21	--	34	17	32	13
700-749	27	29	27	11	11	37	45	37	11	18	34	48	43
650-699	42	59	26	14	14	47	43	25	17	06	48	57	37
600-649	38	48	34	19	16	50	55	30	19	07	55	53	54
550-599	50	39	16	13	04	50	35	20	09	08	57	28	53
500-549	43	24	19	11	01	31	27	08	13	01	27	26	35
450-499	15	11	07	04	01	25	17	05	02	-	30	15	27
400-449	20	15	02	02	-	13	10	01	01	-	13	20	16
350-399	03	01	01	-	-	05	03	01	-	-	10	11	10
300-349	03	-	-	-	-	02	03	-	-	01	3	4	5
250-299	01	04	-	-	-	01	03	-	-	-	-		-
200-249	-	-	-	-	-	01	02	-	-	-	-	-	-
Medians	589	632	655	642	688	611	639	659	647	714	606	640	600

ADVANCED PLACEMENT RESULTS

During 2004, 2005 and 2006 CCHS students sat for 727 Advanced Placement exams in 6 subject areas. A chart summarizing the results of those exams appears below:

AP Scores

Discipline	5	4	3	2	1	Total
Art		3	1			4
English	24	40	26	8	0	98
Foreign Lang.	24	36	57	33	9	159
Math	186	47	8	3	1	245
Science	95	61	39	9	1	205
Social Studies	6	3	3	2	2	16
Totals	335	190	134	55	13	727
Percents	46.1%	26.1%	18.4%	7.6%	1.7%	

Overall, 72.2% of AP exams were rated 4 or 5.

Reform Initiatives

Reform Initiatives reported to NEASC as part of the two-year report.

There have been two major reform initiatives, aside from the usual rewriting of curriculum and information mentioned in the strengths and achievements report.

Achievement Gap

Nearly every school in the country can document an achievement gap whereby certain minority groups and or socio-economic groups score less well on standardized measures and/or on local assessments. Concord-Carlisle High School is no exception. After substantial data collection we determined that on a variety of measures our African-American and Hispanic students as well as our socio-economically disadvantaged students were scoring substantially less than our Caucasian students on a variety of measures. The measures include MCAS exams, PSAT and SAT tests, AP exams, and local assessments as reported in quarterly grades. While we found that the difference in achievement was not as large at CCHS as is reported nation-wide, it is none-the-less a concern because we are committed to all students doing well.

In response we gathered a committee of educators who met and strategized possible interventions. We conducted multiple large group and small group meetings with the students in question. We also conducted individual interviews with the students in question. This year we have begun several initiatives, which we hope will, at the very least, begin to address the discrepancy and, at the most, resolve the situation. We made several interventions. Beginning last fall (2005) we hired a tutor to work specifically with our African-American and Hispanic students. Beginning last spring (2006) we counseled identified students into more advanced classes with support. Beginning this fall (2006) we established a "mentor" program that includes a teacher and upper-class students from Boston working with the underclass students from Boston. Beginning this fall (2006) we have implemented an after school tutorial program taught by our teachers and required for students earning a D or F in any class. Data gathered last June informed us that we had already made a significant difference in the achievement of these students as reported by their fourth quarter and end of year grades (fewer D's and F's and a grade point average almost a half grade higher than before).

Special Education Support

The support we identified as needing change or modification, based on teacher observations, student response, and parent response is the work we do within our special education tutorial center. We found that our tutors needed additional training and that we needed to have special education teachers more closely involved in the tutorial center. We did both. We hired a fully certified and experienced mathematics teacher to staff our Math Resource Center (MARC) full time. We assigned a special education teacher full time to the Special Education tutorial room. The teacher regularly trains special education tutors in a variety of intervention strategies. The teacher also supervises every process and procedure occurring in the tutorial room. Last March the Mass DOE visited us for a Coordinated Program Review mid-cycle review and were very pleased with what they saw. To date we do not have enough data to quantify a difference, but initial reports from students, parents, and teachers are very favorable.

Follow-Up Program

Description of Follow-Up Program reported to NEASC as part of the two-year report

Because this two year report is due about one and a half years after receipt of the visiting committee report, which includes two summer vacations, the follow-up to the NEASC Report had to begin immediately after we received the report. The initial stages included sharing information with staff, parents, students, community members, and the School Committee. Some of this was done through formal meetings (faculty meetings, School Committee meetings, etc,), and some was done more informally (newsletters to parents, local newspapers, etc). Within a few weeks after receiving the report, every major constituency had been apprised of the commendations and recommendations included.

Within a very short time we formed a committee of interested teachers representing every department to act as the Faculty Steering Committee throughout the follow-up. We also organized a strategically important committee of citizens and school department employees to act as the Facility and Safety Committee to address the various recommendations. The Facility and Safety Committee, which included the police chief, fire Lieutenant and Concord building inspector, began meeting during the summer of 2005 to discuss each of the recommendations with particular emphasis on facility and safety. Through this citizen group we were able to specifically identify the facility issues that were correctable, make recommendations to the business manager and school committee regarding necessary funding for repairs, and effectively build the case for the need for the repairs, based on their expert advice. Through their work the School Committee was able to effectively present an argument supporting a request to the town meetings of Concord and Carlisle that resulted in approval of approximately 3 million dollars for facility repairs, even as they continue to discuss a possible new facility. The Faculty Steering Committee began meeting in September of 2005 to discuss all recommendations with particular emphasis on those that addressed curriculum, assessment, and instruction. The Faculty Steering Committee involved every member of the faculty in the discussion as they completed their data and information gathering between scheduled meetings. An additional step was to inform Department Chairs of the conversations and discussions occurring within the committee meetings. In addition, the School Advisory Council, which meets monthly, was regularly informed of work and suggestions emanating from both committees and was regularly solicited for their own thoughts.

The School Advisory Council, which includes teachers, parents, and students, will continue to work on remaining issues throughout this year (and next if necessary). The NEASC Faculty Steering Committee will continue to work for as long as necessary to address all issues.

Committee Members

Facility and Safety Committee

Mr. Arthur Dulong (chair)	Principal, CCHS
Dr. Alan Weinstein,	Assistant Principal, CCHS
Ms. Jessica Truslow	Assistant Principal, CCHS
Mr. David Anderson	Supervisor of Maintenance, Concord and Concord-Carlisle
Mr. Steve Wall	Head Custodian, CCHS
Mr. Len Wetherbee	Chief of Police
Mr. John Minty	Building Inspector, Concord
Mr. Chris Kelly	Lieutenant, Concord Fire Department

Faculty Steering Committee

Mr. Arthur Dulong (co-chair)	Principal, CCHS
Dr. Alan Weinstein	Assistant Principal, CCHS
Mr. Brad McGrath (co-chair)	Guidance Counselor
Mr. Jere Mead	Foreign Language Teacher
Ms. Diane Tomaz	English Teacher
Mr. John Lindner	Art Teacher
Mr. Richard Kerr	Health and Fitness Teacher
Mr. Neil Lynch	English/ELL Teacher
Ms. Rachel Siff	Special Education Social Worker

School Advisory Council

Mr. Arthur Dulong	Principal, CCHS (co-chair)
Mrs. Sharon Trainor	Secretary, CCHS
Mr. Kevin Pennucci	Science Teacher
Mrs. Harriet Stevens	Special Education Teacher
Ms. Dora Golding	English Teacher
Ms Laurie Giunta	Mathematics Teacher
Mr. Christian Manchester	Student '06
Mr. Matthew Pennucci	Student '06
Mr. William Mattson	Student ' 07
Mr. Ian Carr	Student '07
Mr. Ray Ferrara	Parent
Mr. Robert Stone	Parent
Mrs. Jane Turner-Michael	Parent (co-chair)
Mrs. Lisa Pearl	Parent
Mrs. Shelley Mogil	Parent
Mrs. Jennifer Hart	Community Member

STATISTICAL DATA SHEET

School: Concord-Carlisle High School **Principal:** Arthur Dulong

City, State: Concord, MA **School Telephone:** 978-341-2490

E - MAIL Address: adulong@colonial.net **FAX Number:** 978-318-1435

Dates of Accreditation Visit: November 14-17, 2004

Grades: 9-12 **School Enrollment:** 1240 at time of the evaluation

Grades: 9-12 **School Enrollment:** 1260 at present time

Based upon the state's definition of a dropout, indicate the dropout rate for the most recently completed school year as well as for the preceding two years:

In each year less than

0.5 % 20 04
0.5 % 20 05
0.5 % 20 06

DISPOSITION OF VISITING COMMITTEE REPORT RECOMMENDATIONS

	Number	Percentage
COMPLETED	26	53.1
IN PROGRESS	16	32.7
PLANNED FOR THE FUTURE	2	4
REJECTED	1	2
NO ACTION	4	8.2
TOTAL	49	100%

Signature of Principal/Headmaster Arthur Dulong

Signature of Chair of Follow-Up Committee Brad McGrath **Position** Guidance Chair

Date Progress Report Submitted 9/27/06

- Community Visioning Summary

LEARNING OUTCOMES

Group #1

- Life Long Learning
- Responsibility
- Happiness
- Critical Thinking
- Opportunities for Learning

Group #2

- Life long learning
- Flexible adaptability/critical thinkers
- Ability to lead symphonic lives
- Appreciative ability to enjoy life
- Intra/interpersonal skills

Group #3

- Confident in main subject areas
- Ability to conduct research, verify info, analyze outcomes
- To be constant and fluid and develop a passion to last a lifetime
- Ethics/responsibility and environmental stewardship
- Mastery of the basic three R's

Group #4

- Critical Thinking
- Communication skills
- Judgement/evaluation/awareness
- Teamwork and collaboration
- Adaptability & flexibility

Group #5

- Curious confident contributors
- Flexible and adaptable learners
- Foundation skills
- Students ability to transfer skills learned today to experiences tomorrow

Group #6

- Packed and ready – students prepared to go into the world
- Fearless – open to challenges
- Voice – Know themselves and what they want to contribute
- Forward thinking
- Tools, skills and the kit they need to help them get the job done

Group #7

- Strong academic foundation – process
- Global respect and responsibility – social, environment
- Sorting and synthesizing information
- Citizenship, teamwork, collaboration, ethics, historical perspective
- Independence – self confidence, risk taking, use of talents

Group #8

- Good digital citizenship – personal responsibility
- Critical thinking skills - appreciation for the arts
- Global environment issues – how to succeed
- Oral and written communications
- Health – self esteem, dealing with stress and pressures

Summary:

Basics/Fundamentals (30)
Happiness/Appreciative (28)
Global Competence (22)
Leadership (21)
Communication/Teamwork (19)
Life-long Learning (19)
Responsibility/Judgment (19)
Critical Thinking(19)
Flexible/Adaptable (4)
Citizenship (3)

COMMUNTIY NEEDS

Group #1

- Sustainability of Facility
- Sports Recreation Fitness
- Performing Arts
- Adult & Community Ed
- Town Community – CCTV; Emergency broadcast; meeting space; safety shelter

Group #2

- Flexible Space – meeting spaces; community spaces
- Athletics – school and community
- Communications/technology
- Performing & Fine Arts

Group #3

- A Place to be for students
- Sustainable
- Transportation hub

Group #4

- Coffee House – kids meeting place; community space
- Center of the Universe- Arts; sports; civics, etc.
- Enlightenment – for future; energy hub

Group #5

- Community Meeting Space –
- Continuing Ed
- Emergency Shelter
- Gyms and Fields, Ice Rink
- Performing Arts

Group #6

- Theatre – Auditorium, Meeting space
- Recreation/sports/Health & Fitness
- Energy Efficiency
- "Model" building

Group #7

- Community Center – Support local farms, food, early childhood ed, adult ed
- Emergency Center
- Center for the Arts – Theatre

Group #8

- Concept of 24/7
- Air Conditioned
- Looking forward
- Flexible to meet emerging educational needs
- Green
- Spaces that support needs

Summary (Common themes)
Performing Arts
Athletic Center

Place to be
Emergency Shelter
Community Meeting
Community Ed
Sustainability

IDENTIFYING COMMUNITY VALUES

Group #1

- High Performance – Academic/Non-Academic
- Environment
- Vibrant Sense of Community
- Affordability

Group #2

- Sustainable
- Dream Bid – Pursue the possible
- Creativity –funding, space, flexibility,
- Social Contract

Group #3

- Community
- History – self reliance, nature
- Ambitions – teaching, community, zero impact
- Innovation – in design and planning; balance between arts/others
- Our Revolution

Group #4

- Safety
- Attract and retain best educators
- Green and Sustainable building
- Meets educational needs of all the students – alternative ed paths?
- Promotes intellectual curiosity & creativity – Inspires learning

Group #5

- Excellence – cost effective, bang for buck
- Citizenship – activism, tolerance
- Access – community, welcome
- Safety
- Ecology – sustainability; environmental awareness

Group #6

- Sustainability
- Happiness and well-being
- Inclusive – take care of each other
- Pragmatism
- Pride of Place

Group #7

- High Performance – Sustainable value
- Place to see and be seen
- Intellectualism
- Welcoming space
- Service and Caring – philanthropy

Group #8

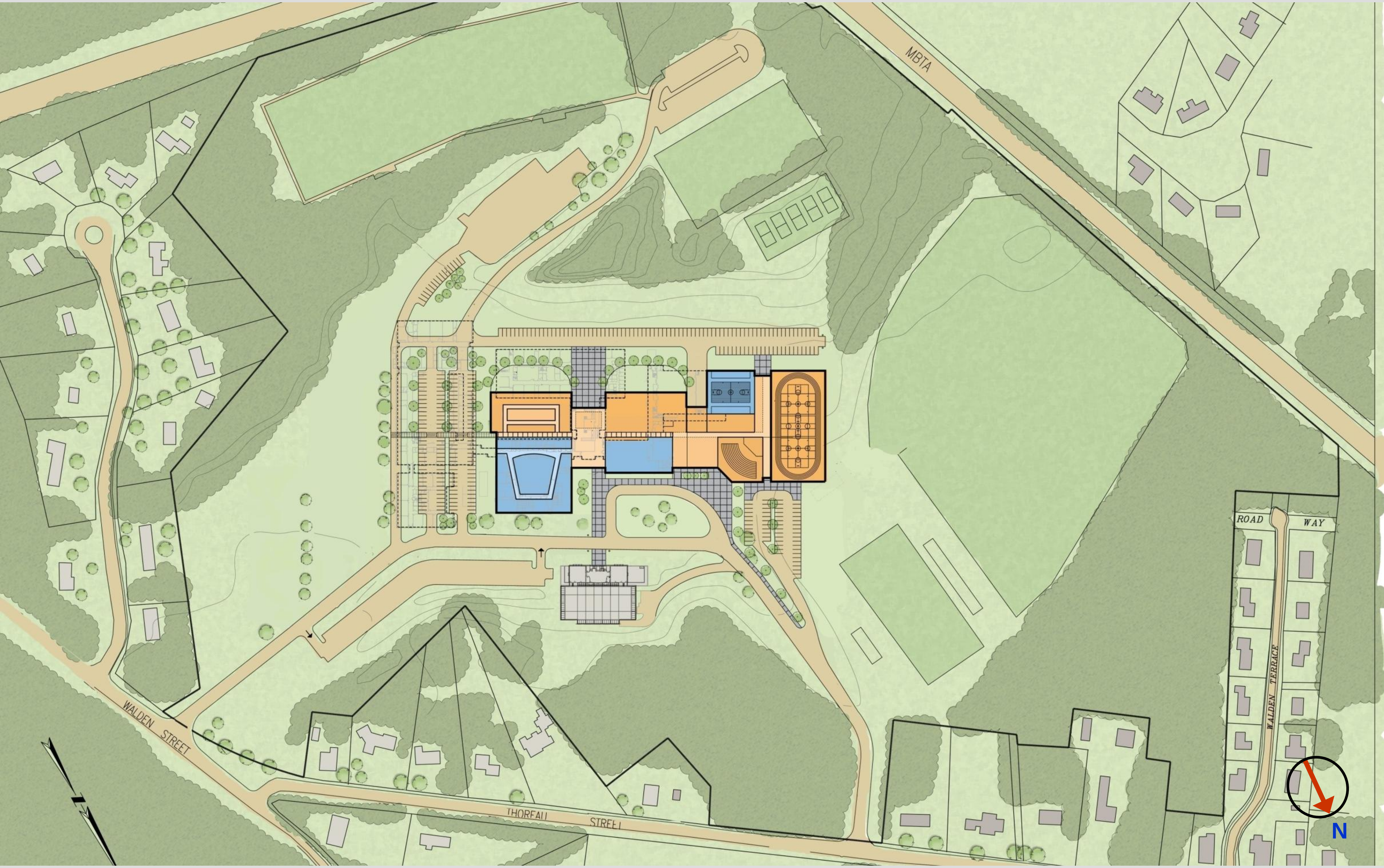
- Comprehensive Facility
- Community and Responsibility – civic pride; sensitivity; fiscal
- Strong Mind – Strong Body – Arts Athletics Community Ed, leadership opps.

Summary:
High Performance (34)
Creativity and Innovation (30)
Sustainability – Green (27)
Activism Social Contract (26)
Community (Main St.) (25)
Whole Being (22)
Affordability (11)
Pride of Place (10)
Safety (3)
Social Contract (2)
Dream Big

- Additional Option Designs

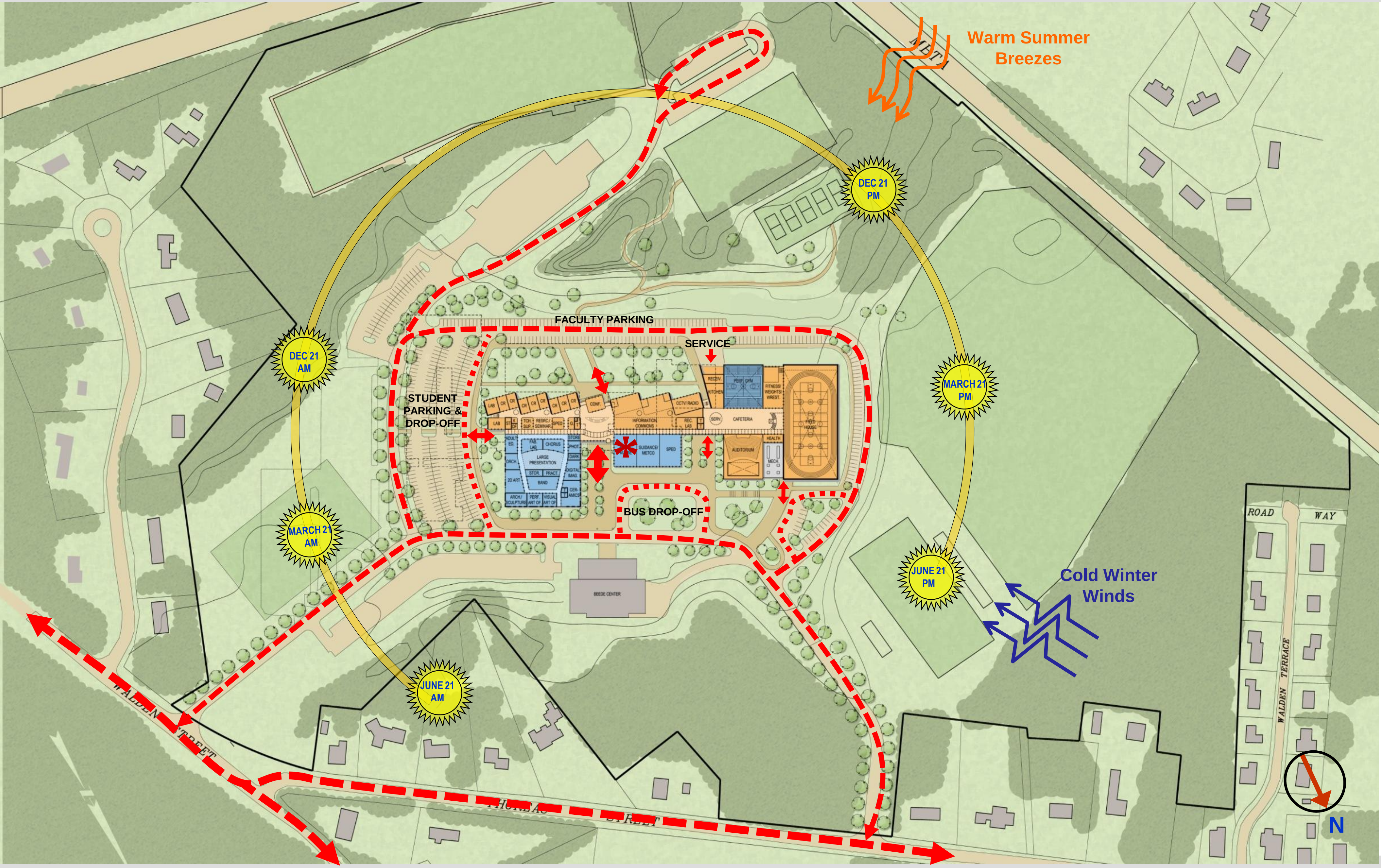
Option F: *Site Plan*

Minor Renovation Major Addition



Option F: *Site Plan*

New Auditorium by Athletics



24 February 2010

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Option F: Main Level

New Auditorium by Athletics

24 February 2010

Concord-Carlisle Regional School District

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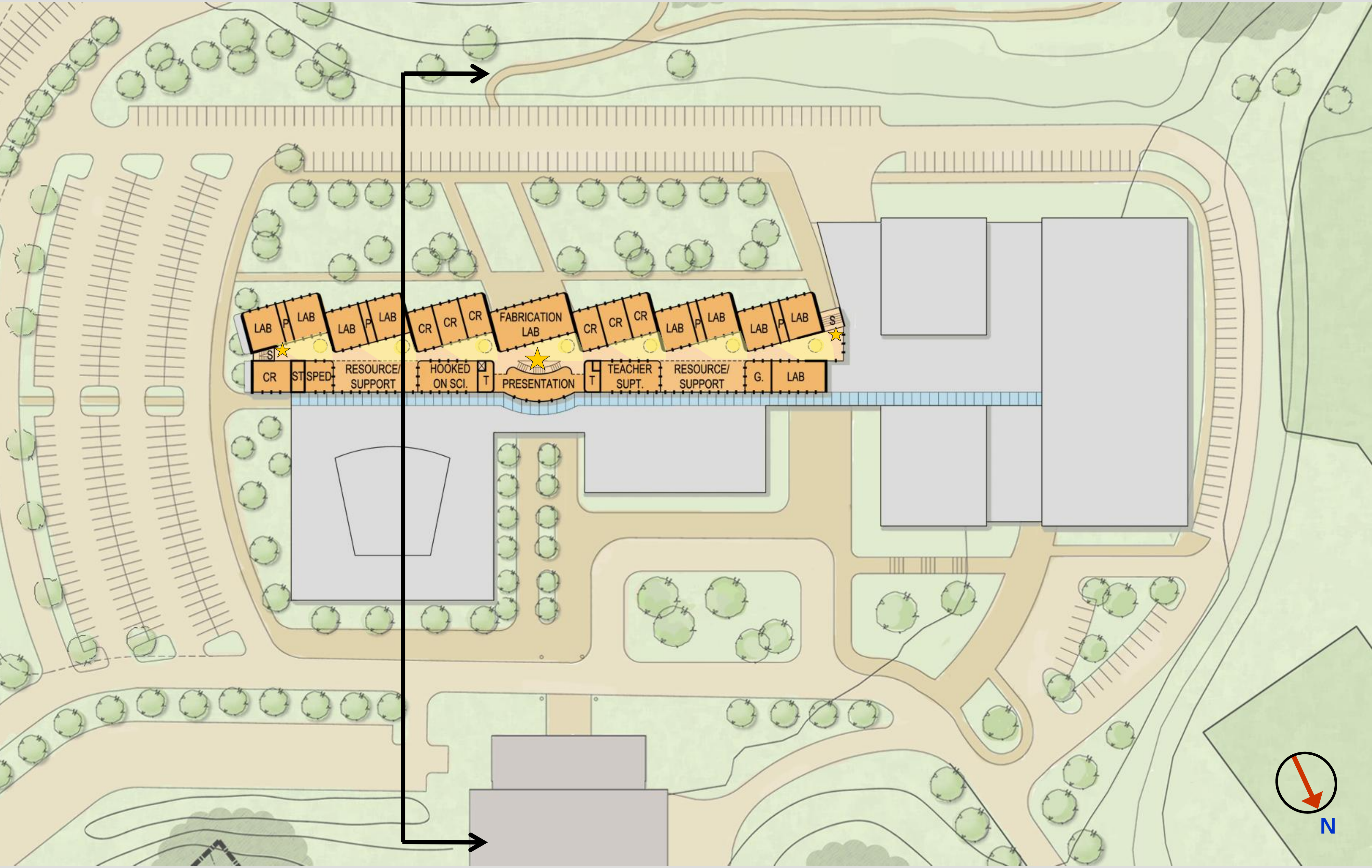
Option F: Second Level

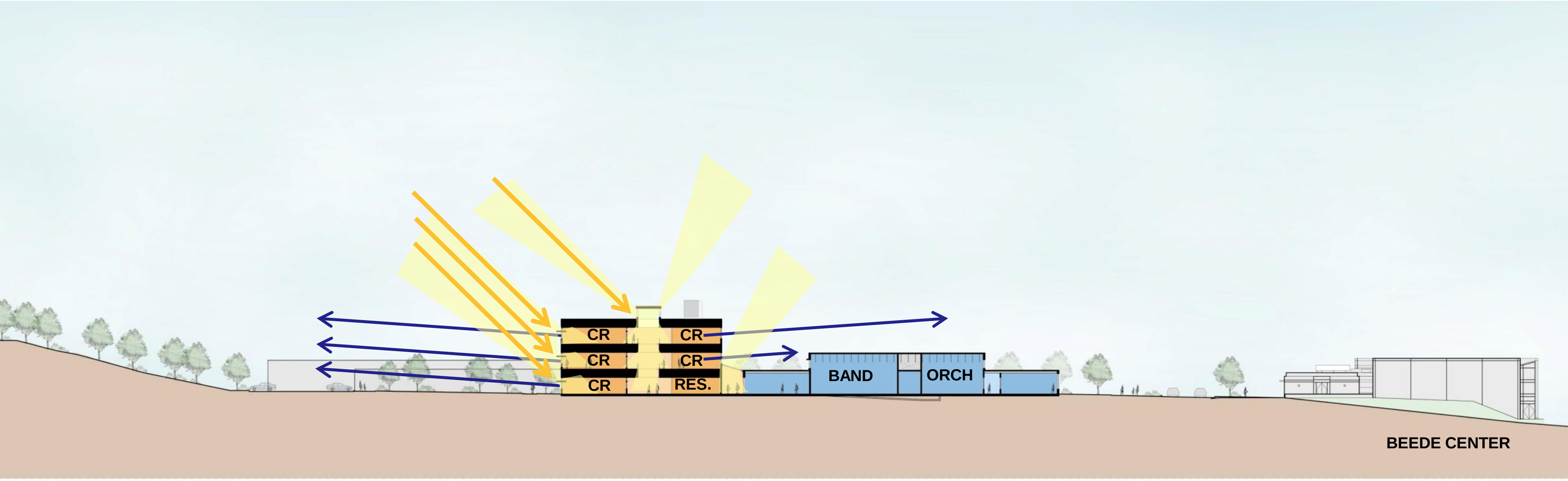
New Auditorium by Athletics

Option F: Third Level

New Auditorium by Athletics



Option F: *Section thru 'A' and new Academic Clusters*

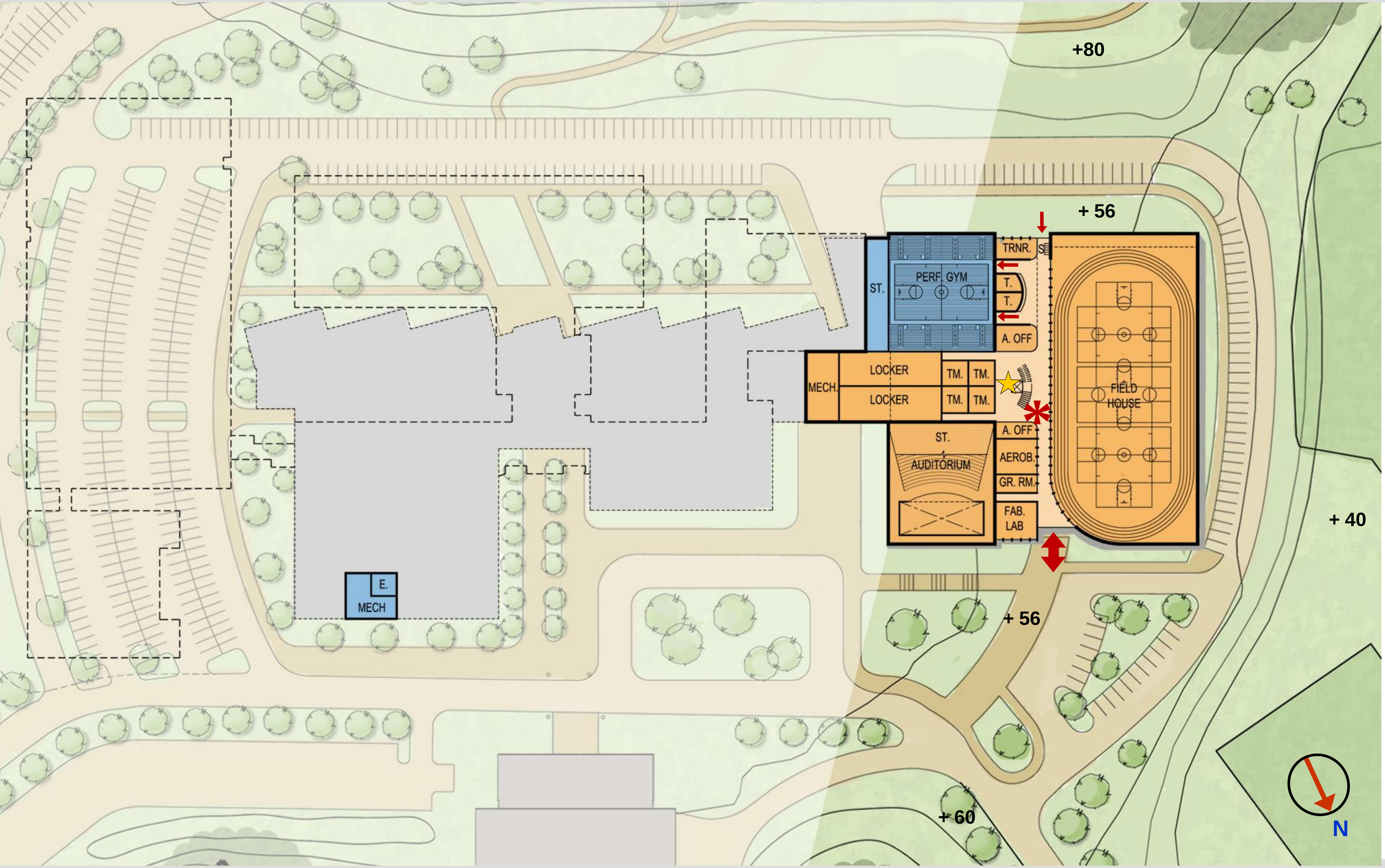


Option F: Main Level

New Auditorium by Athletics

Option F: Lower Level

New Auditorium by Athletics

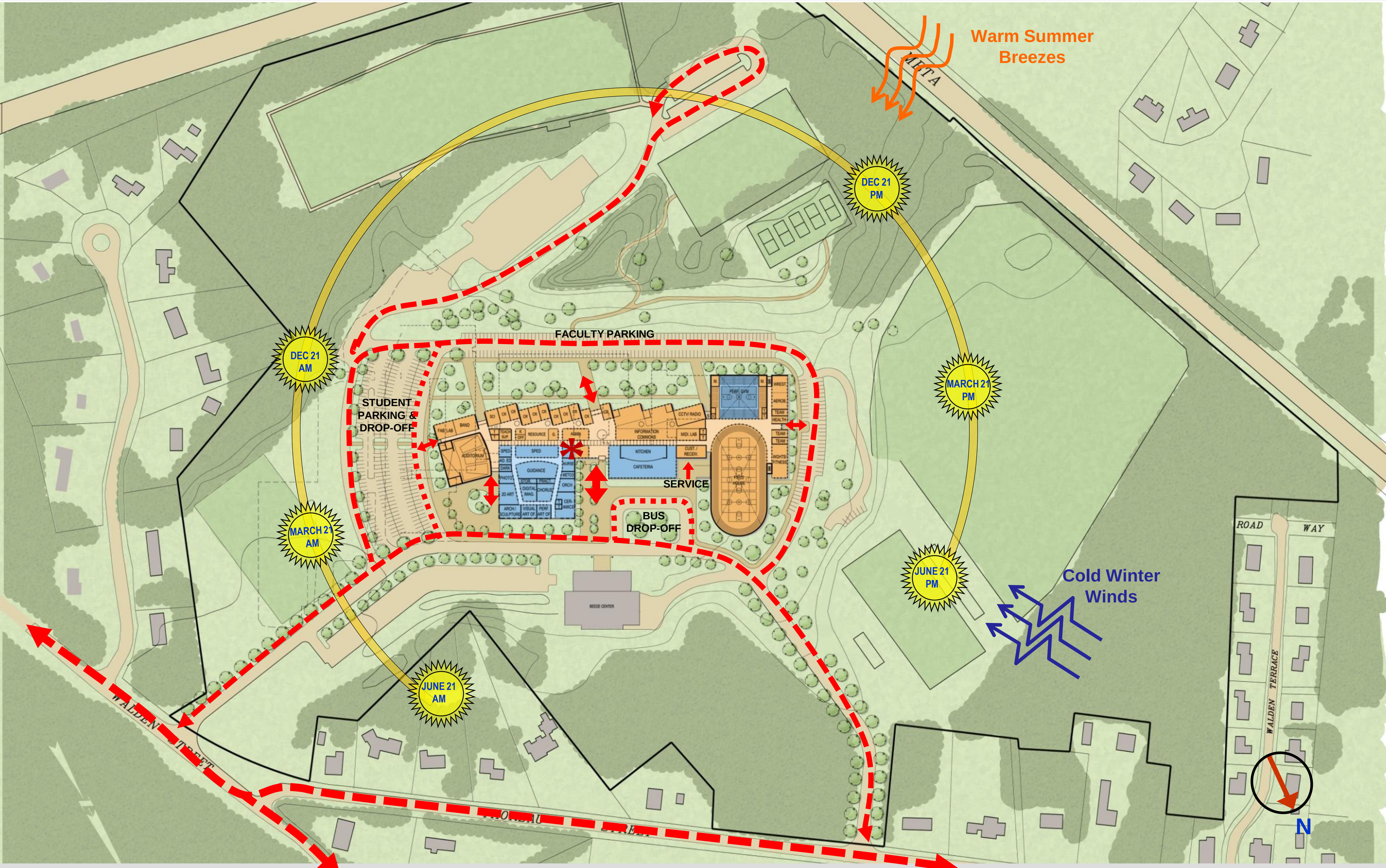


Option F: View from the North

New Auditorium by Athletics

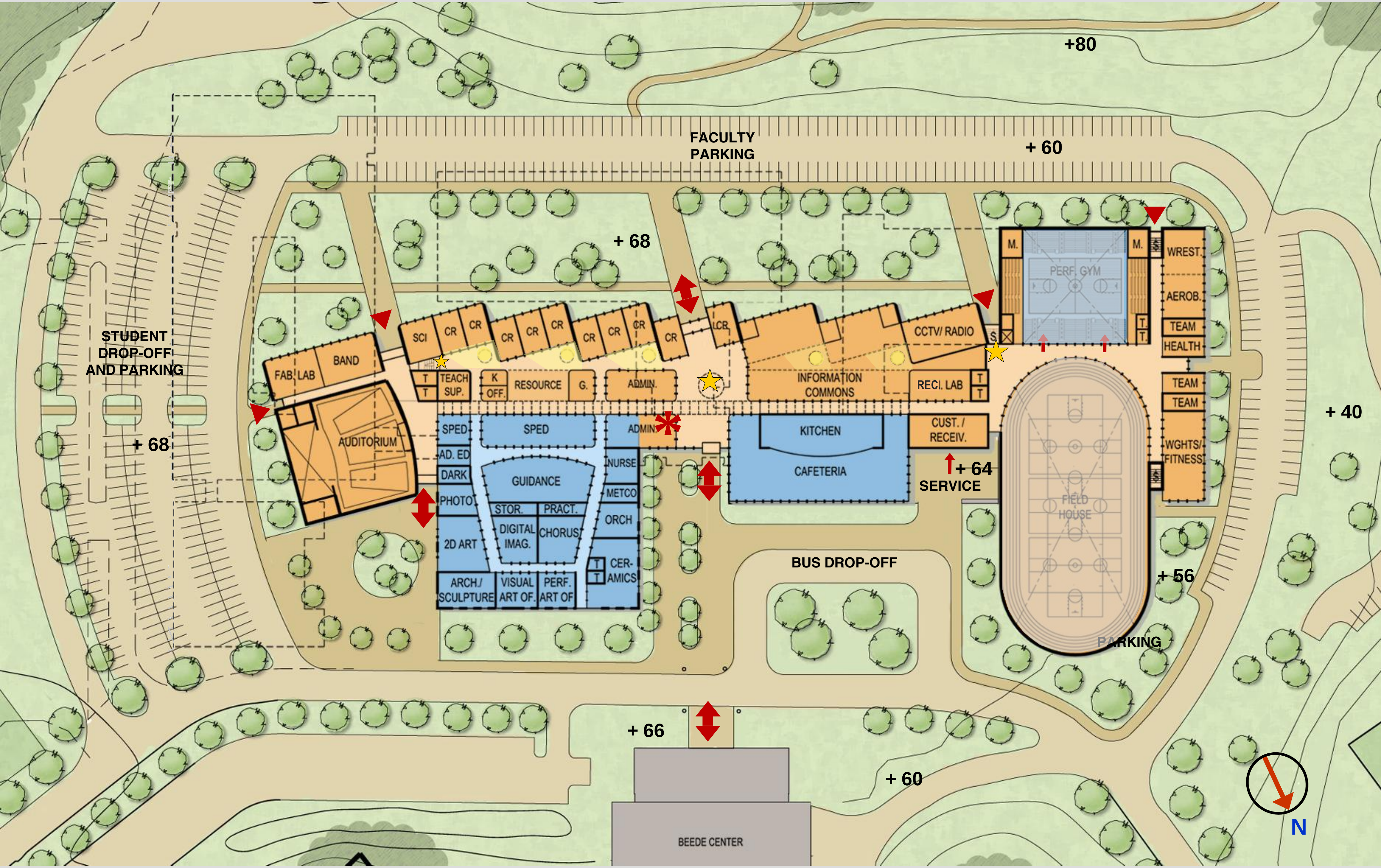
Option F1: Site Plan

New Auditorium by Building 'A'



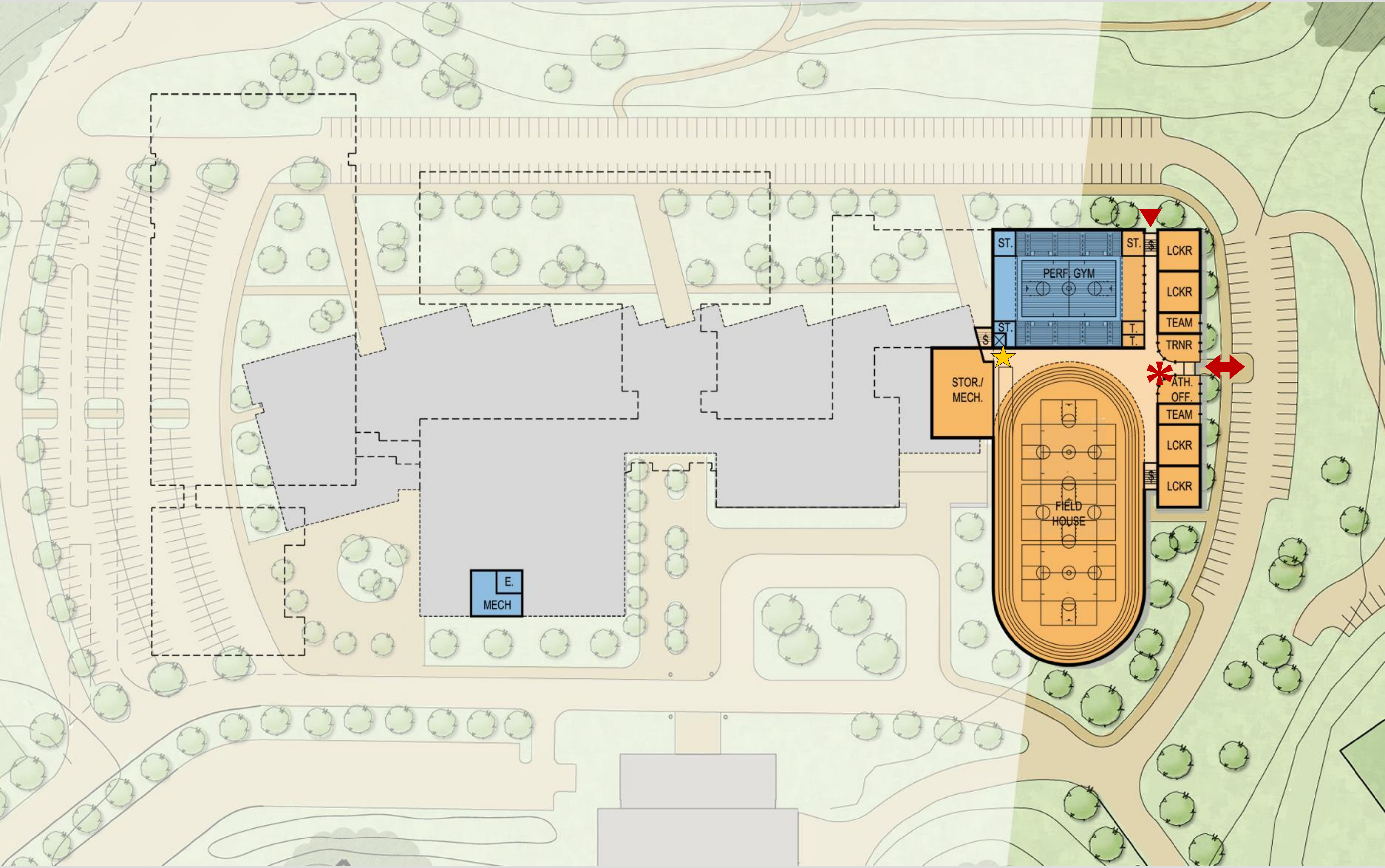
Option F1: Main Level

New Auditorium by Building 'A'



Option F1: Lower Level

New Auditorium by Building 'A'



Option F1: View from the North

New Auditorium by Building 'A'

Option F1: View from the East

New Auditorium by Building 'A'

Option F2: Site Plan

New Auditorium in Building 'A'

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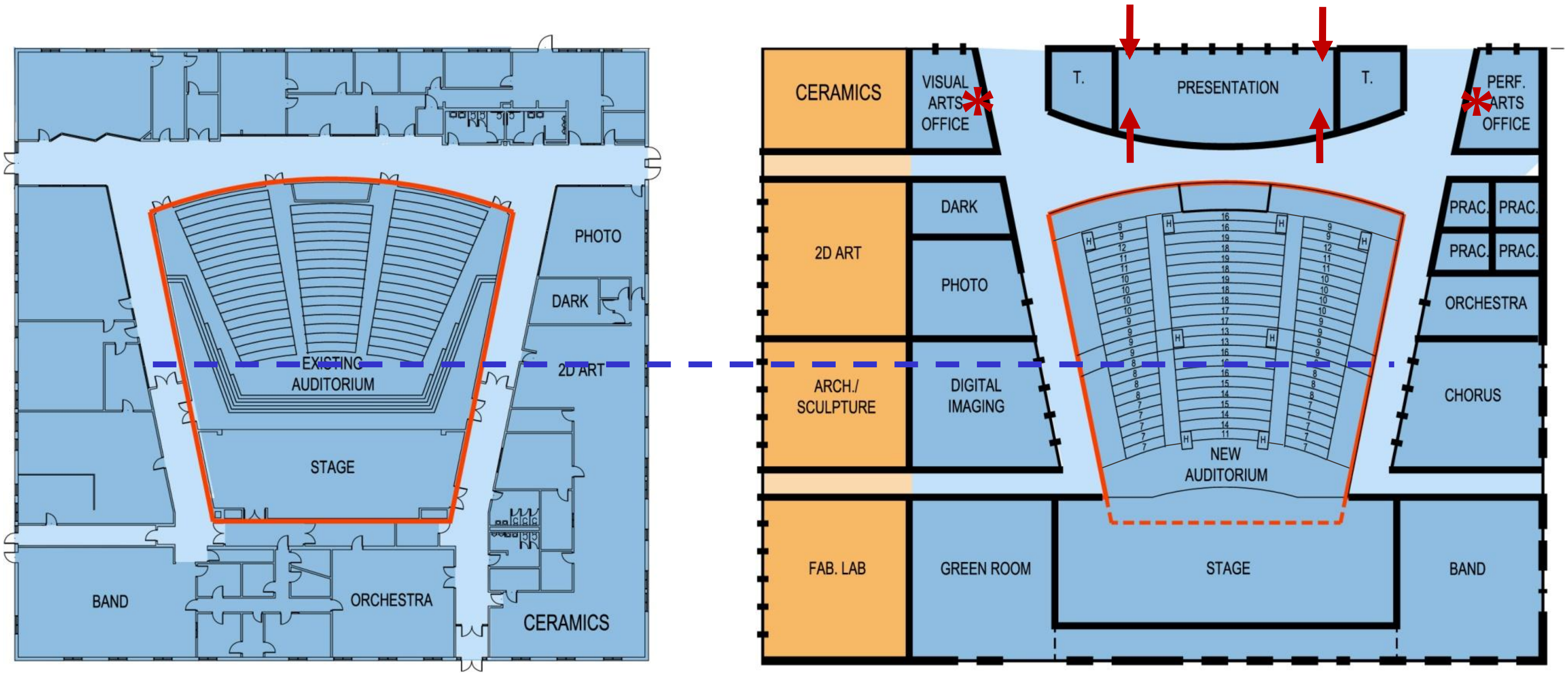
Option F2: Main Level

New Auditorium in Building 'A'

Option F2: Auditorium

New Auditorium in Building 'A'



EXISTING AUDITORIUM

SEATING = 500 +/-

NEW AUDITORIUM

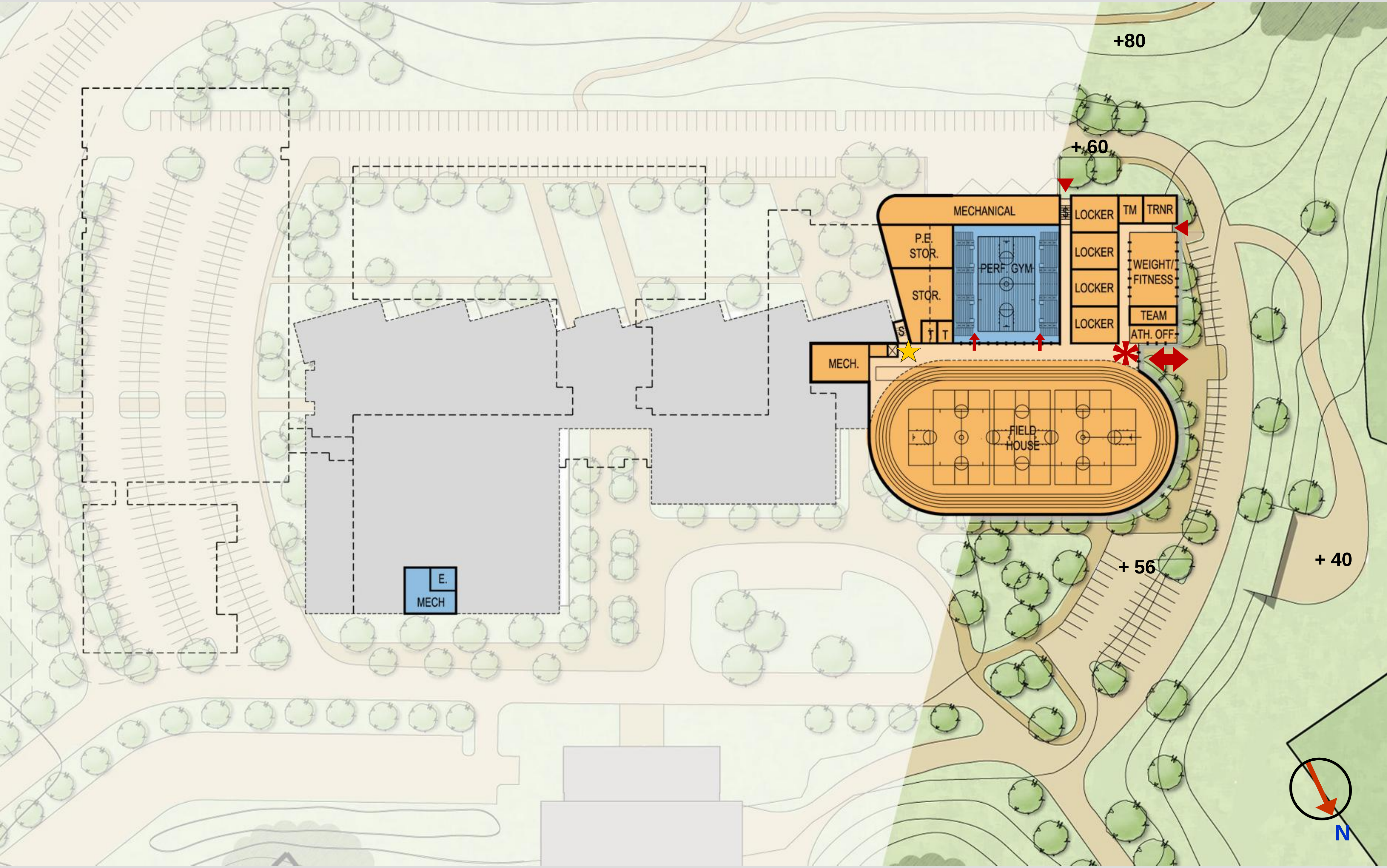
SEATING = 750

Option F2: Main Level

New Auditorium in Building 'A'

Option F2: Lower Level

New Auditorium in Building 'A'



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Option F2: View from the North

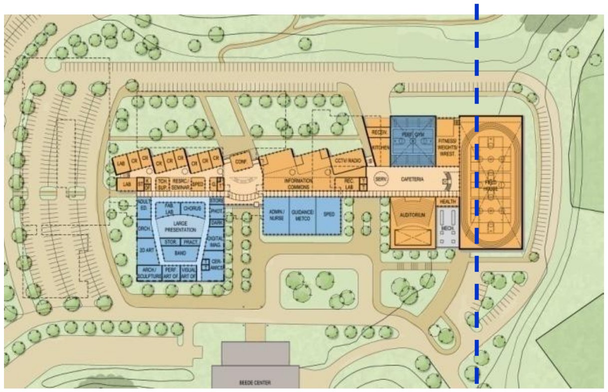
New Auditorium in Building 'A'

Option Comparison

F

New Auditorium by Athletics

- \+ Large assembly spaces all together
- \+ Service in rear
- +/- Cafeteria doubles as auditorium lobby and athletics viewing
- \- Auditorium remote from performance gym, visual arts and biggest parking area
- \- Footprint extends into fields



F1

New Auditorium by Building ‘A’

- \+ Auditorium provides new face to the school on the east side
- \+ Auditorium located with the arts
- \+ Arts and athletics anchor each end of facility
- +/- Athletics footprint pulls out of fields but into entry
- +/- Cafeteria at front with service
- \- Guidance/ sped/ admin. more internal
- \- Long end to end circulation
- \- Longer construction time

F2

New Auditorium in Building ‘A’

- \+ Auditorium located with the arts
- \+ Arts and athletics anchor each end of facility
- \+ Less expensive than building new
- \+ Athletics footprint pulls out of fields and back from the entry
- \+ Cafeteria animates the south lawn
- \+ Most compact and efficient
- +/- New arts classrooms/ renovated auditorium