7 Final Evaluation of Alternatives

- Prospective Site Analyses
- Construction Impact
- Conceptual Drawings
- Structural Systems Outlines
- Existing Utilities Evaluation
- Narrative of Major Building MEP Systems
- Proposed Total Project Budgets and Construction Cost Estimates
- Permitting Requirements
- Proposed Project Design and Construction Schedules
- Current MA CHPS scorecards
- Summary of Preliminary Design Pricing

This section includes all three final alternatives and their evaluation: 6R2, 14B and 14C. 6R2 is a renovation/ addition scheme, 14B is a new building with a phased renovation of a small building, and 14C is a new building with a separately funded small building addition. All are proposed to be a single vote for each of the Towns of Concord and Carlisle.

Prospective Site Analysis

The design team has reviewed the entire CCHS site for potential building locations, either for a new building or for additions to the existing building. Consideration was given to the fields, parking, drop-off and other site improvements. Attached is the Revised Site Consideration Locations diagram dated June 10, 2011. This document identifies sites D and G as being the best locations for a proposed new building. Our information has been revised since the PDP, due to the geotechnical borings that arrived. The pros and cons are below:

Location D:
+ Adjacent to existing school, infrastructure and access
+/- Sloping topography
+/- Solar orientation is just off of due south
+ May balance cut and fill
+ Connects upper fields with campus
+ Good soils for this structure

Location G:
+ Good solar exposure
+ Manageable topography, terraced slopes
+ Close to existing infrastructure and access
+ Connects lower fields area with main campus
- Site requires additional fill
- Existing soils are less satisfactory for additional fill material
- Unable to use existing school in design of new

Attached are site analysis drawings for options 6R2, 14B and 14C. These site plans identify social, man-made, and natural features within a ¾ mile radius of the site. Setbacks, wetlands, roadways and neighborhoods have been identified.

Construction Impact

Construction Impact is clearly a concern for the towns, the teachers and the parents. We have studied and discussed this aspect of the project throughout the evaluation of the alternatives stage so that the Towns are educated with respect to the solutions.

At 44 months, Option 6R2 will have a longer construction duration than the other two, and will be more disruptive to the students and faculty. Temporary facilities would be brought in for swing space to phase the new construction and the renovation work. Students may

need to be transported off-site for PE classes while the gymnasium is being constructed. The close proximity of the construction to the occupied school building may present a problem during MCAS testing and will be disruptive to the academic programs. Parking and site circulation will be limited around the building as space will be used for construction staging and contractor parking, therefore temporary parking will need to be provided at the perimeter of the site, either in wetlands areas or near residential yards. Custodial and maintenance services for trash and deliveries will need to be relocated, probably to the front of the building during construction.

At 32 months, Option 14B will have a shorter building construction time than option 6R2. The students will be able to occupy the existing school during construction. The classes held in the H building may be disrupted by the adjacent building construction. Screened fences would need to be installed to eliminate visual distractions. The students PE classes may be held in the existing upper gymnasium but there will be a period of time when activities in the lower gym will have to be re-located off site, as the work of this major renovation could not be complete in one summer. Circulation will not be available at the rear of the existing building. The existing parking may be used during construction of the new building.

At 30-31 months, Option 14C will have the shortest building construction time. The students will be able to occupy the existing school during construction. The classes held in the H building may be disrupted by the adjacent building construction. Screened fences would need to be installed to eliminate visual distractions. Circulation will not be available at the rear of the existing building. The existing parking may be used during construction of the new building.

Conceptual Drawings

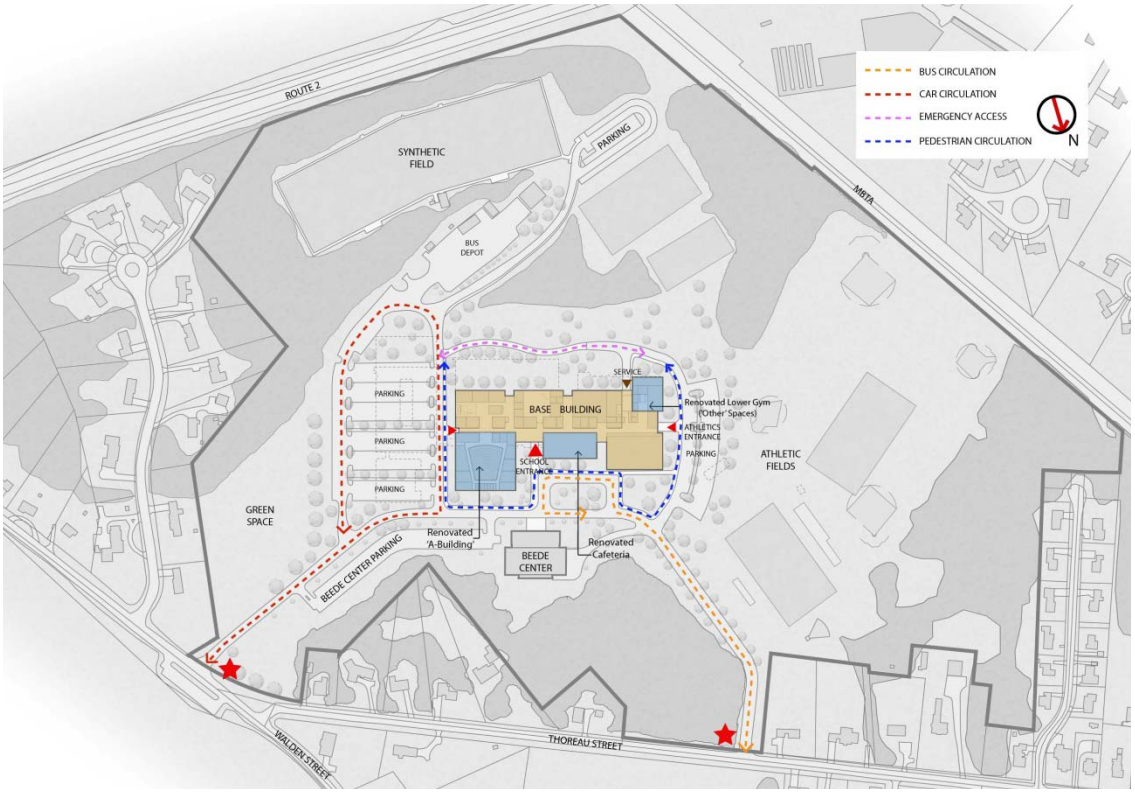
Option 6R2 – Renovations and Additions
Site Plan

Option 6R2 maintains entry points to the site from both Walden and Thoreau Street and access road by the Existing School and Beede Center Swim and Fitness building. Bus drop-off and the main entrance are located on the north side, similar to the current layout.

East of the School a distinct student drop-off area allows for direct access into the school's east-west main circulation 'spine'. New parking lots for students and faculty have been are placed within close proximity to the school; the total number of parking spaces has been increased as the existing is deficient. The continuation of the existing access road is maintained at the transition to the upper fields.

West of the School, the access road and grading have been modified to improve the transition to the Athletics Entry at the Lower Level and meet accessibility requirements. Parking and site circulation at this location is organized to create a new pick-up and drop-off location and parking area, both of which are deficient in the existing layout. A gate or other device would be located at the end of the parking to control vehicular traffic, allowing only service or emergency vehicles to continue around the building to the south side. This would improve security and control the vehicular traffic on the south side of the

building, thus promoting pedestrian circulation at the south court between the new addition and existing hillside.



Conceptual Floor Plans

Option 6R2 is comprised of a series of renovations and additions organized to satisfy the spatial and organizational requirements of the Education Program, while also addressing the deficiencies of the existing buildings and sprawling nature of the existing school. The three-story addition along the south houses the Visual Arts department, Media Center *(Information Commons)*, and Cafeteria/Food Services spaces *(Dining Commons)* on the ground floor; three learning clusters (Humanities departments) on the second level; and the STEM cluster (Science, Technology, Engineering & Math departments) on the third level. This addition connects the fully renovated A-Building, Cafeteria Building and Lower Gym Building as well as the new Gymnasium addition at the west end of the school. The fully renovated A-Building houses the Music, Auditorium/Drama departments as well as the CCTV, Radio and Adult Education spaces. The existing Cafeteria Building is fully renovated and fitted-out for all Student Support Services including Administration, Guidance, SPED and Nurses Suite. The Lower Gym Building is fully renovated, inter-floored to create two levels in the existing two-story space, and houses both PE support spaces as well as Athletic spaces indicated in the “Other” category of the space summary.

Entering the school from the main entry located on the north side, one would pass by a visual control point at the administrative suite into a lobby space with views down the

east-west circulation 'spine'. Directly ahead is the Media Center (Information Commons), centrally located, at the heart of the school. Vertical circulation (stairs and elevator) is located off the 'spine', connecting to the learning clusters and STEM cluster on the floors above. Visual Arts, Music and Drama departments, as well as CCTA, Radio and Adult Education are located to the east, providing direct access to grade. To the west, Administration, Guidance, SPED and the Nurses' spaces are clustered together to provide a Student Support Services Department. The Cafeteria, Kitchen and other Food Services spaces (Dining Commons) are located adjacent to the Information Commons with direct access to an outdoor eating area. Further to the east is a viewing area into the new gym spaces and fitness center with vertical connection to the lower level PE Support spaces.

On the second floor, three Learning Clusters consisting of the English, Social Sciences, and Foreign Language departments are grouped around vertical circulation and day-lighting wells. Classrooms, seminar spaces, and teacher planning areas are organized to promote 21st Century Learning, flexibility and adaptability as required by the Educational Program. Classrooms are oriented on the north and south sides of the building to optimize day-lighting and lower energy consumption. Long views east and west, through the clusters, are created for visual connection to the outdoors.

On the third floor the STEM Cluster is located on one floor, clustering around day-lighting wells with Math Classrooms dispersed throughout the Science Labs, most of which would share prep rooms. The Fabrication Lab is centrally located and near the elevator to strengthen the clustering of Math and Science as well as the Engineering/Robotics Lab. Similar to the three Learning Clusters on the floor below, Classrooms and Science Labs are oriented to the north and south grouped around Teacher Planning and Seminar Spaces, promoting 21st Century Learning, flexibility and adaptability.

ROOM ABBREVIATIONS

CR = CLASSROOM

- **(M)** = MATH
- **(E)** = ENGLISH
- **(SS)** = SOCIAL STUDIES
- **(L)** = LANGUAGE
- **(LH)** = SPED, LIGHTHOUSE
- **(AP)** = SPED, ALTERNATIVE PROGRAM
- **(P)** = SPED, PATHWAYS
- **(CH)** = ADMIN, CHALLENGE
- **(H)** = HEALTH
- **(D)** = DRAMA

SCI = SCIENCE LAB

- **(CHEM)** = CHEMISTRY
- **(PHY)** = PHYSICS
- **(EARTH)** = EARTH SCIENCE
- **(BIO)** = BIOLOGY

TP = TEACHER PLANNING

LANG LAB = LANGUAGE LAB (RESOURCE)

RC = RESOURCE CENTER

SGS = SMALL GROUP SEMINAR

LGS = LARGE GROUP SEMINAR

REC = RECEIVING

ARCH = ARCHITECTURE/SCULPTURE

DIG = DIGITAL IMAGING

PHO = PHOTOGRAPHY

CER = CERAMICS

2D = 2D ART

G = ART GALLERY

EML = ELECTRONIC MUSIC LAB

AE = ADULT EDUCATION

CH = CHORUS

EN = ENSEMBLE (CHAMBER ORCHESTRA)

N = NURSE

AD = ADMINISTRATIVE SUITE

L = LOCKERS

TR = TRAINER

TM = TEAM ROOMS

O = OFFICE

M = MECHANICAL

S = STORAGE

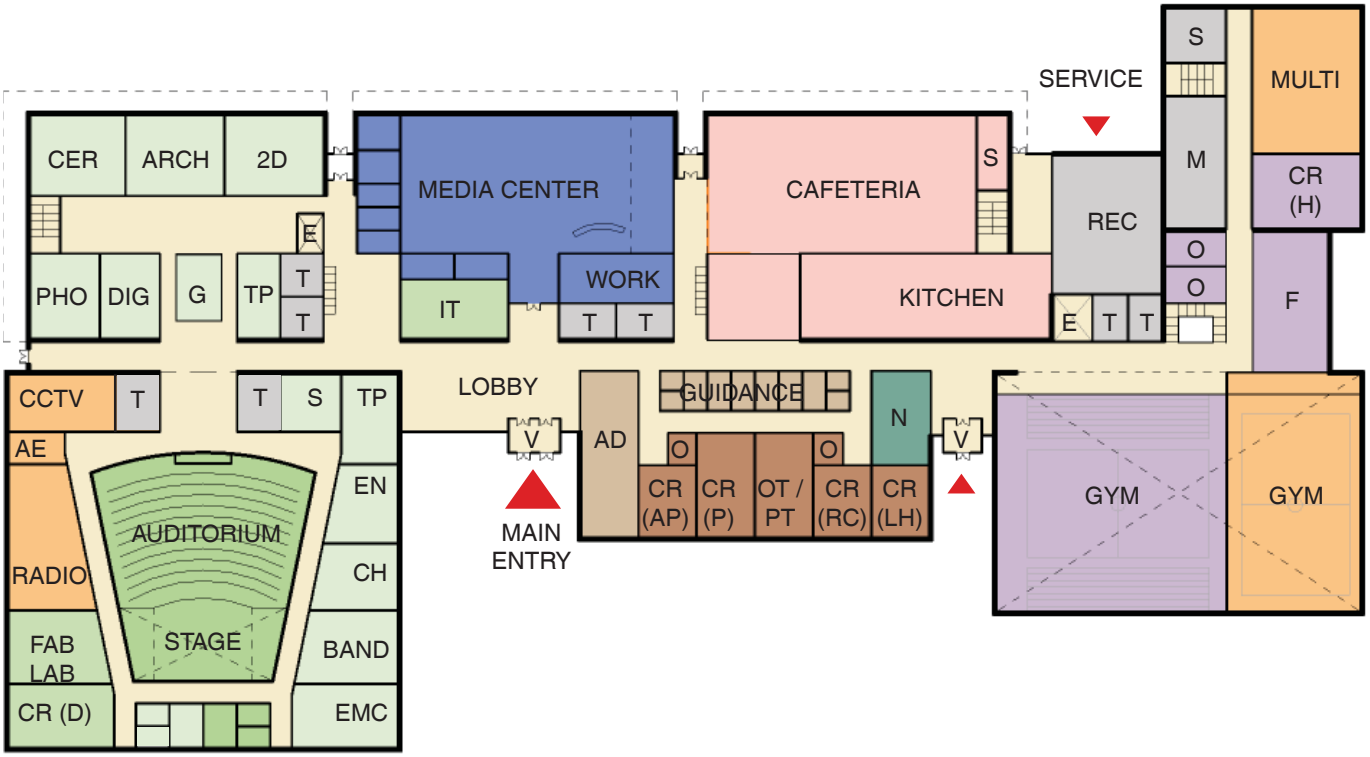
F = FITNESS

E = ELEVATOR

V= VESTIBULE

T = TOILET ROOM

OPTION 6R2:
FIRST FLOOR PLAN



Program Legend

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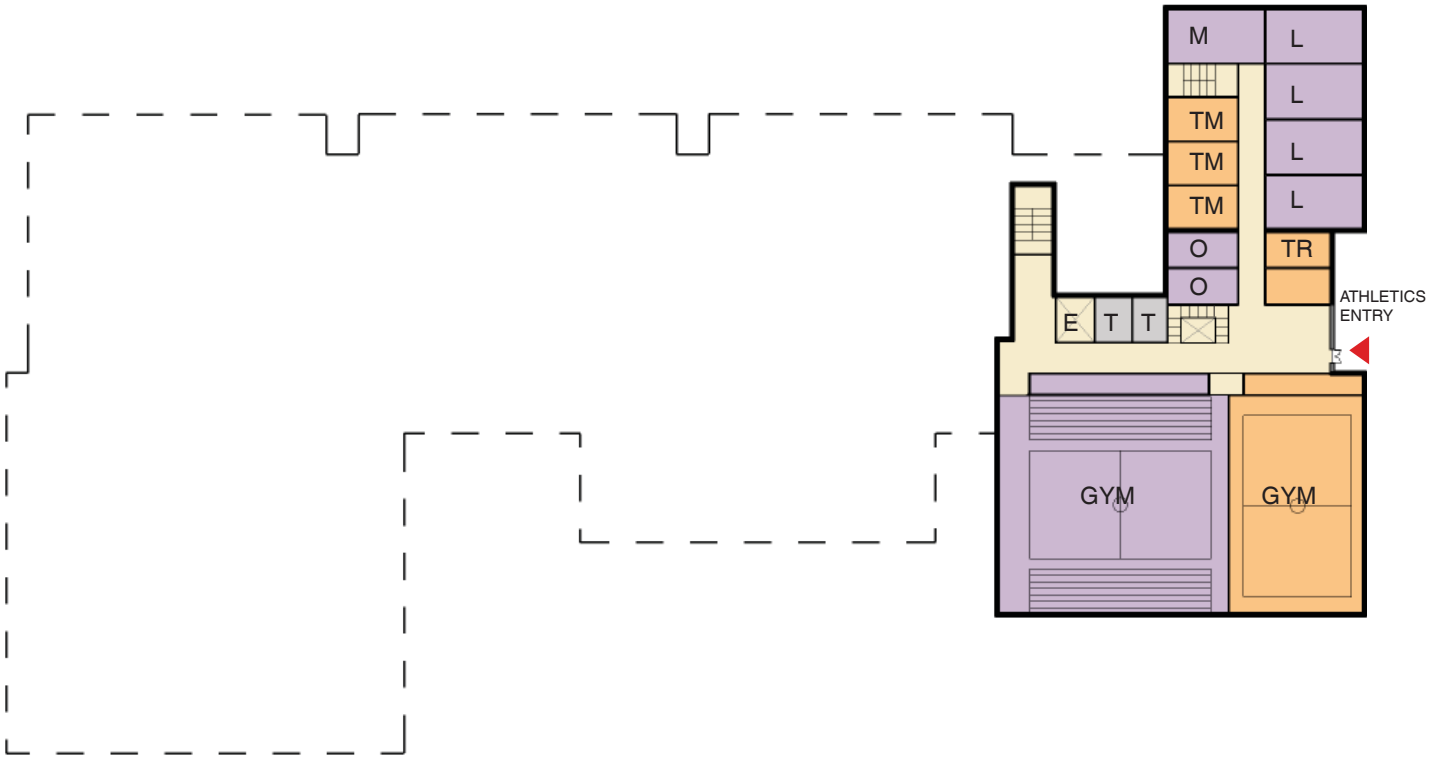
OPTION 6R2:
LOWER FLOOR PLAN



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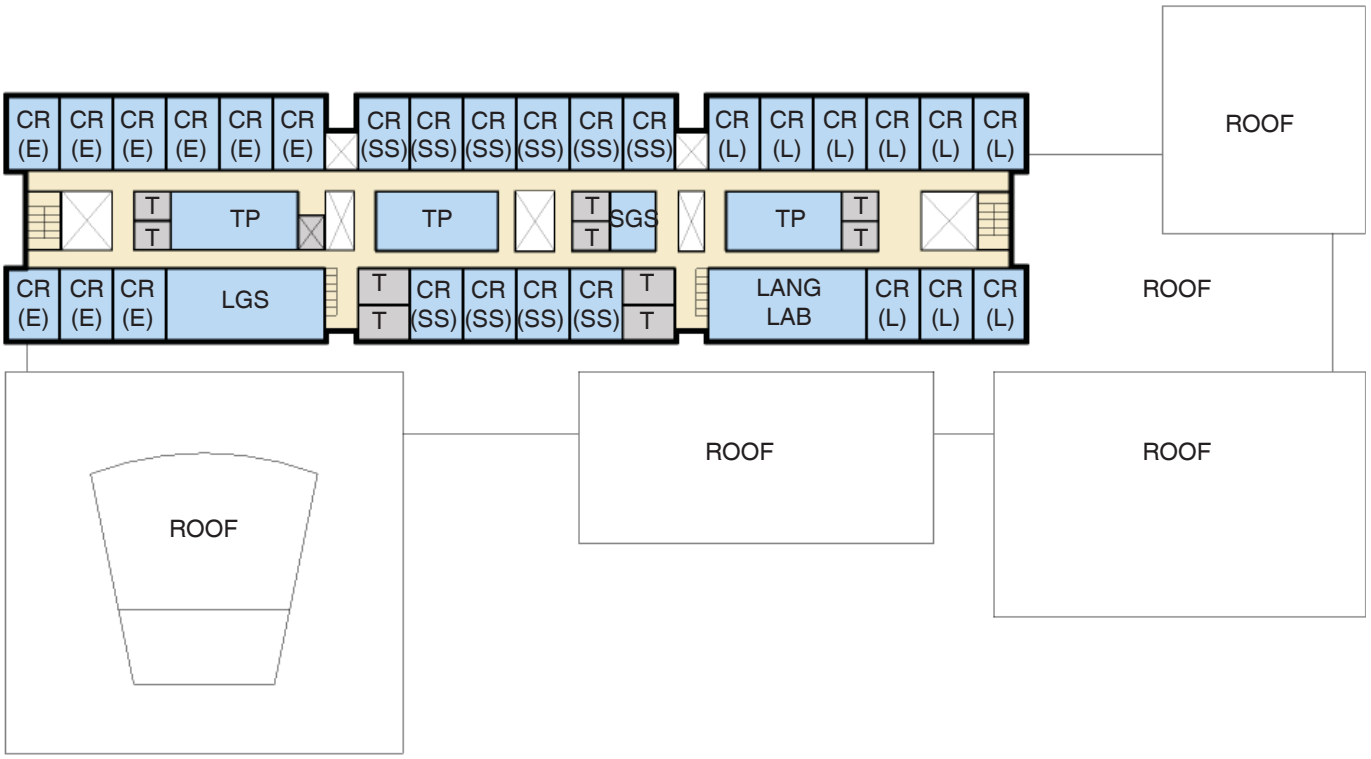
OPTION 6R2:
SECOND FLOOR PLAN



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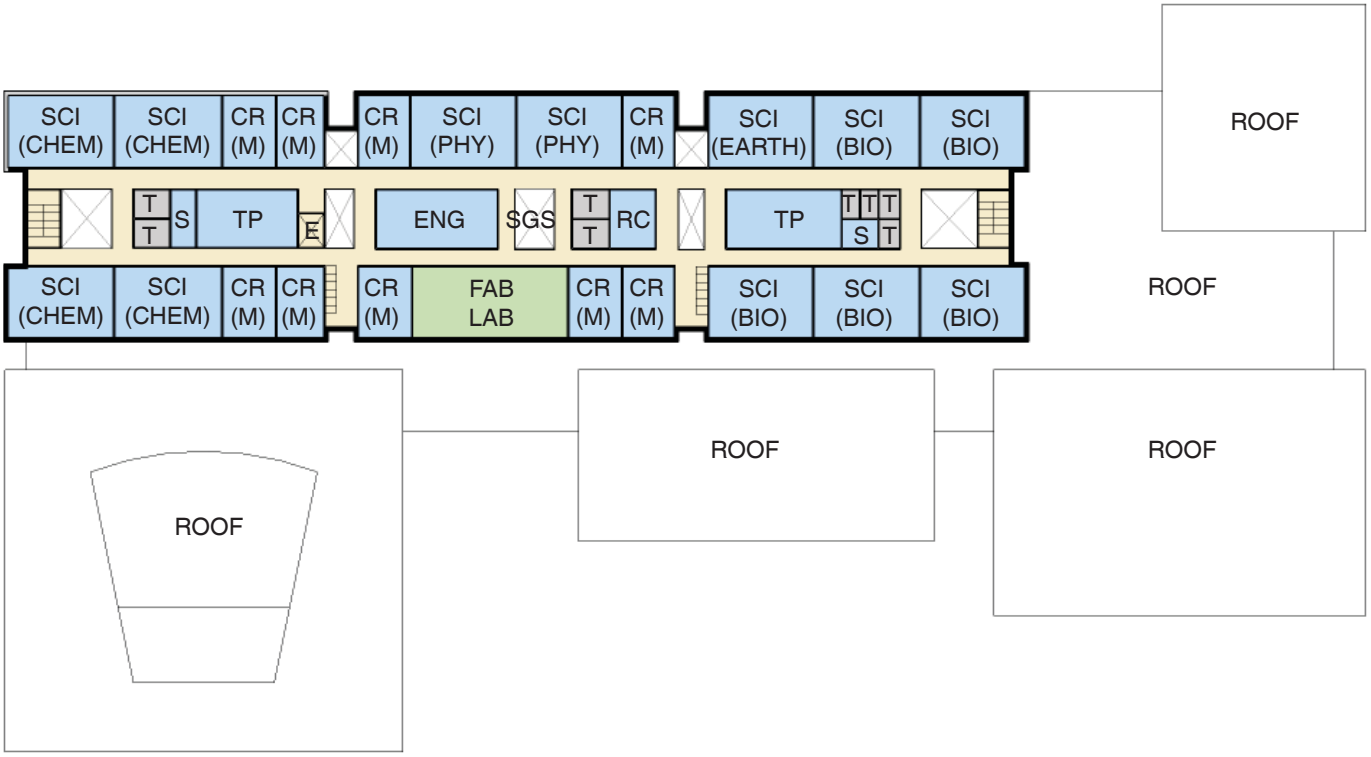
OPTION 6R2:
THIRD FLOOR PLAN



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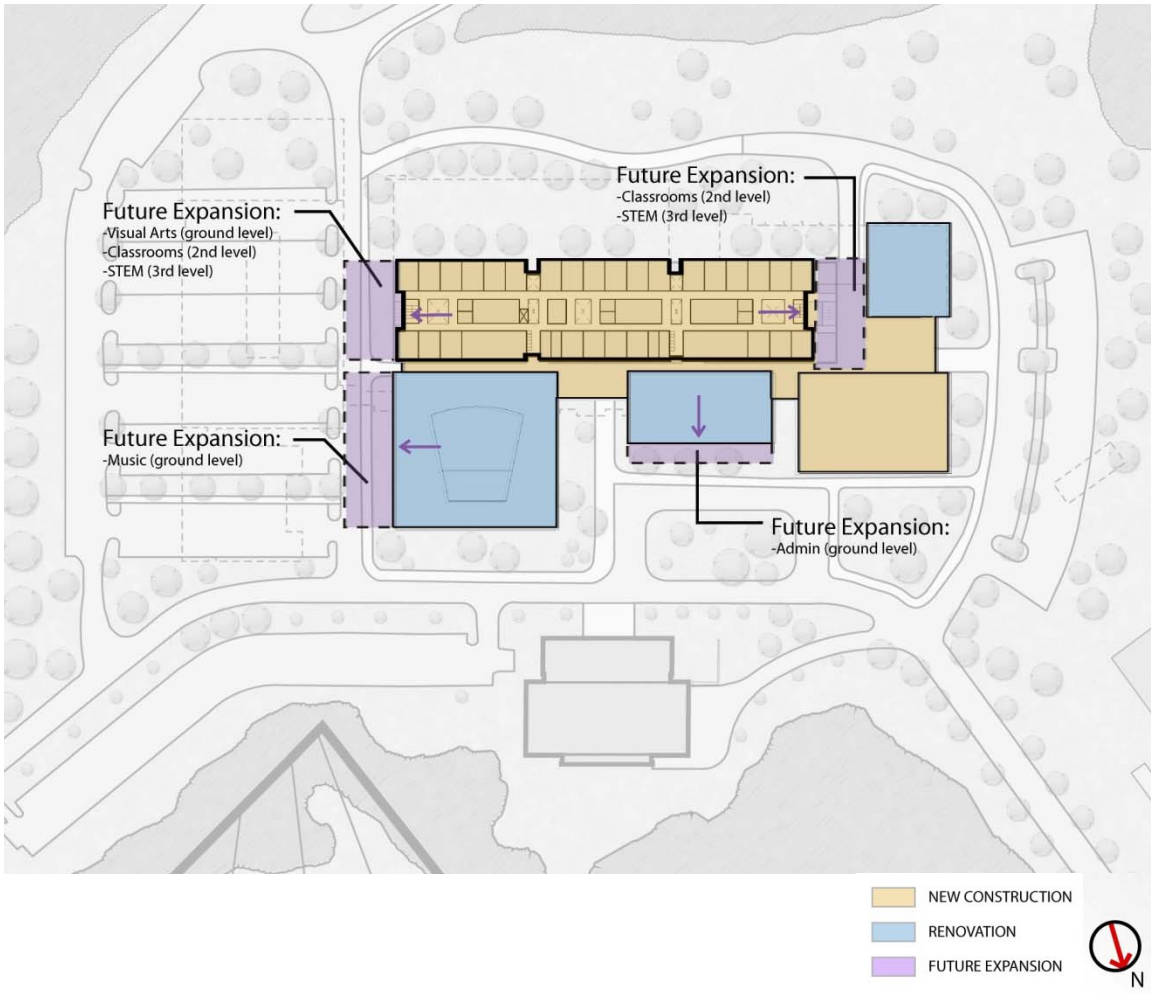
Future Expansion

The diagram below indicates the potential locations for future expansion of the proposed building. Note that parking on the east side could be expanded to the east.



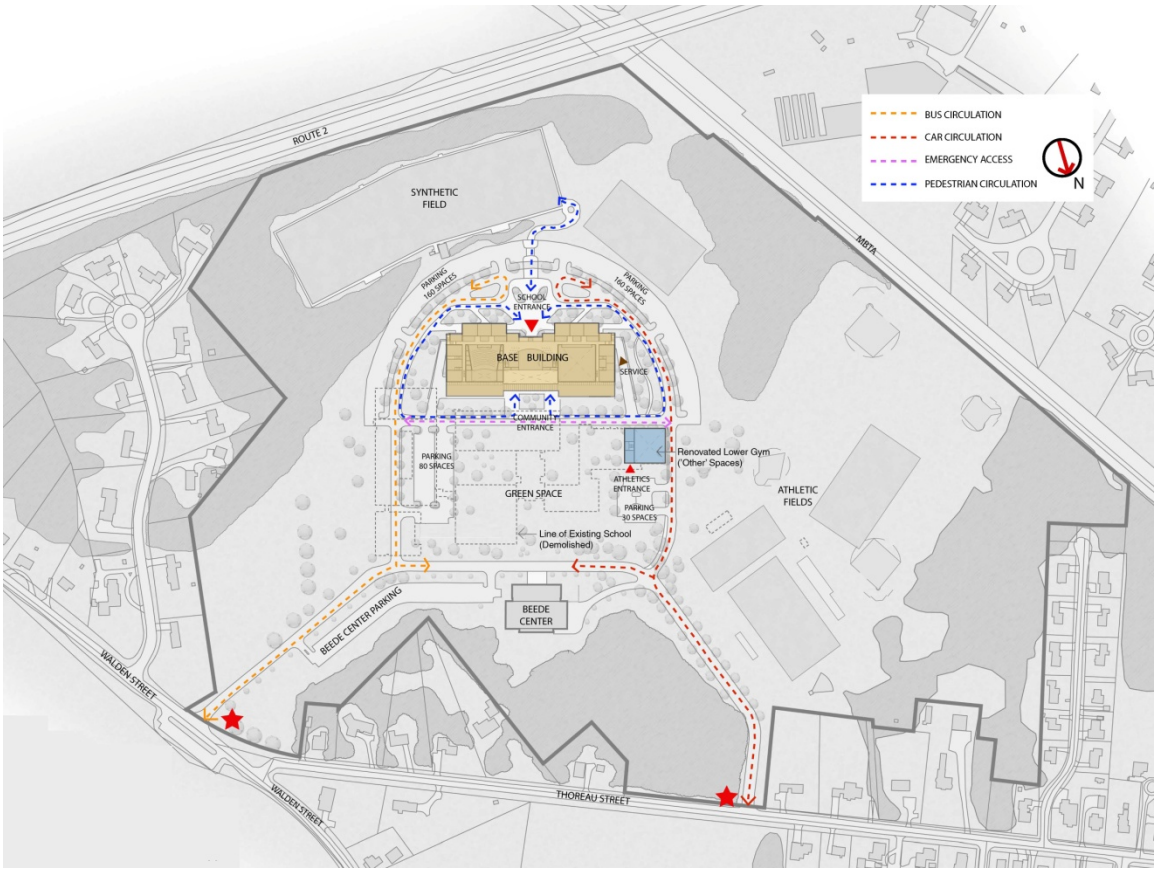
Conceptual Drawings

Option 14B – New Base Building and Renovated Lower Gym

Site Plan

Option 14B proposes the new building (Base Building) south of the existing H-Building with a full renovation of the existing Lower Gym. The new Base Building would have 1-story of space set into grade, with the existing hillside re-graded with the goal of a balanced cut-to-fill ratio at this location of the site.

This option maintains the existing entry points to the site from both Walden and Thoreau Street and access road by the Existing School and Beede Center Swim and Fitness building. A new loop road is proposed around the site and new Base Building with a level plaza and landscape area both at the north and south sides of the Base Building. Distinct bus and student drop-off areas are located at the School Entry on the south side. New student and faculty parking is proposed along the loop road and adjacent to the renovated Lower Gym Building along with parking near the Community Entry on the north side of the Base Building. Once the existing, sprawling school is removed, the vase open space within the loop road unifies the various elements and zones of the site creating and transforming the site as a whole.



Conceptual Floor Plans

Option 14B consists of a new Base Building organized to satisfy the spatial and organizational requirements of the Education Program, while also fully renovating the existing Lower Gym for the Athletic spaces indicated in the Other category of the proposed space summary. The new Base Building houses Student Support Services including Administration, Guidance, SPED and Nurses Suite; the Visual Arts department as well as Radio, Media Center *(Information Commons)*, and IT Department on the ground floor; three learning clusters (Humanities departments) on the second level; and the STEM cluster (Science, Technology, Engineering & Math departments) on the third level. Cafeteria/Food Services spaces *(Dining Commons),* majority of the Health and PE spaces, Music and Drama Departments are located on the lower level.

Entering the school from the main entry located on the south side, one would pass by a visual control point at the administrative suite into a lobby space with views down the east-west circulation 'spine' and through the building to the north. Directly ahead is the Media Center (Information Commons) and IT Department, centrally located, at the heart of the school. The curved wall of the Information Commons is meant allows for the visual connection of the vertical circulation (stairs and elevator) which connect up to the learning clusters and STEM cluster and down to the lower level. To the east one would could enter the top of the steep rake of the Auditorium located across from the Visual Arts Department. Turning the corner at the east end of the building is the Radio Station with an open stair connecting to the Music and Drama spaces below. To the west, Administration, Guidance, SPED and the Nurses' spaces are clustered together to provide a Student Support Services Department. A viewing area looking down into the Performance Gym is located across from SPED and Guidance. Turning the corner at the west end of the building, Locker Rooms and Teacher Planning offices are stacked on the ground floor and lower floor by gender. Another open stair connects the ground floor to the lower level where the remaining Health and PE spaces are.

On the second floor, three Learning Clusters consisting of the English, Social Sciences, and Foreign Language departments are grouped around vertical circulation and day-lighting wells. Classrooms, seminar spaces, and teacher planning areas are organized to promote 21st Century Learning, flexibility and adaptability as required by the Educational Program. Classrooms are oriented on the north and south sides of the building to optimize day-lighting and lower energy consumption. Long views east and west, through the clusters, are created for visual connection to the outdoors.

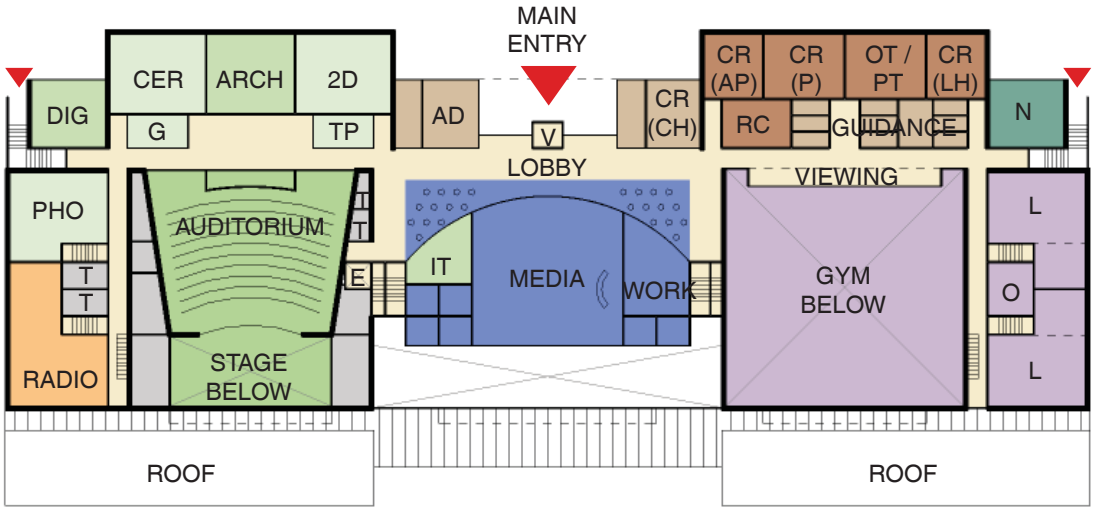
On the third floor the STEM Cluster is located on one floor, clustering around day-lighting wells with Math Classrooms dispersed throughout the Science Labs, most of which would share prep rooms. The Fabrication Lab is centrally located and near the elevator to strengthen the clustering of Math and Science as well as the Engineering/Robotics Lab. Similar to the three Learning Clusters on the floor below, Classrooms and Science Labs are oriented to the north and south grouped around Teacher Planning and Seminar Spaces, promoting 21st Century Learning, flexibility and adaptability.

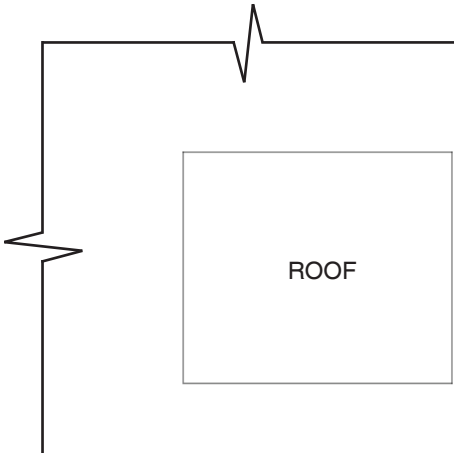
Entering the school from the lower level on the north side (Community Entry), one would pass long the cafeteria space and could enter the Auditorium at stage level, the performance Gym at court level, or connect to the ground level via the open stairs to

either side of the cafeteria. To the east, passing by the entry to the Auditorium is the Music Department, CCTV, and Drama Department. All service and loading for Custodial/Receiving, the Stage, and Fabrication Lab would take place at this level with access to the Kitchen passing through Receiving and north of the Auditorium. To the west of the Community Entry are the Fitness & Weights Room and Health Classroom with adjacent offices for Adult Education.

Detached from the Base Building is the fully renovated Lower Gym Building which houses the Athletic spaces indicated in the Other category of the proposed space summary. These spaces consist of a Multi-purpose Room, Trainer and Toilet facilities on the entry level at grade, and Team Rooms and PE Alternative Gym space at the basement level. Given that this building is not connected to the new Base Building, separate buildings systems would be required.

OPTION 14B:
FIRST FLOOR PLAN





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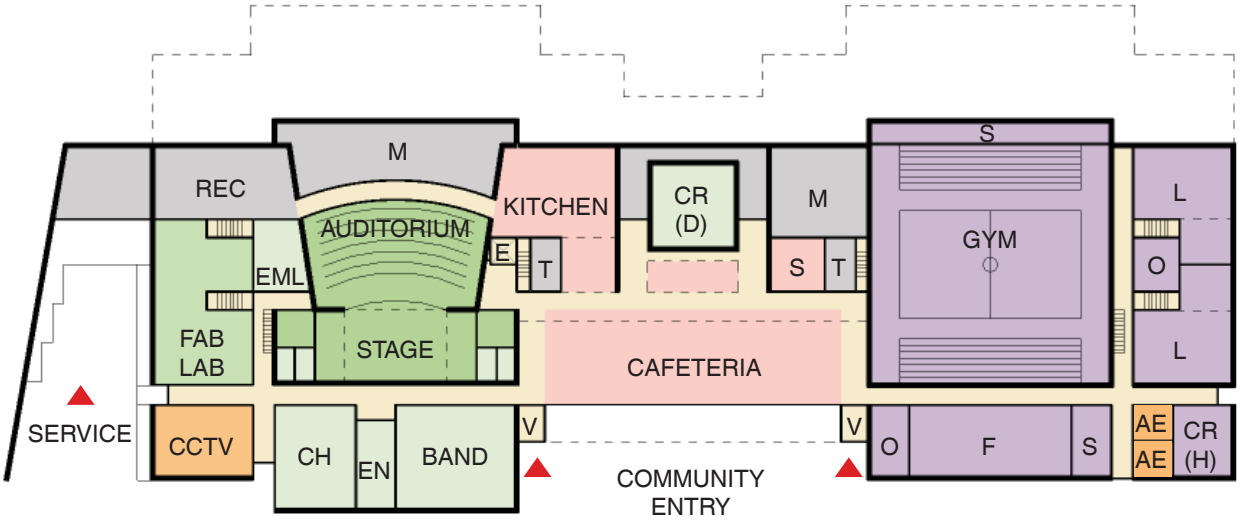
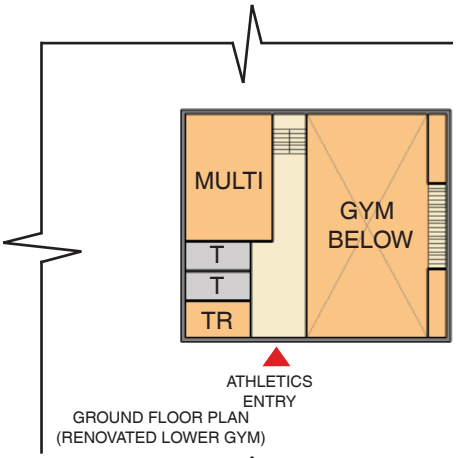
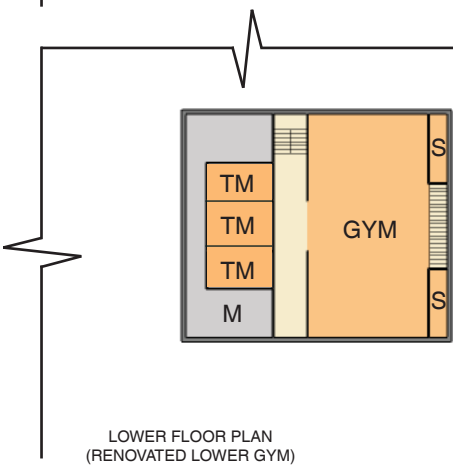
OPTION 14B:
LOWER FLOOR PLAN







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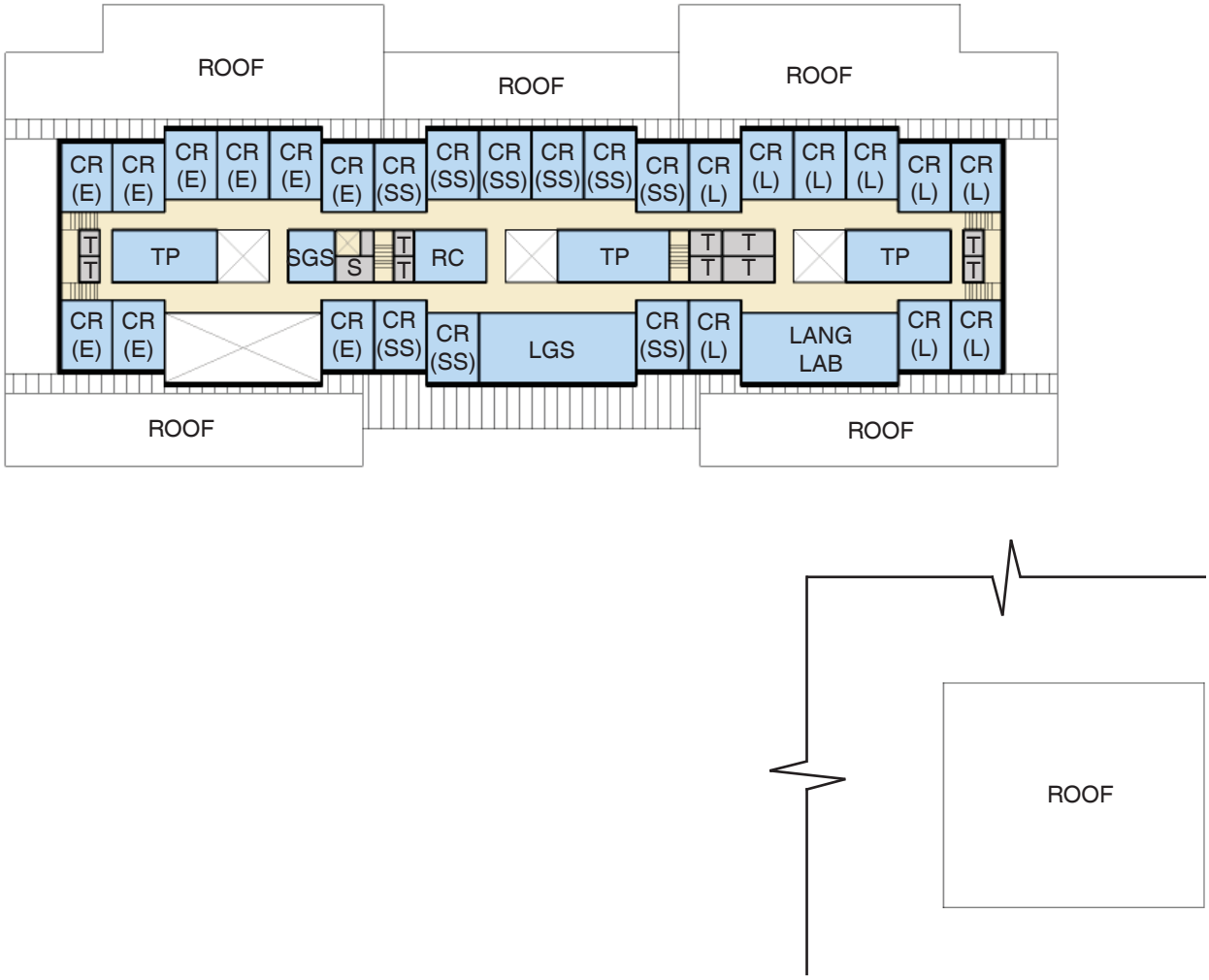
OPTION 14B:
SECOND FLOOR PLAN



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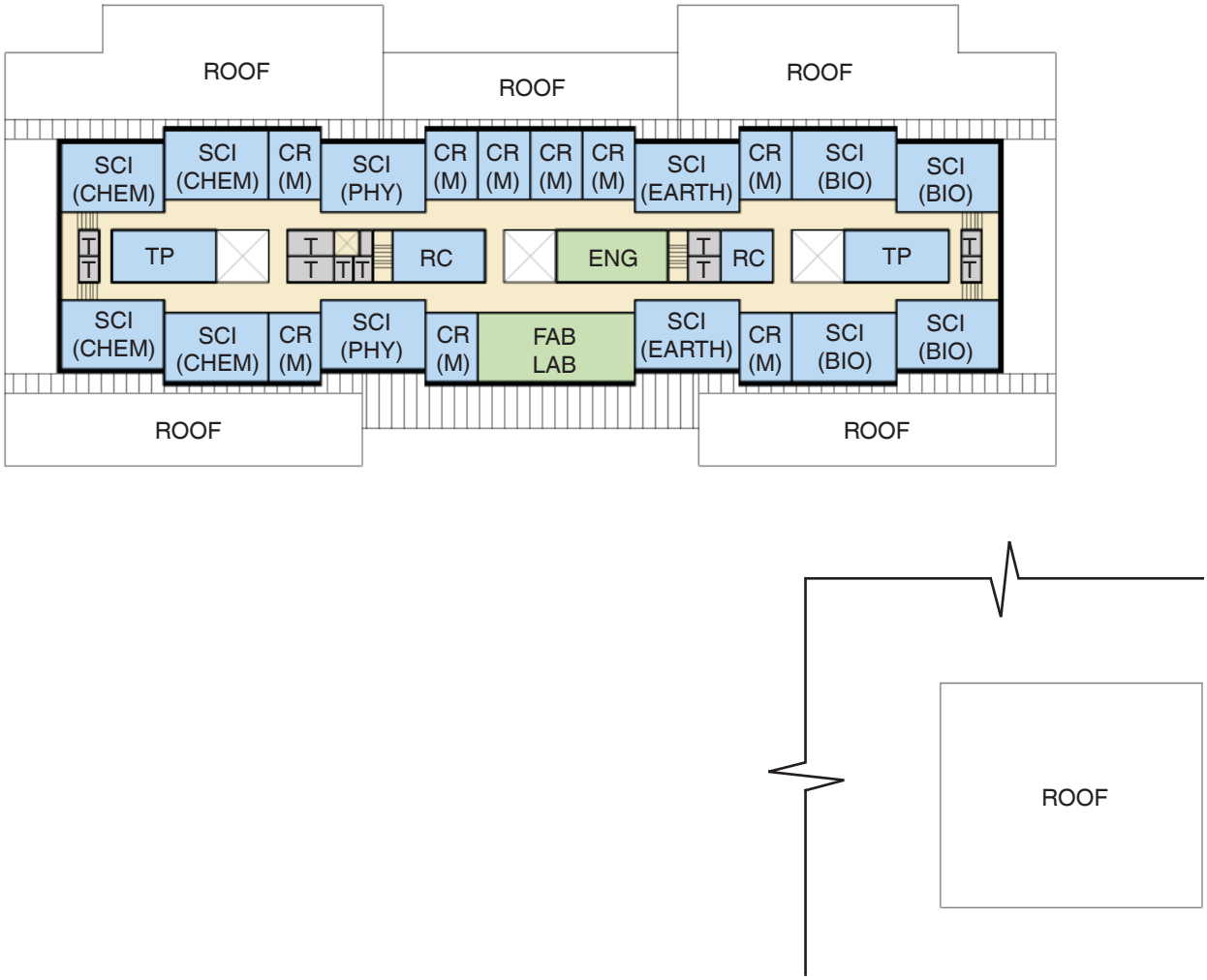
OPTION 14B:
THIRD FLOOR PLAN



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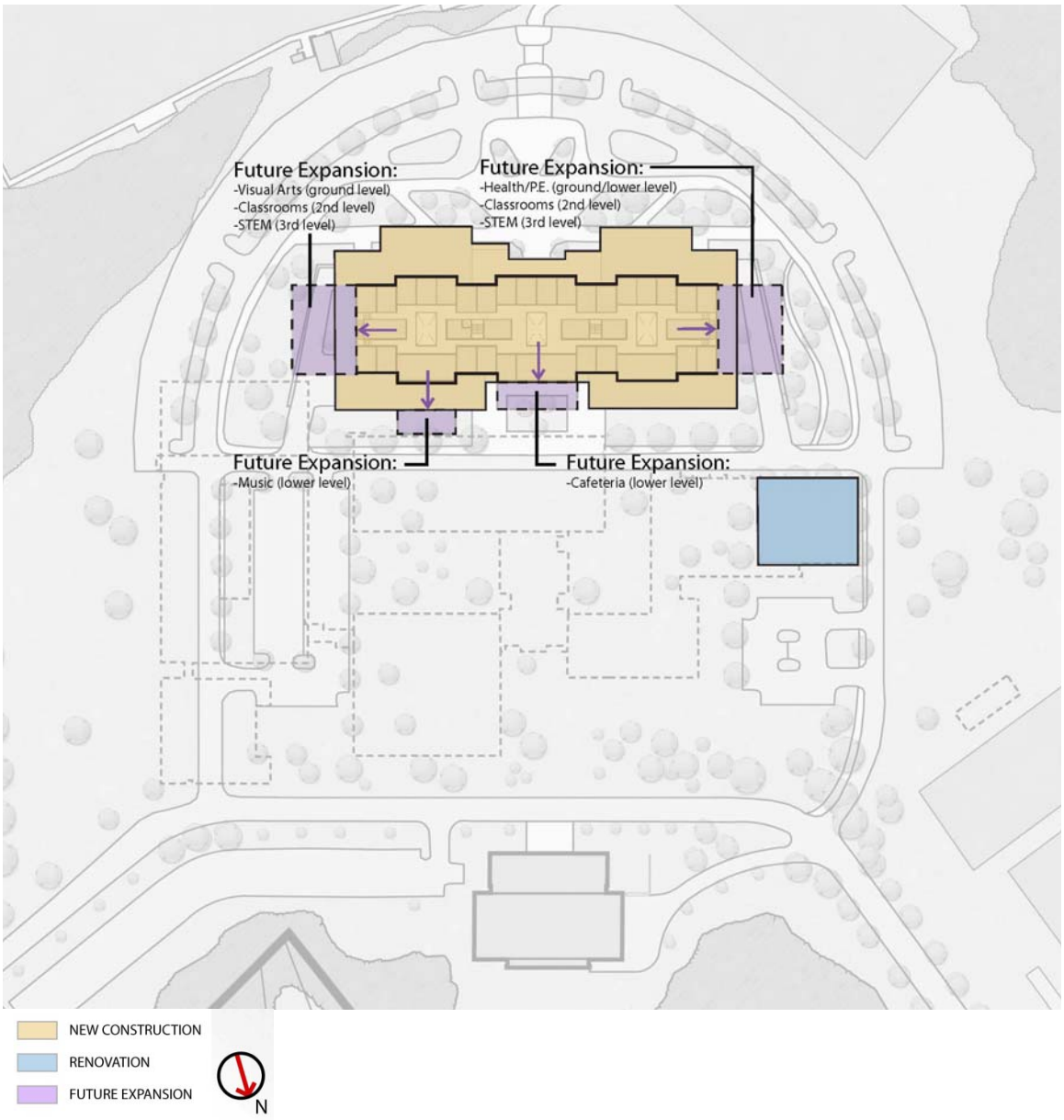
Future Expansion

The diagram below indicates the potential locations for future expansion of the proposed building. Note that parking along the loop road could be expanded to the north.

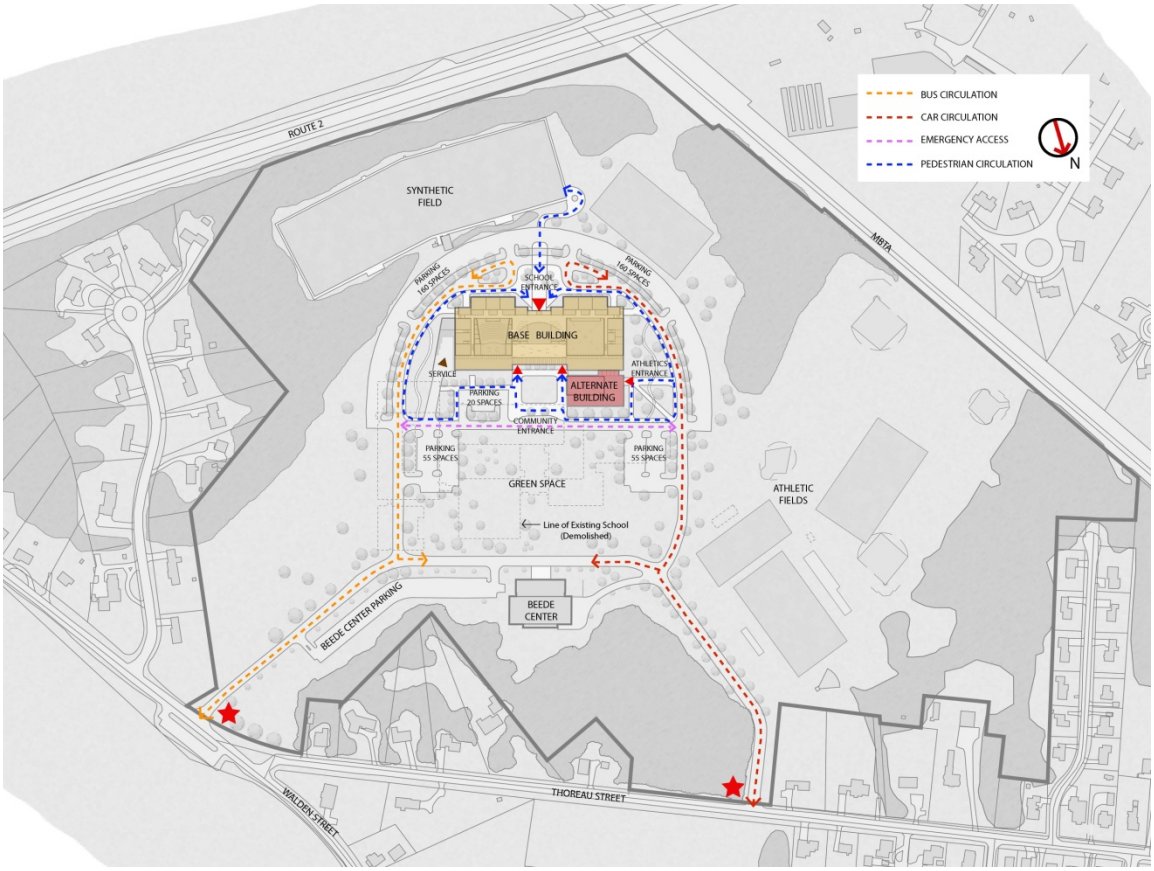


Conceptual Drawings

Option 14C – New Base Building and New Alternate Building (Preferred Alternative)
Site Plan

Option 14C proposes the new building (Base Building) south of the existing H-Building linked to a new building (Alternate Building). The new Base Building would have 1-story of space set into grade, with the existing hillside re-graded with the goal of a balanced cut-to-fill ratio at this location of the site. The new Alternate Building would be located, on grade, at the lower level of the Base Building and linked by a 1-story lobby space.

This option maintains the existing entry points to the site from both Walden and Thoreau Street and access road by the Existing School and Beede Center Swim and Fitness building. A new loop road is proposed around the site and new Base Building with a level plaza and landscape area both at the north and south sides of the Base Building. Distinct bus and student drop-off areas are located at the School Entry on the south side. New student and faculty parking is proposed along the loop road and adjacent to the renovated Lower Gym Building along with parking near the Community Entry on the north side of the Base Building. Once the existing, sprawling school is removed, the vase open space within the loop road unifies the various elements and zones of the site creating and transforming the site as a whole.



Conceptual Floor Plans

Option 14B consists of a new Base Building organized to satisfy the spatial and organizational requirements of the Education Program, while also fully renovating the existing Lower Gym for the Athletic spaces indicated in the Other category of the proposed space summary. The new Base Building houses Student Support Services including Administration, Guidance, SPED and Nurses Suite; the Visual Arts department as well as Radio, Media Center *(Information Commons)*, and IT Department on the ground floor; three learning clusters (Humanities departments) on the second level; and the STEM cluster (Science, Technology, Engineering & Math departments) on the third level. Cafeteria/Food Services spaces *(Dining Commons),* majority of the Health and PE spaces, Music and Drama Departments are located on the lower level.

Entering the school from the main entry located on the south side, one would pass by a visual control point at the administrative suite into a lobby space with views down the east-west circulation 'spine' and through the building to the north. Directly ahead is the Media Center (Information Commons) and IT Department, centrally located, at the heart of the school. The curved wall of the Information Commons is meant allows for the visual connection of the vertical circulation (stairs and elevator) which connect up to the learning clusters and STEM cluster and down to the lower level. To the east one would enter the top of the steep rake of the Auditorium located across from the Visual Arts Department. Turning the corner at the east end of the building is the Radio Station with an open stair connecting to the Music and Drama spaces below. To the west, Administration, Guidance, SPED and the Nurses' spaces are clustered together to provide a Student Support Services Department. A viewing area looking down into the Performance Gym is located across from SPED and Guidance. Turning the corner at the west end of the building, Locker Rooms and Teacher Planning offices are stacked on the ground floor and lower floor by gender. Another open stair connects the ground floor to the lower level where the remaining Health and PE spaces are.

On the second floor, three Learning Clusters consisting of the English, Social Sciences, and Foreign Language departments are grouped around vertical circulation and day-lighting wells. Classrooms, seminar spaces, and teacher planning areas are organized to promote 21st Century Learning, flexibility and adaptability as required by the Educational Program. Classrooms are oriented on the north and south sides of the building to optimize day-lighting and lower energy consumption. Long views east and west, through the clusters, are created for visual connection to the outdoors.

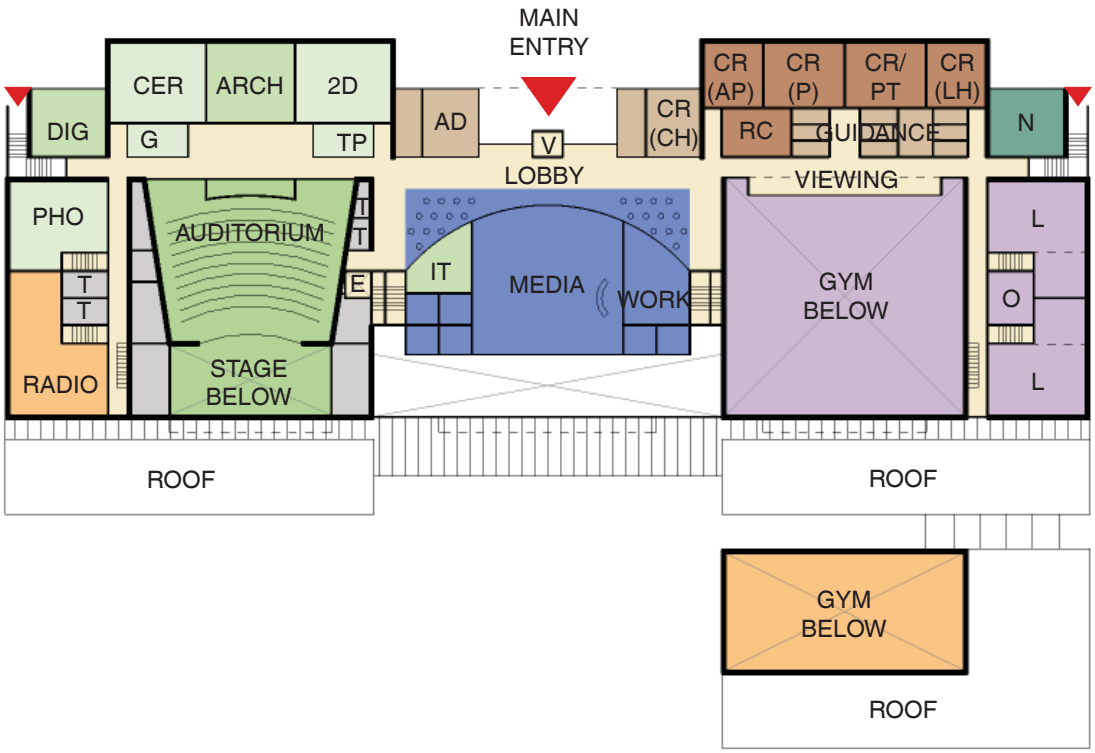
On the third floor the STEM Cluster is located on one floor, clustering around day-lighting wells with Math Classrooms dispersed throughout the Science Labs, most of which would share prep rooms. The Fabrication Lab is centrally located and near the elevator to strengthen the clustering of Math and Science as well as the Engineering/Robotics Lab. Similar to the three Learning Clusters on the floor below, Classrooms and Science Labs are oriented to the north and south grouped around Teacher Planning and Seminar Spaces, promoting 21st Century Learning, flexibility and adaptability.

Entering the school from the lower level on the north side (Community Entry), one would pass long the cafeteria space and could enter the Auditorium at stage level, the performance Gym at court level, or connect to the ground level via the open stairs to

either side of the cafeteria. To the east, passing by the entry to the Auditorium is the Music Department, CCTV, and Drama Department. All service and loading for Custodial/Receiving, the Stage, and Fabrication Lab would take place at this level with access to the Kitchen passing through Receiving and north of the Auditorium. To the west of the Community Entry are the Fitness & Weights Room and Health Classroom with adjacent offices for Adult Education.

Linked to the Base Building, by a 1-story Lobby space, is the distinct Alternate Building with separate building systems which houses the Athletic spaces indicated in the Other category of the space summary. These spaces consist of a Multi-purpose Room, Trainer and Toilet facilities on the entry level at grade, and Team Rooms and PE Alternative Gym space at the basement level.

OPTION 14C: **(Preferred Alternative)**
FIRST FLOOR PLAN



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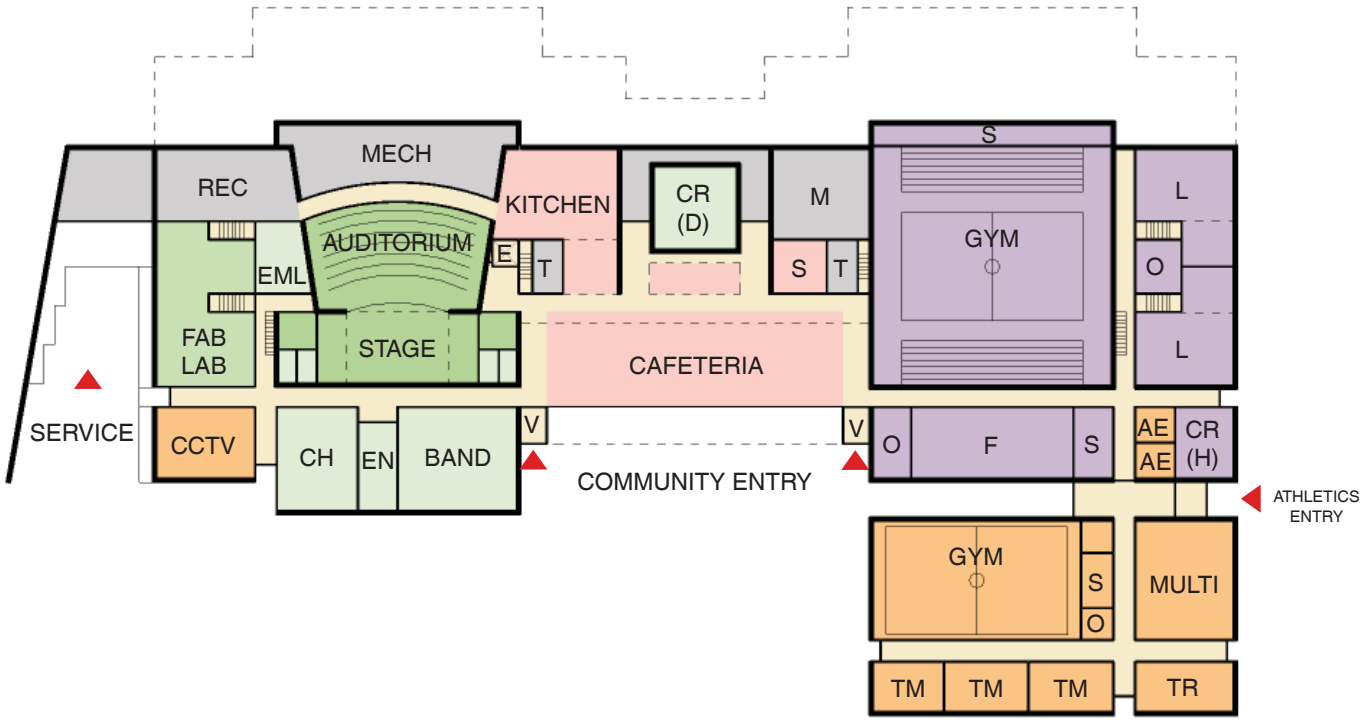
- CORE ACADEMIC SPACES
- CUSTODIAL & MAINT.
- DINING & FOOD SERVICE
- HEALTH & P.E.
- MEDIA CENTER
- MEDICAL
- OTHER
- SPECIAL EDUCATION
- VOC. & TECH.

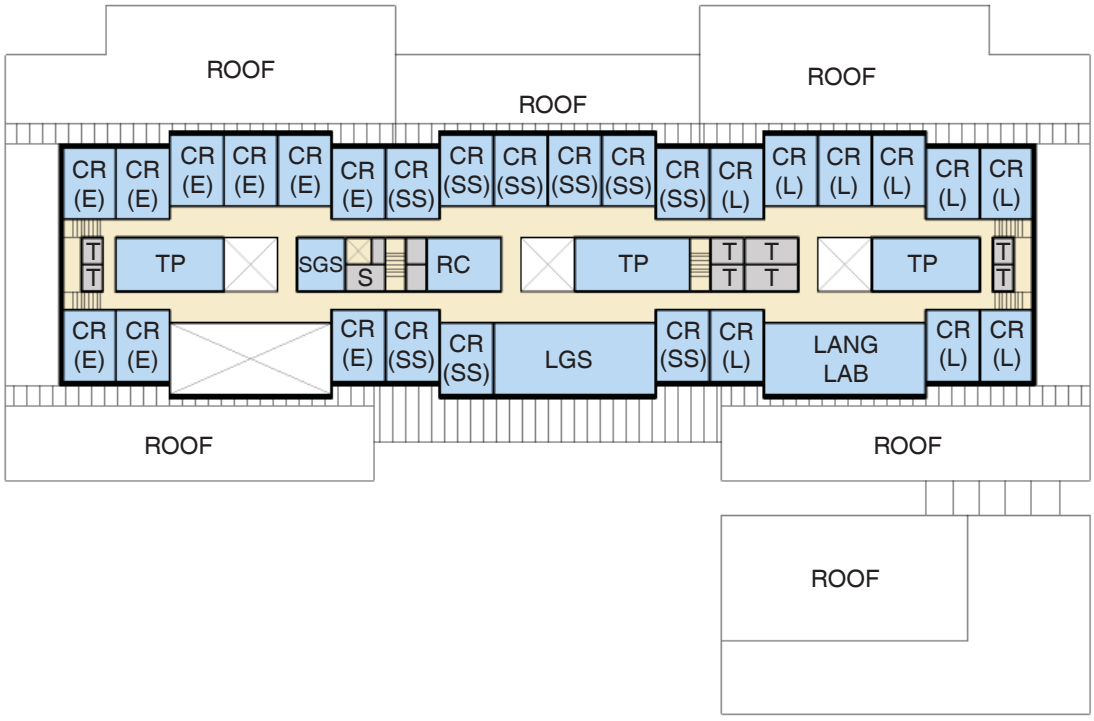
OPTION 14C: **(Preferred Alternative)**
LOWER FLOOR PLAN



Program Legend

- ADM. & GUIDANCE
- ART & MUSIC
- AUDITORIUM / DRAMA
- CIRCULATION
- CORE ACADEMIC SPACES
- CUSTODIAL & MAINT.
- DINING & FOOD SERVICE
- HEALTH & P.E.
- MEDIA CENTER
- MEDICAL
- OTHER
- SPECIAL EDUCATION
- VOC. & TECH.

OPTION 14C: **(Preferred Alternative)**
SECOND FLOOR PLAN



Program Legend

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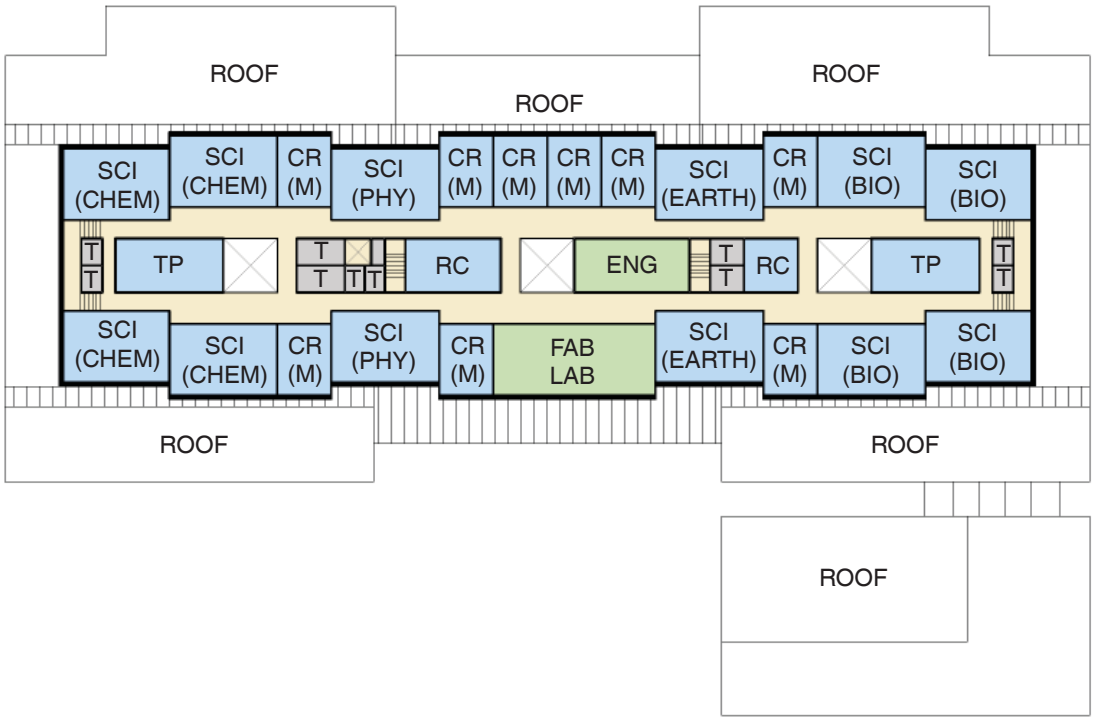
- DINING & FOOD SERVICE
- HEALTH & P.E.
- MEDIA CENTER
- MEDICAL
- OTHER
- SPECIAL EDUCATION
- VOC. & TECH.

OPTION 14C: **(Preferred Alternative)**
THIRD FLOOR PLAN



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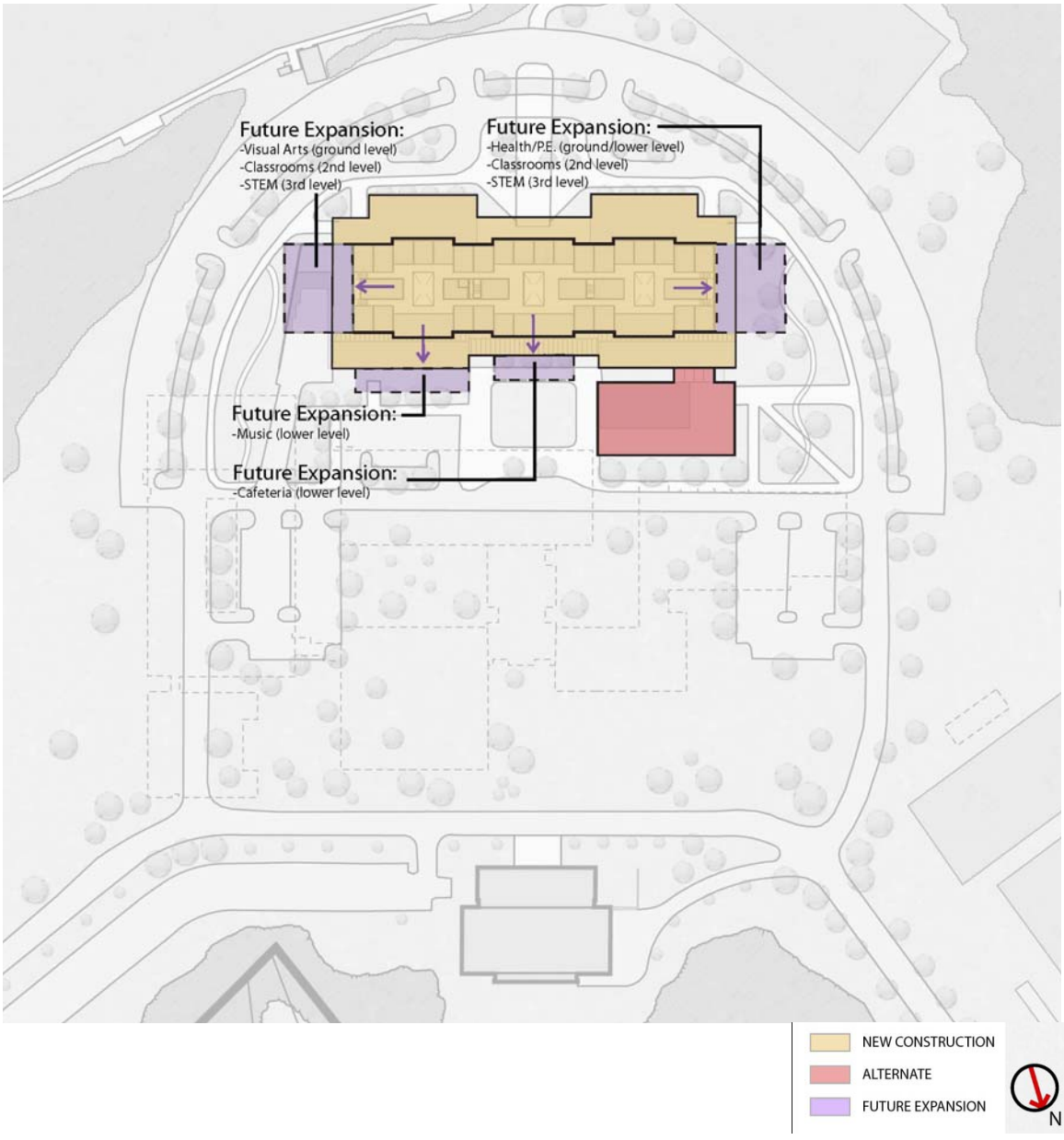
- HEALTH & P.E.
- MEDIA CENTER
- MEDICAL
- OTHER
- SPECIAL EDUCATION
- VOC. & TECH.

Future Expansion

The diagram below indicates the potential locations for future expansion of the proposed building. Note that parking along the loop road could be expanded to the north.



Structural Systems Outline

Refer to the attached structural narratives for an outline of the major structural systems proposed for option 6R2, option 14B and option 14C.

Existing Utilities Evaluation

Refer to the attached civil narrative for an evaluation of the existing utilities relative to option 6R2, option 14B and option 14C.

Narrative of Major Building MEP/FP/Technology and Kitchen Systems

Refer to the following attached narratives for option 6R2, option 14B and option 14C:

a. Plumbing Narrative
b. HVAC Narrative
c. Electrical Narrative
d. Kitchen Equipment Narrative
e. Energy Consumption Comparative

Proposed Total Project Budgets and Construction Cost Estimates

DG Jones International and KV Associates has prepared the attached estimates dated 16 June 2011. KV Associates has prepared the Total Project Budget utilizing cost per square foot values derived from DG Jones estimates. Please refer to the footnotes for further clarification. Please note that Options 1 through 10 were prepared before it was determined that bidding should begin in 1Q2013. Therefore a 1.5% multiplier should be applied to the hard costs located above the escalation line in the PDP Project Budget Option Comparison spreadsheet from April 2011.

Permitting Requirements

The following permitting will be required for options 6R2, 14B and 14C:

- Conservation Commission Approval
- Planning Board Site Plan Review
- The need for a Board of Appeals Approval will need to be determined
- Board of Health Approval

Refer to attached Nitsch Engineering Basis of Design Narrative dated June 16, 2011 for additional permitting requirements.

Proposed Project Design and Construction Schedules

Refer to the attached Project Schedules for option 6R2, 14B and 14C prepared by the OPM.

Current MA CHPS Scorecards

OMR has performed a preliminary evaluation of the Massachusetts High Performance Green School Guidelines (MA-CHPS) Criteria. The design is targeting status as a "green school" and currently is achieving more than the required 34 points which will maximize reimbursement financing. A Sustainable Design narrative from OMR's sustainable consultant (KEMA) has been included in this section.

The attached MA-CHPS scorecards reflect the design team's goal for option 6R2, option 14B and option 14C, based on the conceptual drawings at this time. Comments have been added to the scorecard to explain how the credit may be achieved for the project. The design team has been keeping track of the criteria for both MA-CHPS 2009 and LEED for Schools; a comparative LEED for School scorecard has also been included in this report. During the Schematic Design phase of the project, a decision will be made with the SBC's Sustainability subcommittee to determine which green program to proceed with. The current scorecards are showing 68 points and would allow the building to qualify for MA-CHPS Leader status, with the opportunity for the additional 2% funding reimbursement by the MSBA.

The building narratives, drawings and cost estimates provided in this report include sustainable systems and design features that will achieve the requirements set forth for a high performance green school.

Final Evaluation Criteria

Option	Site Analysis	Construction Impact	Space Organization	Structural Systems	Utilities	MEP Systems	Total Project Budget	Permitting	Design Schedule	Construction Schedule	Phasing	MACHPS
6R2: Phased Reno/Add	4	1	4	2	4	3	1	5	3	1	2	5
14B: New with Reno Lower Gym	4	3	4	3	3	4	4	5	3	3	4	5
14C: New with alternate Addition	5	4	5	4	3	5	4	5	3	5	5	5

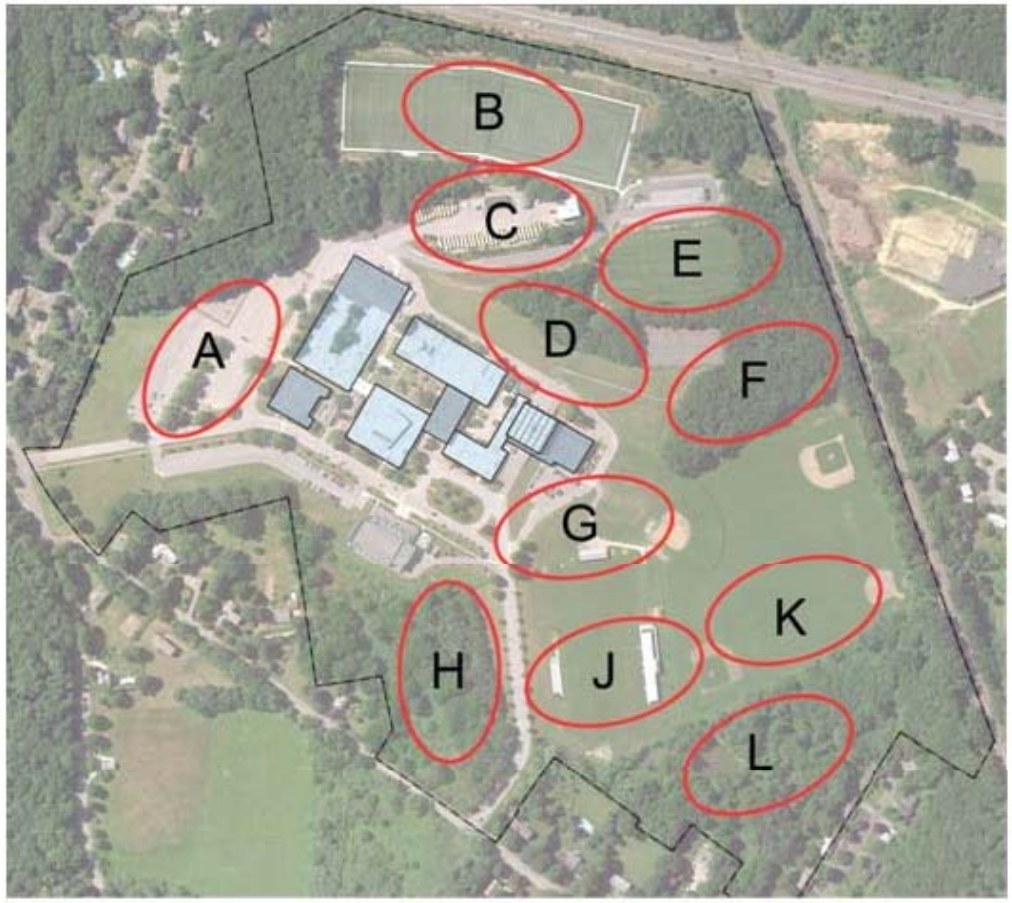
Ranking Criteria:

5 Excellent
4 Very Good
3 Good
2 Fair
1 Poor
NA Not Applicable

Summary of Preliminary Design Pricing

Option	Enrollment (Grades)	Total GSF	SF of Renovated Space (Cost/SF)	SF of New Construction (Cost/SF)	Est. Total Construction (Cost/SF)	Est. Total Project Budget
6R2: Phased Reno/Add	1225 (9-12)	240,278 GSF	62,550 ($187/ SF)	177,728 ($202/ SF)	$80M ($198/ SF of bldg costs)	$99.6M
14B: New with Reno Lower Gym	1225 (9-12)	242,100 GSF	16,275 ($209/ SF)	225,825 ($210/ SF)	$77.2M ($210/ SF of bldg costs)	$92.9M
14C: New with alternate Addition	1225 (9-12)	240,600 GSF	N/A	240,600 ($213/ SF)	$77M ($213/ SF of bldg costs)	$92.5M

Revised Site Locations Considered



Location A:
+ Site is flat
- Close proximity to neighbors
- Requires relocation of existing parking
- Poor solar orientation
- Remote from existing fields

Location B:
- Located on newly constructed turf fields
- Close proximity to neighbors
- Close proximity to Route 2
- On top of hill; remote from rest of campus

Location C:
- Sloping topography
- Located on existing district bus parking
- Site is tight between turf fields and existing roadway
- Poor solar exposure, south faces into the hill

Location D:
+ Adjacent to existing school, infrastructure and access
+/- Sloping topography
+/- Solar orientation is not due south
+ May balance cut and fill
+ Connects upper fields with campus

Location E:
+ Distant from neighbors
+ Good solar exposure
- On top of hill; remote from rest of campus
- Close proximity to MBTA
- Close proximity to Route 2

Location F:
+ Distant from neighbors
- Sloping topography
- Poor solar exposure, south faces into the hill
- Close proximity to MBTA

Location G:
+ Good solar exposure
+ Manageable topography, terraced slopes
+ Close to existing infrastructure and access
+ Connects lower fields area with main campus
- Site requires fill

Location H:
- Close proximity to neighbors
- Encroaches on wetlands
- Sloping topography
- Poor solar exposure

Location J:
+ Good solar exposure
+ Flat site
- Close proximity to neighbors
- Close proximity to wetlands
- Remote from rest of campus

Location K:
+ Good solar exposure
+ Flat site
- Close proximity to neighbors
- Close proximity to MBTA
- Close proximity to wetlands
- Remote from rest of campus

Location L:
- Located in existing woods
- Close proximity to neighbors
- Encroaches on wetlands
- Remote from rest of campus

CONCORD CARLISE HIGH SCHOOL
Option 6R2
3/4 Mile Site Analysis

CONCORD CARLISE HIGH SCHOOL
Option 14B
3/4 Mile Site Analysis

PROPERTY SETBACKS
PROPERTY LINE
WETLANDS
NEIGHBORHOODS
MUNICIPAL BUILDINGS

0 80′ 320′ 1280′
40′ 160′ 640′

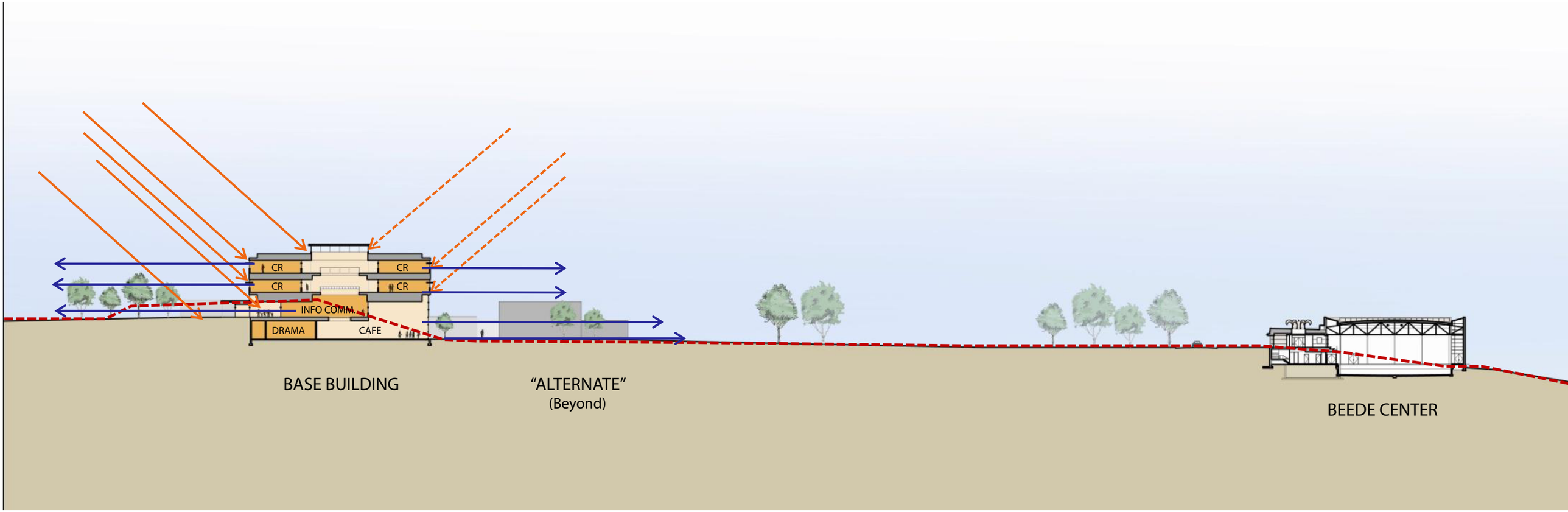
N

CONCORD CARLISE HIGH SCHOOL
Option 14C
3/4 Mile Site Analysis

PROPERTY SETBACKS
PROPERTY LINE
WETLANDS
NEIGHBORHOODS
MUNICIPAL BUILDINGS

0 80′ 320′ 1280′
40′ 160′ 640′

N


CR
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INFO COMM.
DRAMA
CAFE
BASE BUILDING
"ALTERNATE"
(Beyond)
BEEDE CENTER
EXISTING TOPOGRAPHY

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MEMORANDUM

TO: **OMR Architects, Inc. (OMR)**
Attn: Leland Koehler-Rice
Lisa Pecora-Ryan

FROM: Foley Buhl Roberts & Associates, Inc. (FBRA)
Jon Buhl

REFERENCE: **Concord Carlisle Regional High School**

SUBJECT: Options 6R2, 14B and 14C – FBRA Structural Comments

DATE: June 14, 2011

With reference to the June 10, 2011 preliminary drawings prepared by OMR, structural comments for Options 6R2, 14B and 14C are summarized in this Memorandum.

Option 6R2:

Option 6R2 includes renovations to the existing Auditorium, Cafeteria and Lower Gymnasium wings. The balance of the existing construction will be demolished to accommodate a new, three-story classroom addition to the south of the existing, remaining construction as well as new parking areas and green space. Renovations to the existing buildings will be governed by the provisions of the Massachusetts Existing Building Code (MEBC), under the Work Area Method of compliance. The scope of structural work is expected to include the following:

- *Auditorium:* A new Fly Tower will be constructed – this will require the removal and reconstruction of the southern 40%+/- of the Auditorium roof (both low and high sections; new steel framed construction). Elsewhere, sections of existing low roof structure to remain will require reinforcing for snow drifting, due to the higher Auditorium roof and the higher, new classroom addition. Portions of the remaining sections of the Auditorium high roof will also require reinforcing, due to snow drifting from the new Fly Tower and the installation of new HVAC equipment. The Auditorium renovation will be classified as a *Level 3/Substantial Structural Alteration.* The renovated building will need to withstand full wind loads required by the code for new construction and 75% of the seismic loads. To meet this requirement, the existing masonry exterior walls will need to be removed and new, reinforced masonry shear walls or steel bracing will be required in each direction. The cost of this renovation/alteration may approach or exceed the cost of new construction.

- *Cafeteria:* Portions of the existing roof structure will require reinforcing for snow drift loading due to the higher classroom addition and the installation of new HVAC equipment. The Cafeteria renovation will be classified as a *Level 3/Substantial Structural Alteration.* The renovated building will need to withstand full wind loads required by the code for new

construction and 75% of the seismic loads. To meet this requirement, new steel bracing will be required in each direction. Existing exterior walls will need to be removed and reconstructed. The cost of this renovation may approach or exceed the cost of new construction.

- *Lower Gymnasium:* Portions of the existing roof structure will require reinforcing to accommodate the installation of new HVAC equipment. A new, composite steel framed floor will be constructed at the Ground Floor level, inside the existing building envelope. The Lower Gymnasium renovation and addition will be classified as a *Level 3/Substantial Structural Alteration* and will need to meet the requirements of IEBC 2009 Chapters 8 and 10. The renovated building will need to withstand full wind loads required by the code for new construction and 100% of the seismic loads. To meet this requirement, the existing masonry exterior walls will need to be removed and new, reinforced masonry shear walls or steel bracing will be required. The cost of this renovation and addition may approach or exceed the cost of new construction.

- *Classroom Addition:* The new classroom addition will be steel framed, with concrete slabs on steel deck/composite steel beam floors and steel deck/steel beam roofs. Lateral force resistance will be provided by steel bracing in each direction. Foundations will be conventional spread footing construction (2 TSF bearing capacity) with a concrete slab on grade at the Ground Floor level. Preliminary cost estimates should carry at least ***12.5 psf*** of structural steel (excluding entry canopies, equipment screens and equipment supports).

Options 14B and 14C:

Option 14B is a new, 225,826+/- gsf, four-level facility, located to the south of the existing school and constructed into the existing hillside. The organization of the new building places the Gymnasium, Auditorium and Cafeteria (two-story) spaces at the Lower Floor level, with classrooms at the levels above. The new facility will be steel framed, with concrete slabs on steel deck/composite steel beam floors and steel deck/steel beam roofs. Lateral force resistance will be provided by steel bracing in each direction. Foundations will be conventional spread footing construction (2 TSF bearing capacity) with a concrete slab on grade at the Lower Floor level. Preliminary cost estimates should carry at least ***14.0 psf*** of structural steel (excluding entry canopies, equipment screens and equipment supports), allowing for increased steel weight due to transfer conditions over the long span spaces at the Lower Floor level.

The existing Lower Gymnasium (16,275+/- gsf) will be renovated and repurposed for Alternative Health and Physical Education (PE), Team Rooms and PE Support. The Lower Gymnasium renovation and addition will be classified as a *Level 3 Alteration.* The renovated building will need to withstand full wind loads required by the code for new construction and 50% of the seismic loads. To meet this requirement, the existing masonry exterior walls will need to be removed and new, reinforced masonry shear walls or steel bracing will be required.

Option 14C is a new, 225,826+/- gsf, four-level facility, located to the south of the existing school and constructed into the existing hillside, similar to that proposed for Option 14B. In Option 14C; however, the existing Lower Gymnasium will be demolished. A separate, two-story, steel framed building approximately 14,775 gsf in area and constructed to the west of the main facility, is proposed as an alternate (Health and Physical Education (PE), Team Rooms and PE Support). Preliminary cost estimates should carry at least ***14.0 psf*** of structural steel (excluding entry canopies, equipment screens and equipment supports), for the main building (as in Option 14B) and for the alternate, PE building.

Subsurface Soils Conditions (All Options):

Earlier geotechnical explorations indicated the presence of loose, wet sands. Based on their (limited) 2005 exploration/evaluation of the site, The Geotechnical Group concluded that the potential for liquefaction of the subsurface soils during a seismic event may be present (potentially affecting foundation design and construction for all options). Additional borings were taken at the site by Nobis Engineering during the weeks of May 9, 2011 (four borings, for 6 and 12 series options) and June 6, 2011 (two borings, for 6 and 14 series options).

A preliminary Geotechnical Report, addressing Options 6R1 and 12 was issued on June 6, 2011. It was determined that the soils at the site are not susceptible to liquefaction. The site has been classified as Site Class D. Foundations can be conventional spread footings, proportioned on the basis of a 2 TSF allowable bearing pressure. Perimeter and underslab drainage is generally not required; however a perimeter drain will be provided behind foundation walls at below grade spaces. Lowest level floors can be slab on grade construction. Compressible, varved silts and clays were encountered at the Option 12 site (to the west of the existing school) which would result in additional long term settlements (note that additional fill is required for this Option). Preloading of this site (4 to 6 month duration) would be required to mitigate long term settlements. A hard, varved clay and silt layer was encountered in the more recent borings for Option 14; however, cuts into the existing hillside are required for this option (no fill), which will reduce the load on the clay/silt layer and decrease the potential for additional long term settlements.

END OF MEMORANDUM

Nitsch Engineering

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Concord-Carlisle High School
Concord, Massachusetts
Nitsch Project #8540

Basis of Design Narrative
Concord-Carlisle High School Site

June 16, 2011

The Towns of Concord and Carlisle are proposing three building options 6R2 (addition/renovation), 14B (new school) and 14C (new school) to renovate or replace the existing Concord-Carlisle High School facility. The renovated or new school will be located near the present location of the existing school. This narrative outlines some of the major items to consider about the project including permitting, utility infrastructure and other issues.

Permitting

Wetlands:

There is an existing wetland resource area located at the entrance driveway to the High School off Thoreau Street. The proposed options do not affect the wetland or the buffer zone directly. However, since the existing drainage system does not comply with the Department of Environmental Protection's Stormwater Handbook any option selected would need to comply with the Handbook requirements. There are no stream crossings or filling of wetlands proposed. There is one (1) vernal pool off the site in the Town woods across from the Walden Street entrance. At this time it does not appear that any of the options will be within a 750 foot radius of the vernal pool.

The proper permits including a Notice of Intent (NOI) will need to be filed locally and with the state as part of the wetland permitting for the project. A review by the Concord Planning Board and the Concord Board of Health is anticipated. In addition, a design review by the Concord Public Works Commission is anticipated for the replacement of the existing water line and the existing sewer line.

The project does not contain any Areas of Critical Environmental Concern (ACEC), Estimated Natural or Priority Habitat or flood plain. Permits with the Army Corps of Engineers are not anticipated.

MA DEP

The project will not require the filing of a sewer extension permit for the construction of the new sanitary service based on the proposal that the project will be replacing the existing sewer main in kind.

Massachusetts Environmental Protection Act (MEPA):

At this point in the design process, it does not appear that the proposed options trigger any of the MEPA thresholds. An Environmental Notification Form (ENF) does not appear to be required. Nitsch Engineering will be reviewing and updating this section after a design option is selected and Approved by the MSBA.

Table 1 – Permitting Schedule

Permit	Permitting Authority	Anticipated Filing Date	Anticipated Approval Date
Notice of Intent (Order of Conditions)	Town of Concord Natural Resources Commission (Conservation Commission)	After 100% DD	Approval in 3 to 6 months
Planning Board Site Plan Review	Town of Concord Planning Board	From SD to DD	On-going - Up to 6 months+
Board of Health	Town of Concord Board of Health	From SD to DD	Up to 6 months
Public Works Commission - Right of Way Permit and Storm Water Regulations	Town of Concord Public Works Commission	From SD to CD	Up to 6 months
DEP Sewer Extension Permit	Department of Environmental Protection	100% DD	Up to 6 months

Massachusetts Collaborative for High Performance Schools (CHPS):

The following is a list of the site civil related points for MA-CHPS 2009. Nitsch is assuming that all pre-requisites will be met and any site points not discussed herein require the input from other disciplines to determine achievability. A quick analysis of whether it will be possible to achieve the point is provided below:

- SS.C1: Sustainable Site Selection: This credit **May Be Achievable** because the project is not proposing to temporarily or permanently modify the land for the project was public parkland, conservation land, or land acquired for water supply protection.

- SS.C8: Post –Construction Stormwater Management: This credit **May Be Achievable** because the project may reduce impervious area on the site and achieve a 25% decrease in the runoff rate from the 2-year, 24-hour storm from existing to developed conditions OR a 25% decrease in the runoff volume for the 100-year, 24-hour storm from existing to proposed conditions.

Utility Infrastructure:

The project surveyor will obtain existing as-built and record plan information from the Town and Utility owners to aid the utility designer in determining the impact on existing utilities for the three options.

Water:

A new 6” ductile iron fire protection water line will be installed in place of the existing water line. For all options, the new 6-inch fire protection line will extended from Thoreau Street and loop around the building and back out to Walden Street. A new 4-inch domestic water line will extend from Thoreau Street and connect to the new or renovated building. The looped water line will be approximately 6,500± linear feet (fire and domestic). New fire hydrants will be placed near the new school building as requested by the Concord Fire Department.

Hydrant flow testing of the water line is required to determine that there is adequate pressure in the existing water system to preclude the use of a fire pump for any of the options.

Sanitary Sewer:

There is an existing municipal sewer service to the existing school building available for use by this project. A new six inch sewer line will replace the existing sewer line from Thoreau Street to the proposed building location. It appears that there is adequate capacity in the town sewer system for this project. Nitsch Engineering will update this section accordingly after an option is selected.

Storm Drain:

The storm drainage system being proposed for this project is a closed system consisting of underground plastic piping, deep sump hooded catch basins, water quality structures and underground detention/infiltration systems (large diameter perforated pipe wrapped in stone and geotextile fabric). Storm runoff will be treated to meet the requirements of the Massachusetts Department of Environmental Protection (DEP) Stormwater Handbook.

Gas:

A new gas line is proposed for all the options from Walden Street to the new/renovated school building.

Electric:

The site is presently fed with 13.8KV overhead distribution. The capacity for electrical utilities on the street side is adequate. Refer to respective electrical narrative for building load and service required. Also, the school may be able to use the existing underground electric lines to the Beede Center to provide electric service to the new or renovated building option.

Concord-Carlisle High School
Concord, MA
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FIRE PROTECTION SYSTEMS

NARRATIVE REPORT OPTION 6R2

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, 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.

9. DOUBLE CHECK VALVE ASSEMBLY

A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two (2) spare sets of gaskets and repair kits.

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

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

Concord-Carlisle High School
Concord, MA
J#320 007 00.00
L#34044/Page 1/June 13, 2011

PLUMBING SYSTEMS

NARRATIVE REPORT FOR OPTION 6R2

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. Water Closet: 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 Johns Manville Micro-Lok HP.

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.

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

12. ACCESS DOORS

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

13. WATER HEATER

A. Natural-gas fired, high efficiency, condensing, sealed combustion unit water heater with thermostatically controlled mixing device to control water temperature to sinks.

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14. NET ZERO OPTION - RAIN WATER HARVESTING

A. The Plumbing design will study a gray water collection system which will harvest rain water from roof areas. This water will then be stored in an underground storage cistern where it will be used for both flushing water closets and urinals and also for irrigation of plantings on the site.

B. The water to be used for flushing will be pumped from the cistern into the building and then through a treatment system. Treated water will be stored in an atmospherically vented storage tank which is the suction tank for the gray-water booster pump system. At the discharge of storage, the gray water system will be pressurized by a duplex booster pump system which will maintain the pressure required to operate the fixtures on the system. The pumps are variable frequency drive designed to maintain system pressure, by varying the flow and thereby conserving energy. The system will an automated city water back-up in the case of insufficient rainfall.

C. Project phasing and existing conditions may affect overall design capacities.

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HVAC SYSTEMS

NARRATIVE REPORT OPTION 6R2

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 ASHRAE Handbook weather data tables.

Outside: Winter 7°F, Summer 88°F DB 74°F WB

Inside: 72°F 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 62.1-2007 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 (2) 1500 MBH output boilers and (2) end suction base mounted pumps with a capacity of 300 gpm each will be located in the Gym Building mechanical room. The second boiler plant will be located in a Penthouse Mechanical room located in the New Addition Building shall consist of (2) 2500 MBH boilers and (2) end suction base mounted pumps with a capacity of 500 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 300 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 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 part of 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.

The third boiler plant shall be installed during the New Addition construction. The main hot water heating distribution system shall be designed to incorporate valved and capped connections between all three boiler plants so that the boiler plants with provide a level of back-up and redundancy once the project is fully constructed.

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) 250 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°F and 54°F 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 1080 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. Pumps shall have lead/lad/alternating control capability.

Primary and standby vertical split case base mounted condenser pumps with a capacity of 1350 gpm each with variable frequency drives will be provided to distribute condenser water from the chillers to the remote cooling towers. Pumps shall have lead/lad/alternating control capability.

C. Classroom Heating:

It is proposed that a continuous length of ceiling radiant heating panels will be installed along the entire length of the exterior wall in each classroom. The radiation heating in each classroom will be controlled by a space mounted thermostat to maintain overall space temperature control.

D. Classroom Ventilation:

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. Each classroom shall be provided with a variable volume terminal box with hot water reheat coil and temperature and CO2 sensor controls.

E. Classroom Wing Ventilation Equipment:

The primary mechanical ventilation system for the classroom wing will include three (3) 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. The units will each have a capacity of approximately 17,000 CFM, 45 Tons and 750 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. CO2 controls will be provided for monitoring CO2 levels in all classroom ventilation systems.

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. Main Gymnasium:

The gymnasium will be provided with one roof mounted air handling unit of the recirculation design. The unit will be approximately 20,000 CFM and will include supply and return fans with VFDs, 750 MBH hot water heating coil, cooling coil with a capacity of 60 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 7,500 CFM and will include supply and return fan with VFDs, 300 MBH hot water coil with modulating hot water valve, chilled water cooling coil with a capacity of 25 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 (2) two roof mounted air handling units of the 100% outside air design. Each unit will be approximately 2000 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. 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 which will be floor mounted on a concrete housekeeping pad in the mechanical room. The unit will be approximately 7,000 CFM and will include supply fan and exhaust fan with VFDs, 150 MBH hot water coil with modulating hot water valve, chilled water cooling coil with 20 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.

J. Cafeteria:

The Cafeteria, adjacent Lobby and communicating Corridor will be provided with one rooftop air handling unit of the recirculation design. The unit will be approximately 8000 CFM and will include supply fan and return fan with VFDs, 300 MBH hot water coil with modulating hot water valve, MERV 13 filtration, 25 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.

K. 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.

L. 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 14,000 CFM and 35 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.

M. 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.

N. 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.

O. Cable TV Studio/Radio Studio Areas

The Cable TV and Radio Studio areas will each be provided with a roof mounted air handling unit of the 100% outside air design located within a factory fabricated penthouse enclosure. Each unit will be approximately 2500 CFM and will include supply and return fan with VFDs, 150 MBH output hot water coil with modulating hot water valve, MERV 13 filtration, and 9 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. Media Center/Administration Area (including Guidance, Sped, Athletic Admin Areas)

The Media Center and Administration area offices will be provided with indoor air handling units capable of providing 100% outside air. There will be (3) units, each with an approximate capacity of 20,000 CFM and will include supply and return fan with VFDs, 400 MBH hot water coil with modulating hot water valve, MERV 13 filtration, 80 ton capacity chilled water cooling coil supply air temperature. Supply air ventilation will be provided to each space which will satisfy building code requirements based on population. Rooms and different zones in this area will be provided with variable air volume boxes with hot water reheat and temperature and CO2 controls.

S. Main Mechanical Room

The mechanical room, custodial and the loading dock areas shall be provided with indoor hot water heater and ventilation unit with a capacity of approximately 3500 CFM.

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ELECTRICAL SYSTEMS

NARRATIVE REPORT FOR OPTION 6R2

The following is the Electrical system narrative, which defines the scope of work and capacities of the Power and Lighting system as well as the Basis of Design. The electrical systems shall be designed and constructed for ***MA-CHPS*** or ***LEED for Schools***.

1. CODES

All work installed under Division 26 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 Division 26 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 and LEED for Schools.*** The occupancy sensor shall have auxiliary contacts for DDC input functions.

B. Exterior lighting will be controlled by photocell “on” and “smart panel” for “off” operation. The parking area lighting will be controlled by “zones” and have dual level control.

C. Emergency and exit lighting will be run through life safety panels to be on during normal power conditions as well as power outage conditions. 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 3000 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 rooms or closets.

2. The new electrical main service will be located in the existing auditorium building.

3. The equipment will be sub-metered for load shedding purposes as well as building “dashboard” monitoring control of solenoid circuit breakers will be accomplished through the DDC system.

B. Interior Lighting System:

1. Classroom lighting fixtures consist of pendant mounted direct/indirect fluorescent luminaries with T5HO lamps and electronic dimming ballasts. The fixtures will be pre-wired for 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 shall have daylight dimming controls similar to classrooms. The classroom power density will be targeted for less than 0.6 watts/sq. ft.

   In general lighting power density will be 30-40% less than IECC 2009. The power density reduction relates to ***MA-CHPS and LEED for Schools.***

3. Lighting levels will be approximately 30 foot candles in classrooms and offices. The daylight dimming footcandle level will be in compliance with ***MA-CHPS and LEED for Schools.***

4. Gymnasium 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 linear indirect lighting using LED light source. The corridor light level will be designed for approximately 15 foot candles. Corridor lighting will be on time clock control and only “ON” during occupied hours. The corridor lighting will have two level controlled by schedule on DDC system.

6. Cafeteria lighting will be recessed indirect fluorescent fixtures with electronic ballasts. The light levels will be designed for approximately 20 foot candles. Daylighting controls will be provided on perimeter light fixtures with 15 feet of glazing

7. Auditorium theatrical lights with a dimming system will be provided for performances. House lighting in auditorium will be dimmable fluorescent and controlled by theatrical house dimming system. Theatrical boarder lights shall be LED with “RGB” control.

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.

9. Library lighting will consist of pendant linear fixtures with T5 lamps and electronic ballasts. Light levels will be approximately 30 foot candles.

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

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 shall be in accordance with ***MA-CHPS and LEED for schools.***

11. The entire school will be controlled with an automatic lighting control system using the DDC control system for programming lights on & off.

C. Emergency Lighting System:

1. An exterior 350 kw natural gas emergency generator with sound attenuated enclosure will be provided. 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 fire safety systems, boilers and circulating pumps, refrigeration equipment, communications systems, elevator, gym and cafeteria, ventilation and heating, kitchen, etc.

D. Site Lighting System ***MA-CHPS Credit SC5-2***

1. Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the parking area and roadways. Pole heights will be 20 feet. The exterior lighting will be connected to the automatic lighting control system for photocell on and timed off operation. The site lighting fixtures will be dark sky compliant. The illumination level is 0.5fc minimum for parking areas in accordance with Illuminating Engineering Society.

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

E. Wiring Devices:

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

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 neutrals and transient voltage surge suppressors will be provided for receptacle circuits.

6. Certain plug loads such as copiers, printers, electric water coolers will be controlled by the DDC system for shutdown on a schedule basis.

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.

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 an approved method by the fire department.

G. Uninterruptible Power Supply (UPS):

1. Two (2) 20kw, 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.

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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 will be commissioned per Section 018100 of the specifications.

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 head end server will be located in the head end MDF room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders 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 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 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. PHASING

The Work will be conducted in several phases to provide the least possible interference to the activities of the High School. The existing primary feeder and communications demarcation will require relocation. The auditorium building will require new services to be installed in Phase 1. There will be additional phasing at each existing building prior to demolishing of existing. There will be temporary relocation of existing feeders in tunnels in order to maintain existing services.

13. NET ZERO OPTION

This option will require demand reduction so that the least amount of energy is used. This option requires load shedding, enhanced control of lighting system and plug load, HVAC sub-metered, building dashboard system and on-site renewable energy. Other factors such as building envelope HVAC and Plumbing are described in the related narratives. It is estimated that a minimum of a 1 mega-watt (1,000 Kw) ground mounted PV array will be required.

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TECHNOLOGY SYSTEMS

NARRATIVE REPORT FOR OPTION 6R2

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

1. CODES

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

2. DESIGN INTENT

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

3. TECHNOLOGY

   A. The data system infrastructure will consist of fiber optic backbone cabling horizontal wiring will consist of Category 6A UTP Plenum rated cabling for both data and telephone systems for gigabit connectivity. The telephone infrastructure will accommodate Centrex, PBX, or VOIP based voice systems.

   B. Each classroom will have 4 data outlets for student computers. Two data, one voice with video and audio connections to a wall mounted projector will be provided at teacher's station with interconnectivity to a interactive whiteboard. A wall phone outlet with 2 way ceiling speaker will be provided for communications with administration. Clocks will be wireless, part of a GPS/LAN based centralized clock system. Wireless access points will be provided in all classrooms and other spaces.

   C. A central paging system will be provided and integrated with the telephone system.

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

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

4. TESTING REQUIREMENTS

   A. The Technology and Security Contractors shall provide testing of the following systems with the Owner and Owner's representative present:
      - Telephone and data cabling
      - Fiber optic backbone cabling
      - Paging system

- Wireless clock system
- A/V wiring for classrooms

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

5. OPERATION MANUALS AND MAINTENANCE MANUALS:

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

6. RECORD DRAWINGS AND CONTROL DOCUMENTS:

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

7. COMMISSIONING

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

8. PHASING

A. The existing telephone internet and cable-TV services may be impacted by the location of the new building. Relocation services may be required under an early site package.

B. The existing telecommunications and date infrastructure will need to have temporary backbone cabling from new head end to existing IDF's. In addition, it will not be possible to synchronize existing clocks as the present system is faulty. The program bells will be temporarily extended from existing locations to new head end room for synchronization. The amount of temporary cabling will be extensive.

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FIRE PROTECTION SYSTEMS

NARRATIVE REPORT OPTION 14B

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, 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.

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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.

9. DOUBLE CHECK VALVE ASSEMBLY

A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two (2) spare sets of gaskets and repair kits.

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

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

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PLUMBING SYSTEMS

NARRATIVE REPORT FOR OPTION 14B

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. Water Closet: 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 Johns Manville Micro-Lok HP.

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.

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

12. ACCESS DOORS

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

13. WATER HEATER

A. Natural-gas fired, high efficiency, condensing, sealed combustion unit water heater with thermostatically controlled mixing device to control water temperature to fixtures.

14. NET ZERO OPTION - RAIN WATER HARVESTING

A. The Plumbing design will study a gray water collection system which will harvest rain water from roof areas. This water will then be stored in an underground storage cistern where it will be used for both flushing water closets and urinals and also for irrigation of plantings on the site.

B. The water to be used for flushing will be pumped from the cistern into the building and then through a treatment system. Treated water will be stored in an atmospherically vented storage tank which is the suction tank for the gray-water booster pump system. At the discharge of storage, the gray water system will be pressurized by a duplex booster pump system which will maintain the pressure required to operate the fixtures on the system. The pumps are variable frequency drive designed to maintain system pressure, by varying the flow and thereby conserving energy. The system will an automated city water back-up in the case of insufficient rainfall.

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HVAC SYSTEMS

NARRATIVE REPORT OPTION 14B

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 ASHRAE Handbook weather data tables.

Outside: Winter 7°F, Summer 88°F DB 74°F WB

Inside: 72°F 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 62.1-2007 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, with the exception of the renovated gym building, will be through the use of (1) high efficiency gas-fired condensing boiler plants. The boiler plant will consist of four (4) 2500 MBH output boilers and (2) end suction base mounted pumps with a capacity of approximately 670 gpm each and will be in a Penthouse Mechanical room located on the Roof in a central location. The 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.

A high efficiency gas-fired hot water condensing boiler plant will also be provided to serve the Gymnasium building renovation and addition. Refer to Paragraph R below for additional information. Heating hot water supply and return piping will also be routed from the Main building underground to the Gymnasium building to provide back-up hot water.

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) 250 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°F and 54°F 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 1080 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. Pumps shall have lead/lad/alternating control capability.

Primary and standby vertical split case base mounted condenser pumps with a capacity of 1350 gpm each with variable frequency drives will be provided to distribute condenser water from the chillers to the remote cooling towers. Pumps shall have lead/lad/alternating control capability.

C. Classroom Heating:

It is proposed that a continuous length of ceiling radiant heating panels will be installed along the entire length of the exterior wall in each classroom. The radiation heating in each classroom will be controlled by a space mounted thermostat to maintain overall space temperature control.

D. Classroom Ventilation:

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. Each classroom shall be provided with a variable volume terminal box with hot water reheat coil and temperature and CO2 sensor controls.

E. Classroom Wing Ventilation Equipment:

The primary mechanical ventilation system for the classroom wing will include three (3) 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. The units will each have a capacity of approximately 17,000 CFM, 45 Tons and 750 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. CO2 controls will be provided for monitoring CO2 levels in all classroom ventilation systems.

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. Gymnasium (Main Building):

The gymnasium will be provided with one roof mounted air handling unit of the recirculation design. The unit will be approximately 20,000 CFM and will include supply and return fans with VFDs, 750 MBH hot water heating coil, cooling coil with a capacity of 60 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.

G. Locker Rooms:

The locker rooms will be provided with (2) two roof mounted air handling units of the 100% outside air design.. Each unit will be approximately 2000 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.

H. 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 which will be floor mounted on a concrete housekeeping pad in the mechanical room. The unit will be approximately 7,000 CFM and will include supply fan and exhaust fan with VFDs, 150 MBH hot water coil with modulating hot water valve, chilled water cooling coil with 20 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.

I. Cafeteria:

The Cafeteria, adjacent Lobby and communicating Corridor will be provided with one rooftop air handling unit of the recirculation design. The unit will be approximately 8000 CFM and will include supply fan and return fan with VFDs, 300 MBH hot water coil with modulating hot water valve, MERV 13 filtration, 25 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.

J. 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.

K. 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 14,000 CFM and 35 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.

L. 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.

M. 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.

N. Cable TV Studio/Radio Studio Areas

The Cable TV and Radio Studio areas will each be provided with a roof mounted air handling unit of the 100% outside air design located within a factory fabricated penthouse enclosure. Each unit will be approximately 2500 CFM and will include supply and return fan with VFDs, 150 MBH output hot water coil with modulating hot water valve, MERV 13 filtration, and 9 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.

O. Administration Area (including Guidance, Sped, Athletic Admin Areas)

The Administration area offices will be provided with indoor air handling units capable of providing 100% outside air. The air handling units, each will have an approximate capacity of 18,000 CFM and will include supply and return fan with VFDs, 400 MBH hot water coil with modulating hot water valve, MERV 13 filtration, 72 ton capacity chilled water cooling coil supply air temperature. Supply air ventilation will be provided to each space which will satisfy building code requirements based on population. Rooms and different zones in this area will be provided with variable air volume boxes with hot water reheat and temperature and CO2 controls.

P. Media Center (and Adjacent Office Areas)

The Media Center and adjacent offices will be provided with indoor air handling units capable of providing 100% outside air. The air handling units, each will have an approximate capacity of 20,000 CFM and will include supply and return fan with VFDs, 400 MBH hot water coil with modulating hot water valve, MERV 13 filtration, 80 ton capacity chilled water cooling coil supply air temperature. Supply air ventilation will be provided to each space which will satisfy building code requirements based on population. Rooms and different zones in this area will be provided with variable air volume boxes with hot water reheat and temperature and CO2 controls.

Q. Main Mechanical Room

The mechanical room, custodial and the loading dock areas shall be provided with indoor hot water heater and ventilation unit with a capacity of approximately 3500 CFM.

R. Gymnasium Building Renovation and Addition:

A high efficiency gas-fired hot water condensing boiler plant will also be provided to serve the Gymnasium building renovation and addition. The boiler plant will consist of (2) condensing hot water boiler with a capacity of 450 MBH output. Hot water inline primary and standby pumps with variable speed dries and a capacity of 90 gpm shall deliver heating hot water to the Gymnasium air handling equipment via an insulated copper piping distribution system.

Underground chilled water piping will be routed from the central cooling plant to the Gymnasium building air handling equipment. Underground hot water heating piping from the main building central plant will also be provided to serve as backup in the event that the Gym building boilers require repair and/or service.

The Gymnasium will be provided with two roof mounted air handling units of the recirculation design. Each unit will be approximately 8,000 CFM and will include supply and return fan with VFDs, 325 MBH hot water heating coil, cooling coil with a capacity of 20 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.

The team rooms and offices will be served by rooftop energy recovery ventilation unit with supplemental hot water heating and chilled water cooling. The energy recovery unit will have a capacity of approximately 3000 CFM, 150 MBH Heating and 10 tons cooling. The energy recovery unit will also have supply and exhaust fans, 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. Return air will be drawn back to the air handling unit by a combination of ceiling and low wall return air registers.

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ELECTRICAL SYSTEMS

NARRATIVE REPORT FOR OPTION 14B

The following is the Electrical system narrative, which defines the scope of work and capacities of the Power and Lighting system as well as the Basis of Design. The electrical systems shall be designed and constructed for ***MA-CHPS*** or ***LEED for Schools***.

1. CODES

All work installed under Division 26 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 Division 26 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 and LEED for Schools.*** The occupancy sensor shall have auxiliary contacts for DDC input functions.

B. Exterior lighting will be controlled by photocell “on” and “smart panel” for “off” operation. The parking area lighting will be controlled by “zones” and have dual level control.

C. Emergency and exit lighting will be run through life safety panels to be on during normal power conditions as well as power outage conditions. 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 3000 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 rooms or closets.

2. The equipment will be sub-metered for load shedding purposes as well as building “dashboard” monitoring control of solenoid circuit breakers will be accomplished through the DDC system.

B. Interior Lighting System:

1. Classroom lighting fixtures consist of pendant mounted direct/indirect fluorescent luminaries with T5HO lamps and electronic dimming ballasts. The fixtures will be pre-wired for 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 shall have daylight dimming controls similar to classrooms. The classroom power density will be targeted for less than 0.6 watts/sq. ft.

   In general lighting power density will be 30-40% less than IECC 2009. The power density reduction relates to ***MA-CHPS and LEED for Schools.***

3. Lighting levels will be approximately 30 foot candles in classrooms and offices. The daylight dimming footcandle level will be in compliance with ***MA-CHPS and LEED for Schools.***

4. Gymnasium 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 linear indirect lighting using LED light source. The corridor light level will be designed for approximately 15 foot candles. Corridor lighting will be on time clock control and only “ON” during occupied hours. The corridor lighting will have two level controlled by schedule on DDC system.

6. Cafeteria lighting will be recessed indirect fluorescent fixtures with electronic ballasts. The light levels will be designed for approximately 20 foot candles. Daylighting controls will be provided on perimeter light fixtures with 15 feet of glazing

7. Auditorium theatrical lights with a dimming system will be provided for performances. House lighting in auditorium will be dimmable fluorescent and controlled by theatrical house dimming system. Theatrical boarder lights shall be LED with “RGB” control.

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.

9. Library lighting will consist of pendant linear fixtures with T5 lamps and electronic ballasts. Light levels will be approximately 30 foot candles.

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

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 shall be in accordance with ***MA-CHPS and LEED for schools.***

11. The entire school will be controlled with an automatic lighting control system using the DDC control system for programming lights on & off.

C. Emergency Lighting System:

1. An exterior 350 kw natural gas emergency generator with sound attenuated enclosure will be provided. 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 fire safety systems, boilers and circulating pumps, refrigeration equipment, communications systems, elevator, gym and cafeteria, ventilation and heating, kitchen, etc.

D. Site Lighting System ***MA-CHPS Credit SC5-2***

1. Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the parking area and roadways. Pole heights will be 20 feet. The exterior lighting will be connected to the automatic lighting control system for photocell on and timed off operation. The site lighting fixtures will be dark sky compliant. The illumination level is 0.5fc minimum for parking areas in accordance with Illuminating Engineering Society.

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

E. Wiring Devices:

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

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 neutrals and transient voltage surge suppressors will be provided for receptacle circuits.

6. Certain plug loads such as copiers, printers, electric water coolers will be controlled by the DDC system for shutdown on a schedule basis.

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.

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 an approved method by the fire department.

G. Uninterruptible Power Supply (UPS):

1. Two (2) 20kw, 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.

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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 will be commissioned per Section 018100 of the specifications.

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 head end server will be located in the head end MDF room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders 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 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 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. PHASING

The Work will be conducted in phases to provide the least possible interference to the activities of the High School. The existing primary feeder and communications demarcation may require relocation. The impact to the project is minor and this type of work can be accomplished as an early site package.

13. NET ZERO OPTION

This option will require demand reduction so that the least amount of energy is used. This option requires load shedding, enhanced control of lighting system and plug load, HVAC sub-metered, building dashboard system and on-site renewable energy. Other factors such as building envelope HVAC and Plumbing are described in the related narratives. It is estimated that a minimum of a 1 mega-watt (1,000 Kw) ground mounted PV array will be required.

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TECHNOLOGY SYSTEMS

NARRATIVE REPORT FOR OPTION 14B

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

1. CODES

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

2. DESIGN INTENT

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

3. TECHNOLOGY

   A. The data system infrastructure will consist of fiber optic backbone cabling horizontal wiring will consist of Category 6A UTP Plenum rated cabling for both data and telephone systems for gigabit connectivity. The telephone infrastructure will accommodate Centrex, PBX, or VOIP based voice systems.

   B. Each classroom will have 4 data outlets for student computers. Two data, one voice with video and audio connections to a wall mounted projector will be provided at teacher's station with interconnectivity to a interactive whiteboard. A wall phone outlet with 2 way ceiling speaker will be provided for communications with administration. Clocks will be wireless, part of a GPS/LAN based centralized clock system. Wireless access points will be provided in all classrooms and other spaces.

   C. A central paging system will be provided and integrated with the telephone system.

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

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

4. TESTING REQUIREMENTS

   A. The Technology and Security Contractors shall provide testing of the following systems with the Owner and Owner's representative present:
      - Telephone and data cabling
      - Fiber optic backbone cabling
      - Paging system

- Wireless clock system
- A/V wiring for classrooms

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

5. OPERATION MANUALS AND MAINTENANCE MANUALS:

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

6. RECORD DRAWINGS AND CONTROL DOCUMENTS:

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

7. COMMISSIONING

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

8. PHASING

A. The existing telephone internet and cable-TV services may be impacted by the location of the new building. Relocation services may be required under an early site package.

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FIRE PROTECTION SYSTEMS

NARRATIVE REPORT OPTION 14C

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, a school building of greater than 12,000s.f. must be protected with an automatic sprinkler system.

4. DESCRIPTION

   A. Each building will be served by 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 buildings 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 in the new Base Building.

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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.

9. DOUBLE CHECK VALVE ASSEMBLY

A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two (2) spare sets of gaskets and repair kits.

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

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

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PLUMBING SYSTEMS

NARRATIVE REPORT FOR OPTION 14C

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 in each building. 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. Water Closet: 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 Johns Manville Micro-Lok HP.

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.

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

12. ACCESS DOORS

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

13. WATER HEATER

A. Natural-gas fired, high efficiency, condensing, sealed combustion unit water heater with thermostatically controlled mixing device to control water temperature to fixtures.

14. NET ZERO OPTION - RAIN WATER HARVESTING

A. The Plumbing design will study a gray water collection system which will harvest rain water from roof areas. This water will then be stored in an underground storage cistern where it will be used for both flushing water closets and urinals and also for irrigation of plantings on the site.

B. The water to be used for flushing will be pumped from the cistern into the building and then through a treatment system. Treated water will be stored in an atmospherically vented storage tank which is the suction tank for the gray-water booster pump system. At the discharge of storage, the gray water system will be pressurized by a duplex booster pump system which will maintain the pressure required to operate the fixtures on the system. The pumps are variable frequency drive designed to maintain system pressure, by varying the flow and thereby conserving energy. The system will an automated city water back-up in the case of insufficient rainfall.

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HVAC SYSTEMS

NARRATIVE REPORT OPTION 14C

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 ASHRAE Handbook weather data tables.

Outside: Winter 7°F, Summer 88°F DB 74°F WB

Inside: 72°F 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 62.1-2007 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 (1) high efficiency gas-fired condensing boiler plant. The boiler plant will consist of four (4) 2500 MBH output boilers and (2) end suction base mounted pumps with a capacity of approximately 670 gpm each and will be in a Penthouse Mechanical room located on the Roof in a central location. The 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.

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) 250 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°F and 54°F 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 1080 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. Pumps shall have lead/lad/alternating control capability.

Primary and standby vertical split case base mounted condenser pumps with a capacity of 1350 gpm each with variable frequency drives will be provided to distribute condenser water from the chillers to the remote cooling towers. Pumps shall have lead/lad/alternating control capability.

C. Classroom Heating:

It is proposed that a continuous length of ceiling radiant heating panels will be installed along the entire length of the exterior wall in each classroom. The radiation heating in each classroom will be controlled by a space mounted thermostat to maintain overall space temperature control.

D. Classroom Ventilation:

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. Each classroom shall be provided with a variable volume terminal box with hot water reheat coil and temperature and CO2 sensor controls.

E. Classroom Wing Ventilation Equipment:

The primary mechanical ventilation system for the classroom wing will include three (3) 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. The units will each have a capacity of approximately 17,000 CFM, 45 Tons and 750 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. CO2 controls will be provided for monitoring CO2 levels in all classroom ventilation systems.

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. Gymnasium (Main Building):

The gymnasium will be provided with one roof mounted air handling unit of the recirculation design. The unit will be approximately 20,000 CFM and will include supply and return fans with VFDs, 750 MBH hot water heating coil, cooling coil with a capacity of 60 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.

G. Locker Rooms:

The locker rooms will be provided with (2) two roof mounted air handling units of the 100% outside air design.. Each unit will be approximately 2000 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.

H. 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 which will be floor mounted on a concrete housekeeping pad in the mechanical room. The unit will be approximately 7,000 CFM and will include supply fan and exhaust fan with VFDs, 150 MBH hot water coil with modulating hot water valve, chilled water cooling coil with 20 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.

I. Cafeteria:

The Cafeteria, adjacent Lobby and communicating Corridor will be provided with one rooftop air handling unit of the recirculation design. The unit will be approximately 8000 CFM and will include supply fan and return fan with VFDs, 300 MBH hot water coil with modulating hot water valve, MERV 13 filtration, 25 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.

J. 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.

K. 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 14,000 CFM and 35 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.

L. 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.

M. 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.

N. Cable TV Studio/Radio Studio Areas

The Cable TV and Radio Studio areas will each be provided with a roof mounted air handling unit of the 100% outside air design located within a factory fabricated penthouse enclosure. Each unit will be approximately 2500 CFM and will include supply and return fan with VFDs, 150 MBH output hot water coil with modulating hot water valve, MERV 13 filtration, and 9 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.

O. Administration Area (including Guidance, Sped, Athletic Admin Areas)

The Administration area offices will be provided with indoor air handling units capable of providing 100% outside air. The air handling units, each will have an approximate capacity of 18,000 CFM and will include supply and return fan with VFDs, 400 MBH hot water coil with modulating hot water valve, MERV 13 filtration, 72 ton capacity chilled water cooling coil supply air temperature. Supply air ventilation will be provided to each space which will satisfy building code requirements based on population. Rooms and different zones in this area will be provided with variable air volume boxes with hot water reheat and temperature and CO2 controls.

P. Media Center (and Adjacent Office Areas)

The Media Center and adjacent offices will be provided with indoor air handling units capable of providing 100% outside air. The air handling units, each will have an approximate capacity of 20,000 CFM and will include supply and return fan with VFDs, 400 MBH hot water coil with modulating hot water valve, MERV 13 filtration, 80 ton capacity chilled water cooling coil supply air temperature. Supply air ventilation will be provided to each space which will satisfy building code requirements based on population. Rooms and different zones in this area will be provided with variable air volume boxes with hot water reheat and temperature and CO2 controls.

Q. Main Mechanical Room

The mechanical room, custodial and the loading dock areas shall be provided with indoor hot water heater and ventilation unit with a capacity of approximately 3500 CFM.

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R. Gymnasium Building Renovation and Addition:

The Gymnasium will be provided with two roof mounted air handling units of the recirculation design. Each unit will be approximately 8,000 CFM and will include supply and return fan with VFDs, 325 MBH hot water heating coil, cooling coil with a capacity of 20 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.

The team rooms and offices will be served by rooftop energy recovery ventilation unit with supplemental hot water heating and chilled water cooling. The energy recovery unit will have a capacity of approximately 3000 CFM, 150 MBH Heating and 10 tons cooling. The energy recovery unit will also have supply and exhaust fans, 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. Return air will be drawn back to the air handling unit by a combination of ceiling and low wall return air registers.

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ELECTRICAL SYSTEMS

NARRATIVE REPORT FOR OPTION 14C

The following is the Electrical system narrative, which defines the scope of work and capacities of the Power and Lighting system as well as the Basis of Design. The electrical systems shall be designed and constructed for ***MA-CHPS*** or ***LEED for Schools***.

1. CODES

All work installed under Division 26 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 Division 26 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 and LEED for Schools.*** The occupancy sensor shall have auxiliary contacts for DDC input functions.

B. Exterior lighting will be controlled by photocell “on” and “smart panel” for “off” operation. The parking area lighting will be controlled by “zones” and have dual level control.

C. Emergency and exit lighting will be run through life safety panels to be on during normal power conditions as well as power outage conditions. 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 3000 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 rooms or closets.

2. The equipment will be sub-metered for load shedding purposes as well as building “dashboard” monitoring control of solenoid circuit breakers will be accomplished through the DDC system.

B. Interior Lighting System:

1. Classroom lighting fixtures consist of pendant mounted direct/indirect fluorescent luminaries with T5HO lamps and electronic dimming ballasts. The fixtures will be pre-wired for 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 shall have daylight dimming controls similar to classrooms. The classroom power density will be targeted for less than 0.6 watts/sq. ft.

   In general lighting power density will be 30-40% less than IECC 2009. The power density reduction relates to ***MA-CHPS and LEED for Schools.***

3. Lighting levels will be approximately 30 foot candles in classrooms and offices. The daylight dimming footcandle level will be in compliance with ***MA-CHPS and LEED for Schools.***

4. Gymnasium 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 linear indirect lighting using LED light source. The corridor light level will be designed for approximately 15 foot candles. Corridor lighting will be on time clock control and only “ON” during occupied hours. The corridor lighting will have two level controlled by schedule on DDC system.

6. Cafeteria lighting will be recessed indirect fluorescent fixtures with electronic ballasts. The light levels will be designed for approximately 20 foot candles. Daylighting controls will be provided on perimeter light fixtures with 15 feet of glazing

7. Auditorium theatrical lights with a dimming system will be provided for performances. House lighting in auditorium will be dimmable fluorescent and controlled by theatrical house dimming system. Theatrical boarder lights shall be LED with “RGB” control.

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.

9. Library lighting will consist of pendant linear fixtures with T5 lamps and electronic ballasts. Light levels will be approximately 30 foot candles.

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

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 shall be in accordance with ***MA-CHPS and LEED for schools.***

11. The entire school will be controlled with an automatic lighting control system using the DDC control system for programming lights on & off.

C. Emergency Lighting System:

1. An exterior 350 kw natural gas emergency generator with sound attenuated enclosure will be provided. 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 fire safety systems, boilers and circulating pumps, refrigeration equipment, communications systems, elevator, gym and cafeteria, ventilation and heating, kitchen, etc.

D. Site Lighting System ***MA-CHPS Credit SC5-2***

1. Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the parking area and roadways. Pole heights will be 20 feet. The exterior lighting will be connected to the automatic lighting control system for photocell on and timed off operation. The site lighting fixtures will be dark sky compliant. The illumination level is 0.5fc minimum for parking areas in accordance with Illuminating Engineering Society.

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

E. Wiring Devices:

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

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 neutrals and transient voltage surge suppressors will be provided for receptacle circuits.

6. Certain plug loads such as copiers, printers, electric water coolers will be controlled by the DDC system for shutdown on a schedule basis.

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.

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 an approved method by the fire department.

G. Uninterruptible Power Supply (UPS):

1. Two (2) 20kw, 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.

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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 will be commissioned per Section 018100 of the specifications.

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 head end server will be located in the head end MDF room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders 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 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 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. PHASING

The Work will be conducted in phases to provide the least possible interference to the activities of the High School. The existing primary feeder and communications demarcation may require relocation. The impact to the project is minor and this type of work can be accomplished as an early site package.

13. NET ZERO OPTION

This option will require demand reduction so that the least amount of energy is used. This option requires load shedding, enhanced control of lighting system and plug load, HVAC sub-metered, building dashboard system and on-site renewable energy. Other factors such as building envelope HVAC and Plumbing are described in the related narratives. It is estimated that a minimum of a 1 mega-watt (1,000 Kw) ground mounted PV array will be required.

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TECHNOLOGY SYSTEMS

NARRATIVE REPORT FOR OPTION 14C

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

1. CODES

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

2. DESIGN INTENT

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

3. TECHNOLOGY

   A. The data system infrastructure will consist of fiber optic backbone cabling horizontal wiring will consist of Category 6A UTP Plenum rated cabling for both data and telephone systems for gigabit connectivity. The telephone infrastructure will accommodate Centrex, PBX, or VOIP based voice systems.

   B. Each classroom will have 4 data outlets for student computers. Two data, one voice with video and audio connections to a wall mounted projector will be provided at teacher's station with interconnectivity to a interactive whiteboard. A wall phone outlet with 2 way ceiling speaker will be provided for communications with administration. Clocks will be wireless, part of a GPS/LAN based centralized clock system. Wireless access points will be provided in all classrooms and other spaces.

   C. A central paging system will be provided and integrated with the telephone system.

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

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

4. TESTING REQUIREMENTS

   A. The Technology and Security Contractors shall provide testing of the following systems with the Owner and Owner's representative present:
      - Telephone and data cabling
      - Fiber optic backbone cabling
      - Paging system

- Wireless clock system
- A/V wiring for classrooms

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

5. OPERATION MANUALS AND MAINTENANCE MANUALS:

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

6. RECORD DRAWINGS AND CONTROL DOCUMENTS:

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

7. COMMISSIONING

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

8. PHASING

A. The existing telephone internet and cable-TV services may be impacted by the location of the new building. Relocation services may be required under an early site package.

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CONCORD CARLISLE REGIONAL HIGH SCHOOL
TYPICAL CLASSROOM ORIENTATION ENERGY CONSUMPTION COMPARISON

DESCRIPTION	ANNUAL ELEC. CONS. (KWH)	ANNUAL GAS CONS. (BTU)	ANNUAL ELECTRIC COST	ANNUAL GAS COST	COMBINED UTILITY COST	COMBINED EXPENSE SAVINGS**
North Facing Classroom with high efficiency lighting and daylighting controls served by displacement ventialtion system with perimeter fintube	4,642	31,746	$487	$1,163	$1,650	-
15° North East Facing Classroom with high efficiency lighting and daylighting controls served by displacement ventialtion system with perimeter fintube	4,579	31,735	$481	$1,162	$1,643	$7
30° North East Facing Classroom with high efficiency lighting and daylighting controls served by displacement ventialtion system with perimeter fintube	4,520	31,586	$475	$1,160	$1,635	$15
South Facing Classroom with high efficiency lighting and daylighting controls served by displacement ventialtion system with perimeter fintube	4,279	29,017	$449	$1,125	$1,574	$76
15° South West Facing Classroom with high efficiency lighting and daylighting controls served by displacement ventialtion system with perimeter fintube	4,529	28,873	$476	$1,123	$1,599	$51
30° South West Facing Classroom with high efficiency lighting and daylighting controls served by displacement ventialtion system with perimeter fintube	4,533	29,441	$476	$1,130	$1,606	$44

***The above data is based on a 825 ft² classroom with a 30% window to wall ratio. Classroom is served by hot water heating/chilled water cooling rooftop unit with energy recovery wheel.**

Colburn & Guyette Consulting Partners, Incorporated
A Design and Management Consulting Firm Serving the Design and Food Service Industries

June 14, 2011

Foodservice Narrative

MAIN KITCHEN AND STORAGE:

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 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.

At a meeting with the schools principal and chef we found out that the main focus for the kitchen space moving forward is to be on the preparation of fresh foods which translates into requirements for prep space and cold and dry storage. By providing additional freezer space the school will be able to purchase seasonal items in bulk and have the flexibility to serve them throughout the school year. The school would also like to move away from disposable wares and back to re-usable plates, cups and dishes which will require space allotted for a dishroom (approx. 300s.f.). The school does not currently have a composting program in place but would like to look at the possibility of incorporating one at least for kitchen waste and they would also like to start using some of the herbs that will be grown in the student garden as ingredients into the schools menu. Preliminary requirements for cooking equipment indicate the need for a Tilt Skillet, Steam Kettle, Convection Ovens, 6’ Griddle and a Combi Oven. The request was made to not have a center island hood configuration with equipment located on either side of a wall in an attempt to facilitate communication among the kitchen employees.

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MAIN SERVING AREA:

The existing 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 improve 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.

The school would like to increase participation from the current level of approx. 450 students to between 700-800 students. The meal periods are 47 minutes long and there are three lunch periods. The school also runs a snack station that is open in the morning and remains open throughout the day, this station allows the students to purchase breakfast items such as egg sandwiches, bagels and muffins as well as other snack items throughout the school day. Based on the desired participation numbers there should be five points of service in the servery with three cashier stations. The points of service would include a deli, salad bar, hot specials, grill and action station. The action station would be mobile and when in use would be located in the center of the seating area. This station will have an ever changing menu with items such as tacos, burritos and stir fry's. Due to space restrictions a traditional scatter system likely will not be feasible so the stations will be linear with individual queing lines that will still allow the students to enter the space and determine what station they would like to visit. Showcasing menu items on the way into the space can really help with the decision making process of the students and ease congestion. The desired choice of seating style is individual tables and chairs much like those seen in food courts which keeps in line with the individual making a personal choice and eliminating the institutionalized feeling of a traditional cafeteria.

GENERAL COMMENTS:

The space allotted by the MSBA guidelines will be 523 s.f. less than what they have currently (3,125 MSBA-3,648 Current). With the desire to increase participation, prepare more fresh foods, go to re-usable wares and employ a scatter system we would recommend taking the staff toilets, janitor closet, lockers, office and possibly a walk-in cooler or freezer out of the foodservice space so that square footage can be used to incorporate the desired program. 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. 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 modified small scatter style of service was discussed as an option and we feel that the implementation of such a style with varied offerings and the dispersion of students among individual points of service would improve the function and overall feel of the area. The school is doing their best to increase participation, but are limited by serving facilities, the nearby competition and the lingering stigma associated with school foodservice. In order to increase participation the school needs to create a program that is as interesting and convenient to the students as the other nearby options. This would require a commitment to more service space and a willingness to change the way food is served.

Prpared By:
Kevin Sullivan
Colburn & Guyette Consultants
Senior Associate

Concord-Carlisle High School Revitalization - Preliminary Project Budget Option Comparison

June 16, 2011 (revised for PSR submission). All other options have been removed from this analysis

		New/Major Reno Option 6R Phased Construction		New/Minor Reno Option 14B One Building + reno Lower Gym		New + Alternate Option 14C One Building + Alternate Addition	
	Student enrollment	1225		1225		1225	
	Anticipated construction duration	44		32		30.5	
	New work square footage	177,728		225,825		226,000	
	Renovation work square footage	62,550		16,275		-	
	Premium work SF	-		-		14,600	
	Total square footage	240,278		242,100		240,600	
1	**Hard Costs**						
2	New building construction (a) DG J	$35,918,829	202/sf (e)	$47,475,190	210/sf (e)	$51,247,800	213/sf (e)
3	Renovation or alternate addition building construction (a) DG J	$11,693,097	187/sf (e)	$3,400,499	209/sf (e)	included above	(e)
4	CM/GC PR/GC - mgmt. during constr (b)	$9,240,000		$6,720,000		$6,405,000	
5	CM/GC Fee (2%)	$1,137,039		$1,151,914		$1,153,056	
6	Asbestos abatement (revised/updated value)	$1,750,000	(c)	$1,550,000	(c)	$1,500,000	
7	Building take downs	$1,198,750	$7/sf	$1,305,150	$6/sf	$1,402,800	$6/sf
8	Site improvements (a) (d) DG Jones	$5,897,000	(i)	$6,295,000	(i)	$6,256,000	(i)
9	Escalation	$4,678,430	7%	$3,394,888	5%	$3,398,233	5%
9.1	Estimating contingency	$4,290,789	6%	$2,138,779	3%	$2,140,887	3%
10	Hard contingency (new) lines 2, 3-7	$2,991,002	5%	$3,394,607	5%	$3,568,144	5%
11	Hard contingency (reno/prem construction) line 2.1 only	$1,169,310	10%	$340,050	10%	$0	10%
12	**Subtotal Hard Costs**	**$79,964,245**		**$77,166,076**		**$77,071,920**	
13	**Soft Costs**						
14	Design costs (f) *includes feasibility*	$5,797,855		$5,629,965		$5,624,315	
15	OPM feasibility	$235,000		$235,000		$235,000	
16	A/E CA mgmt (g)	$2,640,000	60k/m	$1,920,000	60k/m	$1,830,000	60k/m
17	OPM CA mgmt (h)	$2,200,000	50k/m	$1,600,000	50k/m	$1,525,000	50k/m
18	FFE / technology ($3,200/student)	$4,120,000		$3,920,000		$3,920,000	
19	Temp parking / road access logistics	$250,000		$400,000		$400,000	
20	Temp modulars / storage / offsite	$2,169,500		$50,000		-	
21	Relocation / moving expenses	$350,000		$300,000		$250,000	
22	Misc expenses (testing, legal, utility B/C, other)	$900,000		$900,000		$900,000	
23	Soft contingency (5%)	$933,118	5%	$747,748	5%	$734,216	5%
24	**Subtotal Soft Costs**	**$19,595,472**		**$15,702,713**		**$15,418,531**	
25	**Preliminary Project Budget**	**$99,559,717**		**$92,868,788**		**$92,490,451**	
26	Cost per SF based on Building Construction (line 2 and 3)	$198		$210		$213	
	Cost per SF - Construction (line 12)	$333		$319		$320	
27	Cost per SF based on Total Project Cost (line 25)	$414		$384		$384	
28	% above(below) option 14C	8%		0%			
29	% of total project value compared to total hard costs value	80%		83%		83%	
30	% of total project value compared to total soft costs value	20%		17%		17%	

Notes:

(a) Disposal of contaminated soil is EXCLUDED. Unknown at this time.

(b) Value of $210,000 carried per month for general conditions and project requirements.

(c) Premium for multiple mobilizations.

(d) A conceptual cost analysis has been performed. Costs are based on a balanced cut/fill site. DG Jones value has been carried in this line.

(e) Cost/SF value derived from DG Jones estimate. Refer to DG Jones back up.

(f) 6% is carried based on total hard construction costs + $1,000,000 for feasibility and schematic. Excludes CA costs, carried in line 16

(g) Based on $60,000 per month for A/E services

(h) Based on $50,000 per month for OPM services

(i) DG Jones sitework cost carried for budget purposes. KVA conceptual sitework estimate included as back up.

Concord-Carlisle High School
Concord, MA

Preliminary Cost Estimates
for Options 6R2, 14B AND 14C

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June 17, 2011

SUMMARY

	OPTION 6R2	OPTION 14B	OPTION 14C
Gross Floor Area (sf)	240,278	242,100	240,600
Construction Period (months)	44.0	32.0	30.5
	Element ($)	Element ($)	Element ($)
A Substructure	2,264,795	4,623,219	5,016,855
A10 Foundations	2,264,795	4,623,219	5,016,855
A20 Basement Construction	0	0	0
B Shell	15,145,347	15,822,322	15,915,858
B10 Superstructure	7,074,323	7,674,079	7,590,407
B20 Exterior Enclosure	5,523,071	5,828,076	6,033,089
B30 Roofing	2,547,953	2,320,166	2,292,361
C Interiors	9,392,885	9,506,393	9,455,580
C10 Interior Construction	4,654,146	4,712,813	4,691,700
C20 Stairs	173,457	193,680	192,480
C30 Interior Finishes	4,565,282	4,599,900	4,571,400
D Services	16,275,152	16,396,496	16,296,597
D10 Conveying Systems	272,808	272,808	272,808
D20 Plumbing	2,282,641	2,299,950	2,285,700
D30 HVAC	7,460,632	7,517,205	7,470,630
D40 Fire Protection Systems	1,261,460	1,271,025	1,263,150
D 50 Electrical Systems	4,997,612	5,035,508	5,004,309
E Equipment and Furnishings	4,548,251	4,528,427	4,562,659
E10 Equipment	1,450,969	1,450,969	1,450,969
E 20 Furnishings	3,097,282	3,077,458	3,111,690
F Special Construction and Demolition	4,248,107	2,571,981	2,689,975
F10 Special Construction (Trailers)	1,551,044	0	0
F20 Selective/Building Demolition	1,697,063	1,571,981	1,689,975
F20 Asbestos Abatement	1,000,000	1,000,000	1,000,000
Sub Total Building Cost	**51,874,537**	**53,448,837**	53,937,523
G Building Sitework	5,886,811	6,294,600	6,255,600
G10 Site Preparation	1,081,251	1,089,450	1,082,700
G20 Site Improvements	2,643,058	3,026,250	3,007,500
G30 Site Civil/Mechanical Utilities	1,441,668	1,452,600	1,443,600
G40 Site Electrical Utilities	480,556	484,200	481,200
G90 Other Site Construction	240,278	242,100	240,600
Sub Total Construction	**57,761,348**	**59,743,437**	60,193,123
General Requirements/Conditions	6,618,793	5,458,343	5,319,262
Escalation to mid points of construction	6,495,956	5,529,111	5,555,450
Estimating Contingency	8,159,631	7,299,435	7,106,784
Permit Fee	Excluded	Excluded	Excluded
Construction Contingency	By Owner	By Owner	By Owner
Total Construction Cost	**79,035,729**	**78,030,326**	**78,174,619**

Notes

1. Brief project description:-
   - 3# Options to either renovate/add to existing school or build completely new high school with associated site/utility work.

2. The estimate is based on the following:-
   - Prevailing wage.
   - GC type project.
   - Receipt of 5# bona fide bids.
   - Single contract.
   - Bid date for all Options - 4Q2012.
   - Construction periods are as noted on Summary page.
   - Mid points of construction:-
     - Option 6R2 - 3Q2014
     - Option 14B - 1Q2014
     - Option 14C - 1Q2014

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.

OPTION 14B

		Consolidated		New Construction		Renovations	
Gross Floor Area (sf) =		242,100		225,825		16,275	
		Element ($)	$/sf	Element ($)	$/sf	Element ($)	$/sf
A Substructure		4,623,219	19.10	4,623,219	20.47	0	0.00
A10 Foundations		4,623,219	19.10	4,623,219	20.47	0	0.00
A20 Basement Construction		0	0.00	0	0.00	0	0.00
B Shell		15,822,322	65.35	14,822,848	65.64	999,474	61.41
B10 Superstructure		7,674,079	31.70	7,190,648	31.84	483,431	29.70
B20 Exterior Enclosure		5,828,076	24.07	5,468,005	24.21	360,071	22.12
B30 Roofing		2,320,166	9.58	2,164,195	9.58	155,972	9.58
C Interiors		9,506,393	39.27	8,874,923	39.30	631,470	38.80
C10 Interior Construction		4,712,813	19.47	4,403,588	19.50	309,225	19.00
C20 Stairs		193,680	0.80	180,660	0.80	13,020	0.80
C30 Interior Finishes		4,599,900	19.00	4,290,675	19.00	309,225	19.00
D Services		16,396,496	67.73	15,312,593	67.81	1,083,903	66.60
D10 Conveying Systems		272,808	1.13	272,808	1.21	0	0.00
D20 Plumbing		2,299,950	9.50	2,145,338	9.50	154,613	9.50
D30 HVAC		7,517,205	31.05	7,011,866	31.05	505,339	31.05
D40 Fire Protection Systems		1,271,025	5.25	1,185,581	5.25	85,444	5.25
D 50 Electrical Systems		5,035,508	20.80	4,697,000	20.80	338,508	20.80
E Equipment and Furnishings		4,528,427	18.70	3,842,727	17.02	685,700	42.13
E10 Equipment		1,450,969	5.99	1,285,969	5.69	165,000	10.14
E 20 Furnishings		3,077,458	12.71	2,556,758	11.32	520,700	31.99
F Special Construction and Demolition		2,571,981	10.62	2,571,981	11.39	0	0.00
F10 Special Construction (Trailers)		0	0.00	0	0.00	0	0.00
F20 Selective/Building Demolition		1,571,981	6.49	1,571,981	6.96	0	0.00
F20 Asbestos Abatement		1,000,000	4.13	1,000,000	4.43	0	0.00
Sub Total Building Cost		53,448,837	220.77	50,048,289	221.62	3,400,547	208.94
G Building Sitework		6,294,600	26.00	5,871,450	26.00	423,150	26.00
G10 Site Preparation		1,089,450	4.50	1,016,213	4.50	73,238	4.50
G20 Site Improvements		3,026,250	12.50	2,822,813	12.50	203,438	12.50
G30 Site Civil/Mechanical Utilities		1,452,600	6.00	1,354,950	6.00	97,650	6.00
G40 Site Electrical Utilities		484,200	2.00	451,650	2.00	32,550	2.00
G90 Other Site Construction		242,100	1.00	225,825	1.00	16,275	1.00
Sub Total Construction		59,743,437	246.77	55,919,739	247.62	3,823,697	234.94
General Requirements/Conditions		5,458,343	22.55	5,108,999	22.62	349,345	21.47
Escalation to mid point of construction 1Q2014	8.48%	5,529,111	22.84	5,175,237	22.92	353,874	21.74
Estimating Contingency		7,299,435	30.15	6,620,398	29.32	679,037	41.72
Permit Fee		Excluded		Excluded		Excluded	
Construction Contingency		By Owner		By Owner		By Owner	
Total Construction Cost		78,030,326	322.31	72,824,373	322.48	5,205,954	319.87

$210/SF
$209/SF
221.62
-11.39
$210.23

OPTION 14C

		Consolidated		New Construction		Renovations	
Gross Floor Area (sf) =			240,600		240,600		0
		Element ($)	$/sf	Element ($)	$/sf	Element ($)	$/sf
A Substructure		5,016,855	20.85	5,016,855	20.85	0	0.00
A10 Foundations		5,016,855	20.85	5,016,855	20.85	0	0.00
A20 Basement Construction		0	0.00	0	0.00	0	0.00
B Shell		15,915,858	66.15	15,915,858	66.15	0	0.00
B10 Superstructure		7,590,407	31.55	7,590,407	31.55	0	0.00
B20 Exterior Enclosure		6,033,089	25.08	6,033,089	25.08	0	0.00
B30 Roofing		2,292,361	9.53	2,292,361	9.53	0	0.00
C Interiors		9,455,580	39.30	9,455,580	39.30	0	0.00
C10 Interior Construction		4,691,700	19.50	4,691,700	19.50	0	0.00
C20 Stairs		192,480	0.80	192,480	0.80	0	0.00
C30 Interior Finishes		4,571,400	19.00	4,571,400	19.00	0	0.00
D Services		16,296,597	67.73	16,296,597	67.73	0	0.00
D10 Conveying Systems		272,808	1.13	272,808	1.13	0	0.00
D20 Plumbing		2,285,700	9.50	2,285,700	9.50	0	0.00
D30 HVAC		7,470,630	31.05	7,470,630	31.05	0	0.00
D40 Fire Protection Systems		1,263,150	5.25	1,263,150	5.25	0	0.00
D 50 Electrical Systems		5,004,309	20.80	5,004,309	20.80	0	0.00
E Equipment and Furnishings		4,562,659	18.96	4,562,659	18.96	0	0.00
E10 Equipment		1,450,969	6.03	1,450,969	6.03	0	0.00
E 20 Furnishings		3,111,690	12.93	3,111,690	12.93	0	0.00
F Special Construction and Demolition		2,689,975	11.18	2,689,975	11.18	0	0.00
F10 Special Construction (Trailers)		0	0.00	0	0.00	0	0.00
F20 Selective/Building Demolition		1,689,975	7.02	1,689,975	7.02	0	0.00
F20 Asbestos Abatement		1,000,000	4.16	1,000,000	4.16	0	0.00
Sub Total Building Cost		**53,937,523**	**224.18**	**53,937,523**	**224.18**	**0**	**0.00**
G Building Sitework		6,255,600	26.00	6,255,600	26.00	0	0.00
G10 Site Preparation		1,082,700	4.50	1,082,700	4.50	0	0.00
G20 Site Improvements		3,007,500	12.50	3,007,500	12.50	0	0.00
G30 Site Civil/Mechanical Utilities		1,443,600	6.00	1,443,600	6.00	0	0.00
G40 Site Electrical Utilities		481,200	2.00	481,200	2.00	0	0.00
G90 Other Site Construction		240,600	1.00	240,600	1.00	0	0.00
Sub Total Construction		**60,193,123**	**250.18**	**60,193,123**	**250.18**	**0**	**0.00**
General Requirements/Conditions		5,319,262	22.11	5,319,262	22.11	0	0.00
Escalation to mid point of construction 1Q2014	8.48%	5,555,450	23.09	5,555,450	23.09	0	0.00
Estimating Contingency		7,106,784	29.54	7,106,784	29.54	0	0.00
Permit Fee		Excluded		Excluded		Excluded	
Construction Contingency		By Owner		By Owner		By Owner	
Total Construction Cost		**78,174,619**	**324.92**	**78,174,619**	**324.92**	**0**	**0.00**

$213/SF

224.18
-11.18
$213/SF

Description	Qty	% of Time Allocated	Unit	Rate	Amount
General Requirements/Conditions - Option 6R2					
Field personnel					
Field personnel:-					
- project manager	47.67	25%	week	3,350.00	159,686
- project superintendent	190.67	100%	week	2,950.00	562,477
- field engineer	190.67	100%	week	2,750.00	524,343
- MEP coordinator	190.67	100%	week	2,700.00	514,809
- laborer (2#)	381.34	200%	week	2,550.00	972,417
Main office staff	191.00	100%	week	2,650.00	506,150
Insurance & Bond Cost					
Insurances (includes):-					1,448,400
- builders risk					
- general liability					
- vehicle liability					
- pollution liability					
- workers compensation					Included in Labor
- umbrella coverage					
Performance bond.					724,200
Temporary Utilities & Services					
Temporary utilities & services:-					
- temporary water & sewer service & distribution	190.67		week	175.00	33,367
- temporary water consumed	190.67		week	175.00	33,367
- temporary toilet rental & service	190.67		week	175.00	33,367
- temporary electricity consumed	190.67		week	175.00	33,367
- temporary heating system	190.67		week	175.00	33,367
- temporary heating fuel consumed	190.67		week	175.00	33,367
- emergency diesel generator fuel consumed	190.67		week	175.00	33,367
Additional Categories					
Preparation of progress schedules.	44.00		mth	1,250.00	55,000
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.	44.00		mth	500.00	22,000
Temporary construction.	190.67		week	300.00	57,201
Construction aids (safety nets, personnel protection equipment, partial scaffolding, etc)	190.67		week	250.00	47,668
Barriers and enclosures.	190.67		week	450.00	85,802
Security.	44.00		mth	2,750.00	121,000
Access roads.	190.67		week	275.00	52,434
Temporary controls.	190.67		week	225.00	42,901
Project signs.	44.00		mth	150.00	6,600
Field offices and sheds	44.00		mth	3,250.00	143,000
Field office expenses.	190.67		week	350.00	66,735
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	190.67		week	600.00	114,402
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 - Option 6R2		**Total**			**6,618,793**

Description	Qty	% of Time Allocated	Unit	Rate	Amount
General Requirements/Conditions - Option 14C					
Field personnel					
Field personnel:-					
- project manager	33.04	25%	week	3,350.00	110,692
- project superintendent	132.17	100%	week	2,950.00	389,902
- field engineer	132.17	100%	week	2,750.00	363,468
- MEP coordinator	132.17	100%	week	2,700.00	356,859
- laborer (2#)	264.34	200%	week	2,550.00	674,067
Main office staff	132.00	100%	week	2,650.00	349,800
Insurance & Bond Cost					
Insurances (includes):-					1,457,200
- builders risk					
- general liability					
- vehicle liability					
- pollution liability					
- workers compensation					Included in Labor
- umbrella coverage					
Performance bond.					728,600
Temporary Utilities & Services					
Temporary utilities & services:-					
- temporary water & sewer service & distribution	132.17		week	175.00	23,130
- temporary water consumed	132.17		week	175.00	23,130
- temporary toilet rental & service	132.17		week	175.00	23,130
- temporary electricity consumed	132.17		week	175.00	23,130
- temporary heating system	132.17		week	175.00	23,130
- temporary heating fuel consumed	132.17		week	175.00	23,130
- emergency diesel generator fuel consumed	132.17		week	175.00	23,130
Additional Categories					
Preparation of progress schedules.	30.50		mth	1,250.00	38,125
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.	30.50		mth	500.00	15,250
Temporary construction.	132.17		week	300.00	39,651
Construction aids (safety nets, personnel protection equipment, partial scaffolding, etc)	132.17		week	250.00	33,043
Barriers and enclosures.	132.17		week	450.00	59,477
Security.	30.50		mth	2,750.00	83,875
Access roads.	132.17		week	275.00	36,347
Temporary controls.	132.17		week	225.00	29,738
Project signs.	30.50		mth	150.00	4,575
Field offices and sheds	30.50		mth	3,250.00	99,125
Field office expenses.	132.17		week	350.00	46,260
Equipment rental	1.00		ls	15,000.00	15,000
Snow removal	32.00		ea	500.00	16,000
Winter protection	1.00		ls	85,000.00	85,000
Interim cleaning	132.17		week	600.00	79,302
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 - Option 14C		**Total**			**5,319,262**

Gross Floor Areas

	OPTION 6R2			OPTION 14B			OPTION 14C		
	New (sf)	Reno (sf)	Demo (sf)	New (sf)	Reno (sf)	Demo (sf)	New (sf)	Reno (sf)	Demo (sf)
Basement	24,500	8,800		82,210	16,275		96,545		
Ground Floor	60,628	53,750		48,425			48,865		
2nd Floor	46,300			47,595			47,595		
3rd Floor	46,300			47,595			47,595		
Totals	**177,728**	**62,550**		**225,825**	**16,275**		**240,600**		
Total GFA	**240,278**			**242,100**			**240,600**		
Demolition	**170,550**			**216,825**			**233,100**		

PROJECT COSTS

	OPTION 6R2	OPTION 14B	OPTION 14C
A Substructure	2,264,795	4,623,219	5,016,855
A10 Foundations	2,264,795	4,623,219	5,016,855
A20 Basement Construction	0	0	0
B Shell	15,145,347	15,622,322	15,915,858
B10 Superstructure	7,074,323	7,674,079	7,590,407
B20 Exterior Enclosure	5,523,071	5,828,076	6,033,089
B30 Roofing	2,547,953	2,320,166	2,292,361
C Interiors	9,392,885	9,500,380	9,455,580
C10 Interior Construction	4,654,146	4,712,813	4,691,700
C20 Stairs	173,457	193,680	192,480
C30 Interior Finishes	4,565,282	4,599,900	4,571,400
D Services	10,275,152	10,398,499	10,290,507
D10 Conveying Systems	272,808	272,808	272,808
D20 Plumbing	2,282,641	2,299,950	2,285,700
D30 HVAC	7,460,632	7,517,205	7,470,630
D40 Fire Protection Systems	1,261,460	1,271,025	1,263,150
D 50 Electrical Systems	4,997,612	5,035,508	5,004,309
E Equipment and Furnishings	4,548,251	4,528,427	4,562,859
E10 Equipment	1,450,969	1,450,969	1,450,969
E 20 Furnishings	3,097,282	3,077,458	3,111,890
F Special Construction and Demolition	4,246,107	2,571,981	2,669,975
F10 Special Construction (Trailers)	1,551,044	0	0
F20 Selective/Building Demolition	1,697,063	1,571,981	1,669,975
F20 Asbestos Abatement	1,000,000	1,000,000	1,000,000
Sub Total Building Cost	51,874,537	53,449,837	53,937,523
G Building Sitework	5,650,811	6,294,600	6,255,600
G10 Site Preparation	1,081,251	1,089,450	1,082,700
G20 Site Improvements	2,643,058	3,026,250	3,007,500
G30 Site Civil/Mechanical Utilities	1,441,668	1,452,600	1,443,600
G40 Site Electrical Utilities	480,556	484,200	481,200
G90 Other Site Construction	240,278	242,100	240,600
Sub Total Construction	57,781,348	59,743,437	60,193,123
General Requirements/Conditions	6,618,793	5,458,343	5,319,262
Escalation to mid points of construction	6,495,956	5,529,111	5,555,450
Estimating Contingency	8,159,631	7,299,435	7,106,784
Permit Fee	Excluded	Excluded	Excluded
Construction Contingency	By Owner	By Owner	By Owner
Total Construction Cost	79,035,729	78,030,326	78,174,619
Design Costs (excludes CA, includes Feasibility fees)	4,762,643	5,087,688	5,124,755
A/E CA mgmt	2,200,000	1,920,000	1,920,000
OPM CA mgmt	2,200,000	1,600,000	1,600,000
FFE/technology	4,120,000	3,920,000	3,920,000
Temp parking/road access logistics	250,000	400,000	400,000
Temp modulars/storage	included above	not required	not required
Relocation/moving expenses	350,000	250,000	250,000
Misc expenses (testing, legal, utility B/C, other)	900,000	900,000	900,000
Soft Contongency (5%)	739,132	703,884	705,738
TOTALS	94,557,504	92,811,896	92,995,112

Estimate for: **C-C PSR**

Conceptual Cost Estimate for Sitework

16-Jun-11

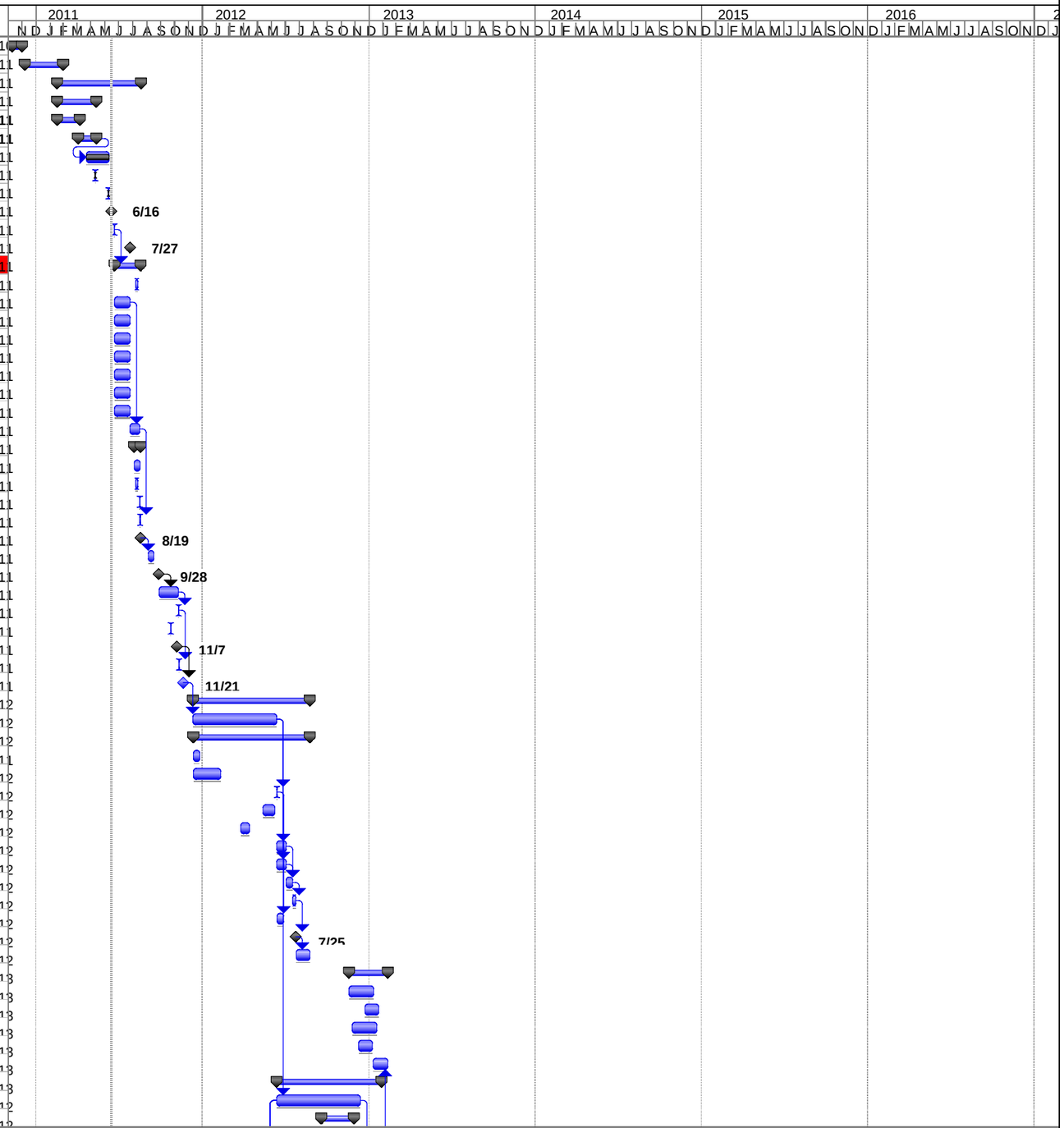
Ref Dwgs: PSR conceptual drawings prepared by OMR Architects

		Option 6R2				Option 14B				Option 14C			
	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	QUANTITY	UNIT	UNIT COST	TOTAL	QUANTITY	UNIT	UNIT COST	TOTAL
1	**G10 - Site Preparation:**												
2	Erosion Control	1	allow	$ 25,000.00	$ 25,000.00	1	allow	$ 35,000.00	$ 35,000.00	1	allow	$ 35,000.00	$ 35,000.00
3	Tree removal	1	allow	$ 10,000.00	$ 10,000.00	1	allow	$ 50,000.00	$ 50,000.00	1	allow	$ 50,000.00	$ 50,000.00
4	Tree protection	1	allow	$ 2,000.00	$ 2,000.00	1	allow	$ 10,000.00	$ 10,000.00	1	allow	$ 10,000.00	$ 10,000.00
5	Remove/reclaim existing asphalt	18,000	sy	$ 6.00	$ 108,000.00	18,000	sy	$ 6.00	$ 108,000.00	18,000	sy	$ 6.00	$ 108,000.00
6	Wheel wash stations	2	ea	$ 6,000.00	$ 12,000.00	3	ea	$ 6,000.00	$ 18,000.00	3	ea	$ 6,000.00	$ 18,000.00
7	Wheel wash stations maintain	60	days	$ 550.00	$ 33,000.00	60	days	$ 550.00	$ 33,000.00	60	days	$ 550.00	$ 33,000.00
8	Construction Fencing (in PR's)		not incl				not incl				not incl		
9	Construction Fencing maintenance (in PR's)		not incl				not incl				not incl		
10	Earthwork - Cuts to Fills and Sub-base materials	610,000	sf	$ 0.50	$ 305,000.00	850,000	sf	$ 0.50	$ 425,000.00	850,000	sf	$ 0.50	$ 425,000.00
11	**Subtotal**				**$ 470,000.00**				**$ 644,000.00**				**$ 644,000.00**
12													
13	**G20 - Site Improvements:**												
14	Curbing	9,000	lf	$ 36.00	$ 324,000.00	10,900	lf	$ 36.00	$ 392,400.00	11,200	lf	$ 36.00	$ 403,200.00
15	Concrete Sidewalks including subbase	26,000	sf	$ 7.00	$ 182,000.00	50,000	sf	$ 7.00	$ 350,000.00	53,000	sf	$ 7.00	$ 371,000.00
16	Concrete equipment pads	1	allow	$ 5,000.00	$ 5,000.00	1	allow	$ 5,000.00	$ 5,000.00	1	allow	$ 5,000.00	$ 5,000.00
17	Retaining walls		none			385	cy	$ 600.00	$ 231,000.00	150	cy	$ 600.00	$ 90,000.00
18	Temp earth support	1	allow	$ 50,000.00	$ 50,000.00	1	allow	$ 50,000.00	$ 50,000.00	1	allow	$ 50,000.00	$ 50,000.00
19	Signage	1	allow	$ 10,000.00	$ 10,000.00	1	allow	$ 15,000.00	$ 15,000.00	1	allow	$ 15,000.00	$ 15,000.00
20	Fencing	1	allow	$ 15,000.00	$ 15,000.00	1	allow	$ 15,000.00	$ 15,000.00	1	allow	$ 15,000.00	$ 15,000.00
21	Pipe bollards	1	allow	$ 5,000.00	$ 5,000.00	1	allow	$ 8,000.00	$ 8,000.00	1	allow	$ 8,000.00	$ 8,000.00
22	Flagpoles and footings	1	ea	$ 5,000.00	$ 5,000.00	1	ea	$ 5,000.00	$ 5,000.00	1	ea	$ 5,000.00	$ 5,000.00
23	Benches	1	allow	$ 10,000.00	$ 10,000.00	1	allow	$ 20,000.00	$ 20,000.00	1	allow	$ 20,000.00	$ 20,000.00
24	Misc (bike racks, trash recep, other)	1	allow	$ 20,000.00	$ 20,000.00	1	allow	$ 20,000.00	$ 20,000.00	1	allow	$ 20,000.00	$ 20,000.00
25	Bit paving (4" average)	6,800	ton	$ 100.00	$ 680,000.00	7,100	ton	$ 100.00	$ 710,000.00	7,600	ton	$ 100.00	$ 760,000.00
26	Pavers at courtyard/entry	1	allow	$ 50,000.00	$ 50,000.00	1	allow	$ 50,000.00	$ 50,000.00	1	allow	$ 50,000.00	$ 50,000.00
27	Feature walls/steps	1	allow	$ 30,000.00	$ 30,000.00	1	allow	$ 50,000.00	$ 50,000.00	1	allow	$ 50,000.00	$ 50,000.00
28	Plantings	1	allow	$ 600,000.00	$ 600,000.00	1	allow	$ 600,000.00	$ 600,000.00	1	allow	$ 600,000.00	$ 600,000.00
29	Loam and Seed	9,000	cy	$ 45.00	$ 405,000.00	12,400	cy	$ 45.00	$ 558,000.00	12,500	cy	$ 45.00	$ 562,500.00
30	Irrigation Systems	1	allow	$ 30,000.00	$ 30,000.00	1	allow	$ 50,000.00	$ 50,000.00	1	allow	$ 50,000.00	$ 50,000.00
31	Initial Landscape Maintenance	12	mos	$ 2,000.00	$ 24,000.00	12	mos	$ 2,000.00	$ 24,000.00	12	mos	$ 2,000.00	$ 24,000.00
32	**Subtotal**				**$ 2,445,000.00**				**$ 3,153,400.00**				**$ 3,098,700.00**
33													
34	**G30 - Mechanical Utilities**												
35	Relocate / temp. existing utilities	1	allow	$ 200,000.00	$ 200,000.00	1	allow	$ 100,000.00	$ 100,000.00	1	allow	$ 100,000.00	$ 100,000.00
36	Domestic Water	1,000	lf	$ 60.00	$ 60,000.00	1,000	lf	$ 40.00	$ 40,000.00	1,000	lf	$ 60.00	$ 60,000.00
37	Fire Service	5,500	lf	$ 80.00	$ 440,000.00	5,500	lf	$ 80.00	$ 440,000.00	5,500	lf	$ 80.00	$ 440,000.00
38	Hydrants	3	ea	$ 6,000.00	$ 18,000.00	3	ea	$ 6,000.00	$ 18,000.00	3	ea	$ 6,000.00	$ 18,000.00
39	Sewer	1,500	lf	$ 80.00	$ 120,000.00	1,500	lf	$ 80.00	$ 120,000.00	1,500	lf	$ 80.00	$ 120,000.00
40	Storm water drainage/infiltration systems	1	allow	$ 750,000.00	$ 750,000.00	1	allow	$ 750,000.00	$ 750,000.00	1	allow	$ 750,000.00	$ 750,000.00
41	Gas service	by Gas Company				by Gas Company				by Gas Company			
42	Utility back charges (gas)	1	allow	$ 75,000.00	$ 75,000.00	1	allow	$ 75,000.00	$ 75,000.00	1	allow	$ 75,000.00	$ 75,000.00
43	**Subtotal**				**$ 1,663,000.00**				**$ 1,543,000.00**				**$ 1,563,000.00**
44													
45													
46	**G40 - Site Electrical:**												
47	Temp service (maintain - phasing)	1	allow	$ 75,000.00	$ 75,000.00								
48	Electrical ductbanks	1,500	lf	$ 120.00	$ 180,000.00	1,500	lf	$ 120.00	$ 180,000.00	1,500	lf	$ 120.00	$ 180,000.00
49	Tel/data ductbank	1,500	lf	$ 80.00	$ 120,000.00	1,500	lf	$ 80.00	$ 120,000.00	1,500	lf	$ 80.00	$ 120,000.00
50	Light poles	35	allow	$ 5,000.00	$ 175,000.00	40	allow	$ 5,000.00	$ 200,000.00	40	allow	$ 7,000.00	$ 280,000.00
51	Light bollards	20	allow	$ 2,500.00	$ 50,000.00	20	allow	$ 2,500.00	$ 50,000.00	20	allow	$ 3,000.00	$ 60,000.00
52	Utility back charges (electric)	1	allow	$ 75,000.00	$ 75,000.00	1	allow	$ 75,000.00	$ 75,000.00	1	allow	$ 75,000.00	$ 75,000.00
53	**Subtotal**				**$ 675,000.00**				**$ 625,000.00**				**$ 715,000.00**
54													
55	**G50 - Other Site Construction:**		None				None				None		
56													
57	**Total**				**$ 5,253,000.00**				**$ 5,965,400.00**				**$ 6,020,700.00**
58													
59	**DG JONES 6/15/11 Estimate (carried in options budget)**				**$ 5,897,000.00**				**$ 6,295,000.00**				**$ 6,256,000.00**

Concord - Carlisle High School

Proposed Project Schedule - PSR Submission - options 6R2, 14B, 14C

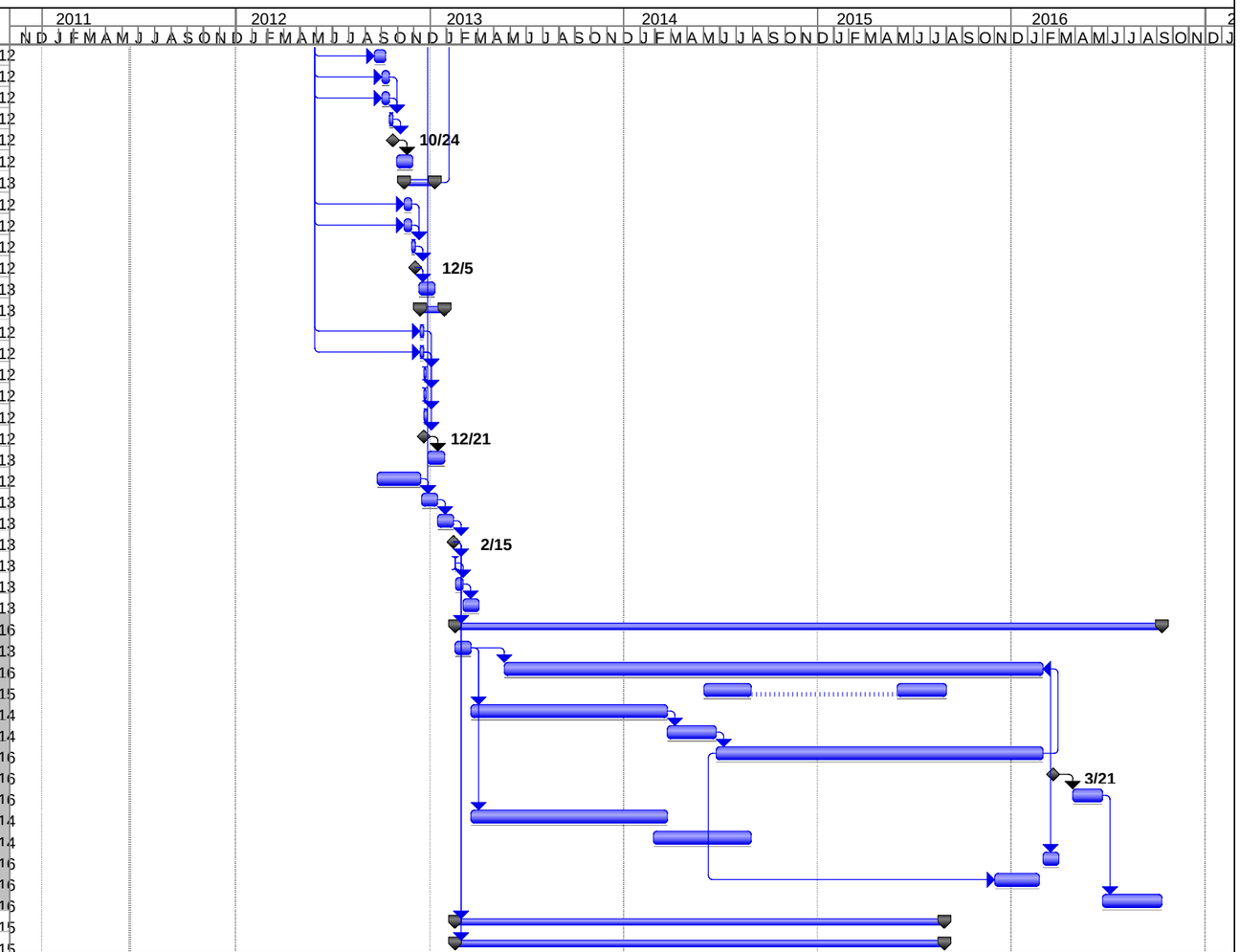
ID	Task Name	Duration	Start	Finish
1	**Procure OPM (MOD 2)**	16 days	Wed 11/10/10	Wed 12/1/10
6	**Procure Architect (MOD 2)**	60 days	Wed 12/8/10	Tue 3/1/11
21	**FEASIBILITY/SCHEMATIC STUDY**	132 days	Thu 2/17/11	Fri 8/19/11
22	**FEASIBILITY STUDY (MOD 3)**	62 days	Thu 2/17/11	Fri 5/13/11
23	Preliminary Design Program (PDP)	**36 days**	**Thu 2/17/11**	**Thu 4/7/11**
34	MSBA PDP	**30 days**	**Mon 4/4/11**	**Fri 5/13/11**
38	Development of options (short list)	36 days	Fri 4/22/11	Fri 6/10/11
39	**MSBA Facilities Assessment Committee (FAS) review**	1 day	Wed 5/11/11	Wed 5/11/11
40	June 9th conf call (Ed Spec resolved and direction on options provided for PSR)	1 day	Thu 6/9/11	Thu 6/9/11
41	Submit Preferred Schematic Report to the MSBA (Normal)	1 day	Thu 6/16/11	Thu 6/16/11
42	**MSBA Facilities Assessment Committee (FAS) review**	1 day	Wed 6/22/11	Wed 6/22/11
43	**MSBA BOD Mtg - July 27th Approve Preferred Schematic Design**	1 day	Wed 7/27/11	Wed 7/27/11
44	**Schematic Design (MOD 4) TBD….pending outcome of FAS meeting**	41 days	Thu 6/23/11	Thu 8/18/11
45	Project Schedule (proposed)	5 days	Mon 8/8/11	Fri 8/12/11
46	Schematic building floor plans / elevations	24 days	Thu 6/23/11	Tue 7/26/11
47	Room data sheets	24 days	Thu 6/23/11	Tue 7/26/11
48	Building systems descriptions (Struct/MEP/Comm/Sustainable design)	24 days	Thu 6/23/11	Tue 7/26/11
49	Preliminary summary of ineligible spaces	24 days	Thu 6/23/11	Tue 7/26/11
50	Outline Specs	24 days	Thu 6/23/11	Tue 7/26/11
51	MA-CHPS Score card	24 days	Thu 6/23/11	Tue 7/26/11
52	FFE spec and estimate	24 days	Thu 6/23/11	Tue 7/26/11
53	Construction Estimate(s)	15 days	Wed 7/27/11	Tue 8/16/11
54	Budget	10 days	Fri 8/5/11	Thu 8/18/11
55	Project budget	9 days	Fri 8/5/11	Wed 8/17/11
56	Summary of ineligible costs	5 days	Mon 8/8/11	Fri 8/12/11
57	Project cash flow	1 day	Wed 8/17/11	Wed 8/17/11
58	MSBA 3011 form	2 days	Wed 8/17/11	Thu 8/18/11
59	Submit Schematic Design to the MSBA (for Sept BOD vote)	1 day	Fri 8/19/11	Fri 8/19/11
60	**Establish a Project Scope and Budget Agreement (MOD 5)**	10 days	Mon 9/5/11	Fri 9/16/11
61	**MSBA BOD Mtg - Sept 28th - Approves Concord-Carlisle PFA**	1 day	Wed 9/28/11	Wed 9/28/11
62	CCHSC markets project to Concord and Carlisle	30 days	Thu 9/29/11	Wed 11/9/11
63	CCHSC votes to accept PBSA with the MSBA	1 day	Thu 11/10/11	Thu 11/10/11
64	School Committee requests BOS to authorize debt exclusion	1 day	Mon 10/24/11	Mon 10/24/11
65	**November STM**	1 day	Mon 11/7/11	Mon 11/7/11
66	**Execute PBSA**	1 day	Fri 11/11/11	Fri 11/11/11
67	**Execute PFA (120 days from Board approval)**	15 days	Mon 11/21/11	Fri 12/9/11
68	**DESIGN DEVELOPMENT - Preliminary TBD**	185 days	Mon 12/12/11	Fri 8/24/12
69	Design Development	132 days	Mon 12/12/11	Tue 6/12/12
70	**DD Phase_MSBA Deliverables**	184 days	Tue 12/13/11	Fri 8/24/12
71	Issuance of the DD work plan	10 days	Tue 12/13/11	Mon 12/26/11
72	Procure CX agent through MSBA	44 days	Tue 12/13/11	Fri 2/10/12
73	Issue 100% DD set	1 day	Wed 6/13/12	Wed 6/13/12
74	Life cycle cost analysis - ongoing throughout dd into cd	20 days	Mon 5/14/12	Fri 6/8/12
75	Design and constructability review	15 days	Mon 3/26/12	Fri 4/13/12
76	Construction Cost Estimate (Architect)	15 days	Wed 6/13/12	Tue 7/3/12
77	Construction Cost Estimate (CM/OPM)	15 days	Wed 6/13/12	Tue 7/3/12
78	Reconcile estimates	10 days	Wed 7/4/12	Tue 7/17/12
79	Update Schedule / Budget	5 days	Wed 7/18/12	Tue 7/24/12
80	Project Design Summary / analysis	10 days	Thu 6/14/12	Wed 6/27/12
81	Submit DD package to MSBA	1 day	Wed 7/25/12	Wed 7/25/12
82	Receive MSBA comments	22 days	Thu 7/26/12	Fri 8/24/12
83	**PERMITTING and APPROVALS - TBD**	61 days	Mon 11/19/12	Mon 2/11/13
84	Conservation Commission (if applicable)	40 days	Mon 11/19/12	Fri 1/11/13
85	Planning Review (site plan review)	22 days	Mon 12/24/12	Tue 1/22/13
86	Peer reviews	40 days	Mon 11/26/12	Fri 1/18/13
87	BOH - Kitchen Design Approval	22 days	Mon 12/10/12	Tue 1/8/13
88	ISD - Building	22 days	Fri 1/11/13	Mon 2/11/13
89	**CONSTRUCTION DOCUMENT PHASE - Preliminary TBD**	164 days	Wed 6/13/12	Mon 1/28/13
90	Construction Documents	132 days	Wed 6/13/12	Thu 12/13/12
91	**CD 60% Phase_MSBA Deliverables**	52 days	Wed 9/19/12	Thu 11/29/12



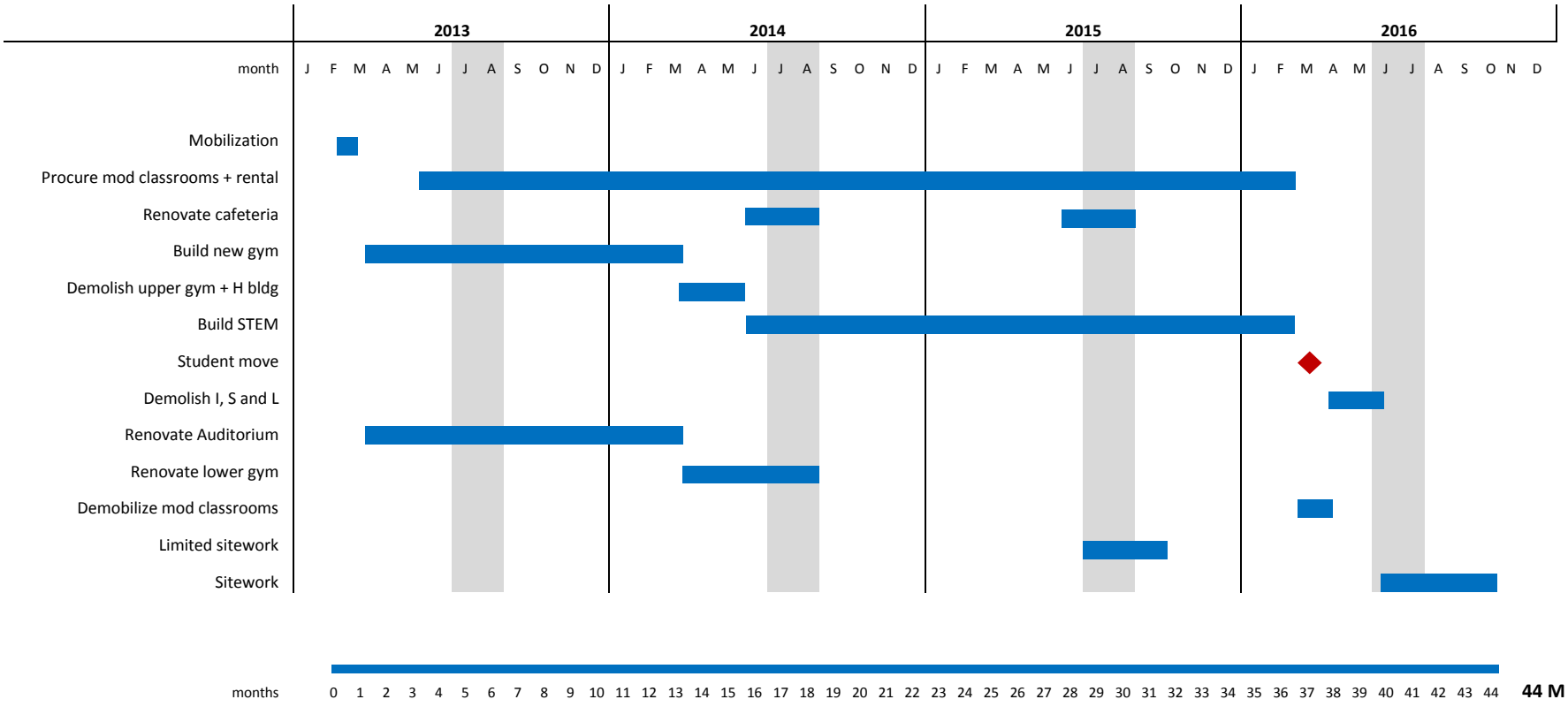
Concord - Carlisle High School

Proposed Project Schedule - PSR Submission - options 6R2, 14B, 14C

ID	Task Name	Duration	Start	Finish
92	Design and constructability review	15 days	Wed 9/19/12	Tue 10/9/12
93	60% Cost Estimate (Architect)	10 days	Wed 10/3/12	Tue 10/16/12
94	60% Cost Estimate (CM/OPM)	10 days	Wed 10/3/12	Tue 10/16/12
95	Reconcile estimates	5 days	Wed 10/17/12	Tue 10/23/12
96	Submit 60% CD MSBA submission	5 days	Wed 10/24/12	Tue 10/30/12
97	Receive MSBA comments	22 days	Wed 10/31/12	Thu 11/29/12
98	**CD 90% Phase_MSBA Deliverables**	42 days	Wed 11/14/12	Thu 1/10/13
99	90% Cost Estimate (Architect)	10 days	Wed 11/14/12	Tue 11/27/12
100	90% Cost Estimate (CM)	10 days	Wed 11/14/12	Tue 11/27/12
101	Reconcile estimates	5 days	Wed 11/28/12	Tue 12/4/12
102	Submit 90% CD MSBA submission	5 days	Wed 12/5/12	Tue 12/11/12
103	Receive MSBA comments	22 days	Wed 12/12/12	Thu 1/10/13
104	**100% MSBA submission**	32 days	Fri 12/14/12	Mon 1/28/13
105	90% Cost Estimate (Architect)	5 days	Fri 12/14/12	Thu 12/20/12
106	90% Cost Estimate (CM)	5 days	Fri 12/14/12	Thu 12/20/12
107	Reconcile estimates	2 days	Fri 12/21/12	Mon 12/24/12
108	Update Schedule / Budget	2 days	Fri 12/21/12	Mon 12/24/12
109	Project Design Summary / Analysis	5 days	Fri 12/21/12	Thu 12/27/12
110	Submit 100% CD drawings to the MSBA	5 days	Fri 12/21/12	Thu 12/27/12
111	Receive MSBA comments	22 days	Fri 12/28/12	Mon 1/28/13
112	**TRADE PREQUALIFICATION**	60 days	Mon 9/24/12	Fri 12/14/12
113	**Trade Bidding**	22 days	Mon 12/17/12	Tue 1/15/13
114	**General Bidding**	22 days	Wed 1/16/13	Thu 2/14/13
115	**Award**	1 day	Fri 2/15/13	Fri 2/15/13
116	Submit MSBA cost comparison spreadsheet	1 day	Mon 2/18/13	Mon 2/18/13
117	MSBA reviews final GMP/cost comparison spreadsheet	10 days	Tue 2/19/13	Mon 3/4/13
118	MSBA amends PFA (if applicable)	22 days	Tue 3/5/13	Wed 4/3/13
119	**CONSTRUCTION - OPTION 6R**	952 days	Mon 2/18/13	Tue 10/11/16
120	Mobilization	22 days	Mon 2/18/13	Tue 3/19/13
121	Procure Modular classrooms + rental	725 days	Wed 5/22/13	Tue 3/1/16
122	Renovate Cafeteria (2 summer slammers)	132 days	Mon 6/2/14	Tue 9/1/15
123	Build new gym	264 days	Wed 3/20/13	Mon 3/24/14
124	Demolish upper Gym (2 levels + abate) + H building	66 days	Tue 3/25/14	Tue 6/24/14
125	Build STEM	440 days	Wed 6/25/14	Tue 3/1/16
126	Student move into STEM	5 days	Mon 3/21/16	Fri 3/25/16
127	Demolish L, S and L buildings	40 days	Wed 4/27/16	Tue 6/21/16
128	Renovate Auditorium	264 days	Wed 3/20/13	Mon 3/24/14
129	Renovate lower gym	132 days	Thu 2/27/14	Fri 8/29/14
130	Demobilize modular classrooms	22 days	Wed 3/2/16	Thu 3/31/16
131	Limited sitework	60 days	Wed 12/2/15	Tue 2/23/16
132	Sitwork and landscaping (parking lots)	80 days	Wed 6/22/16	Tue 10/11/16
133	**CONSTRUCTION - OPTION 14B**	660 days	Mon 2/18/13	Fri 8/28/15
142	**CONSTRUCTION - OPTION 14C**	660 days	Mon 2/18/13	Fri 8/28/15



OPTION 6R2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Mobilization
Procure mod classrooms + rental
Renovate cafeteria
Build new gym
Demolish upper gym + H bldg
Build STEM
Student move
Demolish I, S and L
Renovate Auditorium
Renovate lower gym
Demobilize mod classrooms
Limited sitework
Sitework
months
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Concord - Carlisle High School

Proposed Project Schedule - PSR Submission - options 6R2, 14B, 14C

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51	MA-CHPS Score card	24 days	Thu 6/23/11	Tue 7/26/11
52	FFE spec and estimate	24 days	Thu 6/23/11	Tue 7/26/11
53	Construction Estimate(s)	15 days	Wed 7/27/11	Tue 8/16/11
54	Budget	10 days	Fri 8/5/11	Thu 8/18/11
55	Project budget	9 days	Fri 8/5/11	Wed 8/17/11
56	Summary of ineligible costs	5 days	Mon 8/8/11	Fri 8/12/11
57	Project cash flow	1 day	Wed 8/17/11	Wed 8/17/11
58	MSBA 3011 form	2 days	Wed 8/17/11	Thu 8/18/11
59	Submit Schematic Design to the MSBA (for Sept BOD vote)	1 day	Fri 8/19/11	Fri 8/19/11
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64	School Committee requests BOS to authorize debt exclusion	1 day	Mon 10/24/11	Mon 10/24/11
65	**November STM**	1 day	Mon 11/7/11	Mon 11/7/11
66	**Execute PBSA**	1 day	Fri 11/11/11	Fri 11/11/11
67	**Execute PFA (120 days from Board approval)**	15 days	Mon 11/21/11	Fri 12/9/11
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74	Life cycle cost analysis - ongoing throughout dd into cd	20 days	Mon 5/14/12	Fri 6/8/12
75	Design and constructability review	15 days	Mon 3/26/12	Fri 4/13/12
76	Construction Cost Estimate (Architect)	15 days	Wed 6/13/12	Tue 7/3/12
77	Construction Cost Estimate (CM/OPM)	15 days	Wed 6/13/12	Tue 7/3/12
78	Reconcile estimates	10 days	Wed 7/4/12	Tue 7/17/12
79	Update Schedule / Budget	5 days	Wed 7/18/12	Tue 7/24/12
80	Project Design Summary / analysis	10 days	Thu 6/14/12	Wed 6/27/12
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82	Receive MSBA comments	22 days	Thu 7/26/12	Fri 8/24/12
83	**PERMITTING and APPROVALS - TBD**	61 days	Mon 11/19/12	Mon 2/11/13
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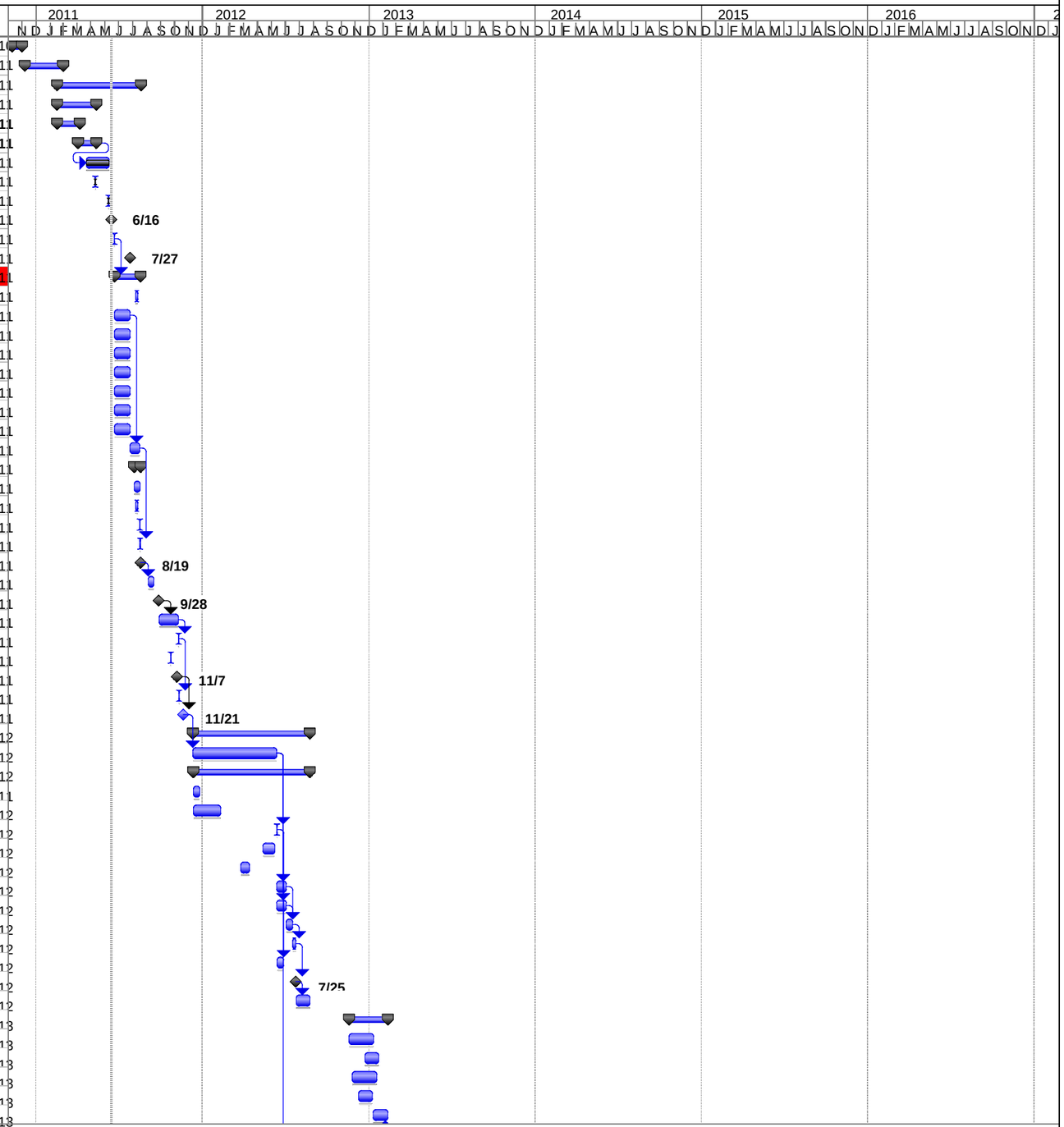
87	BOH - Kitchen Design Approval	22 days	Mon 12/10/12	Tue 1/8/13
88	ISD - Building	22 days	Fri 1/11/13	Mon 2/11/13



Concord - Carlisle High School

Proposed Project Schedule - PSR Submission - options 6R2, 14B, 14C

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91	**CD 60% Phase_MSBA Deliverables**	52 days	Wed 9/19/12	Thu 11/29/12
92	Design and constructability review	15 days	Wed 9/19/12	Tue 10/9/12
93	60% Cost Estimate (Architect)	10 days	Wed 10/3/12	Tue 10/16/12
94	60% Cost Estimate (CM/OPM)	10 days	Wed 10/3/12	Tue 10/16/12
95	Reconcile estimates	5 days	Wed 10/17/12	Tue 10/23/12
96	Submit 60% CD MSBA submission	5 days	Wed 10/24/12	Tue 10/30/12
97	Receive MSBA comments	22 days	Wed 10/31/12	Thu 11/29/12
98	**CD 90% Phase_MSBA Deliverables**	42 days	Wed 11/14/12	Thu 1/10/13
99	90% Cost Estimate (Architect)	10 days	Wed 11/14/12	Tue 11/27/12
100	90% Cost Estimate (CM)	10 days	Wed 11/14/12	Tue 11/27/12
101	Reconcile estimates	5 days	Wed 11/28/12	Tue 12/4/12
102	Submit 90% CD MSBA submission	5 days	Wed 12/5/12	Tue 12/11/12
103	Receive MSBA comments	22 days	Wed 12/12/12	Thu 1/10/13
104	**100% MSBA submission**	32 days	Fri 12/14/12	Mon 1/28/13
105	90% Cost Estimate (Architect)	5 days	Fri 12/14/12	Thu 12/20/12
106	90% Cost Estimate (CM)	5 days	Fri 12/14/12	Thu 12/20/12
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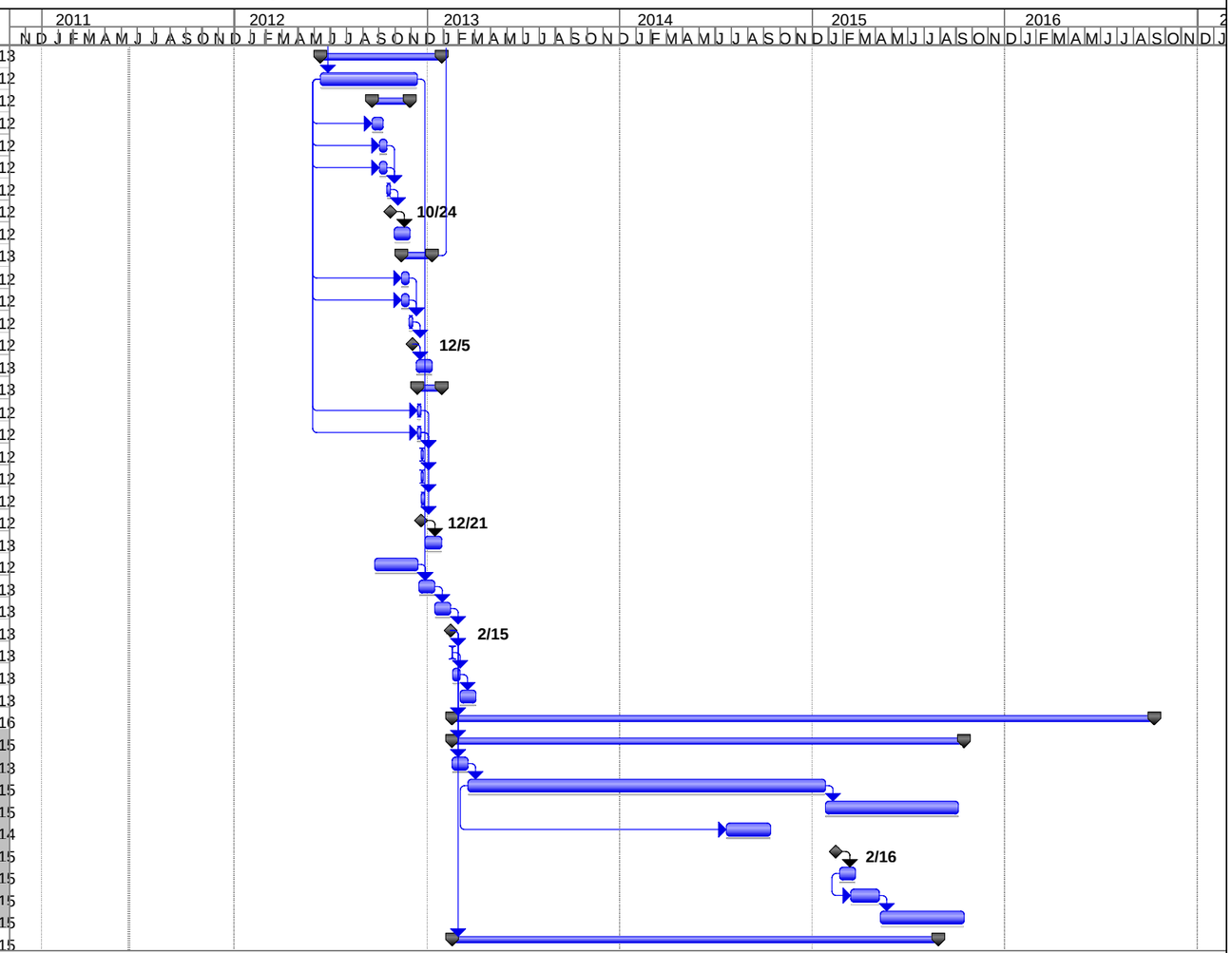
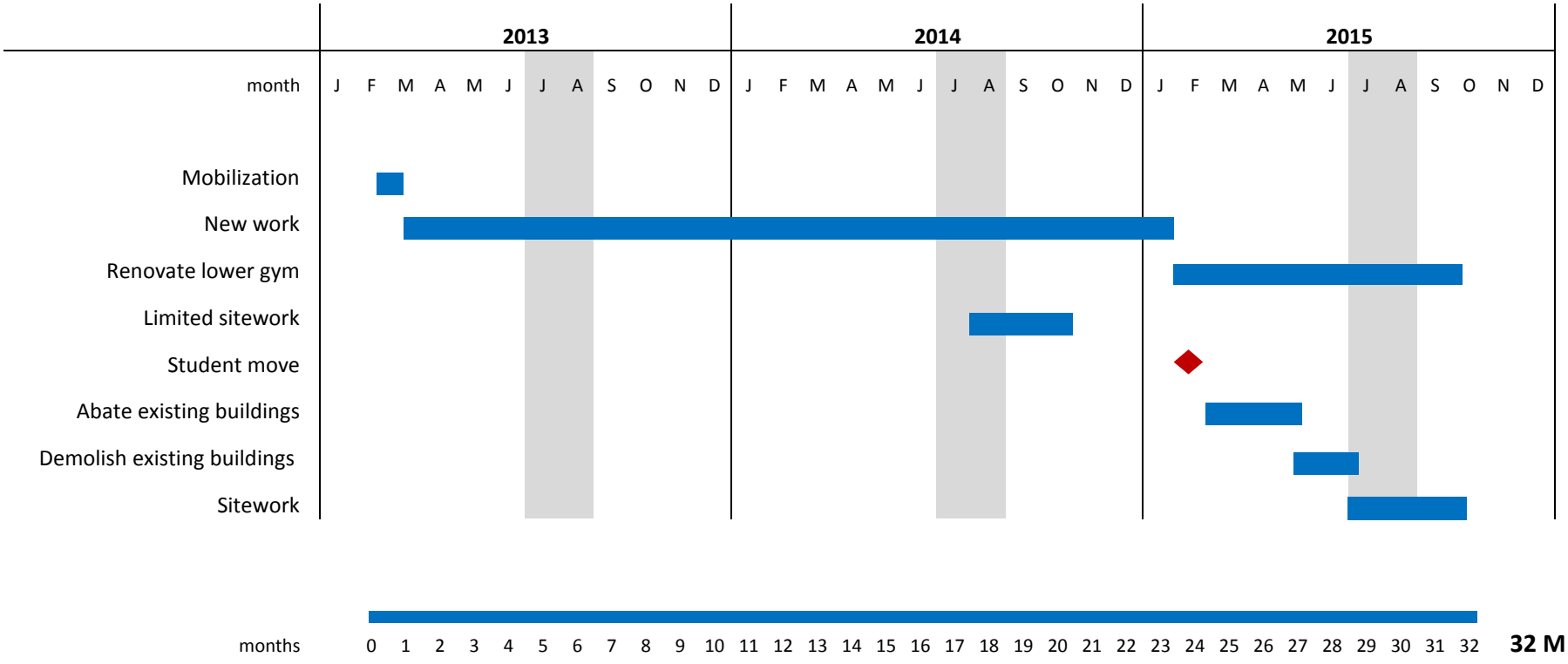
115	**Award**	1 day	Fri 2/15/13	Fri 2/15/13
116	Submit MSBA cost comparison spreadsheet	1 day	Mon 2/18/13	Mon 2/18/13
117	MSBA reviews final GMP/cost comparison spreadsheet	10 days	Tue 2/19/13	Mon 3/4/13
118	MSBA amends PFA (if applicable)	22 days	Tue 3/5/13	Wed 4/3/13
119	**CONSTRUCTION - OPTION 6R**	952 days	Mon 2/18/13	Tue 10/11/16
133	**CONSTRUCTION - OPTION 14B**	695 days	Mon 2/18/13	Fri 10/16/15
134	Mobilization	22 days	Mon 2/18/13	Tue 3/19/13
135	New work	484 days	Wed 3/20/13	Mon 1/26/15
136	Renovate lower gym	180 days	Tue 1/27/15	Mon 10/5/15
137	Limited sitework	60 days	Wed 7/23/14	Tue 10/14/14
138	Student move	5 days	Mon 2/16/15	Fri 2/20/15
139	Abate existing buildings	22 days	Mon 2/23/15	Tue 3/24/15
140	Demolish existing buildings	40 days	Mon 3/16/15	Fri 5/8/15
141	Sitework and landscaping	115 days	Mon 5/11/15	Fri 10/16/15
142	**CONSTRUCTION - OPTION 14C**	660 days	Mon 2/18/13	Fri 8/28/15



OPTION 14B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Limited sitework
Student move
Abate existing buildings
Demolish existing buildings
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32 M

Concord - Carlisle High School

Proposed Project Schedule - PSR Submission - options 6R2, 14B, 14C

ID	Task Name	Duration	Start	Finish
1	**Procure OPM (MOD 2)**	16 days	Wed 11/10/10	Wed 12/1/10
6	**Procure Architect (MOD 2)**	60 days	Wed 12/8/10	Tue 3/1/11
21	**FEASIBILITY/SCHEMATIC STUDY**	132 days	Thu 2/17/11	Fri 8/19/11
22	**FEASIBILITY STUDY (MOD 3)**	62 days	Thu 2/17/11	Fri 5/13/11
23	Preliminary Design Program (PDP)	**36 days**	**Thu 2/17/11**	**Thu 4/7/11**
34	MSBA PDP	**30 days**	**Mon 4/4/11**	**Fri 5/13/11**
38	Development of options (short list)	36 days	Fri 4/22/11	Fri 6/10/11
39	**MSBA Facilities Assessment Committee (FAS) review**	1 day	Wed 5/11/11	Wed 5/11/11
40	June 9th conf call (Ed Spec resolved and direction on options provided for PSR)	1 day	Thu 6/9/11	Thu 6/9/11
41	Submit Preferred Schematic Report to the MSBA (Normal)	1 day	Thu 6/16/11	Thu 6/16/11
42	**MSBA Facilities Assessment Committee (FAS) review**	1 day	Wed 6/22/11	Wed 6/22/11
43	**MSBA BOD Mtg - July 27th Approve Preferred Schematic Design**	1 day	Wed 7/27/11	Wed 7/27/11
44	**Schematic Design (MOD 4) TBD….pending outcome of FAS meeting**	41 days	Thu 6/23/11	Thu 8/18/11
45	Project Schedule (proposed)	5 days	Mon 8/8/11	Fri 8/12/11
46	Schematic building floor plans / elevations	24 days	Thu 6/23/11	Tue 7/26/11
47	Room data sheets	24 days	Thu 6/23/11	Tue 7/26/11
48	Building systems descriptions (Struct/MEP/Comm/Sustainable design)	24 days	Thu 6/23/11	Tue 7/26/11
49	Preliminary summary of ineligible spaces	24 days	Thu 6/23/11	Tue 7/26/11
50	Outline Specs	24 days	Thu 6/23/11	Tue 7/26/11
51	MA-CHPS Score card	24 days	Thu 6/23/11	Tue 7/26/11
52	FFE spec and estimate	24 days	Thu 6/23/11	Tue 7/26/11
53	Construction Estimate(s)	15 days	Wed 7/27/11	Tue 8/16/11
54	Budget	10 days	Fri 8/5/11	Thu 8/18/11
55	Project budget	9 days	Fri 8/5/11	Wed 8/17/11
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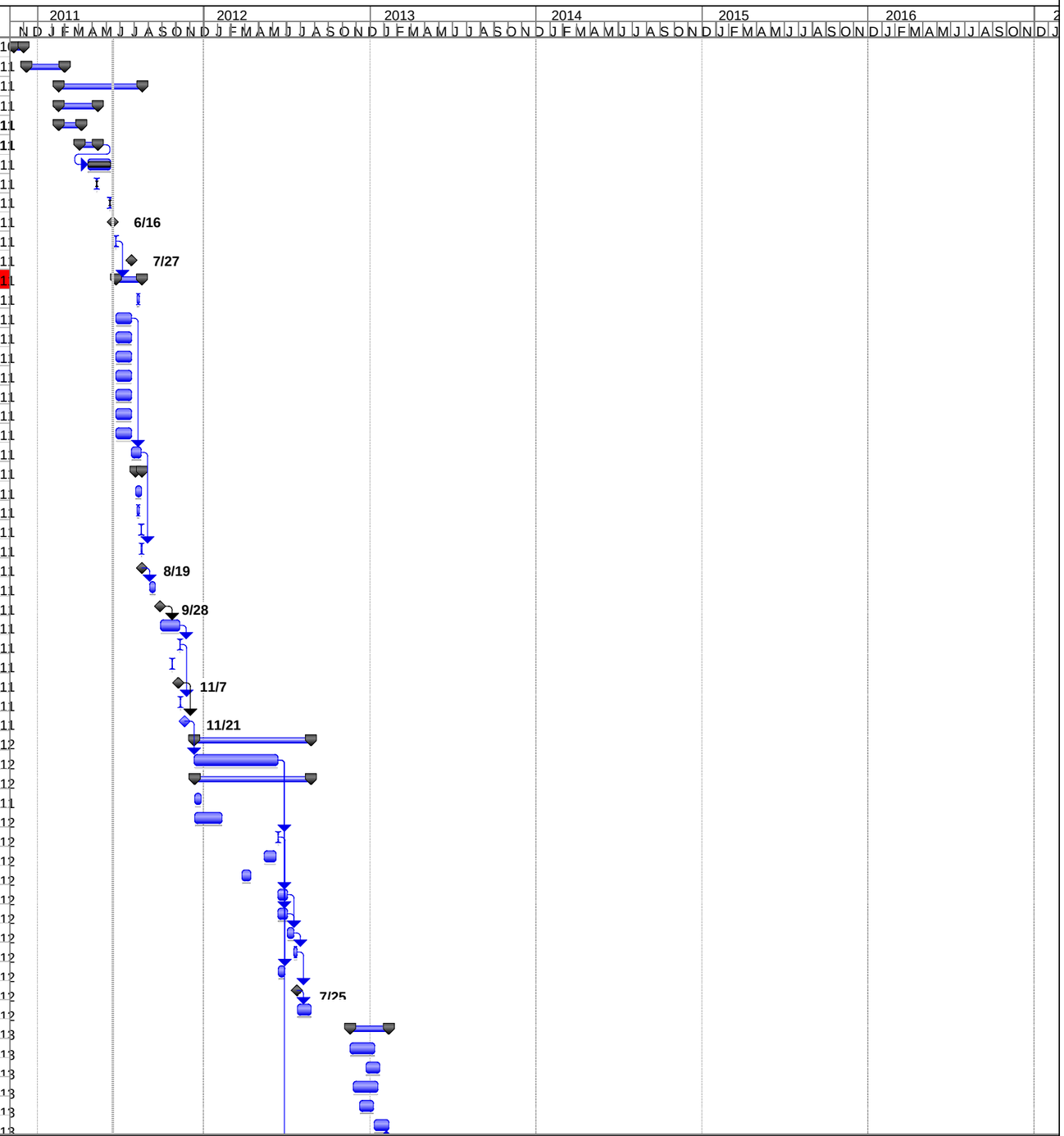

Concord - Carlisle High School

Proposed Project Schedule - PSR Submission - options 6R2, 14B, 14C

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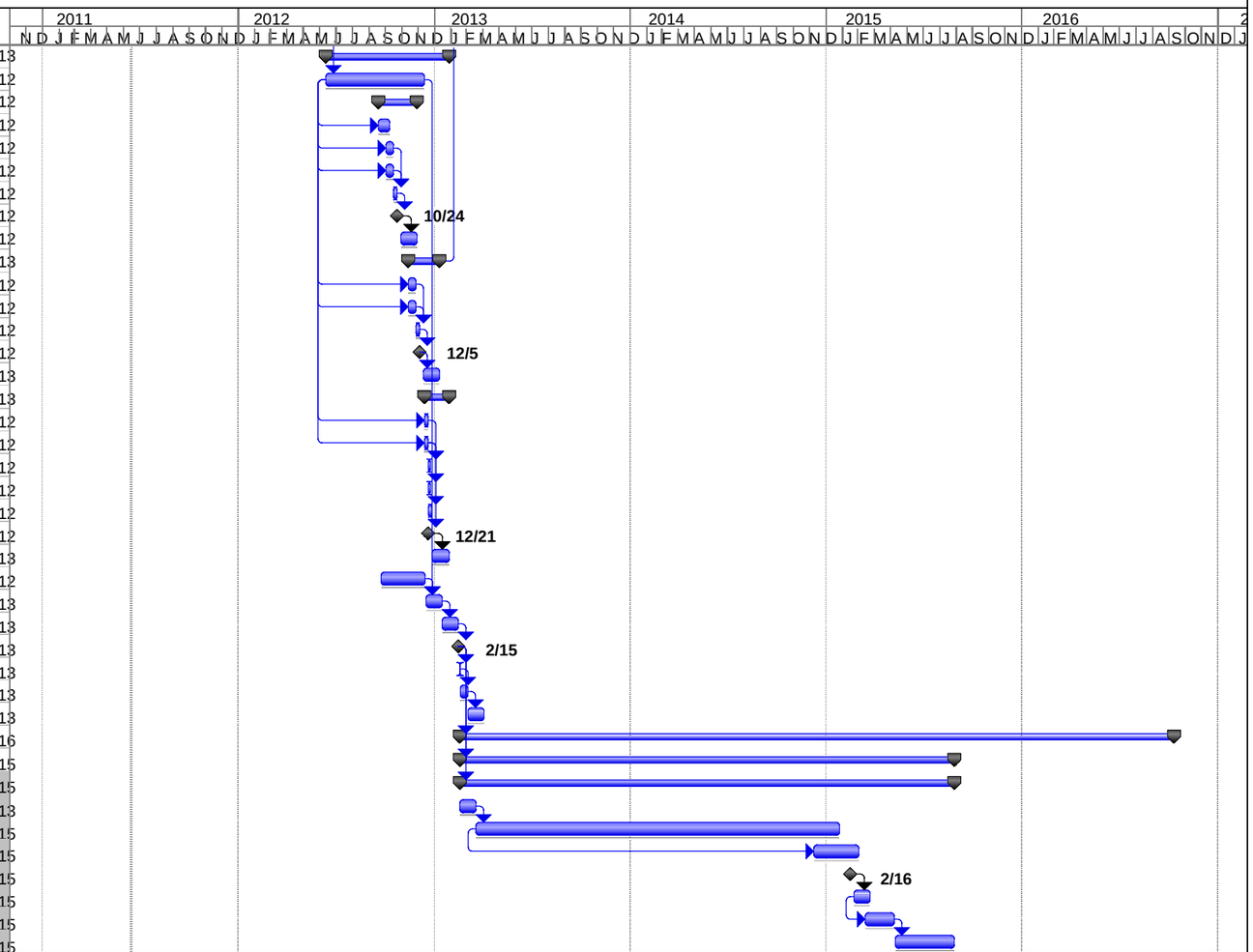
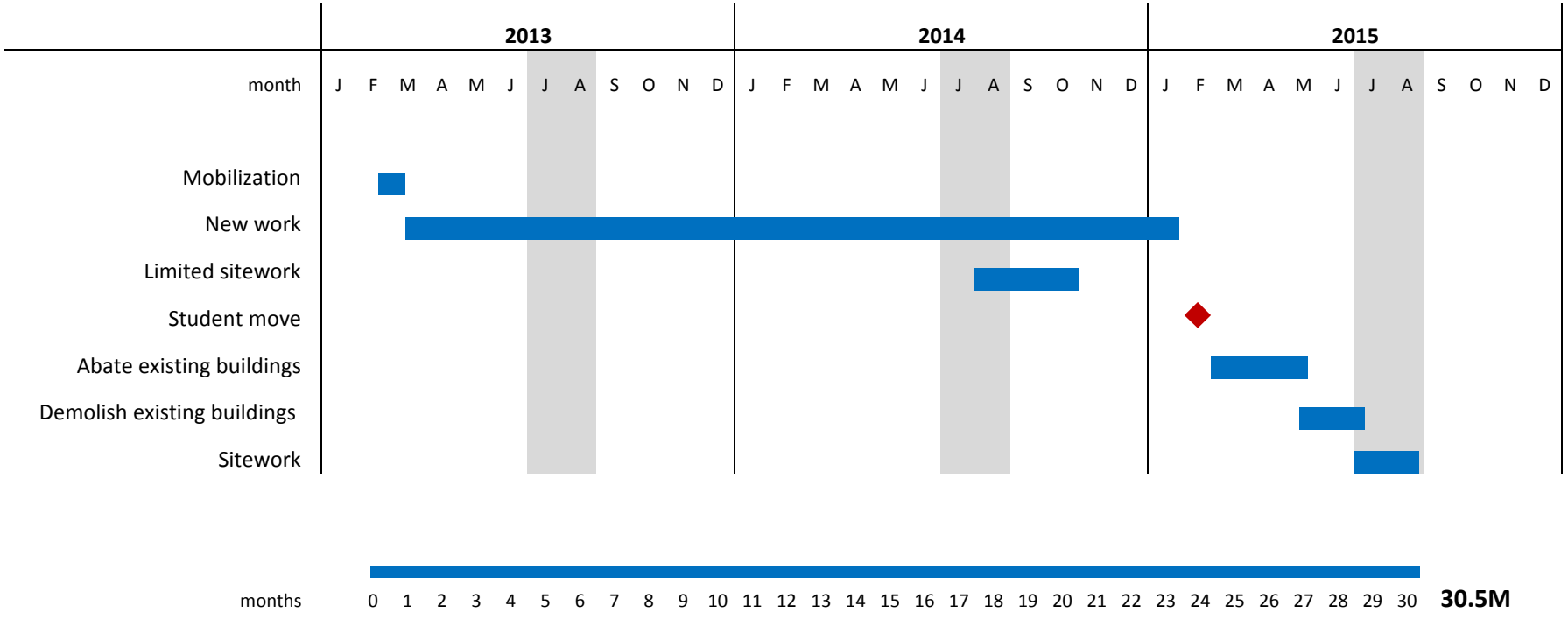


OPTION 14C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Student move
Abate existing buildings
Demolish existing buildings
Sitework
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30.5M

67 South Bedford St., Suite 201E, Burlington, MA 01803 TEL +1 781-418-5700

Concord-Carlisle High School Narrative and Signed Statement

Project Name: Concord-Carlisle High School

Location: Concord, MA

Client Name: Office of Michael Rosenfeld Architects

Date: June 16, 2011

Sustainable Design Elements – Feasibility Study Phase

The owner and design team have taken a deliberative approach to developing the conceptual design for the Concord-Carlisle High School project. Although the programmatic layout of the school has yet to be finalized, fundamental goals for the project have been identified and targeted. To ensure maximum design integration, the design team held a full team charrette with the owner and utility representatives present and fleshed out top priorities for the school: optimized daylighting design, optimized energy efficiency, preferred HVAC and lighting technologies, and natural ventilation for selected spaces.

During this early phase and subsequent re-designs after the charrette, we have utilized MA-CHPS and LEED BD+C v3 scorecards to track project scores, (beginning in March of 2011). The feasibility study contains mechanical, plumbing, and electric design narratives that represent the systems captured during many owner meetings and the design charrette. In addition, the costs of the building systems have been accounted for during this feasibility study phase.

Signed Statement

As of June 16, 2011, CCHS has budgeted for and is on track to achieve either 68 points for MA-CHPS (50 points is the threshold for “Verified Leader”) or a maximum of 60 points under LEED BD+C v3, or “Gold” level (50 points is the LEED Silver threshold). The scores will fluctuate as the school design evolves; however, we fully anticipate that the project will achieve the points needed to qualify for the State’s extra 2 percentage points for a certified green school.

Andrea T. Ranger

Sustainability Consultant

Collaborative for High Performance Schools (CHPS)

PROJECT APPLICATION: Concord Carlisle High School Option 6R2

Based on the 2009 Edition

III. CHPS Scorecard

When your project is ready to be screened and reviewed, notify CHPS by faxing or emailing the registration form signed. On this scorecard, you should have placed a check mark in the "ready for review" column for the design review, and when it is time for the construction review for each prerequisite and credit claimed signifying that its template has been completed and that all supporting attachments and documents have been uploaded to your project CHPS website. Check with CHPS for alternative, equivalent submittals that may be acceptable.

***Key: T** -Template Required, **A** -Attachment Required, **CD** -Construction Document Required, **CA** - Construction Audit Requirement*

CHPS SECTION	CREDIT NUMBER	TITLE	POSSIBLE POINTS	POINTS CLAIMED	NOTES	TEAM MEMBER RESPONSIBLE	DESIGN REVIEW REQUIREMENTS			READY FOR REVIEW	CONSTRUCTION REVIEW REQUIREMENTS		READY FOR REVIEW	CONSTRUCTION AUDIT REQUIREMENT
INTEGRATION AND INNOVATION (2 prerequisites; 11 possible points)														
STRATEGY	II.P1	Integrated Design	Req	REQ	An IDT team has been formed and will meet a minimum of 2 times during the design process	Architect:	T	A	-		-	-		-
	II.P2	Educational Display	Req	REQ	Provide a permanent display of the school site - labeled with high performance features (Similar to what is in Willard Elem. School)	Architect:	T	-	CD		-	A		-
	II.C1	Demonstration Areas	1	-	To be determined	Other:	T	-	CD		-	A		-
	II.C2	Innovation	1-4	2	To be determined. POSSIBLE INTEGRATION OF LOCAL NATIVE AMERICAN ARTIFACT COLLECTION AS PART OF BUILDING INTEGRATED REGIONAL ECOLOGY EXHIBIT/EDUCATIONAL AREAS.	Other:	T	A	-		-	A		-
	II.C3	Life Cycle Cost Analysis	3	3	A lifecycle cost analysis will be performed to show the net present value of the major building systems over 30 years	Engineer:	T	A	-		-	-		-
	II.C4	School Garden	1	1	A designated school garden will be designed into the site	Other:	T	A	CD		T	-		CA
	II.C5	School Master Plan	1		To be determined. Master plan for CHPS would be easy - document future expansion potential and impacts on other MA-CHPS credits and a few other criteria.	Architect:	T	A	-		-	-		-
INDOOR ENVIRONMENTAL QUALITY (4 prerequisites; 26 possible points)														
	EQ.P1	HVAC Design - ASHRAE 62.1	Req	REQ	Design to meet ASHRAE 62.1-2004 Standards. AND Exhaust kitchen, janitorial closets, art rooms, copy/printer rooms (spec instr. for nat. vent.) AND any ductliners must meet ASTM C 1071 or UL 181 and ASTM C 1104 or C 209.		T	A	CD		T	-		-
	EQ.P2	Construction IAQ Management	Req	REQ	1. Develop a SMACNA IAQ plan for occupied buildings under construction.During construction, seal HVAC supply and return openings to protect them from dust infiltration. 2. Follow SMACNA guidelines "Duct Cleanliness for New Construction Guidelines." 3. Develop a plan for building flush out.	Architect:	T	-	CD		T	A		-
	EQ.P3	Pollutant and Chemical Source Control	Req	REQ	We can achieve this prerequisite by: • Locating housekeeping and copiers in rooms that are exhausted sufficiently, have floor to deck partitions and a self-closing door. Installing 2-part walk off floor mats at all exterior entrances, • Electronic ignition for all gas-fired equipment (except chemistry e.g.) • Air intakes 25 feet from exhaust/contaminants • No propane powered ride on equipment indoors (burnishers & polishers).	Architect:	T	A	CD		T	-		CA
	EQ.P4	Moisture Management	Req	REQ	• Surface grades will slope away from the building. Rain leaders will direct water away from the building, and condensate drainage will rely on gravity. • If a lawn irrigation system is to be used then it will not spray on the building. • Building material with the potential for developing mold and bacteria will be kept dry	Engineer:	T	-	CD		T	A		-
	EQ.P5	Minimum Filtration	Req	REQ	Replace all HVAC filtration media immediately prior to occupancy. Minimum filtration shall be MERV 10.	Engineer:	T	-	CD		T	-		CA
	EQ.P6	Thermal Comfort - ASHRAE 55	Req	REQ	Comply with ASHRAE standard 55-2004 for thermal comfort standards within established ranges per climate zone.	Engineer:	T	A	CD		-	-		-
	EQ.P7	View Windows, 70%	Req	REQ	Provide direct line of sight to view glazing from 70% of the combined floor area of classrooms and administration areas.	Architect:	T	-	CD		T	-		CA
	EQ.P8	Eliminate Glare	Req	REQ	Design classrooms to optimize daylight while preventing glare by controlling the sunlight ingress. • Documentation of credit requires modeling.	Architect:	T	A	CD		T	-		-

DESIGN	EQ.P9	Minimum Acoustical Performance	Req	REQ	Meet ANSI S12.60 for classrooms including 1) sound transmission classes, 2) impact insulation class of 50 and 3) Leq 45 dBA maximum for mechanical system background noise. REQUIRES ACOUSTIC CONSULTANT.	Architect:	T	A	CD		-	-		-
DESIGN	EQ.P10	Minimum Low Emitting Materials	Req	REQ	Specify low emitting adhesives and sealants that will meet the requirements for this credit. Must address: 1) Paints & Coatings and 2) Composite Wood and Agrifiber Products - does NOT INCLUDE plywood, panels, OSB, glue lam timber, pre-fab wood joists, and finger jointed lumber.	Architect:	T	A	CD		T	A		-
DESIGN	EQ.C1	View Windows, 80 – 90%	1-2	1	Provide direct line of sight to view glazing from 80-90% of the combined floor area of classrooms and administration areas. To be determined as design develops.	Architect:	-	-	-		-	-		-
DESIGN	EQ.C2	Daylighting in Classrooms	1-6	3	Optimize daylight while avoiding glare. Utilization of shading devices, light shelves orientation anticipated. Classrooms to be designed so that a minimum of 75% meet criteria. Additional pts for admin office area +library, café., auditorium, and multi-purpose common areas.	Architect:	T	-	CD		T	-		CA
	EQ.C3	Advanced Low-Emitting Materials	1-4	2	1. All adhesives and sealants products described in this credit shall meet the VOC content requirements of SCAQMD .2 Flooring systems will meet low VOC requirements. 3. Ceiling and wall systems will meet low VOC requirements. 4. Furniture may be able to meet low VOC requirements?	Architect:	T	-	CD		T	-		CA
	EQ.C4	Ducted Returns	1	1	HVAC returns will be installed in all occupied spaces to avoid dust and microbial growth issues	Engineer:	T	-	CD		T	-		-
	EQ.C5	Enhanced Filtration	1	-	May not be able to achieve this credit	Other:	T	-	CD		T	-		CA
	EQ.C6	Post-Construction IAQ	1	1	HEPA vacuum prior to substantial completion and replace all filters with MERV 10 filters prior to flush out.	Contractor:	T	A	CD		T	-		-
	EQ.C7	Enhanced Acoustical Performance	1-4	1	1. Max. 1.5 seconds of reverberation time in classroom 2. Possibly obtain background noise level of 35 dba in unoccupied classrooms. 3. Commissioning testing of background noise **REQUIRES ACOUSTIC CONSULTANT.**	Architect:	T	-	CD		T	-		CA
	EQ.C8	Controllability of Systems	1-2	2	1. 90% of all classrooms shall have a minimum of one operable window per classroom.. 2.Provide temperature and lighting controls for each classroom.	Architect:	T	-	CD		T	-		CA
	EQ.C9	Duct Access & Cleaning	1	1	Access doors for cleaning all supply and return ducts and execute a plan for post occupancy cleaning	Engineer:	T	-	CD		T	-		CA
	EQ.C10	Electric Lighting	1	1	Multi scene indirect/direct lighting for all classrooms, system will operate in two modes: general illumination at 35-50 foot candles and A/V mode at 10-20 foot candles, Indirect mode lighting to provide at least two levels of uniform lighting both at night and when daylit. DESIGN WILL MAXIMIZE CAPTURED DAYLIGHTING AND DAYLIGHT SENSORS/CONTROLS.	Engineer:	T	A	CD		T	-		CA
ENERGY (3 prerequisites; 36 possible points; minimum 2 points required)																
	EE.P1	Minimum Energy Performance	Req	REQ	Building design shall meet or exceed ASHRAE Standard 90.1-2007. Verified through energy modeling.	Engineer:	T	A	CD		T	-		-
	EE.P2	Commissioning	Req	REQ	MSBA shall engage a Commissioning agent for review of construction documents and to develop a commissioning plan, and verify functional performance. PROJECT WILL INCLUDE BUILDING ENVELOPE COMMISSIONING.	Commissioning Agent:	T	A	CD		T	A		-
	EE.P3	Facility Staff & Occupant Training	Req	REQ	The facility staff will receive training and operation and maintenance documentation on the building systems. The teachers and staff will receive training on the operation of lighting, heating and cooling systems	Commissioning Agent:	T	A	-		T	-		-
DESIGN	EE.C1(A)	Superior Energy Performance (Performance Approach)	1-15	12	To achieve net zero, need 40% more efficient than current code. This credit can be achieved by demonstrating the high-energy performance (30% reduction) of the building through energy modeling. This is the integration of entire building systems including building envelope, lighting systems, day lighting, mechanical efficiency, energy recovery and resource reduction.	Engineer:	-	-	-		-	-		-
DESIGN	EE.C1(B)	Superior Energy Performance (Prescriptive Approach)	2-4	-			T	-	CD		T	-		-
DESIGN	EE.C2	Minimize Air Conditioning	1-3	-	Client wants full air conditioning not dehumidification. ALLOW FOR POSSIBILITY OF PARTIAL NATURAL VENTILATION SYSTEM.	Engineer:	T	-	CD		T	-		-

	EE.C3	Renewable Energy	1-12	2	Client wants PV systems on the ground and points are measured against total energy cost reductions, not just reductions in electricity consumption. ALLOW FOR POSSIBLE LARGER SCALE PV SYSTEM (COMBINED GROUND/BUILDING ARRAYS) IN CONJUNCTION WITH CMLP AND TOWNS.	Engineer:	T	A	CD		T	-		CA
	EE.C4	Plug Load Reduction & ENERGY STAR Equipment	1	1	School Committee to pass resolution to require only Energy Star appliances and equipment. Facilities will develop a plug load reduction plan to turn off devices when not in use.	Other:	T	A	CD		T	-		CA
	EE.C5	Energy Management System and Sub Metering	1-3	3	Install an energy management system (EMS) to monitor and trend the energy consumed by HVAC systems and Install a submetering system for lighting loads and plug loads		T	A	CD		T	A		-
	EE.C6	Flex Energy	1-2	2	An area will be dedicated to future photovoltaics. SEE EE.C3 COMMENTS; DESIGN WILL ALSO EXPLORE SYSTEMS INCLUDING ICE STORAGE, GAS FIRED CHILLERS, ETC.	Architect:	T	-	CD		-	-		-
WATER (2 prerequisite; 16 possible points)															
DESIGN	WE.P1	Irrigation System Performance on Recreational Fields	Req	REQ	Soil moisture meters to be installed at fields with irrigation systems	Engineer:	T	-	CD		T	-		CA
	WE.P2	Indoor Water Use Reduction, 20%	Req	REQ	This prerequisite can be achieved by using high efficiency plumbing fixtures, waterless urinals, and occupant sensors. Can also consider reuse of storm water or grey water for non potable applications.	Engineer:	T	-	CD		T	-		CA
	WE.C1	Indoor Water Use Reduction, 30-40%	1-3	1	This credit can be achieved by reducing the indoor water use through the use of water efficient plumbing fixtures.	Engineer:	-	-	-		-	-		-
	WE.C2	Reduce Potable Water Use for Sewage Conveyance	4	-	(T.B.D) This credit could achieved by reducing the flow of building sewage by 50% through the reduction of the use of potable water by using water efficient fixtures and rain catchment systems.	Engineer:	T	-	CD		T	-		CA
DESIGN	WE.C3	No Potable Water Use for Non-Recreational Landscaping Areas	3	3	No permanent irrigation systems for watering non-playing field landscaped areas will be provided. Drought resistant plants and grasses will be specified. Does not distinguish between use of potable or non potable water.	Engineer:	T	-	CD		T	-		CA
	WE.C4	Reduce Potable Water Use for Recreational Landscaping Areas	2	-	To be determined		T	-	CD		T	-		CA
	WE.C5	Irrigation System Commissioning	1	-	To be determined		T	A	CD		T	A		CA
	WE.C6	Water Management System	1-3	3	Install a water management system to monitor water use of all indoor and outdoor water uses. A full monitoring system would be preferable - must determine costs.	Engineer:	T	A	CD		T	-		CA
SITE (1 prerequisite; 16 possible points)															
DESIGN	SS.P1	Joint Use of Facilities and Parks	Req	REQ	School to be used by the community for meetings recreation and other municipal programs. Bathrooms available for interior joint use?	Architect:	T	A	CD		T	-		-
	SS.C1	Sustainable Site Selection	1-5	4	School grounds to remain as previously used. No change from public parkland, conservation land or water supply protection.	Engineer:	T	A	CD		T	-		-
DESIGN	SS.C2	Central Location / Smart Growth	1	1	Get recent application to Commonwealth Capital Program for 1 point.	Architect:	T	A	-		-	-		-
DESIGN	SS.C3	Reduced Building Footprint	1	1	Proposed building option has multiple levels and a smaller over all footprint than the existing school therefore increasing the availability of open land on the site	Architect:	T	-	-		-	-		-
	SS.C4	Building Layout & Microclimates	1	1	1. orientation of building, 4. Plant and protect existing deciduous trees to block summer sun and allow for winter gain.5. optimize cut and fill. 6. Create physical connection to bike path. 7. maximize area for on-site renewable energy	Architect:	T	A	CD		T	-		CA
	SS.C5	Public Transportation	1	-			T	A	-		-	-		-
	SS.C6	Pedestrian/Bike/Human Powered Transportation	2	-	To be determined by CCHS SBC	Architect:	T	A	CD		T	-		CA
	SS.C7	Parking Minimization	1	-			T	-	CD		T	-		CA
	SS.C8	Post-Construction Stormwater Management	1	1	Exceed MA stormwater standards by 25% for quantity reduction - Could be difficult to achieve - need information from civil engineers.	Engineer:	T	A	CD		T	-		CA
	SS.C9	Reduce Heat Islands – Landscaping	1	-	To be determined		T	-	CD		T	-		CA
	SS.C10	Reduce Heat Islands – Cool Roofs	1	1	Solar reflectance cool roof will be installed	Architect:	T	-	CD		T	-		CA
	SS.C11	Light Pollution Reduction	1	1	This credit can be achieved by using automatically controlled full cutoff light fixtures. Horizontal illumination on ground level must meet criteria light levels and fixtures must be energy efficient.	Engineer:	T	-	CD		T	-		CA

MATERIALS & WASTE MANAGEMENT (2 prerequisite; 14 possible points)																
DESIGN	MW.P1	Storage and Collection of Recyclables	Req	REQ	School shall meet local ordinances for recycling space, provide an easily accessible space that is dedicated to the separation of, collection and storage of materials for recycling, including a minimum for paper cardboard, glass, plastics, aluminum cans and metals	Architect:	T	A	CD		T	-		CA
	MW.P2	Minimum Construction Site Waste Management, 75%	Req	REQ	Recycle, reuse or salvage at least 75% by weight of non hazardous construction and demolition waste.	Contractor:	T	-	CD		T	A		-
	MW.C1	Minimum Construction Site Waste Management, 90%	1	1	Recycle an additional 15% of construction waste	Contractor:	-	-	-		-	-		-
	MW.C2	Single Attribute - Recycled Content Materials	1-2	1	Carpet, acoustical tile, ceramic tile, rubber floor, plastic toilet partitions, MDF, steel doors, structural steel, steel studs, steel decking, linoleum flooring, alum. Panels, alum. Windows, copper piping and flashing, CMU, HVAC, sheet metal, and gypsum board	Architect:	T	-	CD		T	-		CA
	MW.C3	Single Attribute - Rapidly Renewable Materials	1	1	Linoleum and Bio Tile Potential for bamboo flooring and paneling	Architect:	T	-	CD		T	-		CA
	MW.C4	Single Attribute - Certified Wood	1	-	Must bear Forest Stewardship Council label	Architect:	T	-	CD		T	-		CA
	MW.C5	Single Attribute - Regional Materials	1-2	1	Regional material such as concrete and gypsum wall board can purchased from local plants to meet this requirement. Include road base, too.	Architect:	T	-	CD		T	-		CA
	MW.C6	Material Re-Use	1	-			T	-	CD		T	-		CA
	MW.C7	Durable and Low Maintenance Flooring	1	1	Durable and low maintenance flooring will be specified for this project	Architect:	T	-	CD		-	-		CA
	MW.C8	Building Reuse – Exterior	1-4	-	Not applicable to CCHS project.		T	-	CD		T	-		CA
	MW.C9	Building Reuse – Interior	1	-	Not applicable to CCHS project.		T	-	CD		T	-		CA
OPERATIONS & MAINTENANCE (3 prerequisites; 9 possible points)																
PERFORMANCE	OM.P1	Maintenance Plan	Req	Req	School must create and maintain maintenance plan for all equipment and include its preventive and routine maintenance needs. Can use SchoolDude.com to meet requirement.	Other:	T	-	-		-	A		-
	OM.P2	Anti-Idling Measures	Req	Req	School will adopted a no idling policy that applies to all buses operating in the school zone. All vehicles required to limit idling to five minutes per M.G. L. Chapter 90 section 16A. Most of prereq should already be completed from Willard Elem.	Other:	T	-	-		-	A		-
	OM.P3	Green Cleaning	Req	Req	A Green Cleaning Maintenance Program will be developed by the school. Most of prereq should already be completed from Willard Elem project.	Other:	T	-	-		-	A		-
	OM.C1	Work Order and Maintenance Management System	1	1	The school shall purchase and use a computerized maintenance management system, CMMS. CCHS currently has system. School DUDE program could be used.	Other:	T	A	-		-	-		-
	OM.C2	Indoor Environmental Management	1-3	3	The school will implement EPA's tools for schools or an equal program OR could adopt IEQ program developed for Willard Elementary.	Other:	T	A	-		-	A		-
	OM.C3	Green Power	1	-	To be determined		T	A	-		-	-		-
	OM.C4	Climate Change Action: Diesel Bus Retrofit	1	-	To be determined		T	A	-		-	-		-
	OM.C5	Carbon Footprint Reporting	1	-	To be determined - could be an interesting teacher/student activity. DEFINITE INTEREST BY EFS FACULTY/STUDENTS AND TOWN GREEN TEAMS.		T	A	-		-	-		-
	OM.C6	Energy Benchmarking	3	3	Needs to occur as part of M&V of building	Other:	T	A	-		-	-		-
TOTAL POINTS POSSIBLE (127)				**68**												
50 points = MA-CHPS Verified Leader																

Collaborative for High Performance Schools (CHPS)

PROJECT APPLICATION: Concord Carlisle High School Option 14B

Based on the 2009 Edition

III. CHPS Scorecard

When your project is ready to be screened and reviewed, notify CHPS by faxing or emailing the registration form signed. On this scorecard, you should have placed a check mark in the "ready for review" column for the design review, and when it is time for the construction review for each prerequisite and credit claimed signifying that its template has been completed and that all supporting attachments and documents have been uploaded to your project CHPS website. Check with CHPS for alternative, equivalent submittals that may be acceptable.

***Key: T** -Template Required, **A** -Attachment Required, **CD** -Construction Document Required, **CA** - Construction Audit Requirement*

CHPS SECTION	CREDIT NUMBER	TITLE	POSSIBLE POINTS	POINTS CLAIMED	NOTES	TEAM MEMBER RESPONSIBLE	DESIGN REVIEW REQUIREMENTS			READY FOR REVIEW	CONSTRUCTION REVIEW REQUIREMENTS		READY FOR REVIEW	CONSTRUCTION AUDIT REQUIREMENT
INTEGRATION AND INNOVATION (2 prerequisites; 11 possible points)														
STRATEGY	II.P1	Integrated Design	Req	REQ	An IDT team has been formed and will meet a minimum of 2 times during the design process	Architect:	T	A	-		-	-		-
	II.P2	Educational Display	Req	REQ	Provide a permanent display of the school site - labeled with high performance features (Similar to what is in Willard Elem. School)	Architect:	T	-	CD		-	A		-
	II.C1	Demonstration Areas	1	-	To be determined	Other:	T	-	CD		-	A		-
	II.C2	Innovation	1-4	2	To be determined. POSSIBLE INTEGRATION OF LOCAL NATIVE AMERICAN ARTIFACT COLLECTION AS PART OF BUILDING INTEGRATED REGIONAL ECOLOGY EXHIBIT/EDUCATIONAL AREAS.	Other:	T	A	-		-	A		-
	II.C3	Life Cycle Cost Analysis	3	3	A lifecycle cost analysis will be performed to show the net present value of the major building systems over 30 years	Engineer:	T	A	-		-	-		-
	II.C4	School Garden	1	1	A designated school garden will be designed into the site	Other:	T	A	CD		T	-		CA
	II.C5	School Master Plan	1		To be determined. Master plan for CHPS would be easy - document future expansion potential and impacts on other MA-CHPS credits and a few other criteria.	Architect:	T	A	-		-	-		-
INDOOR ENVIRONMENTAL QUALITY (4 prerequisites; 26 possible points)														
	EQ.P1	HVAC Design - ASHRAE 62.1	Req	REQ	Design to meet ASHRAE 62.1-2004 Standards. AND Exhaust kitchen, janitorial closets, art rooms, copy/printer rooms (spec instr. for nat. vent.) AND any ductliners must meet ASTM C 1071 or UL 181 and ASTM C 1104 or C 209.		T	A	CD		T	-		-
	EQ.P2	Construction IAQ Management	Req	REQ	1. Develop a SMACNA IAQ plan for occupied buildings under construction.During construction, seal HVAC supply and return openings to protect them from dust infiltration. 2. Follow SMACNA guidelines "Duct Cleanliness for New Construction Guidelines." 3. Develop a plan for building flush out.	Architect:	T	-	CD		T	A		-
	EQ.P3	Pollutant and Chemical Source Control	Req	REQ	We can achieve this prerequisite by: • Locating housekeeping and copiers in rooms that are exhausted sufficiently, have floor to deck partitions and a self-closing door. Installing 2-part walk off floor mats at all exterior entrances, • Electronic ignition for all gas-fired equipment (except chemistry e.g.) • Air intakes 25 feet from exhaust/contaminants • No propane powered ride on equipment indoors (burnishers & polishers).	Architect:	T	A	CD		T	-		CA
	EQ.P4	Moisture Management	Req	REQ	• Surface grades will slope away from the building. Rain leaders will direct water away from the building, and condensate drainage will rely on gravity. • If a lawn irrigation system is to be used then it will not spray on the building. • Building material with the potential for developing mold and bacteria will be kept dry	Engineer:	T	-	CD		T	A		-
	EQ.P5	Minimum Filtration	Req	REQ	Replace all HVAC filtration media immediately prior to occupancy. Minimum filtration shall be MERV 10.	Engineer:	T	-	CD		T	-		CA
	EQ.P6	Thermal Comfort - ASHRAE 55	Req	REQ	Comply with ASHRAE standard 55-2004 for thermal comfort standards within established ranges per climate zone.	Engineer:	T	A	CD		-	-		-
	EQ.P7	View Windows, 70%	Req	REQ	Provide direct line of sight to view glazing from 70% of the combined floor area of classrooms and administration areas.	Architect:	T	-	CD		T	-		CA
	EQ.P8	Eliminate Glare	Req	REQ	Design classrooms to optimize daylight while preventing glare by controlling the sunlight ingress. • Documentation of credit requires modeling.	Architect:	T	A	CD		T	-		-

DESIGN	EQ.P9	Minimum Acoustical Performance	Req	REQ	Meet ANSI S12.60 for classrooms including 1) sound transmission classes, 2) impact insulation class of 50 and 3) Leq 45 dBA maximum for mechanical system background noise. REQUIRES ACOUSTIC CONSULTANT.	Architect:	T	A	CD		-	-		-
DESIGN	EQ.P10	Minimum Low Emitting Materials	Req	REQ	Specify low emitting adhesives and sealants that will meet the requirements for this credit. Must address: 1) Paints & Coatings and 2) Composite Wood and Agrifiber Products - does NOT INCLUDE plywood, panels, OSB, glue lam timber, pre-fab wood joists, and finger jointed lumber.	Architect:	T	A	CD		T	A		-
DESIGN	EQ.C1	View Windows, 80 – 90%	1-2	1	Provide direct line of sight to view glazing from 80-90% of the combined floor area of classrooms and administration areas. To be determined as design develops.	Architect:	-	-	-		-	-		-
DESIGN	EQ.C2	Daylighting in Classrooms	1-6	3	Optimize daylight while avoiding glare. Utilization of shading devices, light shelves orientation anticipated. Classrooms to be designed so that a minimum of 75% meet criteria. Additional pts for admin office area +library, café., auditorium, and multi-purpose common areas.	Architect:	T	-	CD		T	-		CA
	EQ.C3	Advanced Low-Emitting Materials	1-4	2	1. All adhesives and sealants products described in this credit shall meet the VOC content requirements of SCAQMD .2 Flooring systems will meet low VOC requirements. 3. Ceiling and wall systems will meet low VOC requirements. 4. Furniture may be able to meet low VOC requirements?	Architect:	T	-	CD		T	-		CA
	EQ.C4	Ducted Returns	1	1	HVAC returns will be installed in all occupied spaces to avoid dust and microbial growth issues	Engineer:	T	-	CD		T	-		-
	EQ.C5	Enhanced Filtration	1	-	May not be able to achieve this credit	Other:	T	-	CD		T	-		CA
	EQ.C6	Post-Construction IAQ	1	1	HEPA vacuum prior to substantial completion and replace all filters with MERV 10 filters prior to flush out.	Contractor:	T	A	CD		T	-		-
	EQ.C7	Enhanced Acoustical Performance	1-4	1	1. Max. 1.5 seconds of reverberation time in classroom 2. Possibly obtain background noise level of 35 dba in unoccupied classrooms. 3. Commissioning testing of background noise **REQUIRES ACOUSTIC CONSULTANT.**	Architect:	T	-	CD		T	-		CA
	EQ.C8	Controllability of Systems	1-2	2	1. 90% of all classrooms shall have a minimum of one operable window per classroom.. 2.Provide temperature and lighting controls for each classroom.	Architect:	T	-	CD		T	-		CA
	EQ.C9	Duct Access & Cleaning	1	1	Access doors for cleaning all supply and return ducts and execute a plan for post occupancy cleaning	Engineer:	T	-	CD		T	-		CA
	EQ.C10	Electric Lighting	1	1	Multi scene indirect/direct lighting for all classrooms, system will operate in two modes: general illumination at 35-50 foot candles and A/V mode at 10-20 foot candles, Indirect mode lighting to provide at least two levels of uniform lighting both at night and when daylit. DESIGN WILL MAXIMIZE CAPTURED DAYLIGHTING AND DAYLIGHT SENSORS/CONTROLS.	Engineer:	T	A	CD		T	-		CA
ENERGY (3 prerequisites; 36 possible points; minimum 2 points required)																
	EE.P1	Minimum Energy Performance	Req	REQ	Building design shall meet or exceed ASHRAE Standard 90.1-2007. Verified through energy modeling.	Engineer:	T	A	CD		T	-		-
	EE.P2	Commissioning	Req	REQ	MSBA shall engage a Commissioning agent for review of construction documents and to develop a commissioning plan, and verify functional performance. PROJECT WILL INCLUDE BUILDING ENVELOPE COMMISSIONING.	Commissioning Agent:	T	A	CD		T	A		-
	EE.P3	Facility Staff & Occupant Training	Req	REQ	The facility staff will receive training and operation and maintenance documentation on the building systems. The teachers and staff will receive training on the operation of lighting, heating and cooling systems	Commissioning Agent:	T	A	-		T	-		-
DESIGN	EE.C1(A)	Superior Energy Performance (Performance Approach)	1-15	12	To achieve net zero, need 40% more efficient than current code. This credit can be achieved by demonstrating the high-energy performance (30% reduction) of the building through energy modeling. This is the integration of entire building systems including building envelope, lighting systems, day lighting, mechanical efficiency, energy recovery and resource reduction.	Engineer:	-	-	-		-	-		-
DESIGN	EE.C1(B)	Superior Energy Performance (Prescriptive Approach)	2-4	-			T	-	CD		T	-		-
DESIGN	EE.C2	Minimize Air Conditioning	1-3	-	Client wants full air conditioning not dehumidification. ALLOW FOR POSSIBILITY OF PARTIAL NATURAL VENTILATION SYSTEM.	Engineer:	T	-	CD		T	-		-

	EE.C3	Renewable Energy	1-12	2	Client wants PV systems on the ground and points are measured against total energy cost reductions, not just reductions in electricity consumption. ALLOW FOR POSSIBLE LARGER SCALE PV SYSTEM (COMBINED GROUND/BUILDING ARRAYS) IN CONJUNCTION WITH CMLP AND TOWNS.	Engineer:	T	A	CD		T	-		CA
	EE.C4	Plug Load Reduction & ENERGY STAR Equipment	1	1	School Committee to pass resolution to require only Energy Star appliances and equipment. Facilities will develop a plug load reduction plan to turn off devices when not in use.	Other:	T	A	CD		T	-		CA
	EE.C5	Energy Management System and Sub Metering	1-3	3	Install an energy management system (EMS) to monitor and trend the energy consumed by HVAC systems and Install a submetering system for lighting loads and plug loads		T	A	CD		T	A		-
	EE.C6	Flex Energy	1-2	2	An area will be dedicated to future photovoltaics. SEE EE.C3 COMMENTS; DESIGN WILL ALSO EXPLORE SYSTEMS INCLUDING ICE STORAGE, GAS FIRED CHILLERS, ETC.	Architect:	T	-	CD		-	-		-
WATER (2 prerequisite; 16 possible points)															
DESIGN	WE.P1	Irrigation System Performance on Recreational Fields	Req	REQ	Soil moisture meters to be installed at fields with irrigation systems	Engineer:	T	-	CD		T	-		CA
	WE.P2	Indoor Water Use Reduction, 20%	Req	REQ	This prerequisite can be achieved by using high efficiency plumbing fixtures, waterless urinals, and occupant sensors. Can also consider reuse of storm water or grey water for non potable applications.	Engineer:	T	-	CD		T	-		CA
	WE.C1	Indoor Water Use Reduction, 30-40%	1-3	1	This credit can be achieved by reducing the indoor water use through the use of water efficient plumbing fixtures.	Engineer:	-	-	-		-	-		-
	WE.C2	Reduce Potable Water Use for Sewage Conveyance	4	-	(T.B.D) This credit could achieved by reducing the flow of building sewage by 50% through the reduction of the use of potable water by using water efficient fixtures and rain catchment systems.	Engineer:	T	-	CD		T	-		CA
DESIGN	WE.C3	No Potable Water Use for Non-Recreational Landscaping Areas	3	3	No permanent irrigation systems for watering non-playing field landscaped areas will be provided. Drought resistant plants and grasses will be specified. Does not distinguish between use of potable or non potable water.	Engineer:	T	-	CD		T	-		CA
	WE.C4	Reduce Potable Water Use for Recreational Landscaping Areas	2	-	To be determined		T	-	CD		T	-		CA
	WE.C5	Irrigation System Commissioning	1	-	To be determined		T	A	CD		T	A		CA
	WE.C6	Water Management System	1-3	3	Install a water management system to monitor water use of all indoor and outdoor water uses. A full monitoring system would be preferable - must determine costs.	Engineer:	T	A	CD		T	-		CA
SITE (1 prerequisite; 16 possible points)															
DESIGN	SS.P1	Joint Use of Facilities and Parks	Req	REQ	School to be used by the community for meetings recreation and other municipal programs. Bathrooms available for interior joint use?	Architect:	T	A	CD		T	-		-
	SS.C1	Sustainable Site Selection	1-5	4	School grounds to remain as previously used. No change from public parkland, conservation land or water supply protection.	Engineer:	T	A	CD		T	-		-
DESIGN	SS.C2	Central Location / Smart Growth	1	1	Get recent application to Commonwealth Capital Program for 1 point.	Architect:	T	A	-		-	-		-
DESIGN	SS.C3	Reduced Building Footprint	1	1	Proposed building option has multiple levels and a smaller over all footprint than the existing school therefore increasing the availability of open land on the site	Architect:	T	-	-		-	-		-
	SS.C4	Building Layout & Microclimates	1	1	1. orientation of building, 4. Plant and protect existing deciduous trees to block summer sun and allow for winter gain.5. optimize cut and fill. 6. Create physical connection to bike path. 7. maximize area for on-site renewable energy	Architect:	T	A	CD		T	-		CA
	SS.C5	Public Transportation	1	-			T	A	-		-	-		-
	SS.C6	Pedestrian/Bike/Human Powered Transportation	2	-	To be determined by CCHS SBC	Architect:	T	A	CD		T	-		CA
	SS.C7	Parking Minimization	1	-			T	-	CD		T	-		CA
	SS.C8	Post-Construction Stormwater Management	1	1	Exceed MA stormwater standards by 25% for quantity reduction - Could be difficult to achieve - need information from civil engineers.	Engineer:	T	A	CD		T	-		CA
	SS.C9	Reduce Heat Islands – Landscaping	1	-	To be determined		T	-	CD		T	-		CA
	SS.C10	Reduce Heat Islands – Cool Roofs	1	1	Solar reflectance cool roof will be installed	Architect:	T	-	CD		T	-		CA
	SS.C11	Light Pollution Reduction	1	1	This credit can be achieved by using automatically controlled full cutoff light fixtures. Horizontal illumination on ground level must meet criteria light levels and fixtures must be energy efficient.	Engineer:	T	-	CD		T	-		CA

MATERIALS & WASTE MANAGEMENT (2 prerequisite; 14 possible points)																
DESIGN	MW.P1	Storage and Collection of Recyclables	Req	REQ	School shall meet local ordinances for recycling space, provide an easily accessible space that is dedicated to the separation of, collection and storage of materials for recycling, including a minimum for paper cardboard, glass, plastics, aluminum cans and metals	Architect:	T	A	CD		T	-		CA
	MW.P2	Minimum Construction Site Waste Management, 75%	Req	REQ	Recycle, reuse or salvage at least 75% by weight of non hazardous construction and demolition waste.	Contractor:	T	-	CD		T	A		-
	MW.C1	Minimum Construction Site Waste Management, 90%	1	1	Recycle an additional 15% of construction waste	Contractor:	-	-	-		-	-		-
	MW.C2	Single Attribute - Recycled Content Materials	1-2	1	Carpet, acoustical tile, ceramic tile, rubber floor, plastic toilet partitions, MDF, steel doors, structural steel, steel studs, steel decking, linoleum flooring, alum. Panels, alum. Windows, copper piping and flashing, CMU, HVAC, sheet metal, and gypsum board	Architect:	T	-	CD		T	-		CA
	MW.C3	Single Attribute - Rapidly Renewable Materials	1	1	Linoleum and Bio Tile Potential for bamboo flooring and paneling	Architect:	T	-	CD		T	-		CA
	MW.C4	Single Attribute - Certified Wood	1	-	Must bear Forest Stewardship Council label	Architect:	T	-	CD		T	-		CA
	MW.C5	Single Attribute - Regional Materials	1-2	1	Regional material such as concrete and gypsum wall board can purchased from local plants to meet this requirement. Include road base, too.	Architect:	T	-	CD		T	-		CA
	MW.C6	Material Re-Use	1	-			T	-	CD		T	-		CA
	MW.C7	Durable and Low Maintenance Flooring	1	1	Durable and low maintenance flooring will be specified for this project	Architect:	T	-	CD		-	-		CA
	MW.C8	Building Reuse – Exterior	1-4	-	Not applicable to CCHS project.		T	-	CD		T	-		CA
	MW.C9	Building Reuse – Interior	1	-	Not applicable to CCHS project.		T	-	CD		T	-		CA
OPERATIONS & MAINTENANCE (3 prerequisites; 9 possible points)																
PERFORMANCE	OM.P1	Maintenance Plan	Req	Req	School must create and maintain maintenance plan for all equipment and include its preventive and routine maintenance needs. Can use SchoolDude.com to meet requirement.	Other:	T	-	-		-	A		-
	OM.P2	Anti-Idling Measures	Req	Req	School will adopted a no idling policy that applies to all buses operating in the school zone. All vehicles required to limit idling to five minutes per M.G. L. Chapter 90 section 16A. Most of prereq should already be completed from Willard Elem.	Other:	T	-	-		-	A		-
	OM.P3	Green Cleaning	Req	Req	A Green Cleaning Maintenance Program will be developed by the school. Most of prereq should already be completed from Willard Elem project.	Other:	T	-	-		-	A		-
	OM.C1	Work Order and Maintenance Management System	1	1	The school shall purchase and use a computerized maintenance management system, CMMS. CCHS currently has system. School DUDE program could be used.	Other:	T	A	-		-	-		-
	OM.C2	Indoor Environmental Management	1-3	3	The school will implement EPA's tools for schools or an equal program OR could adopt IEQ program developed for Willard Elementary.	Other:	T	A	-		-	A		-
	OM.C3	Green Power	1	-	To be determined		T	A	-		-	-		-
	OM.C4	Climate Change Action: Diesel Bus Retrofit	1	-	To be determined		T	A	-		-	-		-
	OM.C5	Carbon Footprint Reporting	1	-	To be determined - could be an interesting teacher/student activity. DEFINITE INTEREST BY EFS FACULTY/STUDENTS AND TOWN GREEN TEAMS.		T	A	-		-	-		-
	OM.C6	Energy Benchmarking	3	3	Needs to occur as part of M&V of building	Other:	T	A	-		-	-		-
TOTAL POINTS POSSIBLE (127)				**68**												
50 points = MA-CHPS Verified Leader																

Collaborative for High Performance Schools (CHPS)

PROJECT APPLICATION: Concord Carlisle High School Option 14C

Based on the 2009 Edition

III. CHPS Scorecard

When your project is ready to be screened and reviewed, notify CHPS by faxing or emailing the registration form signed. On this scorecard, you should have placed a check mark in the "ready for review" column for the design review, and when it is time for the construction review for each prerequisite and credit claimed signifying that its template has been completed and that all supporting attachments and documents have been uploaded to your project CHPS website. Check with CHPS for alternative, equivalent submittals that may be acceptable.

***Key: T** -Template Required, **A** -Attachment Required, **CD** -Construction Document Required, **CA** - Construction Audit Requirement*

CHPS SECTION	CREDIT NUMBER	TITLE	POSSIBLE POINTS	POINTS CLAIMED	NOTES	TEAM MEMBER RESPONSIBLE	DESIGN REVIEW REQUIREMENTS			READY FOR REVIEW	CONSTRUCTION REVIEW REQUIREMENTS		READY FOR REVIEW	CONSTRUCTION AUDIT REQUIREMENT
INTEGRATION AND INNOVATION (2 prerequisites; 11 possible points)														
STRATEGY	II.P1	Integrated Design	Req	REQ	An IDT team has been formed and will meet a minimum of 2 times during the design process	Architect:	T	A	-		-	-		-
	II.P2	Educational Display	Req	REQ	Provide a permanent display of the school site - labeled with high performance features (Similar to what is in Willard Elem. School)	Architect:	T	-	CD		-	A		-
	II.C1	Demonstration Areas	1	-	To be determined	Other:	T	-	CD		-	A		-
	II.C2	Innovation	1-4	2	To be determined. POSSIBLE INTEGRATION OF LOCAL NATIVE AMERICAN ARTIFACT COLLECTION AS PART OF BUILDING INTEGRATED REGIONAL ECOLOGY EXHIBIT/EDUCATIONAL AREAS.	Other:	T	A	-		-	A		-
	II.C3	Life Cycle Cost Analysis	3	3	A lifecycle cost analysis will be performed to show the net present value of the major building systems over 30 years	Engineer:	T	A	-		-	-		-
	II.C4	School Garden	1	1	A designated school garden will be designed into the site	Other:	T	A	CD		T	-		CA
	II.C5	School Master Plan	1		To be determined. Master plan for CHPS would be easy - document future expansion potential and impacts on other MA-CHPS credits and a few other criteria.	Architect:	T	A	-		-	-		-
INDOOR ENVIRONMENTAL QUALITY (4 prerequisites; 26 possible points)														
	EQ.P1	HVAC Design - ASHRAE 62.1	Req	REQ	Design to meet ASHRAE 62.1-2004 Standards. AND Exhaust kitchen, janitorial closets, art rooms, copy/printer rooms (spec instr. for nat. vent.) AND any ductliners must meet ASTM C 1071 or UL 181 and ASTM C 1104 or C 209.		T	A	CD		T	-		-
	EQ.P2	Construction IAQ Management	Req	REQ	1. Develop a SMACNA IAQ plan for occupied buildings under construction.During construction, seal HVAC supply and return openings to protect them from dust infiltration. 2. Follow SMACNA guidelines "Duct Cleanliness for New Construction Guidelines." 3. Develop a plan for building flush out.	Architect:	T	-	CD		T	A		-
	EQ.P3	Pollutant and Chemical Source Control	Req	REQ	We can achieve this prerequisite by: • Locating housekeeping and copiers in rooms that are exhausted sufficiently, have floor to deck partitions and a self-closing door. Installing 2-part walk off floor mats at all exterior entrances, • Electronic ignition for all gas-fired equipment (except chemistry e.g.) • Air intakes 25 feet from exhaust/contaminants • No propane powered ride on equipment indoors (burnishers & polishers).	Architect:	T	A	CD		T	-		CA
	EQ.P4	Moisture Management	Req	REQ	• Surface grades will slope away from the building. Rain leaders will direct water away from the building, and condensate drainage will rely on gravity. • If a lawn irrigation system is to be used then it will not spray on the building. • Building material with the potential for developing mold and bacteria will be kept dry	Engineer:	T	-	CD		T	A		-
	EQ.P5	Minimum Filtration	Req	REQ	Replace all HVAC filtration media immediately prior to occupancy. Minimum filtration shall be MERV 10.	Engineer:	T	-	CD		T	-		CA
	EQ.P6	Thermal Comfort - ASHRAE 55	Req	REQ	Comply with ASHRAE standard 55-2004 for thermal comfort standards within established ranges per climate zone.	Engineer:	T	A	CD		-	-		-
	EQ.P7	View Windows, 70%	Req	REQ	Provide direct line of sight to view glazing from 70% of the combined floor area of classrooms and administration areas.	Architect:	T	-	CD		T	-		CA
	EQ.P8	Eliminate Glare	Req	REQ	Design classrooms to optimize daylight while preventing glare by controlling the sunlight ingress. • Documentation of credit requires modeling.	Architect:	T	A	CD		T	-		-

DESIGN	EQ.P9	Minimum Acoustical Performance	Req	REQ	Meet ANSI S12.60 for classrooms including 1) sound transmission classes, 2) impact insulation class of 50 and 3) Leq 45 dBA maximum for mechanical system background noise. REQUIRES ACOUSTIC CONSULTANT.	Architect:	T	A	CD		-	-		-
DESIGN	EQ.P10	Minimum Low Emitting Materials	Req	REQ	Specify low emitting adhesives and sealants that will meet the requirements for this credit. Must address: 1) Paints & Coatings and 2) Composite Wood and Agrifiber Products - does NOT INCLUDE plywood, panels, OSB, glue lam timber, pre-fab wood joists, and finger jointed lumber.	Architect:	T	A	CD		T	A		-
DESIGN	EQ.C1	View Windows, 80 – 90%	1-2	1	Provide direct line of sight to view glazing from 80-90% of the combined floor area of classrooms and administration areas. To be determined as design develops.	Architect:	-	-	-		-	-		-
DESIGN	EQ.C2	Daylighting in Classrooms	1-6	3	Optimize daylight while avoiding glare. Utilization of shading devices, light shelves orientation anticipated. Classrooms to be designed so that a minimum of 75% meet criteria. Additional pts for admin office area +library, café., auditorium, and multi-purpose common areas.	Architect:	T	-	CD		T	-		CA
	EQ.C3	Advanced Low-Emitting Materials	1-4	2	1. All adhesives and sealants products described in this credit shall meet the VOC content requirements of SCAQMD .2 Flooring systems will meet low VOC requirements. 3. Ceiling and wall systems will meet low VOC requirements. 4. Furniture may be able to meet low VOC requirements?	Architect:	T	-	CD		T	-		CA
	EQ.C4	Ducted Returns	1	1	HVAC returns will be installed in all occupied spaces to avoid dust and microbial growth issues	Engineer:	T	-	CD		T	-		-
	EQ.C5	Enhanced Filtration	1	-	May not be able to achieve this credit	Other:	T	-	CD		T	-		CA
	EQ.C6	Post-Construction IAQ	1	1	HEPA vacuum prior to substantial completion and replace all filters with MERV 10 filters prior to flush out.	Contractor:	T	A	CD		T	-		-
	EQ.C7	Enhanced Acoustical Performance	1-4	1	1. Max. 1.5 seconds of reverberation time in classroom 2. Possibly obtain background noise level of 35 dba in unoccupied classrooms. 3. Commissioning testing of background noise **REQUIRES ACOUSTIC CONSULTANT.**	Architect:	T	-	CD		T	-		CA
	EQ.C8	Controllability of Systems	1-2	2	1. 90% of all classrooms shall have a minimum of one operable window per classroom.. 2.Provide temperature and lighting controls for each classroom.	Architect:	T	-	CD		T	-		CA
	EQ.C9	Duct Access & Cleaning	1	1	Access doors for cleaning all supply and return ducts and execute a plan for post occupancy cleaning	Engineer:	T	-	CD		T	-		CA
	EQ.C10	Electric Lighting	1	1	Multi scene indirect/direct lighting for all classrooms, system will operate in two modes: general illumination at 35-50 foot candles and A/V mode at 10-20 foot candles, Indirect mode lighting to provide at least two levels of uniform lighting both at night and when daylit. DESIGN WILL MAXIMIZE CAPTURED DAYLIGHTING AND DAYLIGHT SENSORS/CONTROLS.	Engineer:	T	A	CD		T	-		CA
ENERGY (3 prerequisites; 36 possible points; minimum 2 points required)																
	EE.P1	Minimum Energy Performance	Req	REQ	Building design shall meet or exceed ASHRAE Standard 90.1-2007. Verified through energy modeling.	Engineer:	T	A	CD		T	-		-
	EE.P2	Commissioning	Req	REQ	MSBA shall engage a Commissioning agent for review of construction documents and to develop a commissioning plan, and verify functional performance. PROJECT WILL INCLUDE BUILDING ENVELOPE COMMISSIONING.	Commissioning Agent:	T	A	CD		T	A		-
	EE.P3	Facility Staff & Occupant Training	Req	REQ	The facility staff will receive training and operation and maintenance documentation on the building systems. The teachers and staff will receive training on the operation of lighting, heating and cooling systems	Commissioning Agent:	T	A	-		T	-		-
DESIGN	EE.C1(A)	Superior Energy Performance (Performance Approach)	1-15	12	To achieve net zero, need 40% more efficient than current code. This credit can be achieved by demonstrating the high-energy performance (30% reduction) of the building through energy modeling. This is the integration of entire building systems including building envelope, lighting systems, day lighting, mechanical efficiency, energy recovery and resource reduction.	Engineer:	-	-	-		-	-		-
DESIGN	EE.C1(B)	Superior Energy Performance (Prescriptive Approach)	2-4	-			T	-	CD		T	-		-
DESIGN	EE.C2	Minimize Air Conditioning	1-3	-	Client wants full air conditioning not dehumidification. ALLOW FOR POSSIBILITY OF PARTIAL NATURAL VENTILATION SYSTEM.	Engineer:	T	-	CD		T	-		-

	EE.C3	Renewable Energy	1-12	2	Client wants PV systems on the ground and points are measured against total energy cost reductions, not just reductions in electricity consumption. ALLOW FOR POSSIBLE LARGER SCALE PV SYSTEM (COMBINED GROUND/BUILDING ARRAYS) IN CONJUNCTION WITH CMLP AND TOWNS.	Engineer:	T	A	CD		T	-		CA
	EE.C4	Plug Load Reduction & ENERGY STAR Equipment	1	1	School Committee to pass resolution to require only Energy Star appliances and equipment. Facilities will develop a plug load reduction plan to turn off devices when not in use.	Other:	T	A	CD		T	-		CA
	EE.C5	Energy Management System and Sub Metering	1-3	3	Install an energy management system (EMS) to monitor and trend the energy consumed by HVAC systems and Install a submetering system for lighting loads and plug loads		T	A	CD		T	A		-
	EE.C6	Flex Energy	1-2	2	An area will be dedicated to future photovoltaics. SEE EE.C3 COMMENTS; DESIGN WILL ALSO EXPLORE SYSTEMS INCLUDING ICE STORAGE, GAS FIRED CHILLERS, ETC.	Architect:	T	-	CD		-	-		-
WATER (2 prerequisite; 16 possible points)															
DESIGN	WE.P1	Irrigation System Performance on Recreational Fields	Req	REQ	Soil moisture meters to be installed at fields with irrigation systems	Engineer:	T	-	CD		T	-		CA
	WE.P2	Indoor Water Use Reduction, 20%	Req	REQ	This prerequisite can be achieved by using high efficiency plumbing fixtures, waterless urinals, and occupant sensors. Can also consider reuse of storm water or grey water for non potable applications.	Engineer:	T	-	CD		T	-		CA
	WE.C1	Indoor Water Use Reduction, 30-40%	1-3	1	This credit can be achieved by reducing the indoor water use through the use of water efficient plumbing fixtures.	Engineer:	-	-	-		-	-		-
	WE.C2	Reduce Potable Water Use for Sewage Conveyance	4	-	(T.B.D) This credit could achieved by reducing the flow of building sewage by 50% through the reduction of the use of potable water by using water efficient fixtures and rain catchment systems.	Engineer:	T	-	CD		T	-		CA
DESIGN	WE.C3	No Potable Water Use for Non-Recreational Landscaping Areas	3	3	No permanent irrigation systems for watering non-playing field landscaped areas will be provided. Drought resistant plants and grasses will be specified. Does not distinguish between use of potable or non potable water.	Engineer:	T	-	CD		T	-		CA
	WE.C4	Reduce Potable Water Use for Recreational Landscaping Areas	2	-	To be determined		T	-	CD		T	-		CA
	WE.C5	Irrigation System Commissioning	1	-	To be determined		T	A	CD		T	A		CA
	WE.C6	Water Management System	1-3	3	Install a water management system to monitor water use of all indoor and outdoor water uses. A full monitoring system would be preferable - must determine costs.	Engineer:	T	A	CD		T	-		CA
SITE (1 prerequisite; 16 possible points)															
DESIGN	SS.P1	Joint Use of Facilities and Parks	Req	REQ	School to be used by the community for meetings recreation and other municipal programs. Bathrooms available for interior joint use?	Architect:	T	A	CD		T	-		-
	SS.C1	Sustainable Site Selection	1-5	4	School grounds to remain as previously used. No change from public parkland, conservation land or water supply protection.	Engineer:	T	A	CD		T	-		-
DESIGN	SS.C2	Central Location / Smart Growth	1	1	Get recent application to Commonwealth Capital Program for 1 point.	Architect:	T	A	-		-	-		-
DESIGN	SS.C3	Reduced Building Footprint	1	1	Proposed building option has multiple levels and a smaller over all footprint than the existing school therefore increasing the availability of open land on the site	Architect:	T	-	-		-	-		-
	SS.C4	Building Layout & Microclimates	1	1	1. orientation of building, 4. Plant and protect existing deciduous trees to block summer sun and allow for winter gain.5. optimize cut and fill. 6. Create physical connection to bike path. 7. maximize area for on-site renewable energy	Architect:	T	A	CD		T	-		CA
	SS.C5	Public Transportation	1	-			T	A	-		-	-		-
	SS.C6	Pedestrian/Bike/Human Powered Transportation	2	-	To be determined by CCHS SBC	Architect:	T	A	CD		T	-		CA
	SS.C7	Parking Minimization	1	-			T	-	CD		T	-		CA
	SS.C8	Post-Construction Stormwater Management	1	1	Exceed MA stormwater standards by 25% for quantity reduction - Could be difficult to achieve - need information from civil engineers.	Engineer:	T	A	CD		T	-		CA
	SS.C9	Reduce Heat Islands – Landscaping	1	-	To be determined		T	-	CD		T	-		CA
	SS.C10	Reduce Heat Islands – Cool Roofs	1	1	Solar reflectance cool roof will be installed	Architect:	T	-	CD		T	-		CA
	SS.C11	Light Pollution Reduction	1	1	This credit can be achieved by using automatically controlled full cutoff light fixtures. Horizontal illumination on ground level must meet criteria light levels and fixtures must be energy efficient.	Engineer:	T	-	CD		T	-		CA

MATERIALS & WASTE MANAGEMENT (2 prerequisite; 14 possible points)																
DESIGN	MW.P1	Storage and Collection of Recyclables	Req	REQ	School shall meet local ordinances for recycling space, provide an easily accessible space that is dedicated to the separation of, collection and storage of materials for recycling, including a minimum for paper cardboard, glass, plastics, aluminum cans and metals	Architect:	T	A	CD		T	-		CA
	MW.P2	Minimum Construction Site Waste Management, 75%	Req	REQ	Recycle, reuse or salvage at least 75% by weight of non hazardous construction and demolition waste.	Contractor:	T	-	CD		T	A		-
	MW.C1	Minimum Construction Site Waste Management, 90%	1	1	Recycle an additional 15% of construction waste	Contractor:	-	-	-		-	-		-
	MW.C2	Single Attribute - Recycled Content Materials	1-2	1	Carpet, acoustical tile, ceramic tile, rubber floor, plastic toilet partitions, MDF, steel doors, structural steel, steel studs, steel decking, linoleum flooring, alum. Panels, alum. Windows, copper piping and flashing, CMU, HVAC, sheet metal, and gypsum board	Architect:	T	-	CD		T	-		CA
	MW.C3	Single Attribute - Rapidly Renewable Materials	1	1	Linoleum and Bio Tile Potential for bamboo flooring and paneling	Architect:	T	-	CD		T	-		CA
	MW.C4	Single Attribute - Certified Wood	1	-	Must bear Forest Stewardship Council label	Architect:	T	-	CD		T	-		CA
	MW.C5	Single Attribute - Regional Materials	1-2	1	Regional material such as concrete and gypsum wall board can purchased from local plants to meet this requirement. Include road base, too.	Architect:	T	-	CD		T	-		CA
	MW.C6	Material Re-Use	1	-			T	-	CD		T	-		CA
	MW.C7	Durable and Low Maintenance Flooring	1	1	Durable and low maintenance flooring will be specified for this project	Architect:	T	-	CD		-	-		CA
	MW.C8	Building Reuse – Exterior	1-4	-	Not applicable to CCHS project.		T	-	CD		T	-		CA
	MW.C9	Building Reuse – Interior	1	-	Not applicable to CCHS project.		T	-	CD		T	-		CA
OPERATIONS & MAINTENANCE (3 prerequisites; 9 possible points)																
PERFORMANCE	OM.P1	Maintenance Plan	Req	Req	School must create and maintain maintenance plan for all equipment and include its preventive and routine maintenance needs. Can use SchoolDude.com to meet requirement.	Other:	T	-	-		-	A		-
	OM.P2	Anti-Idling Measures	Req	Req	School will adopted a no idling policy that applies to all buses operating in the school zone. All vehicles required to limit idling to five minutes per M.G. L. Chapter 90 section 16A. Most of prereq should already be completed from Willard Elem.	Other:	T	-	-		-	A		-
	OM.P3	Green Cleaning	Req	Req	A Green Cleaning Maintenance Program will be developed by the school. Most of prereq should already be completed from Willard Elem project.	Other:	T	-	-		-	A		-
	OM.C1	Work Order and Maintenance Management System	1	1	The school shall purchase and use a computerized maintenance management system, CMMS. CCHS currently has system. School DUDE program could be used.	Other:	T	A	-		-	-		-
	OM.C2	Indoor Environmental Management	1-3	3	The school will implement EPA's tools for schools or an equal program OR could adopt IEQ program developed for Willard Elementary.	Other:	T	A	-		-	A		-
	OM.C3	Green Power	1	-	To be determined		T	A	-		-	-		-
	OM.C4	Climate Change Action: Diesel Bus Retrofit	1	-	To be determined		T	A	-		-	-		-
	OM.C5	Carbon Footprint Reporting	1	-	To be determined - could be an interesting teacher/student activity. DEFINITE INTEREST BY EFS FACULTY/STUDENTS AND TOWN GREEN TEAMS.		T	A	-		-	-		-
	OM.C6	Energy Benchmarking	3	3	Needs to occur as part of M&V of building	Other:	T	A	-		-	-		-
TOTAL POINTS POSSIBLE (127)				**68**												
50 points = MA-CHPS Verified Leader																

LEED 2009 for Schools New Construction and Major Renovations
Project Scorecard

Project Name: Concord-Carlisle High School Options 6R2, 14B and 14C
Project Address:

Yes	?	No			
10	5	9	**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			
5	4	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			
23	10	2	**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
15	4		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

LEED 2009 for Schools New Construction and Major Renovations
Project Scorecard

Project Name: Concord-Carlisle High School Options 6R2, 14B and 14C
Project Address:

Yes	?	No				
				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
				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
4	3		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	2		Credit 5	Measurement and Verification		2
		2	Credit 6	Green Power		2

Yes	?	No		
4	4	5	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
		2	Credit 3	Materials Reuse	1 to 2
				5% Reuse	1
				10% Reuse	2
1	1		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

LEED 2009 for Schools New Construction and Major Renovations
Project Scorecard

Project Name: Concord-Carlisle High School Options 6R2, 14B and 14C
Project Address:

Yes	?	No				
12	5	2	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
4			Credit 4	Low-Emitting Materials		Up to 4
					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	1	1	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				
5	1		INNOVATION IN DESIGN			6 Points
4			Credit 1	Innovation in Design		1 to 4
					Innovation or Exemplary Performance- MRc2 -Construction Waste Management	1
					Innovation or Exemplary Performance - EBOM EQc3.6 Indoor Integrated Pest Mngmt	1
					Innovation or Exemplary Performance - Green Educational Signage	1
					Innovation - Green Housekeeping	1
1			Credit 2	LEED® Accredited Professional		1
	1		Credit 3	School as a Teaching Tool		1
Yes	?	No				
1	2	1	REGIONAL PRIORITY			4 Points
1	2	1	Credit 1	Regional Priority		1 to 4
					Regionally Defined Credit Achieved SSc2, SSc3, MRc1.1 - NA	1
					Regionally Defined Credit Achieved SSc6.2 - YES	1
					Regionally Defined Credit Achieved WEc2 - Depends on client decision ($)	1
					Regionally Defined Credit Achieved EAc2 - Depends on client decision ($)	1
Yes	?	No				
60	31	21	PROJECT TOTALS (Certification Estimates)			110 Points

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