Perkins Eastman

North Haven Middle School
Feasibility Report

team dtc

Submitted to:

Mr. Michael J. Freda
First Selectman
Town of North Haven
18 Church Street
North Haven, CT

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DIVERSIFIED TECHNOLOGY CONSULTANTS
PERKINS EASTMAN ARCHITECTS

Table of Contents

1.0 Executive Summary
- 1.1. Introduction
- 1.2. Scope of Feasibility Report
- 1.3. Feasibility Report Team

2.0 Existing Middle School Evaluation
- 2.1. Introduction – Scope of Evaluation Report
- 2.2. Applicable Codes
- 2.3. Description of the Existing Facility
  - 2.3.1. Building Envelope
  - 2.3.2. Classroom Wings, Educational Occupancy
  - 2.3.3. Assembly Area Occupancies
  - 2.3.4. Building Interior Finishes
  - 2.3.5. Accessibility
  - 2.3.6. Asbestos Management and Hazardous Materials
- 2.4. Site/Civil Evaluation
  - 2.4.1. Vehicular Circulation
  - 2.4.2. Athletic Fields
- 2.5. Structural Evaluation
- 2.6. Existing MEP Systems Evaluation
  - 2.6.1. Mechanical System
  - 2.6.2. Electrical System
  - 2.6.3. Plumbing Systems
  - 2.6.4. Fire Protection System
  - 2.6.5. M/E/P/FP Existing Systems Summary
- 2.7. Code Compliance Review
- 2.8. Summary
- 2.9. Drawings
  - 2.9.1. Existing Building Drawings
  - 2.9.2. Firm Flood Insurance Rate Map
  - 2.9.3. Zoning Map

3.0 Existing Gateway/Orchard Hill School Evaluation
- 3.1. Introduction – Scope of Evaluation Report
- 3.2. Applicable Codes
- 3.3. Description of the Existing Facility
  - 3.3.1. Building Envelope
  - 3.3.2. Classroom Wings, Educational Occupancy
  - 3.3.3. Assembly Area Occupancies
  - 3.3.4. Building Interior Finishes
  - 3.3.5. Accessibility
  - 3.3.6. Asbestos Management
- 3.4. Site/Civil Evaluation
  - 3.4.1. Vehicular Circulation
  - 3.4.2. Athletic Fields
- 3.5. Structural Evaluation
- 3.6. Existing MEP Systems Evaluation
  - 3.6.1. Mechanical System
  - 3.6.2. Electrical System
  - 3.6.3. Plumbing Systems
  - 3.6.4. Fire Protection System
  - 3.6.5. M/E/P/FP Existing Systems Summary
- 3.7. Code Compliance Review
- 3.8. Summary
- 3.9. Drawings
  - 3.9.1. Existing Building Drawings
  - 3.9.2. Firm Flood Insurance Rate Map
  - 3.9.3. Zoning Map

4.0 Architectural Program
- 4.0 Executive Summary
- 4.1. Building Organizational Outline
- 4.2. Ed Spec - Built Environment Goals
- 4.3. Site Planning Principles
- 4.4. Facility Architectural Program
- 4.5. Adjacency Diagrams
- 4.6. Engineering & Sustainability Requirements
- 4.7. Space Specific Requirements

5.0 Concept Design – Option 1: Existing Middle School-Renovate as New
- 5.1. Building Design Narrative
- 5.2. Site/Civil Improvements
- 5.3. Structural Systems
- 5.4. Heating, Ventilating, & Air Conditioning Systems
- 5.5. Electrical, Technology and Security Systems
- 5.6. Plumbing & Fire Protection Systems
- 5.7. Proposed Phasing Plan
- 5.8. Advantages, Disadvantages and Remarks
- 5.9. Proposed Site Design Layout
- 5.10. Proposed Architectural Floor Plan

6.0 Concept Design – Option 2: Existing Gateway/Orchard Hill-Renovate as New
- 6.1. Building Design Narrative
- 6.2. Site/Civil Improvements
- 6.3. Structural Systems
- 6.4. Heating, Ventilating, & Air Conditioning Systems
- 6.5. Electrical, Technology and Security Systems
- 6.6. Plumbing & Fire Protection Systems
- 6.7. Proposed Phasing Plan
- 6.8. Gateway Property Conveyance Summary
- 6.9. Advantages, Disadvantages and Remarks
- 6.10. Proposed Site Design Layout
- 6.11. Proposed Architectural Floor Plan

7.0 Concept Design – Option 3: New School Fronting Bailey Road
- 7.1. Building Design Narrative
- 7.2. Site/Civil Improvements
- 7.3. Structural Systems
- 7.4. Heating, Ventilating, & Air Conditioning Systems
- 7.5. Electrical, Technology and Security Systems
- 7.6. Plumbing & Fire Protection Systems
- 7.7. Proposed Phasing Plan
- 7.8. Advantages, Disadvantages and Remarks
- 7.9. Proposed Site Design Layout
- 7.10. Proposed Architectural Floor Plan
- 7.11. Conceptual Design Illustrations

8.0 Estimating / Cost Report
- 8.1. Option 1 Estimate of Proposed Renovation – North Haven Middle School
- 8.2. Option 2 Estimate of Proposed Renovation-Gateway/Orchard Hill
- 8.3. Option 3 Estimate of Proposed New Building
- 8.4. Option 3B Estimate of Proposed New Building – Unitized Construction
- 8.5. Conceptual Budget Summaries

9.0 Sustainable Design/CT High performance/LEED

10.0 State Reimbursement Analysis

11.0 Report Summary

12.0 Document Limitations and Qualifications

13.0 Appendix
- 13.1. Unitized School Construction Information
- 13.2. Guidelines for Determining Eligibility of School Construction Projects
- 13.3. ASHRAE Life Expectancy Table
- 13.4. NHMS Assessor's Property Card
- 13.5. Gateway/Orchard Hill Assessor's Property Card
- 13.6. 86 Bassett Road (Ball Fields) Assessor's Property Card
- 13.7. PCB Remediation Information

1.1 Introduction:

The existing North Haven Middle School facility was constructed in 1960. This public school building has educated over 42,000 North Haven children for over half a century. Many elements of the building and grounds are in need of refurbishment or replacement due to age. Additionally, current technologies for energy efficiency and delivery systems are needed to serve the facility over the next half century.

To this end, the Town of North Haven has requested a team of Architects and Building Engineers to investigate the condition of North Haven's 53-year-old Middle School and study cost effective measures to address this issue.

1.2 Scope of the Feasibility Report:

This report will evaluate the condition of the existing North Haven Middle School and assess its suitability to renovate to an "as new" facility; the condition of the existing Gateway/Orchard Hill school facility and its potential for renovation "as new"; and the portion of the existing Middle School property fronting Bailey Road for suitability to serve the program defined for construction of a new Middle School and athletic fields.

1.3 Feasibility Report Team:

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2.1 Introduction and Scope of Evaluation Report

This report will evaluate the existing North Haven Middle School building and site for code compliance, building condition and compliance with health, safety, welfare, and building accessibility requirements as determined by applicable Codes and the Connecticut State Statutes. Please see section 2.7 for a detailed code compliance analysis.

This report is a summary of an investigation of the existing Middle School building and campus at 55 Bailey Avenue in North Haven, Connecticut. The investigation team evaluated the existing facility for the purposes of determining whether this property is appropriate for a renovate "as-new" school facility.

2.2 Applicable Codes

The following is a listing of applicable Codes within the Jurisdiction of the work.

- 2005 Connecticut Building Code / IBC 2003
- IBC-International Building Code (2003) w/2004 CT Amendments
- 2005 IBC w/Connecticut Supplements
- 2003 International Existing Building Code
- ICC/ANSI A117.1/2003 Accessible and Usable Buildings and Facilities
- Americans with Disabilities Act 1988 (ADA)
- Connecticut Department of Public Health Code
- State of Connecticut Fire Safety Code Guidebook-2005
- International Energy Conservation Code 2006
- International Mechanical Code 2003
- International Plumbing Code 2003
- 2005 National Electric Code, NFPA 70-2005

The 2005 Connecticut State Building Code incorporates the 2004, 2005 Connecticut Supplements and the 2009 Amendments with additions and deletions into the language of the 2003 International Building Code. The officially adopted 2005 State Building Code consists of the regular designated Section 29-252id together with all referenced Codes and Standards collectively known as the Connecticut State Building Code-2005 with the CT supplement adopted by the Commissioner of Public Safety under the authority of Section 290252 of the CT General Statues, the effective date of the regulations is December 31, 2005 and shall apply to all building Permits applied on or after this date.

Under guidelines promulgated by the State Department of Construction Services, the existing facility may be renovated to a "like-new" status, any and all of the existing non conforming building elements that are currently "grandfathered-in" must be brought up to current codes.

2.3 Description of the Existing Facility

The existing building is approximately 142,209 gross square feet. Built in 1960 as a Junior High School, it later became one of two high school campuses. It now houses the three middle grades (6-8). The physical building is a neighbor to the North Haven High School (grades 9-12) on the same property. The schools share the campus with separate driveway entrances, one connecting access driveway, a ¼-mile running track and athletic fields and bleachers. The building was designed and constructed prior to the building code requiring compliance with the ADA accessibility law.

In the 1980's, several additions and renovations occurred. Classrooms D1, D2 and D3, the library, media center, computer labs, black-box theater, administrative, guidance and faculty lounge re-configurations were added. Many code upgrades also occurred: multiple compartmentalizing smoke doors added, wheelchair access provided to many areas, toilet room upgrades, and the addition of accessible directional signage.

The 2012 report 'North Haven Public Schools Enrollment Projected to 2021' The indicates the current enrollment of 841 will decline to 599 students by 2021, and an 8 year peak of 784 students for a construction grant application.

The building has two separate cafeterias with ample seating, a large and a small gymnasium, and an auditorium that seats 475. Each core teacher and teachers of special education have their own classroom. World Language, Reading and Unified Arts teachers also have their own classrooms. The library and the two computer labs provide supplemental information, materials and equipment for instructional use; and all three resource areas are reserved by teachers and used daily.

This evaluation describes the existing conditions of the building envelope, the detailed use-group specific areas of the building, the building interior finishes, accessibility, site layout and building systems.

View of existing Middle School

2.3.1 Building Envelope

The exterior envelope is brick cavity wall with concrete masonry unit back-up walls on the interior. This type of wall construction is ideal for a weatherproof enclosure, maintenance and thermal properties. There are spotty efflorescence minerals leaching from the brick, indicating unfavorable water absorption. The perimeter fenestration consists almost entirely of a storefront window system with operable hopper sashes. The window sill sits on a brick knee wall with its head terminating at the underside of a steel header supporting a tectum roof deck. This steel header is exposed to the exterior and interior with no thermal break, therefore exterior temperatures migrate directly through it. Additionally, there is a gap between the fluted deck and the top flange of the steel header. This gap is insufficiently filled with an unknown type of friable thermal insulation (may contain asbestos), with a wood fascia on the exterior.

The existing fenestration has an innovative retrofitted double pane window system set within the existing frames. This occurs at a majority of the existing fenestration openings. However, the aluminum frames are not thermally broken and the anodized coating is pitted and chalky. There are some existing, non-retrofitted single pane windows at the cafeteria and two gymnasiums clerestories.

The existing roof deck is flat with a modified built-up bituminous membrane (vintage approx 1970), and presumably tapered rigid insulation pitched to interior drain and leader systems. The membrane has many surface cracks, with visible deterioration and organic growth. Ponding due to improper drainage is evident, many leaks are reportedly occurring inside the building. The investigation team observed many water stained ceiling and floor tiles in the building. Modified built-up bituminous membrane roofs have a life span of 30-35 years, which indicates that the membrane has reached the end of its useable life.

Building Envelope Summary

- Brick displays evidence of unfavorable water intrusion
- Gaps and thermal bridges in the fenestration system contribute to heat loss
- Suspect insulation material may contain asbestos
- Failing finishes (pits and chalk) on window frames
- Multi-modal failure of roof membrane (cracks, leaks, ponding and vegetation)

Typical exterior wall with window

Single pane windows at clerestories

Existing roof condition, ponding

Detailed Use-Group Areas

2.3.2 Classroom Wings, Education Occupancy

The classroom portions of the building have long span steel column bays, infilled with concrete block partitions and bar joist roof framing with a tectum paneled deck. The concrete slab on grade appears to be in good condition. There does not appear to be an existing underslab waste pipe (except at toilet rooms).

The science labs there do not appear to have underslab power or data distribution systems. There are several classroom standard sizes; classroom-A is 784 net sq. ft., classroom-B is 952 net sq. ft. and classroom-C is 1,288 net sq. ft., which are primarily science classrooms with lab-stations. The existing classrooms are undersized according to the requirements specified in the Ed Spec.

The science labs consist of a mixture of original antiquated lab stations and others renovated and/or added in the late 1980's. Both have exposed surface supplied gas and water pipe, and questionable utility connections at the lab tables and sinks. The casework at the renovated labs is in good condition. The casework in the original labs is in fair condition, but missing much of its hardware and showing signs of significant age. There are no fume hoods in any of the science labs, however there are emergency wash-off stations. The lab prep rooms are small, and have very little storage for materials and equipment.

A suspended acoustical tile ceiling grid system was added to most portions of the building's classrooms and science labs. It is a 2x4 grid ceiling system with recessed fluorescent light fixtures and acrylic lenses. Many of the ceiling tiles have water stains, scuffs, bowed, and are deforming. Replacement of the ceiling grid is required throughout the building.

Existing Science Lab

Damaged materials from water infiltration

Classrooms Summary

- Labs lack underslab distribution for power and data
- Existing classrooms and labs do not meet size requirements in Education Specification
- Science labs do not have fume hoods
- Casework is antiquated and missing much of its hardware
- Science prep rooms are inadequate in size and storage capacity
- Suspended ceiling system is in poor condition and in need of replacement

Detailed Use-Group Areas

2.3.3 Assembly Area Occupancies

Cafeteria

The existing cafeteria has a central commercial kitchen with 2 flanking cafeteria seating areas of 2,933 and 2,523 sf. The cafeteria can accommodate up to 260 students in one seating. An outside food service vendor delivers prepared food daily. Therefore, the 2500 square foot commercial kitchen is significantly oversized for its current use.

Cafeteria Summary

- Adequate seating capacity
- Kitchen is oversized for a prepared food program

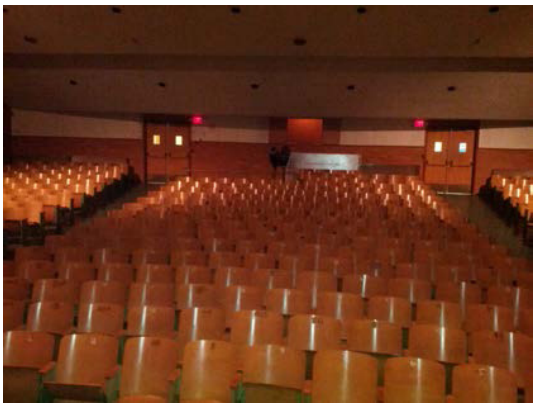
Existing Cafeteria

Gymnasiums

The school has two gymnasiums. The larger is 8000 square feet and the smaller is 4,640 square feet. Each has over 20 foot clearances to the underside of the roof structure. These indoor athletic facilities are well above the standard Middle School athletic, physical education, competitive sports and wellness curriculum requirements. There is currently an accessible route through the locker rooms with flush floor conditions, however clearances at doors and vestibules are inadequate for ADA requirements.

Gymnasium Summary

- Exceeds size requirements for Middle School athletics
- Does not meet accessibility standards



Existing Auditorium

Auditorium

There is space for clear wheelchair accessible spaces in the pit area or stage-front portion of the audience seating section. However, no accessible seating or companion seating is designated. There is no compliant accessible route from the seating area to the stage without leaving the auditorium and entering the stage via a remote but adjacent connecting corridor to the stage.

The acoustical qualities of the auditorium are lively (likely does not meet minimum acoustical standards for auditoriums: NC 20-30, STC 60, RT 60), negatively affecting the intelligibility of speech and performance. This is due to the presence of excessive reflective materials such as plywood and masonry, and insufficient sound absorptive materials. The auditorium finishes are in good condition. The stage and its performance equipment is compatible with middle school curriculum and the Ed Spec.

Auditorium Summary

- Does not meet accessibility standards
- Poor acoustics. Exhibits excessive reflection and reverberation. Lacks sufficient sound absorptive materials.

Detailed Use-Group Areas

Library Media Center and Technology Labs

The Library Media Center is an addition to the existing facility. The existing library stacks accommodate approximately 12,750 volumes. However, a collection size of 18 volumes per pupil (x800) for a total of 14,400 volumes is recommended.

Library Media Center Summary

- Lacks sufficient stack capacity

Existing Library

Interior Finishes

2.3.4 Building Interior Finishes

Corridor walls are constructed of 6" concrete masonry units faced with 2" glazed block that is in good condition. However, transitions from glazed to un-faced block are constructed with an awkward ¼" indentation.

Many floor finishes appear to be the original 9"x9" vinyl asbestos tile. This must be confirmed by testing the tile material and its mastic. The ceramic wall tiles and mosaic floor tiles in the toilet rooms, locker rooms and showers are in good condition.

All of the metal materials in the facility are dented and chipped; hall lockers and the perimeter mechanical fan coil unit covers are visually blemished with scratches and rust. The hydronic fin tube heating unit covers around the perimeter of the classrooms are dented and also have chipped paint.

There is visible friable pipe insulation wrap and insulation material of unknown composition at the juncture between the underside of the tectum roof deck and the steel header supporting it. (also noted under Building Envelope) This material must be tested for hazardous materials content.

The underside of the tectum deck is in good condition with sporadic water stains.

A suspended acoustical tile ceiling grid system was added in 1993 to most portions of the building's classrooms, science labs, and corridors. It is a 2x4 grid ceiling system with recessed fluorescent light fixtures with acrylic lenses. Many of the ceiling tiles have water stains, scuffs, bowed and/or deforming. Replacement is required throughout the entire building.

Thermal insulation at roof deck

Interior Finishes Summary

- Block walls in serviceable condition
- Suspended acoustical tile ceiling beyond its useful life
- Suspect vinyl asbestos tile and friable insulation require testing
- Metal materials lockers, unit covers, etc. in need of replacement

2.3.5 Accessibility

The building is mostly handicap accessible due to the renovations performed in the late 1980's. However, small non-accessible details remain. Many classroom doors lack accessible clearance requirements because of locker infringement into the door setbacks. Signage, drinking fountains, showers, staff toilets, and the auditorium are not accessible. (see Section 3.2.2).

Accessibility Summary

- Many accessibility issues remain throughout the building: minimum door side clearances, accessible route deficiencies, drinking fountains, showers, toilets, etc.

2.3.6 Asbestos Management and Hazardous Materials

An asbestos management report, air quality report and related environmental documentation are on file with the Town. Asbestos floor tile, mastic and pipe wrap is known to be present in the building. A detailed environmental survey is necessary to identify any materials present that will require remediation, whether the building is renovated or demolished.

Additional study is required regarding the following:

- A site and building Environmental Phase-1, 2, and 3 Report
- A thorough review of the existing Hazardous Material Manifest

Typical hazardous materials encountered in a school building of this vintage:

- Lead based paint
- Asbestos: floor tile, mastic, pipe insulation
- Mercury containing thermostats and switches
- PCB Containing Building Items – light ballasts, clocks, transformers, capacitors, misc electrical equipment
- PCB Containing Building Materials – caulk, adhesives/mastic, certain paint, waterproofing materials, HVAC gaskets, roofing, etc (potentially present in any material that needs to be chemical & fire resistant, durable, and elastic).
- Building Materials that have become PCB contaminated due to leaching of PCBs from caulk and other building materials – grout, concrete, brick, stucco, wood, glass, HVAC system (contaminated dust).
- Exterior soil below PCB contaminated caulk – leaching of PCBs from caulk.

Damaged metal enclosure

Suspect floor tile

Building Site

2.4 Site/Civil Evaluation

The total parcel is 15 acres in a suburban residential zone (R20), approximately 2 miles south from the center of North Haven, and east of interstate highway I-91 and a small corporate park. The property is outside the 500 year flood plain. The site is generally flat to moderately sloped. Site drainage runoff is primarily in the Southerly direction. The building conforms to the property setback requirements. The existing bus loop occurs on the north side of the building directly adjacent to the assembly areas which is ideal for staging for pick-up. The parent drop-off and pick-up occurs on the east side of the school directly adjacent to the administrative offices of the school, which allows for ideal monitoring of this activity.

Site/Civil Summary

- Site is outside the 500 year flood plain
- Moderately flat, no significant drainage issues.
- Site is suitable for current use
- Verify availability of future required utility services and infrastructure

Arial view of existing Middle School site

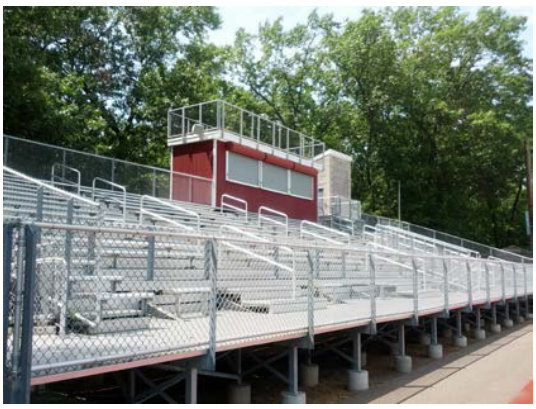
2.4.1 Vehicular Circulation

The existing surface parking lot is located on the north side of the property ideally situated adjacent to the assembly areas of the school; the indoor athletic facilities and the auditorium. There are 190 parking spaces in this lot as well as 10 visitor spaces located adjacent to the front entry. The loop drive around the large lot accommodates a large capacity of queuing school buses.

Based on its current condition, the existing parking lot should be milled and overlaid with a new surface course. Additional tree islands should be considered in order to improve shading effects of the parking lot and to improve overall appearance.

Circulation Summary

- Existing paved areas and roadways require refurbishment



Home grandstand

2.4.2 Athletic Fields

Four of the five shared outdoor athletic fields are on the east side of the campus with the middle school building in the center, this is not ideal for high school student access to these fields. High School students must circulate through the middle school zone to get to any of these four fields.

The existing competitive athletic playing field and stadium as a whole is in fair condition; it includes an accessible grandstand and press-box, a synthetic running track (which has reached the end of its useable life) and an athletic play field with natural turf. Many High School fields are trending toward synthetic turf for increased usage and less maintenance.

The home grandstand has a capacity of approximately 400 spectators. The visiting bleachers have a capacity of 160 spectators. Both are considered low capacity.

This stadium facility is not directly adjacent to the High School's associated athletic facilities, locker rooms or parking lots.

Athletic Fields Summary

- Access to track, athletic fields and grandstand not ideal for High School students as they must pass through the Middle School zone and are thus separated from their supporting amenities
- Track in poor condition, in need of replacement
- Grandstand and Visitor's bleachers in fair condition, lack adequate capacity

Middle School Courtyards

There are three courtyards within the facility; two are between the classroom wings and one divides the auditorium from the cafeteria. All three are in various stages of neglect with overgrowth of vegetation and abandoned equipment, garden structures and site furnishings.

The two courtyards between the classroom wings have several mature specimen trees that have high canopies to create ideal shaded areas. However, seasonal dropped leaf removal and plant maintenance is not apparent, contributing to deterioration of roof.

The courtyards should be properly landscaped and hardscaped in order to provide minimal maintenance and maximum usage or scenic melancholy as a respite to the academic curriculum. At the similar Fairfield Warde High School, the students are allowed to utilize the secure and central courtyard as a cafeteria spill-out space, it is actively used and part of the school culture.

Middle School Courtyards Summary

- Courtyards in neglect and disrepair, require complete redesign/renovation to better serve the school program

2.5 Structural System

The structural system appears to be in adequate condition for the existing building loads. Structural analysis will be required if additional mass is added to the structure, as in the case of roof mounted mechanical equipment. Evaluation of lateral forces should be performed if the building is to be renovated. Shear walls, moment resisting frames, or braced frames may be introduced into the structure to resist seismic forces and lateral wind loads.

The existing 1-story building structure consists of steel columns supporting steel beams , purlins, open web steel joists and a metal roof deck. Column spacing of a typical wing is approximately 15'-9" x 30'-0", with a corridor span of 10'-0", and a clear vertical height of approximately 10'-4". This provides less than adequate room for the introduction of updated mechanical and fire protection systems.

Structural Summary

- Structure appears adequate for present loads. Evaluate structure for any intended modifications

Unused greenhouse structure

Plant overgrowth mixed with paving

Outdated mechanical systems

2.6.1 HVAC Existing Systems:

General System Overview:

In general, the existing systems are 50 years old and far beyond their useful life expectancy. The systems are not suitable for today's educational needs. Roof top equipment has been added to provide cooling in various areas but is not adequate for all conditions, except in the Media Center. Interior mechanical spaces are generally too small and adequate maintenance access is not provided. Ventilation is inadequate in areas and will not promote good indoor air quality.

- Presently hot water heat is provided. Heat is provided from one central boiler room. The boiler room has two original oil fired scotch marine type heating boilers, 10,000 MBH input each. The boilers have been re-tubed and replacement dual fuel (gas/oil) burners installed. Gas is currently not provided to the building. The existing boilers are vented through a masonry chimney. Combustion air is provided through a louver in the exterior wall
- Two main 20 horsepower hot water circulation pumps and distribution piping are original to the building.
- The classrooms are mainly heated via either baseboard radiation alone or in combination with unit ventilators located along the exterior walls with louvers for outside air intake. The unit ventilators are in disrepair and most likely not providing the required amount of ventilation air to the spaces.
- There are general and dedicated exhaust systems through out the building. Some of the exhaust fans have been replaced but the majority of the exhaust systems are original to the building.
- The main offices, library, media center and computer labs are air conditioned through single zone DX roof top air conditioning units.
- Some classrooms and various lounges are air conditioned by window air conditioners.
- The gymnasiums are heated and ventilated by large units located at the ceiling. The units are loud and cannot be used when there is an event in the space causing a lack of ventilation at these times.
- The Auditorium is heated and ventilated by a built up fan and coil system located in the a mechanical room adjacent to the stage, with large hot water coil located in the ductwork above the stage.
- The existing control systems are primarily the pneumatic type and are in various stages of inoperability. The controls are not allowing for the building operators to maintain acceptable temperature conditions for comfort and energy considerations.

2.6.2 Electrical Existing System

In general, the electrical system is beyond its useful life and under capacity for the use of the building. It is recommended that the entire electrical service be replaced and the service upgraded. Primary deficiencies observed are as follows:

- Present electrical service is inadequate for the proposed use of the building. Service should be upgraded to 2000 amp 480 volts 3-phase.
- Existing panels and main electrical gear do not have capacity for expansion and are past their useful life. Many panels are original to the building. All panels and main electrical service should be replaced.
- There is an insufficient quantity of outlets throughout the building in general. It is recommended that a complete re-wiring of the building be performed to rectify this.
- Disconnect switches and motor starters are old and should be replaced.
- Exterior building mounted lighting is mainly original HID technology, and numerous fixtures are non-functional. In addition, fixtures at exterior egress doors do not meet current codes. All exterior fixtures should be replaced with newer more efficient fixtures that meet current codes.
- Parking lot lighting is HID technology, old, and should be replaced with newer, higher efficiency fixtures with appropriate controls.
- Exterior canopy lighting is linear fluorescent and should be replaced with newer, higher efficiency fixtures.
- Fire alarm system is an old, zoned system with mostly original devices. Some newer Wheelock devices have been installed in recent years. Devices are not located per current NFPA standards. A complete fire alarm system replacement is recommended.
- In general, interior lighting is inefficient compared to modern technology. The current layouts provide light levels inadequate compared to IES standards. Interior lighting should be completely replaced with new fixtures in optimal layouts to provide adequate and efficient lighting.
- Exit signs are original and should be replaced. No handicap or low level exit signs are present and should be added.
- Many egress paths do not contain proper emergency lighting per code.
- Public address system is old and should be replaced.
- Security camera system is past its useful life and should be replaced with higher resolution cameras.
- Occupancy sensors are present in most rooms, but not in corridors. Occupancy sensors should be provided in all areas in the building.
- Grandstand elevator does not work, may be an electrical issue.
- WiFi system is present, should be upgraded to new technology.
- Many devices are surface mounted on the walls and are fed with surface mounted raceway.
- Stage and auditorium lighting systems and controls are aged and should be completely replaced.

Outdated plumbing systems

2.6.3 Existing Plumbing Systems

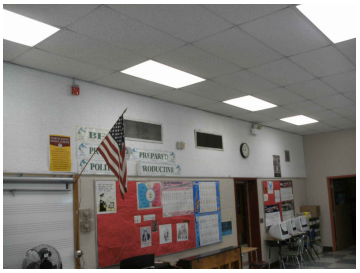
General System Overview

In general the existing systems are over 50 years old and far beyond their useful life expectancy. Plumbing piping, roof drainage and fixtures are in fair to poor condition. Complete removal and replacement is recommended.

- Natural gas is not currently at the school. There some small exterior propane tanks which feed the water heaters in the boiler room. Southern CT Gas Company mentioned that this school can be fed with a new natural gas main. They have spoken with the town in the past about converting over from oil. Also the adjacent high school is fed with natural gas.
- Roof drainage is accommodated via a flat built up roof pitched to a minimal amount of internal roof drains located in the center. The roof drains are hard piped with cast iron pipe with hub and spigot joints. The piping is collected together throughout the building and is piped underground to a main system in the street which leads to Overbrook Road. The roof is ponding severely. There are no secondary roof drains. In the event of a clogged roof drain, the water will spill over the roof as there are no parapets around the perimeter. The primary roof drains are in poor condition, broken and clogged.
- Sanitary sewerage service consists of cast iron pipe with hub and spigot joints. The piping is collected together throughout the building and is piped underground to a main system in the street. Sewer service is a gravity type to a public treatment facility. Septic tanks are not present. Pumping is not present.
- Domestic water to the school is fed from an existing eight-inch water main in Bailey Road which feeds a six-inch water main to the school. Domestic water piping is copper tubing type "L" with soldered type joints. Pipe insulation was missing in some locations. A backflow preventer is not present. Pressure, size and flow characteristics are unknown. There is a 2" water main which leaves the boiler room and feds a site main to exterior hydrants. Existing water pressure is 52 psi which is fair. With the low pressure, a booster pump would likely be required due to a backflow preventer and new flush valve pressure requirements.
- Domestic water is heated with two individual 50 gallon, vertical, propane gas-fired water heaters in the boiler room which serves the school. Tempering valves at each water heater were not present to prevent scalding. The original school had its own oil-fired boiler and horizontal storage tank which is currently abandoned.
- Some plumbing fixtures were updated to ADA (Americans with Disabilities Act) compliant fixtures in 1990. The plumbing fixtures also are not low-flow or energy efficient. This is not a requirement but may be desired. The current plumbing fixtures are in fair condition.

Existing kitchen systems

- The kitchen has an in-floor grease trap that is noncompliant. The grease trap must be either an above grade grease recovery unit or an exterior minimum 1,000 gallon grease trap.
- The State of Connecticut Department of Environmental Protection issued a General Permit for the Discharge of Wastewater Associated with Food Preparation Establishments on September 30, 2005. A facility, which began discharging on or before the effective date of the general permit, with a grease trap/interceptor not in compliance with Section 5(b) of the general permit shall comply with all conditions of this general permit no later than July 1, 2011. This document details the effluent limitations and treatment requirements. The CT Public health code also requires minimum 140 degree f. hot water for rinsing and sanitization of kitchen equipment; utensils, pots, etc.


The majority of the school is not sprinklered

2.6.4 Fire Protection Existing System

General System Overview:

In general the majority of the existing school is not sprinklered and must be sprinklered. The existing sprinklers and service would be replaced in the case of a renovation.

- The existing 1960 school did not have sprinklers or standpipes.
- In 1990, a code update provided sprinklers and standpipes to the stage area only. There is a fire curtain, so a deluge sprinkler system is not required at the stage. The remainder of the school is not sprinklered.
- Today's buildings require fully sprinklered schools. There is little ceiling space above the hung ceiling to install sprinklers.
- Existing water pressure is 52 psi which is fair. Flow near the high school is 2,134 gpm which is excellent. The flow and pressure would support a sprinkler system. With the low pressure, a fire pump would likely be required to minimize pipe sizes.
- An existing eight-inch water main exists in Bailey Road which feeds a six-inch water main to the school.
- Some classrooms are below grade without an exterior door at grade or two means of egress. Sprinklers are currently not provided.
- A standpipe system is not required throughout the school as the floor of the highest story is not greater than 30 feet above fire department access.
- State of CT Public Act 29-515 requires: "When any building is eligible for a school building grant pursuant to chapter 173, and put out to bid on or after July 1, 2004, such building shall have an automatic fire extinguishing system approved by the State Fire Marshal on each floor."
- Due to the low floor to structure height, low ceiling heights, small bar joist openings throughout the school, to add sprinklers concealed above the ceiling would be very difficult. Exposing sprinklers in a school environment is not recommended as they would be subject to damage, false alarms and flooding. Exposing piping is not recommended in any renovated installation.

2.6.5 Existing Systems Summary - Mechanical, Electrical, Plumbing and Fire Protection

In general, the existing systems are obsolete and far beyond their useful life:

Mechanical Systems

- The existing Mechanical system is obsolete and in need of replacement
- To accomplish the long term needs of the facility it is anticipated the existing mechanical systems will need to be completely removed and replaced with new energy efficient systems suitable for the new function of the space.

Electrical System

- The existing electrical system is aged and the existing service inadequate.
- The entire electrical system should be replaced, and the service upgraded to meet the needs and demands of a modern school building.

Plumbing Systems

- The existing systems are over 50 years old and far beyond their useful life expectancy.
- Plumbing piping, roof drainage and fixtures are in fair to poor condition. Complete removal and replacement is required.

Fire Protection System

- The majority of the existing school is not sprinklered and must be sprinklered.

Energy

- The School's energy usage is likely 30-50% higher than modern schools

Notes

This report is an existing equipment audit based on site observations. However, it should be noted it is intended to present a description of existing M/E/P/FP systems only, with general references to potential upgrades for scope and magnitude of cost purposes. Should the school be renovated, a phase two analysis will identify various options, with recommendations for the owner based on the architectural vision for the future building occupancy and function.

2.7 Code Compliance Summary

2005 Connecticut Building Code / IBC 2003

IBC International Building Code (2003) w/2004 CT Amendments
ICC/ANSI A117.1/1998 Accessible and Usable Buildings and Facilities

2005 Connecticut Fire Safety Code Guidebook
2005 IBC w/Connecticut Supplements

International Energy Conservation Code 2003
International Mechanical Code 2003
International Plumbing Code 1997
International Electric Code
Federal Fair Housing Act (1988)

Project Description

An existing 1960, one-story 142,209 square foot Public Middle School located in North Haven, Connecticut, with a mixed occupancy at 55 Bailey Road on approximately 27.54 acres, sharing a campus with the High School.

Chapter 3: Building Occupancy

	Section	Description	Allowed/Required	Provided	Remarks
	302.1	Occupancy	E - Educational A-1, A-2, A-3 – Assembly B - Business		
	302.1.1	Incidental Use	Boiler rooms, science lab – requires sprinkler system and smoke barrier		
	302.2.1	Accessory Use	Assembly Areas		
	302.3	Mixed Occupancies	NFPA 13R	No existing system	Look at table 302.
	302.3.2	Separated Uses	2 hr. (1 hr. reduction)	No existing Separations	

Chapter 4: Special Detailed Requirements Based on Use and Occupancy

	Section	Description	Allowed/Required	Provided	Remarks
	410.3.1.1	Stage Height and Area	Area = Stage + Support Areas Height = Low point of stage to high point of underside of deck		
	410.3.3	Exterior Stage Doors	Fire doors (Section 715) Vestibules on loading doors		
	410.3.6	Scenery	Combustible materials rendered flame resistant		
	410.3.7	Stage Ventilation	>1000 SF requires emergency ventilation		
	410.3.7.1	Roof Vents	2 or more heat-activated vents Clear opening not less than 5% of stage area		
	410.3.7.2	Smoke Control	See Section 909		.
	410.5.1	Dressing Rooms - Separation from Stage	Height <50 ft. = 1 Hr. Fire Barrier		
	410.5.2	Separation From Each Other	1 Hr.		
	410.5.4	Stage Exits	1 Approved means of egress @ each side of stage		
	410.6	Automatic Sprinkler System	Equip according to Chapter 9. Not required under stage if<4' in clear height and used for storage		
	410.7	Standpipes	Provide according to Section 905	No existing system	
	419	Group E			
	419.2	Fire Barriers	Exception 1 – Sprinkler System		

Chapter 5: General Building Heights and Areas

	Section	Description	Allowed/Required	Provided	Remarks
	503 table	Assembly (A-1)	2 Floors/55 Ft. – 8,500 SF MAX		2B construction
	503 table	Assembly (A-2/A-3)	2 Floors/55 Ft. - 9,500 SF MAX		2B construction
	503 table	Educational (E)	2 Floors/55 Ft. - 14,500 SF MAX		2B construction
	503 table	Business (B)	4 Floors/55 FT. - 23,000 SF MAX		2B construction
	504.2	Automatic sprinkler system increase	+ 20 Feet / +1 Level		
	506.1	General	Aa=At+[At+If/100] + [At+Is/100] Assembly(A-1): Aa = 38,250 SF Assembly(A-2, A-3): Aa = 42,750 SF Education(E): Aa = 65,250 SF		Need 2 Separated Education Areas
	506.2	Area Modification	Frontage Increase If=100[F\P -0.25]W/30 If = 50%		
	506.3	Area Modification	Automatic Sprinkler System increase = 300%		

Chapter 6: Construction Classification

	Section	Description	Allowed/Required	Provided	Remarks
	602.2	Type 2B	Noncombustible Materials		
	601 Table Type 2B	Fire Rating for Building Elements	**Structural Frame: 0 hr** **Bearing wall Int/ Ext: 0 hr** **Floor Const: 0 hr** **Roof Const: 0 hr**		
	602 table	Exterior wall fire rating	>10'=30' requires 0 Hr rating at 2B Construction Type	0 Hr	

Chapter 7: Fire Resistant Rated Construction

	Section	Description	Allowed/Required	Provided	Remarks
	704.8	Allowable Area of Openings	Table 704.8 Fire Separation Distance >20' = No limit		
	706.1	Fire Barriers	Horizontal Exits, separate occupancies, incidental use areas, separate single occupancy into different fire areas.	2 hr. Provided	Table 706.3.7 E & A – 2 Hr.
	706.5	Horizontal fire Barriers	As per section 711	Provided	Incidental use sep.
	706.7	Openings	Protected as per 715	Provided	
	715.3 Table	Fire Door Ratings	2 HR Assembly = 1 ½ Hr. door		

Chapter 9: Fire Protection Systems

	Section	Description	Allowed/Required	Provided	Remarks
	903.2.1	Group A	Automatic Sprinkler System - to be provided	None existing	
	903.2.1.1	Group A-1	Occupant Load >300 Occupants		
	903.2.1.2	Group A-2	Fire Area >5000 SF, Occupancy Load >300		
	903.2.1.3	Group A-3	Fire Area >12000 SF, Occupancy Load >300		
	903.2.2	Group E	Automatic sprinkler system to be provided throughout Fire Areas >20,000 SF		
	905.3.4	Stages	Hose connections connected to Sprinkler system at each end of stage	None existing	
	906.1	Portable Fire Extinguishers	Required		
	907.2.1	Fire Alarm – Group A	Manual alarm not required if automatic sprinkler system		
	907.2.3	Fire Alarm – Group E	Fire alarm connected to building system Ex. 1 <50 people Ex. 2 Manual alarm not required if interior corridor protected by smoke detectors; auditorium, café, gym protected by head detectors		

Chapter 10: Means of Egress

	Section	Description	Allowed/Required	Provided	Remarks
	1003,2	Ceiling Height	Min 7ft		
	1004.1.2 Table	Max floor area allowance per Occupant	Gym = 5 net Assembly (fixed seats) = # of seats Assembly (cafeteria) = 15 net Business = 100 gross Stages = 15 net Lockers = 50 gross Storage/Mechanical = 300 gross Library (reading) = 50 net Library (stacks) = 100 gross Educational (classroom) = 20 net Educational (shops) = 50 net		
	1004.3	Posting of Occupancy Load	Assembly Areas		
	1004.7	Fixed Seating	Occupancy load determined by # of fixed seats		
	1004.8	Outdoor Areas	Occupancy load assigned by building official. Provide means of egress		
	1004.9	Multiple Occupancies	2 or more occupancies utilize same means of egress, meet more stringent requirements		
	Section	Description	Allowed/Required	Provided	Remarks
	1005.1	Minimum Required Egress Width	Occupancy Load x 0.2		
	1007.1	Accessible Means of Egress	Required		
	1008.1.1	Exit Door requirements	Size of Doors – not less than 32”		
	1008.3	Turnstiles	Not obstruct means of egress		
	1010.2	Ramp Slope	1:12 slope max for egress 1:18 all other pedestrian uses	Provided	Remarks
	1010,4	Ramp Rise	Max rise 30”		
	1010.4	Ramp width	Min 36” clear between handrails		
	1010.6.1	Ramp landing size	36” W x 60” L		Landing w/ direction change 60”x60”
	1010.8	Ramp Handrails	Ramps with rise >6” must have handrails both sides		

Chapter 10: Means of Egress

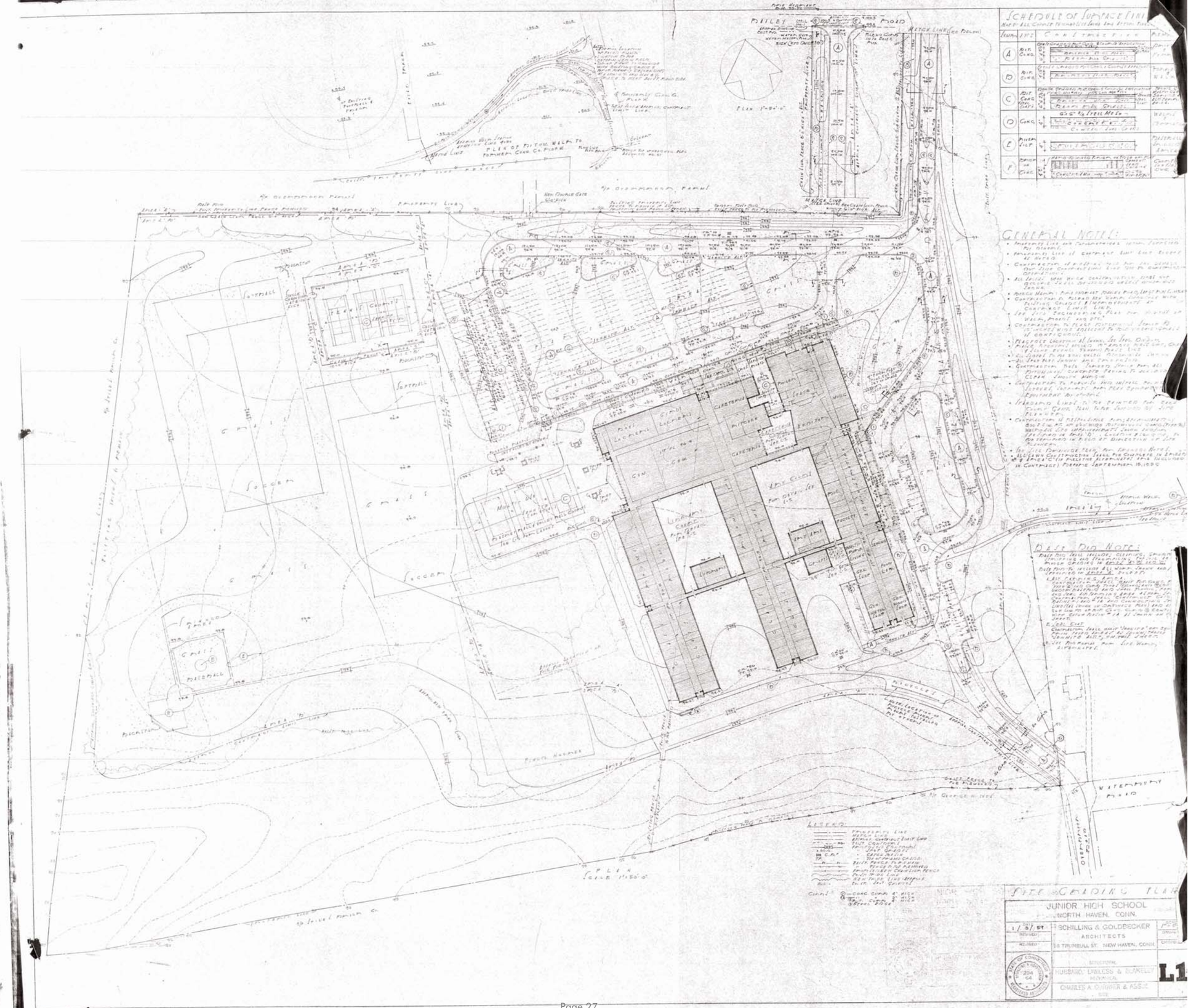
	1011.1.1	Floor Proximity Exit Signs	Group A >300 Occupants, required		
	1013	Exit Access			
	1013.3	Common Path of Travel	75 ft max		
	1013.4	Aisles	Assembly – comply with Section 1024		
	1014.1	Exit and Exit Access Doorways	Table 1014.1 Max occupancy load = 50 with 1 means of egress		
	1014.3	Boiler, Incinerator and Furnace Rooms	>500 SF requires 2 exits		
	1014.6	Stage Means of Egress	1 Means of egress at each side of stage required		
	1015.1 Table	Exit Access Travel Distance	A, E - 250 ft w/sprinkler		
	1015.1	Exit Access Travel Distance	Continuous Illuminated strip required.		
	1016.1	Corridor Fire resistance	**Occupancy>30** - 0 hr w/ sprinkler		
	1016.2	Corridor Width	Ex. 4 – Group E w/ 100 Occ. Load = 72" minimum		
	1018.1	Min number of exits	**Min 2 exits w 1-500 occupant load** **3 exits 501-1000 occupant load**		
	1021.2	Separation	Horizontal exit with fire wall (705) or fire barrier (706) Not less than 2 Hr.		
	1024.2	Assembly Main Exit	Exits can be distributed around perimeter		
	1024.6.1	Without Smoke Protection	Slopes > 1:12 = 22/100" per occupant Slopes < 1:12 = 2/10" per occupant		
	1024.7	Travel Distance	250 ft. in sprinklered building		
	1024.9.1	Minimum Aisle Width	42" for ramped with seating on both sides 36" for ramped with seating on one side		
	1025.1.1	Emergency Escape & rescue	Group E Occupancies – not required with sprinkler system		

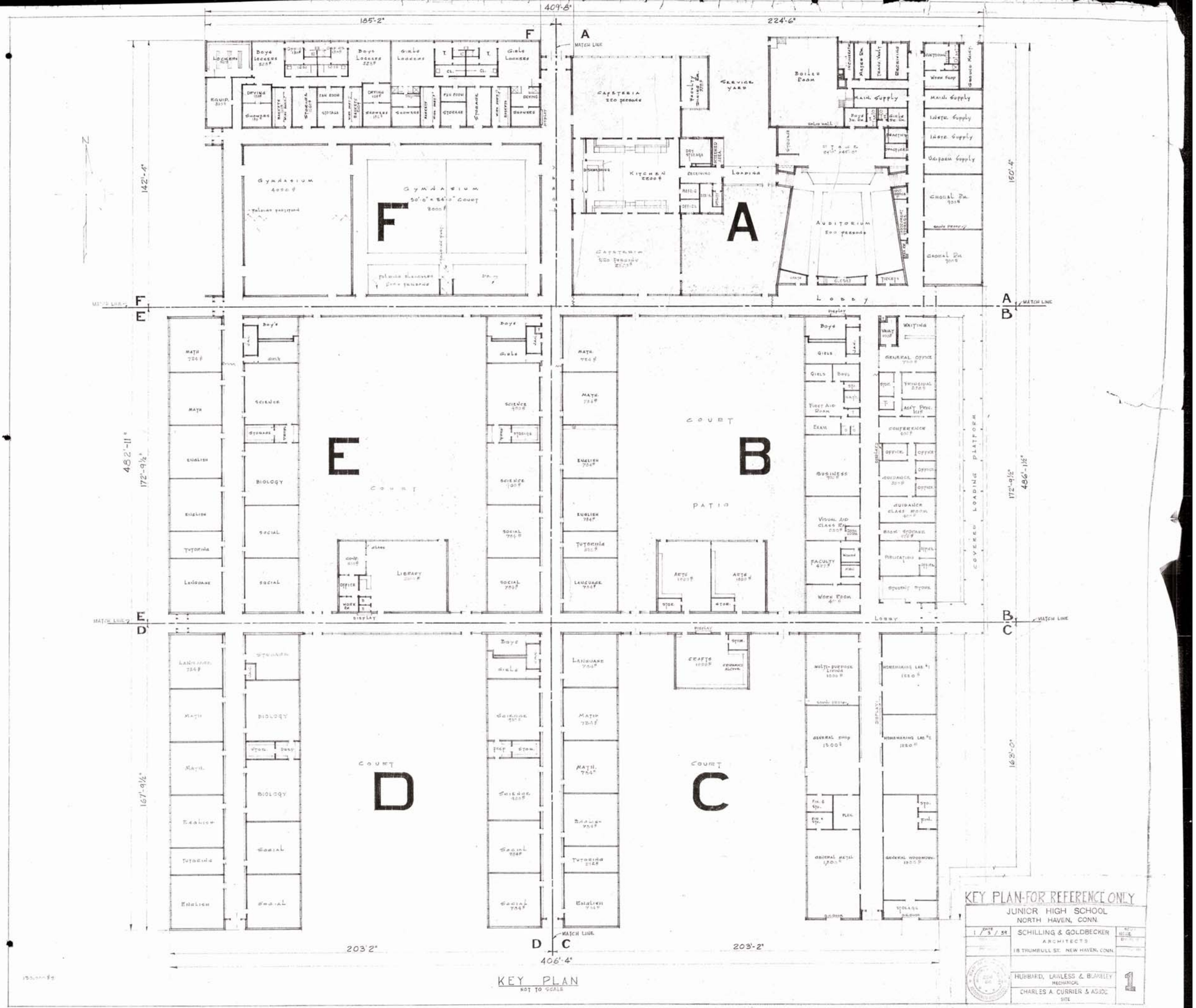
Chapter 11: Accessibility

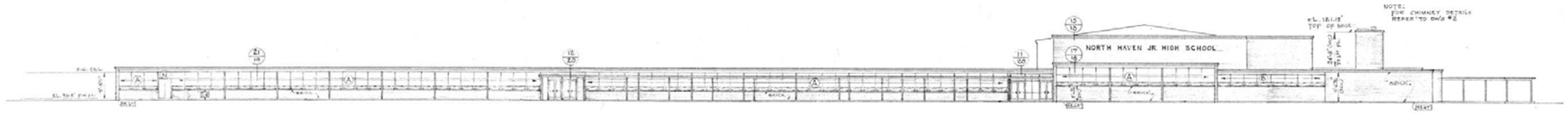
	Section	Description	Allowed/Required	Provided	Remarks
	1106	Parking & Passenger Loading Facilities			
	1106.5.1	Van Space	1 for every 6 accessible spaces		Space 16' Wide w/8" aisle
	1108.2	Assembly Area Seating			
	1108.2.1	Wheelchair Spaces	Table 1108.2.2.1: 301-500 = 6 wheelchair spaces		
	1108.2.7	Assistive Listening Systems	Table 1108.2.7.1: 201-500 = 2 receivers + 1/25 seats over 50 ¼ of receivers hearing aid compatible		

2.8 Summary

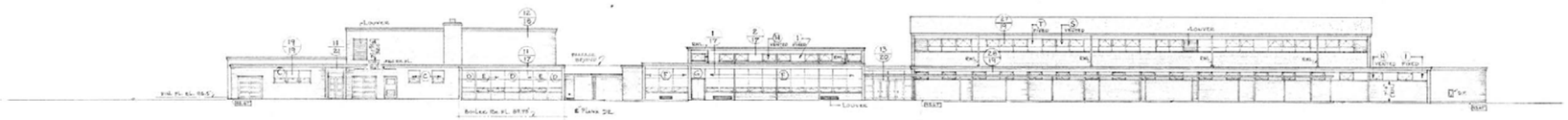
This report has described and analyzed the existing school facility for compliance with current Code, building condition deficiencies as well as evaluated the building systems and finishes. The report has provided recommendations to remediate non-conforming components to improve the health, safety, welfare, and public accessibility to the existing facility.


SCHEDULE OF SURFACE FINISH
GENERAL NOTES:
BASE BID NOTES:
LEGEND
SITE GRADING PLAN
JUNIOR HIGH SCHOOL
NORTH HAVEN, CONN.
SCHILLING & GOLDBECKER
ARCHITECTS
38 TRUMBULL ST. NEW HAVEN, CONN.
HUBBARD, EMMESS & BLAKELY
CHARLES A. GUNNER & ASSOC.
L1


409'-8"
185'-2"
224'-6"
142'-4"
150'-4"
482'-11"
172'-9½"
486'-1½"
167'-9½"
163'-0"
203'-2"
406'-4"
F
A
E
B
D
C
Gymnasium
Gymnasium
50'-0" x 84'-0" Court
Cafeteria
Service Yard
Boiler Room
Kitchen
Auditorium
Lobby
Court
Patio
Library
Biology
Social
Math
English
Tutoring
Language
Science
Boys
Girls
Crafts
Business
Visual Aid Class Rm.
Faculty
Work Room
General Office
Waiting
Conference
Guidance
Publications
Homemaking Lab.
General Shop
General Metal
General Woodwork
Covered Loading Platform
Main Supply
Water Supply
Uniform Supply
Choral Rm.
Match Line
KEY PLAN
NOT TO SCALE
KEY PLAN-FOR REFERENCE ONLY
JUNIOR HIGH SCHOOL
NORTH HAVEN, CONN.
1/3/58
SCHILLING & GOLDBECKER
ARCHITECTS
18 TRUMBULL ST. NEW HAVEN, CONN.
HUBBARD, LAWLESS & BLAKELEY
MECHANICAL
CHARLES A. CURRIER & ASSOC.
SITE
1



ELEVATION "A-A"



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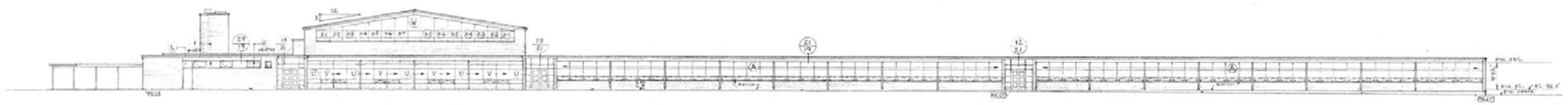
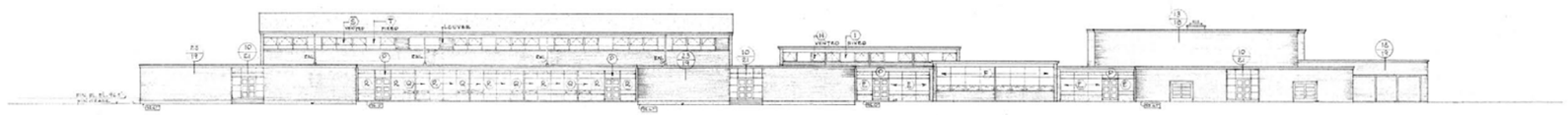


ELEVATION "C-C"



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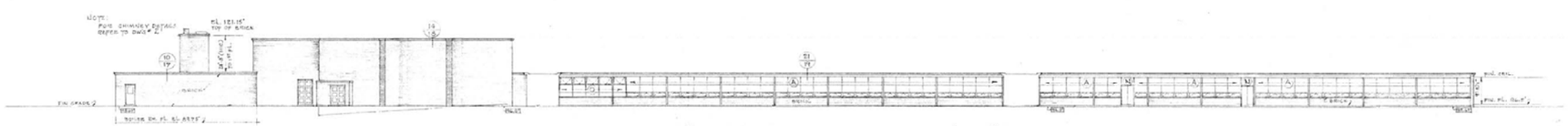

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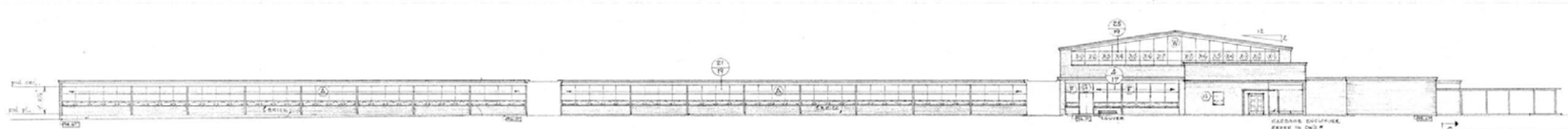

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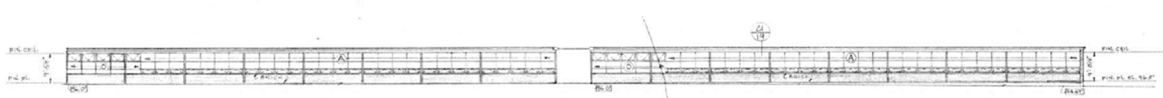
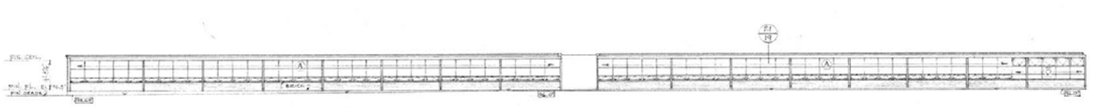
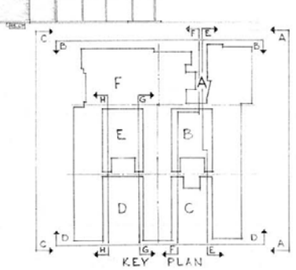


ELEVATION "G-G"



ELEVATION "H-H"

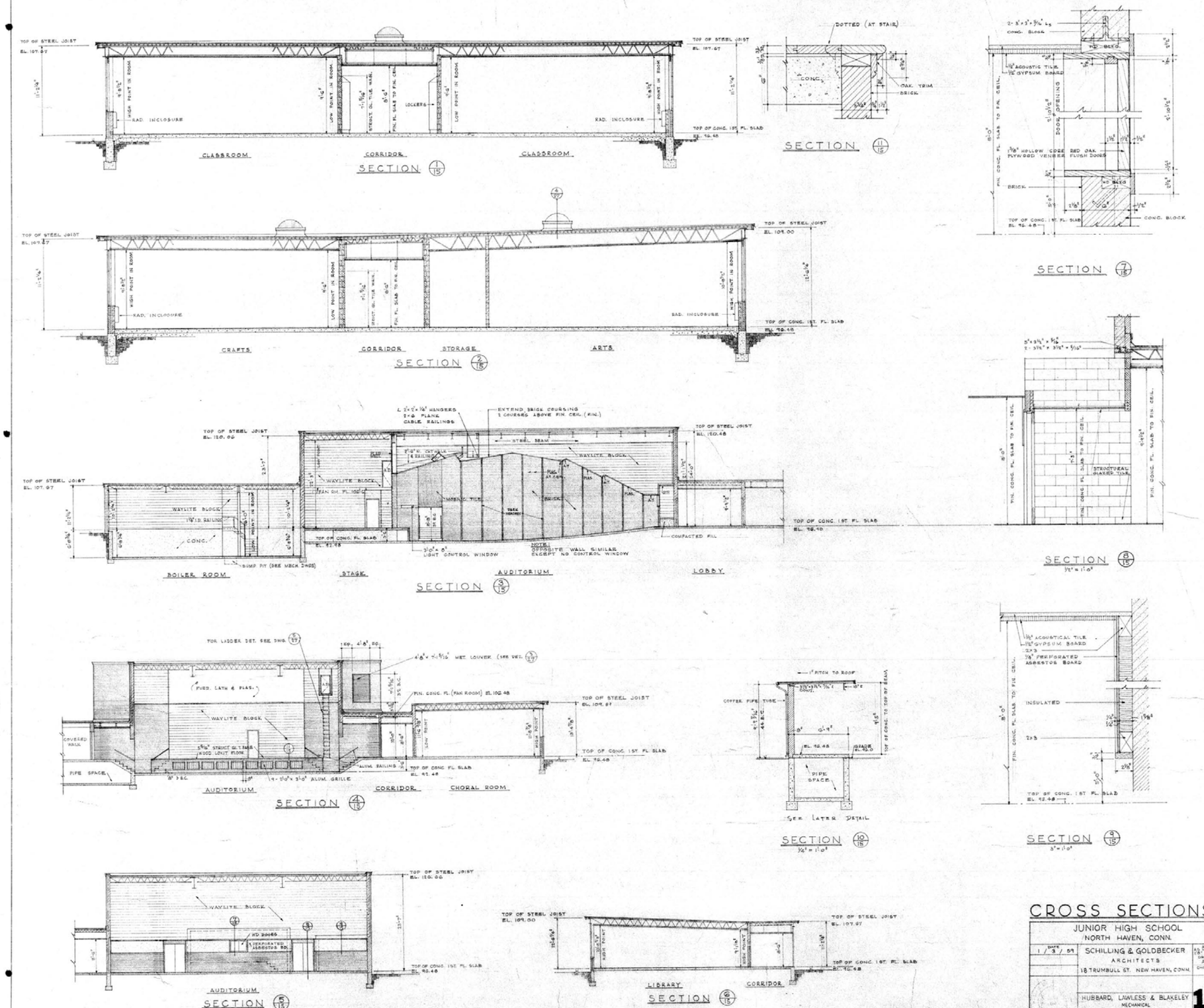


KEY PLAN

ELEVATIONS

JUNIOR HIGH SCHOOL
NORTH HAVEN, CONN.

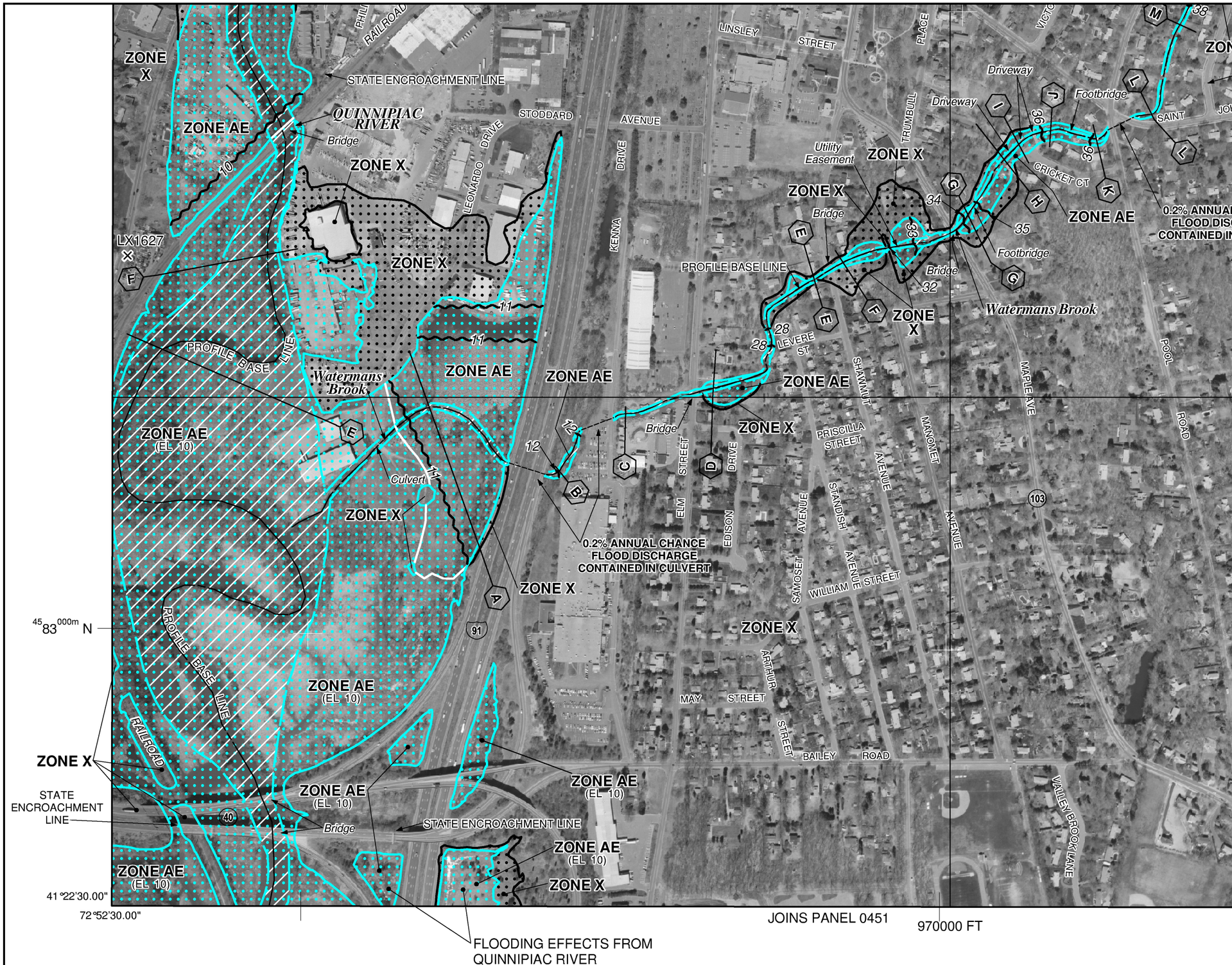
DATE 1/3/59	SCHILLING & GOLDIBECKER ARCHITECTS 18 TRUMBULL ST. NEW HAVEN, CONN.	SCALE 1/8"=1'-0" DRAWN BY
	STRUCTURAL HUBBARD, LAWLESS & BLAKELEY MECHANICAL CHARLES A. CURRIER & ASSOC. SITE	9



CROSS SECTIONS

JUNIOR HIGH SCHOOL
NORTH HAVEN, CONN.

DATE 1/3/59	SCHILLING & GOLDBECKER ARCHITECTS 18 TRUMBULL ST. NEW HAVEN, CONN.	SCALE AS NOTED DRAWN BY A.H.H. CHECKED BY
	HUBBARD, LAWLESS & BLAKELEY MECHANICAL	15
	CHARLES A. CURRIER & ASSOC. SITE	



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0313H

FIRM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT

(ALL JURISDICTIONS)

PANEL 313 OF 635

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
NORTH HAVEN, TOWN OF	090086	0313	H

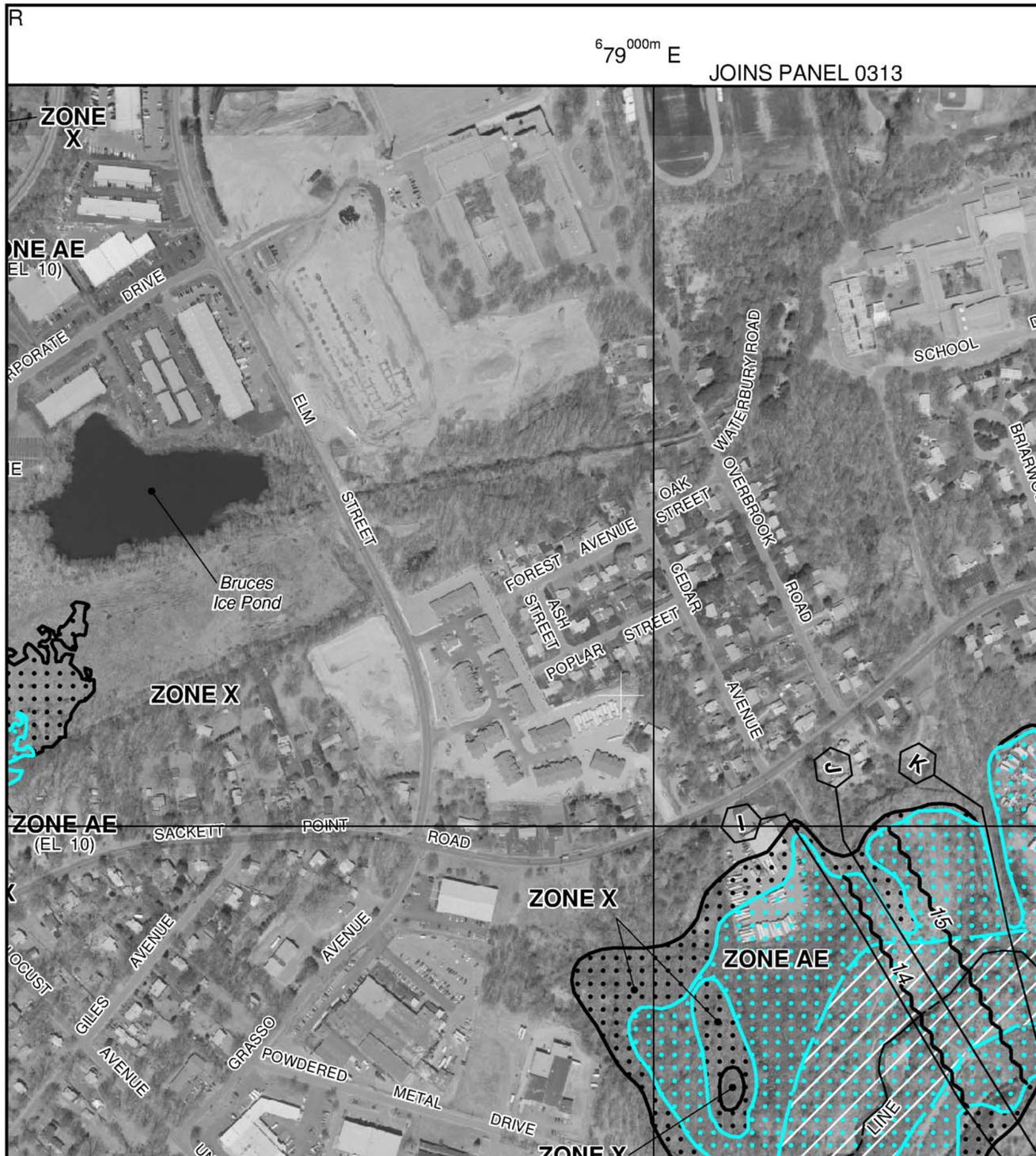
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
09009C0313H

EFFECTIVE DATE
DECEMBER 17, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0451H

FIRM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT

(ALL JURISDICTIONS)

PANEL 451 OF 635

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HAMDEN, TOWN OF	090078	0451	H
NORTH HAVEN, TOWN OF	090086	0451	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
09009C0451H

EFFECTIVE DATE
DECEMBER 17, 2010

Federal Emergency Management Agency

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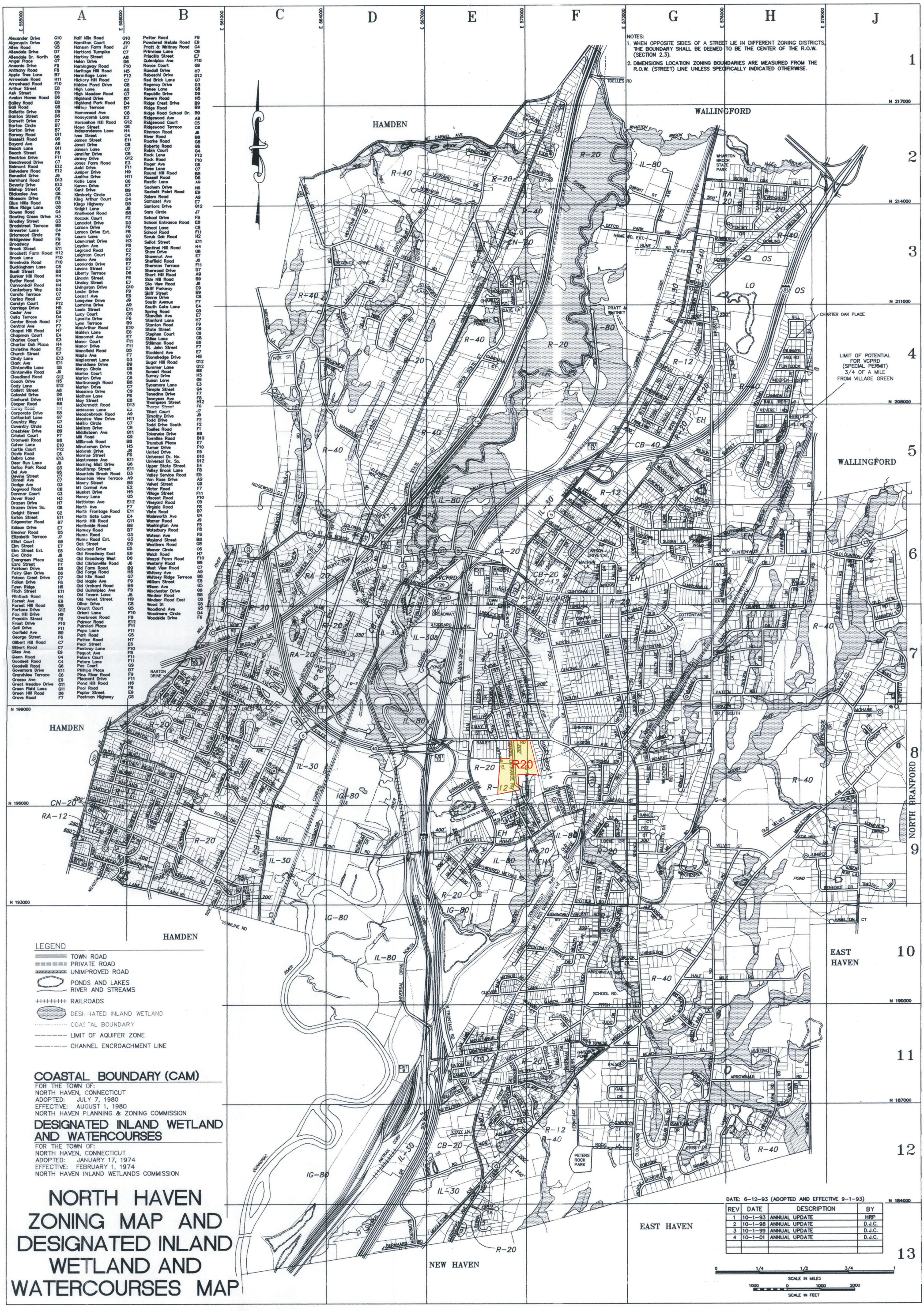
NOTES:
1. WHEN OPPOSITE SIDES OF A STREET LIE IN DIFFERENT ZONING DISTRICTS, THE BOUNDARY SHALL BE DEEMED TO BE THE CENTER OF THE R.O.W. (SECTION 2.3).
2. DIMENSIONS LOCATION ZONING BOUNDARIES ARE MEASURED FROM THE R.O.W. (STREET) LINE UNLESS SPECIFICALLY INDICATED OTHERWISE.



DATE: 6-12-93 (ADOPTED AND EFFECTIVE 9-1-93)

REV	DATE	DESCRIPTION	BY
1	10-1-93	ANNUAL UPDATE	HRP
2	10-1-98	ANNUAL UPDATE	D.J.C.
3	10-1-99	ANNUAL UPDATE	D.J.C.
4	10-1-01	ANNUAL UPDATE	D.J.C.

3.1 Introduction and Scope of Evaluation Report

This report will evaluate the existing Gateway College, also known as the former Orchard Hill Junior High School facility (prior to the Town selling the facility to the State of Connecticut in 1986) for Code compliance, building condition and compliance with safety, welfare, and building accessibility as determined by applicable Codes and the Connecticut State Statutes. Please see section 3.7 for a detailed code compliance analysis.

This report is a summary of an investigation of the existing Middle School building and campus at 88 Basset Road in North Haven, Connecticut. The investigation team evaluated the existing facility for the purposes of determining whether this property is appropriate for a renovate "as-new" school facility.

3.2 Applicable Codes

The following is a listing of applicable Codes within the Jurisdiction of the work.

- 2005 Connecticut Building Code / IBC 2003
- IBC-International Building Code (2003) w/2004 CT Amendments
- 2005 IBC w/Connecticut Supplements
- 2003 International Existing Building Code
- ICC/ANSI A117.1/2003 Accessible and Usable Buildings and Facilities
- Americans with Disabilities Act 1988 (ADA)
- Connecticut Department of Public Health Code
- State of Connecticut Fire Safety Code Guidebook-2005
- International Energy Conservation Code 2006
- International Mechanical Code 2003
- International Plumbing Code 2003
- 2005 National Electric Code, NFPA 70-2005

The 2005 Connecticut State Building Code incorporates the 2004, 2005 Connecticut Supplements and the 2009 Amendments with additions and deletions into the language of the 2003 International Building Code. The officially adopted 2005 State Building Code consists of the regular designated Section 29-252id together with all referenced Codes and Standards collectively known as the Connecticut State Building Code-2005 with the CT supplement adopted by the Commissioner of Public Safety under the authority of Section 290252 of the CT General Statues, the effective date of the regulations is December 31, 2005 and shall apply to all building Permits applied on or after this date.

Under guidelines promulgated by the State Department of Construction Services, the existing facility may be renovated to a "like-new" status, any and all of the existing non conforming building elements that are currently "grandfathered-in" must be brought up to current codes.

3.3 Description of the Existing Facility

The existing building is a three story structure on a gently sloping site. The lower level is approximately 33,730 sq. ft., and partially subterranean. The main level is approximately 66,063 sq. ft., the upper level is approximately 54,964 sq. ft., for a total square footage of approximately 154,537 sq. ft. The building, completed in 1968, is of mixed-use occupancy, consisting of educational, business (administrative offices) and assembly occupancies. The building is located on approximately 20 acres in a residential zoned (R20) area of North Haven. The property has an abundance of abutting athletic fields owned and maintained by the Town. The building was designed and constructed prior to the building code requiring compliance with the ADA accessibility law.

In 1993 the building was renovated as a branch of Gateway Community College. At that time, several upgrades occurred to the building including a new entry canopy to enhance the main entry, new hung ceilings with recessed fluorescent light fixtures, roof membrane, HVAC rooftop units and vinyl floor tiles.

This evaluation describes the existing conditions of the building envelope, the detailed use group specific areas of the building, the building interior finishes, accessibility, site layout and building systems.

View from Bassett Road

View from the parking area towards main entry

3.3.1 Building Envelope Description

The exterior envelop is made-up of a cast-in-place reinforced concrete frame structure and waffle slabs, with brick cavity and concrete masonry unit (CMU) back-up walls as infill walls. This type of wall construction is ideal for a weatherproof enclosure with good maintenance and thermal properties. There is no efflorescence (mineralized deposits) visible. The interior wall finish is the inside of the CMU back-up wall.

The building's structural system is a cast in place column, beam and waffle slab system. As the building was constructed in 1968, it is not designed to current structural code requirements for seismic restraint. This is a major concern when a building is renovated to "as-new" status. The building is not required to be updated structurally, as long as it is capable of performing its function over the life of then new renovation. See structural review section 3.5.

The concrete structure also poses difficulty with mechanical penetrations through decks and beams.

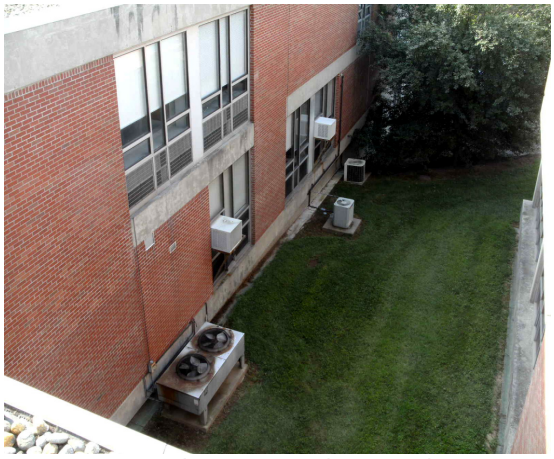
The perimeter fenestration is an aluminum storefront window system with operable hopper sashes and thru-wall louvers for the perimeter fan coil units. The storefront sill sits on the concrete deck which forms an exterior spandrel beam and fascia panel, which also acts as a continuous band at the base and roof of the building. The glass panels of the window/storefront system are single un-insulated units, the aluminum frames are not thermally broken and the anodized coating is pitted and chalky.

The roof deck is flat reinforced concrete with a ballasted rubber EPDM membrane (replaced in 1993) with tapered rigid insulation pitched to interior roof drain and leader systems. The membrane has some issues around mechanical roof top equipment, but otherwise appears to be in good condition. EPDM roof membranes are usually warranted by the manufacturer for 25-30 years.

Building Envelope Summary

- Structural concrete frame and waffle slabs in good condition.
- Failing finishes (pits and chalk) on window frames, single pane windows glass. Windows are in need of replacement.
- Roof membrane is in good condition, likely reparable at problem areas.

View over roof to exterior wall with windows



Single pane windows at clerestories

Roof mounted HVAC equipment, partially exposed roof membrane

Detailed Use-Group Areas

3.3.2 Typical Classrooms, Education Occupancy

The educational classrooms are confined at the ceiling level by cast-in-place reinforced concrete beams of substantial depth. This will inhibit mechanical duct runs between rooms and down corridors and/or restrict ceiling height where this may occur. There are two standard size classrooms:

Classroom 'type A' measures approximately 727 net sq. ft.

Classroom 'type B' are approximately 1,200 net sq. ft., and used primarily used as science labs.

The type A classroom is 125 sq. ft. smaller than the Ed Spec requirement.

The science labs consist of a mixture of original antiquated labs and others renovated and/or added in 1993. The casework at the renovated labs, while in good condition, is 20 years old. The casework in the original labs is in fair condition. There are fume hoods and emergency wash-off stations dated 1993 in many science labs. There are very small lab prep rooms adjacent to the existing science labs.

A suspended acoustical tile ceiling grid system was added in 1993 to most portions of the building's classrooms, science labs, and corridors. It is a 2'x4' grid ceiling system with similar sized recessed fluorescent light fixtures with acrylic lenses and surface applied 1x4's in some of the corridors. Many of the ceiling tiles have water stains, scuffs, and are bowed and/or deforming. Replacement of the suspended ceiling and installation of energy efficient light fixtures is required throughout the building.

Classrooms Summary

- Heating Ventilating and Air Conditioning upgrades will be difficult to integrate due to the limiting factors of the building structure.
- Type A classrooms and do not meet size requirements in the Education Specification
- Casework is antiquated
- Science prep rooms are inadequate in size and storage capacity
- Suspended ceiling system and lighting is in need of replacement

Vintage 1968 Science Lab1

Detail at Casework

Hallway view

Detailed Use-Group Areas

3.3.3 Assembly Area Occupancies

Cafeteria

The existing cafeteria has a central commercial kitchen with 2 flanking cafeteria seating areas of 4,200 sq. ft. each, which will easily accommodate up to 260 students in one seating. An outside food service vendor delivers prepared food daily for the current Middle School. The 6,720 square foot commercial kitchen and servery is oversized for this type of program.

Cafeteria Summary

- Adequate seating capacity
- Kitchen is oversized for a prepared food program

View of cafeteria

Gymnasiums

The school has two Gymnasiums of differing sizes. The large gym is 7,623 sq. ft., and the smaller gym is 3,625 sq. ft. Each has over 20 foot clearances to the underside of the roof structure. The original locker rooms were partially dismantled in 1993, and must be completely renovated and made accessible. The existing athletic wood floors must be completely replaced. There is an existing collegiate 3,000 sq. ft. fitness center present, above and beyond any requirements of the Ed Spec.

Gymnasium Summary

- Lockers and Gymnasium floors in need of replacement
- Does not meet accessibility standards
- Existing Fitness Center not required by Ed Spec

View of Automotive Shop / former gymnasium

Library Media Center and Technology Labs

The Library Media Center is on the upper level and in good condition. Preliminary layout options suggest that the area where the current library exists will be needed for 7 and 8 grade classrooms. Therefore reconstructing a new library on the main level west of the auditorium will be required. The existing building can accommodate this change within the existing footprint.

Library Media Center Summary

- Relocate Library Media Center to lower level

View of Media Center

Auditorium

There is space for clear wheelchair accessible spaces in the pit area or stage-front portion of the audience seating section. However no accessible seating or companion seating is designated. There is no compliant accessible route from the seating area to the stage without leaving the auditorium and entering the stage via a remote but adjacent connecting corridor to the stage. The acoustical qualities in the auditorium are good, and all finishes are in good condition. The stage and its equipment are compatible with the curriculum and the Ed Spec.

Auditorium Summary

- Does not meet ADA standards, requires modifications
- Adequate for Middle School program and Ed Spec

Interior Finishes

3.3.4 Building Interior Finishes

The corridor walls are constructed of 8″ concrete masonry units, which is in good condition overall. Some of the floor finishes appear to be the original 9″x9″ vinyl asbestos tile. This must be confirmed with testing. Other floor tiles are 12″x12″ and appear to be part of the 1993 Gateway College renovation. The ceramic wall tile and mosaic floor tile in the toilet rooms are also in good condition, and appear to date from the 1993 renovation.

The hall lockers appear to have been replaced in the 1993 renovation, or could be in good condition because they have not been used in 20 years.

A suspended acoustical tile ceiling grid system was added in 1993 to most portions of the building's classrooms, science labs, and corridors. There are 2'x2' and 2'x4' grid ceiling systems present, with similar sized recessed fluorescent light fixtures with acrylic lenses and surface applied 1x4's, mostly in the corridors. Many of the ceiling tiles have water stains, scuffs, bowed and/or deforming. Replacement of hung ceiling and energy efficient light fixtures is suggested throughout the building.

Interior Finishes Summary

- Block walls in serviceable condition
- Ceramic wall and floor tile in bathrooms in good condition
- Suspended acoustical tile ceiling in need of replacement
- Suspect vinyl asbestos tile requires testing
- Metal lockers in good condition

3.3.5 Accessibility

The building is mostly handicap accessible due to the renovations in 1993. However, small non-accessible details remain. Many classroom doors lack the required accessible clearances because of locker infringement into the door setback, drinking fountains are not accessible, showers, accessible signage, staff toilets, and the auditorium lack accessibility (see Section 3.2.2).

Accessibility Summary

- Many accessibility issues remain throughout the building: minimum door side clearances, accessible route deficiencies, drinking fountains, showers, toilets, etc.

Vintage Auditorium

Restroom lavatories

Toilet compartment

Detailed Use-Group Areas

3.3.6 Asbestos Management and Hazardous Materials

An asbestos management report is on file with the State. Asbestos floor tile, mastic and other hazardous materials may be present in the building. A detailed environmental survey is necessary to identify any materials present that will require remediation during renovation.

Suspect floor tile and building materials require environmental testing

Typical hazardous materials encountered in a school building of this vintage:

- Lead based paint
- Asbestos: floor tile, mastic, pipe insulation
- Mercury containing thermostats and switches
- PCB Containing Building Items – light ballasts, clocks, transformers, capacitors, misc electrical equipment
- PCB Containing Building Materials – caulk, adhesives/mastic, certain paint, waterproofing materials, HVAC gaskets, roofing, etc (potentially present in any material that needs to be chemical & fire resistant, durable, and elastic).
- Building Materials that have become PCB contaminated due to leaching of PCBs from caulk and other building materials – grout, concrete, brick, stucco, wood, glass, HVAC system (contaminated dust).
- Exterior soil below PCB contaminated caulk – leaching of PCBs from caulk.

Additional study is required regarding the following:

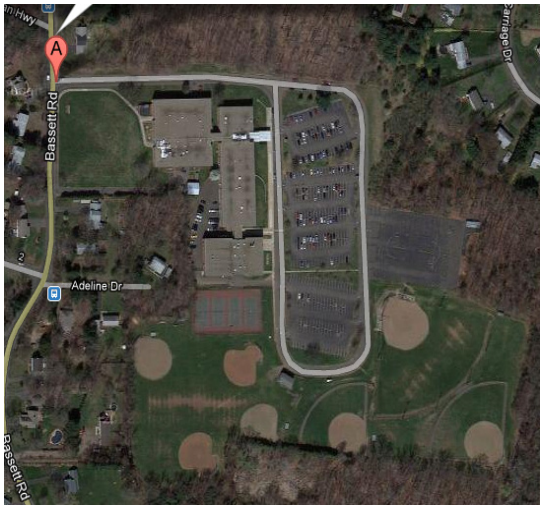
- A site and building Environmental Phase-1, 2, and 3 Report
- A thorough review of the existing Hazardous Material Manifest

Building Site

3.4 Site/Civil Evaluation

The total existing parcel is 20 acres, located in a suburban residential zone (R20). The property is outside the 500 year flood plain. Existing site grades are moderately sloped with steeper grades to the West toward Bassett Road. The building conforms to the local property setback requirements.

The existing surface parking lot is in the rear of the site and visually screened from the road by the building itself and from the perimeter by dense woodlands. Existing site stormwater runoff is to the South and West. An existing stormwater management basin is located South of the athletic fields and collects, treats, and reduces site runoff from the majority of the impervious surfaces on the site.



Site location

Site/Civil Summary

- Site is outside the 500 year flood plain
- Moderately flat, no significant drainage issues.
- Site is suitable for current use
- Verify availability of future required utility services and infrastructure

3.4.1 Vehicular Circulation

The existing surface parking lot is approximately 4.5 acres. This may be reduced to 3 acres to reclaim lawn area, while still allowing for approximately 300 parking spaces.

Based on their current condition, it is recommended that the existing parking lots be milled and overlaid with a new surface course. Tree islands should also be provided between parking rows to increase shading effects and improve aesthetics.

The existing large surface lot is ideally located near the assembly areas of the facility, which helps to facilitate bus staging and audience pedestrian travel.

View of Southwest lot from roof

There is a small surface parking lot in the southwest corner section of the site wedged between the property line and the old basement industrial art shops. This lot should be removed and restored to create a hardscaped and landscaped courtyard with benched seating for cafeteria spill-out space.

The lot can also provide ample school bus queuing space directly adjacent to the main entry. The existing site does not incorporate a separate parent drop-off/pick-up loop drive. It is suggested that this be added on the Bassett Road side of the parcel. This location will increase trip efficiencies and decrease vehicular and pedestrian cross traffic.

Circulation Summary

- Existing paved areas and roadways require refurbishment
- Create new loop for parent drop-off at front of school

3.4.2 Athletic Fields

The existing parking lots are currently shared between the Community College and the Town owned athletic fields. Generally, the athletic fields are not in public use while the school is in session. Therefore, the sharing of these parking lots does not create significant additional loading. It is unknown if a formal agreement for the sharing of the lots is in place, and what impact the conveyance of the property to a new owner may have on the sharing arrangement.

Reducing the acreage of the large lot will increase opportunities for restored natural areas for lawns, athletic fields, plantings, and shade trees; and will reduce the volume and peak flows from site drainage runoff.

Athletic Fields Summary

- Reclaim south parking lot to create new athletic field on site
- Reclaim west parking lot as lawn area / secondary field
- Investigate what becomes of the parking lot sharing arrangement if property is sold

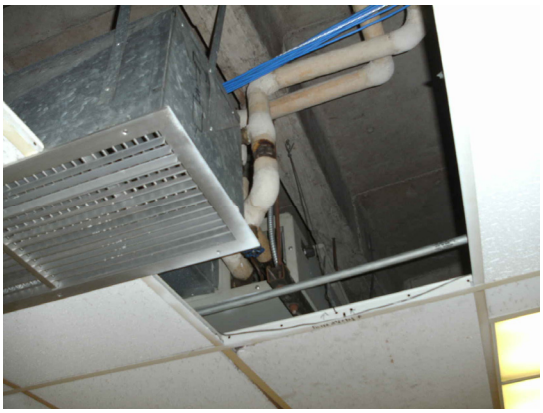
3.5 Structural System

The existing 2-story building structure consists of cast-in-place concrete columns and cast-in-place concrete waffle slab floors and roof. The system appears to be in good condition and suitable for present loads.

The structural grid varies, consisting primarily of a 28′ x 26′-46′ column spacing with12′ vertically from floor to floor and 10′ ceiling heights. There is a marginal amount of room for the introduction of updated mechanical and life safety systems, however much of the space is interrupted by the configuration of the concrete beams and waffle recesses. Coring of the concrete will be required to accommodate new M/E/P/FP systems.

Structural analysis will be required if modifications are made to the structure or if additional mass is added, as in the case of roof mounted mechanical equipment.

Structure restricts penetrations between beams



Limited space between ceiling and structure

Structural Summary

- Structure appears adequate for present loads. Evaluate structure for any intended modifications
- Limited ceiling height and the depth of the cast in place concrete beams make integration of new HVAC systems difficult

Existing mechanical systems

3.6.1 HVAC Existing Systems

General System Overview

In general the existing systems, except for the Heating plant are 20-45 years old and beyond their useful life expectancy. The systems are generally not suitable for today's educational needs. Roof top equipment has been added to provide cooling in various areas but is not adequate for all conditions. Interior mechanical spaces are generally too small and adequate maintenance access is not provided. Ventilation is inadequate in areas and will not promote good indoor air quality. It should be noted that due to the type of building construction, concrete beams, columns and floors, it will be difficult to provide modifications to the structure that can accommodate changes in the type of heating and cooling systems to be utilized.

- Presently hot water heat is provided. Heat is provided from one central boiler room. The boiler room has three dual fuel (gas/#2) oil fired 4,000 MBH capacity cast iron type heating boilers, that were installed as part of a recent boiler replacement project. The existing boilers are vented through a masonry chimney. Combustion air is provided through a louver in the exterior wall.
- Hot water circulation pumps and distribution piping are mostly original to the building.
- The classrooms are heated via unit ventilators located along the exterior walls with louvers for outside air intake. Perimeter fan coils, convectors and perimeter radiation. The heating terminals are in disrepair and most likely not providing the required amount of ventilation air to the spaces.
- There are general and dedicated exhaust systems through out the building. Some of the exhaust fans have been replaced but the majority of the exhaust systems are original to the building.
- The main offices, library, media center and computer labs are air conditioned through single zone DX roof top air conditioning units.
- Some classrooms and various lounges are air conditioned by split or roof top packaged air conditioning equipment.
- The gymnasiums are heated and ventilated by large units located at the ceiling. The space has been converted to an auto shop and additional ventilation equipment added to accommodate the vehicle exhaust requirements.
- The Auditorium is heated and ventilated by two air handlers located in adjacent mechanical spaces.
- The existing control systems are primarily the pneumatic type and are in various stages of inoperability. The controls are not allowing for the building operators to maintain acceptable temperature conditions for comfort and energy considerations.

Existing electrical systems

3.6.2 Electrical Existing Systems

General System Overview

The present electrical service is 2000 Amp, 208 Volt 3, phase service. The electrical system overall is in fair condition. Existing main electrical service size is likely inadequate to support new building program and will need to be replaced. The primary observation regarding the electrical system are as follows:

- Recommend upgrading service to 2000 Amp, 480 Volt, 3 phase.
- In general, additional outlets should be added in most spaces. Many areas have had outlets added, fed with surface mounted raceway. All old wiring should be replaced throughout the building due to the age.
- Fire alarm system is newer Simplex 4100U with mass notification and blue light devices. This system is generally in good condition and could be re-used, but would need to be expanded upon. Devices are not located per current NFPA standards and many devices should be added to bring up to current codes.
- In general, interior lighting is inefficient compared to modern technology. The current layouts provide light levels inadequate compared to IES standards. Interior lighting should be completely replaced with new fixtures in optimal layouts to provide adequate and efficient lighting.
- Parking lot lighting is original HID technology, past its useful life, and should be replaced with higher efficiency fixtures and appropriate controls.
- Solar photovoltaic system is newer and could be re-used if retained.
- Clock / Public Address system is older and should be replaced.
- Stage and auditorium lighting systems are aged and should be replaced.
- In general, existing panels and electrical switchgear do not have capacity for expansion and are past their useful life. Many panels are original to the building. Most panels and main electrical service should be replaced.
- Newer Cisco WiFi system is present and could be re-used.
- Not all elevators have a recall system connected to it. Elevator recall systems should be added to all elevators.
- Exterior building mounted lighting is mainly original HID technology, and numerous fixtures are non-functional. In addition, fixtures at exterior egress doors do not meet current codes. All exterior fixtures should be replaced with newer more efficient fixtures that meet current codes.
- Telecomm grounding system has been installed in building and may be able to be re-used.
- Security camera system is newer and may be able to be re-used.

Existing plumbing conditions

3.6.3 Plumbing Existing Systems

General System Overview

In general the existing systems are 45 years old and far beyond their useful life expectancy. Plumbing piping, roof drainage and fixtures are in fair condition. Complete removal and replacement is recommended with the exception of the new water heaters.

- Natural gas is currently at the school. In 2010, the main boilers and water heaters were replaced. A new gas meter is at this location.
- Roof drainage is accommodated via a flat built up roof pitched to a minimal amount of internal roof drains located in the center. The roof drains are hard piped with cast iron pipe with hub and spigot joints. The piping is collected together throughout the building and is piped underground to a main system in the street which leads to Bassett Road. Some ponding is occurring near the rooftop units. There are no secondary roof drains. In the event of a clogged roof drain, the water will spill over the roof as there are no parapets around the perimeter. The primary roof drains are in poor condition, broken and clogged.
- Sanitary sewerage service consists of galvanized steel for the smaller piping and cast iron pipe with hub and spigot joints for the larger piping. The piping is collected together throughout the building and is piped underground to a main system in the street. Sewer service is a gravity type to a public treatment facility. Septic tanks not present. Pumping is not present.
- Domestic water to the school is fed from an existing eight-inch water main in Bassett Road which feeds a eight-inch water main to the school. Domestic water piping is copper tubing type "L" with soldered type joints. Pipe insulation was missing in some locations. A backflow preventer is not present. Existing water pressure is 45 psi is fair. With the low pressure, a booster pump would likely be required due to a backflow preventer and new flush valve pressure requirements.
- Domestic water is heated with two newer individual 100 gallon, vertical, gas-fired water heaters in the boiler room which serves the school, installed in 2010. There is also a large point of use electric water heater for the kitchen located in a storage room adjacent to the kitchen.
- Some plumbing fixtures were updated to ADA (Americans with Disabilities Act) compliant fixtures in 1993 when the building was sold to the State University system and renovated into a branch of Gateway Technical College. The plumbing fixtures also are not low-flow or energy efficient. This is not a requirement but may be desired. The current plumbing fixtures are in fair condition.
- The kitchen has a floor set grease trap that is noncompliant. The grease trap must be either an above grade grease recovery unit or an exterior minimum 1,000 gallon grease trap.
- The CT Public health code also requires minimum 140 deg. F hot water for rinsing and sanitization of kitchen equipment; utensils, pots, etc.

The majority of the school is not sprinklered.

3.6.4 Fire Protection Existing System

General System Overview

In general the majority of the existing school is not sprinklered and needs to be sprinklered. The existing sprinklers and service would be replaced due to renovations occurring.

- The existing 1960 school did not have sprinklers or standpipes.
- In 1990, a code update provided sprinklers and standpipes to the stage area only. There is a fire curtain, so a deluge sprinkler system is not required at the stage. The remainder of the school is not sprinklered.
- Today's buildings require fully sprinklered schools. There is little ceiling space above the hung ceiling to install sprinklers.
- Existing water pressure is 52 psi which is fair. Flow near the high school is 2,134 gpm which is excellent. The flow and pressure would support a sprinkler system. With the low pressure, a fire pump would likely be required to minimize pipe sizes.
- An existing eight-inch water main exists in Bailey Road which feeds a six-inch water main to the school.
- Some classrooms are below grade without an exterior door at grade or two means of egress. Sprinklers are currently not provided.
- A standpipe system is not required throughout the school as the floor of the highest story is not greater than 30 feet above fire department access.
- State of CT Public Act 29-515 requires: "When any building is eligible for a school building grant pursuant to chapter 173, and put out to bid on or after July 1, 2004, such building shall have an automatic fire extinguishing system approved by the State Fire Marshal on each floor."
- Due to the low floor to structure height, low ceiling heights, small bar joist openings throughout the school, to add sprinklers concealed above the ceiling would be very difficult. Exposing sprinklers in a school environment is not recommended as they would be subject to damage, false alarms and flooding. Exposing piping is not recommended in any renovated installation.

3.6.5 Existing Systems Summary - Mechanical, Electrical, Plumbing and Fire Protection

In general, the existing systems are obsolete and far beyond their useful life:

Mechanical Systems

- The existing Mechanical system is obsolete and in need of replacement
- To accomplish the long term needs of the facility it is anticipated the existing mechanical systems will need to be completely removed and replaced with new energy efficient systems suitable for the new function of the space.

Electrical System

- The existing electrical system is aged and the existing service inadequate.
- The entire electrical system should be replaced, and the service upgraded to meet the needs and demands of a modern school building.

Plumbing Systems

- The existing systems are 45 years old and far beyond their useful life expectancy. Plumbing piping, roof drainage and fixtures are in fair condition.
- Complete removal and replacement is recommended with the exception of the new water heaters.

Fire Protection System

- The majority of the existing school is not sprinklered and must be sprinklered.

Notes

This report is an existing equipment audit based on site observations. However, it should be noted it is intended to present a description of existing M/E/P/FP systems only, with general references to potential upgrades for scope and magnitude of cost purposes. Should the school be renovated, a phase two analysis will identify various options, with recommendations for the owner based on the architectural vision for the future building occupancy and function.

3.7 CODE COMPLIANCE SUMMARY:

2005 Connecticut Building Code / IBC 2003

IBC International Building Code (2003) w/2004, CT Amendments
ICC/ANSI A117.1/1998 Accessible and Usable Buildings and Facilities

2005 Connecticut Fire Safety Code Guide book
2005 IBC w/Connecticut Supplements

International Energy Conservation Code 2003
International Mechanical Code 2003
International Plumbing Code 1997
International Electric Code
Federal Fair Housing Act (1988)

Project Description

An existing 1968 three story, 154,537 square foot school facility located in North Haven, Connecticut at 88 Bassett Road on 20.01 acres with a mixed use occupancy.

Chapter 3: Building Occupancy

	Section	Description	Allowed/Required	Provided	Remarks
	302.1	Occupancy	E - Educational A-1, A-2, A-3 – Assembly B - Business		
	302.1.1	Incidental Use	Boiler rooms, Science Labs – requires sprinkler system and smoke barrier		
	302.2.1	Accessory Use	Assembly Areas		
	302.3	Mixed Occupancies	NFPA 13 Sprinkler	No existing system	Look at table 302.
	302.3.2	Separated Uses	2 hr. (1 hr. reduction)	1hr. Provided	

Chapter 4: Special Detailed Requirements Based on Use and Occupancy

	Section	Description	Allowed/Required	Provided	Remarks
	410.3.1.1	Stage Height and Area	Area = Stage + Support Areas Height = Low point of stage to high point of underside of deck		
	410.3.3	Exterior Stage Doors	Fire doors (Section 715) Vestibules on loading doors		
	410.3.6	Scenery	Combustible materials rendered flame resistant		
	410.3.7	Stage Ventilation	>1000 SF requires emergency ventilation		
	410.3.7.1	Roof Vents	2 or more heat-activated vents Clear opening not less than 5% of stage area		
	410.3.7.2	Smoke Control	See Section 909		.
	410.5.1	Dressing Rooms - Separation from Stage	Height <50 ft. = 1 Hr. Fire Barrier		
	410.5.2	Separation From Each Other	1 Hr.		
	410.5.4	Stage Exits	1 Approved means of egress @ each side of stage		
	410.6	Automatic Sprinkler System	Equip according to Chapter 9. Not required under stage if<4' in clear height and used for storage	No existing system	
	410.7	Standpipes	Provide according to Section 905	No existing system	
	419	Group E			
	419.2	Fire Barriers	Exception 1 – Sprinkler System	Not required	

Chapter 5: General Building Heights and Areas

	Section	Description	Allowed/Required	Provided	Remarks
	503 table	Assembly (A-1)	5 Floors/Unlimited SF		1B construction
	503 table	Assembly (A-2/A-3)	11 Floors/Unlimited SF		1B construction
	503 table	Educational (E)	5 Floors/Unlimited SF		1B construction
	503 table	Business (B)	11 Floors/Unlimited SF		1B construction
	504.2	Automatic sprinkler system increase	NA		
	506.1	General	NA		
	506.2	Area Modification	NA		
	506.3	Area Modification	NA		

Chapter 6: Construction Classification

	Section	Description	Allowed/Required	Provided	Remarks
	602.2	Type 2B	Noncombustible Materials		
	601 Table Type 2B	Fire Rating for Building Elements	Structural Frame: 2 hr Bearing wall Int/ Ext:2 hr Floor Const: 2 hr Roof Const: 2 hr		
	602 table	Exterior wall fire rating	>10'=30' requires 1 Hr rating at 1B Construction Type	1 Hr	

Chapter 7: Fire Resistant Rated Construction

	Section	Description	Allowed/Required	Provided	Remarks
	704.8	Allowable Area of Openings	Table 704.8 Fire Separation Distance >20' = No limit		
	706.1	Fire Barriers	Horizontal Exits, separate occupancies, incidental use areas, separate single occupancy into different fire areas.	2 hr. Provided	Table 706.3.7 E & A – 2 Hr.
	706.5	Horizontal fire Barriers	As per section 711	Provided	Incidental use sep.
	706.7	Openings	Protected as per 715	Provided	
	715.3 Table	Fire Door Ratings	2 HR Assembly = 1 ½ Hr. door	NA	

Chapter 9: Fire Protection Systems

	Section	Description	Allowed/Required	Provided	Remarks
	903.2.1	Group A	Automatic Sprinkler System - to be provided		
	903.2.1.1	Group A-1	Occupant Load >300 Occupants		
	903.2.1.2	Group A-2	Fire Area >5000 SF, Occupancy Load >300		
	903.2.1.3	Group A-3	Fire Area >12000 SF, Occupancy Load >300		
	903.2.2	Group E	Automatic sprinkler system to be provided throughout Fire Areas >20,000 SF		
	905.3.4	Stages	Hose connections connected to Sprinkler system at each end of stage		
	906.1	Portable Fire Extinguishers	Required		
	907.2.1	Fire Alarm – Group A	Manual alarm not required if automatic sprinkler system		
	907.2.3	Fire Alarm – Group E	Fire alarm connected to building system Ex. 1 <50 people Ex. 2 Manual alarm not required if interior corridor protected by smoke detectors; auditorium, café, gym protected by head detectors		

Chapter 10: Means of Egress

	Section	Description	Allowed/Required	Provided	Remarks
	1003,2	Ceiling Height	Min 7ft		
	1004.1.2 Table	Max floor area allowance per Occupant	Gym = 5 net Assembly (fixed seats) = # of seats Assembly (cafeteria) = 15 net Business = 100 gross Stages = 15 net Lockers = 50 gross Storage/Mechanical = 300 gross Library (reading) = 50 net Library (stacks) = 100 gross Educational (classroom) = 20 net Educational (shops) = 50 net		
	1004.3	Posting of Occupancy Load	Assembly Areas		
	1004.7	Fixed Seating	Occupancy load determined by # of fixed seats		
	1004.8	Outdoor Areas	Occupancy load assigned by building official. Provide means of egress		
	1004.9	Multiple Occupancies	2 or more occupancies utilize same means of egress, meet more stringent requirements		
	1005.1	Minimum Required Egress Width	Occupancy Load x 0.2		
	Section	Description	Allowed/Required	Provided	Remarks
	1007.1	Accessible Means of Egress	Required		
	1008.1.1	Exit Door requirements	Size of Doors – not less than 32”		
	1008.3	Turnstiles	Not obstruct means of egress		
	1010.2	Ramp Slope	1:12 slope max for egress 1:18 all other pedestrian uses	Provided	Remarks
	1010,4	Ramp Rise	Max rise 30”		
	1010.4	Ramp width	Min 36” clear btwn handrails		
	1010.6.1	Ramp landing size	36” W x 60” L		Landing w/ direction change 60”x60”
	1010.8	Ramp Handrails	Ramps with rise >6” must have handrails both sides		
	1011.1.1	Floor Proximity Exit Signs	Group A >300 Occupants, required		

Chapter 10: Means of Egress

	1013	Exit Access			
	1013.3	Common Path of Travel	75 ft max		
	1013.4	Aisles	Assembly – comply with Section 1024		
	1014.1	Exit and Exit Access Doorways	Table 1014.1 Max occupancy load = 50 with 1 means of egress		
	1014.3	Boiler, Incinerator and Furnace Rooms	>500 SF requires 2 exits		
	1014.6	Stage Means of Egress	1 Means of egress at each side of stage required		
	1015.1 Table	Exit Access Travel Distance	A, E - 250 ft w/sprinkler		
	1015.1	Exit Access Travel Illumination	Provide continuous Illuminated strip along exit access corridor		
	1016.1	Corridor Fire resistance	Occupancy>30 - 0 hr w/ sprinkler		
	1016.2	Corridor Width	Ex. 4 – Group E w/ 100 Occ. Load = 72" minimum		
	1018.1	Min number of exits	Min 2 exits w 1-500 occupant load 3 exits 501-1000 occupant load		
	1021.2	Separation	Horizontal exit with fire wall (705) or fire barrier (706) Not less than 2 Hr.		
	1024.2	Assembly Main Exit	Exits can be distributed around perimeter		
	1024.6.1	Without Smoke Protection	Slopes > 1:12 = 22/100" per occupant Slopes < 1:12 = 2/10" per occupant		
	1024.7	Travel Distance	250 ft. in sprinklered building		
	1024.9.1	Minimum Aisle Width	42" for ramped with seating on both sides 36" for ramped with seating on one side		
	1025.1.1	Emergency Escape & rescue	Group E Occupancies – not required with sprinkler system		

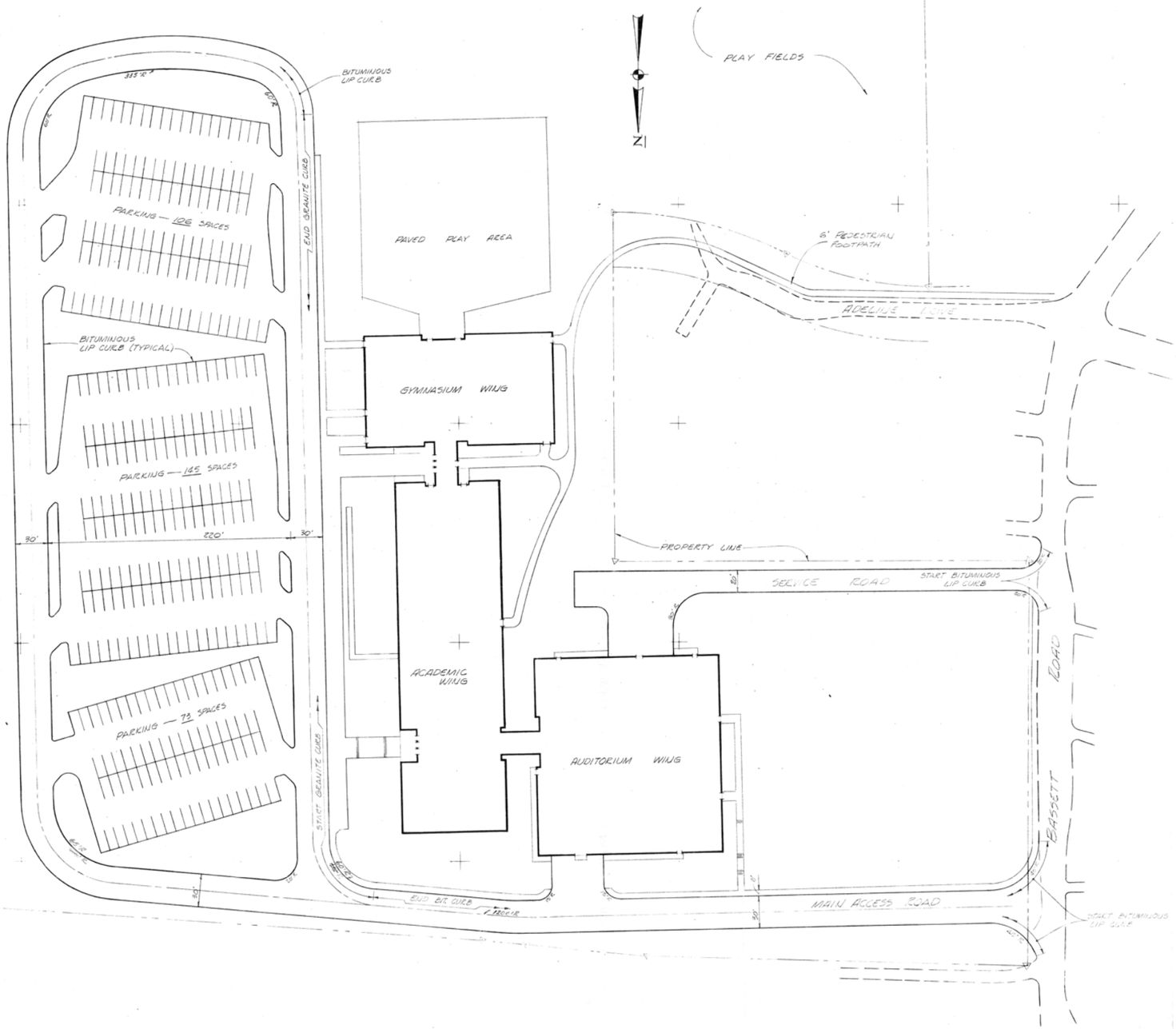
Chapter 11: Accessibility

	Section	Description	Allowed/Required	Provided	Remarks
	1106	Parking & Passenger Loading Facilities			
	1106.5.1	Van Space	1 for every 6 accessible spaces		Space 16' Wide w/8" aisle
	1108.2	Assembly Area Seating			
	1108.2.1	Wheelchair Spaces	Table 1108.2.2.1: 301-500 = 6 wheelchair spaces		
	1108.2.7	Assistive Listening Systems	Table 1108.2.7.1: 201-500 = 2 receivers + 1/25 seats over 50 ¼ of receivers hearing aid compatible		

3.8 Summary

This report has described and analyzed the existing school facility for compliance with current Code, building condition deficiencies as well as evaluated the building systems and finishes. The report has provided recommendations to remediate non-conforming components to improve the health, safety, welfare, and public accessibility to the existing facility.

REVISIONS				
NO.	DATE	DESCRIPTION	DES.	DR.



PRELIMINARY

ORCHARD HILL JUNIOR HIGH SCHOOL

NORTH HAVEN CONNECTICUT

SITE PLAN

MILTON E. NELSON, A.I.A.
ARCHITECT

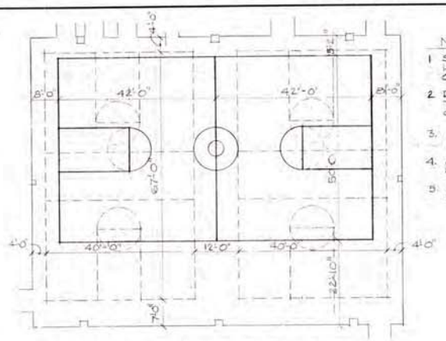
CHARLES A. MAGUIRE & ASSOCIATES
ENGINEERS
PROVIDENCE — HARTFORD — BOSTON

PROJ. MGR.	DFS/DFJ	SCALE: 1" = 40'	DRAWING NUMBER
DRAWN		DATE: 19 NOV. 65	
		C.A.M. NO. 560	SHEET OF

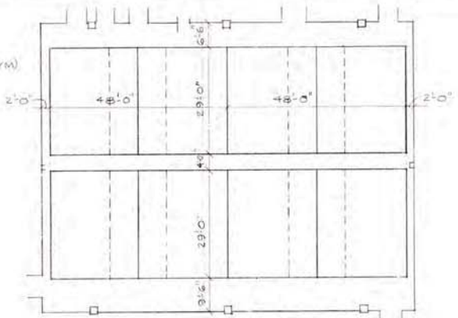
REVISIONS				
NO.	DATE	DESCRIPTION	DES.	DR.

NOTES:

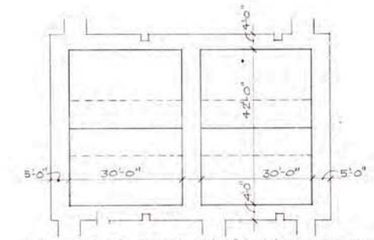
1. SOLID LINES INDICATE REGULATION HIGH SCHOOL SIZE BASKETBALL COURT MARKINGS. SIZE 50'-0" x 84'-0" (IN LARGE GYM)
2. DOTTED LINES INDICATE MARKINGS FOR TWO 40'-0" x 67'-0" PRACTICE BASKETBALL COURTS. (IN LARGE GYM)
3. ALL BASKETBALL COURT MARKING LINES ARE 2" WIDE
4. ALL VOLLEYBALL COURT MARKING LINES ARE 2" WIDE
5. ALL BADMINTON COURT MARKING LINES ARE 1½" WIDE



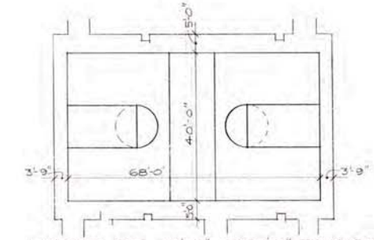
LAYOUT OF BASKETBALL COURTS IN LARGE GYM. ROOM NO. 0001
SCALE 1/16" = 1'-0"



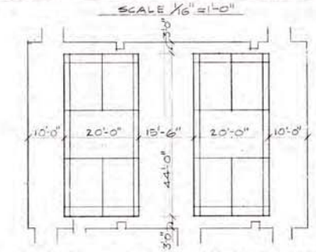
LAYOUT OF FOUR 29'-0" x 48'-0" VOLLEYBALL COURTS IN LARGE GYM. ROOM NO. 0001
SCALE 1/16" = 1'-0"



LAYOUT OF TWO 30'-0" x 42'-0" VOLLEYBALL COURTS IN SMALL GYM ROOM NO. 0011
SCALE 1/16" = 1'-0"

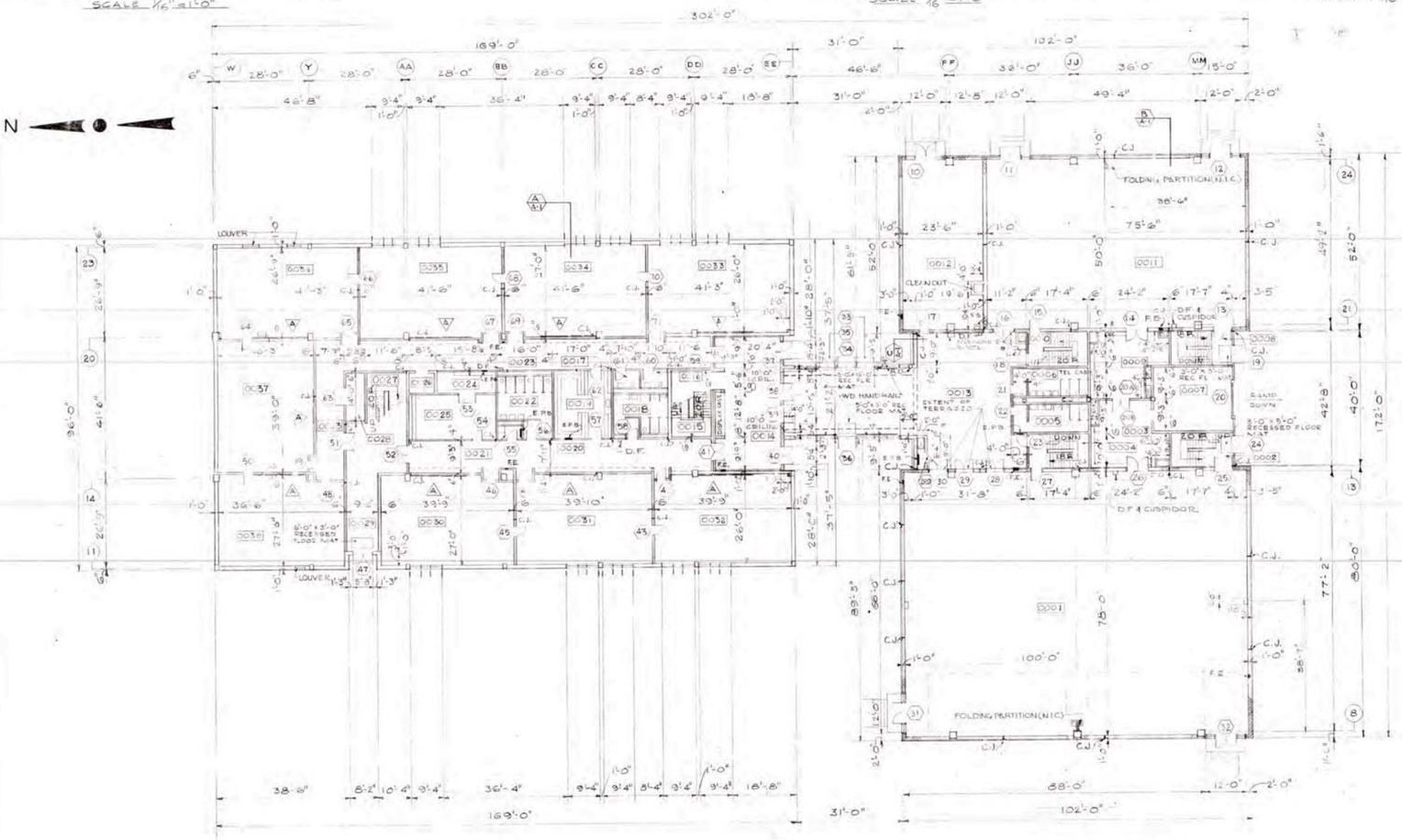


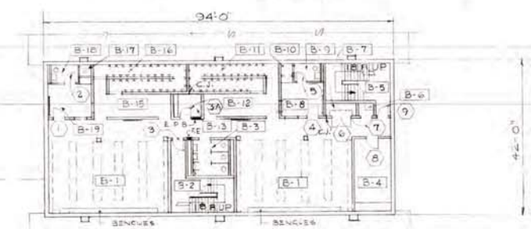
LAYOUT OF 40'-0" x 68'-0" BASKETBALL COURT IN SMALL GYM. ROOM NO. 0011
SCALE 1/16" = 1'-0"



LAYOUT OF TWO 20'-0" x 44'-0" BADMINTON COURTS IN SMALL GYM - ROOM NO. 0011
SCALE 1/16" = 1'-0"

N

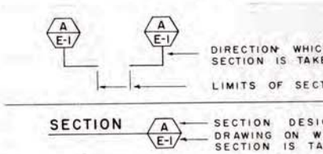




BASEMENT FLOOR PLAN

ROOM LEGEND

B-1	BOY'S LOCKER ROOM	0001	GYMNASIUM	0020	CORRIDOR
B-2	STAIRHALL	0002	STAIRHALL	0021	CUSTODIAL CLOSET
B-3	TOILET ROOM	0003	STORAGE ROOM	0022	TOILET ROOM
B-4	STORAGE ROOM	0004	STAIRHALL	0023	CORRIDOR
B-5	STAIRHALL	0005	TOILET ROOM	0024	MACHINE & STORAGE RM.
B-6	CUSTODIAL CLOSET	0006	TOILET ROOM	0025	DEPT. HEAD OFFICE
B-7	TOWEL STORAGE	0007	STORAGE ROOM	0026	ELEVATOR SHAFT
B-8	OFFICE	0008	STAIRHALL	0027	STAIRHALL
B-9	TOILET ROOM	0009	STORAGE ROOM	0028	EQUIPMENT ROOM
B-10	SHOWER ROOM	0010	STAIRHALL	0029	CORRIDOR
B-11	SHOWER ROOM	0011	GYMNASIUM	0030	GENERAL SCIENCE LAB.
B-12	DRYING ROOM	0012	MECHANICAL ROOM	0031	GENERAL SCIENCE LAB.
B-13	STORAGE ROOM	0013	LOBBY	0032	GENERAL SCIENCE LAB.
B-15	DRYING ROOM	0014	VESTIBULE	0033	GENERAL SCIENCE LAB.
B-16	SHOWER ROOM	0015	STAIRHALL	0034	GENERAL SCIENCE LAB.
B-17	SHOWER ROOM	0016	TOILET ROOM	0035	GENERAL SCIENCE LAB.
B-18	TOILET ROOM	0017	TOILET ROOM	0036	GENERAL SCIENCE LAB.
B-19	OFFICE	0018	TOILET ROOM	0037	GENERAL SCIENCE LAB.
		0019	STORAGE & PREPARATION	0038	GENERAL SCIENCE LAB.



SECTION LEGEND

LIST OF ABBREVIATIONS

ACOUS. = ACOUSTIC
ACOUST. = ACOUSTIC
ADJ. = ADJUSTABLE
ALUM. = ALUMINUM
APPROX. = APPROXIMATE
A.V. = AUDIO VISUAL
BM. = BEAM
BSMT. = BASEMENT
CAB. = CABINET
C.B. = CHALK BOARD
CEIL. = CEILING
C.J. = CONTROL JOINT
C.M.U. = CONCRETE MASONRY UNIT
COL. = COLUMN
CONC. = CONCRETE
CONT. = CONTINUOUS
C.T. = CERAMIC TILE
DEPT. = DEPARTMENT
DET. = DETAIL
D.F. = DRINKING FOUNTAIN
DISP. = DISPENSER
DR. = DOOR
DRS. = DOORS
DWG. = DRAWING
ELECT. = ELECTRIC
ELEV. = ELEVATION
E.P.B. = ELECTRIC PANEL BOARD
EQUIP. = EQUIPMENT
E.W.C. = ELECTRIC WATER COOLER
EXIST. = EXISTING
EXP. = EXPANSION
EXP. STRUCT. = EXPOSED STRUCTURE
EXT. = EXTERIOR
EXT'D. = EXTEND
F.A. = FRESH AIR
FAC. = FACTORY
FAST. = FASTENED
F.D. = FLOOR DRAIN
F.E. = FIRE EXTINGUISHER
FIN. = FINISH
FL. = FLOOR
FND. = FOUNDATION
GALV. = GALVANIZED
GR. = GRADE
GYM. = GYMNASIUM
HT. = HEIGHT
INSUL. = INSULATION
JT. = JOINT
LAB. = LABORATORY
L.C. = LEAD COATED
MECH. = MECHANICAL
MET. = METAL
M.O. = MASONRY OPENING
NAT. = NATURAL
N.I.C. = NOT IN CONTRACT
NO. = NUMBER
NOS. = NUMBERS
O.C. = ON CENTER
OPNG. = OPENING
OPP. = OPPOSITE
OZ. = OUNCE
PERF. = PERFORATED
PLYWD. = PLYWOOD
POL. = POLISHED
PT. = PAINT
PTD. = PAINTED
R. = RISERS
R.D. = ROOF DRAIN
REC. = RECESSED
REQD. = REQUIRED
RM. = ROOM
RMS. = ROOMS
S.A.T. = SUSPENDED ACOUSTIC TILE
S. & H. = SEALER & HARDENER
S.G.F.T. = STRUCTURAL GLAZED FACING TILE
SHT. = SHEET
S.K.C.P. = SUSPENDED KEANE'S CEMENT PLASTER
S.N.D. = SANITARY NAPKIN DISPENSER
S.N.DISP. = SANITARY NAPKIN DISPOSER
SPEC. = SPECIFICATION
S-ST. = STAINLESS STEEL
STRUCT. = STRUCTURAL
ST. TR. = STEEL TROWEL
T. Pb. = TACK BOARD
T. & B. = TOP & BOTTOM
THK. = THICK
TEL. = TELEPHONE
TEMP. = TEMP.
TERR. = TERRAZZO
TPD. = TOILET PAPER DISPENSER
TR. = TRANSOM
TYP. = TYPICAL
V.A.T. = VINYL ASBESTOS TILE
VERT. = VERTICAL
V.T.R. = VENT THROUGH ROOF
W&W. = WASH & WAX
WD. = WOOD
WT. = WEIGHT
@ = AT
& = AND
W/ = WITH
℄ = PLATE

MATERIAL LEGEND

CONCRETE
BRICK
C M U
S.G.F.T.
ACOUSTIC TILE
RIGID INSULATION
WD. BLOCKING
STEEL
PLYWOOD
FINISHED WD.
1/4" WIRE GLASS
GLASS FIBER INSULATION
EARTH
COMPACTED GRAVEL

GRAPHIC SCALE

1/16" = 1'-0" 0 5' 10' 20' 30' 40' 50' 60'

NOTES:
1-FOR SECTIONS A/E-1 B/A-1 C/A-1 SEE DWG. NO. A-12
2-FOR ENTRANCE ELEVATIONS & DETAILS SEE DRAWING NOS. A-13 & A-14
3-FOR CHALK BOARD & TACK BOARD ELEVATIONS SEE DRAWING NO. A-24
4-FOR DISPLAY CASE DETAILS SEE DWG. NO. A-9
5-FOR DETAILS OF 10'-0" CEILING SOFFIT RM. 0013 SEE DRAWING A-2
6-FOR DETAILS OF WOOD HANDRAILS IN ROOM 0013 SEE DETAILS DRAWING A-16

ORCHARD HILL JUNIOR HIGH SCHOOL

NORTH HAVEN — CONNECTICUT

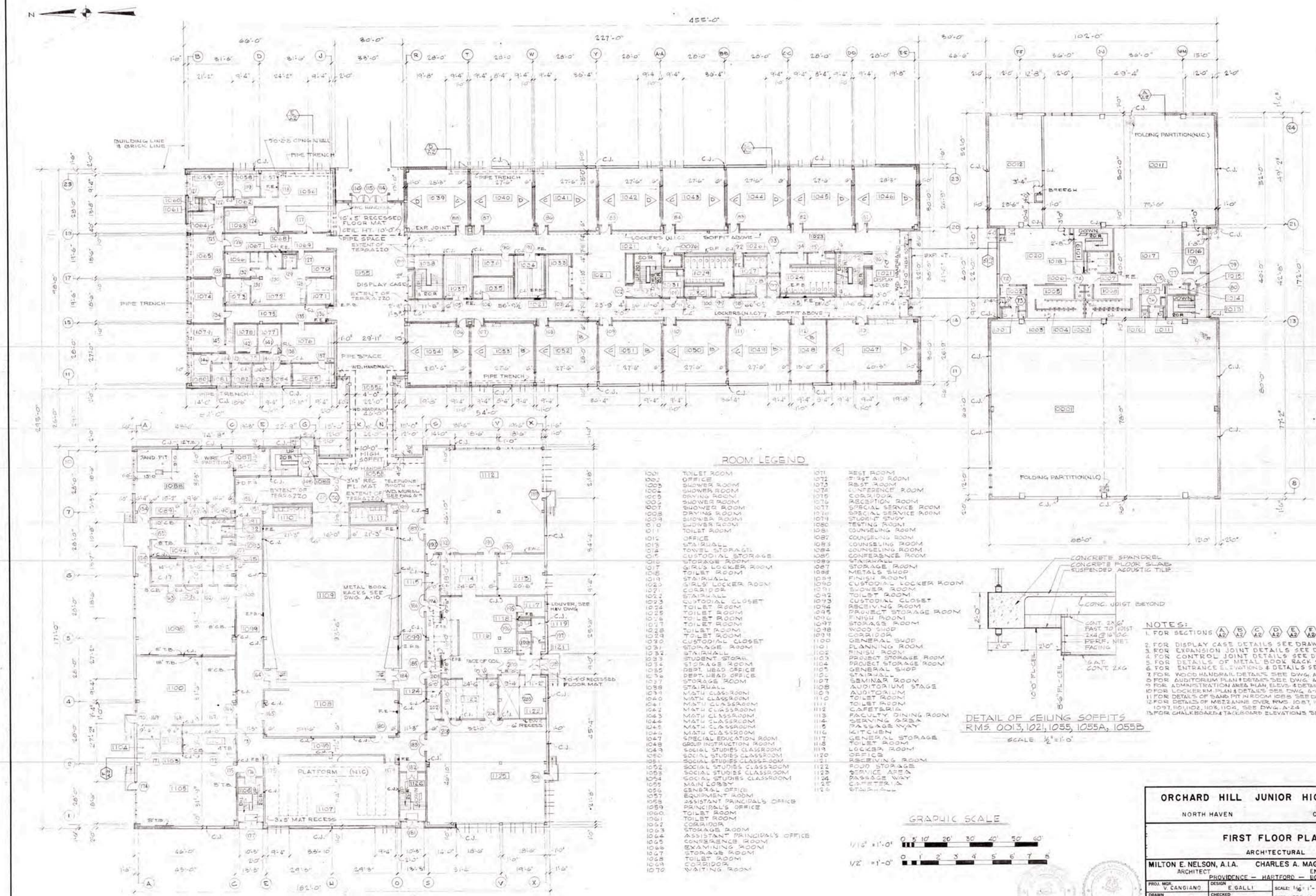
GROUND & BASEMENT FLOOR PLANS

ARCHITECTURAL

MILTON E. NELSON, A.I.A. — ARCHITECT
CHARLES A. MAGUIRE & ASSOCIATES — ENGINEERS
PROVIDENCE — HARTFORD — BOSTON

PROJ. MGR. V. CANGIANO	DESIGN E. GALLI	SCALE: 1/16" = 1'-0"	DRAWING NUMBER A-1
DRAWN R. HALKOLA	CHECKED P. PETERSON	DATE: FEB. 14, 1966	
APPROVED		C.A.M. NO. 560	SHEET 12 OF 88

REVISIONS				
NO.	DATE	DESCRIPTION	DES.	DR.



ROOM LEGEND

1001	TOILET ROOM	1071	REST ROOM
1002	OFFICE	1072	FIRST AID ROOM
1003	SHOWER ROOM	1073	REST ROOM
1004	SHOWER ROOM	1074	CONFERENCE ROOM
1005	DRYING ROOM	1075	CORRIDOR
1006	SHOWER ROOM	1076	RECEPTION ROOM
1007	SHOWER ROOM	1077	SPECIAL SERVICE ROOM
1008	DRYING ROOM	1078	SPECIAL SERVICE ROOM
1009	SHOWER ROOM	1079	STUDENT STUDY
1010	SHOWER ROOM	1080	TESTING ROOM
1011	TOILET ROOM	1081	COUNSELING ROOM
1012	OFFICE	1082	COUNSELING ROOM
1013	STAIRWALL	1083	COUNSELING ROOM
1014	TOWEL STORAGE	1084	COUNSELING ROOM
1015	CUSTODIAL STORAGE	1085	CONFERENCE ROOM
1016	STORAGE ROOM	1086	STAIRWALL
1017	GIRLS' LOCKER ROOM	1087	STORAGE ROOM
1018	TOILET ROOM	1088	METALS SHOP
1019	STAIRWALL	1089	FINISH ROOM
1020	GIRLS' LOCKER ROOM	1090	CUSTODIAL LOCKER ROOM
1021	CORRIDOR	1091	SHOWER ROOM
1022	STAIRWALL	1092	TOILET ROOM
1023	CUSTODIAL CLOSET	1093	CUSTODIAL CLOSET
1024	TOILET ROOM	1094	RECEIVING ROOM
1025	TOILET ROOM	1095	FACULTY STORAGE ROOM
1026	TOILET ROOM	1096	FINISH ROOM
1027	TOILET ROOM	1097	STORAGE ROOM
1028	TOILET ROOM	1098	WOOD SHOP
1029	TOILET ROOM	1099	CORRIDOR
1030	CUSTODIAL CLOSET	1100	GENERAL SHOP
1031	STORAGE ROOM	1101	PLANNING ROOM
1032	STAIRWALL	1102	FINISH ROOM
1033	STUDENT STORE	1103	PROJECT STORAGE ROOM
1034	STORAGE ROOM	1104	PROJECT STORAGE ROOM
1035	DEPT. HEAD OFFICE	1105	GENERAL SHOP
1036	DEPT. HEAD OFFICE	1106	STAIRWALL
1037	STORAGE ROOM	1107	SEMINAR ROOM
1038	STAIRWALL	1108	AUDITORIUM STAGE
1039	MATH CLASSROOM	1109	AUDITORIUM
1040	MATH CLASSROOM	1110	TOILET ROOM
1041	MATH CLASSROOM	1111	TOILET ROOM
1042	MATH CLASSROOM	1112	CAFETERIA
1043	MATH CLASSROOM	1113	FACULTY DINING ROOM
1044	MATH CLASSROOM	1114	SERVING AREA
1045	MATH CLASSROOM	1115	PASSAGE WAY
1046	MATH CLASSROOM	1116	KITCHEN
1047	SPECIAL EDUCATION ROOM	1117	GENERAL STORAGE
1048	GROUP INSTRUCTION ROOM	1118	TOILET ROOM
1049	SOCIAL STUDIES CLASSROOM	1119	LOCKER ROOM
1050	SOCIAL STUDIES CLASSROOM	1120	OFFICE
1051	SOCIAL STUDIES CLASSROOM	1121	RECEIVING ROOM
1052	SOCIAL STUDIES CLASSROOM	1122	FOOD STORAGE
1053	SOCIAL STUDIES CLASSROOM	1123	SERVICE AREA
1054	SOCIAL STUDIES CLASSROOM	1124	PASSAGE WAY
1055	MAIN LOBBY	1125	CAFETERIA
1056	GENERAL OFFICE	1126	STAIRWALL
1057	EQUIPMENT ROOM		
1058	ASSISTANT PRINCIPAL'S OFFICE		
1059	PRINCIPAL'S OFFICE		
1060	TOILET ROOM		
1061	TOILET ROOM		
1062	CORRIDOR		
1063	STORAGE ROOM		
1064	ASSISTANT PRINCIPAL'S OFFICE		
1065	CONFERENCE ROOM		
1066	EXAMINING ROOM		
1067	STORAGE ROOM		
1068	TOILET ROOM		
1069	CORRIDOR		
1070	WAITING ROOM		

DETAIL OF CEILING SOFFITS RMS. 0013, 1021, 1055, 1055A, 1055B

SCALE 1/2" = 1'-0"

NOTES:

1. FOR SECTIONS A/A2 B/A2 C/A2 D/A2 E/A2 F/A2 SEE DRAWING NO. A-12
2. FOR DISPLAY CASE DETAILS SEE DRAWING NO. A-9
3. FOR EXPANSION JOINT DETAILS SEE DRAWING NO. A-23
4. FOR CONTROL JOINT DETAILS SEE DRAWING NO. A-23
5. FOR DETAILS OF METAL BOOK RACK SEE DRAWING A-10
6. FOR ENTRANCE ELEVATIONS & DETAILS SEE DRAWING A-13 & 14
7. FOR WOOD HANDRAIL DETAILS SEE DWG. A-16
8. FOR AUDITORIUM PLAN & DETAILS SEE DWG. A-10
9. FOR ADMINISTRATION AREA PLAN, ELEVS. & DETAILS SEE DWGS. A-7 A-8, A-9
10. FOR LOCKER RM. PLAN & DETAILS SEE DWG. A-6
11. FOR DETAILS OF SAND PIT IN ROOM 1088 SEE DWG. A-24
12. FOR DETAILS OF MEZZANINE OVER RMS. 1087, 1089, 1090, 1098, 1096, 1097, 1101, 1102, 1103, 1104, SEE DWG. A-24
13. FOR CHALKBOARD & TACKBOARD ELEVATIONS SEE DWG. A-24

GRAPHIC SCALE

1/16" = 1'-0" 0 5' 10' 20' 30' 40' 50' 60'

1/2" = 1'-0" 0 1' 2' 3' 4' 5' 6' 7' 8'

ORCHARD HILL JUNIOR HIGH SCHOOL

NORTH HAVEN — CONNECTICUT

FIRST FLOOR PLAN

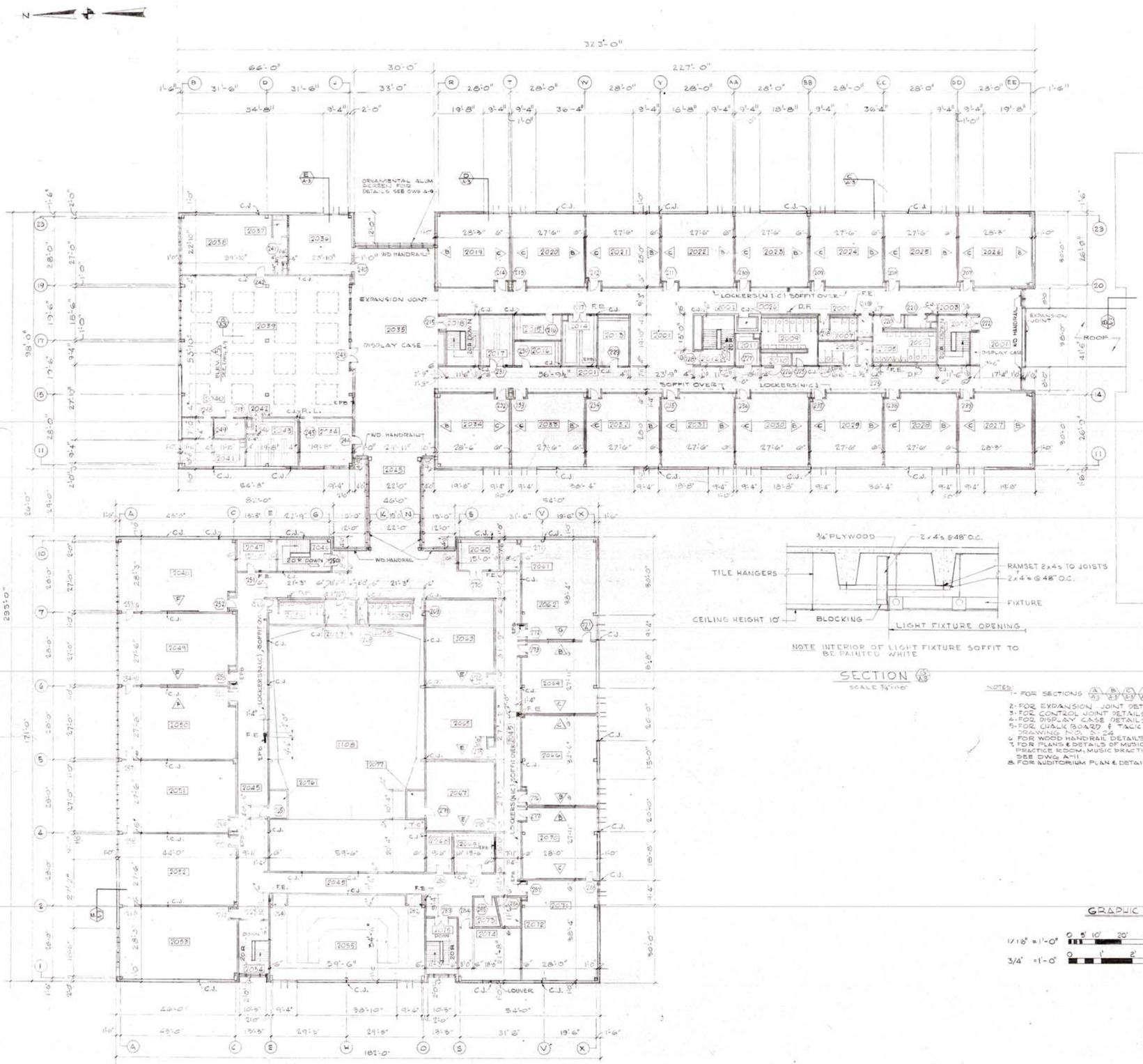
ARCHITECTURAL

MILTON E. NELSON, A.I.A. — ARCHITECT

CHARLES A. MAGUIRE & ASSOCIATES — ENGINEERS — PROVIDENCE — HARTFORD — BOSTON

PROJ. MGR. V. CANGIANO	DESIGN E. GALLI	SCALE: 1/16" = 1'-0"	DRAWING NUMBER A-2
DRAWN W. HALKOLA	CHECKED P. PETERSON	DATE: FEB. 14, 1966	
APPROVED		C.A.M. NO. 560	SHEET 13 OF 88

REVISIONS				
NO.	DATE	DESCRIPTION	DES.	DR.



NOTE INTERIOR OF LIGHT FIXTURE SOFFIT TO BE PAINTED WHITE

SECTION

SCALE 3/4"=1'-0"

NOTES:
1- FOR SECTIONS A/A3 B/A3 C/A3 D/A3 E/A3 F/A3 SEE DWG. NO. A-12
2- FOR EXPANSION JOINT DETAILS SEE DRAWING NO. A-23
3- FOR CONTROL JOINT DETAILS SEE DRAWING NO. A-23
4- FOR DISPLAY CASE DETAILS SEE DRAWING NO. A-9
5- FOR CHALK BOARD & TACK BOARD ELEVATIONS SEE DRAWING NO. A-24
6- FOR WOOD HANDRAIL DETAILS SEE DWG. A-14
7- FOR PLANS & DETAILS OF MUSIC CLASSROOMS, MUSIC GROUP PRACTICE ROOM, MUSIC PRACTICE ROOMS & BAND ROOM SEE DWG. A-11
8- FOR AUDITORIUM PLAN & DETAILS SEE DWG. NO. A-10

ROOM LEGEND

2001	CORRIDOR	2039	LIBRARY READING ROOM
2002	STAIRWALL	2040	OFFICE
2003	CUSTODIAL CLOSET	2041	WORK ROOM
2004	TOILET ROOM	2042	REFERENCE ROOM
2005	TOILET ROOM	2043	PERIODICAL STORAGE RM
2006	TOILET ROOM	2044	CONFERENCE ROOM
2007	TOILET ROOM	2045	CORRIDOR
2008	TOILET ROOM	2046	STAIRWALL
2009	TOILET ROOM	2047	STORAGE ROOM
2010	CUSTODIAL CLOSET	2048	ART ROOM
2011	STORAGE ROOM	2049	ART ROOM
2012	STAIRWALL	2050	ART ROOM
2013	STUDENT PUBLICATION	2051	HOME ECONOMICS ROOM
2014	STORAGE ROOM	2052	HOME ECONOMICS ROOM
2015	DEPT HEAD OFFICE	2053	HOME ECONOMICS ROOM
2016	DEPT HEAD OFFICE	2054	STAIRWALL
2017	STORAGE ROOM	2055	BAND ROOM
2018	STAIRWALL	2056	TOILET ROOM
2019	ENGLISH CLASSROOM	2057	PROJECTION ROOM
2020	ENGLISH CLASSROOM	2058	CUSTODIAL CLOSET
2021	ENGLISH CLASSROOM	2059	TOILET ROOM
2022	ENGLISH CLASSROOM	2060	STORAGE ROOM
2023	ENGLISH CLASSROOM	2061	STORAGE ROOM
2024	ENGLISH CLASSROOM	2062	ART ROOM
2025	ENGLISH CLASSROOM	2063	GENERAL MUSIC ROOM
2026	ENGLISH CLASSROOM	2064	GENERAL CLASSROOM
2027	SOCIAL STUDIES CLASSROOM	2065	GENERAL MUSIC ROOM
2028	SOCIAL STUDIES CLASSROOM	2066	LANGUAGE LAB.
2029	LANGUAGE CLASSROOM	2067	GENERAL MUSIC ROOM
2030	LANGUAGE CLASSROOM	2068	MUSIC STORAGE RM.
2031	LANGUAGE CLASSROOM	2069	MUSIC STORAGE RM.
2032	LANGUAGE CLASSROOM	2070	GENERAL CLASSROOM
2033	LANGUAGE CLASSROOM	2071	HOME ECONOMICS RM.
2034	LANGUAGE CLASSROOM	2072	MUSIC PRACTICE RM.
2035	LOBBY	2073	MUSIC PRACTICE RM.
2036	FACULTY ROOM	2074	MUSIC GROUP PRACTICE RM.
2037	DARK ROOM	2075	STAIRWALL
2038	AUDIO VISUAL ROOM	2076	MECHANICAL ROOM
		2077	MECHANICAL ROOM

GRAPHIC SCALES

1/16" = 1'-0" 0 5' 10' 20' 30' 40' 50' 60'

3/4" = 1'-0" 0 1' 2' 3' 4' 5'

ORCHARD HILL JUNIOR HIGH SCHOOL

NORTH HAVEN CONNECTICUT

SECOND FLOOR PLAN

ARCHITECTURAL

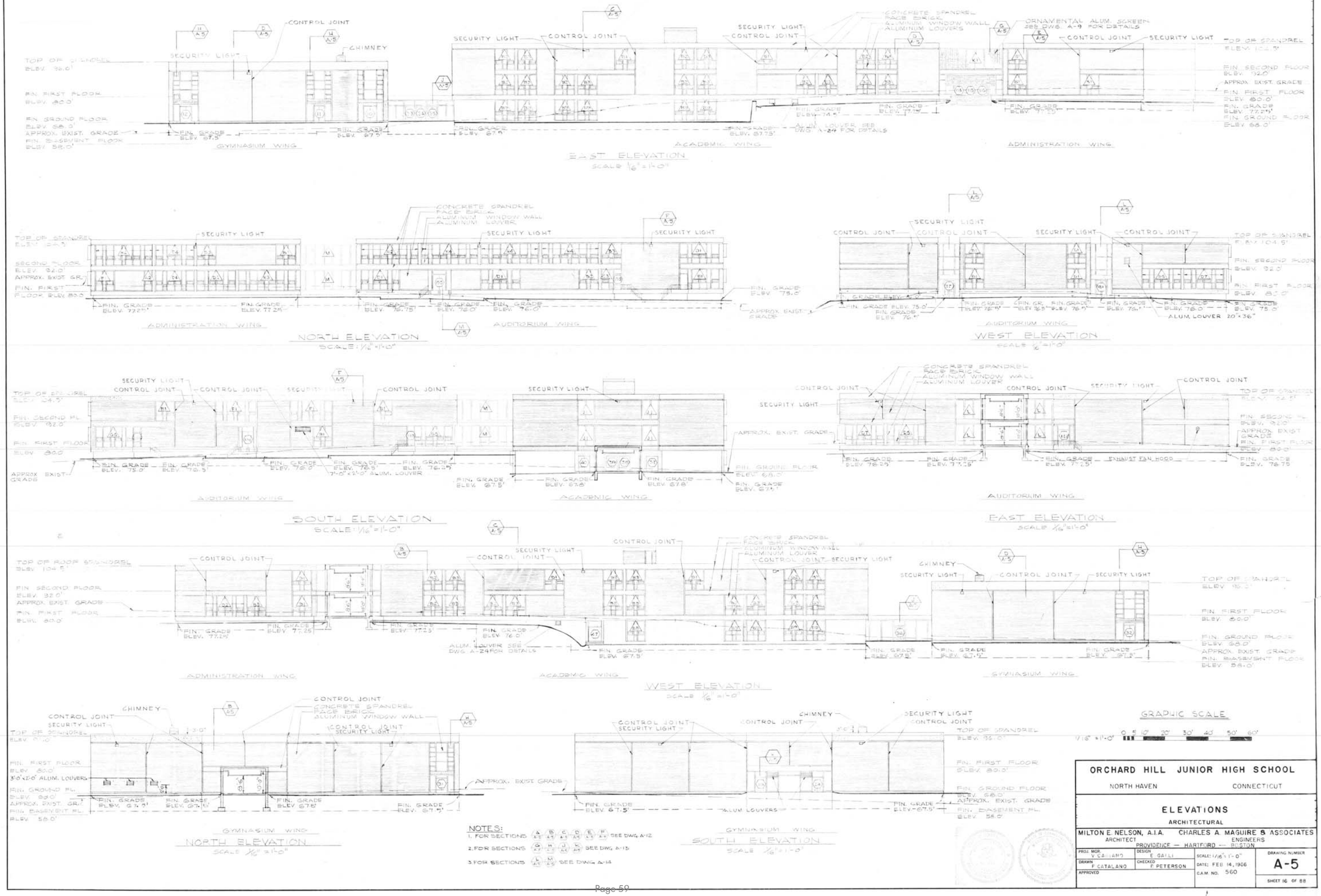
MILTON E. NELSON, A.I.A. ARCHITECT

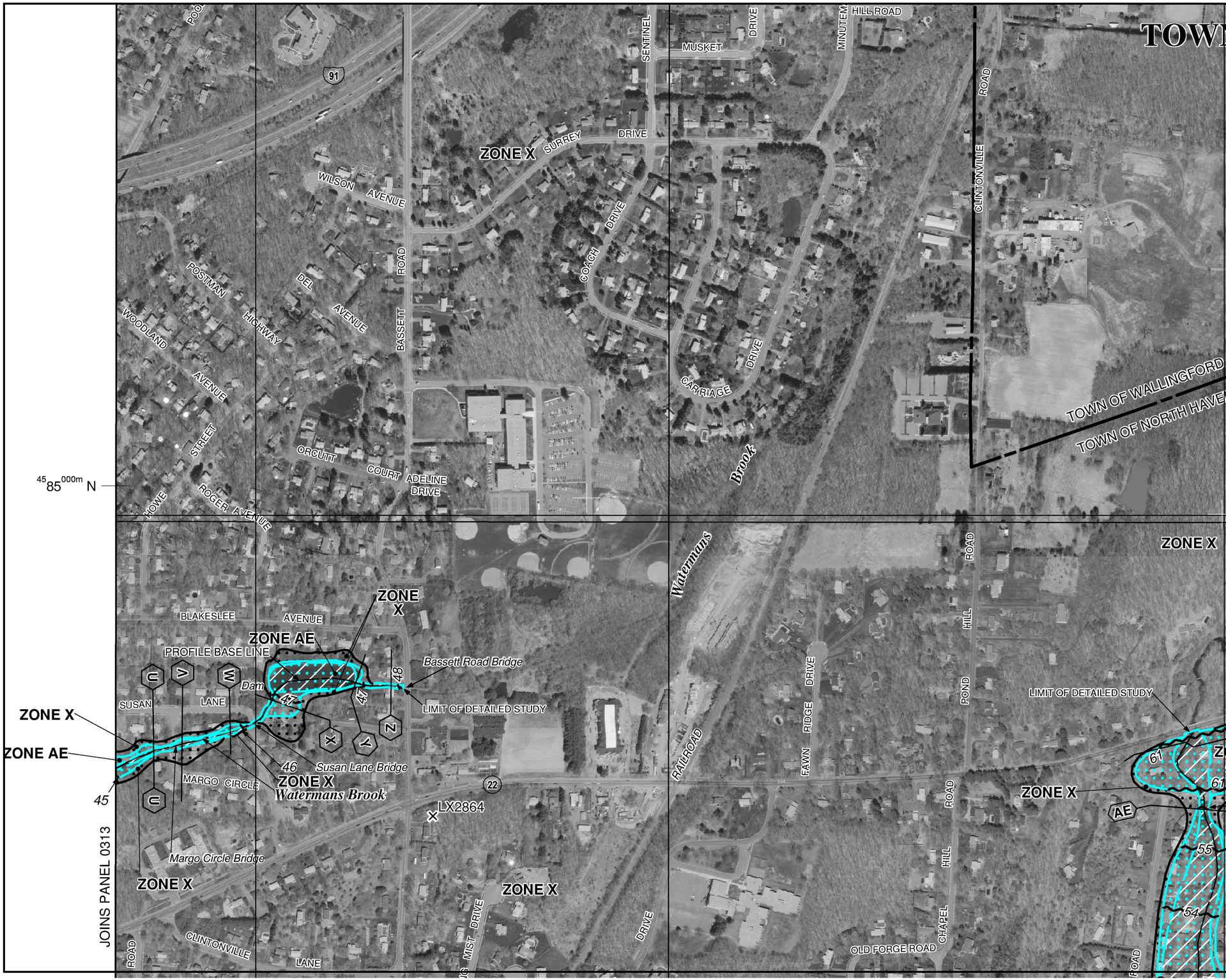
CHARLES A. MAGUIRE & ASSOCIATES ENGINEERS

PROVIDENCE — HARTFORD — BOSTON

PROJ. MGR. V. CANGIENO	DESIGN C. GALLI	SCALE: 1/16" = 1'-0"	DRAWING NUMBER A-3
DRAWN W. HALKOLA	CHECKED P. PETERSON	DATE: FEB. 14, 1966	
APPROVED		C.A.M. NO. 560	SHEET 14 OF 88

REVISIONS				
NO.	DATE	DESCRIPTION	DES.	DR.





NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0314H

FIRM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT

(ALL JURISDICTIONS)

PANEL 314 OF 635

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
NORTH BRANFORD, TOWN OF	090085	0314	H
NORTH HAVEN, TOWN OF	090086	0314	H
WALLINGFORD, TOWN OF	090090	0314	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

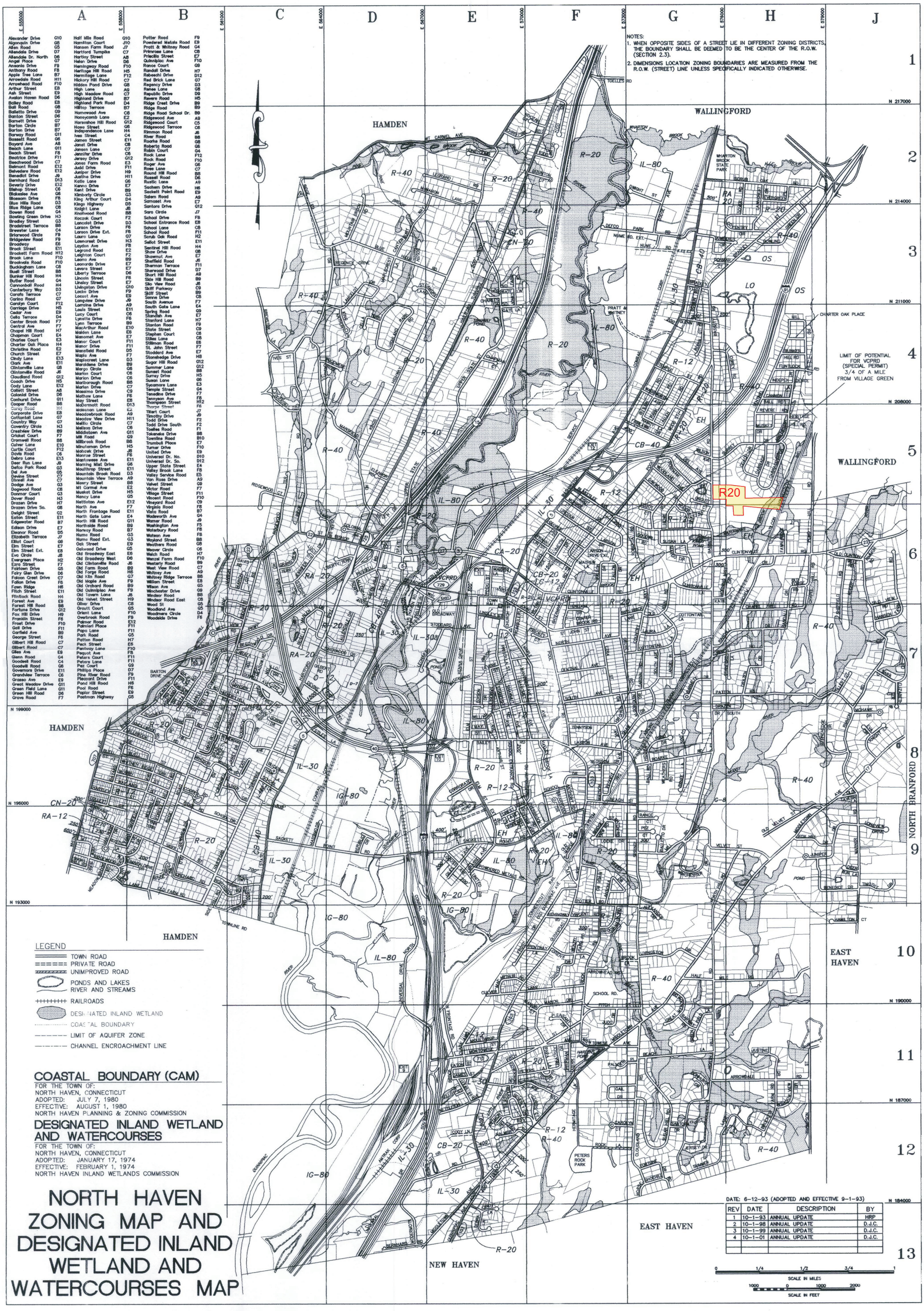
MAP NUMBER
09009C0314H

EFFECTIVE DATE
DECEMBER 17, 2010

Federal Emergency Management Agency

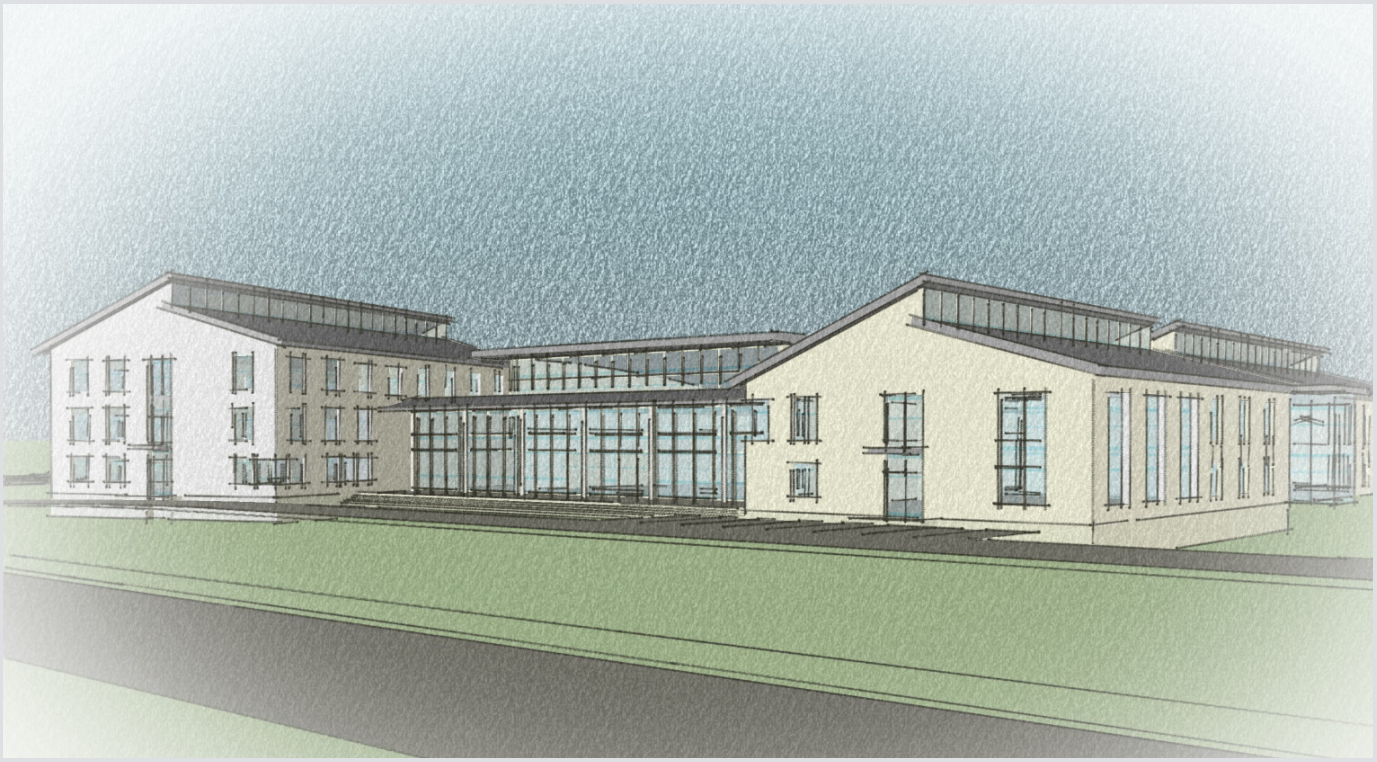
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Alexander Drive	G10	Half Mile Road	G10	Potter Road	F9
Algonquin Drive	G8	Hamilton Court	J10	Powdered Metals Road	E9
Allen Road	G5	Hanson Farm Road	J7	Pratt & Whitney Road	G4
Allendale Drive	D7	Hartford Turnpike	C7	Primrose Lane	C8
Allendale Dr. North	D6	Hartley Street	A8	Priscilla Street	E7
Angel Place	G7	Helen Drive	D6	Quinnipiac Ave	F10
Anaonia Drive	F9	Hemingway Road	F10	Rance Court	G9
Anthony Road	F8	Heritage Hill Road	H5	Randall Drive	H7
Apple Tree Lane	B7	Hermitage Lane	F12	Rebeschi Drive	D12
Arrowdale Road	H11	Hickory Hill Road	C7	Red Brick Lane	G7
Arrowhead Road	F10	Hidden Pond Drive	G8	Regency Drive	D3
Arthur Street	E8	High Lane	A9	Renee Lane	G8
Ash Street	E9	High Meadow Road	C7	Republic Drive	D9
Avalon Haven Road	D6	Highland Drive	B7	Revere Road	H5
Bailey Road	E8	Highland Park Road	D4	Ridge Crest Drive	B9
Ball Road	G8	Hilltop Terrace	B7	Ridge Road	B9
Balletto Drive	G9	Homewood Ave	C8	Ridge Road School Dr.	B9
Banton Street	D6	Honeycomb Lane	E2	Ridgewood Ave	A9
Barnett Drive	G7	Horseshoe Hill Road	G12	Ridgewood Court	C5
Barton Circle	B7	Howe Street	G6	Ridgewood Terrace	C6
Barton Drive	B7	Independence Lane	H4	Rimmon Road	J6
Barway Road	G11	Ives Street	C4	River Road	B8
Bassett Road	G6	James Street	E11	Roarke Road	G8
Bayard Ave	A8	Janet Drive	C8	Roberta Road	G6
Beach Lane	G11	Jansen Lane	C7	Robin Court	G4
Beach Street	F8	Jennifer Drive	C6	Rock Lane	F12
Beatrice Drive	F11	Jersey Drive	G12	Rock Road	F10
Beechwood Drive	C7	Jones Farm Road	E3	Roger Ave	G6
Belmont Road	E12	Judd Drive	F11	Rose Lane	C7
Belvedere Road	E12	Juniper Drive	H9	Round Hill Road	B8
Benedict Drive	J9	Justine Drive	H11	Russell Road	D6
Bernhard Road	D13	Katie Lane	G6	Rustic Lane	A9
Beverly Drive	E12	Kenna Drive	E7	Sachem Drive	H6
Bishop Street	C6	Kent Drive	B9	Sackett Point Road	E9
Blakeslee Ave	G6	Kimberly Circle	G3	Salem Road	A9
Blossom Drive	F8	King Arthur Court	D4	Samaset Ave	E7
Blue Hills Road	D3	Kings Highway	D5	Santore Drive	G12
Blue Ridge Lane	C8	Knight Lane	J8	Sara Circle	J7
Bowen Road	C4	Knollwood Road	B8	School Drive	F8
Bowling Green Drive	H3	Koczak Court	F2	School Entrance Road	E8
Bradley Street	G3	Lancelot Drive	D3	School Lane	C8
Bradstreet Terrace	B8	Larson Drive	F6	School Road	F11
Brewster Lane	C4	Larson Drive Ext.	F6	Scrub Oak Road	H2
Briarwood Circle	F9	Laura Lane	G7	Sellot Street	E11
Bridgeview Road	F9	Lasmarest Drive	H3	Sentinel Hill Road	H4
Broadway	E6	Layden Ave	F8	Shaw Drive	G8
Brock Street	E11	Legrand Road	E2	Shawmut Ave	E7
Brockett Farm Road	H12	Leighton Court	F2	Sheffield Road	J6
Brook Lane	F10	Leona Ave	B9	Sherman Terrace	F11
Brookvale Road	F10	Leonardo Drive	E7	Sherwood Drive	D7
Buckingham Lane	C8	Levera Street	E7	Short Hill Road	A9
Buell Street	B8	Liberty Terrace	D6	Side Hill Road	B9
Bunker Hill Road	H4	Lincoln Street	F6	Silo View Road	J6
Butler Road	G4	Linsley Street	E7	Skiff Parkway	C9
Cannonball Road	H4	Livingston Drive	G10	Skiff Street	B9
Canterbury Way	D3	Locke Drive	F9	Sonne Drive	C8
Carafa Terrace	C7	Locust Ave	E9	South Avenue	F7
Carina Road	G7	Longview Drive	J9	South Gate Lane	E4
Carolyn Court	F12	Lorraine Drive	A9	Spring Road	G9
Carriage Drive	H5	Louis Street	E11	Standish Ave	E7
Cedar Ave	E9	Lucy Court	C6	Stanford Lane	H7
Celia Terrace	D4	Lynette Drive	F6	Stanton Road	F9
Center Brook Road	F7	Lynn Terrace	B9	State Street	C9
Central Ave	F7	MacArthur Road	E10	Stephen Court	C6
Chapel Hill Road	H7	Malden Lane	E6	Stiles Lane	C8
Chapman Court	E4	Manomet Ave	E7	Stillman Road	E6
Charles Court	E3	Manor Court	F11	St. John Street	F7
Charter Oak Place	H4	Manor Drive	F11	Stoddard Ave	E7
Christina Road	E2	Mansfield Road	D5	Stonehedge Drive	H8
Church Street	E7	Maple Ave	F7	Sugar Hill Road	G12
Cindy Lane	E13	Maplecrest Lane	D3	Summer Lane	G12
Clark Ave	E11	Maraldene Drive	B9	Sunset Road	B8
Clintonville Lane	G8	Margo Circle	G8	Surrey Drive	H5
Clintonville Road	J6	Marion Court	C6	Susan Lane	G6
Cloudland Road	G12	Marion Drive	C6	Sycamore Lane	E3
Coach Drive	H5	Marlborough Road	B8	Temple Street	C4
Cody Lane	E12	Marlen Drive	C7	Tenedine Drive	F7
Collett Street	A8	Massimo Drive	C9	Tennyson Ave	F8
Colonial Drive	D6	Mathew Lane	F6	Thompson Street	H12
Conhurst Drive	G11	May Street	E8	Thorpe Street	F6
Cooper Road	B8	McDermott Road	D13	Tillert Court	J7
Corey Road	H4	McKeonon Lane	E2	Timothy Drive	J9
Corporate Drive	E8	Meadowbrook Road	A9	Todd Drive	F2
Cottontail Lane	G7	Meadow View Drive	H11	Todd Drive South	F2
Country Way	G7	Mellio Circle	C7	Toelles Road	F1
Coventry Circle	H3	Melissa Drive	C6	Tokeneke Drive	B8
Crestview Drive	B9	Middletown Ave	G11	Townline Road	B10
Cricket Court	F7	Mill Road	G9	Trumbull Place	E7
Cromwell Road	B8	Millbrook Road	B8	Turner Drive	F10
Culver Lane	E10	Minuteman Drive	H5	United Drive	E9
Curtis Court	F12	Mohawk Drive	J8	Universal Dr. No.	D10
Davis Road	C6	Monroe Street	F6	Universal Dr. So.	D12
Debra Lane	E13	Montowese Ave	E11	Upper State Street	E4
Deer Run Lane	J9	Morning Mist Drive	G6	Valley Brook Lane	F8
Defco Park Road	G3	Mouthrop Street	E11	Valley Service Road	E5
Del Ave	G5	Mountain Brook Road	D3	Van Rose Drive	A9
Devine Street	C7	Mountain View Terrace	A9	Velvet Street	G9
Dibrell Ave	C7	Mowry Street	B8	Victor Road	F7
Dodge Ave	G3	Mt Carmel Ave	E2	Village Street	F11
Dogwood Road	C8	Muskat Drive	H5	Vincent Road	F10
Donmar Court	G3	Nancy Lane	G5	Vineyard Road	C9
Dover Road	H3	Nettleton Ave	E12	Virginia Road	F8
Drazen Drive	H7	North Ave	F7	Vista Road	B7
Drazen Drive So.	G8	North Frontage Road	E11	Wadsworth Ave	G4
Dwight Street	G2	North Gate Lane	E4	Warner Road	J9
Eaton Street	E11	North Hill Road	G11	Washington Ave	F5
Edgewater Road	B7	Northside Road	B9	Waterbury Road	F8
Edison Drive	E7	Norway Road	B7	Watson Ave	F8
Eleanor Road	D5	Nume Road	G3	Wayland Street	B8
Elizabeth Terrace	J7	Nume Road Ext.	G3	Weathers Road	G8
Elliot Court	G8	Oak Street	E9	Weaver Circle	C6
Elm Street	E7	Oakwood Drive	G5	Welch Road	H7
Elm Street Ext.	E8	Old Broadway East	E6	Wenzel Farm Road	F10
Eva Circle	J8	Old Broadway West	D6	Westerly Road	B9
Evergreen Place	H2	Old Clintonville Road	J6	West View Road	C7
Ezra Street	F7	Old Farm Road	B9	Whitney Ave	A9
Fairlawn Drive	G5	Old Forge Road	H6	Whitney Ridge Terrace	B8
Fairy Glen Drive	D6	Old Kiln Road	G7	William Street	E8
Falcon Crest Drive	C7	Old Maple Ave	F9	Wilson Ave	G5
Fallon Drive	F6	Old Orchard Road	B9	Winchester Drive	G9
Fawn Ridge	H6	Old Quinnipiac Ave	F9	Windsor Road	B8
Fitch Street	E11	Old Tavern Lane	J8	Windsor Road East	C8
Flintlock Road	H4	Old Velvet Street	H9	Wood St	G5
Forest Ave	E9	Oliver Drive	C8	Woodland Ave	G5
Forest Hill Road	B8	Orcutt Court	G5	Woodmere Circle	D4
Fortune Drive	G12	Orient Lane	F10	Woodside Drive	F6
Fox Hill Drive	H9	Overbrook Road	F9		
Franklin Street	F6	Palmer Road	E12		
Frost Drive	F10	Palmieri Place	F11		
Gail Drive	F11	Papa Lane	F11		
Garfield Ave	B9	Park Road	G5		
George Street	F6	Patten Road	H7		
Gilbert Hill Road	C7	Peck Street	E6		
Gilbert Road	C7	Pentway Lane	F10		
Giles Ave	E9	Pequot Ave	F8		
Glenn Road	G4	Peters Court	F11		
Goodsell Road	C4	Peters Lane	F11		
Goodwill Road	G6	Pez Court	G9		
Governors Drive	E11	Phillips Place	D7		
Grandview Terrace	C6	Pine River Road	F9		
Grasso Ave	E9	Pleasant Drive	F11		
Great Meadow Drive	G11	Pond Hill Road	H6		
Green Field Lane	G11	Pool Road	F6		
Green Hill Road	D6	Poplar Street	E9		
Grove Road	F7	Postman Highway	G5		



NORTH HAVEN MIDDLE SCHOOL

MASTER PLANNING + PROGRAMMING REPORT



Perkins Eastman

NORTH HAVEN MIDDLE SCHOOL
FACILITY SPACE PROGRAM REPORT

Prepared by:

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Prepared for:
North Haven Middle School

Publication Date:
28 January 2013

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This guideline is the result of an enormous collaborative effort on the part of Perkins Eastman and the entire project team. Although it is impossible to acknowledge each contributor individually, we wish to thank the following individuals who contributed their ideas, their time, their expertise – and above all, their passion for education – in making this document possible:

TABLE OF CONTENTS

4.0 EXECUTIVE SUMMARY
4.1 BUILDING ORGANIZATIONAL OUTLINE
4.2 ED SPEC - BUILT ENVIRONMENT GOALS
4.3 SITE PLANNING PRINCIPLES
4.4 FACILITY SPACE ARCHITECTURAL PROGRAM
4.5 ADJACENCY DIAGRAMS
4.6 ENGINEERING & SUSTAINABILITY REQUIREMENTS
4.7 SPACE SPECIFIC REQUIREMENTS

EXECUTIVE SUMMARY 4.0

The Town of North Haven is concerned that the 62 year-old Middle School Facility has reached the end of its usable life, and that the building does not have the capacity to meet current educational needs or code requirements. As noted by the New England Association of Schools and Colleges, the current physical condition of the Middle School is not conducive to a good progressive school program, and its capacity for future programming, educational approach, technology infrastructure, and flexible dynamic development is limited.

The future plan for the Middle School is a three tiered study to analyze three separate design scenarios that meet the education specification for current and future Middle School curriculum requirements. The three design scenarios are the following.

1. Renovate the existing School to an "as-new" facility.

2. Acquire the existing Gateway/Orchard Hill School and renovate to an "as-new" facility.

3. Construct a new Middle School on the existing Campus (fronting Bailey Avenue), then demolish the existing Middle School and replace with athletic playing fields and parking.

The renovation or construction of a new Middle School will complete the Town of North Haven School District's future educational building goal of housing Pre-k to grade-5 Elementary students, a Middle School with grade 6 to 8 students, and a High School with grade 9 to 12 students. Renovating or replacing the aging existing Middle School with a new facility will allow the Town of North Haven Public Schools to achieve the following:

- Improved academic programs for students in North Haven.
- Ensure safe and appropriate learning environments of students.
- Incorporate current teaching technology into the classroom curriculum.
- Correct the gross code compliance issues that exist throughout the school.
- Provide a middle school that is commensurate with the modern high school
- Attract citizens to North Haven.
- Establish the Town as a community that embraces education.

Byram Hills Crittenden Middle School

Fairfield Middle School

Franklin L. Williams Middle School

BUILDING ORGANIZATIONAL OUTLINE

4.1

The Draft Educational Specifications (Ed Spec) is a very comprehensive document, and is supplemental to this Architectural Program, therefore repeating the Program requirement information in this document is unnecessary.

There are seven (7) major program elements or building organizational components to the North Haven Middle School, which are commonly summarized into the following major areas:

1. Academic Spaces: general-purpose classrooms, clusters of classrooms (the "house"-see the following section), special education classrooms.

2. Teacher/Admin Support: conference rooms, common faculty (team teaching) planning and workrooms, faculty dining room, conference rooms, adult toilets.

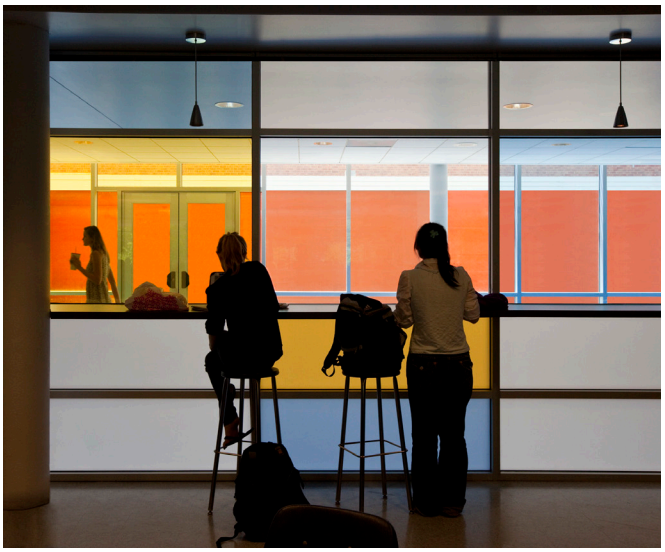
3. Media and Technology: technology center, flexible lab space, library/media center.

4. School Community Space: cafeteria, student commons, parent centers, special use/club meeting rooms, exhibition space.

5. Wellness/Fitness/Health: Gymnasiums, natatoriums, fitness rooms, weight rooms and aerobic rooms, health and fitness centers/phys-ed associated classrooms, storage rooms, locker rooms, team rooms, athletic fields, bleacers and grandstands.

6. Arts, Performing and Visual: art rooms, choral rooms, music rooms (band, orchestra) music practice rooms, black-box theater, studios, auditorium, specific storage rooms.

7. Facilities Management: custodial space, receiving, loading docks, dumpsters, maintenance space, mechanical equipment space, main electric service rooms, satellite closets, data service rooms and closets, building wide storage/supply rooms, and custodial offices.



Yorktown High School

Yorktown High School

Brightwood Elementary School

ED SPEC - BUILT ENVIRONMENT GOALS

4.2

THE BUILT ENVIRONMENT:

The Role of the A/E in the process: As Architects and Engineers we can assist the North Haven Town Building Committees, the Public School Districts and the Community to evaluate, design, and construct their public school built environments. As experts in planning, construction, building design and engineering, The Architect and Engineering (A&E) team can help facilitate the development of the built environment for the academic response through research, innovation, development and problem solving methodologies. The Architect and Engineering team will work with the Town Building Committee and the School District to help them with their built-environment, whether it's a renovation, a new building or the entire campus master plan. The role of the Architect and the Engineering team is to listen, understand, gather data, guide, innovate, and most importantly become part of the School Community.

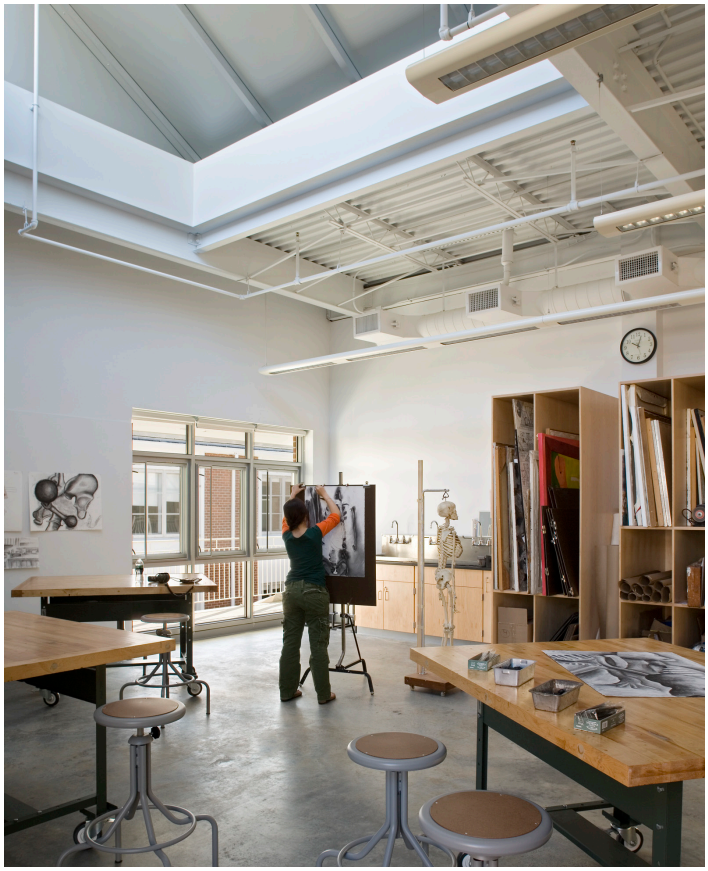
It is the A&E team's role to watch, listen and learn about the Facility, with special emphasis on learning and absorbing the culture and the educational approach. The Architectural team must fully understand the existing facility's culture, operations and overall educational goals. This key component is critical to good planning, design, and problem solving. The holistic approach to understanding and appreciation of the facilities culture, educational strategies and academic built environment which allows the A&E team to directly address the real problems with the right solutions tailored to the traditions of Middle School.

The A&E team's role is to provide expertise and guidance to the School District and Building Committee, the School Administrators and the faculty. The A&E team must ask the pertinent questions and absorb the goals and strategies of the facility to assist in delivering the desired result. After fully immersed in the culture and approach to the education of the children it is then that the Architect and Engineer can help facilitate and deliver the appropriate, innovative and cost effective building design and engineering that is completely compatible with the School Districts goals.

A key component to providing Architectural services is extensive research, data gathering and analysis of the existing facility; researching for code compliance, building systems, infrastructure, and energy performance, and sustainability. Observing and analyzing primary and secondary circulation must also be considered and incorporated into the analysis. Through complete understanding the final design will reflect the facilities values and sense of community. The Middle School feasibility study provides the opportunity for the community of the School to build common values that can be nurtured and instilled into their students. The Architectural and Engineering team must share that vision and transform it into the School built environment.

The Educational Specifications describes in detail each of the seven (7) important program elements, and we have included the detail in the "Space Specific Requirements" section of this Architectural Program. Because the Ed Spec is supplemental to this document we will not repeat all the same building requirements here, instead we will list the broad "built environment" goals as outlined in the Educational Specification.

Princeton Day School



Princeton Day School

Educational Goals

- Provide a built environment organizational pattern, which will include small communities for learning, interdisciplinary teaming, flexible grouping and integrated approaches to instruction.
- Provide a built environment to foster an educational atmosphere that simulates the growth of each student's personal responsibility, creativity, talents and gifts.

Meeting Student Needs

- Provide an atmosphere that motivates each student to realize his/her learning potential.
- To encourage each student to learn the values of good citizenship and character, social cooperation, physical development and aesthetic appreciation.

Curriculum and Program of Instruction

- To utilize current technologies such as computer science and practice arts in a manner that will assist every student with employment opportunities or further education.

Educational Staff

- Provide a built environment that encourages staff members to participate in developing the educational program and measuring its effectiveness.
- Provide a built environment that encourages teachers and building administrators to meet regularly and discuss educational and professional areas of mutual interest and concerns.

Environment and Resources

- To develop a comprehensive, long-range plan for the most effective use of the school and grounds.
- To develop a school facility that meets or exceeds LEED Silver certification for energy efficiency, use of natural lighting and recycled materials in design and construction
- To develop a school facility that meets the CT High performance Building Standards for public school facilities, as required by State Law.

Project Rationale

- Improve electrical wiring increasing the availability of instructional technology necessary for twenty-first century classrooms.
- Design science classrooms to meet requirements of the STEM initiatives call for by State and Federal Governments.
- Modern science laboratories.
- Design adequate space for whole school activities to include an updated enlarged auditorium, cafeteria, and other common spaces

Long Range Plan

- Ensure safe and appropriate learning environments for students.
- Incorporate current teaching technology into the classroom curriculum.

Health and Safety

- Every consideration should be given to the prevention of "sealed building syndrome" exposure to radon gas and other hazards. Adequate ventilation and air circulation and the use of non-allergenic interior finish materials will be a priority.

School Without Walls

Byram Hills High School

St. Francis Preparatory School

Stoddert Elementary School

SITE PLANNING PRINCIPLES 4.3

The traffic circulation on the site is critical, most importantly the bus circulation coupled with the student and parent drop-off areas and their effect on queuing, time lap's analysis and pedestrian circulation. Additionally, the proximity and layout of the parking lots and athletic fields are other components that influence efficient and a cohesive site circulation. The site must accommodate the physical education program and appropriate community use after hours.

The areas listed below are important to incorporate into the site design:

- Clear distinction and signage for the following site functions:
  - Parking areas, for both employee and visitors.
  - Identification of building entries for students from buses, pedestrian "walkers", parent vehicles, deliveries.
  - Traffic flow for buses, parent vehicles with students, and delivery vehicles.
  - Bus queue area.
  - Athletic visitor's buses.
  - One way entrances and exits are required to ensure pedestrian safety.

- Adequate parking for the School staff, visitors, volunteers, after hours Community and accessible spaces.

- Bus loading and unloading should enter and exit from a separate site entry point and no other traffic should be allowed in the bus loading and unloading area during the time when students are arriving and being dismissed. The area should accommodate all bus queue space requirements. The student waiting area should be paved and protected from the weather.

- Parent pick-up/drop-off area should not be directly adjacent to the School main office.

- Provide accessible continuous sidewalks around the perimeter of the School.

- Adequate lighting at perimeter sidewalk, building entries and parking lots.

- Provide an asphalt recreation area adjacent to the cafeteria.

- All interior courtyards need to be landscaped for reasonable maintenance free upkeep, and fully accessible.

- The site will be landscaped to be pleasing for the schools occupants as well as being easy and efficiently maintained. Deciduous local perennial plantings will be utilized.

- Provisions to accommodate snow clearing and temporary collection areas.

- An erosion and sedimentation control plan will be engineered for the construction phase of the project to reduce the negative impact these activities could have on neighborhood water and air quality. The site engineering will also utilize sustainable design strategies like silt fencing, earthen dikes, sediment traps, sediment basins, temporary and permanent seeding and mulching.

- Light Pollution Reduction; Provide site lighting that maintains a safe light level while reducing off-site spill (trespass) and uplight night sky pollution which will improve night sky access and reduce site light impact on the nocturnal environment.

Aerial View of Existing North Haven Middle School

Aerial View of Existing Orchard Hill

WIPE HANDS WITH
PAPER TOWELS
CLAY WILL CLOG
SINK!

FACILITY SPACE ARCHITECTURAL PROGRAM

4.4

The following program is taken from the Ed Spec. Program spaces have een organized into departments. There is some integration of spaces between departments which is indicated in Section 5 - Adjacency Diagrams. Also indicated is the net and gross building areas. A grossing factor of 35% is recommended for building circulation.

PROGRAM

Division	PROPOSED PROGRAM QUANTITY	SQUARE FOOTAGE	SUB-TOTAL
1.0 GENERAL CLASSROOMS			
Grade 6 Classroom	10	850	8,500
Grade 6 Classroom - Science	3	1,025	3,075
Grade 6 Prep/Storage - Science	3	200	600
Grade 7-8 Classroom - English	6	850	5,100
Grade 7-8 Classroom - Social Studies	6	850	5,100
Grade 7-8 Classroom - Math	6	850	5,100
Grade 7-8 Classroom - Science	6	1,025	6,150
Grade 7-8 Prep/Storage - Science	6	200	1,200
Grades 6-8 Classroom - Reading	2	850	1,700
Common Rooms	3	250	750
Division Subtotal			37,275
2.0 WORLD LANGUAGE			
World Language Classroom	5	850	4,250
World Language Lab	1	1,000	1,000
Division Subtotal			5,250
3.0 SPECIALIZED INSTRUCTIONAL/CLASSROOM			
Computer Classroom/Lab.	2	900	1,800
Division Subtotal			1,800
4.0 VISUAL ARTS (art,music,drama)			
Art Classroom	4	1,000	4,000
Art Room: Kiln & Storage	2	250	500
General Music Classroom	2	950	1,900
Band Room w/Storage	1	1,200	1,200
Practice Rooms	2	150	300
Choral Room with Risers	1	1,000	1,000
Drama Room with Storage	1	1,000	1,000
Midi-Computer Room	1	850	850
Division Subtotal			10,750
5.0 LIFE SKILLS			
Health Classroom	1	850	850
Division Subtotal			850
6.0 SPECIAL EDUCATION			
Special Ed. Classrooms	5	850	4,250
Life Skills Classroom/Lab	1	1,000	1,000
Resource Room	3	500	1,500
Division Subtotal			6,750
7.0 LIBRARY MEDIA CENTER			
Reading/Research area/Stacks	1	2,500	2,500
Office/Workroom/Copying	1	350	350
Computer Area off Library	1	900	900
Storage	1	250	250
Division Subtotal			4,000
8.0 PHYSICAL EDUCATION/GYM			
Gymnasium w/divider	1	7,000	7,000
Small Gymnasium	1	2,500	2,500
Locker Rooms/shower (7 & 8)	2	1,200	2,400
Teacher Office/Storage/Shower	3	500	1,500
Physical Education Storage	1	700	700
Division Subtotal			14,100

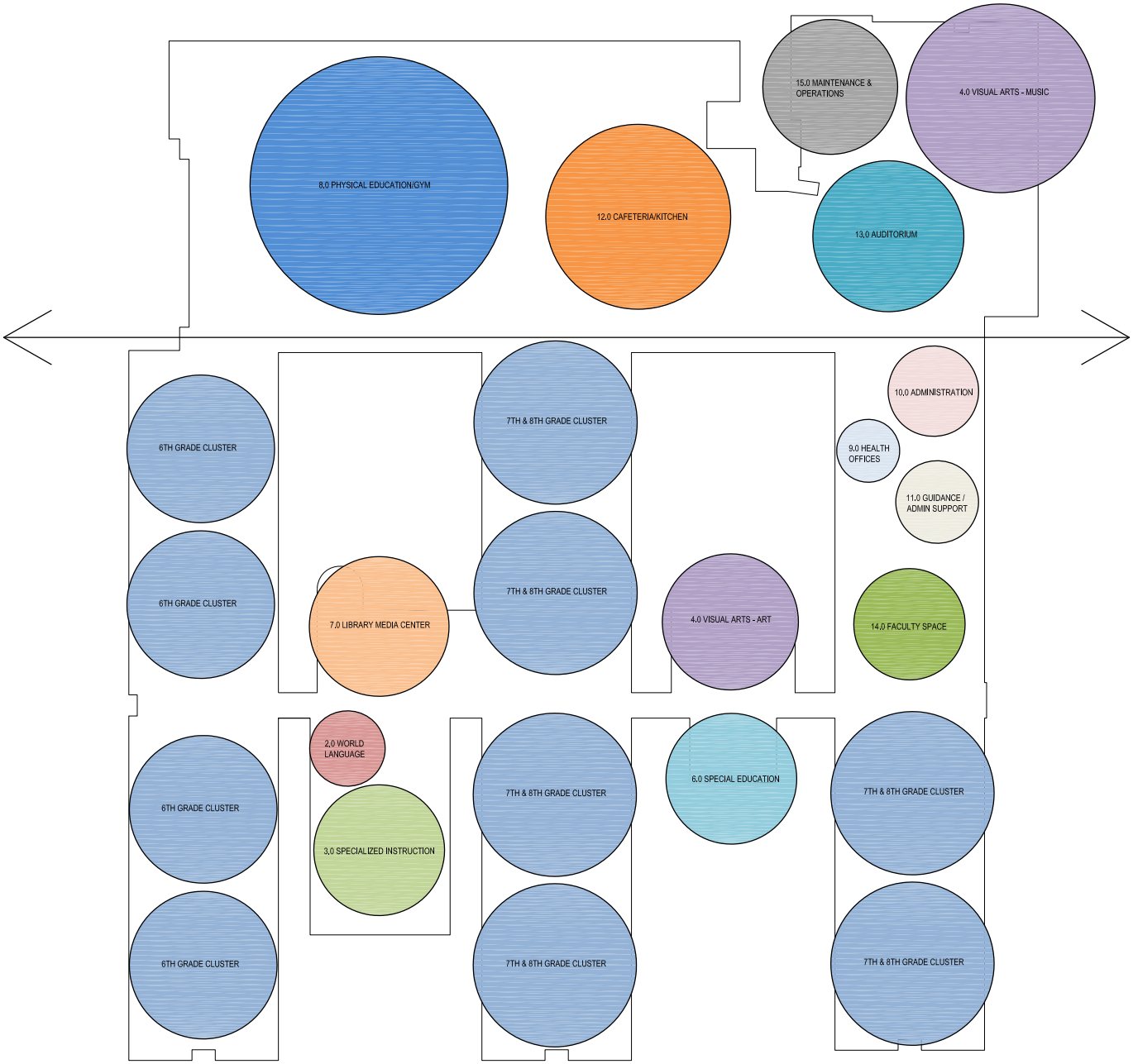
Proposed Program

9.0 HEALTH OFFICES			
Nurse's Office	1	125	125
Cot Room	1	150	150
Exam Room	1	100	100
Male Toilet	1	80	80
Female Toilet	1	80	80
Waiting/ Circulation	1	110	110
Storage	1	50	50
Division Subtotal			695
10.0 ADMINISTRATION			
Principal's Office	1	450	450
Conference Room	2	450	900
Assistant Principal	2	250	500
Principal's Secretary	1	150	150
Secretarial Support	2	150	300
Storage/workroom/kitchenette	1	275	275
Unisex Toilet	1	80	80
File Room	1	100	100
Waiting Room	1	175	175
Division Subtotal			2,930
11.0 GUIDANCE/ADMIN SUPPORT			
Guidance Counselor	3	200	600
Secretarial Support	1	150	150
School Psychologist	1	150	150
Social Worker	1	150	150
Speech/hearing/OT/PT	3	150	450
Conference Space/PPT	1	260	260
Division Subtotal			1,760
12.0 CAFETERIA/KITCHEN			
Cafeteria - 3 lunch waves	1	4,000	4,000
Kitchen/servery	1	2,000	2,000
Dry Storage	1	300	300
Food Storage	1	700	700
Office/Locker Space/ toilet	1	300	300
Division Subtotal			7,300
13.0 AUDITORIUM			
Auditorium	1	6,500	6,500
Division Subtotal			6,500
14.0 FACULTY SPACE/GEN. PURPOSE			
Faculty kitchenette w/mailboxes	1	450	450
Faculty Dining	1	300	300
Faculty copyroom/workroom	3	150	450
Department Offices	6	150	900
Book Storage (1 per grade)	3	375	1,125
Teaching supplies storage	3	600	1,800
Division Subtotal			5,025
15.0 MAINTENANCE & OPERATIONS			
Office/shop	1	1,000	1,000
Storage Areas	2	400	800
Employee Locker room/toilets	1	140	140
Utility/boiler/electrical	1	700	700
Water Sprinkler Room	1	100	100
Custodian Closet	4	75	300
Data Rooms	4	50	200
Data/Server Room	1	250	250
Elevator Machine room	1	150	150
Elevator	1	150	150
Division Subtotal			3,790
BUILDING NET AREA			**108,775**
Building Circulation (Grossing Factor = 35%)			38,071
Total Gross Area (to exterior face of walls)			**146,846**

Proposed Program (cont.)

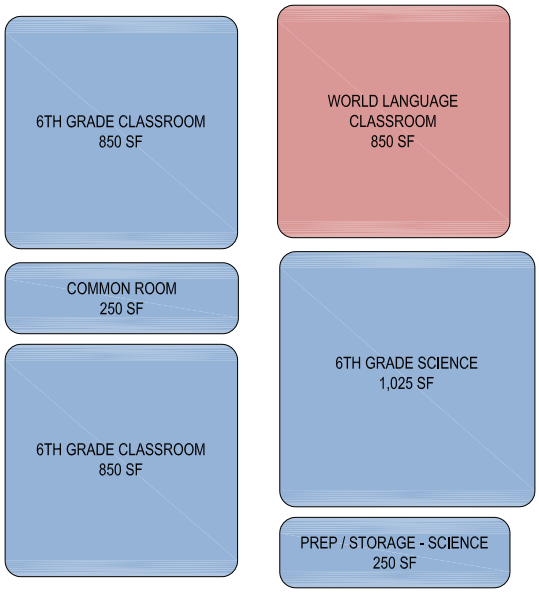
ADJACENCY DIAGRAMS 4.5

Spatial relationships between rooms and departments are critical to how a building functions and to how students, faculty and the community interact with the built environment and with each other.

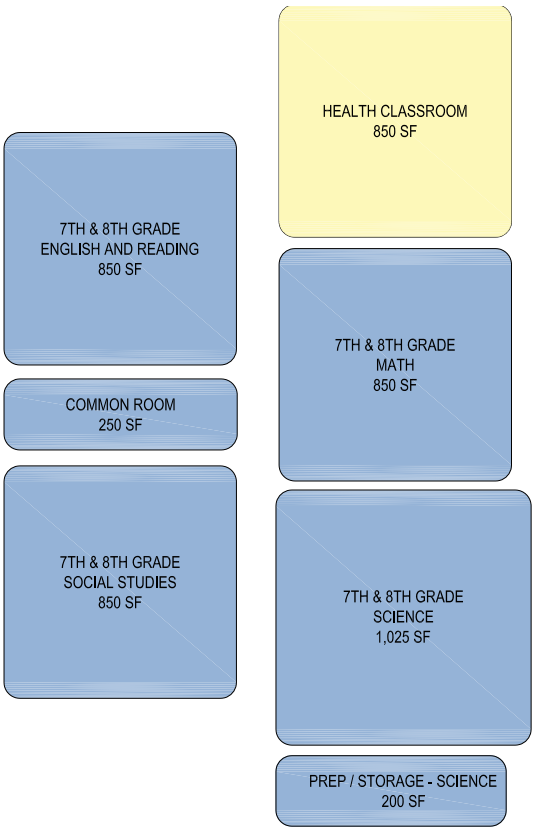


Department Adjacency Diagram

ADJACENCY DIAGRAMS



6th Grade Classroom Cluster



7th & 8th Grade Classroom Cluster

The school design is to support the mission and goals of the North Haven School District. As such, classrooms are to be organized by grade level and include a small assembly space per grade level for team meetings, presentations, displays and other group activities.

The core academic curriculum for 6th, 7th and 8th graders includes language arts, mathematics, science, social studies, foreign language, art, music and physical education. Classrooms for 6th graders should be segregated from 7th and 8th graders into grade level teams which should provide a transition from the self-contained classrooms of the elementary school to the broader exploratory grades 7 and 8 program of the middle school.

Grade level clusters should be in distinct and separate areas of the building. The 6th grade cluster consists of 2 general classrooms, a science lab and prep room, a general room (for world language, reading, health or special education) and a common room. The 7th & 8th grade cluster consists of one English and reading classroom, one social studies classroom, one mathematics classroom, one science lab and prep room, one general room (for world language, health or special education) and a common room.

ENGINEERING & SUSTAINABILITY REQUIREMENTS

4.6

MEP&FP/Technology Approach

The Ed Spec is very specific regarding facility energy efficiency and atmosphere concerns. It requires that the building systems have maximum energy performance that achieve increased levels of energy performance above the prerequisite standard as well as reduced environmental impacts associated with excessive energy use. A computer simulation model will be utilized by the design team to evaluate energy performance of the building systems and help identify cost effective energy efficiency measures.

The Ed Spec specifically instructs the A&E team to follow the USGBC LEED Silver certification requirements and should be considered in the design and construction of the new facility. In addition the CT State Department of Construction Services/BSF reimbursement unit requires the facility to comply with the CT High Performance Building Guidelines.

The Ed Spec outlines the following facility engineering design strategies:

- Indoor Environmental Quality; Attention will be given to the design of the HVAC system capacities to monitor indoor air quality in order to sustain long-term occupant health and comfort.

- The HVAC system along with the building envelop will optimize the air change effectiveness in order to introduce and mix fresh outside tempered air with the indoor forced air mechanical system to optimize the health, safety and comfort of the building occupants.

- Local controls; systems will be designed for local occupant controls for airflow, temperature and lighting to support optimum health, productivity and comfort. The Ed Spec recommends several strategies to consider; include task lighting, operable windows, and underfloor HVAC distribution with individual diffusers.

- The HVAC system in conjunction with the building envelop will be designed to industry establish temperature and humidity comfort ranges through-out to ensure productivity and health.

- Maximize daylighting and views; provide a connection between the indoor and outdoor environments through introduction of sunlight and views to the occupied areas of the building.

- Energy efficiency; Estimate the energy needs of the building and investigate various opportunities to engage in green power initiatives and contracts with the local utility to encourage the development in grid-source energy technologies.

- Provide an energy model (to help predict savings) and design the building systems to monitor the energy and water consumption in order to benchmark for accountability, optimization and resource consumption over time.

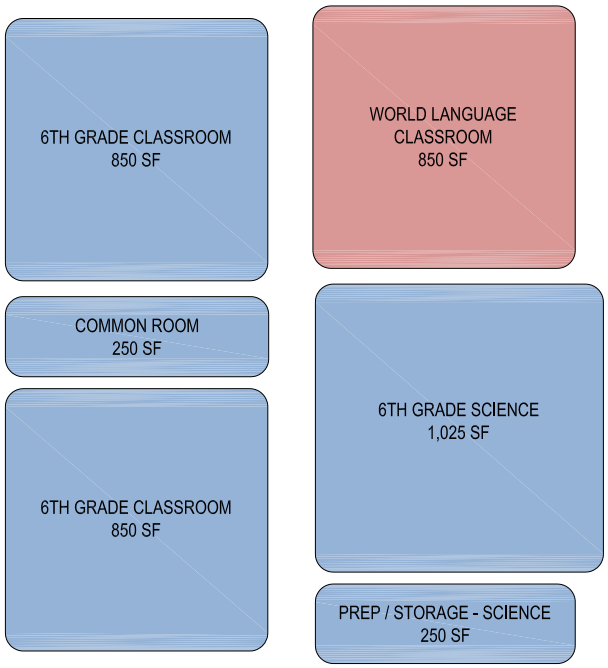
SPACE SPECIFIC REQUIREMENTS

4.7

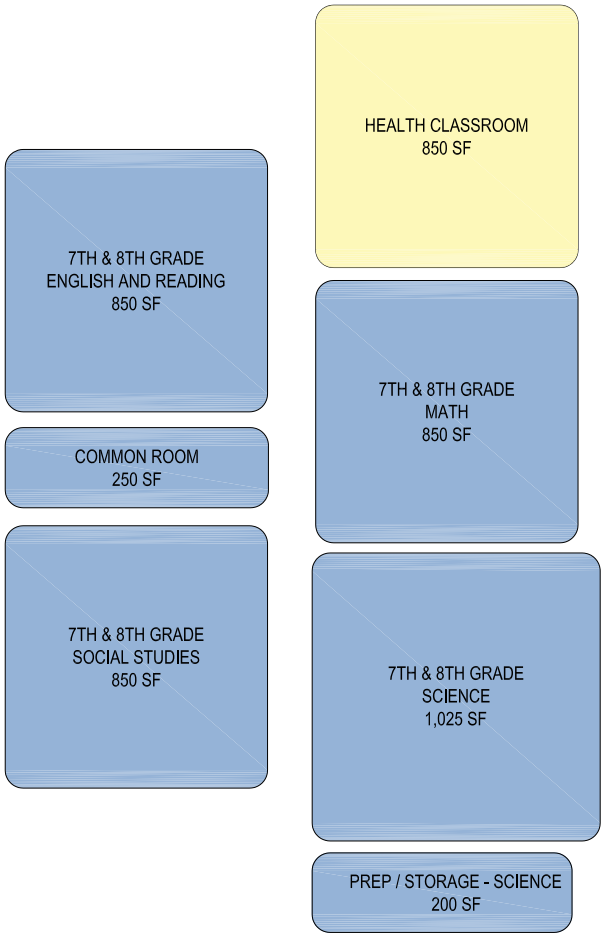
1. ACADEMIC SPACE
6th - 8th Grade

1.0 GENERAL CLASSROOMS			
Grade 6 Classroom	10	850	8,500
Grade 6 Classroom - Science	3	1,025	3,075
Grade 6 Prep/Storage - Science	3	200	600
Grade 7-8 Classroom - English	6	850	5,100
Grade 7-8 Classroom - Social Studies	6	850	5,100
Grade 7-8 Classroom - Math	6	850	5,100
Grade 7-8 Classroom - Science	6	1,025	6,150
Grade 7-8 Prep/Storage - Science	6	200	1,200
Grades 6-8 Classroom - Reading	2	850	1,700
Common Rooms	3	250	750
Division Subtotal			37,275

5.0 LIFE SKILLS			
Health Classroom	1	850	850
Division Subtotal			850



6th Grade Cluster Diagram



7th-8th Grade Cluster Diagram

6th -8th Grade

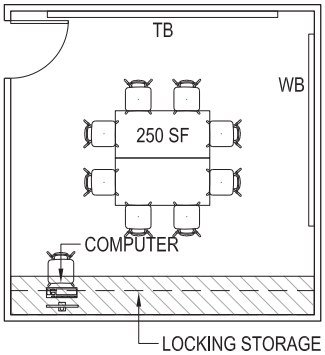
Classrooms are to be organized by grade level and include an assembly space per grade. Each grade lavel cluster should have a small common room for team meetings, parent conferences and small student workgroups. These rooms will have white boards, tackboards, chairs, conference table, computer & locking storage.

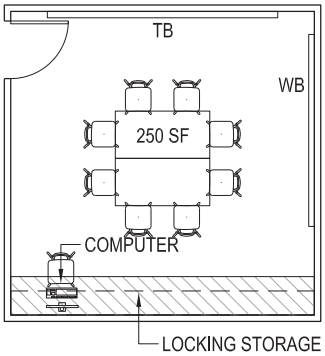
Program Overview

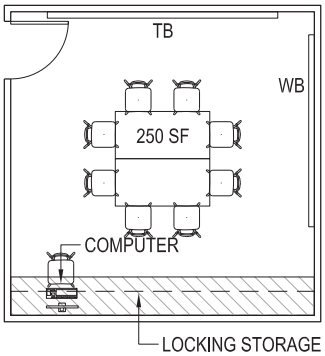
North Haven's Academic curriculum for 6th, 7th and 8th graders includes Language Arts, Mathematics, Science, Social Studies, Foreign Language, Art, Music, and Physical Education. Classrooms are designed to allow flexibility for different teaching / working in teams and working independently.

Organization

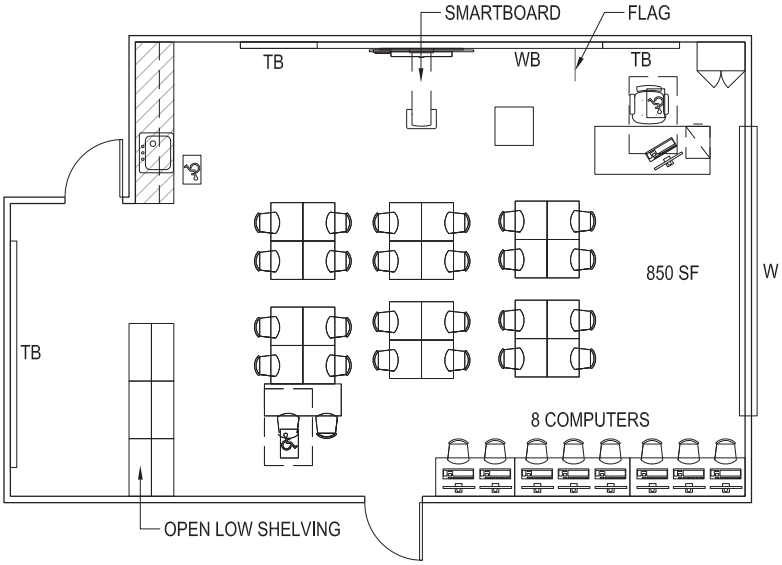
Classrooms for 6th graders should be segregated from 7th and 8th graders into grade level teams. To create these teams, classrooms should be clustered into groups of four - Language Arts, Mathematics, Science, Social Studies and a General Room.







Meeting Pod Options



6th Grade Classroom

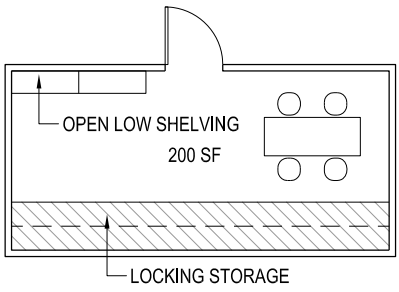
6th -8th Grade - Science

Program Overview

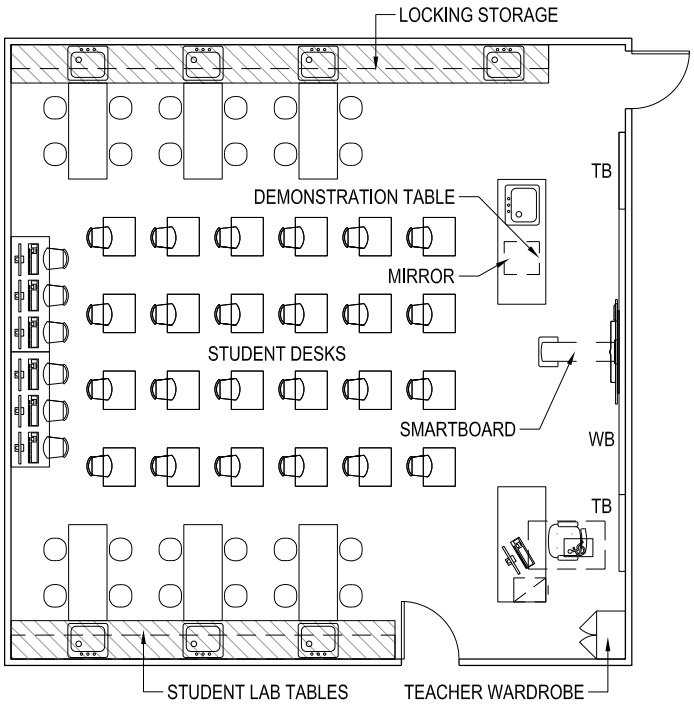
The focus of the Science Program is to encourage exploration in Earth, Life and Physical Science. The goal is to encourage inquiry and process, while engaging students in hands-on inquiry based instruction, promoting student interest. Science skills are emphasized in all 3 grades including but not limited to Introduction to Scientific Method, Observing, Inferring, Classification and Microscope Work.

Organization

Classrooms / Laboratories are designed around two distinct areas. One for classroom instruction and one for lab activities. Activities include large and small group instruction, from individual and team class work to laboratory investigations with science becoming more integrated with other disciplines and should be placed in a central location. Each classroom will include a teacher's demonstration table with a side sink and detachable overhead mirror, the student furniture include desks for large group instruction and lab tables for experiments.



Prep/Storage - Science



Science Classroom

6th -8th Grade - English & Reading

Program Overview

The focus of the literary program is to continue to develop reading, comprehension skills and strategies, to nurture reading, and to develop expertise in writing. Students will also develop awareness, appreciation and critical evaluation of literature and improve speaking, listening and viewing skills.

Organization

These classrooms are integrated with other subjects and closely tied to the library/media program. Activities include large and small group instruction and individual seatwork.

6th -8th Grade - Mathematics

Program Overview

The focus of the mathematics program is to develop skills in problem solving and computation as applied to a variety of mathematics topics.

Organization

The students will participate in large and small group instruction as well as individual and small group practice. Many hands-on materials are used including calculators and computers.

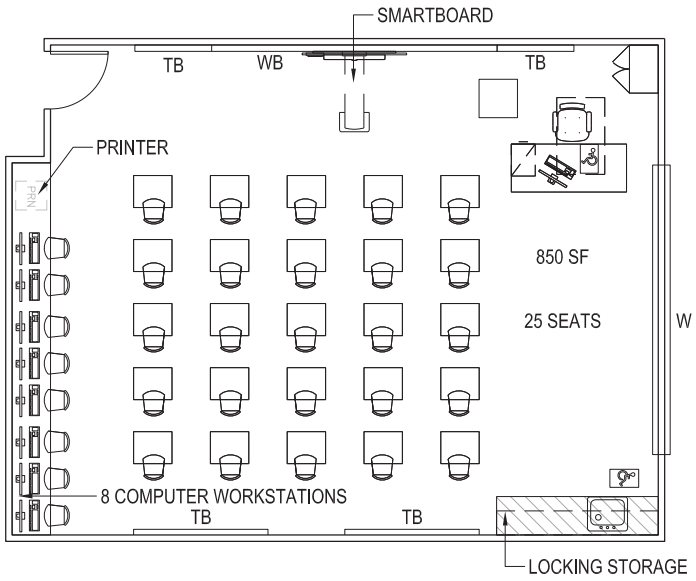
6th -8th Grade - Social Studies

Program Overview

The overall objective is to assist students in understanding world cultures and increase their awareness of roles in society. Students will gain knowledge of history, civics and government, geography and economics.

Organization

Activities include large and small group instruction and individual sea



6th-8th Grade Classroom

2. ACADEMIC SPACE
World Language

2.0 WORLD LANGUAGE			
World Language Classroom	5	850	4,250
World Language Lab	1	1,000	1,000
Division Subtotal			5,250

World Language Lab Diagram

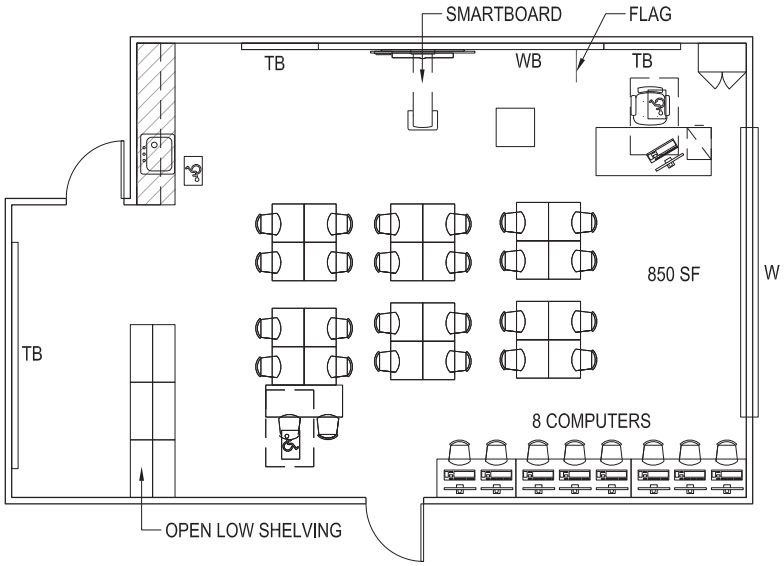
World Language Lab & Classroom

Program Overview

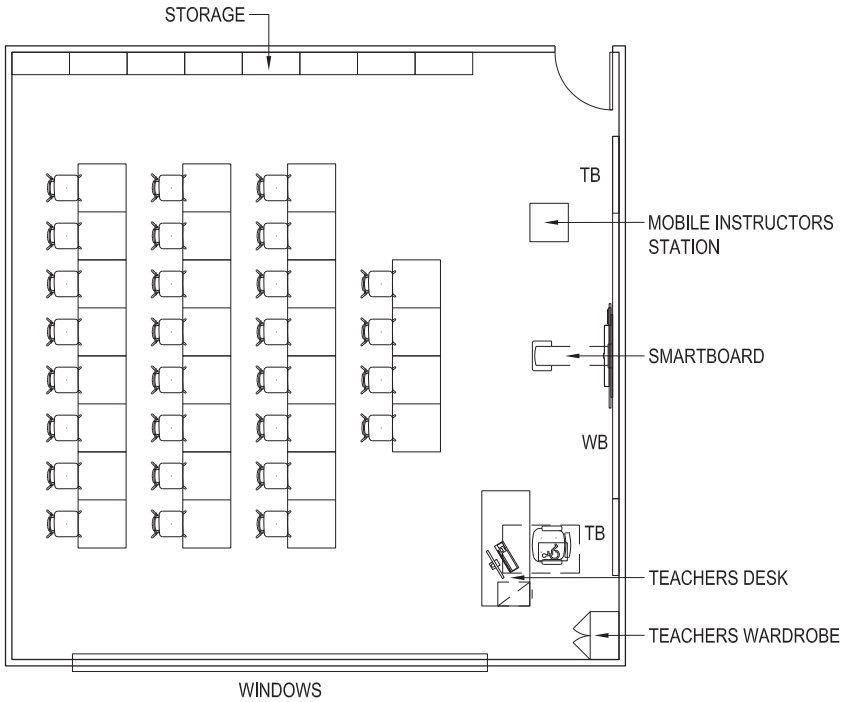
Provides learning opportunities for students to develop basic speaking, writing & verbal proficiency in a World Language.

Organization

The Language Lab will accommodate the latest technology to provide guided individual instruction. Including immediate feed-back to each student's workstation. The World Language Classroom is flexible to accommodate large and small group instruction and individual seat work.



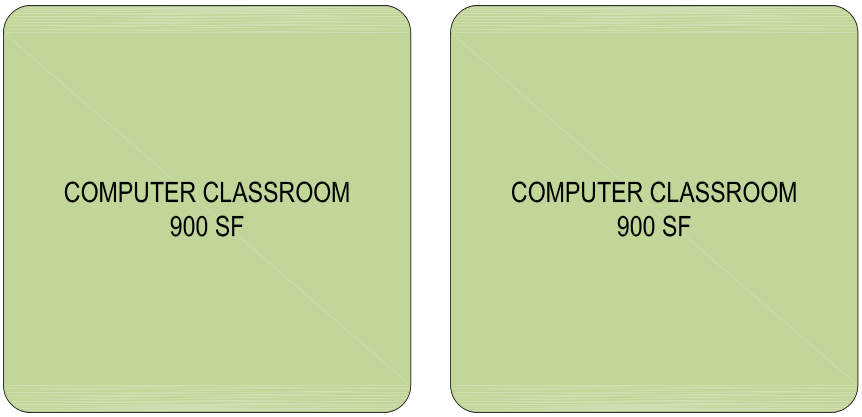
World Language Classroom



World Language Lab

3. MEDIA & TECHNOLOGY
Computer Lab

3.0 SPECIALIZED INSTRUCTIONAL/CLASSROOM			
Computer Classroom/Lab.	2	900	1,800
Division Subtotal			1,800



Computer Classroom

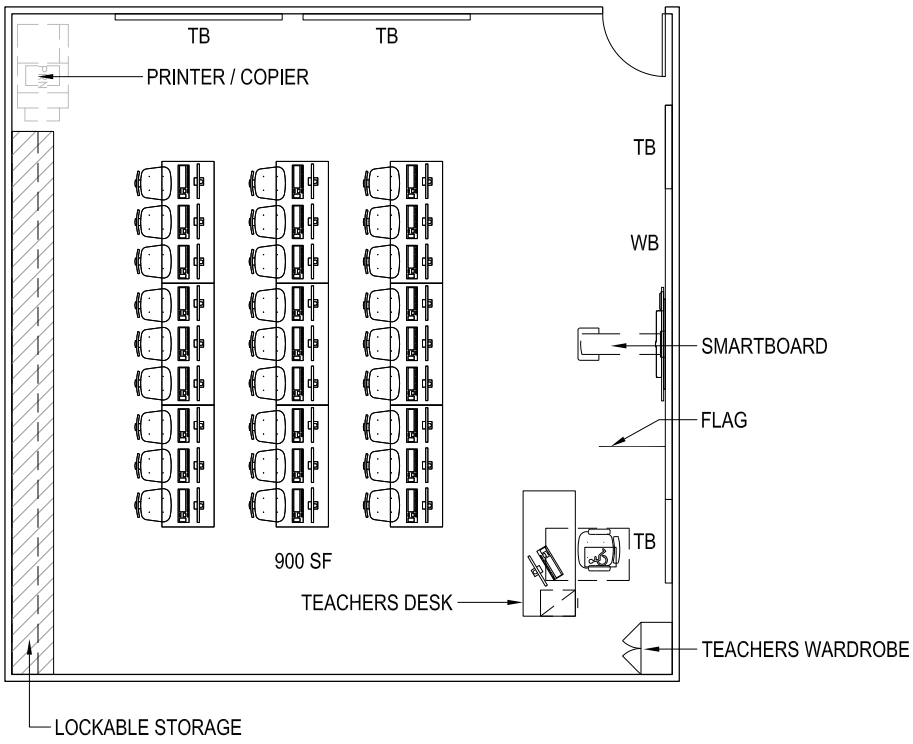
Computer Classroom

Program Overview

The focus of the Computer Classroom is to develop the understanding of technology for North Haven's Students. Through the study and application of materials, tools and process in solving problems, students will become proficient in the use of state of the art technology.

Organization

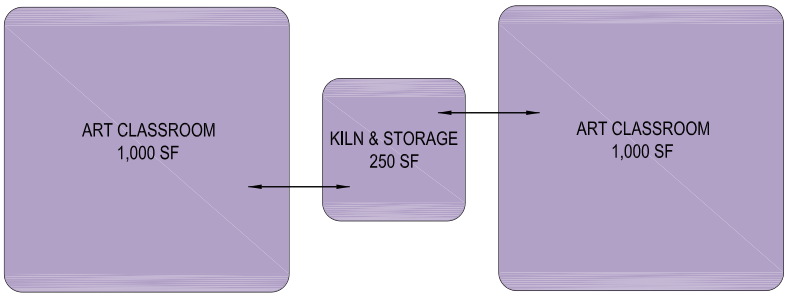
Each classroom should be equipped with 25 student computer stations including printers and copiers. These lab classrooms will accommodate the latest technology to provide guided individual instruction including immediate feedback. The activities include group instruction and individual seatwork.



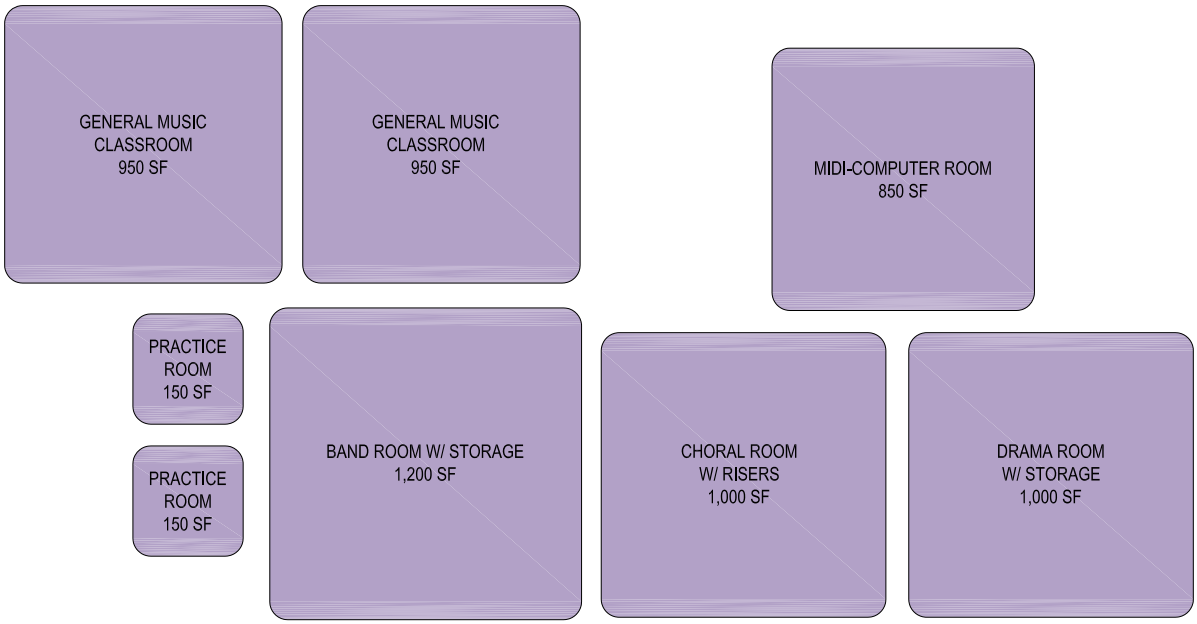
Computer Classroom

4. ARTS
Visual Arts

4.0 VISUAL ARTS (art,music,drama)			
Art Classroom	4	1,000	4,000
Art Room: Kiln & Storage	2	250	500
General Music Classroom	2	950	1,900
Band Room w/Storage	1	1,200	1,200
Practice Rooms	2	150	300
Choral Room with Risers	1	1,000	1,000
Drama Room with Storage	1	1,000	1,000
Midi-Computer Room	1	850	850
Division Subtotal			10,750



Visual Arts - Art Diagram



Visual Arts - Music Diagram

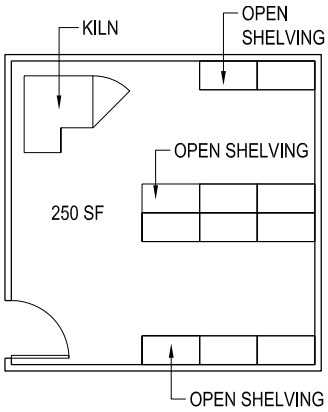
Visual Arts - Art Classroom & Art Room

Program Overview

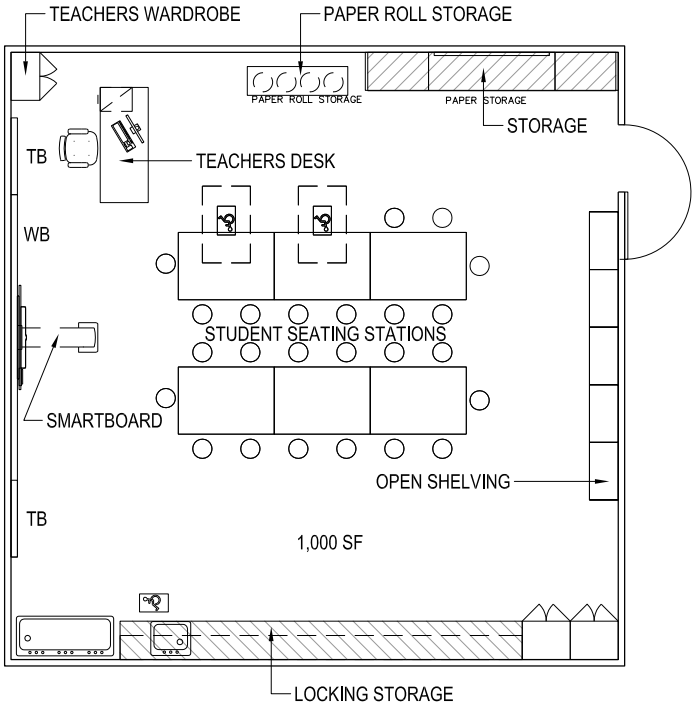
Through art education students will develop an awareness, understanding and appreciation of art techniques and process. Students at all grade levels will produce, recognize, analyze and appreciate a wide range of art in a variety of media. Activities include group instruction at large art tables and indidual workspace for small projects. Students will explore through parinting, drawing, sculpture, pottery, animation and photography.

Organization

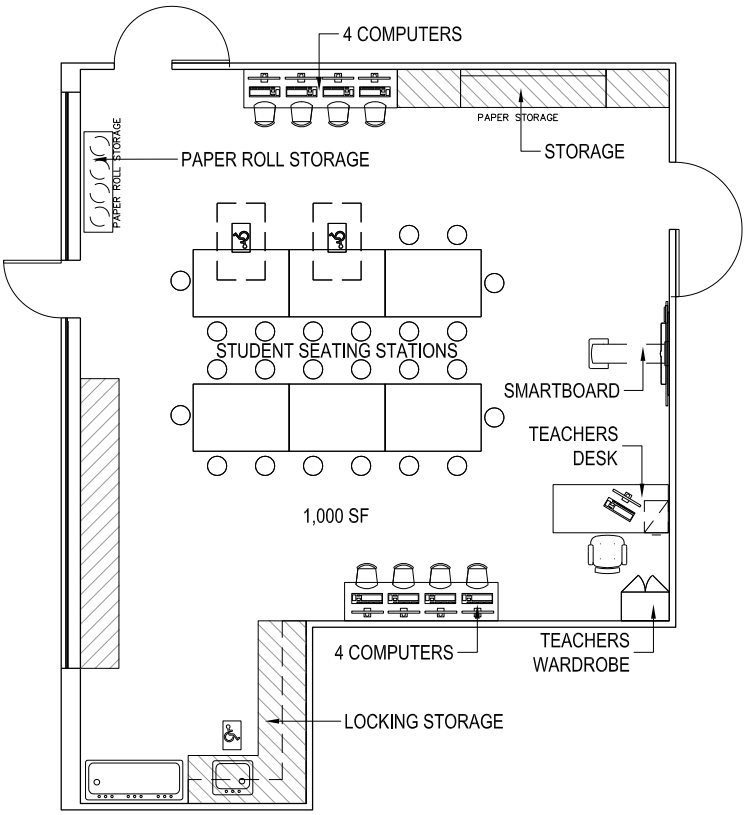
Classrooms should be equipped with 25 student seating stations designed for art programs and a presentation area for the teacher. Computer equipment will be used for animation and visual arts programs.



Kiln and Storage



Art Room



Art Classroom

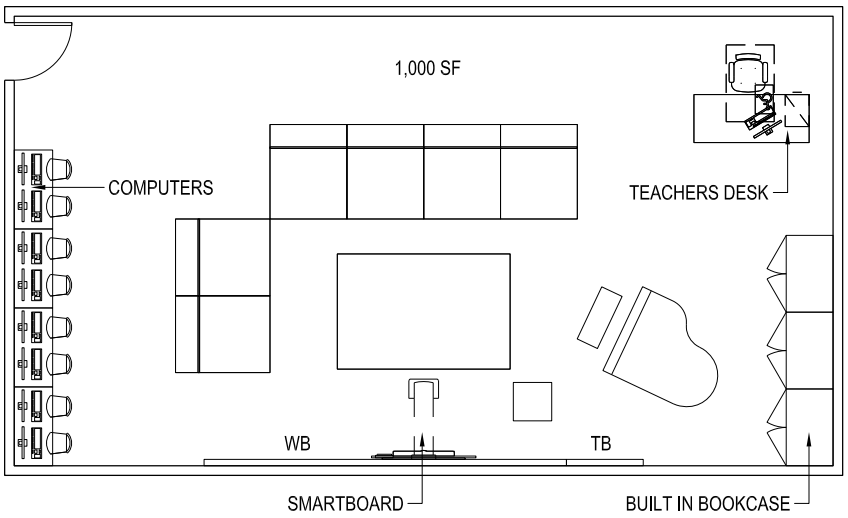
Visual Arts - Music

Program Overview

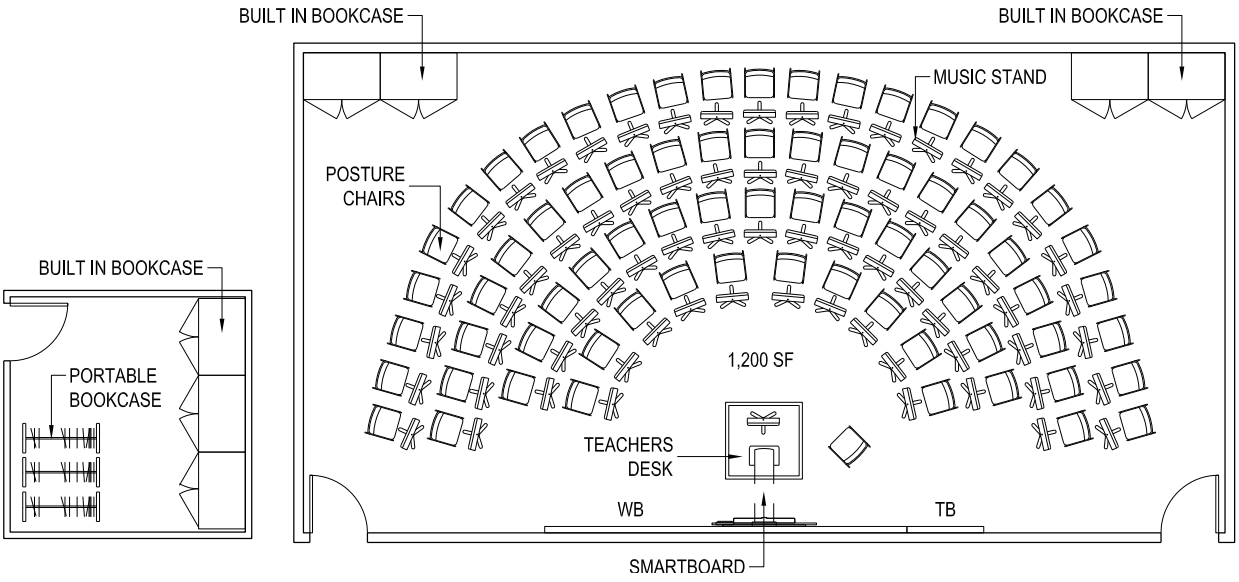
The music program has 3 categories: general music, band and choral. The focus is to develop an appreciation and knowledge of music to increase enjoyment, critical analysis, creativity and cultural awareness.

Organization

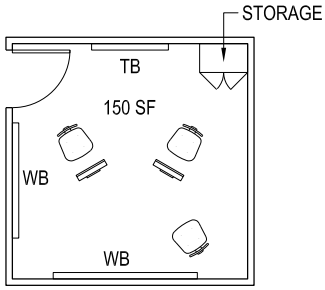
Classrooms must include acoustical treatment with seating that is movable and flexible. The activities in the music department include group instruction and individual instrumental practice space.



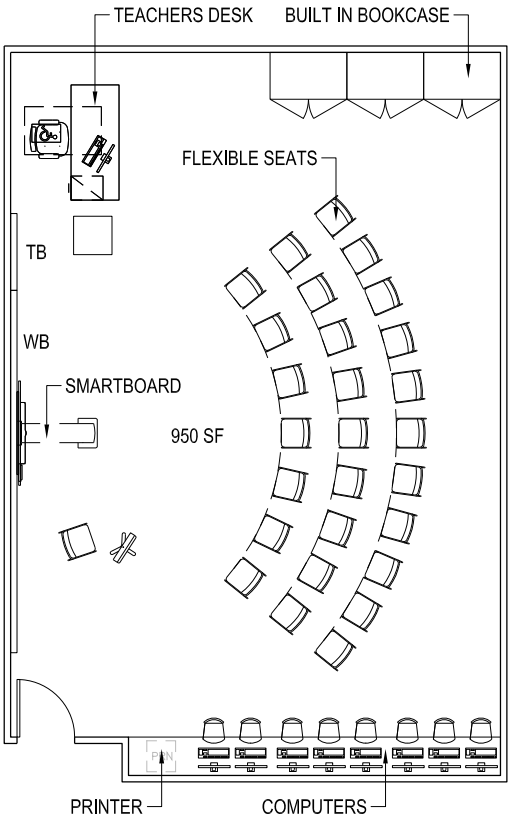
Choral Room



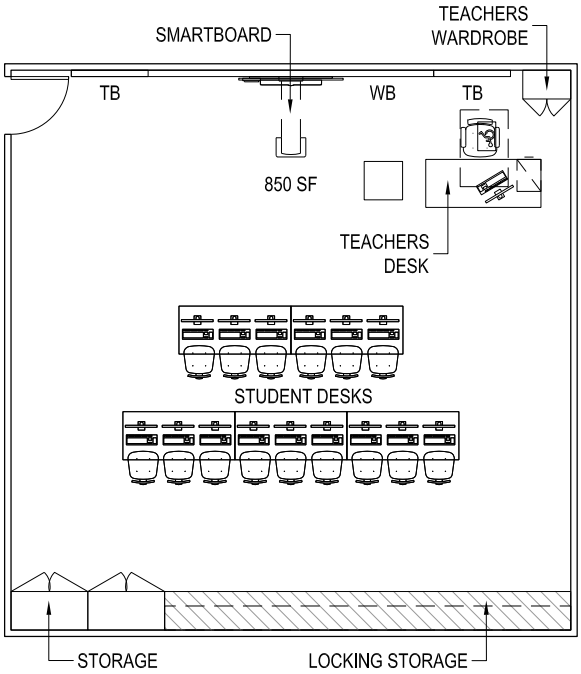
Band Room w/ Storage



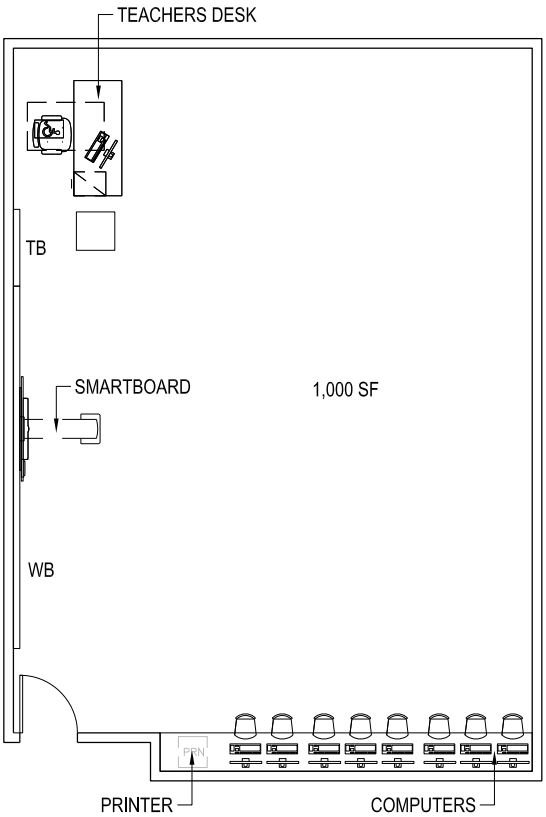
Practice Room



General Music Classroom



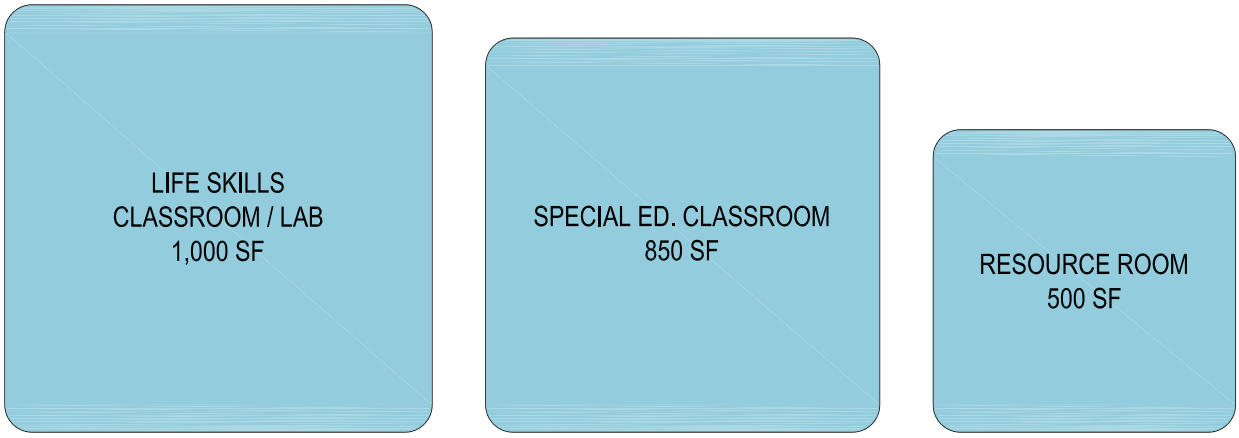
Midi- Computer Room



Drama Room

6. ACADEMIC SPACE
Special Education

6.0 SPECIAL EDUCATION			
Special Ed. Classrooms	5	850	4,250
Life Skills Classroom/Lab	1	1,000	1,000
Resource Room	3	500	1,500
Division Subtotal			6,750



Special Education Diagram

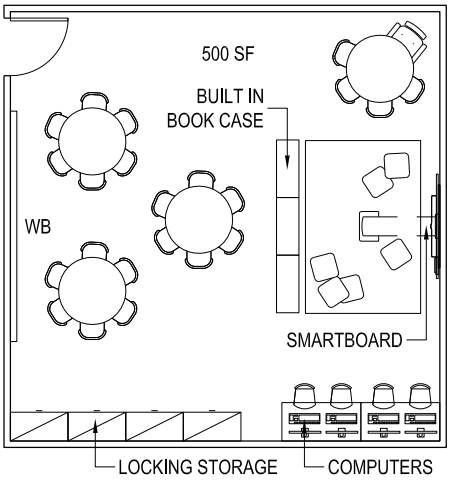
Special Education

Program Overview

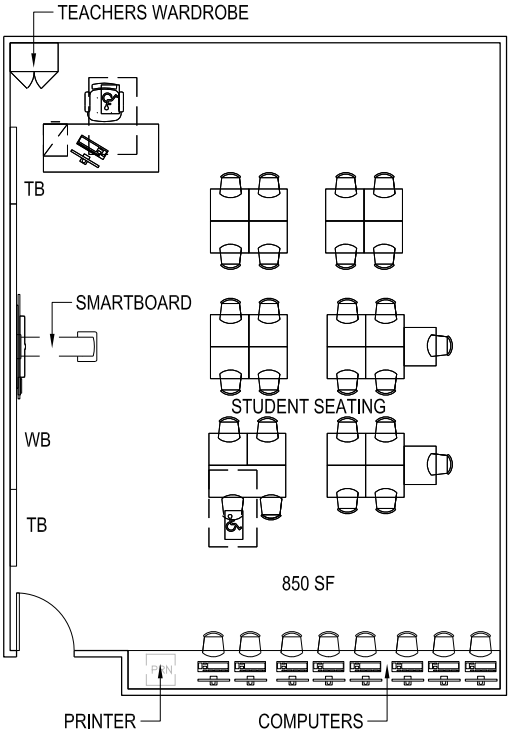
The emphasis of the special education program is the placement of special needs students in the least restrictive environment. Student learning objectives are with a prescribed curriculum at rates and depths appropriate to their potential and to develop skill levels where possible. Most students will be mainstreamed to learn in a regular school setting. Some, due to disabilities, will be in self contained classrooms.

Organization

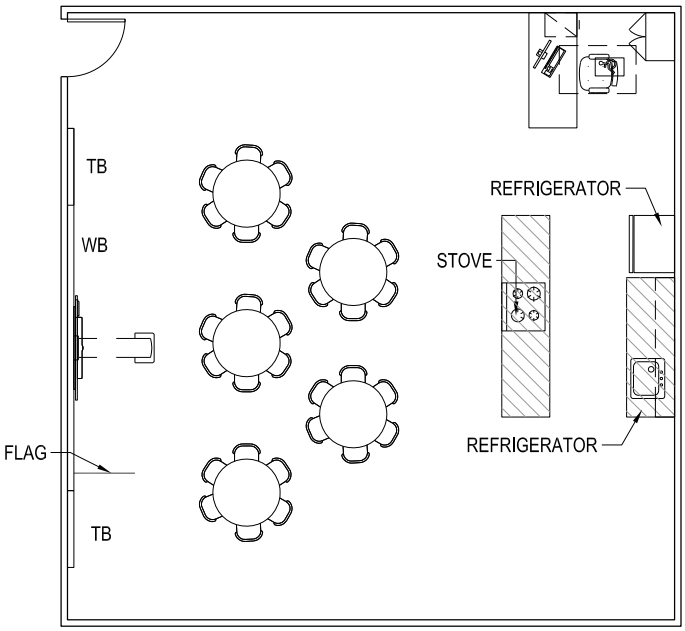
The special education classrooms will be designed for maximum flexibility including one classroom/lab for life skills training. Resource rooms strategically placed within the building will serve each grade.



Resource Room



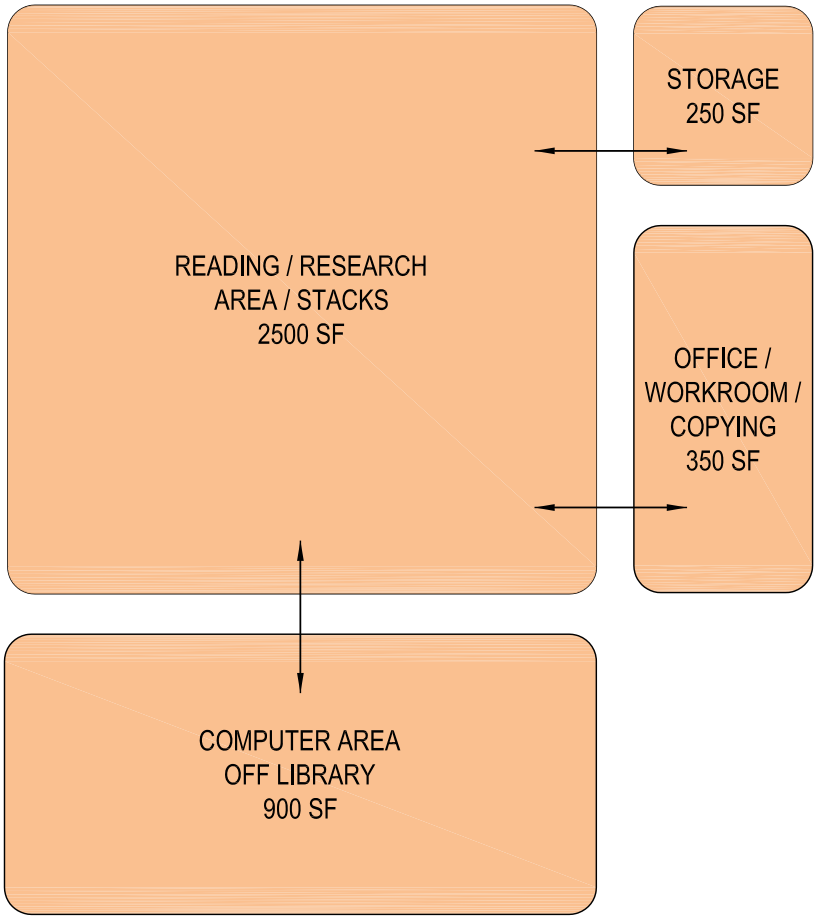
Special Education Classroom



Resource Room

7. LIBRARY MEDIA CENTER
Media

7.0 LIBRARY MEDIA CENTER			
Reading/Research area/Stacks	1	2,500	2,500
Office/Workroom/Copying	1	350	350
Computer Area off Library	1	900	900
Storage	1	250	250
Division Subtotal			4,000



Library Media Center Diagram

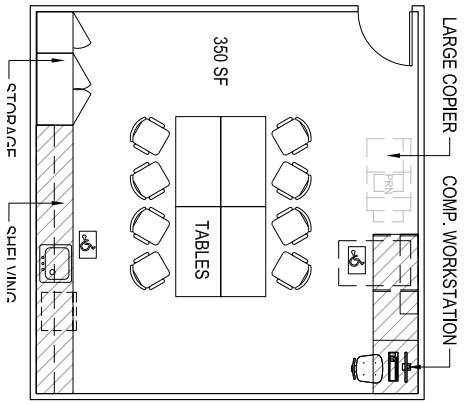
Media

Program Overview

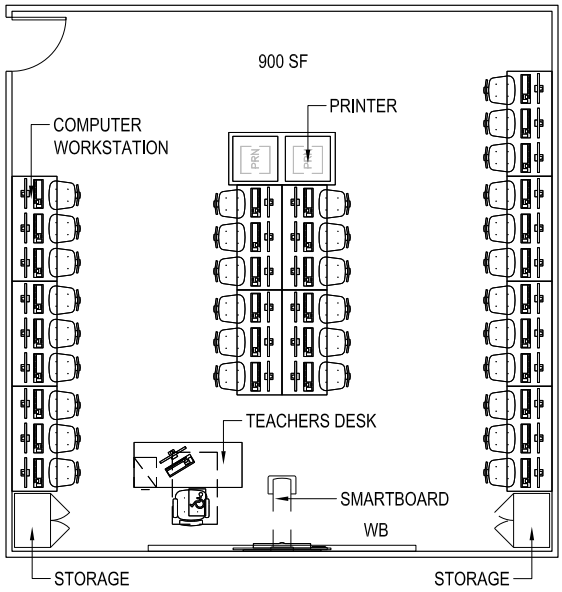
The library media center is a vital supplement to the school and supports the educational mission. Both students and staff will develop the ability to use information effectively by fully integrating print and non-print resources in all curricula areas.

Organization

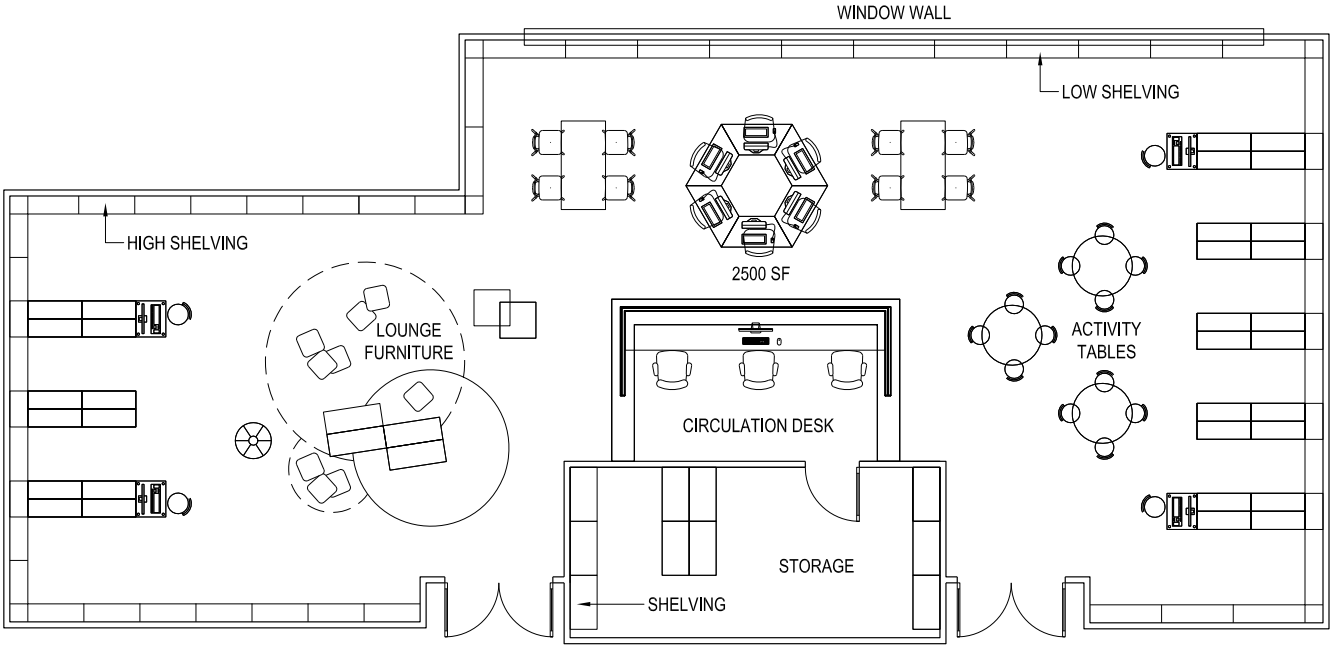
The media center should be located in a central location of the building to provide easy access from all areas. A computer area adjacent to the library provides educational support and complements the focus of the media center.



Office Workroom Copying



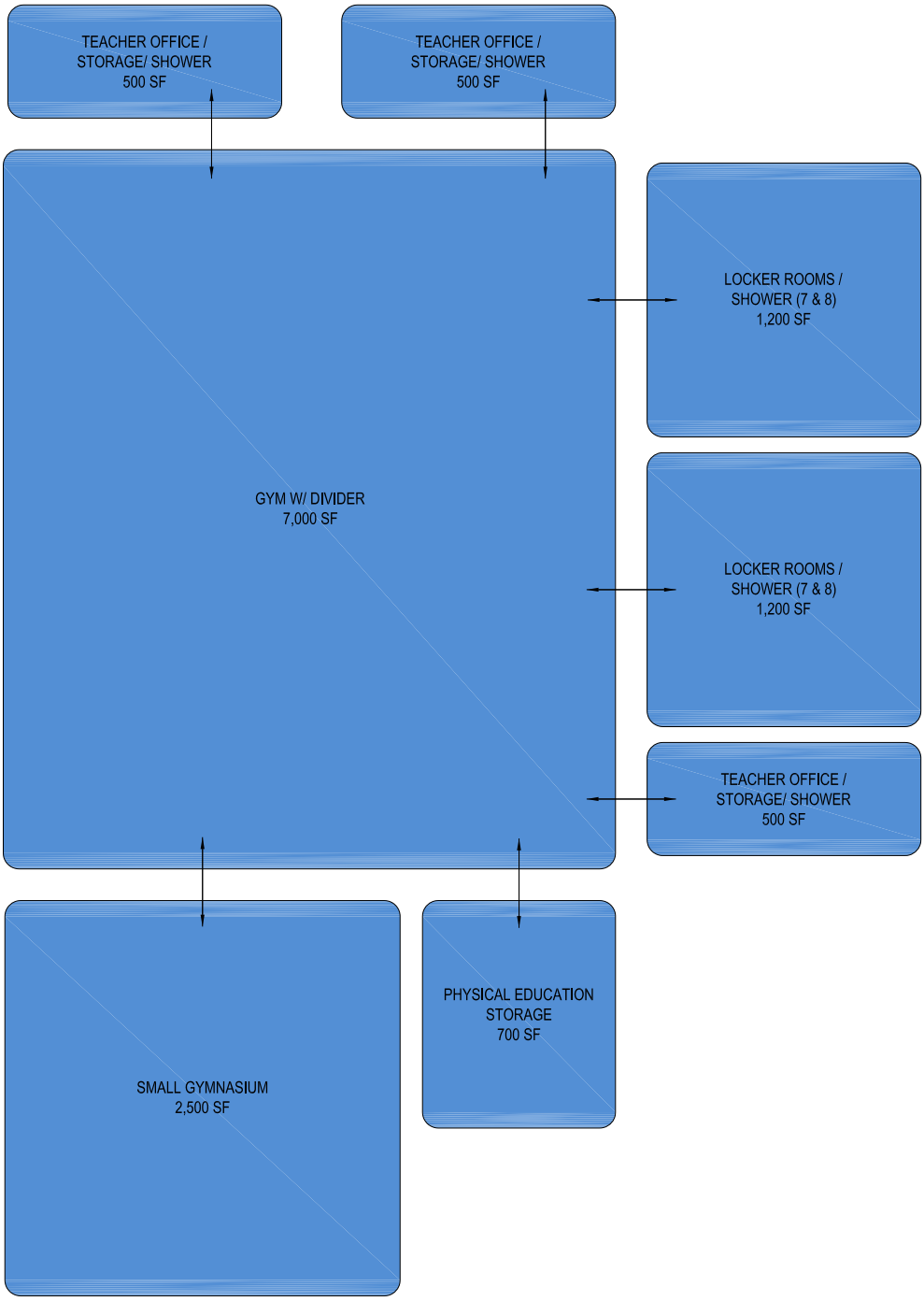
Computer Area



Reading, Research, Storage and Stacks

8. WELLNESS/FITNESS/HEALTH
Physical Education

8.0 PHYSICAL EDUCATION/GYM			
Gymnasium w/divider	1	7,000	7,000
Small Gymnasium	1	2,500	2,500
Locker Rooms/shower (7 & 8)	2	1,200	2,400
Teacher Office/Storage/Shower	3	500	1,500
Physical Education Storage	1	700	700
Division Subtotal			14,100



Physical Education Diagram

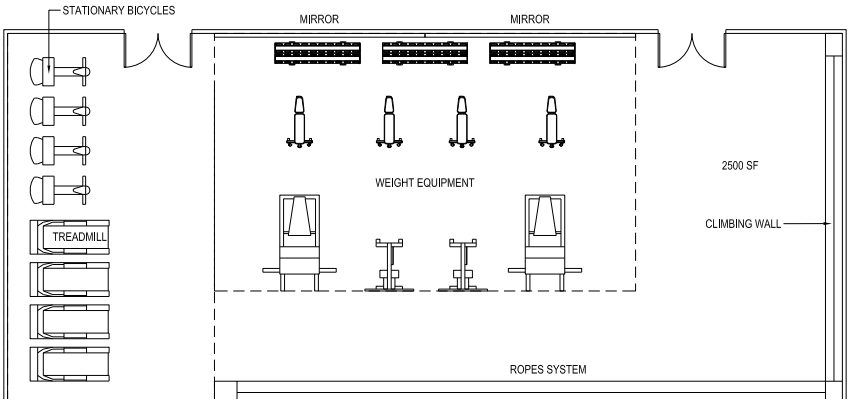
Physical Education

Program Overview

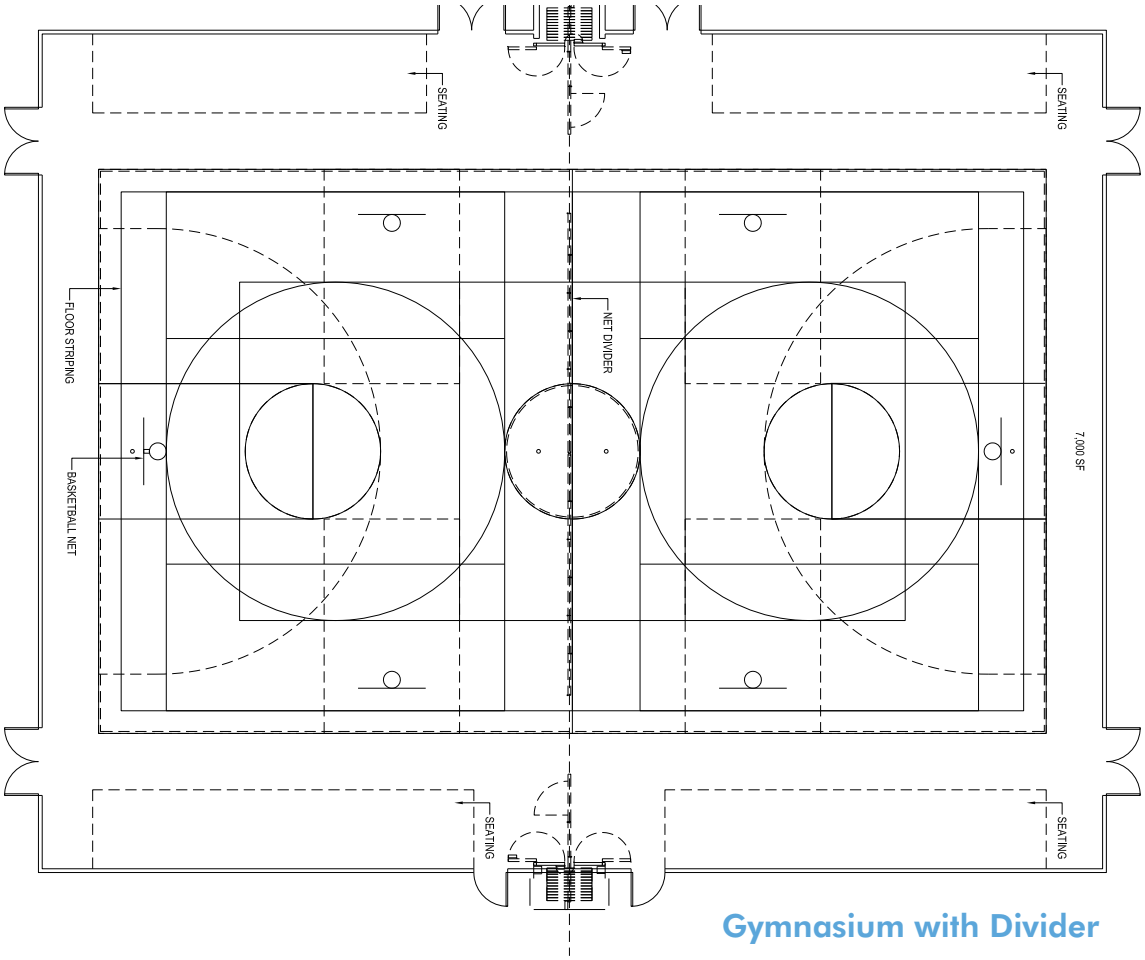
The objectives of the physical education program is to develop all students health and well being by helping them to acquire lifetime physical fitness. Health education is included as part of the curricula and provides opportunities for students to acquire the knowledge, attitudes and skills for maintenance of good personal health.

Organization

The gymnasium is to be divided into 2 teaching stations with a net divider. The small gym should be equipped as an adaptive physical education and physical therapy space to provide instruction in body strength and development.



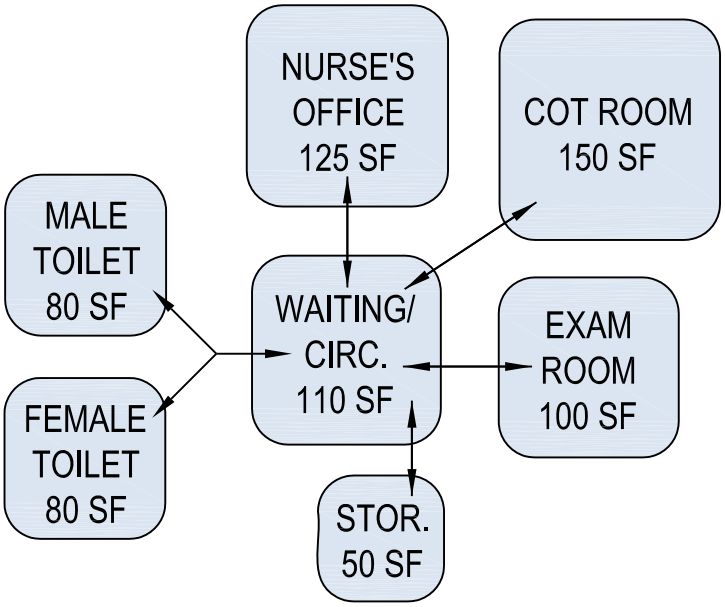
Small Gymnasium



Gymnasium with Divider

9. NURSE'S SUITE
Health Offices

9.0 HEALTH OFFICES			
Nurse's Office	1	125	125
Cot Room	1	150	150
Exam Room	1	100	100
Male Toilet	1	80	80
Female Toilet	1	80	80
Waiting/ Circulation	1	110	110
Storage	1	50	50
Division Subtotal			695



Health Offices Diagram

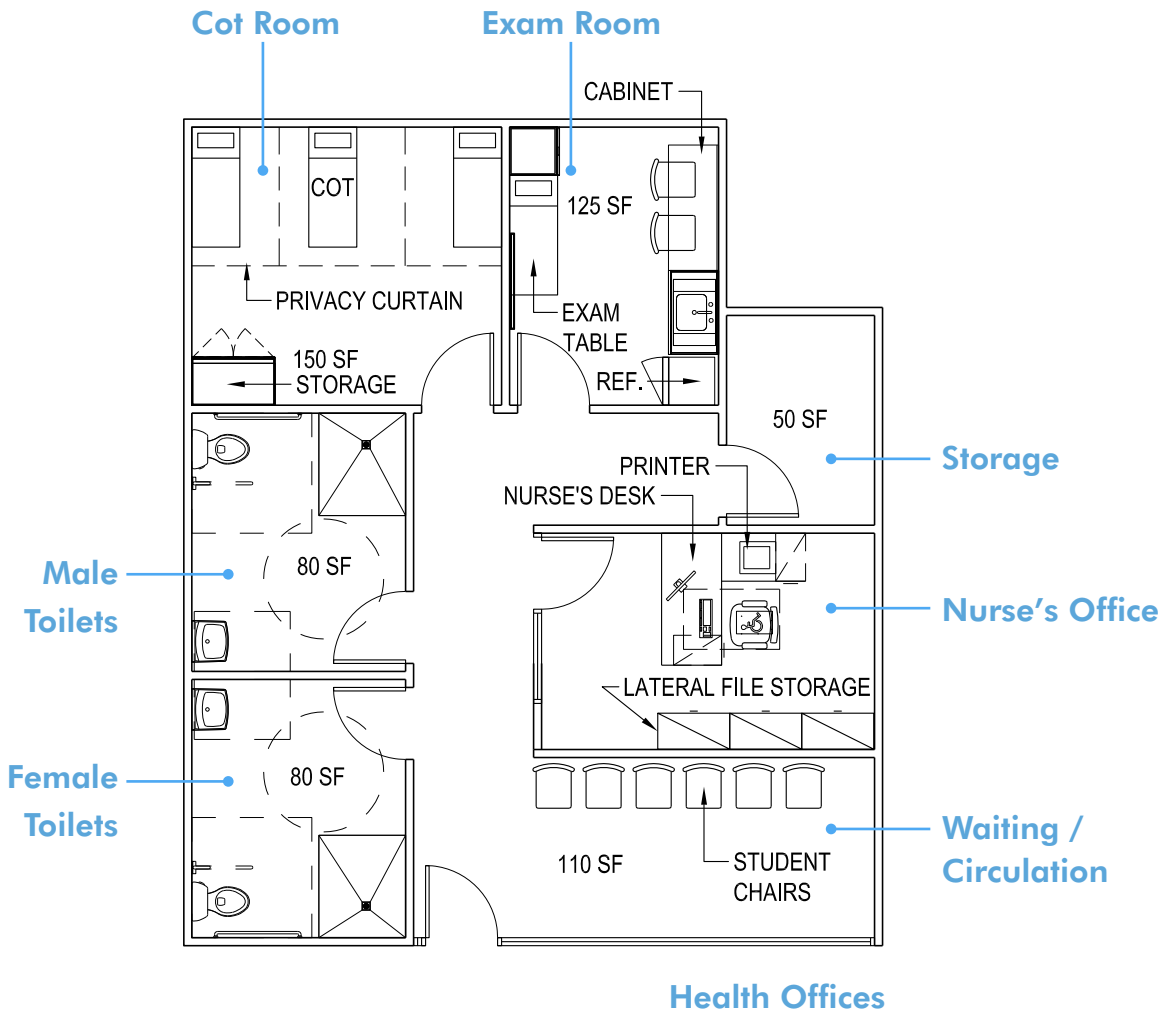
Health Offices

Program Overview

The health offices will provide quality health care and assistance to students and offer preventative services as required. The health office will serve the entire population of the school. It will be staffed by a licensed, registered nurse who dispenses general health care and medication to students in need and conduct screenings and preventative programs.

Organization

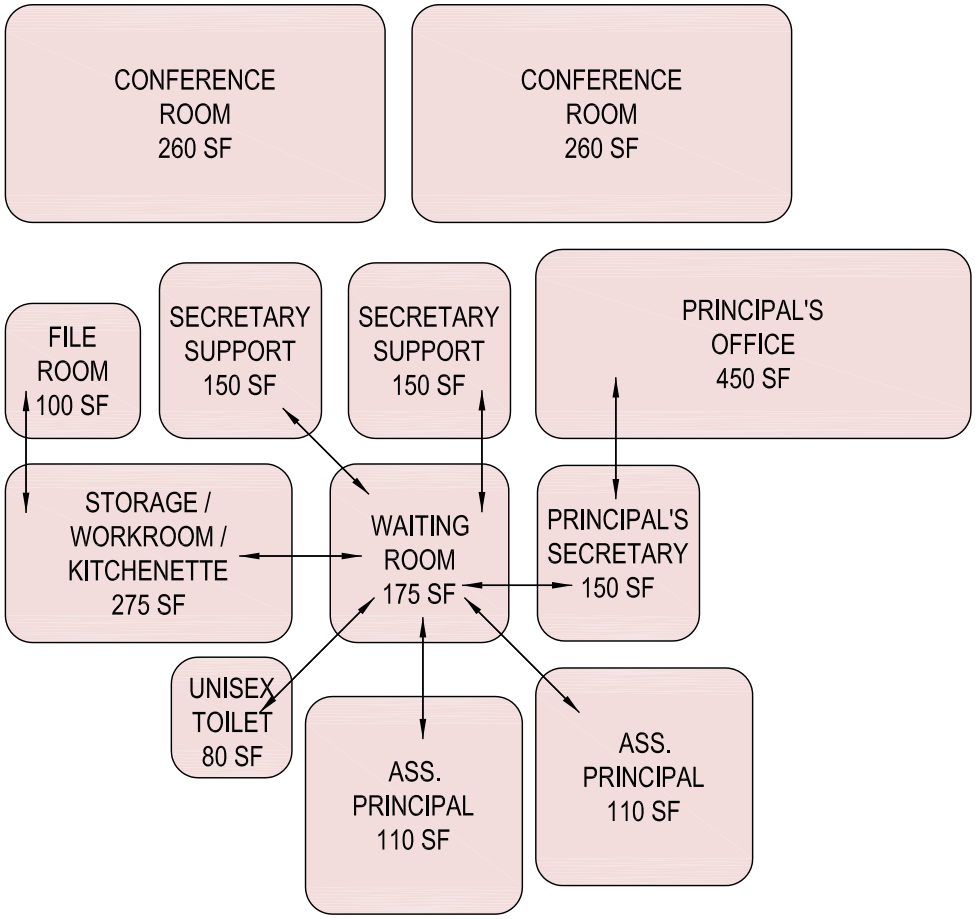
The health office will include an office, waiting area, examining area, toilet, cot room and storage. It should be adjacent to the administrative offices and to student service support areas. It should also be within view of pick-up and drop-off area at the front of the building, with easy access for parents.



Health Offices

10. TEACHER/ADMIN SUPPORT
Administration

10.0 ADMINISTRATION			
Principal's Office	1	450	450
Conference Room	2	450	900
Assistant Principal	2	250	500
Principal's Secretary	1	150	150
Secretarial Support	2	150	300
Storage/workroom/kitchenette	1	275	275
Unisex Toilet	1	80	80
File Room	1	100	100
Waiting Room	1	175	175
Division Subtotal			2,930



Administration Diagram

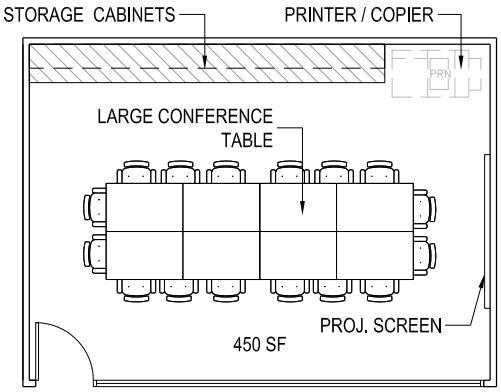
Administration

Program Overview

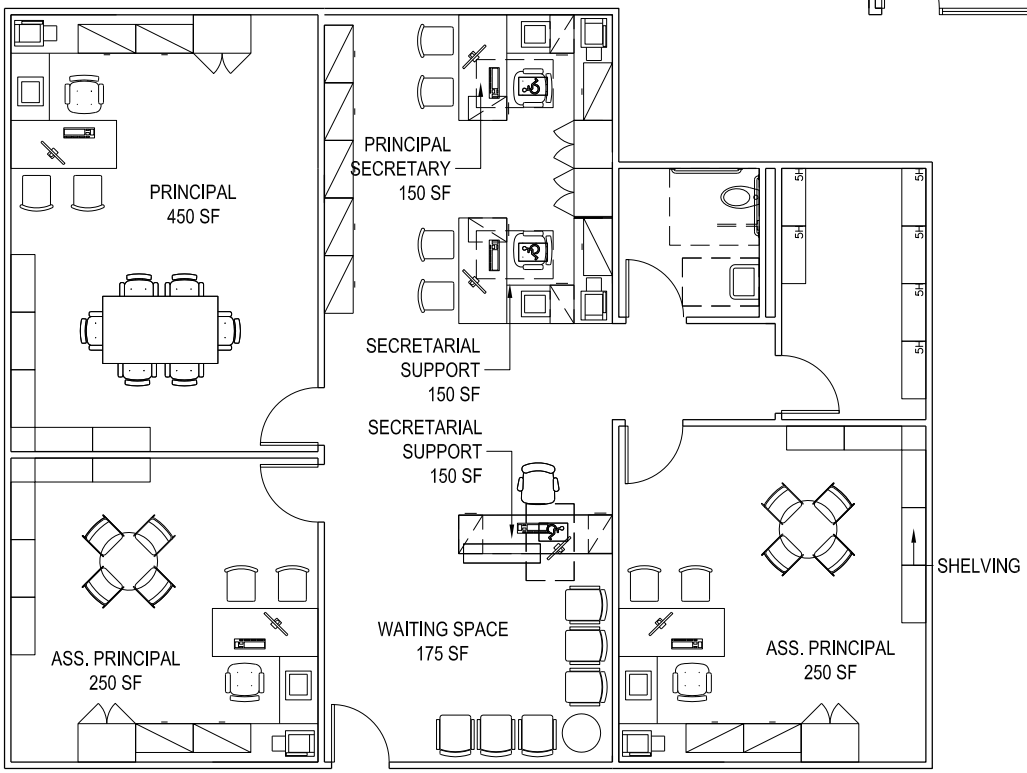
The focus of the administration suite is to provide leadership, coordination and support for the instructional program. It should function as the nerve center of the building. Consideration must be given to security. Secure storage of student records, as well as night security system will be necessary.

Organization

The leadership area should be open and inviting, as well as practical and efficient. Located near the main entrance, the complex should include a public reception large enough to accommodate normal traffic of adults and students. The lobby area should be equipped with display materials for student art/project work and for important notices. The entire suite should support and facilitate communication between staff, students and parents.



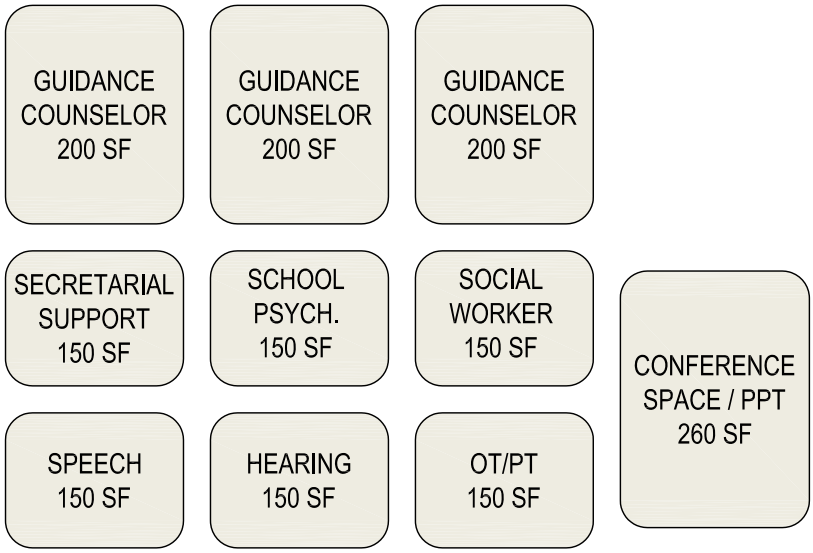
Conference Room



Administration Suite

11. TEACHER/ADMIN SUPPORT
Guidance

11.0 GUIDANCE/ADMIN SUPPORT			
Guidance Counselor	3	200	600
Secretarial Support	1	150	150
School Psychologist	1	150	150
Social Worker	1	150	150
Speech/hearing/OT/PT	3	150	450
Conference Space/PPT	1	260	260
Division Subtotal			1,760

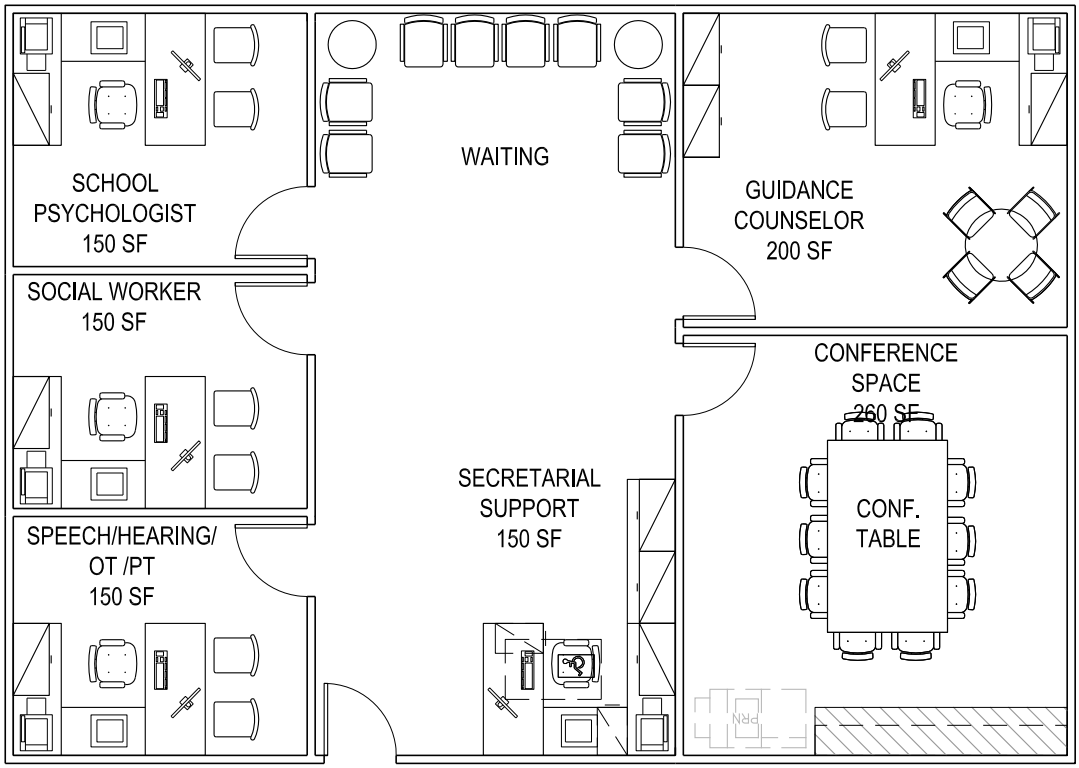


Guidance Diagram

Guidance

Program Overview

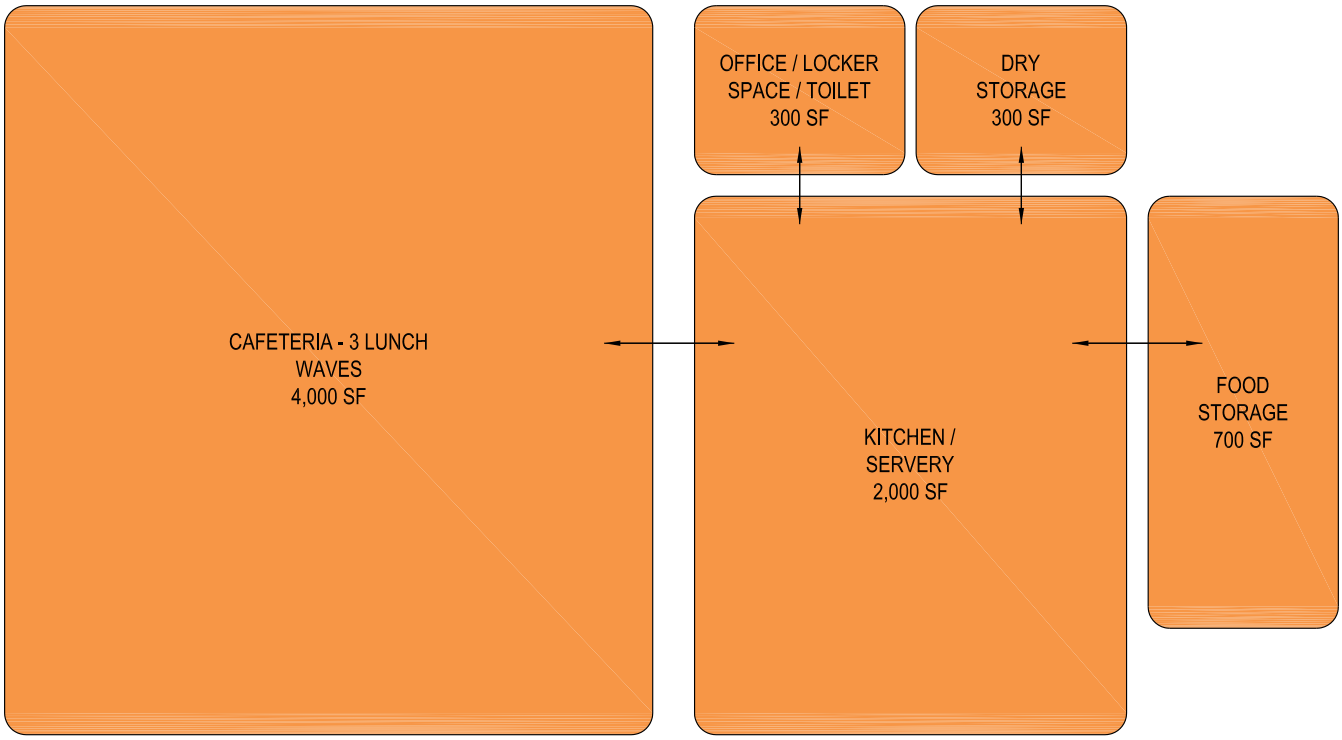
The guidance and suppot offices will be located in an office suite arrangement near of adjacent to the administrative offices.



Guidance Suite

12. CAFETERIA / KITCHEN
Cafeteria

12.0 CAFETERIA/KITCHEN			
Cafeteria - 3 lunch waves	1	4,000	4,000
Kitchen/servery	1	2,000	2,000
Dry Storage	1	300	300
Food Storage	1	700	700
Office/Locker Space/ toilet	1	300	300
Division Subtotal			7,300



Cafeteria / Kitchen Diagram

Cafeteria

Program Overview

The cafeteria will serve lunch daily for up to 800 students in a pleasant, low stress environment which encourages good nutrition and appropriate social behavior. It should also provide a large group meeting area for school and public use.

Organization

A Middle School of this size will require a self-contained cafeteria with a full service kitchen for the preparation of lunches for the student body and faculty. The cafeteria should be large enough to serve 3 lunch waves of students. The cafeteria should have easy access to the building loading dock and be accessible to the public. It should also be equipped with fixtures and equipment for special events and meetings. The design should minimize noise during lunch sittings. Bathrooms should be located near the cafeteria and easy access to the outside is desirable.

Kitchen

Program Overview

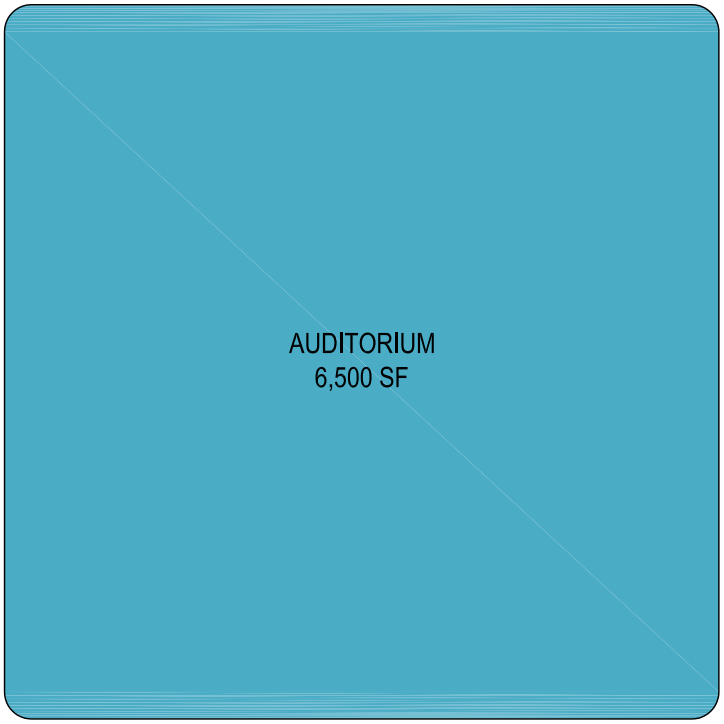
The kitchen must have adequate space for food preparation and storage of supplies and equipment. Three student serving areas or food access areas and payment lines will be needed for efficient service. The kitchen will be designed to meet all local and State health and safety codes.

Organization

Support spaces to the kitchen include a manager's office, storage, rest rooms, serving areas and scullery. Equipment for the kitchen is outlines in the Ed Spec. The kitchen should be designed for maximum efficiency and maintenance.

13. AUDITORIUM
Auditorium

13.0 AUDITORIUM			
Auditorium	1	6,500	6,500
Division Subtotal			6,500



Auditorium Diagram

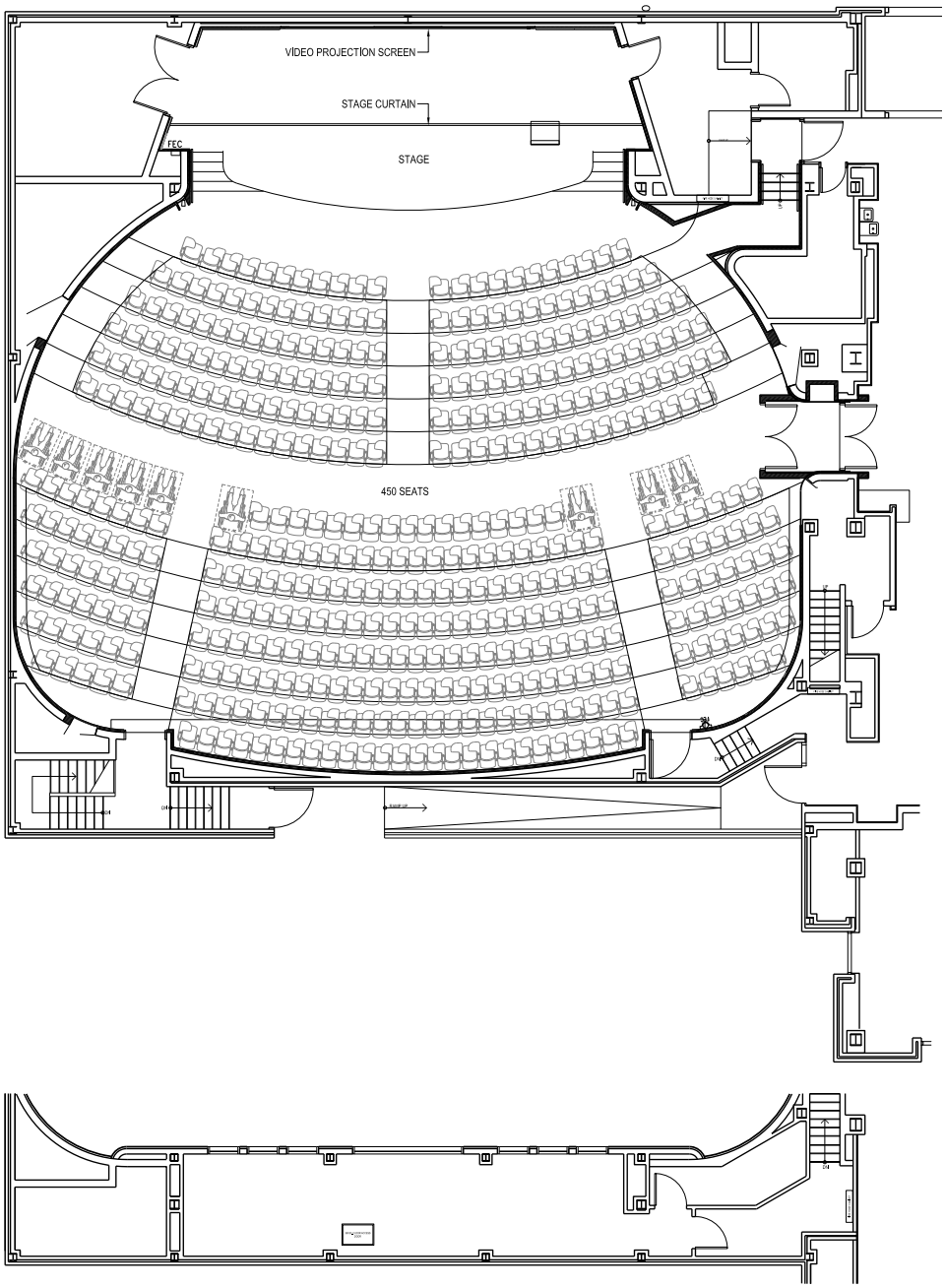
Auditorium

Program Overview

The auditorium should accommodate half of the student body and be fully handicap accessible. It should also have the ability to operate independently of the school. Special considerations for acoustics and digital sound systems must be made. Various equipment, lighting and sound controls must be provided as outlined in the Ed Spec.

Organization

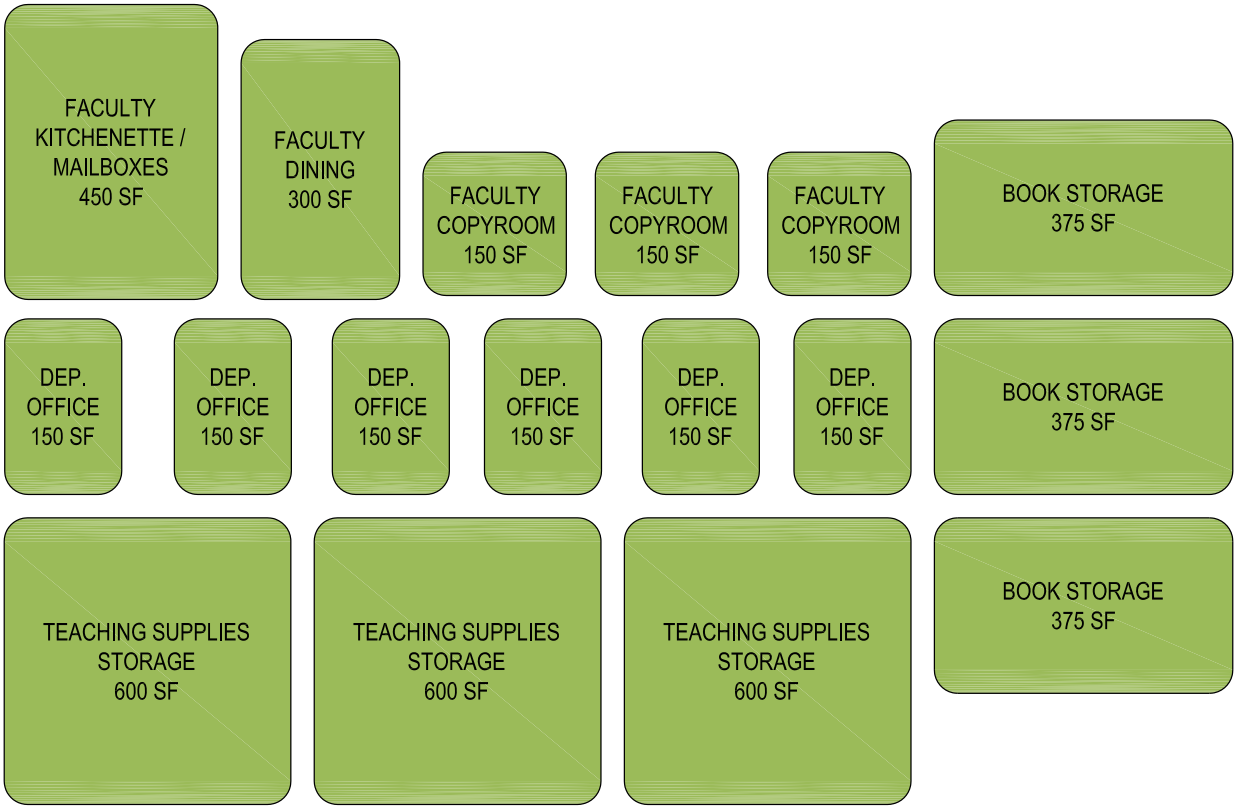
The auditorium should be provided with a lobby and toilet facilities accessible to the general public without having to enter other areas of the school to gain access.



Auditorium

FACULTY SPACES/GENERAL PURPOSE ROOMS
Facility Space

14.0 FACULTY SPACE/GEN. PURPOSE			
Faculty kitchenette w/mailboxes	1	450	450
Faculty Dining	1	300	300
Faculty copyroom/workroom	3	150	450
Department Offices	6	150	900
Book Storage (1 per grade)	3	375	1,125
Teaching supplies storage	3	600	1,800
Division Subtotal			5,025



Faculty Space Diagram

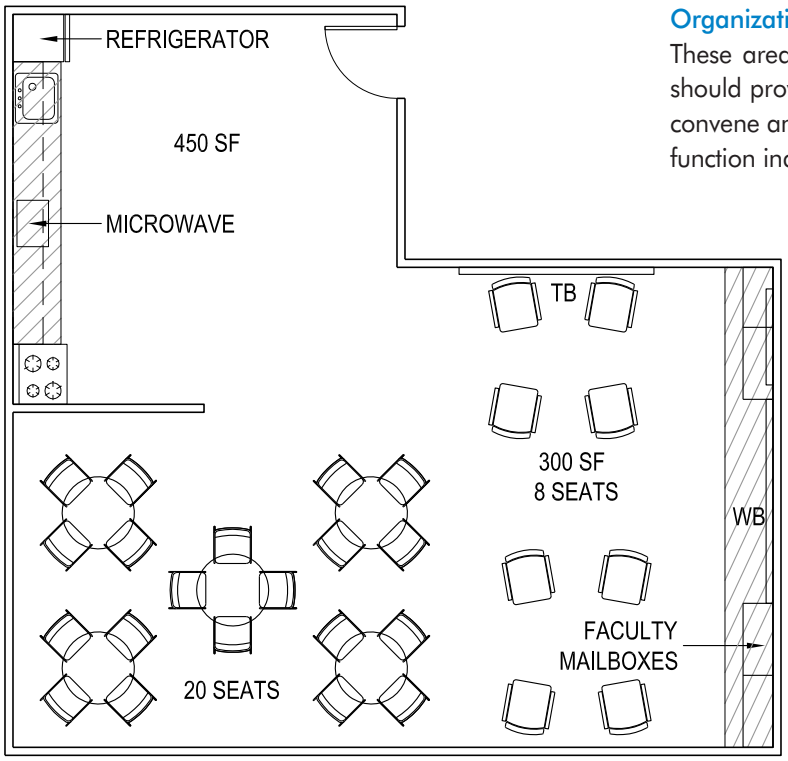
Faculty Space

Program Overview

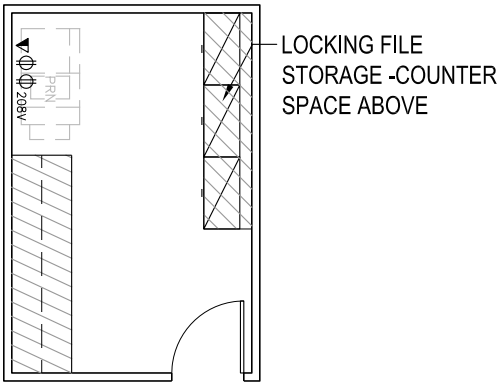
The faculty work rooms department offices and dining area is intended to provide space for teachers to meet, work and dine together corroboratively, prepare materials and lessons, communicate with parents and relax.

Organization

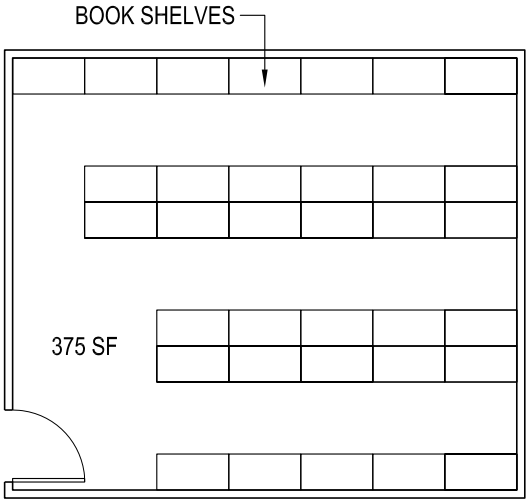
These areas should be available to all members of staff. They should provide comfortable, flexible seating permitting groups to convene and collaborate. The dining area and work area should function independently.



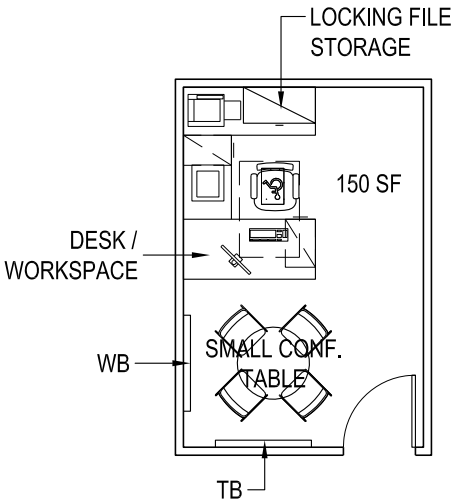
Faculty Dining & Kitchenette w/ mailboxes



Faculty Copy room / Faculty Workroom



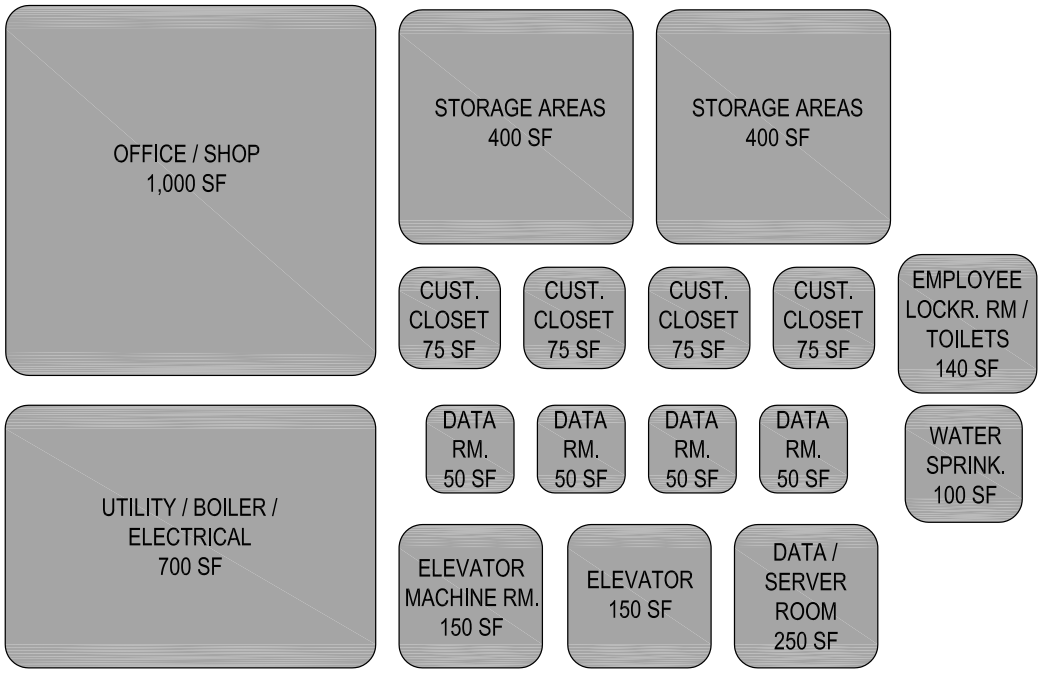
Book Storage (1 per grade)



Department Offices

15. FACILITY MANAGEMENT
Maintenance and Operations

15.0 MAINTENANCE & OPERATIONS			
Office/shop	1	1,000	1,000
Storage Areas	2	400	800
Employee Locker room/toilets	1	140	140
Utility/boiler/electrical	1	700	700
Water Sprinkler Room	1	100	100
Custodian Closet	4	75	300
Data Rooms	4	50	200
Data/Server Room	1	250	250
Elevator Machine room	1	150	150
Elevator	1	150	150
Division Subtotal			3,790



Maintenance and Operations Diagram

Maintenance and Operations

Program Overview

Refer to the Ed Spec for a description of maintenance and operations space & equipment requirements.

5.1 Building Design Narrative

Option 1, Renovate the existing North haven Middle School "As New", entails modifying the existing building to accommodate the Building Program defined by the Educational Specifications, and replacing all systems and interior finishes to achieve a facility that meets the standards and codes of new construction.

Renovate as new projects attempt to optimize costs by taking advantage of the existing structure's primary elements. The structural frame and the majority of the building's enclosure remain in place. Additionally, the State of Connecticut grants a 10% higher reimbursement rate for this type of school construction. Much of these gains may be lost however, as construction phasing and swing space is required to accommodate students during the course of construction. Phased construction also takes longer, which adds cost.

The following is an outline of the systems to remain and those to be replaced.

To Remain:

- Brick cavity wall and knee-walls through-out
- Steel framing, bar joists, and tectum deck
- CMU dividing walls-95% to remain
- Toilet room plumbing
- Most classrooms configurations to remain (15% re-configuration).
- Administration Offices to remain
- Two existing gymnasiums
- Library with new interior finishes

To be Replaced:

- Roof membrane replaced with TPO, all rigid and tapered insulation to pitch ½"/12" min, roof overflow drains, perimeter nailers and drip edge.
- Fenestration and entry doors through-out, replaced with double glass pain with high performance SHGC and U-value.
- The facility should be designed with climate control features that will permit year-round use for instruction and community purposes. The facility should include central, school wide air conditioning. A four pipe heating and air conditioning system allowing flexibility for fluctuations in temperature requiring switching from cooling to heating on a regular basis should be considered to maintain maximum comfort in the building. (Ed Spec)
- An emergency generator will be installed and sized to meet the minimum requirements of the new facility. The generator should be sized to run 75% of the building at maximum load. The cafeteria, data center, main office, life safety equipment, gym, and theater should all be on the generator. A room within the building should be designated for emergency operations and supported by the generator. (Ed Spec)
- All power and data distribution and service entry to be replaced to meet current code and equipment requirements.

- All classroom, science labs and prep rooms storage and worktop casework.
- Auditorium seating and wall finishes.
- All floor finishes.
- All areas except gyms and auditorium to receive new acoustical tile ceilings and 2x4 light fixtures (basket type).
- All hallway metal lockers.
- At the existing locker room area northwest corner 30% will be demolished and reconfigured for two Art classrooms and the Health classroom.
- The Cafeterias and commercial kitchen will be reconfigured to become smaller in size and 2 art rooms added to the courtyard side of the wing for exterior daylight and an outdoor classroom in the courtyard.
- The music rooms will receive new designations and finishes through-out.
- New signage throughout.

To be Added:

- A new entry canopy and vestibule at the existing school entry.

Building Site

5.2 Site/Civil Improvements

For Option 1, Renovate as New, the Middle School campus will be renovated and improved in the following key areas:

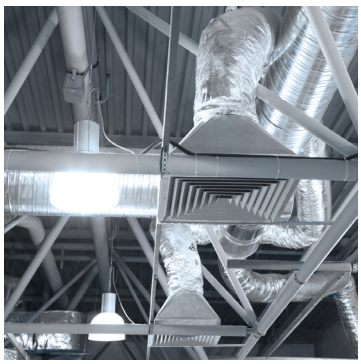
- New courtyard hardscape and landscaping to be installed (3 places) that will require minimum maintenance.
- New site walks and building plantings
- The existing parking lot and roadways will be milled and overlaid with a new surface course. New curbing.
- New tree island plantings to improve shading effects of the parking lot and to improve overall appearance.
- Resurfaced track
- General repairs to Grandstand

Building Structure

5.3 Structural Systems

The existing structure and perimeter enclosure to remain, with minimal modifications.

- The existing 1-story steel building structure will be evaluated for lateral loads and additional mass from roof mounted equipment if required.
- Repartitioned areas that affect the building structure will be accommodated with new structural components to allow modification of the existing structure.



New Systems – Renovate as new

5.4 Heating, Ventilating and Air Conditioning Systems

Heating

Heating shall be provided by a hot water system. Four high efficiency condensing boilers shall be located inside the main boiler room, each sized for 25% of total school heating load of approximately 6.0 million btuh. New hot water distribution piping, valves, pumps and controls will be provided to new terminal units.

Hot water will be circulated via variable speed pumps also located inside the boiler room. Pump selections will be based on 100% redundancy, with one standby pump. Constant flow primary and variable flow secondary base mounted pumps will circulate the hot water through the heating boilers and out to the terminal units throughout the building. Fuel source for heating shall be natural gas served by Southern Connecticut Gas Company.

Wall mounted finned tube radiation units will be used and will be supplemented with hot water ceiling radiant panels as required in new and reconfigured perimeter areas.

Hot water design temperatures:

190 Degree F hot water supply
170 Degree F hot water return
20 degree temperature difference

Cooling

The facility will be fully air conditioned. The chilled water plant will consist of one electric centrifugal air or water cooled chiller located in a new mechanical room with heat rejection via either by a counter flow cooling tower or air cooled condenser located on the ground or roof of the building. Each chiller will be a centrifugal type chiller utilizing variable speed, magnetic bearing technology for maximum energy efficiency. Dual temperature chilled water will be utilized to supply water to both Air Handling units (44 Degree F.) and chilled beams (60 Degree F). The secondary chilled water to the chilled beams will be provided via a plate frame type heat exchanger. Glycol will be utilized for freeze protection in the lower temperature loop to the air handling units.

The chilled water distribution system will incorporate a primary/secondary pump system with variable speed drives on the secondary pumps. Chilled water system control valves will be modulating, two-way type.

The condenser water system will include chemical treatment and a side stream filtration. The cooling towers will be provided with variable speed fan control.

Cooling plant:

400 ton chiller
primary chilled water pumps: 2 at 800 gpm ea.
Secondary chilled water pumps: 4 at 400 gpm ea.
44 and 60 degree F supply water temperature

Air Distribution

Air handling units located on the roof and within the building mechanical rooms shall provide conditioned and ventilation air to all spaces. All units are provided with 100% outside air economizer, two sets of filters, one at 30% and one at 80% filtration and a carbon dioxide detection system. All motors shall be premium efficiency.

Air distribution system shall vary in different areas to meet space requirements but be subject to sound criteria requirements for classrooms and Libraries. Outside air ventilation rates will be based on ASHRAE 62.1 2004 for all spaces.

Air handling units that have high outside air requirements will also utilize total energy heat recovery devices.

Due to limited space above the ceilings throughout the building the number of units will be selected to allow for minimizing the duct sizes required to be accommodated. Where it is impossible to fit ductwork into existing spaces, it may be required to run ductwork exposed on the roof which will be susceptible to impact from weather and vandalism. Where exposed ductwork is required to be installed due to building constraints, double wall prefab panel construction type will be used, with the maximum available 10 year manufacturers warrantee for leakage. Structural systems will have to be provided above the roof to support the new equipment also contributing to the above roof work which will hinder access and maintenance activities.

Ductwork Distribution:

- In accordance with SMACNA standards
- Meet ANSI and State requirements for sound. Ducts sized for low velocity in learning spaces. Use of sound attenuators and acoustically line first 20 feet of inlet and outlet ductwork of all air handling units and exhaust fans.
- Spiral round for exposed ductwork
- Externally insulated or lined to meet State Energy Code.
- Duct sizing maximum 1250 fpm primary ducts, and 600 fpm within 30 feet of outlets.

Main Classrooms and Administration Areas

Air systems serving Administration areas will be constant or variable volume with single duct terminal and air hot water reheat coils. The air handling units will be double-wall, modular construction, total energy heat recovery wheel, draw-through type with integral mixing box, filters, heating and cooling coils, and supply and return fans. Supply and return fans will utilize variable speed drives. Air flow measuring stations will be located on the supply fan, return damper at mixing box, and outside air duct. Primary Air Units serving the chilled beams within the Classrooms will utilize a heat recovery dehumidification cycle to ensure proper humidity levels within the space and chilled beam operation. Chilled beams are designed to operate in a non-condensing mode with all of the humidity control being provided via the dedicated primary air unit that also provides the ventilation for the space.

Trunk ductwork from the air handling units will be rectangular or round duct. Terminal boxes will be single duct pressure independent, variable volume shutoff type with DDC controllers and integral hot water reheat coils. Ductwork on the inlet of the terminal boxes will be prefabricated, medium pressure, round spiral seam duct. Supply ductwork downstream of the terminal boxes and return ductwork will be low pressure duct with internal lining. CO2 Sensors located in classroom will minimize outside flow CFM according to actual occupancy.

Terminal units within the classrooms will consist of ceiling or console type wall mounted active chilled beams with 4 pipe hot and chilled water distribution and ventilation air connections.

Perimeter heating will be provided either by the chilled beams or supplemented by hot water radiation or radiant ceiling panels.

For units serving administration areas, back-up DX coils and related condensing units will be provided for operation during times when the rest of the school is unoccupied and it is not economical to run the main chilled water plant.

Open Multi-Use Spaces

Air system shall be single zone type with variable volume control. The air handling unit will be double-wall, modular construction, draw-through type with integral mixing box, filters, heating and cooling coils, reheat coils, and supply fan. Supply and return fans will utilize variable speed drives. Air flow measuring stations will be located on the supply fan, return air damper at mixing box, and outside air duct. CO2 sensor located in return duct will minimize outside air CFM according to actual zone occupancy.

All distribution ductwork from the air handling units will be prefabricated, low pressure, insulated, double-wall round or flat oval spiral seam duct where exposed and rectangular where concealed above ceilings.

In unoccupied mode systems will decrease air capacity up to 30% to minimize energy usage.

Gymnasiums

Air systems will be single zone type with variable volume control. The air handling units will be double-wall, modular construction, draw-through type with integral mixing box, filters, heating and cooling coils, and supply fan. Supply and return fans will utilize variable speed drives. Air flow measuring stations will be located on the supply fan, return air damper at mixing box, and outside air duct. CO2 sensor located in return duct will minimize outside air CFM according to actual zone occupancy.

Supply ductwork will be low pressure, prefabricated round spiral seam double wall insulated duct. Return ductwork will be low pressure rectangular duct.

Locker Rooms

The new Locker Room areas will be provided with a new single zone air system that will provide constant volume 100% outside air. The air handling unit will be double-wall, modular construction and plate type heat recovery section, draw-through type with integral mixing box, filters, heating and cooling coils, and supply and exhaust fans. Ductwork will be low pressure rectangular duct of aluminum construction. Controls will allow ventilation air to be reduced during long unoccupied periods, but still allow for use of the unit for heating.

Mechanical/Electrical Spaces

The boiler/chiller plant mechanical spaces will have a heating and ventilating unit (H&V) to meet heating and combustion air requirements. The H&V unit will have integral filters, heating coil, and supply fan. A sidewall propeller fan will provide additional summer ventilation.

Mechanical fan rooms, fire pump room, and chiller room will be provided with hot water unit heaters and propeller fans for ventilation.

General Exhaust

Toilet rooms, locker rooms, janitor closets, and other miscellaneous spaces will be exhausted through exhaust fans located on the roof. Ductwork will be low pressure rectangular duct. Locker room exhaust ductwork shall be of aluminum construction. Heat recovery will be used wherever possible to capture the heat from the exhaust that would otherwise be discharged from the building.

Special Exhaust

Science room exhaust hoods and other localized special exhaust will have dedicated variable volume exhaust fan control. Fiberglass VFD drive exhaust fans will be located on the roof. Ductwork shall be fully welded, stainless steel construction or as required for the specific material being exhausted. Kiln rooms, work rooms, art rooms, kitchen hoods and shop areas will all be provided with dedicated contaminant removal exhaust systems.

Miscellaneous Cooling Systems

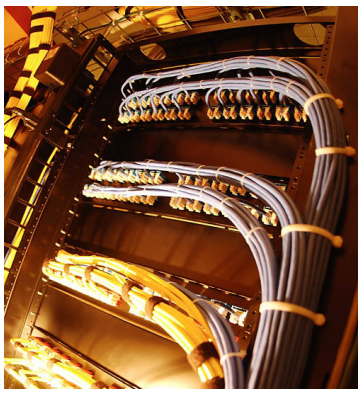
Split system DX for all spaces such as telephone/data rooms, computer rooms, elevator machine rooms that require cooling year round.

Materials and Methods:

Ductwork: galvanized sheet metal G90. Aluminum for showers, 316 stainless steel for hoods.

Piping: Schedule 40 black steel, or Type "L" copper with 95/5 solder fittings (2 ½" and smaller threaded). Schedule 40 black steel with welded or mechanical couplings (3" and larger) with fiberglass insulation and ASJ vapor barrier jacket.

Valves: Ball or High performance butterfly type rated for system. Balance valves to be pressure balanced type.

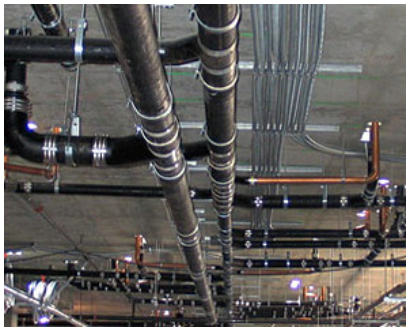


New Systems – Renovate as new

5.5 Electrical System, Security and Technology

The existing electrical systems will be removed and upgraded as follows:

- Service upgrade to 2000 amp 480 volts 3-phase.
- All panels and main electrical service replaced.
- Complete re-wiring of facility with additional electrical outlets and circuits
- New disconnect switches and motor starters
- All exterior fixtures replaced with newer more efficient fixtures that meet current codes.
- Parking lot lighting replaced with newer, higher efficiency fixtures with appropriate controls.
- Exterior canopy lighting replaced with newer, higher efficiency fixtures.
- Complete fire alarm system replacement.
- Interior lighting completely replaced with new fixtures in optimal layouts to provide adequate and efficient lighting.
- Exit signs to be replaced. handicap and/or low level exit signs added.
- Egress paths to contain proper emergency lighting per code.
- Public address system is old and should be replaced.
- Security camera system replaced with higher resolution and additional cameras.
- Occupancy sensors added to most areas in the building.
- Grandstand elevator repaired
- New WiFi system.
- Eliminate surface mounted raceways by integrating into new system.
- Stage and auditorium lighting systems completely replaced.
- New emergency generator installed and sized to meet the minimum requirements of the new facility. Generator sized to run 75% of the building at maximum load. The cafeteria, data center, main office, life safety equipment, gym, and theater should all be on the generator. A room within the building should be designated for emergency operations and supported by the generator. (Ed Spec)
- Option for solar panels and PPA (Power Purchase Agreement)



New Systems – Renovate as new

5.6 Plumbing Systems

General

All plumbing systems shall be designed in accordance with the International Plumbing Code, the Americans with Disabilities Act, State of Connecticut Water Conservation Standards, and with the Educational Specifications for the new school.

Fixtures

All plumbing fixtures shall be of institutional quality. Handicapped – accessible fixtures shall be ADA compliant. Flush valves and faucets shall be of the water conservation type. Faucets on ADA compliant lavatories and sinks shall be electronic.

Floor drains shall be provided in toilet rooms, locker rooms, science labs, and in mechanical rooms. Floor drains shall be provided with trap primers, if warranted.

Piping shall be provided for a full service kitchen for commercial cooking, with the coordination of the food service consultant.

Domestic Water System

Cold water shall be piped to each plumbing fixture and to each piece of plumbed kitchen equipment. Cold water shall be extended to non-freeze wall hydrants located approximately 200-feet on center along the perimeter wall.

Hot water shall be provided at 140 F degrees from indirect water heaters located in the boiler room. Hot water shall be distributed at 140 degrees F to janitor mop sinks, kitchen pot sinks and dishwater. A local electric booster heater shall boost the 140 degrees F water to 180 degrees F for the dishwater rinse cycle. A thermostatic mixing valve shall provide tempered water and be distributed throughout the remainder of the school at 115 degrees F. The entire domestic hot water system shall be equipped with a pumped recirculation line.

Sanitary, Waste and Vent System

Sanitary, waste and vent piping shall be extended to each plumbing fixture and to each piece of plumbed kitchen equipment.

A central acid waste neutralization tank with monitoring shall be provided for all science and prep room sinks, if required.

An external underground 3,000-gallon grease separator shall be provided on site for kitchen waste.

Clay traps shall be provided for all art room sinks.

Storm System

Roof drains shall be provided for each roof low point. Overflow roof drains or scuppers shall be provided for emergency and discharge to exterior.

Gas Distribution System

Natural gas shall be provided to the building with both firm and interruptive services.

The firm service shall supply the boiler for indirect water heaters, commercial kitchen, and science labs with emergency shut-off system.

The hot water heating boilers shall be connected to the interruptible service; a contract agreement between Owner and supplier to be determined.

Materials and Methods

Storm, sanitary, waste and vent piping above grade shall be hubless cast iron with no-hub couplings; branch waste and vent piping above grade shall be Type "DWV" copper with soldered fittings or no-hub cast iron. Water pipe above grade shall be Type "L" copper with wrought copper sweat fittings using 95/5 solder.

Sanitary, storm, waste and vent piping below grade shall be service-weight cast iron bell and spigot, with push-on, neoprene-gasketed joints.

Gas piping under two (2") inch diameter shall be Schedule 40 black steel with malleable threaded fittings or copper, gas piping two (2") inch diameter and over shall be Schedule 40 black steel with welded fittings.

Condensate piping shall be Type "M" copper with 95/5 soldered joints.

Domestic hot, cold, hot water recirculating, condensate and all horizontal storm piping and roof drain bowls shall be insulated with fiberglass insulation and preformed insulated fittings and vapor barrier.

Acid waste and vent piping shall be polypropylene.

Seismic bracing will be provided per the State of Connecticut Building Code.

Fire Protection Systems

General
Fire protection system will include a hydraulically balanced system throughout the school with standpipe system such that every part of building can be reached with a 100-foot hose projecting a 30-foot stream. Fire main service shall be located within the utility room of the ground floor and be connected to a fire pump. Fire protection system will be designed and installed in accordance with the State of Connecticut Building Code, the State of Connecticut Fire Safety Code, NFPA 13, NFPA 14, NFPA 20, and the Town of North Haven Fire Marshal.

Standpipes
Standpipes will be provided for the stage area.

Sprinklers
The School will be fully sprinklered with a wet pipe system. Limited area subject to freezing will be protected with dry sidewall heads and/or dry alarm valves.

Materials and Methods
Piping will be Schedule 40 black steel pipe with cast iron threaded or grooved fittings and joints.

Sprinkler heads in finished ceiling areas will be concealed type with white cover plates.

Sprinkler heads in unfinished ceiling areas will be upright type.

Piping is to run concealed in all finished areas where possible and so arranged that all portions could be drained.

The Contractor will provide complete drawings and calculations as required by NFPA 13. All drawings will be computer generated. A Professional Engineer will seal drawings and calculations.

Seismic bracing will be provided per the State of Connecticut Building Code.

5.7 Option 1: Proposed Phasing Plan

Execution of the Renovate Existing School as New option requires swing space to accommodate the school population while the existing school is renovated.

Schedule

Spring	Year 1:	Referendum
Summer	Year 1:	Select A/E team and award
		Commence construction documents
Spring	Year 2:	Bid project and award construction contract
Summer	Year 2-3:	Deploy swing space
		Construction
Fall	Year 4:	Project completion

5.8 Option 1: Advantages and Disadvantages

Renovating the existing school "As New" offers significant advantages and disadvantages:

Advantages

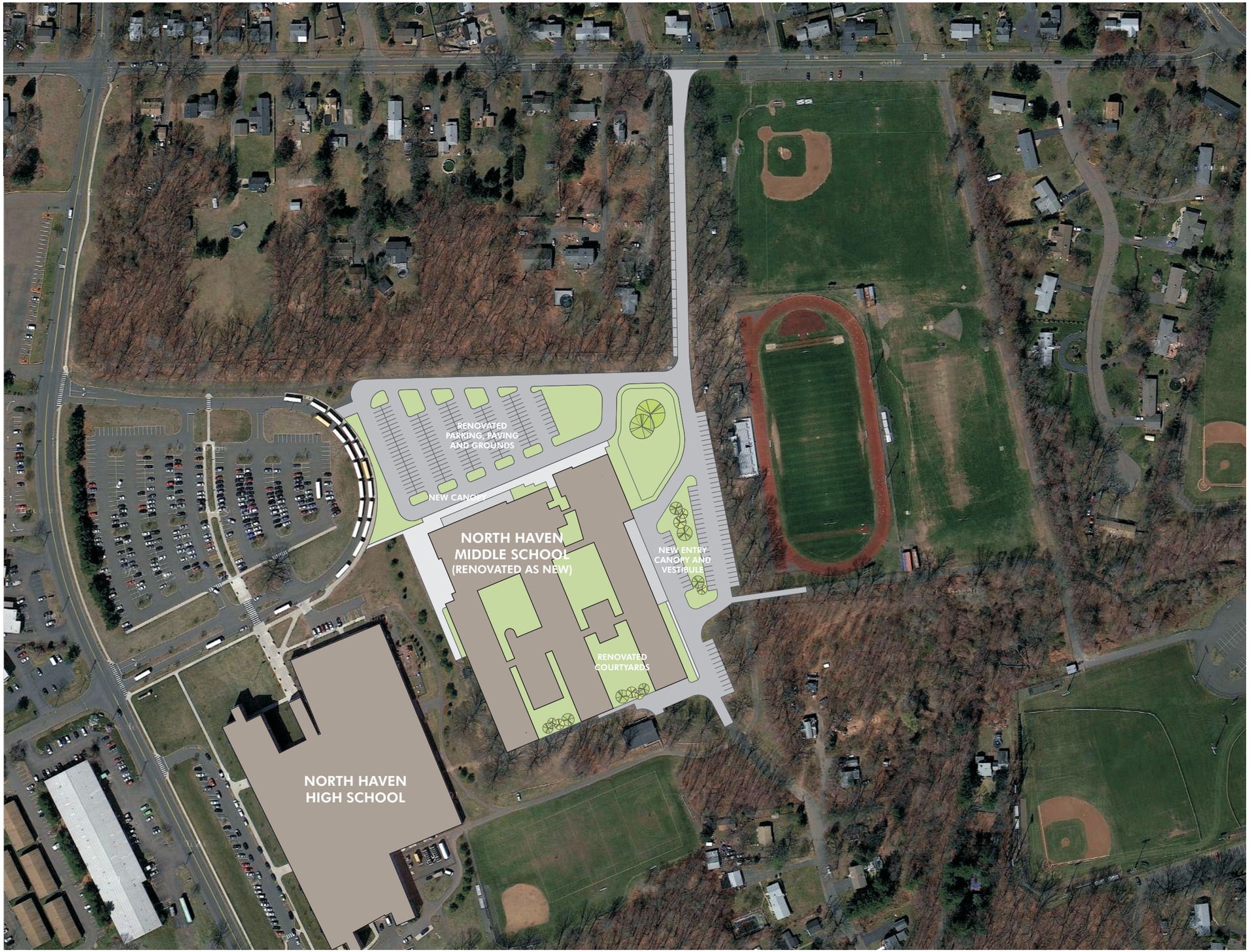
- Yields highest State reimbursement rate
- Will not impact existing athletic fields
- Location maintains present relationship with High School and shared resources

Disadvantages

- Much of the cost savings lost by costs required for swing space
- Existing building has very low ceiling height, limiting for new HVAC integration
- Building not entirely conducive to Ed Spec, e.g. existing classrooms are sub-standard by present day size requirements
- Abatement could be extensive, ultimate costs are unknown
- Swing space on-site through the use of portables is not desirable due to costs, logistics, and negative affects upon the school program

Cost Control Opportunities

- Limit of new construction: Exterior canopies and site construction
- Quality and extent of finishes
- Extent and quality of Auditorium renovation
- Complexity/efficiency of Mechanical , Electrical and Plumbing systems



Perkins Eastman

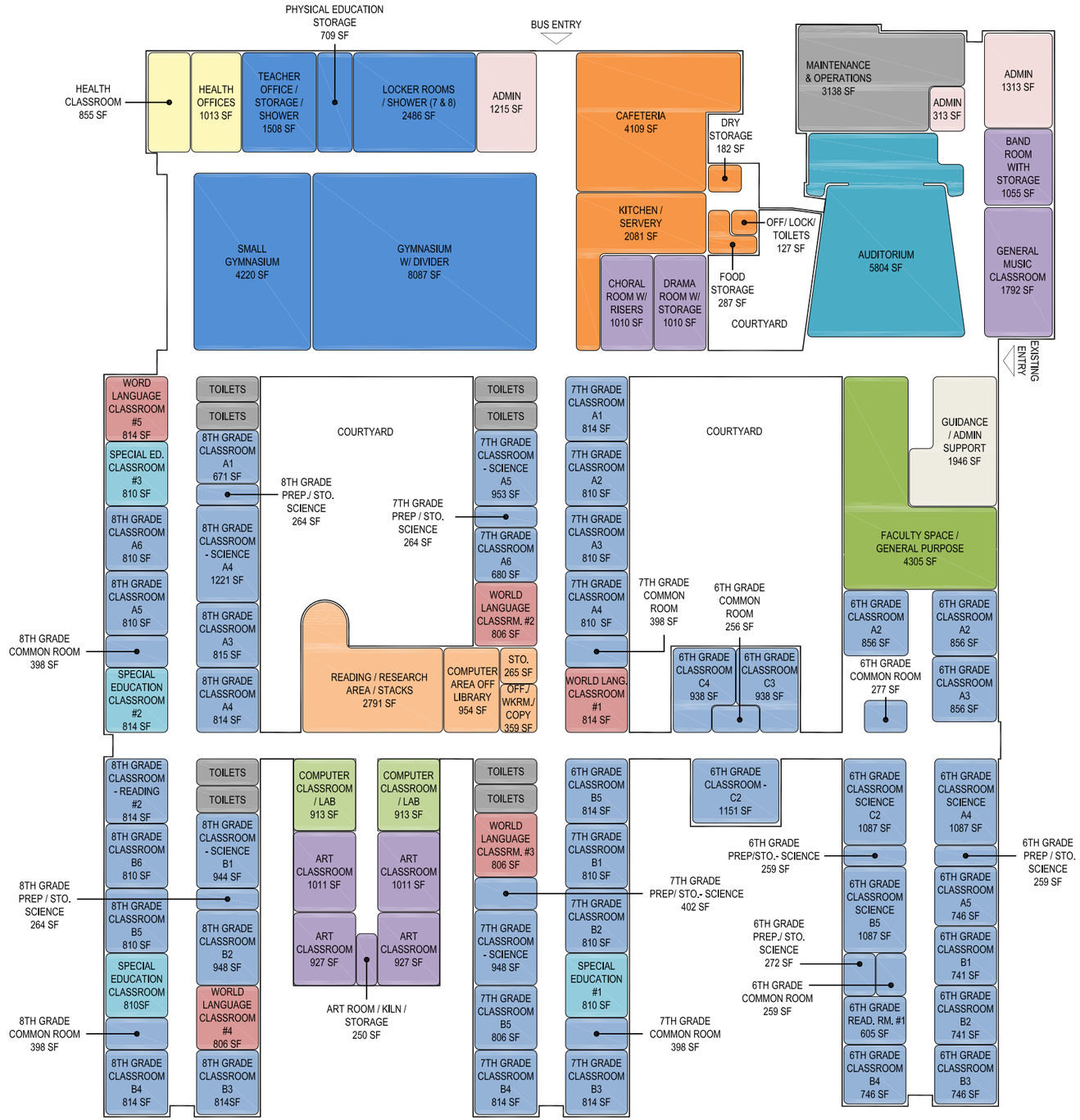
DIVERSIFIED TECHNOLOGY CONSULTANTS

PROPOSED SITE PLAN

NORTH HAVEN MIDDLE SCHOOL - RENOVATE AS NEW

Scale: 1:20 01-30-2013

L1



GROUND LEVEL FLOOR PLAN

NORTH HAVEN MIDDLE SCHOOL

LEGEND

- CLASSROOM
- WORLD LANGUAGE
- SPECIALIZED INSTRUCTION
- VISUAL ARTS
- LIFE SKILLS
- SPECIAL EDUCATION
- LIBRARY MEDIA CENTER
- PHYSICAL EDUCATION
- HEALTH OFFICES
- ADMINISTRATION
- GUIDANCE
- CAFETERIA
- AUDITORIUM
- FACULTY SPACE
- MAINTENANCE AND OPERATION

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NORTH HAVEN MIDDLE SCHOOL- RENOVATE AS NEW
JANUARY 25, 2013
SCALE: NTS

A0

6.1 Building Design Narrative

Option 2 is to renovate the existing Gateway College, formerly the Orchard Hill School building, into an "As-New" facility. The existing building will be modified to accommodate the Building Program defined by the Educational Specifications. MEP systems and interior finishes will be replaced to achieve a facility that meets the standards and codes of new construction.

The following is an outline of the systems to remain, to be replaced and new additional construction.

To Remain:

- All exterior brick cavity walls throughout.
- All concrete structure beams, columns and decks.
- CMU infill/dividing walls-90% to remain.
- Toilet room plumbing and finishes.
- Most classrooms configurations to remain (10% reconfigured) except at existing library and vocational classrooms (see below at "To be replaced").
- Administration offices to remain.
- Two existing gymnasiums, however all new wood floor, wall pads and equipment.
- Cafeteria; replace floor and ceiling finishes.

To be Replaced:

- Fenestration and entry doors through-out, replaced with double glass pain with high performance SHGC and U-value.
- All VAT floor finishes.
- All areas except gyms and auditorium to receive new acoustical tile ceiling and grids and 2x4 light fixtures (basket type).
- Commercial kitchen; reconfigure to new operating functions replace equipment.
- The library will be relocated to main level where vocational classrooms are on north side of auditorium, provide new interior finishes through-out, lighting power and data.
- The existing library on the upper level will be replaced with classrooms and science labs around the perimeter, with new GWB dividing walls and new interior finishes through-out, casework, lighting power and data.
- The facility should be designed with climate control features that will permit year-round use for instruction and community purposes. The facility should include central, school wide air conditioning. A four pipe heating and air conditioning system allowing flexibility for fluctuations in temperature requiring switching from cooling to heating on a regular basis should be considered to maintain maximum comfort in the building.
- An emergency generator will be installed and sized to meet the minimum requirements of the new facility. The generator should be sized to run 75% of the building at maximum load. The cafeteria, data center, main office, life safety equipment, gym, and theater should all be on the generator. A room within the building should be designated for emergency operations and supported by the generator. (Ed Spec)

- All power and data distribution and service entry to be replaced to meet current code and equipment requirements.
- All classrooms, science labs and prep rooms; provide new storage and worktop casework through-out.
- All corridor metal lockers.
- Reconstruct locker rooms between gymnasiums..
- The all finishes in the music and band rooms will be replaced.
- New signage throughout.

To be Added:

- New exterior signage.
- New secondary entry facing Bassett Road with new exterior ramp and portico.
- New Loop drive off of Bassett Road, parent drop-off.
- Recommend that the exterior entry canopy (facing east) receive a facelift.
- Shade trees at parking and fields

To be Removed:

- Photovoltaic solar arrays, equipment and storage structures.
- Easterly surface parking lot, restore to lawn.
- Lower lot at western side along residential boundary line, reclaim as outdoor classroom.
- Lower southerly surface lot between tennis courts and fields, restore to athletic field.

Building Site

6.2 Site/Civil Improvements

For Option 2, Renovate as New, the Gateway School campus will be renovated and improved in the following key areas:

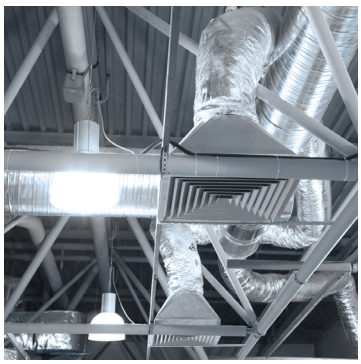
- New outdoor classroom on west side of building
- New site walks and building plantings
- The existing parking lots and roadways will be milled and overlaid with a new surface course. New curbing.
- New tree island plantings to improve shading effects of the parking lot and to improve overall appearance.
- South and East lots converted to lawn/athletic fields.

Building Structure

6.3 Structural Systems

The existing structure and perimeter enclosure to remain, with minimal modifications.

- The existing 2-story cast in place concrete column and waffles slab building structure will be evaluated for potential impacts to the structural system sue to repartitioning of the interior spaces and integration of new mechanical, electrical and plumbing systems.
- Areas that affect the building structure will be accommodated with new structural components to allow modification of the existing structure.



New Systems – Renovate as new

6.4 Heating, Ventilating and Air Conditioning Systems

Heating

Heating shall be provided by a hot water system. The existing boilers are in good condition and may be able to be reused. A hybrid system with supplemental gas fired condensing boiler for shoulder months should be analyzed for energy savings. New Hot water distribution piping, valves, pumps and controls will be provided to new terminal units.

Hot water will be circulated via variable speed pumps also located inside the boiler room. Pump selections will be based on 100% redundancy, with one standby pump. Constant flow primary and variable flow secondary base mounted pumps will circulate the hot water through the heating boilers and out to the terminal units throughout the building. Fuel source for heating shall be natural gas served by dual fuel with #2 fuel oil and gas service via SC Gas Company.

The existing unit ventilators will be replaced by a four pipe heating and cooling chilled beam system with tempered and dehumidified primary air delivered to each space through the chilled beam (see below.)

Hot water design temperatures:

190 Degree F hot water supply

170 Degree F hot water return

20 degree temperature difference

Cooling - System

The facility will be fully air conditioned. The chilled water plant will consist of one electric centrifugal air or water cooled chiller located in a new mechanical room with heat rejection via either by a counter flow cooling tower or air cooled condenser located on the ground or roof of the building. Each chiller will be a centrifugal type utilizing variable speed, magnetic bearing technology for maximum energy efficiency. Dual temperature chilled water will be utilized to supply water to both Air Handling units (44 Degree F.) and chilled beams (60 Degree F). The secondary chilled water to the chilled beams will be provided via a plate frame type heat exchanger. Glycol will be utilized for freeze protection in the lower temperature loop to the air handling units.

The chilled water distribution system will incorporate a primary/secondary pump system with variable speed drives on the secondary pumps. Chilled water system control valves will be modulating, two-way type.

The condenser water system will include chemical treatment and a side stream filtration. The cooling towers will be provided with variable speed fan control.

Cooling plant:

400 ton chiller

primary chilled water pumps: 2 at 800 gpm ea.

Secondary chilled water pumps: 4 at 400 gpm ea.

44 and 60 degree F supply water temperature

Air Distribution

Air handling units located on the roof and within the building mechanical rooms shall provide conditioned and ventilation air to all spaces. All units are provided with 100% outside air economizer, two sets of filters, one at 30% and one at 80% filtration and a carbon dioxide detection system. All motors shall be premium efficiency.

Air distribution system shall vary in different areas to meet space requirements but be subject to sound criteria requirements for classrooms and Libraries. Outside air ventilation rates will be based on ASHRAE 62.1 2004 for all spaces.

Air handling units that have high outside air requirements will also utilize total energy heat recovery devices.

Due to space constraints throughout the building the number of units will be selected to allow for minimizing the duct sizes and amount of disruption to the structure required. Where it is impossible to fit ductwork into existing spaces, it may be required to run ductwork exposed on the roof which will be susceptible to impact from weather and vandalism. Where exposed ductwork is required to be installed due to building constraints, double wall prefab panel construction type will be used, with the maximum available 10 year manufacturer's warrantee for leakage. Structural systems may have to be provided above the roof to support the new equipment also contributing to the above roof work which will hinder access and maintenance activities.

Ductwork Distribution

- In accordance with SMACNA standards
- Meet ANSI and State requirements for sound. Ducts sized for low velocity in learning spaces. Use of sound attenuators and acoustically line first 20 feet of inlet and outlet ductwork of all air handling units and exhaust fans.
- Spiral round for exposed ductwork
- Externally insulated or lined to meet State Energy Code.
- Duct sizing maximum 1250 fpm primary ducts, and 600 fpm within 30 feet of outlets.

Main Classrooms and Administration Areas

New heating and cooling air systems serving Administration areas will be constant or variable volume with single duct terminal and air hot water reheat coils. The air handling units will be double-wall, modular construction, total energy heat recovery wheel, draw-through type with integral mixing box, filters, heating and cooling coils, and supply and return fans. Supply and return fans will utilize variable speed drives. Air flow measuring stations will be located on the supply fan, return damper at mixing box, and outside air duct.

Primary Air Units serving the chilled beams within the Classrooms will utilize a dehumidification cycle to ensure proper humidity levels within the space and chilled beam operation. Chilled beams are designed to operate in a non-condensing mode with all of the humidity control being provided via the dedicated primary air unit that also provides the ventilation for the space.

Trunk ductwork from the air handling units will be rectangular or round duct. Terminal boxes will be single duct pressure independent, variable volume shutoff type with DDC controllers and integral hot water reheat coils. Ductwork on the inlet of the terminal boxes will be prefabricated, medium pressure, round spiral seam duct. Supply ductwork downstream of the terminal boxes and return ductwork will be low pressure duct with internal lining. CO2 Sensors located in classroom will minimize outside flow CFM according to actual occupancy.

Terminal units within the classrooms will consist of ceiling or console type wall mounted active chilled beams with 4 pipe hot and chilled water distribution and ventilation air connections.

Perimeter heating will be provided either by the chilled beams or supplemented by hot water radiation or radiant ceiling panels.

For units serving administration areas, back-up DX coils and related condensing units will be provided for operation during times when the rest of the school is unoccupied and it is not economical to run the main chilled water plant.

Open Multi-Use Spaces

Air system shall be single zone type with variable volume control. The air handling unit will be double-wall, modular construction, draw-through type with integral mixing box, filters, heating and cooling coils, reheat coils, and supply fan. Supply and return fans will utilize variable speed drives. Air flow measuring stations will be located on the supply fan, return air damper at mixing box, and outside air duct. CO2 sensor located in return duct will minimize outside air CFM according to actual zone occupancy.

All distribution ductwork from the air handling units will be prefabricated, low pressure, insulated, double-wall round or flat oval spiral seam duct where exposed and rectangular where concealed above ceilings.

In unoccupied mode systems will decrease air capacity up to 30% to minimize energy usage.

Gymnasiums

Air systems will be single zone type with variable volume control. The air handling units will be double-wall, modular construction, draw-through type with integral mixing box, filters, heating and cooling coils, and supply fan. Supply and return fans will utilize variable speed drives. Air flow measuring stations will be located on the supply fan, return air damper at mixing box, and outside air duct. CO2 sensor located in return duct will minimize outside air CFM according to actual zone occupancy.

Supply ductwork will be low pressure, prefabricated round spiral seam double wall insulated duct. Return ductwork will be low pressure rectangular duct.

Locker Rooms

The new Locker Room areas will be provided with new single zone air system that will provide constant volume 100% outside air. The air handling unit will be double-wall, modular construction and plate type heat recovery section, draw-through type with integral mixing box, filters, heating and cooling coils, and supply and exhaust fans. Ductwork will be low pressure rectangular duct of aluminum construction. Controls will allow for the amount of ventilation air to be reduced during long unoccupied periods but still allow for use of the unit for heating.

Mechanical/Electrical Spaces

The boiler/chiller mechanical spaces will have a heating and ventilating unit (H&V) to meet heating and combustion air requirements. The H&V unit will have integral filters, heating coil, and supply fan. A sidewall propeller fan will provide additional summer ventilation.

Mechanical fan rooms, fire pump room, and chiller room will be provided with hot water unit heaters and propeller fans for ventilation.

General Exhaust

Toilet rooms, locker rooms, janitor closets, and other miscellaneous spaces will be exhausted through exhaust fans located on the roof. Ductwork will be low pressure rectangular duct. Locker room exhaust ductwork shall be of aluminum construction. Heat recovery will be used wherever possible to capture the heat from the exhaust that would otherwise be discharged from the building.

Special Exhaust

Science room exhaust hoods and other localized special exhaust will have dedicated variable volume fan control. Fiberglass VFD drive exhaust fans will be located on the roof. Ductwork shall be fully welded, stainless steel construction or as required for the specific material being exhausted. Kiln rooms, work rooms, art rooms, kitchen hoods and shop areas will all be provided with dedicated contaminant removal exhaust systems.

Miscellaneous Cooling Systems

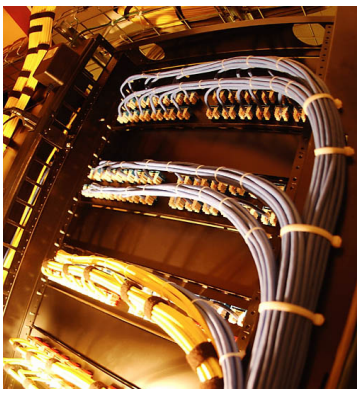
Split system DX for all spaces such as telephone/data rooms, computer rooms, elevator machine rooms that require cooling year round.

Materials and Methods:

Ductwork: galvanized sheet metal G90. Aluminum for showers, 316 stainless steel for hoods.

Piping: Schedule 40 black steel, or Type "L" copper with 95/5 solder fittings (2 ½" and smaller threaded). Schedule 40 black steel with welded or mechanical couplings (3" and larger) with fiberglass insulation and ASJ vapor barrier jacket.

Valves: Ball or High performance butterfly type rated for system. Balance valves to be pressure balanced type.



New Systems – Renovate as new

6.5 Electrical System, Security and Technology

The existing electrical systems will be removed and upgraded as follows:

- Service upgrade to 2000 amp 480 volts 3-phase
- Complete re-wiring of facility with additional electrical outlets and circuits
- Evaluate fire alarm, mass notification system and blue light devices for reuse, update and expansion. Locate devices per NFPA standards
- Interior lighting completely replaced with new fixtures in optimal layouts to provide adequate and efficient lighting and meet IES standards.
- Upgrade and expand existing parking lot lighting with high efficiency fixtures and appropriate controls. Remove or relocate where required by site modifications.
- Remove Solar photovoltaic system
- New Clock and Public Address System
- Replace stage and auditorium lighting systems
- Replace existing panels and electrical switchgear
- Provide new WiFi system
- Add elevator recall to all elevators
- Replace all exterior lighting fixtures with more efficient fixtures that meet current codes
- Evaluate telecomm grounding system for possible reuse
- Upgrade and expand security camera system
- New emergency generator installed and sized to meet the minimum requirements of the new facility. Generator sized to run 75% of the building at maximum load. The cafeteria, data center, main office, life safety equipment, gym, and theater should all be on the generator. A room within the building should be designated for emergency operations and supported by the generator. (Ed Spec)

New Systems – Renovate as new

6.6 Plumbing Systems

All plumbing systems shall be designed in accordance with the International Plumbing Code, the Americans with Disabilities Act, State of Connecticut Water Conservation Standards, and with the Educational Specifications for the new school.

Fixtures

All plumbing fixtures shall be of institutional quality. Handicapped – accessible fixtures shall be ADA compliant. Flush valves and faucets shall be of the water conservation type. Faucets on ADA compliant lavatories and sinks shall be electronic.

Floor drains shall be provided in toilet rooms, locker rooms, science labs, and in mechanical rooms. Floor drains shall be provided with trap primers, if warranted.

Piping shall be provided for a full service kitchen for commercial cooking, with the coordination of the food service consultant.

Domestic Water System

Cold water shall be piped to each plumbing fixture and to each piece of plumbed kitchen equipment. Cold water shall be extended to non-freeze wall hydrants located approximately 200-feet on center along the perimeter wall.

Hot water shall be provided at 140 F degrees from indirect water heaters located in the boiler room. Hot water shall be distributed at 140 degrees F to janitor mop sinks, kitchen pot sinks and dishwater. A local electric booster heater shall boost the 140 degrees F water to 180 degrees F for the dishwater rinse cycle. A thermostatic mixing valve shall provide tempered water and be distributed throughout the remainder of the school at 115 degrees F. The entire domestic hot water system shall be equipped with a pumped recirculation line.

Fire Protection Systems

General

Fire protection system will include a hydraulically balanced system throughout the school with standpipe system such that every part of building can be reached with a 100-foot hose projecting a 30-foot stream. Fire main service shall be located within the utility room of the ground floor and be connected to a fire pump. Fire protection system will be designed and installed in accordance with the State of Connecticut Building Code, the State of Connecticut Fire Safety Code, NFPA 13, NFPA 14, NFPA 20, and the Town of North Haven Fire Marshal.

Standpipes

Standpipes will be provided for the stage area.

Sprinklers

The School will be fully sprinklered with a wet pipe system. Limited area subject to freezing will be protected with dry sidewall heads and/or dry alarm valves.

Materials and Methods

Piping will be Schedule 40 black steel pipe with cast iron threaded or grooved fittings and joints.

Sprinkler heads in finished ceiling areas will be concealed type with white cover plates.

Sprinkler heads in unfinished ceiling areas will be upright type.

Piping is to run concealed in all finished areas where possible and so arranged that all portions could be drained.

The Contractor will provide complete drawings and calculations as required by NFPA 13. All drawings will be computer generated. A Professional Engineer will seal drawings and calculations.

Seismic bracing will be provided per the State of Connecticut Building Code.

6.7 Option 2: Proposed Phasing Plan

Execution and schedule for the Renovate Gateway College as New option is dependant upon acquisition of the site from the State of Connecticut. Coordination with the school year would allow construction to proceed for a Fall occupation date, after acquisition process is complete (see Section 6.8)

Schedule

Spring	Year 1:	Referendum
		Begin site acquisition process
Summer	Year 1:	Select A/E team and award
	Year ?:	Complete site acquisition
		Commence construction documents
Spring	Year 2:	Bid project and award construction contract
Summer	Year 2:	Commence construction
Fall	Year 3:	Project complete, School opens for Fall academic year

6.8 Option 2: Advantages and Disadvantages

Renovating the existing Gateway facility "As New" offers inherent advantages and disadvantages:

Advantages

- Construction does not affect operation of existing school
- Structure is in better condition than existing Middle School
- Will not impact existing NHMS athletic fields
- Maintains parking adjacent to Town-owned athletic fields
- Allows redevelopment of existing middle school site for additional athletic fields

Disadvantages

- Existing building structure presents difficulties for HVAC integration
- Building not entirely conducive to Ed Spec, e.g. existing classrooms are sub-standard by present day size requirements
- Abatement could be extensive, ultimate costs are unknown
- Decentralizes bussing
- Prohibits sharing of resources and programs with High School
- Site acquisition process will likely be lengthy
- Site acquisition cost unknown

Cost Control Opportunities

- Limit of new construction: Exterior canopies
- Reduce scope of site work, current budget: 5.3MM
- Quality and extent of finishes
- Extent and quality of Auditorium renovation
- Complexity and efficiency of Mechanical , Electrical and Plumbing systems

If the Gateway site is to be a viable option as a new Middle School for the Town of North Haven, some consideration must be given to the length of time and cost required for the Town to acquire the facility. The Town must recognize the complex process of property disposition for State owned assets.

The Connecticut Board of Regents for Higher Education (BOR) own and maintain facilities located at 88 Bassett Road in the Town of North Haven. The State of Connecticut took title to this facility in 1986, upon completion of a sale from the Town of North Haven to the State of Connecticut for an amount of $5 million. This facility has been and continues to be utilized by Gateway Community College primarily for their automotive tech program as well as Gateway's Center for a Sustainable Future.

While there has been some discussion and/or thought by the Gateway administration to vacate the North Haven facility (potentially relocating the automotive tech program to Gateway's facility at Long Wharf in New Haven), no formal action has occurred to date to initiate such a move. As a matter of due diligence towards any consideration of use or re-use by the Town of North Haven of the Gateway facility, it is important to fully understand the processes associated with any potential conveyance of same from the State to the Town. The following narrative provides an overview of the state processes that are necessary.

First, Gateway Community College would need to make a determination that the North Haven campus no longer meet their needs and that a relocation of any programs or services provided at the North Haven campus would be in the best interest of the college, BOR and/or State of Connecticut. Should the college make this determination, a feasibility study is initiated. The study includes determining the cost(s), timeline and physical logistics that are to be included with any relocation/consolidation. Such a study was initiated in 2012, but canceled due to the Governor's rescissions. It is reasonable to anticipate that it will take 18-24 months for the completion of the study and its final recommendations. Additionally, the logistics associated with the process of Gateway/BOR vacating the property (i.e. fully relocate remaining programs to another location) will encompass an additional interval of 12-24 months.

Following a decision by the college and the BOR to vacate the North Haven campus, the BOR will make a formal recommendation to release the property to the State of Connecticut. The timeline for this action will likely be 6-12 months. Upon such a release, the property is then be transferred to the Office of Policy and Management's (OPM) Bureau of Asset Management. The Bureau of Assets Management is responsible for fulfilling OPM's statutory and administrative obligations with regard to real property transactions (i.e. sales, acquisitions, leases, etc). Upon the release of the property to OPM, such property would undergo an evaluation. The purpose of the evaluation is to determine if the property is no longer required for use by the State. If OPM determines that the property is surplus property, the disposition process of the property is subject to the process outlined in CGS 4b-21.

In summary, the statute requires the following steps in the surplus process:

1. The agency with custody and control of the property notifies the OPM in writing that the property is surplus to the needs of the declaring agency.
2. OPM then transfers custody and control of the property to the Department of Public Works (DPW) who is responsible for day-to-day management of the property until a final disposition (i.e. reuse or sale) is achieved.
3. If the Secretary of the OPM determines that the property was purchased or improved with the proceeds of tax-exempt obligations issued or to be issued by the State, the Secretary of the OPM is required by C.G.S. 4b-21 to notify the Treasurer of the State of Connecticut.
4. In order to determine if the property in question is surplus to the needs of the State, OPM solicits reuse proposals for the property from other state agencies. If a feasible and appropriate state reuse is identified OPM directs DPW to transfer custody and control of the property to the appropriate agency.
5. If OPM decides that there is no feasible and appropriate state reuse, DPW is notified that the property is surplus to the needs of the State of Connecticut and should be divested from State ownership.
6. In accordance with CGS 3-14b, the property is offered for sale to the local municipality.

The sale of all such surplus property is subject to the approval of:

- The Commissioner of the DPW, and
- The Secretary of the OPM, and
- The State Properties Review Board, and
- The Joint standing committees of cognizance of the General Assembly, *and*
- The Office of the Attorney General

In addition, the Treasurer of the State of Connecticut is responsible for executing and delivering any deed or instrument necessary to convey the title to any property authorized under C.G.S. 4b-21.

C.G.S. 4b-21 and C.G.S. 3-14b allow approximately six (6) months for the disposition of surplus State property. However, if reuse by another State agency is not an option, significant work must be completed by DPW prior to divesting the State of the property, including;

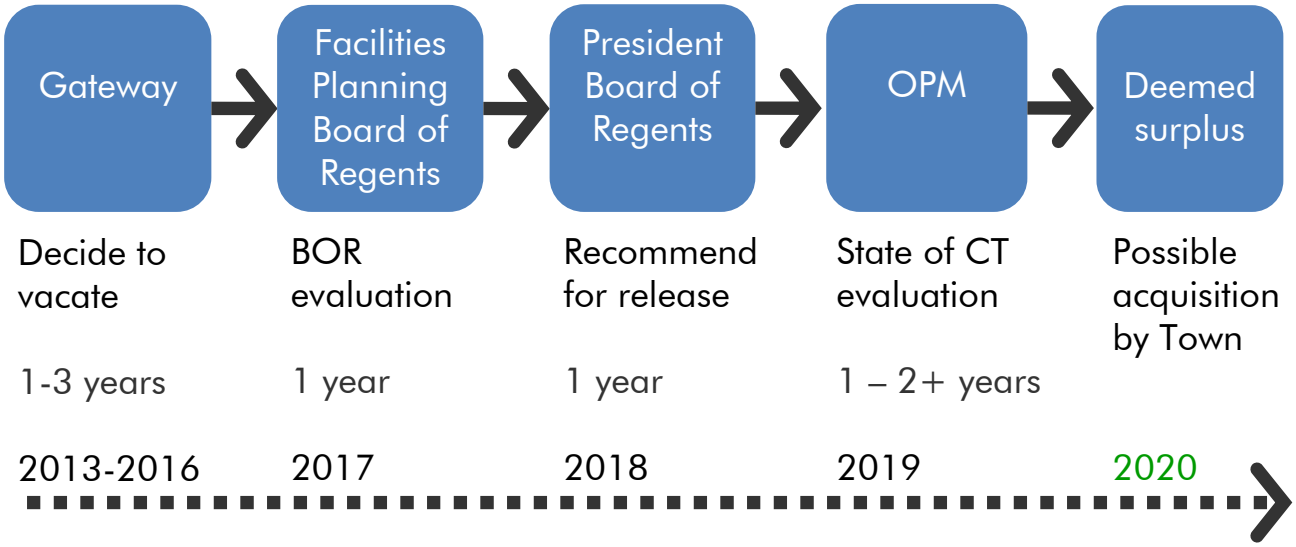
- Property appraisals
- Surveys
- Phase I, Phase II and/or Phase III environmental studies (as necessary)
- Title searches, etc.

These studies are typically carried out by the DPW and depending upon on the size and complexity of the specific property in question, and assuming that the necessary funding is in place to undertake the required studies, the completion of these studies can take between 12-24 months.

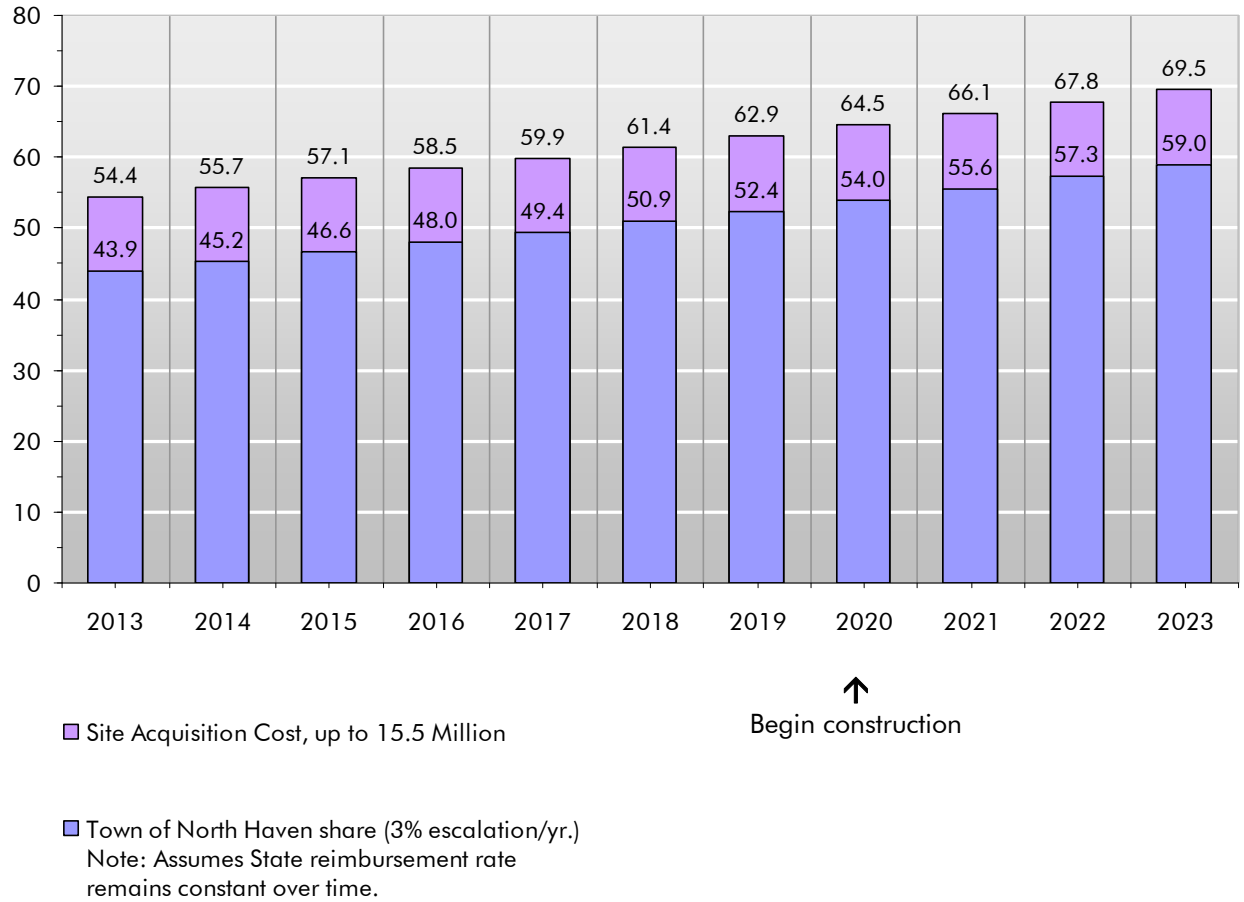
As outlined above there are many dependent and independent factors and processes that affect the Town taking deed/ownership of the property located at 88 Bassett Road, and currently under ownership by the Connecticut Board of Regents for Higher Education being utilized by Gateway Community College. It is important to understand, in consideration of this option for the Town's Middle School use, that the processes outlined have yet to be started.

In consideration of this, it is reasonable to estimate that the timeline under the best case scenario would be 4 years. Likewise, under a worse case scenario the timeline would be 8+ years before the town took deed/ownership of the property. Realistically the timeline for the Town of North Haven to take deed/ownership of this property is likely 5-7 years from the date in which such a process began.

The timeline and conclusion are illustrated as follows:



It is also important to consider the additional costs the Town will incur in the form of escalation (3% per year) during the 4-7+ year disposition process. The following chart illustrates the escalation of project costs incurred from the site acquisition process.



Perkins Eastman

DIVERSIFIED TECHNOLOGY CONSULTANTS

PROPOSED SITE PLAN

NORTH HAVEN MIDDLE SCHOOL - GATEWAY / ORCHARD HILL SITE

Scale: 1:120 01-30-2013

L1

EXISTING SITE PLAN

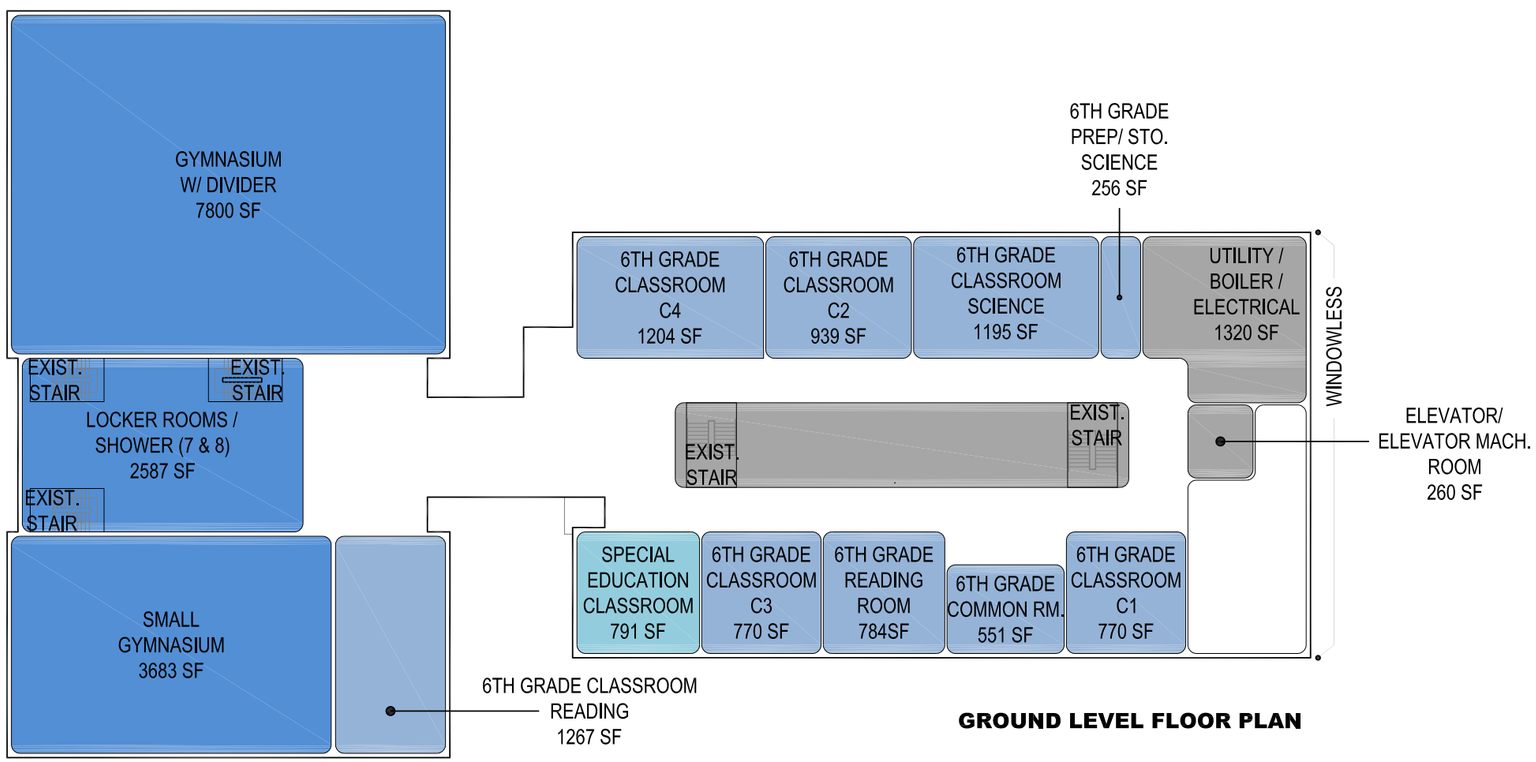
Perkins Eastman
422 SUMMER STREET
STAMFORD, CT 06901
T. 203.251.7400
F. 203.251.7474

GATEWAY / ORCHARD HILL SCHOOL- RENOVATE AS NEW
JANUARY 25, 2013
SCALE: 1:1000

S1

LEGEND

- CLASSROOM
- WORLD LANGUAGE
- SPECIALIZED INSTRUCTION
- VISUAL ARTS
- LIFE SKILLS
- SPECIAL EDUCATION
- LIBRARY MEDIA CENTER
- PHYSICAL EDUCATION
- HEALTH OFFICES
- ADMINISTRATION
- GUIDANCE
- CAFETERIA
- AUDITORIUM
- FACULTY SPACE
- MAINTENANCE AND OPERATION



GROUND LEVEL FLOOR PLAN

Perkins Eastman
422 SUMMER STREET
STAMFORD, CT 06901
T. 203.251.7400
F. 203.251.7474

GATEWAY / ORCHARD HILL SCHOOL- RENOVATE AS NEW
JANUARY 25, 2013
SCALE: 1/16" = 1'-0"

A0

LEGEND

- CLASSROOM
- WORLD LANGUAGE
- SPECIALIZED INSTRUCTION
- VISUAL ARTS
- LIFE SKILLS
- SPECIAL EDUCATION
- LIBRARY MEDIA CENTER
- PHYSICAL EDUCATION
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- ADMINISTRATION
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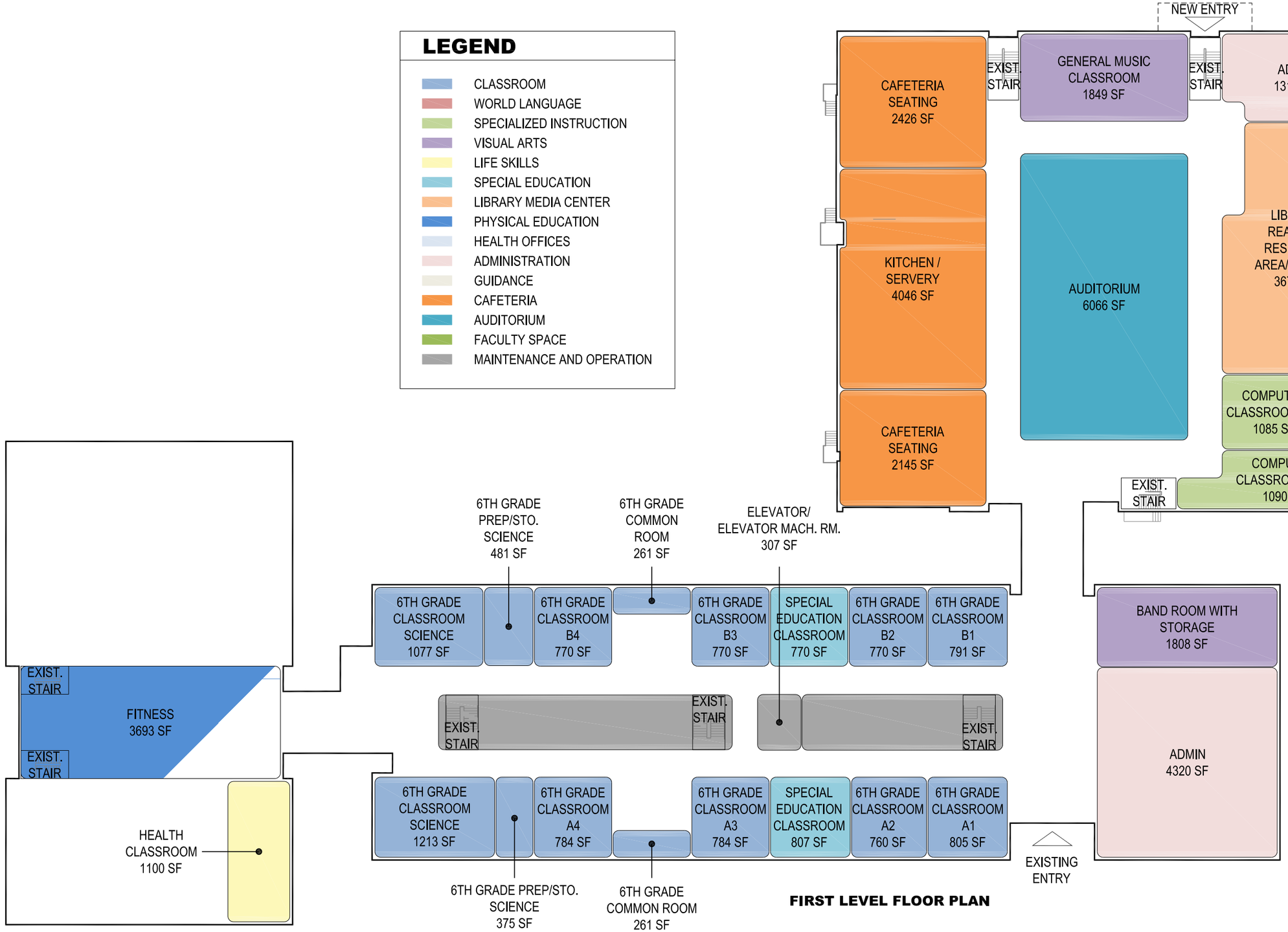
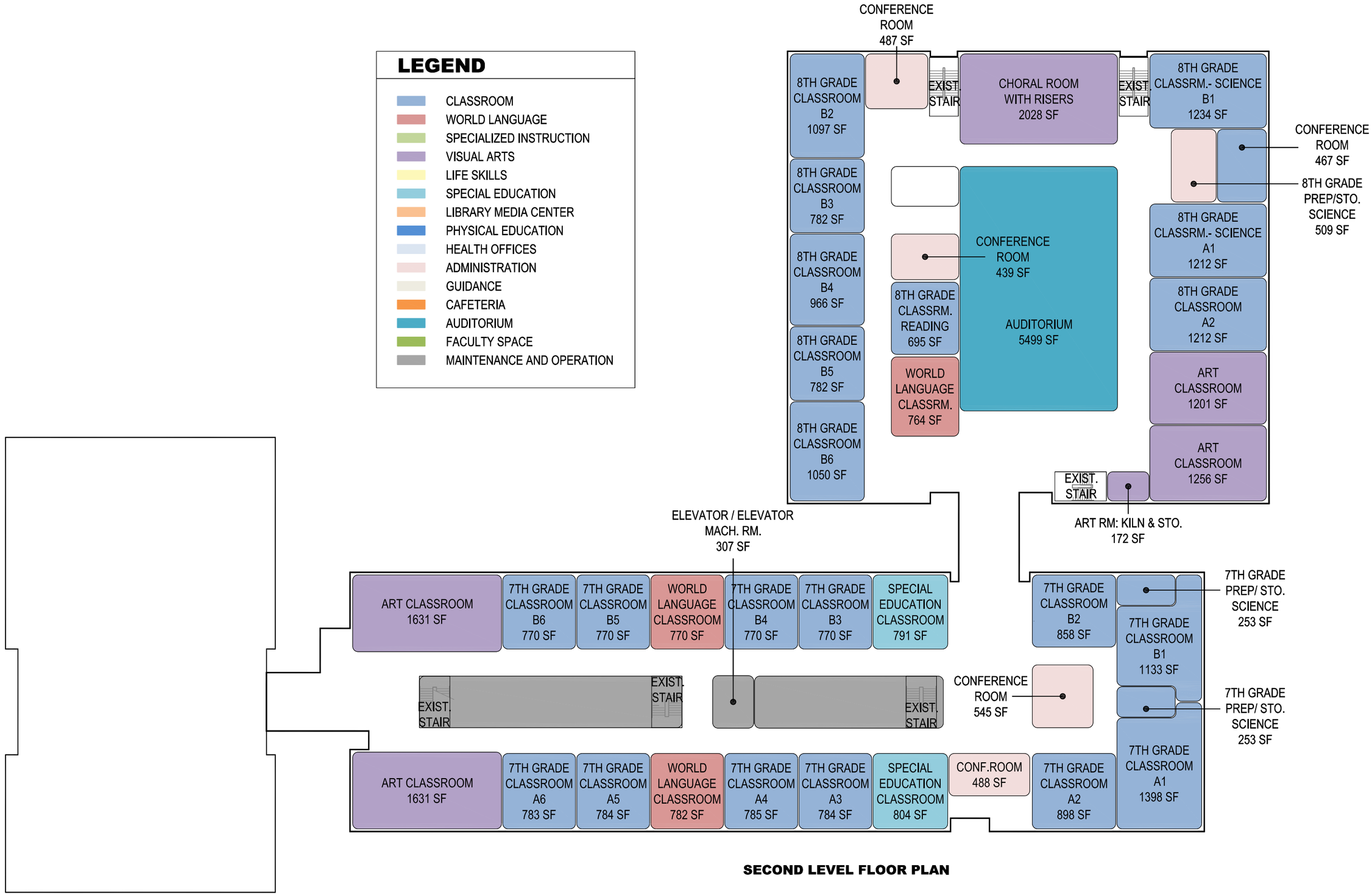


FIRST LEVEL FLOOR PLAN

Perkins Eastman
422 SUMMER STREET
STAMFORD, CT 06901
T. 203.251.7400
F. 203.251.7474

GATEWAY / ORCHARD HILL SCHOOL- RENOVATE AS NEW
JANUARY 25, 2013
SCALE: 1/16" = 1'-0"

A1



SECOND LEVEL FLOOR PLAN

Perkins Eastman
422 SUMMER STREET
STAMFORD, CT 06901
T. 203.251.7400
F. 203.251.7474

GATEWAY / ORCHARD HILL SCHOOL- RENOVATE AS NEW
JANUARY 25, 2013
SCALE: 1/16" = 1'-0"

A2

7.1 Building Design Narrative

Option 3 proposes constructing a new energy efficient Middle School fronting Bailey Road with new front and rear lawns, vehicular access roads and pedestrian walkways. After completion and occupancy of the new school building, the existing 1960 building and some surface parking lots will be removed and replaced with grass athletic fields, shade trees and walkways to form a new High School/Middle School campus green.

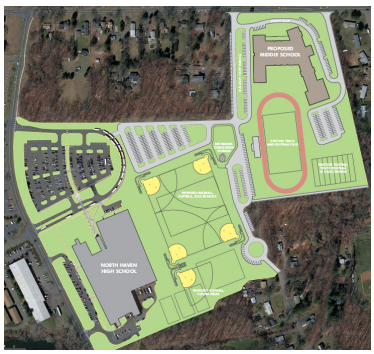
The following is an outline of the new building configuration, materials, construction, and systems to be utilized.

New Building Description:

- The new Middle School Building is designed to respond to the site, the building is composed of three sections the largest being the three story classroom building running parallel to the eastern tree-line and perpendicular to Bailey Road, this section is capped by the gymnasium subsection on the south side abutting the field. Opposite to this wing to the west is a two story cafeteria-multipurpose room and arts wing section, these two sections are linked by the administration offices (fronting Bailey Road) and the auditorium section forming a hook shaped footprint.
- The new building will be a combination of 1, 2 and 3 story elements of steel framing with concrete foundations and slabs on grade. The framing will be infilled with heavy gauge steel studs with impact resistant sheathing and exterior brick veneer cavity wall construction. Approximately 30% of the façade will be fenestration of high performance insulated glass storefronts and windows with some metal panels. The metal roof deck will be a combination of pitched (where visible) and flat where required for roof-top mechanical units, roof transitions and building massing.
- The facility will incorporate appropriate safety and security control measures. (Incorporate into Ed Spec.)
- The interior walls are faced in high impact gypsum wall board will have a porcelain tile wainscot in the corridors and other public areas. A majority of the ceiling will be a 2'x2' acoustical tile grid and panel ceiling system with recessed fixtures in the corridors and linear pendant light fixtures in the classrooms and library for optimum ambient up-light in these areas. Floor finish material will be 85% vinyl floor tile with porcelain tile in the public lobby space and toilet rooms. Carpet will be in the library/media Center and auditorium with hardwood floors in the gymnasiums.

To be Removed:

- Existing MS building, concrete slab on grade and foundations and backfilled with suitable fill and topsoil to create fields.
- Easterly surface parking lot and road.



To be Added:

- New loop drive off Bailey Road for parent drop-off encircling a front lawn for setback buffer and civic stature.
- New loop road parallel to existing Middle School access road for new bus loop.
- Shade trees at existing parking and between new fields

To remain:

- Existing middle school parking lot at north side of site.
- All mature shade trees at parking and around the perimeter.
- High School stadium and track.

Building Site

7.2 Site/Civil Improvements

For Option 3, construct a new Middle School fronting Bailey Road, the campus will be renovated and improved in the following key areas:

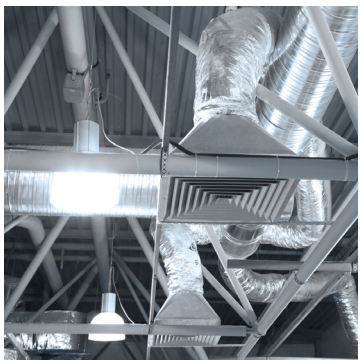
- The existing parking lot and roadways will be completely reconfigured to serve the new school and shared athletic fields.
- New landscaping will be installed throughout that will require minimum maintenance.
- New site walks and building plantings throughout
- New tree island plantings to improve shading effects of the parking lot and to improve overall appearance.
- Resurfaced track, reconditioned football field and neighboring track and field areas
- General repairs to Grandstand
- Construct new athletic fields on site of demolished school building
- Option for rainwater collection and irrigation system

Building Structure

7.3 Structural Systems

The structural system shall consist of:

- Concrete foundation, slab on grade. Design of foundation subject to geotechnical investigation
- Structural steel framing: columns, beams and joists.
- Conventional moment frames for seismic and wind load resistance
- Metal roof deck



New School Construction

7.4 Heating, Ventilating and Air Conditioning Systems

Heating

Heating shall be provided by a hot water system. Four high efficiency condensing boilers shall be located inside the main boiler room, each sized for 25% of total school heating load of approximately 4.0 million btuh. Hot water distribution piping, valves, pumps and controls will be provided to terminal units throughout the building.

Hot water will be circulated via variable speed pumps also located inside the boiler room. Pump selections will be based on 100% redundancy, with one standby pump. Constant flow primary and variable flow secondary base mounted pumps will circulate the hot water through the heating boilers and out to the terminal units. Fuel source for heating shall be natural gas served by CNG Gas Company. Glycol will be utilized for freeze protection in the lower temperature loop to the air handling units.

Hot water design temperatures:

190 Degree F hot water supply

170 Degree F hot water return

20 degree temperature difference

Cooling - System

The facility will be fully air conditioned. The chilled water plant will consist of one electric centrifugal air or water cooled chiller located in a new mechanical room with heat rejection via either by a counter flow cooling tower or air cooled condenser located on the ground or roof of the building. Each chiller will be a centrifugal type chiller utilizing variable speed, magnetic bearing technology for maximum energy efficiency. Dual temperature chilled water will be utilized to supply water to both Air Handling units (44 Degree F.) and chilled beams (60 Degree F). The secondary chilled water to the chilled beams will be provided via a plate frame type heat exchanger. Glycol will be utilized for freeze protection in the lower temperature loop to the air handling units.

The chilled water distribution system will incorporate a primary/secondary pump system with variable speed drives on the secondary pumps. Chilled water system control valves will be modulating, two-way type.

The condenser water system will include chemical treatment and a side stream filtration. The cooling towers will be provided with variable speed fan control.

Cooling plant:

350 ton chiller

primary chilled water pumps: 2 at 700 gpm ea.

Secondary chilled water pumps: 4 at 350 gpm ea.

44 and 60 degree F supply water temperature

Air Distribution

Air handling units located on the roof and within the building mechanical rooms shall provide conditioned and ventilation air to all spaces. All units are provided with 100% outside air economizer, two sets of filters, one at 30% and one at 80% filtration and a carbon dioxide detection system. All motors shall be premium efficiency.

Air distribution system shall vary in different areas to meet space requirements but be subject to sound criteria requirements for classrooms and Libraries. Outside air ventilation rates will be based on ASHRAE 62.1 2004 for all spaces.

Air handling units that have high outside air requirements will also utilize total energy heat recovery devices.

Ductwork Distribution:

- In accordance with SMACNA standards
- Meet ANSI and State requirements for sound. Ducts sized for low velocity in learning spaces. Use of sound attenuators and acoustically line first 20 feet of inlet and outlet ductwork of all air handling units and exhaust fans
- Spiral round for exposed ductwork
- Externally insulated or lined to meet State Energy Code.
- Duct sizing maximum 1250 fpm primary ducts, and 600 fpm within 30 feet of outlets.

Main Classrooms and Administration Areas

Air systems serving Administration areas will be constant or variable volume with single duct terminal and air hot water reheat coils. The air handling units will be double-wall, modular construction, total energy heat recovery wheel, draw-through type with integral mixing box, filters, heating and cooling coils, and supply and return fans. Supply and return fans will utilize variable speed drives. Air flow measuring stations will be located on the supply fan, return damper at mixing box, and outside air duct. Primary Air (100% OA) units serving the chilled beams within the Classrooms will incorporate a heat recovery, dehumidification cycle to ensure proper humidity levels within the space and chilled beam operation. Chilled beams are designed to operate in a non-condensing mode with all of the humidity control being provided via the dedicated primary air unit that also provides the ventilation for the space.

Trunk ductwork from the air handling units will be rectangular or round duct. Terminal boxes will be single duct pressure independent, variable volume shutoff type with DDC controllers and integral hot water reheat coils. Ductwork on the inlet of the terminal boxes will be prefabricated, medium pressure, round spiral seam duct. Supply ductwork downstream of the terminal boxes and return ductwork will be low pressure duct with internal lining. CO2 Sensors located in classroom will minimize outside flow CFM according to actual occupancy.

Terminal units within the classrooms will consist of ceiling or console type wall mounted active chilled beams with 4 pipe hot and chilled water distribution and ventilation air connections.

Perimeter heating will be provided either by the chilled beams or supplemented by hot water radiation or radiant ceiling panels.

For units serving administration areas, back-up DX coils and related condensing units will be provided for operation during times when the rest of the school is unoccupied and it is not economical to run the main chilled water plant.

Open Multi-Use Spaces

Air system shall be single zone type with variable volume control. The air handling unit will be double-wall, modular construction, draw-through type with integral mixing box, filters, heating and cooling coils, reheat coils, and supply fan. Supply and return fans will utilize variable speed drives. Air flow measuring stations will be located on the supply fan, return air damper at mixing box, and outside air duct. CO2 sensor located in return duct will minimize outside air CFM according to actual zone occupancy.

All distribution ductwork from the air handling units will be prefabricated, low pressure, insulated, double-wall round or flat oval spiral seam duct where exposed and rectangular where concealed above ceilings.

In unoccupied mode systems will decrease air capacity up to 30% to minimize energy usage.

Gymnasiums

Air systems will be single zone type with variable volume control. The air handling units will be double-wall, modular construction, draw-through type with integral mixing box, filters, heating and cooling coils, and supply fan. Supply and return fans will utilize variable speed drives. Air flow measuring stations will be located on the supply fan, return air damper at mixing box, and outside air duct. CO2 sensor located in return duct will minimize outside air CFM according to actual zone occupancy.

Supply ductwork will be low pressure, prefabricated round spiral seam double wall insulated duct. Return ductwork will be low pressure rectangular duct.

Locker Rooms

Locker Room areas will be provided with new single zone air system that will provide constant volume 100% outside air. The air handling unit will be double-wall, modular construction and plate type heat recovery section, draw-through type with integral mixing box, filters, heating and cooling coils, and supply and exhaust fans. Ductwork will be low pressure rectangular duct of aluminum construction. Controls will allow for the amount of ventilation air to be reduced during long unoccupied periods but still allow for use of the unit for heating.

Mechanical/Electrical Spaces

The boiler/chiller plant mechanical spaces will have a heating and ventilating unit (H&V) to meet heating and combustion air requirements. The H&V unit will have integral filters, heating coil, and supply fan. A sidewall propeller fan will provide additional summer ventilation.

General Exhaust

Toilet rooms, locker rooms, janitor closets, and other miscellaneous spaces will be exhausted through exhaust fans located on the roof. Ductwork will be low pressure rectangular duct. Locker room exhaust ductwork shall be of aluminum construction. Heat recovery will be used wherever possible to capture the heat from the exhaust that would otherwise be discharged from the building.

Special Exhaust

Science room exhaust hoods and other localized special exhaust will have dedicated variable volume fan control. Fiberglass VFD drive exhaust fans will be located on the roof. Ductwork shall be fully welded, stainless steel construction or as required for the specific material being exhausted. Kiln rooms, work rooms, art rooms, kitchen hoods and shop areas will all be provided with dedicated contaminant removal exhaust systems.

Miscellaneous Cooling Systems

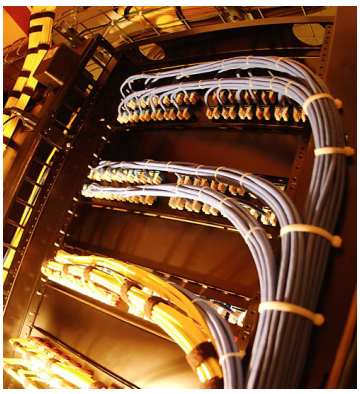
Split system DX for all spaces such as telephone/data rooms, computer rooms, elevator machine rooms that require cooling year round.

Materials and Methods

Ductwork: galvanized sheet metal G90. Aluminum for showers, 316 stainless steel for hoods.

Piping: Schedule 40 black steel, or Type "L" copper with 95/5 solder fittings (2 ½" and smaller threaded). Schedule 40 black steel with welded or mechanical couplings (3" and larger) with fiberglass insulation and ASJ vapor barrier jacket.

Valves: Ball or High performance butterfly type rated for system. Balance valves to be pressure balanced type.



New School Construction

7.5 Electrical System, Security and Technology

Electrical service

A new electric service shall be served by a new pad mounted transformer located on site (location to be determined). The pad mounted transformer will be fed from a utility pole located on Bailey Road.

- Two concrete encased 4" PVC conduits will be provided from the utility pole to the pad mounted transformer.
- The electrical service to the building will be routed from the pad mounted transformer to the main electrical room located on the ground level.

Telecommunication Service

- Three 4" PVC conduits will be provided from a new utility pole on Bailey Road to the main telecomm service entrance room in the building. These conduits may follow the same routing (and use the same trench) as the primary electrical conduits for cost savings.

Site Lighting

Site lighting around the building will be a combination of bollards, pole mounted fixtures and building mounted fixtures. The exterior lighting will be designed to comply with the 2009 IECC and LEED SS Credit 8, Light Pollution Reduction.

- Bollard lights or pedestrian scale pole mounted lights will be provided along walkways around the building. These fixtures will be LED with dark sky friendly, full cutoff distributions. The walkways will be lit to an average of 2 footcandles.
- 25'-0" Pole mounted fixtures will be provided in the parking lot area. These fixtures will be LED with dark sky friendly, full cutoff distributions. The parking lot will be lit to an average of 2 footcandles.
- Building mounted light fixtures will be provided at egress doors. These fixtures will be LED with dark sky friendly, full cutoff distributions, two lamps and two ballasts per code. These fixtures will be fed from the generator and will be provided with emergency relays.
- Controls for the site lighting will consist of a photocell mounted to the building and a lighting control panel in the main electrical room containing an astronomic time clock.
- The use of motion sensors on the site lighting fixtures will be investigated to further reduce energy consumption of the facility.

General

The electrical systems for the buildings will be designed in accordance with:

- NFPA 70, 2011 National Electrical Code with Connecticut Amendments
- NFPA 101 Life Safety Code
- International Building Code
- 2009 International Energy Conservation Code with MA supplements
- NFPA 72 – National Fire Alarm Code
- Connecticut State Fire Safety Code

The design will incorporate LEED green building design measures to enhance the energy efficiency of the building.

Power Distribution

- The pad mounted transformer will feed a main switchboard in the main electrical room on the ground level.
- Electrical Distribution Equipment
  - A new 1200A, 208Y/120V, 3 phase, 4 wire main switchboard (sized for 25% future growth) consisting of: a 1200A molded case circuit breaker; 65kAIC bracing; TVSS protection; digital demand/pulse output meter; copper bussing; distribution section and metering section. Distribution over current devices will be circuit breaker type. See attached room layout.
  - One 100 Amp life safety transfer switch and one 1200 amp standby power transfer switch will be provided for generator backup of the entire facility.
  - One 42-pole, 100 Amp MCB life safety power panelboard will be provided for serving of life safety loads, including egress lighting and fire alarm control panel.
  - One 42-pole, 1200 Amp MCB standby power panel will be provided to serve the remainder of the building. This panel will serve large equipment loads and three sub-panels for branch circuits throughout the building.
  - Three 42-pole, 225 Amp MLO standby power panelboards will be provided to serve all remaining non-life-safety loads throughout the building.

- A new building grounding system will be provided, consisting of: ground rods; ground cables; ground bars and connectors. A new copper bus within the main switchgear will be utilized as the single point of connection for these system grounds and will be connected to the main building grounding triad, cold water pipes, building steel, telecommunications main grounding busbar and any additional code required items.
- Mechanical equipment rated below ½ HP will be supplied by 120V single-phase power. Mechanical equipment rated ½ HP and above will be supplied with 208V three-phase power.
- All lighting will be 120V, and will be powered from panelboards in their respective areas. All convenience power in the buildings will be 120V, and will be powered from panelboards in their respective areas. Local panelboards will be GE A-series panelboards or equal.
- The distribution of power in the building will be concealed wherever possible.
- MC type cable will be used for branch circuits where concealed above ceilings or behind walls.
- EMT conduit and wire will be used where exposed in unfinished spaces such as electrical rooms.
- Rigid galvanized steel conduit and wire will be used where exposed to physical damage or wetness such as mechanical rooms.
- No conduits or cable will be exposed in finished areas. Columns, walls, and ceiling plenums will be used for power distribution where possible. Where necessary to expose raceway in finished spaces, Wiremold V700 series or equal will be utilized.
- All wiring will be designed with less than a 2% voltage drop for all feeders and less than a 3% voltage drop for all branch circuits.
- Duplex receptacles rated at 20 amperes, 125 volts, grounding type with polarized parallel slots will be provided throughout the building and Ground Fault Interrupters will be provided where appropriate. No more than 8 duplex receptacles will be connected to a single 20 amp branch circuit.
- The building standard will be white devices and cover plates. In abusive locations ivory devices with stainless steel cover plates.
- Floor boxes and poke-throughs will be provided for tables and desks not adjacent to walls or columns. See attached marked up plans for preliminary quantities and locations.
- Call for aid systems will be provided in all single occupancy toilet rooms.
- Power connections will be provided for all owner furnished equipment including printers, copiers, faxes, projectors, screens, powered doors,

- Power system calculations shall be specified to be performed by the installing contractor, including:
  - Short Circuit Study
  - Protective Device Coordination Study
  - Arc Flash Hazard Analysis

Emergency Power

- A new pad mounted generator will be provided, sized to service the entire facility. The life safety and standby power loads will be separated per code.
- Generator will be provided with a weatherproof, sound attenuating enclosure, battery charger, battery heater, block heater and other accessories.
- A 500kW pad mounted diesel generator with 48 hour sub-base fuel tank will be provided.
- Relays will be provided to power code required egress lighting and exit signage from the generator life safety distribution system.

Lighting System

- Interior lighting for the building shall be predominantly of the fluorescent type equipped with long-life, low-mercury, T-8 or T-5 lamps, electronic dimming ballasts and appropriate lenses.
- LED lighting for general areas such as offices, classrooms and corridors will be investigated for life cycle cost effectiveness.
- Occupancy sensors or timer switches will be provided in all spaces. Ultrasonic, infrared and dual technology sensors will be utilized in various spaces. Basis of design sensors include Wattstopper DT-300, DT-200, UT-300 and WT-2250.
- In offices and like spaces, when an individual enters the room, the lights will turn on to 50% output (fixtures will have step-dim ballasts). The individual may force the lights to 100% output by use of a wall mounted button.
- Multiple ballasts will be utilized where appropriate to allow for multiple lighting level control for optimal user comfort.
- Daylighting controls will be utilized where ample daylight is available, mainly in classrooms. Control systems for daylight harvesting will be Wattstopper DLM or equal.
- Various specialty lighting products will be used throughout select areas of the building to accent architectural features.
- The interior lighting will be designed with illuminance (fc) foot-candle levels per the IESNA guidelines.
- Exit lights will be edge-lit LED type with red lettering. The exit signs will be powered by the generator life safety system.
- International symbol of accessibility signate and low level exit signage will be provided per CT supplements to the IBC.

- An egress path marking system will be provided throughout the corridors per CT supplements to the IBC. This system will be connected to 120V power.

Lightning Protection

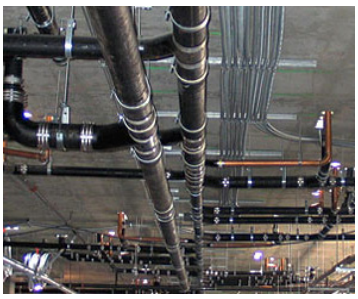
- A UL Master label listed lighting protection system will be provided, consisting of air terminals, down conductors and connections to the building grounding system and structure.

Fire Alarm System

- A new fully addressable Fire Alarm system will be provided, consisting of: control panels and power supplies; smoke and heat detectors; audio/visual devices; manual pull stations; monitoring and control devices; magnetic door holders; elevator recall devices; tamper and flow switches; remote annunciation panels; voice evacuation equipment; wiring; and raceway.
- Fire alarm MC cable will be specified for all concealed spaces. Where exposed or in unfinished spaces, wiring will be in conduit.
- Locations for devices will be in accordance with NFPA and ADA requirements and will include:
- Smoke detectors in all storage rooms, corridors, electric closets and telecommunication rooms.
- Manual pull stations at all exit doors.
- Notification appliances in all occupied spaces.
- Elevator recall devices.
- Heat detectors in mechanical rooms

Low Voltage Systems / Telecom

- A new area of refuge system will be provided, including call stations in designated stairwells, annunciation at the main building entrance, and connection to the town's central dispatch via phone lines.
- Telecommunications system cabling and jack locations to be determined by owner.
- Telecommunications equipment and UPS requirements to be determined by owner.
- Electrical contractor will provide cable tray, raceways and boxes to accommodate owner's telecommunications system design.
- CCTV cameras on site



New School Construction

7.6 Plumbing Systems

General

All plumbing systems shall be designed in accordance with the International Plumbing Code, the Americans with Disabilities Act, State of Connecticut Water Conservation Standards, and with the Educational Specifications for the new school.

Fixtures

All plumbing fixtures shall be of institutional quality. Handicapped – accessible fixtures shall be ADA compliant. Flush valves and faucets shall be of the water conservation type. Faucets on ADA compliant lavatories and sinks shall be electronic.

Floor drains shall be provided in toilet rooms, locker rooms, science labs, and in mechanical rooms. Floor drains shall be provided with trap primers, if warranted.

Piping shall be provided for a full service kitchen for commercial cooking, with the coordination of the food service consultant.

Domestic Water System

Cold water shall be piped to each plumbing fixture and to each piece of plumbed kitchen equipment. Cold water shall be extended to non-freeze wall hydrants located approximately 200-feet on center along the perimeter wall.

Hot water shall be provided at 140 F degrees from indirect water heaters located in the boiler room. Hot water shall be distributed at 140 degrees F to janitor mop sinks, kitchen pot sinks and dishwater. A local electric booster heater shall boost the 140 degrees F water to 180 degrees F for the dishwater rinse cycle. A thermostatic mixing valve shall provide tempered water and be distributed throughout the remainder of the school at 115 degrees F. The entire domestic hot water system shall be equipped with a pumped recirculation line.

Sanitary, Waste and Vent System

Sanitary, waste and vent piping shall be extended to each plumbing fixture and to each piece of plumbed kitchen equipment.

A central acid waste neutralization tank with monitoring shall be provided for all science and prep room sinks, if required.

An external underground 3,000-gallon grease separator shall be provided on site for kitchen waste.

Clay traps shall be provided for all art room sinks.

Storm System

Roof drains shall be provided for each roof low point. Overflow roof drains or scuppers shall be provided for emergency and discharge to exterior.

Gas Distribution System

Natural gas shall be provided to the building with both firm and interruptive services. The firm service shall supply the boiler for indirect water heaters, commercial kitchen, and science labs with emergency shut-off system.

The hot water heating boilers shall be connected to the interruptible service; a contract agreement between Owner and supplier to be determined.

Materials and Methods

Storm, sanitary, waste and vent piping above grade shall be hubless cast iron with no-hub couplings; branch waste and vent piping above grade shall be Type "DWV" copper with soldered fittings or no-hub cast iron. Water pipe above grade shall be Type "L" copper with wrought copper sweat fittings using 95/5 solder.

Sanitary, storm, waste and vent piping below grade shall be service-weight cast iron bell and spigot, with push-on, neoprene-gasketed joints.

Gas piping under two (2") inch diameter shall be Schedule 40 black steel with malleable threaded fittings or copper, gas piping two (2") inch diameter and over shall be Schedule 40 black steel with welded fittings.

Condensate piping shall be Type "M" copper with 95/5 soldered joints.

Domestic hot, cold, hot water recirculating, condensate and all horizontal storm piping and roof drain bowls shall be insulated with fiberglass insulation and preformed insulated fittings and vapor barrier.

Acid waste and vent piping shall be polypropylene.

Seismic bracing will be provided per the State of Connecticut Building Code.

Fire Protection System

General

Fire protection system will include a hydraulically balanced system throughout the school with standpipe system such that every part of building can be reached with a 100-foot hose projecting a 30-foot stream. Fire main service shall be located within the utility room of the ground floor and be connected to a fire pump. Fire protection system will be designed and installed in accordance with the State of Connecticut Building Code, the State of Connecticut Fire Safety Code, NFPA 13, NFPA 14, NFPA 20, and the Town of North Haven Fire Marshal.

Standpipes

Standpipes will be provided for the stage area and stair towers.

Sprinklers

The School will be fully sprinklered with a wet pipe system. Limited area subject to freezing will be protected with dry sidewall heads and/or dry alarm valves.

Materials and Methods

Piping will be Schedule 40 black steel pipe with cast iron threaded or grooved fittings and joints.

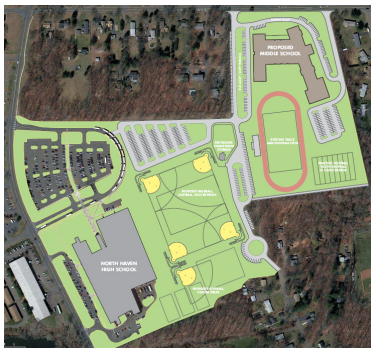
Sprinkler heads in finished ceiling areas will be concealed type with white cover plates.

Sprinkler heads in unfinished ceiling areas will be upright type.

Piping is to run concealed in all finished areas where possible and so arranged that all portions could be drained.

The Contractor will provide complete drawings and calculations as required by NFPA 13. All drawings will be computer generated. A Professional Engineer will seal drawings and calculations.

Seismic bracing will be provided per the State of Connecticut Building Code.



7.7 Option 3: Proposed Schedule

Option 3 positions a new school on the existing ball field fronting Bailey Road. The existing school will operate until the new school is completed. After occupancy of the new school, the old middle school will be demolished to make way for new athletic fields. Proposed project schedule:

Schedule

Spring	Year 1:	Referendum
Summer	Year 1:	Select A/E team and award
		Commence construction documents
Spring	Year 2:	Bid project and award construction contract
Summer	Year 2:	Commence construction
Mid-term	Year 3:	Project complete, take occupancy of new school
Spring	Year 4:	Demolish old school and commence athletic field construction

7.8 Option 3: Advantages and Disadvantages

Constructing a new School at Bailey Road with a revitalized athletic site complex presents unique pros and cons:

Advantages

- Provides a building that is tailored exactly to the Ed Spec, with up to date building systems, finishes and equipment
- More energy efficient construction and healthful interior environment
- Maintains central location of Middle School and High School for shared resources and multi-school families
- Existing Middle School may continue to operate during construction
- Close proximity between new school and old eases transition to new facility
- Provides an academic and athletic community campus, with a much needed expansion of Town field facilities
- Phased document preparation may be employed for early construction start

Disadvantages

- More costly option
- Impacts existing ball field during course of construction

Cost Control Opportunities

- Reduce scope of site work:
  - Reduce expansion of parking
  - Phase or reduce scope of athletic fields
- Quality and extent of finishes
- Complexity of Auditorium
- Complexity and efficiency of MEP systems and controls
- Alternative energy options

Perkins Eastman

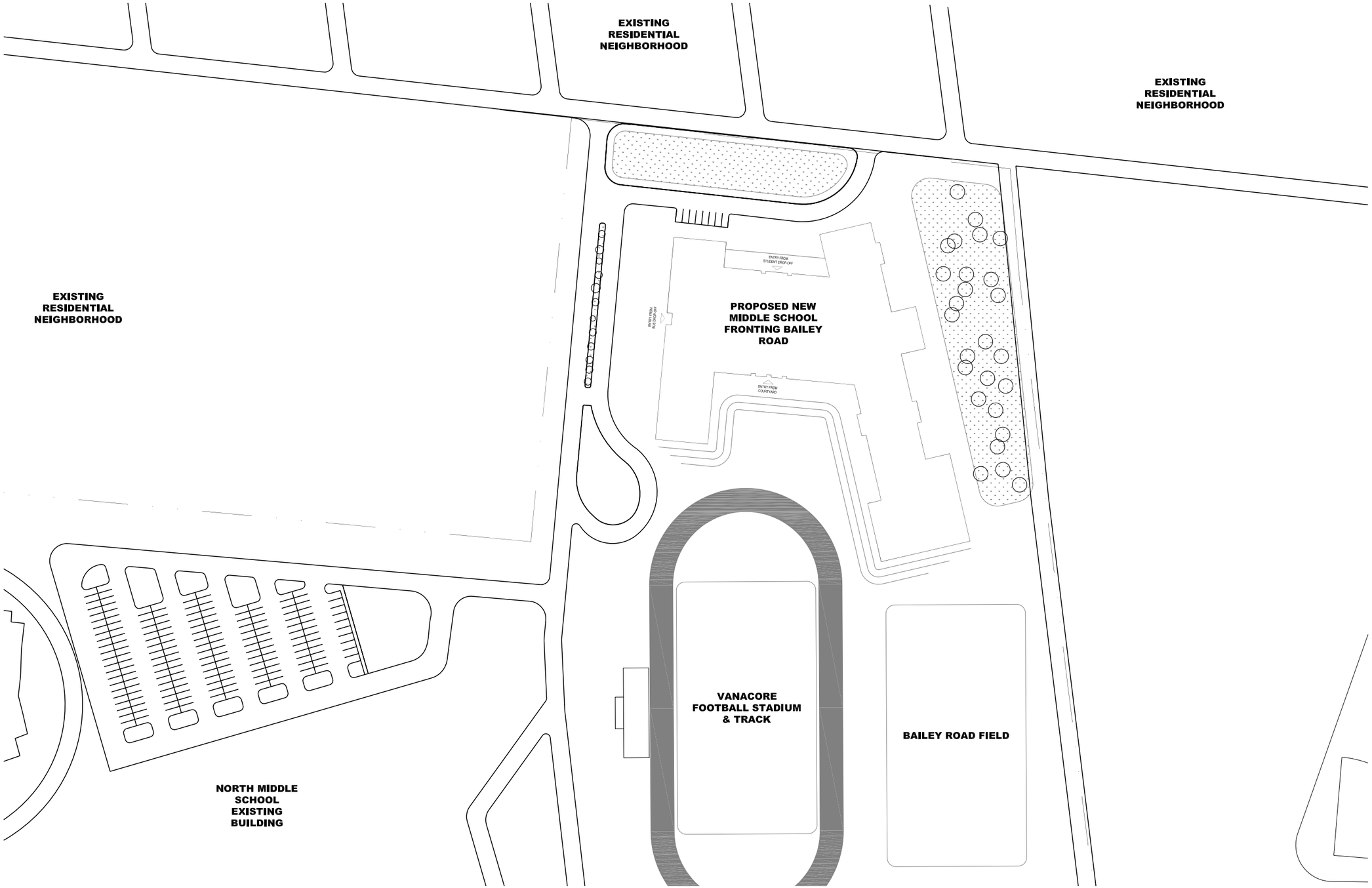
DIVERSIFIED TECHNOLOGY CONSULTANTS

PROPOSED MASTER SITE PLAN

NORTH HAVEN MIDDLE SCHOOL - NEW SCHOOL AND ATHLETICS COMPLEX

Scale: 1:20 01-30-2013

L1



SITE PLAN

Perkins Eastman
422 SUMMER STREET
STAMFORD, CT 06901
T. 203.251.7400
F. 203.251.7474

PROPOSED NEW MIDDLE SCHOOL FRONTING BAILEY ROAD
JANUARY 25, 2013
SCALE: NTS

S1

GROUND FLOOR PLAN

Perkins Eastman
422 SUMMER STREET
STAMFORD, CT 06901
T. 203.251.7400
F. 203.251.7474

NORTH HAVEN MIDDLE SCHOOL- RENOVATE AS NEW
JANUARY 25, 2013
SCALE: NTS

A1

SECOND FLOOR PLAN

Perkins Eastman
422 SUMMER STREET
STAMFORD, CT 06901
T. 203.251.7400
F. 203.251.7474

NORTH HAVEN MIDDLE SCHOOL- RENOVATE AS NEW
JANUARY 25, 2013
SCALE: NTS

A2

LEGEND

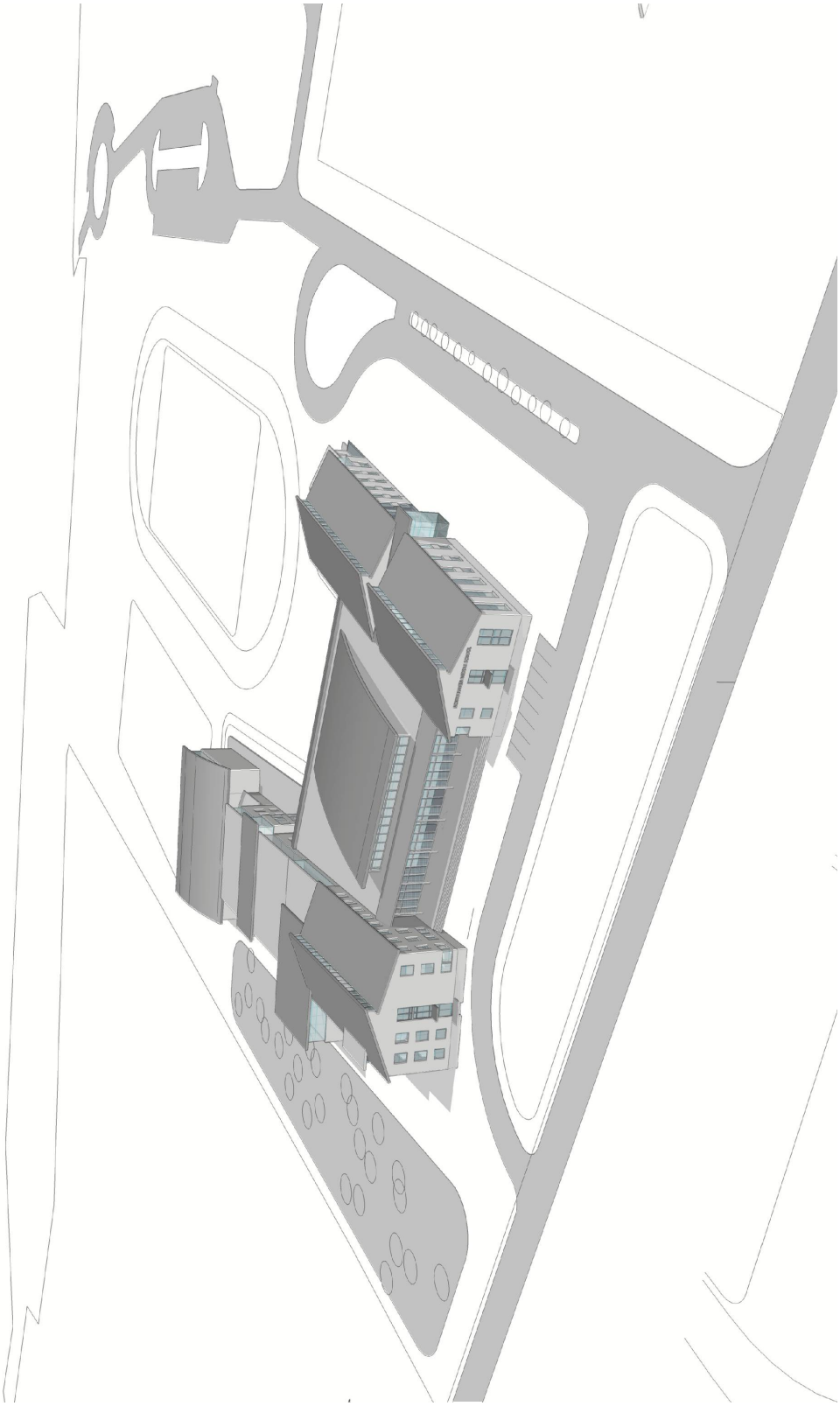
- CLASSROOM
- WORLD LANGUAGE
- SPECIALIZED INSTRUCTION
- VISUAL ARTS
- LIFE SKILLS
- SPECIAL EDUCATION
- LIBRARY MEDIA CENTER
- PHYSICAL EDUCATION
- HEALTH OFFICES
- ADMINISTRATION
- GUIDANCE
- CAFETERIA
- AUDITORIUM
- FACULTY SPACE
- MAINTENANCE AND OPERATION

THIRD FLOOR PLAN

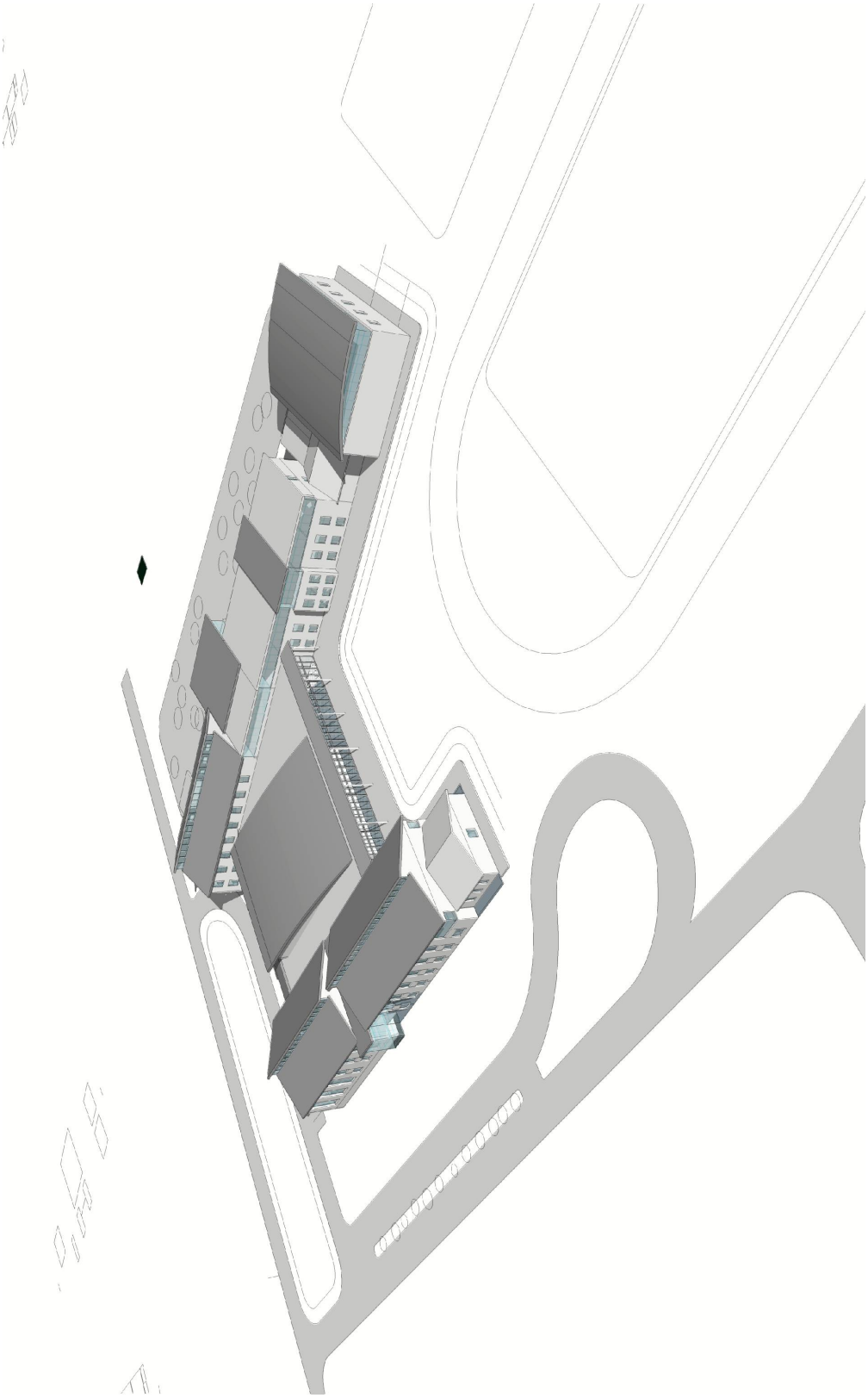
Perkins Eastman
422 SUMMER STREET
STAMFORD, CT 06901
T. 203.251.7400
F. 203.251.7474

NORTH HAVEN MIDDLE SCHOOL- RENOVATE AS NEW
JANUARY 25, 2013
SCALE: NTS

A3



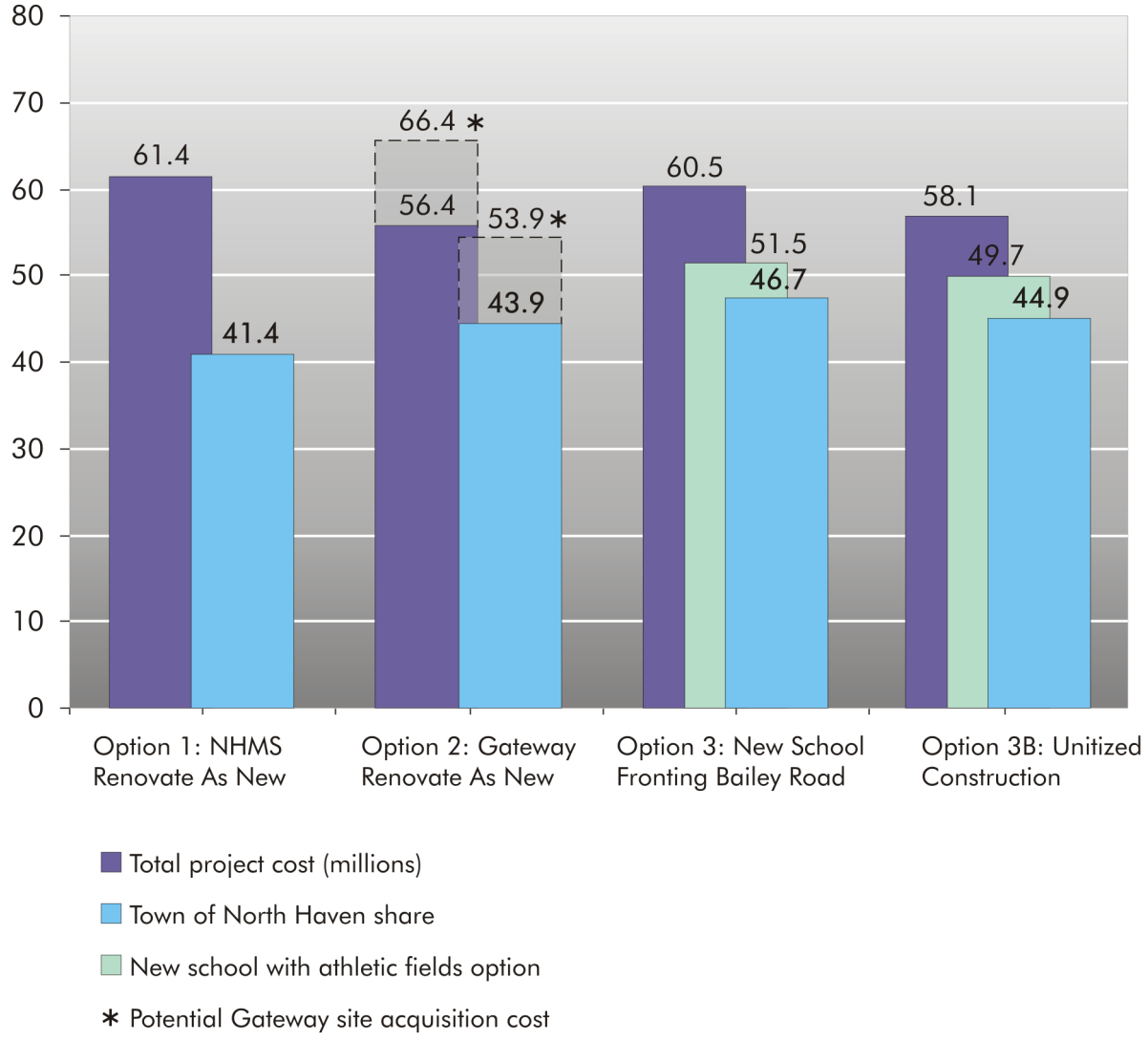
Arial view of conceptual program massing from Bailey Road



Arial view of conceptual program massing from athletic fields

Conceptual view from Bailey Road

The following chart compares conceptual project costs between the options.



CONCEPTUAL BUDGET SUMMARIES

Option 1	NHMS Renovate as New	41.4 M
Option 2	Gateway, Renovate as New	43.9 M – 53.9 M (depending on site acquisition cost)
Option 3	New School at Bailey Road	46.7 M
	New School with Athletic Fields	51.5 M
Option 3B	New School, Unitized Construction	44.9 M
	New School, with Athletic Fields	49.7 M

29	4		Total Project Points*		*(A minimum of 28 strategies must be implemented)				
Yes	Poss	No	Credit	Dsgn/ Const	Credit Name	Description	% Complt	Resp. Party	Remarks
			Mandatory Requirements (16a-38k-3):						
Y	-	-	16a-38k-3(a)	D/C	Building Commissioning	Building commissioning shall be an integral part of the building project			Third party for Owner
Y	-	-	16a-38k - 3(b)	D	Integrated Design Process:	All building construction projects shall follow an integrated design process to achieve environmental and building performance goals			Done during design
Y	-	-	16a-38k-3(c)	D	Energy Performance:	The base minimum energy performance for all building projects shall be twenty-one percent (21%) better than the most current Connecticut State Building Code or ASHRAE 90.1-2004, whichever is more stringent. Base minimum energy performance shall be determined using approved building modeling software that is identified in the Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings –August 2009.			Energy Model
Y	-	-	16a-38k-3(d)	D	ENERGY STAR Products	Energy consuming products installed in the building shall be ENERGY STAR compliant if the product category has an ENERGY STAR specification.			
Y	-	-	16a-38k-3(e)	C	Indoor Air Quality Management Plan	An indoor air quality management plan shall be developed for the construction phase of the project.			
Y	-	-	16a-38k-3(f)	D	Water Usage:	Use low-flow fixtures to consume twenty percent less water in aggregate as compared to base levels calculated by meeting the Federal Energy Policy Act of 1992 fixture performance requirements.			
Y	-	-	16a-38k-3(g)	-	Recycling of Materials	The building or building site shall contain convenient areas to serve as collection points for recyclable materials and shall include an area for the sorting and storage of such materials for pick-up by recyclers.			
Y	-	-	16a-38k-3(h)	D	Erosion and Sedimentation Control:	All construction shall include a plan for erosion and sedimentation control, as required by sections 22a-325 through 22a-329 of the Connecticut General Statutes.			
Y	-	-	16a-38k-3(i)	D	No Smoking Policy	Smoking shall not be permitted in any building or portion of a building owned and operated or leased and operated by the state or any political subdivision thereof as mandated by section 19-342 of the Connecticut General Statutes			
Y	-	-	16a-38k-3(j)	D	Integrated Pest Management Plan	An Integrated Pest Management Plan, as defined in section 22a-47 of the Connecticut General Statutes, shall be established as required under section 22a-66l for general pest and rodent control in state buildings. Schools shall comply with sections 10-231 and 22a-66l of the Connecticut General Statutes.			
Y	-	-	16a-38k-3(k)	D	Chlorofluorocarbon (CFC)-Based Refrigerants	Chlorofluorocarbon (CFC)-based refrigerants shall not be utilized for energy systems in new construction. For renovation projects where existing HVAC equipment is reused, a CFC phase-out conversion shall be undertaken.			

29	4		Total Project Points*		*(A minimum of 28 strategies must be implemented)				
Yes	Poss	No	Credit	Dsgn/ Const	Credit Name	Description	% Complt	Resp. Party	Remarks
Y	-	-	16a-38k-3(l)	D	Minimum Ventilation Requirement	Buildings shall be designed to meet the minimum ventilation requirements of the current ASHRAE Standard 62.1 using the Ventilation Rate Procedure for mechanical systems. If the current Connecticut State Building Code contains more stringent requirements, it shallbe used to meet minimum ventilation requirements.			
			Additional Mandatory Building requirements for Schools (16a-38k-5)						
Y	-	-	16a-38k-5(a)	D	Acoustical Standards:	All classrooms, including art rooms, music rooms, science rooms,computer rooms, and special needs, remedial and library space shall meet the acoustical standards as required under Section 10-285g of the Connecticut General Statues.			
Y	-	-	16a-38k-5(b)	D	Properly Locate Outside Air Intakes:	Outside air intakes shall be located a minimum of twenty-five feet from any hazard or noxious contaminants such as vents, chimneys, plumbing vents, exhaust fans, cooling towers, street alleys, parking lots, loading docks, dumpster areas, bus loops, or any area where vehicle idling occurs. If locating an air intake within twenty-five feet of a contaminant source is unavoidable, the intake must be located a minimum of ten feet horizontal distance and two feet lower than the contaminant source.			
Y	-	-	16a-38k-5l	D	Install Gas Equipment with Electronic Ignition	Only electronic ignitions shall be specified for gas-fired water heaters, boilers, furnaces, air handling units, and stovetops/ovens.			
Y	-	-	16a-38k-5(d)	D	Use Low VOC products, Resilient flooring and associated adhesives	Adhesives and sealants used in the interior of the building shall be certified for low emissions of volatile organic compounds (VOCs) using specifications or certification programs listed in the Connecticut High Performance Building Compliance Manual Section 16a-38k-4 (b)(4). Use Low VOC Materials: The following materials shall be certified for low emissions of volatile organic compounds (VOCs) using specifications or certification programs listed in the Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings: 1. 50% of Adhesives and sealants used in the interior of the building. 2)Acoustic ceiling tiles and wall panels. 3)interior paints. 4)wall coverings. 5)carpet systems 6)Composite and solid wood flooring			

29	4		Total Project Points*		*(A minimum of 28 strategies must be implemented)				
Yes	Poss	No	Credit	Dsgn/ Const	Credit Name	Description	% Complt	Resp. Party	Remarks
Y	-	-	16a-38k-5(e)	D	Environmental Site Assessment	The City, Town or regional board of education and the building committee of such town or district, shall provide for a Phase I environmental site assessment in accordance with the American Society for Testing and Materials Standard #1527, Standard Practice for Environmental Site Assessments: Phase I Site Assessment Process, or similar subsequent standards, as required pursuant to Section 10-291 of the Connecticut General Statutes. If a town, regional board of education or the building committee of such town or district suspect contamination, a Phase II Environmental Site Assessment shall be undertaken as described in American Society for Testing and Materials Standard E1903-97 or similar subsequent standards. Any contamination found shall be remedied.			
Y	-	-	16a-38k-5(f)	C	HEPA Vacuuming	Prior to substantial completion of the building, vacuum all carpeted and soft surfaces with a high-efficiency particulate arrestor (HEPA) vacuum. For phased or occupied renovations, HEPA vacuum the carpet daily in occupied areas.			
			Building Standard Select Options						
			Energy Efficiency & renewable Energy			At least 1 measure in subsection (a) must be selected			Remarks
			For reference from Section 16a-38k-3(c) mandatory energy performance: The base minimum energy performance for all building projects shall be twenty-one percent (21%)						
	-P	-	16a-38k-6(a)(1)	D	24.5 Percent better				Diff w/exst'g
	-P	N	16a-38k-6(a)(2)	D	28 Percent better				Diff w/exst'g
-	-	N	16a-38k-6(a)(3)		31.5 Percent better				
-	-	N	16a-38k-6(a)(4)		35 Percent better				
-	-	N	16a-38k-6(a)(5)		38.5 Percent better				
-	-	N	16a-38k-6(a)(6)		42 Percent better				
-	-	N	16a-38k-4 (a)(7)		On-Site Renewable Energy 3%	The installation of on-site renewable energy shall provide atleast 3 percent of the building energy needs based upon the most recent version of the U.S. Department of Energy Commercial Buildings Energy Consumption Survey for estimated electricity usage or by using the same modeling software used to demonstrate compliance with the energy efficiency section of this document. Any facility that installs renewable energy systems must retain associated RECs			Very Difficult
-	-	N	16a-38k-6(a)(8)		On-Site Renewable Energy 7%	Same as in subsection (a)(7) except at least 7 percent of the building energy needs are met through on-site renewable energy.			Very Difficult
-	-	N	16a-38k-6(a)(9)		On-Site Renewable Energy 10%	Same as in subsection (a)(7) except at least 10 percent of building energy needs are met through on-site renewable energy.			Extremely Difficult

29	4		Total Project Points*		*(A minimum of 28 strategies must be implemented)				
Yes	Poss	No	Credit	Dsgn/Const	Credit Name	Description	% Complt	Resp. Party	Remarks
-	P	-	16a-38k-6(a)(10)	C	Purchase Renewable Energy from Utility Source	The facility shall have a two-year contract to purchase at least 35 percent of the building's annual electricity consumption from a Class I renewable energy source. Alternately, the purchase may be in the form of New England Power Pool Generation Information System (NEPOOL-GIS) renewable energy credits (RECs); if procuring RECs outside of the NEPOOL-GIS, the RECs shall be equivalent to Class I renewable energy source and certified by a nationally recognized certification organization as identified in the Connecticut State Facilities Building Standard Guidelines Compliance Manual for High Performance Buildings; or the purchase may be through the CT Clean EnergyOptions™ program . Baseline electric usage can be determined using either the most recent version of the U. S. Department of Energy Commercial Buildings Energy Consumption survey for estimated electricity usage or by using building modeling software that is identified in the Connecticut State Facilities Building Standard Guidelines Compliance Manual for High Performance Buildings. RECs purchased to comply with this section cannot be purchased from a facility that has installed renewable energy systems for credit under 16a-38k-3(a)(7 through 9).			Owner to coordinate with Utility
-	-	-	16a-38k-6(a)(11)	D	Energy Measurement & Verification	Develop a measurement and verification plan for energy usage, to cover a period of at least one year after occupancy.			
			Indoor Environment			At least 2 measures in subsection (b) must be selected			
Y	-	-	16a-38k-4(b)(1)	D	Permanent Air Monitoring Systems	Install permanent indoor air monitoring systems to provide performance feedback on ventilation systems. Such monitoring systems, at minimum, shall include devices to measure temperature, relative humidity, carbon dioxide, and dew point. Carbon dioxide measurement sensors shall measure both interior and exterior levels of CO2			
-	P	-	16a-38k-6 (b)(2)	D	Provide Increased Outdoor Ventilation	Provide increased outdoor ventilation by designing mechanical ventilation systems to exceed the minimum rates required by the current Connecticut State Building Code or the most recent version of the ASHRAE Standard 62.1 whichever is more stringent, by thirty percent.			Diff w/exst'g
Y	-	-	16a-38k-6 (b)(3)	C	Building Flush-out	After construction ends and with all interior finishes installed but prior to building occupancy, flush the building continuously for at least ten days with outside air while maintaining an internal temperature between 60°F and 78°F and relative humidity no higher than 60%. Do not "bake out" the building by increasing the temperature of the space. Alternatively, use the following strategy: Flush out each space separately until 3,500 cubic feet of outside air per square foot of floor space has been delivered to that space. The space shall then be ventilated at the rate of 0.3 cubic feet per minute per square foot of floor space or the design minimum outside air rate, whichever is greater. This shall be performed for a minimum of three hours prior to occupancy and then during occupancy until a total of 14,000 cubic feet of outside air per square foot of floor area has been delivered to that space.			Requires time at end of construction
Y	-	-	16a-38k-6(b)(4)	D	Composite Wood & Agrifiber	All composite wood and agrifiber products used within the shell of the building shall meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers, including 2004 Addend			
Y	-	-	16a-38k-6(b)(5)	D	Individual Light Control	Allow for individual lighting control for 90% or more of the building occupants to allow for adjustments to suit individual tasks and preferences and provide lighting system controllability for all shared multi-occupant spaces to enable lighting adjustment that meets group needs and preferences.			

29	4		Total Project Points*		*(A minimum of 28 strategies must be implemented)				
Yes	Poss	No	Credit	Dsgn/Const	Credit Name	Description	% Complt	Resp. Party	Remarks
Y	-	-	16a-38k-6(b)(6)	D	Individual Thermal Control	Using conditions for thermal comfort described in the current version of the ASHRAE Standard 55, allow for individual thermal comfort control for fifty percent or more of the building occupants to allow for adjustments to suit individual tasks and preferences and provide thermal system comfort controllability for all shared multi-occupant spaces to enable adjustment that meets group needs and preferences. Owner, shall administer an anonymous survey for building occupants within the first twelve months after initial occupancy to assess occupant satisfaction and implement corrective actions for recurrent issues. At minimum, the survey shall cover thermal building comfort, lighting, security issues, indoor air quality, functionality of space, and acoustics. If greater than 20% of respondents express dissatisfaction with any specific issue, the building owner shall prepare a plan for remedial action.			
Y	-	-	16a-38k-6(b)(7)	C	Building Occupant Anonymous Survey	Buidling facility personnel, under direction of the bulding Owner, shall administer an anonymous survey of building occupants…...			Owner post occupancy
-	P	N	16a-38k-6(b)(8)	D	Daylight Contribution	Demonstrate through computer software simulations or through recording of indoor light measurements that a minimum illumination level of twenty-five footcandles has been achieved from daylight in at least 75% of all regularly occupied areas.			Difficult Calculation
	P	-	16a-38k-6(b)(9)	D	Views to Outdoor Environmentways	There shall be a direct line of sight to the outdoor environment via window glazing between 2 ½ and 7 ½ feet above the finished floor for 70% of all regularly occupied areas.			Difficult w/existing buildings
Y	-	-	16a-38k-6(b)(10)	D	Mold Prevention	Rt prevent mold, heating, ventilating and air conditioning systems (HVAC) shall be designed to limit space relative humidity to 60% or less during load conditions whether the building is occupied or not. An ongoing indoor air quality management plan shall be implemented as required under Section 10-220 of the Connecticut general statutes.			
Y	-	-	16a-38k-6(b)(11)	D	Low VOC Furniture	Student and teacher classroom chairs, desks,and tables manufactured, refurbished, or refinished within one year prior to occupancy and used within the building interior shall be certified for low chemical emissions byGreenguard Environmental Institute.			
Y	-	-	16a-38k-6(b)(12)	D	Isolation of Chemical Use Areas	Where chemical use occurs, including housekeeping areas, chemical storage and mixing areas, and copy/print rooms, use dedicated exhaust to ventilate the space at a minimum of 0.5 cubic feet per minute per square foot with adequate make-up air. No recirculation is permitted and such spaces shall have a negative air pressure of at least 5 pascal (.02 inches of water gauge) to a minimum of 1 pascal (0.004 in. of water gauge) when doors are closed.			
-	P	-	16a-38k-6(b)(13)	D	Control Entry Pollutants	To protect building occupants from potentially hazardous particulates and pollutants, building design shall control entry of pollutants and excess moisture into buildings and later cross-contamination of regularly occupied areas at all entries directly connecting to the outdoors through the use of permanent entryway systems to capture, dirt, particulates, and moisture. Such entryway systems shall be a minimum of six feet long and may be permanently installed grates, grills, or slotted systems that allow for cleaning underneath. Outside air intakes shall be located a minimum of twenty-five feet from any hazard or noxious contaminants such as vents, chimneys, plumbing vents, exhaust fans, cooling towers, street alleys, parking lots, loading docks, dumpster areas, or any area where vehicle idling occurs. If locating an air intake within twenty-five feet of a contaminant source is unavoidable, the intake must be located a minimum of ten feet horizontal distance and two feet lower than the contaminant source			Difficult w/existing buildings

29	4		Total Project Points*		*(A minimum of 28 strategies must be implemented)				
Yes	Poss	No	Credit	Dsgn/ Const	Credit Name	Description	% Complt	Resp. Party	Remarks
			Water Efficiency			At least 1 measure in subsection © must be selected			
Y	-	-	16a-38k-6©(1)	D	Conserving Strategies 30% Less	Same as in Section 16a-38k-3(g), except that the conserving strategies use 30 percent less water in aggregate.			
-	-	N	16a-38k-6©(2)	D	Water Required for Landscaping reduce 50%	Reduce by 50 percent the amount of water required for landscaping from a mid-summer baseline usage case. Reductions may be attributed to the use of captured rainwater, recycled waste (grey) water, efficiency of irrigation strategies, and use of drought resistant plant species. This strategy only applies to renovation projects.			Costly
-	-	N	16a-38k-6©(3)	D	No Irrigation or use non-potable water	Use landscaping that does not require a permanent irrigation system or uses non-potable water for irrigation. Any system installed for irrigation using potable water shall only be utilized for plant establishment and be removed prior to one year of building occupancy.			Costly
-	-	N	16a-38k-6©(4)	D	Reduce potable water usage	Reduce potable water use by half through water conserving fixtures and/or use of non-potable water using methodologies stated in the Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings. This strategy only applies to renovation projects.			Costly
			Recycling, Reuse, and Sustainability			At least 2 measure in subsection (d) must be selected			
-	P	-	16a-38k-6 (d)(1)		Maintain 75% of Existing Building	Retain at least 75 percent, by surface area, of an existing building structure, including structural floor and roof decking, exterior framing, and envelope surface, but excluding window assemblies and non-structural roofing material. This strategy only applies to renovation projects.			Existing Buildings Only
-	P	-	16a-38k-6 (d)(2)		Maintain 95% of Existing Building	Same as subsection (d)(1) above, except that a total of 95 percent of the building structure is retained. This strategy only applies to renovation projects.			Existing Buildings Only
-	-	N	16a-38k-6 (d)(3)		Re-use Existing Non-Structural Building Elements	Use existing non-structural elements such as interior walls, doors, floor coverings and ceiling systems in at least half (by square footage) of the completed building. This strategy only applies to renovation projects.			
-	-	N	16a-38k-6 (d)(4)		Recycle or Salvage 50%of Construction & demo debris	Recycle or salvage at least half of non-hazardous construction and demolition debris.			
-	-	N	16a-38k-6 (d)(5)		Recycle or Salvage 75%of Construction & demo debris	Same as subsection (d)(4) above, except that a total of 75 percent of non-hazardous construction and demolition debris is recycled or salvaged.			
-	-	N	16a-38k-6 (d)(6)		Use 5% refurbished, Salvaged, or Reused Material	Use 5 percent of refurbished, salvaged, or reused materials, based on cost of the total value of materials on the project. Only permanently installed materials can be used in calculations.			
-	-	N	16a-38k-6 (d)(7)		Use 10% refurbished, Salvaged, or Reused Material	Same as subsection (d)(6) above, except that a total of 10 percent of refurbished, salvaged, or reused materials, based on cost of the total value of materials on the project shall be used.			
Y	-	-	16a-38k-6 (d)(8)	D	Use 10% Recycled Content Materials	Use materials where the weighted average of recycled materials content is 10 percent, based on cost, of the total value of the materials in the project. Recycled content value of a material assembly shall be determined by weight. The weighted average shall be determined using the following formula:Weighted average of recycled materials equals the percentage of post consumer content + 1/2(% of preconsumer content).			

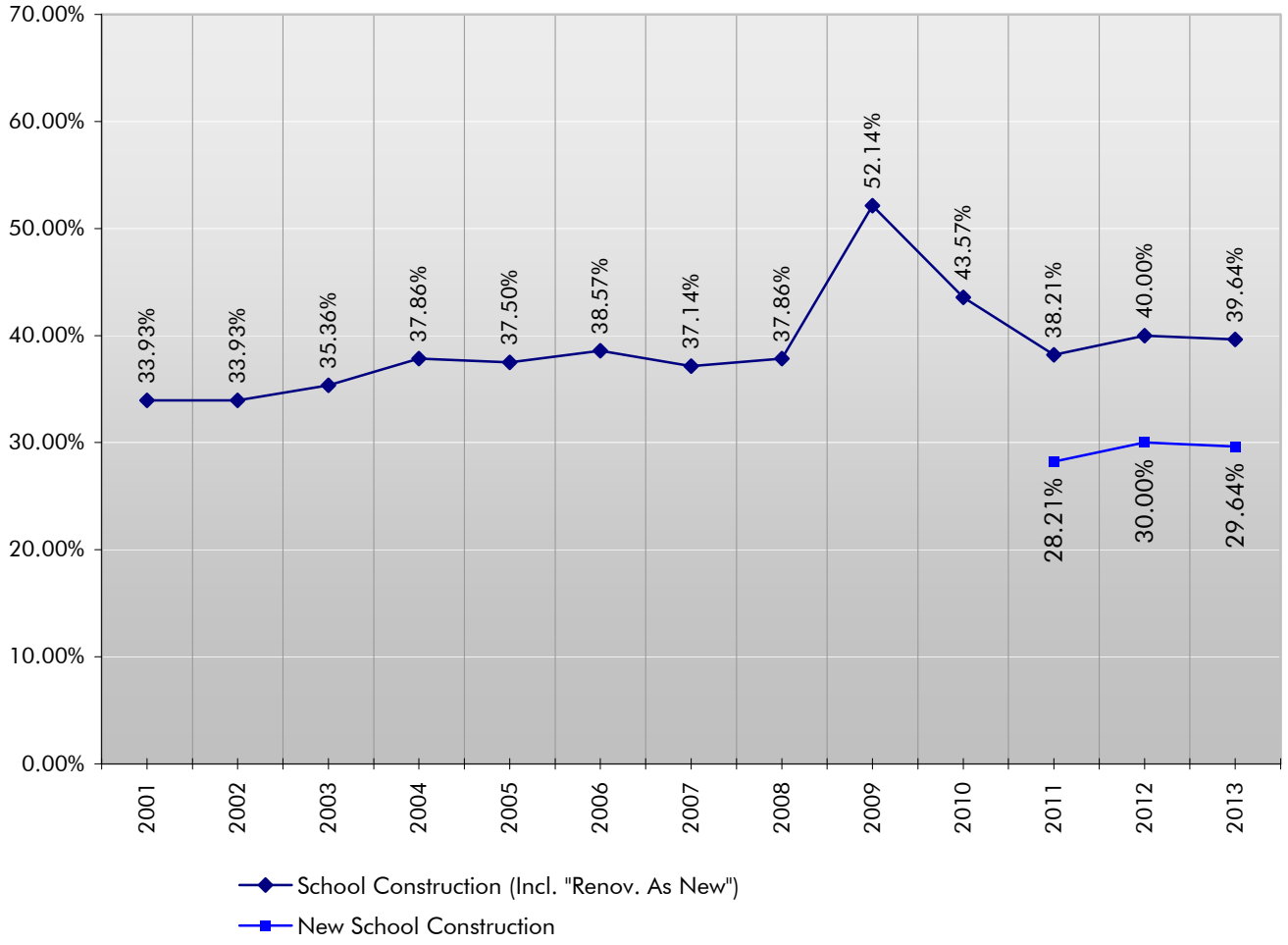
29	4		Total Project Points*		*(A minimum of 28 strategies must be implemented)				
Yes	Poss	No	Credit	Dsgn/ Const	Credit Name	Description	% Complt	Resp. Party	Remarks
-	P	-	16a-38k-6 (d)(9)		Use 20% Recycled Content Materials	Same as subsection (d)(8) above, except that the weighted average of recycled materials must constitute at least 20 percent, based on cost, of the total value of the materials in the project.			Difficult
-	P	-	16a-38k-6 (d)(10)	D	Use 10% Local Materials	Use a minimum of 10 percent of building materials extracted or manufactured within a five-hundred mile radius of the building site.			
-	-	-	16a-38k-6 (d)(11)		Use 20% Local Materials	Same as (d)(10) above, except that a minimum of 20 percent of building materials extracted or manufactured within a five-hundred mile radius of the building site shall be used.			Difficult
-	P	-	16a-38k-6 (d)(12)		Use Building Materials made from Short Harvested Cycle Plants	Use building materials and products that are made from plants harvested in a ten-year or shorter cycle. Two and one-half percent of the total value of building materials and products, based on costs, must be used in the project.			Difficult percentage
Y	-	-	16a-38k-6 (d)(13)		Use Forest Stewardship Council (FSC) Certified Wood Products	At least half of permanently installed wood and wood-based products shall be certified in accordance with the current Forest Stewardship Council (FSC) principles and criteria.			
			Site Selection & development			At least 2 measure in subsection (e) must be selected			
-	P	-	16a-38k-6(e)(1)		Re-develop a Local Site	Construct or renovate the building on a previously developed site and within one-half mile of a residential zone/neighborhood with an average density of ten units per acre net and within one half mile of a minimum of ten basic services as described in the State Facilities Building Standard Guidelines Compliance Manual for High Performance Buildings (this document) and with pedestrian access between the building and the services.			Existing Buildings Only
Y	-	-	16a-38k-6(e)(2)		Select a Site with Public Transportation Access	Develop on a site that is defined as a brownfield by a local, state, or federal government agency. ("Brownfields" are abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contaminations. Environmental concerns should be addressed before building, but builders are encouraged to re-use these sites.)			School bus system
Y	-	-	16a-38k-6(e)(3)	D	Encourage Bicycle Transportation	Encourage bicycle transportation by providing secure bicycle racks or storage within five-hundred feet of a building entrance for a minimum of 5 percent of building users at peak times and shower and changing facilities must be provided in the building or within five-hundred feet of the building. For residential buildings, covered storage facilities shall be provided for securing bicycles for a minimum of 15 percent of building occupants.			
Y	-	-	16a-38k-6(e)(4)	D	Encourage Low-Emission Vehicle Use with Preferred Parking	Encourage the use of low-emitting and fuel efficient vehicles by providing preferred parking for low-emitting and fuel efficient vehicles for 5 percent of the total parking capacity at the site.			

29	4		Total Project Points*		*(A minimum of 28 strategies must be implemented)				
Yes	Poss	No	Credit	Dsgn/ Const	Credit Name	Description	% Complt	Resp. Party	Remarks
Y	-	-	16a-38k-6(e)(5)	D	Encourage Car and Van-Pooling	Reduce pollution from single occupancy vehicle use by sizing parking capacity to meet, but not exceed minimum local zoning requirements; provide designated preferred parking for carpools or vanpools for 5 percent of the total provided parking spaces; and provide infrastructure and support programs to facilitate shared vehicle usage such as ride sharing, bulletin boards & shuttle services to mass transit.			Work with P&Z
Y	-	-	16a-38k-6(e)(6)		Protect Natural Areas at the Construction Site	Protect existing natural areas or restore damaged areas to promote biodiversity. Any site disturbances shall be limited to no more than forty feet beyond the building perimeter; ten feet beyond surface walkways, patios, surface parking and utilities less than twelve inches in diameter; fifteen feet beyond primary roadway curbs and main utility branch trenches; and twenty-five feet beyond constructed areas with permeable surfaces, such as playing fields, that require additional staging areas in order to limit compaction in the constructed area. For previously developed or graded sites, restore or protect to a minimum of 50 percent of the site area, excluding the building footprint, to plant species indigenous to the locality or to cultivars of nativeplants adapted to the local climate conditions and not considered invasive species or noxious weeds. Except for playing fields and picnic areas, minimize lawn areas to less than 10 percent of the building site landscape.			
-	P	-	16a-38k-6(e)(7)		Maximize Open Space	Maximize open space at the site. Provide vegetated open space within the project boundary to exceed the local zoning's open space requirement by 25percent; where there is no local zoning requirement, provide vegetated open space adjacent to the building that, at minimum, is equal to the building footprint.			Work with P&Z
-	P	-	16a-38k-6(e)(8)		Implement Stormwater Management Plan Reducing Run-off by 25%	Design the site to minimize storm water runoff. Implement a storm water management plan that results in a 25 percent reduction in peak run-off rate for a two year, twenty-four hour storm design from pre-construction to developed conditions; and implement a storm water management plan that results in a 25 percent decrease in run-off volume of storm water runoff from the one hundred-year, twenty-four hour storm design from existing to developed conditions.			Site Specific
-	-	N	16a-38k-6(e)(9)		Implement Stormwater Management Plan That Treats 90% of Annual Rainfall	Design the site to minimize pollutants in storm water runoff by implementing a storm water management plan that reduces impervious cover, promotes infiltration, redirects water to pervious areas or storage reservoirs that treats storm water runoff from 90 percent of the average annual rainfall.			Difficult
-	P	-	16a-38k-6(e)(10)	D	Reduce Heat Island Effect Through Landscaping Strategies	Reduce heat island effect at the site by utilizing any combination of the use of native shade species, paving materials with a solar reflectance index of at least twenty-nine, and/or an open grid pavement system for 50 percent or more of the site parking, sidewalk and road areas; or place at least 50 percent of parking spaces under a covering, such as the a deck, a roof, underground or the building itself. Any roof used to cover parking spaces must have a solar reflectance index of at least twenty-nine.			Difficult

29	4		Total Project Points*		*(A minimum of 28 strategies must be implemented)				
Yes	Poss	No	Credit	Dsgn/ Const	Credit Name	Description	% Complt	Resp. Party	Remark
Y	-	-	16a-38k-6(e)(11)	D	Select Roofing Materials to Reduce Heat Island Effect	Reduce heat island effect through roofing selection by eitherinstalling native vegetation on at least 50 percent of the roof area or by using a roofing material that has a Solar Reflectance Index equal to or greater than the values in the following table on at least 75 percent of the roof surface.			Building dependant
Y	-	-	16a-38k-6(e)(12)	D	Reduce Outdoor Light Pollution	Reduce light pollution from the site. In addition to requirements mandated in Section 4b-16 of the Connecticut General Statutes, automatic controls to turn off lights during non-business hours shall be installed on all non-emergency interior lighting. Manual override capability may be provided for after hours use. Exterior lighting shall be provided only in areas where lighting is required for safety and comfort. Light fixtures shall not be installed where the main purpose is to light building facades or landscape features. Exterior building-mounted lighting fixtures that are only needed during building operation shall be controlled by a time-clock with an easily accessible manual control. Lighting of flags, signs, and monuments shall be limited to fifty watts per fixture and shall incorporate shielding devices to minimize light pollution. No more than two fixtures may be used for each flag, sign or monument.			
-	P	-	16a-38k-6(e)(13)	D	Orient Building for Daylighting and Energy Performance	Building orientation shall be such that the east/west glazing exposure is minimized. South windows shall have an external overhang to entirely shade adjacent windows during the summer solstice or shall utilize glazing with a solar heat gain coefficient of less than or equal to 0.4. Shading mechanisms or glazing with a solar heat gain coefficient less than or equal to 0.4 shall be installed at eastern and western exposure windows to minimize solar heat gain early and late in the day respectively.			New Buildings only
Y	-	-	16a-38k-6(e)(14)	D	No Building in Floodplain and Sustainable Site Development	Buildings, roads, parking areas, sidewalks, or other impervious surfaces shall not be built in any area that is inconsistent with the state plan of conservation and development.			
Y	-	N	16a-38k-6(e)(15)	D	Site Building away from External Sources of Excessive Noise	The school building shall be sited an land away from sources of unreasonable excess noise, such as highways, airport flight paths, and areas that are subject to unreasonable noise from agricultural or industrial equipment use.			Both sites comply

29	4		Total Project Points*		*(A minimum of 28 strategies must be implemented)				
Yes	Poss	No	Credit	Dsgn/ Const	Credit Name	Description	% Complt	Resp. Party	Remarks
			Operations and Procedures/Innovation						
Y	-	-	16a-38k-6(f)(1)	D	Eliminate the use of CFCs, HCFCs and Halons	Do not install fire suppression systems that contain chlorofluorocarbons (CFCs), hydrochlorofluorocarbon (HCFCs), or halons. Select refrigerants and heating, ventilating,			Standard B.O.D.
Y	P	-	16a-38k-6(f)(2)	D	Building Innovation	Utilize innovative high performance features or technologies that greatly exceed any existing mandatory requirement as specified in Section 16a-38k-3 or optional measure within Section 16a-38k-4. Paints and coatings used in the interior of the building shall be certified for low emissions of volatile organic compounds (VOCs) using specifications or certification programs listed in the Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings. All carpet, carpet adhesive products and carpet cushion installed in the building interior shall meet current testing and product requirements of the Carpet and Rug Institute's Green Label Plus program.			Standard B.O.D.
Y	-	-	16a-38k-6(f)(3)	C	Curriculum on Sustainable Building Features	Integrate the sustainable features of the school building into the educational curriculum within the first full year of school operation.			Owner

State of Connecticut Reimbursement Percentages, 2001-2013
Town of North Haven



State Reimbursement Analysis

Each year the State of Connecticut, State Department of Education (SDE) adjusts the reimbursement rates for all districts. Reimbursement rates for school construction range between 20% and 80%. The chart above shows the Town of North Haven reimbursement rate from 2001 to 2013. In 2011 the SDE made a further distinction between "Renovate as New" and "New School Construction" projects. Since 2011, Renovation projects receive a higher reimbursement rate, providing a potential cost advantage to renovating as new vs. constructing a new school.

Reimbursement rates for the Town of North Haven peaked in 2009 at 52.14%, with an all time low of 28.21% in 2011 for new school construction. The anticipated 2013 reimbursement rate for school construction projects from the State of Connecticut for 2013 is 39.64% (Renovate as New project) vs. 29.64% for construction of a new school.

Reimbursement percentages are calculated by the SDE for each district. The following table lists the anticipated rates published by the SDE.

	TOWN	DRG	Wealth AENGLC Rank	Adult Education (0-65%)	Transportation (0-60%)	School Construction (20-80%)	New School Construction (10-70%)	Health Services (10-90%)
85	MONROE	B	46	17.41	11.13	36.07	26.07	31.43
86	MONTVILLE	F	138	53.01	47.68	68.93	58.93	75.24
88	NAUGATUCK	G	154	59.2	54.04	74.64	64.64	82.86
89	NEW BRITAIN	I	168	64.61	59.6	79.64	69.64	89.52
90	NEW CANAAN	A	2	0.39	0	20.36	10.36	10.48
91	NEW FAIRFIELD	B	53	20.12	13.91	38.57	28.57	34.76
92	NEW HARTFORD	C	71	27.08	21.06	45.00	35.00	43.33
93	NEW HAVEN	I	166	63.84	58.81	78.93	68.93	88.57
94	NEWINGTON	D	110	42.17	36.56	58.93	48.93	61.9
95	NEW LONDON	I	163	62.68	57.62	77.86	67.86	87.14
96	NEW MILFORD	D	65	24.76	18.68	42.86	32.86	40.48
97	NEWTOWN	B	42	15.86	9.54	34.64	24.64	29.52
98	NORFOLK	E	33	12.38	5.96	31.43	21.43	25.24
99	NORTH BRANFORD	E	95	36.37	30.6	53.57	43.57	54.76
100	NORTH CANAAN	F	123	47.2	41.72	63.57	53.57	68.1
101	**NORTH HAVEN**	D	56	21.28	15.1	**39.64**	**29.64**	36.19
102	NORTH STONINGTON	E	62	23.6	17.48	41.79	31.79	39.05
103	NORWALK	H	36	20	7.15	32.50	22.50	80
104	NORWICH	H	158	65	55.63	76.07	66.07	84.76
106	OLD SAYBROOK	D	24	8.9	2.38	28.21	18.21	20.95
107	ORANGE	B	44	16.64	10.33	35.36	25.36	30.48
108	OXFORD	C	52	19.73	13.51	38.21	28.21	34.29
109	PLAINFIELD	G	157	60.36	55.23	75.71	65.71	84.29
110	PLAINVILLE	F	131	50.3	44.9	66.43	56.43	71.9

The following SDE table defines allowable square footage per pupil based on school grades within the building.

STATE SPACE STANDARDS

Space Standards - For grant purposes, a maximum allowable square footage per pupil is determined for a facility. This maximum is based upon the projected enrollment for the project, grades housed at the school, and the amount of square footage, if any, constructed prior to 1950.

See C.G.S. 10-287c-15(a)

State Standard Space Specifications													
Grades													
Projected Enrollment	Pre-K and K	1	2	3	4	5	6	7	8	9	10	11	12
Allowable Square Footage per Pupil													
0 - 350	124	124	124	124	124	156	156	180	180	180	194	194	194
351 - 750	120	120	120	120	120	152	152	176	176	176	190	190	190
751 - 1500	116	116	116	116	116	148	148	170	170	170	184	184	184
Over 1500	112	112	112	112	112	142	142	164	164	164	178	178	178

8 year peak students:	773	*Students*
Projected Middle School Net Area:	108,775	*Sq. Ft.*
Allowable Middle School Gross Area:	**125,741**	*Sq. Ft.*
Projected Middle School Gross Area, Option 1:	142,209	*Sq. Ft., Existing North Haven Middle School*
Projected Middle School Gross Area, Option 2:	154,537	*Sq. Ft., Gateway/Former Orchard Hill Site*
Projected Middle School Gross Area, Option 3:	146,846	*Sq. Ft., New School fronting Bailey Road*

Square Footage Analysis

Current enrollment projections (see chart, following page) indicate that the population at the Town of North Haven Middle School peaked in the 2004 school year at 972 students, and has been gradually declining; down to 784 students in 2012. 10 year projections for the new Middle School indicate a building design population of 773.

The SDE allowable square footage for a middle school is 162.66 SF per student. Therefore allowable square footage for the North Haven Middle School is:

773 Students X 162.66 SF/student = 125,741 Allowable Square Feet

Square footage in excess of 125,741 will be funded by the Town at the 100% construction cost. Both the existing Middle School and the Gateway/Orchard Hill facility provide enough square footage to accommodate the Educational Specifications.

This report has examined the condition of the existing North Haven Middle School to assess its suitability to renovate to an "as new" facility; the condition of the existing Gateway/Orchard Hill school facility and its potential for renovation; and the portion of the existing Middle School property fronting Bailey Road as a potential site for a new school.

Option 1: Renovate Existing School "As New"

The NEASC visiting committee noted, "the facilities are out of date and merely adequate for a 21st century middle school". Also noted are "visible signs of age and water damage". The degradation of the structure is contributing to moisture control problems and poor indoor air quality. The reduced ceiling height of the existing structure limits the integration of new mechanical systems. Renovating the school requires retention of the existing 810 square foot classrooms, which do not meet the 850 square foot classroom requirement of the Educational Specifications.

Renovation of the existing school will cost approximately 41.4 million.

Option 2: Renovate Gateway Campus "As New"

The Gateway campus and school facility are 8 years newer than the present Middle School, and built to a higher level of construction in respect to the building envelope and structural system. Having served as a middle school in the past, the capacity and layout of the building is conducive to a middle school program. The existing 755 square foot classrooms, which do not meet the 850 square foot classroom requirement of the Educational Specifications.

The site acquisition cost is expected to range between 5.0 -15.0 million dollars, with 4-7 years required for the State property conveyance process. These factors affect the ultimate determination of the schedule and budget.

Renovation of the existing school will approximately range between 43.9 and 53.9 million dollars depending upon site acquisition cost.

Option 3: New School Fronting Bailey Road

Constructing a new school along Bailey Road allows the Town to build a new, efficient facility designed to meet the needs of a 21st Century school program. The resulting facility will meet the needs of the Educational Specifications, meet energy conservation goals, and may utilize construction materials favorable to a healthy indoor environment. A test fit schematic design demonstrates that the available area at Bailey Road is adequate to contain the building program.

Moreover, the Town is in dire need of additional athletic fields to support one of its most attractive assets, the vibrant youth athletics programs. Removing the existing school and redeveloping the open space between the new middle school and existing high school as athletic fields will greatly improve this situation, and would be subject to state reimbursement if executed as part of the middle school project.

The cost to construct a new school is approximately 46.7 million dollars (51.5 million dollars with expanded athletic fields). This gap might be reduced by considering alternative construction delivery methods such as unitized construction. (See Appendix 13.1)

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Higher quality - Engineered, factory built, premium materials

Safer - 2008 IBC, zone 4 seismic, 110+ mph wind

faster

Purchase - Single, integrated point of purchase

Permit - 50 - 75% design docs complete, DSA pre check

Build - Permanent facilities built in less than 6 months

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Materials - High-recycled content, high LEED spec

Operations - 50 - 75% less energy consumption

Waste reduction - Near-zero on site construction waste

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Purchase - 25 - 40% less first cost with less risk

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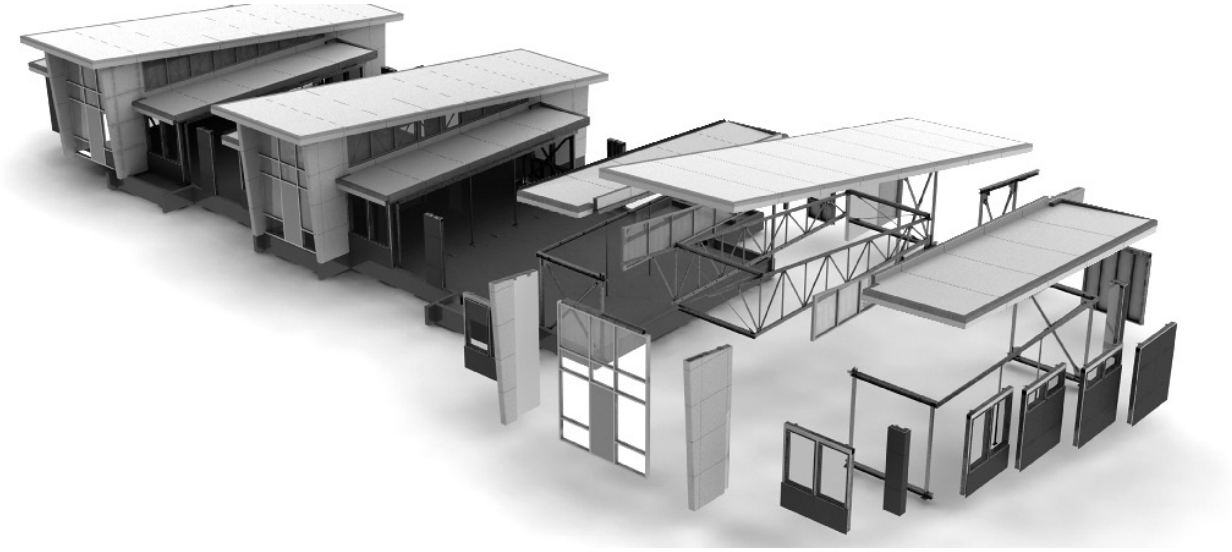

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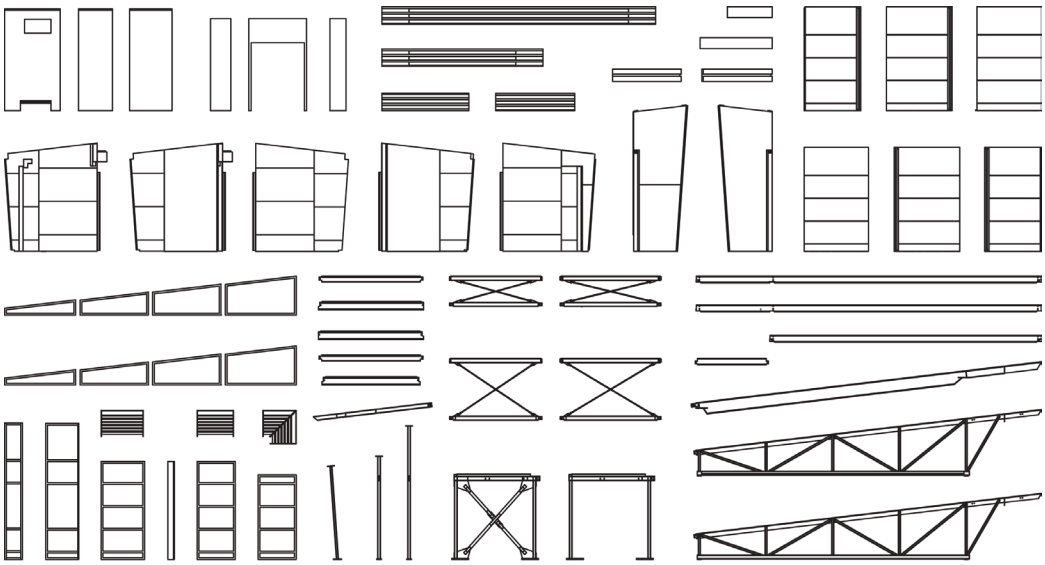

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learning environments

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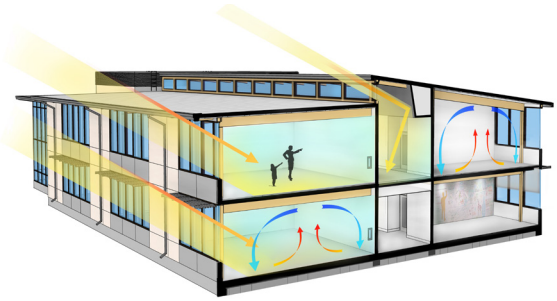
The result? Better, brighter academic buildings, built faster, greener, more affordably and durably than any acceptable alternative.

- 1- and 2-story building kit ideal for projects ranging from 7 - 60,000 sf for full campus solutions and classroom additions.
- 8 - 9 months from PO to Occupancy.
- Affordability achieved through Smart Customization & optimized supply chain.
- $190 - 235/sf all-in depending on site readiness, size, schedule and geography. Site work beyond building and FF&E not included.
- Multiple scales and building configurations available.
- LEED Silver certification at minimum. Easily adapted to Net Zero and passive energy requirements. CHPS compliant.



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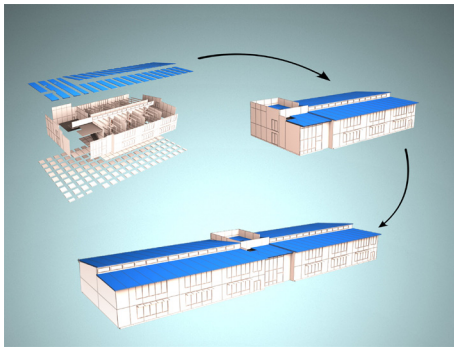

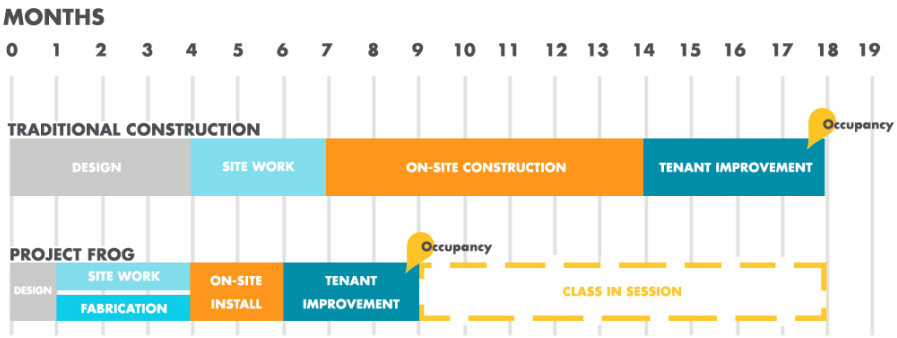

* Typical construction schedule (in months): Traditional Construction vs. Project Frog

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Speed

In Design: Pre-designed and pre-approved architectural plans reduce design time by 75%

During Construction: Vertical construction time of 2 months vs. 7-10 months for traditional construction

To Market: As little as 8 months from Purchase Order to Occupancy

Cost Reduction

Design: Pre-designed buildings reduce architectural and engineering costs by 50%

Construction: less expensive than a traditionally-constructed building of the same specs

Operations: 40-50% more energy efficiency than traditional construction, which translates into operational savings

Risk Mitigation

Resources: Proven designs mean a faster, more accurate bidding process and reduced material and labor pricing volatility

Schedule: Shorter construction duration means less exposure to weather and other sources of delay

Cost Certainty: Once a PO is executed, the majority of the building budget is locked in, protecting you from change orders

Better

Greener: LEED Silver-ready, Eco-impact payback in less than 10 years, Near-zero on site construction waste

Stronger: 2008 IBC, zone 4 seismic, 110+ mph wind

Healthier: No VOCs, high air quality, abundant daylight, CHPS compliant

Working with you. Schools, architects, developers, operators and representatives: if you have an immediate need and would like to reserve a development slot for Frog's 2012-13 Impact funnel, please contact Marijke Smit, Vice President, Strategic Partnerships at 415.814.8518, or smit@projectfrog.com.

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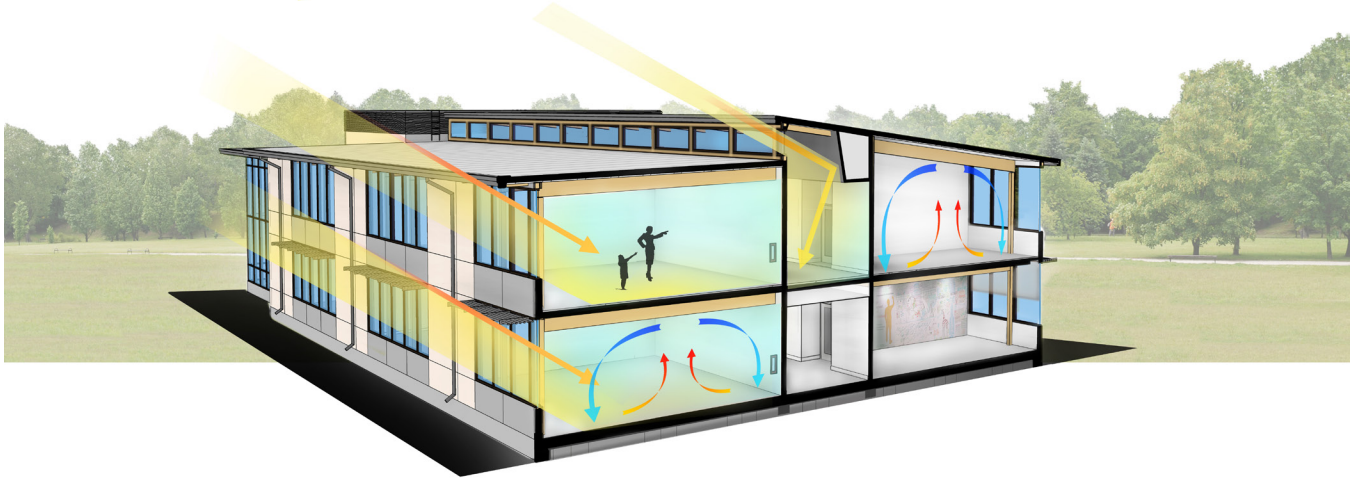
How it Works



Natural Daylighting + Ventilation

Improves learning rates by up to 26%

1. High windows and 11′4″ ceilings draw in natural light to maximize daylight autonomy
2. Exterior sunshades reduce glare, sun spotting and solar gain
3. Mechanized interior shades allow teachers to control daylighting for multimedia instruction
4. Central clerestory pulls light into center of building
5. Ductless Variant Refrigerant Flow system provides efficient and precise temperature control
6. High performance acoustics control sound transmission and prevent reverberation

Smart Technology

Predicts and tracks performance

1. Proprietary building dashboard system collects and displays critical energy use data for real-time teaching tool
2. Daylight and occupancy sensors regulate use of LED lights to optimize lighting levels and reduce energy use
3. Wireless controls of low-voltage lighting and shading

Energy Efficient

Uses 50% less energy than code requires

1. Low-E windows manage solar impacts by reflecting heat away from the building
2. Use of indirect light reduces requirements for artificial lighting
3. Integrated LED lighting and control systems
4. R-30 roof insulation; R-18 wall insulation
5. Cool roof reflects heat away from the building
6. PV-ready with standing seam roof mounting
7. Thermally broken wall panels and windows reduce heat transfer

Environmental Impact

Unparalleled environmental benefits

1. Exceeds green certification criteria
2. Overall environmental impact 1/10th of standard buildings
3. Generates 1/12th the greenhouse gas of traditional buildings
4. Produces 1/6th the on-site waste of traditional construction

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built for inspiration

El Sol Science + Arts Academy

The first phase of El Sol's campus development, to open in Fall 2013, will be a two-story, 12-classroom academic building and 3,000 square foot family Wellness Center serving students, families, and community members. HMC Architects is already at work refining the full campus master plan that will allow El Sol to grow to 900 students, while moving students out of the portable classrooms that predominate on the campus today. El Sol chose HMC's partner Project Frog, the award winning prefab green building company, to serve as the basis for building design and construction.

Optimizing human, economic + environmental performance

El Sol's new learning center will be optimized around the very qualities that support how teachers teach best and how students learn best – abundant natural light, superior indoor air quality, thermal comfort and day lighting autonomy. In fact, high performance buildings like Project Frog translate directly into 26% faster learning rates, up to 18% improved test scores, improved wellness, and a decrease in lost school days from asthma and other air quality-related illnesses.

Client: El Sol Science + Arts Academy
Project Developer: Pacific Charter School Development
Design Build Team: HMC Architects, Bernards, Project Frog, Inc.

222 vallejo street, suite 320, san francisco, california 94111 | projectfrog.com | 415.814.8500
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projectfrog®

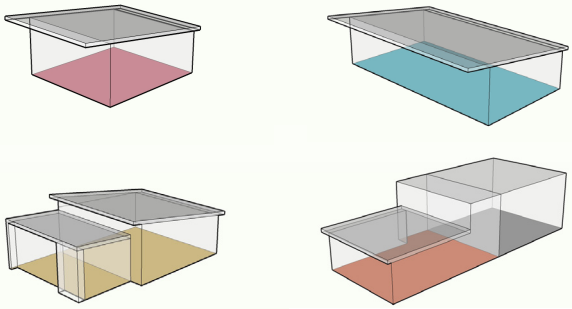
inspiring a district

South San Francisco Unified School District

San Francisco, California

The Board of Trustees of the South San Francisco Unified School District voted unanimously to select Project Frog and its build partner, USS Cal Builders, as the solution for the 100,000 square foot Modular Building Program of their $162M Measure J Bond. With Swinerton Consulting as the Program Manager, the Bond was passed by the voters in 2010 to renovate or replace school facilities over the next three years. The District was faced with the challenge of implementing a broad build program that would quickly and efficiently deliver quality spaces that fit the program needs and aesthetics unique to each school within the district. The solution needed to provide contemporary, safe and clean learning environments for the students, efficient work spaces for staff, administration and district operations, all while reflecting the district commitment to sustainability. Project Frog's beautiful, high performance component buildings could achieve all of these goals, and will provide each campus with mix of new classrooms, exploratoriums, and small library/media centers. As proof of their industry leading build schedule, Project Frog will have the first 5 campuses complete by August 2013.

Scale: 100,000 sf
Schedule: **Start:** Spring 2013 **End:** Summer 2013*
* first 5 campuses complete



example building configurations classroom, exploratorium, library, media center

frog fact

The Board of Trustees of SSFUSD was so pleased with the build team's proposal, that they have since awarded an additional 100,000 square feet to Project Frog's scope of work.

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11 February 2013

Perkins Eastman and Diversified Technology Consultants (DTC), have produced this document under an agreement between the Town of North Haven and DTC, as well as an agreement between DTC and Perkins Eastman. All conditions and terms of those agreements are inclusive in this document by inference. Perkins Eastman, Diversified Technology Consultants and the Town of North Haven disclaim any obligation to any other persons and/or private or public entity with respect to the material in this Feasibility Report who may utilize and/or rely on this information without advance written consent from DTC, Perkins Eastman, and/or the Town of North Haven and such person's written agreement is to be bound by all limitations, qualifications, terms, conditions, and indemnification to the parties listed above and set forth in each agreement, furthermore the above parties disclaim any obligations to any outside entity.

Perkins Eastman and Diversified Technology Consultants (DTC) assert that our review and this Report for the existing North Haven Middle School facility is subject to monetary, schedule, and scope constraints, with limitations, qualifications and conditions as authorized by the Town of North Haven. Given this, we have made reasonable and professional informed assumptions and opinions; based on industry best practices within the reasonable scope of investigation. The information presented in this document is bound by the above parameters. DTC and Perkins Eastman's actual knowledge of the subject matter after such inquiry is considered reasonable given the parameters listed above.

To the extent of the physical inspection and observation in this Report, it was conducted with limited visual inspection and observation of existing surface materials and construction of the building by the Architect/Engineering team. In addition, discussions with the First Selectman, Director of Finance, District Central Administration and Facility Director, the Middle School Principal, and the M.S. Educational Specification Consultant. In addition, limited hard copies of drawings of the building and systems were available for review. Assumptions regarding the overall condition of the building and property have been developed based on observation of representative areas of the facilities. As such, the development of conceptual designs and associated budget estimates for the correction of identified deficiencies is based on the overview observation and is limited by this Feasibility Report parameters.

13.2 Guidelines for Determining Eligibility of School Construction Projects

CONNECTICUT STATE DEPARTMENT OF EDUCATION
Division of Finance and Internal Operations
Bureau of School Facilities

SCHOOL CONSTRUCTION PROJECTS: GUIDELINES FOR
APPLYING FOR RENOVATION STATUS

PURPOSE:

Section 10-282 (18) of the Connecticut General Statutes (C.G.S.) defines "Renovation" as "a school building project to totally refurbish an existing building (A) which results in the renovated facility taking on a useful life comparable to that of a new facility and which will cost less than building a new facility as determined by the department, provided the school district may submit a feasibility study and cost analysis of the project prepared by an independent licensed architect to the department prior to final plan approval, (B) which was not renovated in accordance with this subdivision during the twenty-year period ending on the date of application, and (C) of which not less than seventy-five per cent of the facility to be renovated is at least thirty years old."

The purpose of this legislation is to support local decisions to renovate existing schools (or purchase and renovate existing buildings) whenever such options represent a cost effective alternative to constructing a new facility. The Department will use these guidelines to determine whether a project is eligible for designation as a "Renovation" project.

GUIDELINES FOR ELIGIBILITY:

In order to be considered a renovation as defined above, the following conditions must be met:

1. The applicant must make written application for such status.
2. (a) The applicant must have gone through a process of evaluating the proposed project compared to a new facility by providing feasibility study and cost analysis.

   (b) Professional estimates must be available to document that significant cost savings will result.
3. The entire facility must be brought into 100 percent compliance with all applicable codes (including handicapped accessibility) when the renovation project is complete. Partial renovations of an entire facility or complete renovations of a wing of a facility do not qualify.
4. The renovation must incorporate education technology capability throughout the facility, as recommended in the Guidelines for Technology Infrastructure in Connecticut Schools (or other current Technology Infrastructure standards).
5. It must be determined by a structural engineer that the structural integrity of the original building has not been compromised and is adequate to provide for continued occupancy for a period of time comparable to that of a new facility.
6. A detailed report on all existing building systems must be provided, including finishes, roofing, plumbing, water supply, fire protection, HVAC, electrical systems, energy monitoring, communications and security systems. Signed professional opinions must be provided that all systems will have a useful life of 20 years (or that comparable to a new system if less than 20 years) following the construction project completion.
7. All new and replacement windows must be energy efficient.
8. The site of the existing facility must be central to the area served and adequate to provide the educational programs offered.

SCHOOL CONSTRUCTION PROJECTS: GUIDELINES FOR
APPLYING FOR RENOVATION STATUS

GUIDELINES FOR ELIGIBILITY (continued):

9. Any other analysis deemed necessary by the Department to properly evaluate the request must be provided

DETERMINATION OF ELIGIBILITY:

Upon review of the materials submitted, the Division of Finance and Internal Operations will make recommendation to the Commissioner as to the project's eligibility for renovation status (allow 30 days).

The school district shall be notified in writing of the Commissioner's determination.

Note: Statements of compliance with requirement Nos. 3 through 7 must be signed and stamped by design professionals. Requirement No. 8 must be signed by Superintendent of Schools.

G:\SFUDOC\Plan Review Unit\Plan Review Process\Supplements to Guidelines\renovationguidelines.doc

Rev.11/05/09 (CS)

13.3 ASHRAE Life Expectancy Table

Equipment Item	Median Years
Air conditioners	
Window unit	10
Residential single or split package	15
Commercial through-the wall	15
Water-cooled package	15
Heat Pumps	
Residential air-to-air	15
Commercial air-to-air	
Commercial water-to-air	19
Roof-top air conditioners	
Single-zone	15
Multi-zone	15
Boilers, hot water (steam)	
Steel water-tube	24 (30)
Steel fire-tube	25 (25)
Cast iron	35 (30)
Electric	15
Burners	21
Furnaces	
Gas- or oil-fired	18
Unit heaters	
Gas or electric	13
Hot water or steam	20
Radiant Heaters	
Electric	10
Hot water or steam	25

Equipment Item	Median Years
Air terminals	
Diffusers, grilles, and registers	27
Induction and fan coil units	20
VAV and double-duct boxes	20
Air washers	17
Ductwork	30
Dampers	20
Fans	
Centrifugal	25
Axial	20
Propeller	15
Ventilating roof-mounted	20
Coils	
DX, water, or steam	20
Electric	15
Heat Exchangers	
Shell-and-tube	24
Reciprocating compressors	20
Packaged chillers	
Reciprocating	20
Centrifugal	23
Absorption	23
Cooling towers	
Galvanized metal	20
Wood	20
Ceramic	34

Equipment Item	Median Years
Air-cooled condensers	20
Evaporative condensers	20
Insulation	
Molded	20
Blanket	24
Pumps	
Base-mounted	20
Pipe-mounted	10
Sump and well	10
Condensate	15
Reciprocating engines	20
Steam turbines	30
Electric motors	18
Motor starters	17
Electric transformers	30
Controls	
Pneumatic	20
Electric	16
Electronic	15
Valve actuators	
Hydraulic	15
Pneumatic	20
Self-contained	10

Map/Lot :	045/ / 117/ /
Location:	55 BAILEY RD
Owner Name:	NORTH HAVEN TOWN OF
Account Number:	905150

Parcel Value

Item	Current Appraised Value	Current Assessed Value	FY 2009 Appraised Value	FY 2009 Assessed Value
Buildings	11,691,100	8,183,770	11,691,100	8,183,770
Xtra Bldg Features	0	0	0	0
Outbuildings	52,100	36,470	52,100	36,470
Land	2,098,100	1,468,670	2,098,100	1,468,670
Total:	**13,841,300**	**9,688,910**	**13,841,300**	**9,688,910**

Owner of Record

NORTH HAVEN TOWN OF
18 CHURCH ST
NORTH HAVEN, CT 06473

Ownership History

Owner Name	Book/Page	Sale Date	Sale Price
NORTH HAVEN TOWN OF	103/ 321	8/26/1948	0

Land Use

Land Use Code	Land Use Description
9033	MUN PUB SCHOOL M94

Land Line Valuation

Size	Zone	Appraised Value	Assessed Value
27.54 AC	R20	2,098,100	1,468,670

Construction Detail

Building # 1

STYLE School	**MODEL** Comm/Ind	**Stories:** 1
Occupancy 1	**Exterior Wall 1** Brick	**Roof Structure** Flat
Roof Cover T&G/Rubber	**Interior Wall 1** Drywall	**Interior Floor 1** Average
Heating Fuel Gas	**Heating Type** Forced Air-Duc	**AC Type** Central
Bldg Use MUN PUB SCHOOL M94	**Heat/AC** HEAT/AC PKGS	**Frame Type** REINF. CONCR
Baths/Plumbing AVERAGE	**Ceiling/Wall** CEIL & WALLS	**Rooms/Prtns** AVERAGE
Wall Height 12		

Building Valuation

Living Area: 147,418 square feet **Year Built**: 1960 **Building Value**: 11,691,100

Extra Features

Code	Description	Units	Appraised Value
No Extra Building Features			

Outbuildings

Code	Description	Units	Appraised Value
SHD1	SHED FRAME |	800 S.F.	4800

PAV1	PAVING-ASPHALT |	70000 S.F.	47300

Building Sketch

Subarea Summary

Code	Description	Gross Area	Living Area
BAS	First Floor	147418	147418

Map/Lot :	075/ / 043/ /
Location:	88 BASSETT RD
Owner Name:	CONNECTICUT STATE OF
Account Number:	900047

Parcel Value

Item	Current Appraised Value	Current Assessed Value	FY 2009 Appraised Value	FY 2009 Assessed Value
Buildings	10,927,600	7,649,320	10,927,600	7,649,320
Xtra Bldg Features	0	0	0	0
Outbuildings	302,200	211,540	302,200	211,540
Land	2,488,500	1,741,950	2,488,500	1,741,950
Total:	**13,718,300**	**9,602,810**	**13,718,300**	**9,602,810**

Owner of Record

CONNECTICUT STATE OF
DEPT OF ED
60 SARGENT DR
ATTN LISA
NEW HAVEN, CT 06511

Ownership History

Owner Name	Book/Page	Sale Date	Sale Price
CONNECTICUT STATE OF	349/ 597	1/23/1986	0

Land Use

Land Use Code	Land Use Description
9014	STATE EDUC M94

Land Line Valuation

Size	Zone	Appraised Value	Assessed Value
20.01 AC	R20	2,488,500	1,741,950

Construction Detail

Building # 1

STYLE College/Univ	**MODEL** Comm/Ind	**Stories:** 2
Occupancy 1	**Exterior Wall 1** Brick	**Roof Structure** Flat
Roof Cover Rolled Compos	**Interior Wall 1** Drywall	**Interior Floor 1** Average
Heating Fuel Gas	**Heating Type** HW/Steam	**AC Type** None
Bldg Use STATE EDUC M94	**Heat/AC** NONE	**Frame Type** REINF. CONCR
Baths/Plumbing AVERAGE	**Ceiling/Wall** CEIL & WALLS	**Rooms/Prtns** AVERAGE
Wall Height 10		

Building Valuation

Living Area: 137,759 square feet **Year Built**: 1968 **Building Value**: 10,814,800

Extra Features

Code	Description	Units	Appraised Value
No Extra Building Features			

Outbuildings

Code	Description	Units	Appraised Value

Code	Description	Units	Appraised Value
FCP	CARPORT |	1904 S.F.	14900
PAV1	PAVING-ASPHALT |	283000 S.F.	191000
TEN1	TENNIS COURT |	7200 S.F	7200
TEN1	TENNIS COURT |	7200 S.F	7200
TEN1	TENNIS COURT |	7200 S.F	7200
TEN1	TENNIS COURT |	7200 S.F	7200
FN3	FENCE-6' CHAIN |	15000 L.F.	67500

Building Sketch

Subarea Summary

Code	Description	Gross Area	Living Area
BAS	First Floor	76806	76806
CAN	Canopy	1904	0
FUS	Upper Story, Finished	60953	60953
UBM	Basement, Unfinished	31093	0

Construction Detail

Building # 2

STYLE Garage/Office
MODEL Comm/Ind
Stories: 2
Occupancy 1
Exterior Wall 1 Clapboard
Roof Structure Gable/Hip
Roof Cover Asphalt
Interior Wall 1 Drywall
Interior Floor 1 Average
Heating Fuel Electric
Heating Type Electr Basebrd
AC Type None
Bldg Use STATE EDUC M94
Heat/AC NONE
Frame Type WOOD FRAME

Building Valuation

Living Area: 1,824 square feet **Year Built**: 2000 **Building Value**: 112,800

Extra Features

Code	Description	Units	Appraised Value
No Extra Building Features			

Outbuildings

Code	Description	Units	Appraised Value
No Outbuildings			

Building Sketch

Subarea Summary

Code	Description	Gross Area	Living Area
BAS	First Floor	836	836
FUS	Upper Story, Finished	988	988

Powered by Vision Government Solutions, Inc.

Map/Lot :	075/ / 052/ /
Location:	86 BASSETT RD
Owner Name:	NORTH HAVEN TOWN OF
Account Number:	900034

Parcel Value

Item	Current Appraised Value	Current Assessed Value	FY 2009 Appraised Value	FY 2009 Assessed Value
Buildings	0	0	0	0
Xtra Bldg Features	0	0	0	0
Outbuildings	204,100	142,870	204,100	142,870
Land	189,700	132,790	189,700	132,790
Total:	**393,800**	**275,660**	**393,800**	**275,660**

Owner of Record

NORTH HAVEN TOWN OF
18 CHURCH ST
NORTH HAVEN, CT 06473

Ownership History

Owner Name	Book/Page	Sale Date	Sale Price
NORTH HAVEN TOWN OF	349/ 597	1/23/1986	0

Land Use

Land Use Code	Land Use Description
903V	MUNICIPAL MDL-00

Land Line Valuation

Size	Zone	Appraised Value	Assessed Value
8.93 AC	R20	189,700	132,790

Construction Detail

Building # 1

STYLE Vacant Land **MODEL** Vacant

Building Valuation

Living Area: 0 square feet **Year Built**: **Building Value**: 0

Extra Features

Code	Description	Units	Appraised Value
No Extra Building Features			

Outbuildings

Code	Description	Units	Appraised Value
FN1	FENCE-4' CHAIN |	12000 L.F.	36000
FN1	FENCE-4' CHAIN |	20000 L.F.	60000
LT5	MERC VAP/FLU |	13 UNITS	6500
TEN1	TENNIS COURT |	26400 S.F	26400
SHD7	COMM GOOD |	1824 S.F.	75200

Building Sketch

Fact Sheet for Schools: Caulk containing PCBs may be present in older schools and buildings

Between 1950 and 1978, caulk containing potentially harmful PCBs (polychlorinated biphenyls) was used in many buildings, including schools. Although PCBs were banned in the United States in 1978, contaminated caulk still exists in older establishments that have not had the caulk replaced. PCB bioaccumulation in children can damage immune, reproductive, nervous, and endocrine systems.

Children can be exposed to PCBs by:

- Breathing in dust contaminated with PCBs
- Touching caulk and contaminated soil directly
- Putting their hands into their mouths after touching the caulk, soil, and surrounding building materials.

PCBs were not added to caulk after 1978. Therefore, in general, schools built after 1978 do not contain PCBs in caulk.

What are PCBs?

PCBs are organic chemicals that were used in construction materials and electrical products produced before 1978. Caulk containing these chemicals may still be present in older schools and buildings, sometimes at high levels. With increased awareness and cleanup efforts, PCB levels in the United States have decreased substantially.

How are people exposed to PCBs?

People whose workplaces and jobs involve working with PCB-laden objects or in PCB cleanup are at the highest risk for elevated exposure. Most people have some accumulation of PCBs in their bodies. Fish, meat, and dairy contain small amounts of PCBs. In fact, most peoples' exposure to PCBs is via the food chain. When products containing PCBs are disposed of improperly, PCBs can enter waterways and contaminate fish and other animals. Indoor air has been found to contain PCBs from some types of caulk in building materials. People can also be exposed to PCBs when handling PCB-containing products such as caulk.

Does the caulk in my home or other places contain PCBs?

PCBs in caulk have not been found in single-family homes. EPA has only found the chemical in caulk in large, older apartment complexes and some older buildings, such as schools.

What can I do about PCBs in schools?

If caulk containing PCBs is discovered, you should avoid direct contact with caulk and nearby porous materials, if possible. If caulk-containing PCBs are discovered, be sure to limit exposure to the caulk until it has been safely removed. Here are some ways for decreasing exposure:

- Keep children from touching caulk or surfaces near caulk.
- Clean frequently to reduce dust.
- Use wet cloths to clean surfaces.
- Use vacuums with HEPA filters.
- Wash children's hands with soap and water before eating.
- Wash children's toys often.
- Wash surfaces, window sills, walls, and objects often in rooms known to have PCB-containing caulk.
- Consider testing the air for PCBs or test the caulk if it is peeling or visibly deteriorating.
- Follow safe work practices when renovating.
- Improve ventilation by opening windows or adding exhaust fans.

What NOT to Do:

- Do not attempt to remove PCB-containing caulk by yourself. PCBs should be removed by personnel wearing protective equipment who follow procedures to minimize the spread of PCBs.
- Do not sweep with dry brooms or use dusters because they spread dust.

Are children in direct danger if their school has caulk containing PCBs?

PCBs accumulate in the body in high levels only after prolonged exposure to the chemical. Follow the recommended procedures to reduce exposure. Restricting children from areas where PCB-containing caulk is located, promoting safe work practices during renovation activities in schools, and removing caulk safely as part of a PCB removal or renovation project reduces the potential for exposure.

EPA is helping to address the issue of PCBs in caulk

EPA is conducting research on how the public is exposed to PCBs in caulk and on the best approaches for reducing exposure and potential risks associated with PCBs in caulk. Where PCBs have been found in caulk, EPA is committed to helping schools and communities enact plans to reduce exposure. Please contact your regional PCB coordinator at 888-835-5372 for help with assessing contamination and exposure and developing cleanup plans.

Contact

Call EPA's PCBs in Caulk Hotline: 888-835-5372 to learn more about PCBs in caulk and to get information on PCB professionals in your area.

EPA-747-F-09-003

Fact Sheet for Schools: PCBs in Caulk School Checklist

✓ School Checklist

Was your school built or remodeled between 1950 and 1978?

Many older schools and older buildings built or remodeled before 1978 have been found to have caulk containing PCBs (polychlorinated biphenyls). These chemicals can have adverse effects on human health, so children and teachers need to be informed about potential risks.

Do you see walls or window sills in your school with cracking caulk?

As caulk ages, it cracks and flakes from the source. This leads to PCB-laden dust. Also, PCBs can, over time, be released from caulk into the air. Find out if your school has PCBs by calling a professional to test for PCBs in the air or, if caulk is peeling or visibly deteriorating, by having a professional test the caulk.

Have PCBs already been detected in your school's caulk?

If so, caulk with the highest levels of PCBs should be removed in the short term. Ultimately, the goal is to remove all PCB-contaminated caulk at levels greater than 50 parts per million.

Do children touch surfaces frequently or play in soil around their school?

Yes, young children can put their hands in their mouths after touching PCB-contaminated surfaces, which could seriously impact their health. Wash children's hands and toys often to reduce potential exposure.

Soil around schools and buildings may also contain PCB caulk dust or flakes. This would include playground soil and soil surrounding building foundations. Children can accidentally swallow the soil after handling it when outdoors, or the soil may be tracked indoors from shoes onto carpet and floors where children have a greater risk of ingesting it. Teach children to wipe and remove their shoes and to wash their hands after playing outside.

School Advisory: Talking Points for Teachers and Daycare Staff

Why should you be worried about PCBs in caulk?

High levels of PCBs in the body can cause adverse effects on the immune, reproductive, nervous, and endocrine systems. PCB exposure could result in cancer.

Can PCBs be found in and around my school?

PCBs are harmful chemicals sometimes found in schools and other buildings built or remodeled before 1978, and are found in and around building joints and other places, including:

- Cracking and flaking caulk
- Contaminated soil
- Masonry adjacent to windows
- Indoor air that has been exposed to PCBs
- Paint, electrical transformers, and light ballasts.

PCBs were not added to caulk after 1978. Therefore, in general, schools built after 1978 do not contain PCBs in caulk.

Are my children at risk for PCB exposure?

PCBs accumulate in the body in high levels only after prolonged exposure to the chemical. Follow the recommended procedures to reduce exposure. Restricting children from areas where PCB-containing caulk is located, promoting safe work practices during renovation activities in schools, and removing caulk safely as part of a PCB removal or renovation project reduces the potential for exposure.

How can you prevent PCB accumulation in the body?

- Keep children from touching caulk or surfaces near caulk
- Keep children away from soil that may contain PCBs
- Clean the floor, walls, and window sills regularly with wet cloths
- Wash children's hands and toys often.
- Improve ventilation by opening windows or adding exhaust fans.

Contact

Call EPA's PCBs in Caulk Hotline: 888-835-5372 to learn more about PCBs in caulk and to get information on PCB specialist professionals in your area.

EPA-747-F-09-003

Perkins Eastman

North Haven Middle School
Feasibility Report

Addendum 1
Option 4
Renovate +
New Addition

Submitted to:

North Haven Middle School
Building Committee
Gary Johns, Chairman

Michael J. Freda
First Selectman

Town of North Haven
18 Church Street
North Haven, CT

November 18, 2013

team dtc

DIVERSIFIED TECHNOLOGY CONSULTANTS
PERKINS EASTMAN ARCHITECTS

Table of Contents

1.0 Concept Design – Option 4

Renovate as New & Construct New Academic Addition

1.1 Design Narrative

1.2 Features of Option 4 Design Concept

1.3 Scope of Renovated vs. New Addition Spaces

1.4 Systems to be Replaced in Renovated Areas

2.0 Concept Design – Engineering Components – Option 4

2.1 Site/Civil Improvements

2.2 Structural Systems

2.3 Heating, Ventilating, & Air Conditioning Systems

2.4 Plumbing Systems

2.5 Fire Protection Systems

2.6 Electrical, Security Systems and Technology

3.0 Site Design

3.1 Schematic Building Program Plan

4.0 Estimating / Cost Report

4.1 Estimate of Proposed Renovation & Additions– North Haven Middle School Concept – Option 4

5.0 Scheduling

5.1 Option 1

5.2 Option 3

5.3 Option 4

1.0 Concept Design – Option 4

Renovate as New & Construct New Academic Addition

1.1 Design Narrative

Based on continuing discussions and evaluations of alternative options previously considered: Option: 1 Like-New Renovation to NHMS, and Option 3: Construction of All–New NHMS at Bailey Road, this option is considered a "hybrid" option, as it combines the best attributes of Option 1 and 3. In essence, the option calls for the construction of a new Academic Addition at the front of the existing middle school structure, demolishing the classroom wings located at the rear of the school, and renovating remaining assembly common spaces to "like-new" renovation status. Modifications and improvements to the existing common spaces and the design of the new additions will be defined by requirements outlined in the approved educational specifications. The existing parking displaced by the proposed addition at the front of the school will be relocated to an enhanced parking area on the east side of the existing building. All existing systems and finishes in the remaining renovated areas shall be replaced to meet the requirements of like-new renovation status in accordance with Connecticut General Statutes (CGS).

As stated in the Option 1 Concept'; renovate "like-new" projects attempt to optimize cost and eligible state reimbursement grants by taking advantage of an existing school's amenities and virtues while repairing or replacing components that because of age, code or educational needs are no longer usable in a modern school setting. The State of Connecticut encourages "like-new" renovations as an incentive to re-use existing schools by providing grant funding to repair or replace components of a school facility that otherwise would not be eligible under statutory limitations. Typically, a town's eligible rate for a renovation project is 10% higher than the eligible rate for an all new school structure. However, it must be recognized that by providing additional funding incentives, the State requires that the school be brought up to code, and that the resulting school facility will provide a life expectancy equivalent to that of a new structure. Consequently, comprehensive improvements, interior and exterior,

must be included within the scope of the project and are not subject to discretionary consideration.

The NHMS must remain operational during the renovation and construction of the new classroom addition proposed in Option 4. This will extend the duration of the construction process beyond that of an all-new school building project. However, Option 4 does provide for a substantial new addition that could potentially reduce the duration of the construction project relative to Option 1. Refer to the preliminary project schedule for a comparison between Options 1, 3 and 4.

1.2 Features of Option 4 Design Concept

While a full design has not yet been developed, this option proposes retaining the "common spaces" such as the small & large gyms, locker rooms, the cafeteria, auditorium, stage and music spaces and renovating them to "like-new" construction status. These improvements would include accessibility enhancements, new MEP and life safety systems, new technology connectivity and electronics, new security systems, new finishes, acoustics, etc. resulting in a substantial improvement to the existing construction and functionality of those spaces. Option 4 also includes constructing a new academic addition containing classrooms, science labs, and media center/library at the front of the existing school building. Furthermore, since the "front door" will be re-established in the new addition, administrative offices, nurse's suite and entry lobby would likely be part of the new academic addition. The new addition creates an opportunity for an all-new façade, providing the Town of North Haven with a seemingly new school, without having to construct all of the square footage.

One of the most significant advantages of this option is the elimination of having to find classroom swing space in order to renovate the classroom wings in Option 1. Finding appropriate space within the existing school to teach children in proper classroom settings is difficult and costly. Many districts lease or purchase "portable" classrooms to provide swing space, but these often prove to cost nearly as much as new construction, and consume site area that is

needed for construction staging and educational program use. Another consideration is the concern with hazardous material abatement; CGS prohibits remediation of hazardous material in an occupied school. This limits the periods available for remediation activities, thereby making the total construction duration longer.

Constructing a new classroom addition and then moving students into the new spaces allows the abatement and demolition processes to occur in a single, consolidated phase without the concern for students being in close proximity to the work. Often, districts demolish and dispose of old schools en mass by treating the entire structure as a regulated material. It is slightly more costly, but the time saved in demolition may offset the added disposal costs. Further investigation into the extent and nature of the hazardous materials is necessary to more closely define this issue and weigh the potential advantages of this approach.

Once the additions are completed, the existing academic classrooms are demolished and the site once occupied by single story classrooms is restored to athletic fields. These fields would be located directly behind the NHHS facility, and could be used by both the HS and the MS as well as for community use sports.

The distinct advantage of this option is that it preserves large occupancy spaces such as the gyms and the auditorium, that are more readily renovated to "like new" status. It also eliminates existing spaces that are too small for Middle School use, low in ceiling height and costly to renovate; and provides a higher eligible renovation rate than that of an all-new building project.

Additionally, this option provides the Town with an opportunity to re-define some significant portions of the school façade for both energy efficiency and school identity. Option 4 also provides new learning and teaching spaces prepared for the 21st Century. The Town would appear to have received a completely new school without the added expenditure of replacing every square foot. Moreover, the new academic addition would be designed for today's teaching methods and would be arranged to encourage team teaching and

learning, as well as robust technology and communication systems. As a school that serves three grades, the academic block could be arranged in clusters or organized by floors, providing administrators with a variety of school organizations specifically designed for the Town of North Haven.

Connections to the common spaces could be facilitated at the ground floor with a gallery or east west circulation "spine" linking these large spaces along an interior "street". This space could be used as a breakout area for the gyms, cafeteria, or auditorium occupants during simultaneous community events. The space could be viewed as a community hall serving both the students and community as needed. Another option could include a court / commons space that is more compact and less linear. This too could be used for breakout functions and as a community hall when required. Many other design options are available with this arrangement. It is important to note that middle school children are in physical and emotional transition as they move through the 6th, 7th and 8th grades. A school that provides a sense of place and inclusion in a large community can help students make that transition more smoothly. This design concept can provide that sense of belonging.

Constructing a new academic wing at the front of the school will displace a number of existing parking areas. One solution to this will be replicating lost spaces at the eastern side of the school, between the stadium fence line and the eastern edge of the existing school that is being renovated. This side of the property could also provide service access to maintenance areas and the loading dock. An efficient arrangement of parking and drives would be developed for the remaining area. These spaces would be in close proximity and available for athletic event parking as required. By building a two or three story academic classroom addition, the new building footprint would be substantially smaller than the current classroom wings. This strategy preserves more land area for parking, athletic fields and outdoor student educational spaces.

A new bus loop and drop-off area will be created at the front of the new addition, or at the rear of the existing renovated building. The parent drop-off

and pick up areas could occupy the opposite side of the bus loop area and would be completely separate and distinct from the bus traffic. This rear drive could also provide service access for the cafeteria and auditorium spaces, as well as a drive for security and first responder access.

Another possibility for the middle school bus loop may include using the existing high school loop. Since the new academic wing would be constructed in closer proximity to the loop than as currently exists, the high school loop would be more convenient for a shared use function. This is only possible if the arrival and dismissal periods of the two schools is staggered and does not conflict with one another. A perimeter sidewalk along the loop provides easy access to the Middle School along the new western façade of the academic addition. An entry area canopy can be designed to bring children from the MS to the bus loop under cover. Middle School students reporting to home rooms are correctly located on site for easy access to classroom homerooms. Teachers and administrators from the new academic classrooms can also monitor the arrival and departure of buses.

Most importantly, re-using the HS loop for the MS buses conserves site area and funds that can be utilized elsewhere on the school campus.

Lastly, Option 4 provides a large area of property available for the creation of new athletic fields. The precise number and types of fields is yet to be determined, and will be subject to BOE and community requirements. It should be noted that the approximate available land area closely approximates the area occupied by the existing high school stadium, bleachers and adjacent practice field. This provides a wide range of field design options for re-use of this property.

Final field requirements and layout needs to be evaluated and discussed by the BOE and/or the Building Committee with associated direction provided to the A&E team for feasibility analysis and layout.

1.3 Scope of Renovated vs. New Addition Spaces

Spaces to be renovated to like-new condition

- Small Gymnasium
- Large Gymnasium
- Boys and Girls Locker Rooms
- Cafeteria & Food Service
- Auditorium & Stage Platform
- Music Spaces

Spaces to be constructed in new Academic Wing

- New Entry Canopy / Covered Walk-way
- Media Center / Library
- 6th, 7th and 8th Grade Classrooms
- Science Classrooms
- Commons Rooms
- World Language Classrooms
- Computer Classrooms / Labs
- Visual Art Rooms
- Health Classroom
- Nurse's Suite / Health Offices
- Administration and Guidance Suites
- Special Education Classrooms
- Support Spaces / Storage Areas
- Entry Lobby / Arrival Commons

1.4 Systems to be Replaced in the renovated areas

- Roof membrane with TPO, all rigid and tapered insulation to meet minimum slope standards, overflow drains, perimeter nailers and drip edge. All roofs to be positively sloped to drain.
- Fenestration and existing exterior doors throughout, replaced with insulating glazed, thermally broken metal frames, with high performance SHGC and U-value
- The facility will be designed with digital climate control throughout new and renovated spaces, utilizing diversity loading considerations, air conditioning and fresh air cooling permitting year round school facility

use. The school will be designed to meet CT High Performance Building equivalent to LEED Silver. The system will be designed for comfort, adequate fresh air, efficiency and quiet operation.

- An emergency generator will be installed to meet the minimum requirements of a new school facility. Typically the generator will provide power to vital school systems such as the heating and distribution piping system, domestic hot water and pumps, food refrigeration and cooking appliances, communication and security, and low level lighting for the cafeteria, gymnasium and public circulation areas. The school will not be designed as a FEMA shelter, although the school could be used for temporary community refuge in case of prolonged power outages. The school building could provide a safe place for a meal, showers and a warm place to sleep until power is restored in the community.
- All electrical power systems, data network and devices will be replaced to meet current code and educational requirements.
- All existing casework, lockers, fixtures will be replaced in the renovated areas.
- Auditorium seating, acoustical treatments, finishes, lighting, stage equipment, etc. will be replaced.
- The cafeteria spaces will be redesigned as a single dining area and food service equipment replaced to meet district requirements.
- New signage
- New lighting

2.0 Concept Design – Engineering Components – Option 4

2.1 Site / Civil Improvements

For Option 4, Renovate + New Addition, the Middle School campus will be renovated and improved in the following key areas:

- New Athletic Field at former classroom wings. New hardscape and landscaping to be installed that will require minimum maintenance.
- New site walks and building plantings
- The existing parking lot and roadways impacted by the new addition will be reconfigured, milled and overlaid with a new surface course. New curbing throughout.
- New tree island plantings to improve shading effects of the parking lot and to improve overall appearance.
- Resurfaced track
- General repairs to Grandstand

2.2 Structural Systems

Structural Systems – Existing Structure to Remain

The existing structure and perimeter enclosure of the core facilities to remain, with minimal modifications.

- The existing classroom wings are to be demolished. The resulting openings are to be structurally reinforced and infilled with a new wall system.
- The existing 1-story steel building structure to remain will be evaluated for lateral loads and additional mass from roof mounted equipment if required.
- Areas of the existing building that are affected by the new addition will be accommodated with new structural components to allow modification of the existing structure.

Structural Systems– New Academic Addition

The structural system of the new academic addition shall consist of:

- Concrete foundation, slab on grade. Design of foundation subject to geotechnical investigation
- Structural steel framing: columns, beams and joists.
- Conventional moment frames for seismic and wind load resistance
- Metal roof deck

2.3 Heating, Ventilating, & Air Conditioning Systems

Heating

Heating shall be provided by a hot water system. Four high efficiency condensing boilers shall be located inside the main boiler room, each sized for 25% of total school heating load of approximately 4.0 million btuh. Hot water distribution piping, valves, pumps and controls will be provided to terminal units throughout the building.

Hot water will be circulated via variable speed pumps also located inside the boiler room. Pump selections will be based on 100% redundancy, with one standby pump. Constant flow primary and variable flow secondary base mounted pumps will circulate the hot water through the heating boilers and out to the terminal units. Fuel source for heating shall be natural gas served by Southern Connecticut Gas Company. Glycol will be utilized for freeze protection in the lower temperature loop to the air handling units.

Hot water design temperatures:

190 Degree F hot water supply

170 Degree F hot water return

20 degree temperature difference

Cooling System

The facility will be fully air conditioned. The chilled water plant will consist of one electric centrifugal air or water cooled chiller located in a new mechanical room with heat rejection via either by a counter flow cooling tower or air cooled condenser located on the ground or roof of the building. Each chiller will be a centrifugal type chiller utilizing variable speed, magnetic bearing technology for maximum energy efficiency. Dual temperature chilled water will be utilized to supply water to both Air Handling units (44 Degree F.) and chilled beams (60 Degree F). The secondary chilled water to the chilled beams will be provided via a plate frame type heat exchanger. Glycol will be utilized for freeze protection in the lower temperature loop to the air handling units.

The chilled water distribution system will incorporate a primary/secondary pump system with variable speed drives on the secondary pumps. Chilled water system control valves will be modulating, two-way type.

The condenser water system will include chemical treatment and a side stream filtration. The cooling towers will be provided with variable speed fan control.

Cooling plant:

350 ton chiller

primary chilled water pumps: 2 at 700 gpm ea.

Secondary chilled water pumps: 4 at 350 gpm ea.

44 and 60 degree F supply water temperature

Air Distribution

Air handling units located on the roof and within the building mechanical rooms shall provide conditioned and ventilation air to all spaces. All units are provided with 100% outside air economizer, two sets of filters, one at 30% and one at 80% filtration and a carbon dioxide detection system. All motors shall be premium efficiency.

Air distribution system shall vary in different areas to meet space requirements but be subject to sound criteria requirements for classrooms and Libraries. Outside air ventilation rates will be based on ASHRAE 62.1 2004 for all spaces.

Air handling units that have high outside air requirements will also utilize total energy heat recovery devices.

Ductwork Distribution:

- In accordance with SMACNA standards
- Meet ANSI and State requirements for sound. Ducts sized for low velocity in learning spaces. Use of sound attenuators and acoustically line first 20 feet of inlet and outlet ductwork of all air handling units and exhaust fans
- Spiral round for exposed ductwork
- Externally insulated or lined to meet State Energy Code.
- Duct sizing maximum 1250 fpm primary ducts, and 600 fpm within 30 feet of outlets.

Main Classrooms and Administration Areas

Air systems serving Administration areas will be constant or variable volume with single duct terminal and air hot water reheat coils. The air handling units will be double-wall, modular construction, total energy heat recovery wheel, draw-through type with integral mixing box, filters, heating and cooling coils, and supply and return fans. Supply and return fans will utilize variable speed drives. Air flow measuring stations will be located on the supply fan, return damper at mixing box, and outside air duct. Primary Air (100% OA) units serving the chilled beams within the Classrooms will incorporate a heat recovery, dehumidification cycle to ensure proper humidity levels within the space and chilled beam operation. Chilled beams are designed to operate in a non-condensing mode with all of the humidity control being provided via the dedicated primary air unit that also provides the ventilation for the space.

Trunk ductwork from the air handling units will be rectangular or round duct. Terminal boxes will be single duct pressure independent, variable volume shutoff type with DDC controllers and integral hot water reheat coils. Ductwork on the inlet of the terminal boxes will be prefabricated, medium pressure, round spiral seam duct. Supply ductwork downstream of the terminal boxes and return ductwork will be low pressure duct with internal lining. CO2 Sensors located in classroom will minimize outside flow CFM according to actual occupancy.

Terminal units within the classrooms will consist of ceiling or console type wall

mounted active chilled beams with 4 pipe hot and chilled water distribution and ventilation air connections.

Perimeter heating will be provided either by the chilled beams or supplemented by hot water radiation or radiant ceiling panels.

For units serving administration areas, back-up DX coils and related condensing units will be provided for operation during times when the rest of the school is unoccupied and it is not economical to run the main chilled water plant.

Open Multi-Use Spaces

Air system shall be single zone type with variable volume control. The air handling unit will be double-wall, modular construction, draw-through type with integral mixing box, filters, heating and cooling coils, reheat coils, and supply fan. Supply and return fans will utilize variable speed drives. Air flow measuring stations will be located on the supply fan, return air damper at mixing box, and outside air duct. CO2 sensor located in return duct will minimize outside air CFM according to actual zone occupancy.

All distribution ductwork from the air handling units will be prefabricated, low pressure, insulated, double-wall round or flat oval spiral seam duct where exposed and rectangular where concealed above ceilings.

In unoccupied mode systems will decrease air capacity up to 30% to minimize energy usage.

Gymnasium

Air systems will be single zone type with variable volume control. The air handling units will be double-wall, modular construction, draw-through type with integral mixing box, filters, heating and cooling coils, and supply fan. Supply and return fans will utilize variable speed drives. Air flow measuring stations will be located on the supply fan, return air damper at mixing box, and outside air duct. CO2 sensor located in return duct will minimize outside air CFM according to actual zone occupancy.

Supply ductwork will be low pressure, prefabricated round spiral seam double wall insulated duct. Return ductwork will be low pressure rectangular duct.

Locker Rooms

Locker Room areas will be provided with new single zone air system that will provide constant volume 100% outside air. The air handling unit will be double-wall, modular construction and plate type heat recovery section, draw-through type with integral mixing box, filters, heating and cooling coils, and supply and exhaust fans. Ductwork will be low pressure rectangular duct of aluminum construction. Controls will allow for the amount of ventilation air to be reduced during long unoccupied periods but still allow for use of the unit for heating.

Mechanical/Electrical Spaces

The boiler/chiller plant mechanical spaces will have a heating and ventilating unit (H&V) to meet heating and combustion air requirements. The H&V unit will have integral filters, heating coil, and supply fan. A sidewall propeller fan will provide additional summer ventilation.

General Exhaust

Toilet rooms, locker rooms, janitor closets, and other miscellaneous spaces will be exhausted through exhaust fans located on the roof. Ductwork will be low pressure rectangular duct. Locker room exhaust ductwork shall be of aluminum construction. Heat recovery will be used wherever possible to capture the heat from the exhaust that would otherwise be discharged from the building.

Special Exhaust

Science room exhaust hoods and other localized special exhaust will have dedicated variable volume fan control. Fiberglass VFD drive exhaust fans will be located on the roof. Ductwork shall be fully welded, stainless steel construction or as required for the specific material being exhausted. Kiln rooms, work rooms, art rooms, kitchen hoods and shop areas will all be provided with dedicated contaminant removal exhaust systems.

Miscellaneous Cooling Systems

Split system DX for all spaces such as telephone/data rooms, computer rooms, elevator machine rooms that require cooling year round.

Materials and Methods

Ductwork: galvanized sheet metal G90. Aluminum for showers, 316 stainless steel for hoods.

Piping: Schedule 40 black steel, or Type "L" copper with 95/5 solder fittings (2 ½" and smaller threaded). Schedule 40 black steel with welded or mechanical couplings (3" and larger) with fiberglass insulation and ASJ vapor barrier jacket.

Valves: Ball or High performance butterfly type rated for system. Balance valves to be pressure balanced type.

2.4 Plumbing Systems

General

All plumbing systems shall be designed in accordance with the International Plumbing Code, the Americans with Disabilities Act, State of Connecticut Water Conservation Standards, and with the Educational Specifications for the new school.

Fixtures

All plumbing fixtures shall be of institutional quality. Handicapped – accessible fixtures shall be ADA compliant. Flush valves and faucets shall be of the water conservation type. Faucets on ADA compliant lavatories and sinks shall be electronic.

Floor drains shall be provided in toilet rooms, locker rooms, science labs, and in mechanical rooms. Floor drains shall be provided with trap primers, if warranted.

Piping shall be provided for a full service kitchen for commercial cooking, with the coordination of the food service consultant.

Domestic Water System

Cold water shall be piped to each plumbing fixture and to each piece of plumbed kitchen equipment. Cold water shall be extended to non-freeze wall hydrants located approximately 200-feet on center along the perimeter wall.

Hot water shall be provided at 140 F degrees from indirect water heaters located in the boiler room. Hot water shall be distributed at 140 degrees F to janitor mop sinks, kitchen pot sinks and dishwater. A local electric booster heater shall boost the 140 degrees F water to 180 degrees F for the dishwater rinse cycle. A thermostatic mixing valve shall provide tempered water and be distributed throughout the remainder of the school at 115 degrees F. The entire domestic hot water system shall be equipped with a pumped recirculation line.

Sanitary, Waste and Vent System

Sanitary, waste and vent piping shall be extended to each plumbing fixture and to each piece of plumbed kitchen equipment.

A central acid waste neutralization tank with monitoring shall be provided for all science and prep room sinks, if required.

An external underground 3,000-gallon grease separator shall be provided on site for kitchen waste.

Clay traps shall be provided for all art room sinks.

Storm System

Roof drains shall be provided for each roof low point. Overflow roof drains or scuppers shall be provided for emergency and discharge to exterior.

Gas Distribution System

Natural gas shall be provided to the building with both firm and interruptive services. The firm service shall supply the boiler for indirect water heaters, commercial kitchen, and science labs with emergency shut-off system.

The hot water heating boilers shall be connected to the interruptible service; a contract agreement between Owner and supplier to be determined.

Materials and Methods

Storm, sanitary, waste and vent piping above grade shall be hubless cast iron with no-hub couplings; branch waste and vent piping above grade shall be Type "DWV" copper with soldered fittings or no-hub cast iron. Water pipe above grade shall be Type "L" copper with wrought copper sweat fittings using 95/5 solder.

Sanitary, storm, waste and vent piping below grade shall be service-weight cast iron bell and spigot, with push-on, neoprene-gasketed joints.

Gas piping under two (2") inch diameter shall be Schedule 40 black steel with malleable threaded fittings or copper, gas piping two (2") inch diameter and over shall be Schedule 40 black steel with welded fittings.

Condensate piping shall be Type "M" copper with 95/5 soldered joints.

Domestic hot, cold, hot water recirculating, condensate and all horizontal storm piping and roof drain bowls shall be insulated with fiberglass insulation and preformed insulated fittings and vapor barrier.

Acid waste and vent piping shall be polypropylene.

Seismic bracing will be provided per the State of Connecticut Building Code.

2.5 Fire Protection System

General

Fire protection system will include a hydraulically balanced system throughout the school with standpipe system such that every part of building can be reached with a 100-foot hose projecting a 30-foot stream. Fire main service shall be located within the utility room of the ground floor and be connected to a fire pump. Fire protection system will be designed and installed in accordance with the State of Connecticut Building Code, the State of Connecticut Fire Safety Code, NFPA 13, NFPA 14, NFPA 20, and the Town of North Haven Fire Marshal.

Standpipes

Standpipes will be provided for the stage area and stair towers.

Sprinklers

The School will be fully sprinklered with a wet pipe system. Limited area subject to freezing will be protected with dry sidewall heads and/or dry alarm valves.

Materials and Methods

Piping will be Schedule 40 black steel pipe with cast iron threaded or grooved fittings and joints.

Sprinkler heads in finished ceiling areas will be concealed type with white cover plates.

Sprinkler heads in unfinished ceiling areas will be upright type.

Piping is to run concealed in all finished areas where possible and so arranged that all portions could be drained.

The Contractor will provide complete drawings and calculations as required by NFPA 13. All drawings will be computer generated. A Professional Engineer will seal drawings and calculations.

Seismic bracing will be provided per the State of Connecticut Building Code.

2.6 Electrical System, Security and Technology

Electrical service

A new electric service shall be served by a new pad mounted transformer located on site (location to be determined).

- Two concrete encased 4″ PVC conduits will be provided from the existing utility line to the pad mounted transformer.
- The electrical service to the building will be routed from the pad mounted transformer to the main electrical room located on the ground level.

Telecommunication Service

- Three 4″ PVC conduits will be provided to the main telecomm service

entrance room in the building. These conduits may follow the same routing (and use the same trench) as the primary electrical conduits for cost savings.

Site Lighting

Site lighting around the building will be a combination of bollards, pole mounted fixtures and building mounted fixtures. The exterior lighting will be designed to comply with the 2009 IECC and LEED SS Credit 8, Light Pollution Reduction.

- Bollard lights or pedestrian scale pole mounted lights will be provided along walkways around the building. These fixtures will be LED with dark sky friendly, full cutoff distributions. The walkways will be lit to an average of 2 footcandles.
- 25′-0″ Pole mounted fixtures will be provided in the parking lot area. These fixtures will be LED with dark sky friendly, full cutoff distributions. The parking lot will be lit to an average of 2 footcandles.
- Building mounted light fixtures will be provided at egress doors. These fixtures will be LED with dark sky friendly, full cutoff distributions, two lamps and two ballasts per code. These fixtures will be fed from the generator and will be provided with emergency relays.
- Controls for the site lighting will consist of a photocell mounted to the building and a lighting control panel in the main electrical room containing an astronomic time clock.

The use of motion sensors on the site lighting fixtures will be investigated to further reduce energy consumption of the facility.

General

The electrical systems for the buildings will be designed in accordance with:

- NFPA 70, 2011 National Electrical Code with Connecticut Amendments
- NFPA 101 Life Safety Code
- International Building Code
- 2009 International Energy Conservation Code with MA supplements
- NFPA 72 – National Fire Alarm Code
- Connecticut State Fire Safety Code

The design will incorporate LEED green building design measures to enhance the energy efficiency of the building.

Power Distribution

- The pad mounted transformer will feed a main switchboard in the main electrical room on the ground level.
- Electrical Distribution Equipment

- A new 1200A, 208Y/120V, 3 phase, 4 wire main switchboard (sized for 25% future growth) consisting of: a 1200A molded case circuit breaker; 65kAIC bracing; TVSS protection; digital demand/pulse output meter; copper bussing; distribution section and metering section. Distribution over current devices will be circuit breaker type. See attached room layout.
- One 100 Amp life safety transfer switch and one 1200 amp standby power transfer switch will be provided for generator backup of the entire facility.
- One 42-pole, 100 Amp MCB life safety power panelboard will be provided for serving of life safety loads, including egress lighting and fire alarm control panel.
- One 42-pole, 1200 Amp MCB standby power panel will be provided to serve the remainder of the building. This panel will serve large equipment loads and three sub-panels for branch circuits throughout the building.
- Three 42-pole, 225 Amp MLO standby power panelboards will be provided to serve all remaining non-life-safety loads throughout the building.
- A new building grounding system will be provided, consisting of: ground rods; ground cables; ground bars and connectors. A new copper bus within the main switchgear will be utilized as the single point of connection for these system grounds and will be connected to the main building grounding triad, cold water pipes, building steel, telecommunications main grounding busbar and any additional code required items.
- Mechanical equipment rated below ½ HP will be supplied by 120V single-phase power. Mechanical equipment rated ½ HP and above will be supplied with 208V three-phase power.
- All lighting will be 120V, and will be powered from panelboards in their respective areas. All convenience power in the buildings will be 120V, and will be powered from panelboards in their respective areas. Local panelboards will be GE A-series panelboards or equal.
- The distribution of power in the building will be concealed wherever possible.
- MC type cable will be used for branch circuits where concealed above ceilings or behind walls.
- EMT conduit and wire will be used where exposed in unfinished spaces such as electrical rooms.
- Rigid galvanized steel conduit and wire will be used where exposed to physical damage or wetness such as mechanical rooms.
- No conduits or cable will be exposed in finished areas. Columns, walls, and ceiling plenums will be used for power distribution where possible. Where necessary to expose raceway in finished spaces,

Wiremold V700 series or equal will be utilized.

- All wiring will be designed with less than a 2% voltage drop for all feeders and less than a 3% voltage drop for all branch circuits.
- Duplex receptacles rated at 20 amperes, 125 volts, grounding type with polarized parallel slots will be provided throughout the building and Ground Fault Interrupters will be provided where appropriate. No more than 8 duplex receptacles will be connected to a single 20 amp branch circuit.
- The building standard will be white devices and cover plates. In abusive locations ivory devices with stainless steel cover plates.
- Floor boxes and poke-throughs will be provided for tables and desks not adjacent to walls or columns. See attached marked up plans for preliminary quantities and locations.
- Call for aid systems will be provided in all single occupancy toilet rooms.

- Power connections will be provided for all owner furnished equipment including printers, copiers, faxes, projectors, screens, powered doors, Power system calculations shall be specified to be performed by the installing contractor, including:
  - Short Circuit Study
  - Protective Device Coordination Study
  - Arc Flash Hazard Analysis

Emergency Power

- A new pad mounted generator will be provided, sized to service the entire facility. The life safety and standby power loads will be separated per code.
- Generator will be provided with a weatherproof, sound attenuating enclosure, battery charger, battery heater, block heater and other accessories.
- A 500kW pad mounted diesel generator with 48 hour sub-base fuel tank will be provided.
- Relays will be provided to power code required egress lighting and exit signage from the generator life safety distribution system.

Lighting System

- Interior lighting for the building shall be predominantly of the fluorescent type equipped with long-life, low-mercury, T-8 or T-5 lamps, electronic dimming ballasts and appropriate lenses.
- LED lighting for general areas such as offices, classrooms and corridors will be investigated for life cycle cost effectiveness.
- Occupancy sensors or timer switches will be provided in all spaces. Ultrasonic, infrared and dual technology sensors will be utilized in various spaces. Basis of design sensors include Wattstopper DT-300,

DT-200, UT-300 and WT-2250.

- In offices and like spaces, when an individual enters the room, the lights will turn on to 50% output (fixtures will have step-dim ballasts). The individual may force the lights to 100% output by use of a wall mounted button.
- Multiple ballasts will be utilized where appropriate to allow for multiple lighting level control for optimal user comfort.
- Daylighting controls will be utilized where ample daylight is available, mainly in classrooms. Control systems for daylight harvesting will be Wattstopper DLM or equal.
- Various specialty lighting products will be used throughout select areas of the building to accent architectural features.
- The interior lighting will be designed with illuminance (fc) foot-candle levels per the IESNA guidelines.
- Exit lights will be edge-lit LED type with red lettering. The exit signs will be powered by the generator life safety system.

International symbol of accessibility signate and low level exit signage will be provided per CT supplements to the IBC.

- An egress path marking system will be provided throughout the corridors per CT supplements to the IBC. This system will be connected to 120V power.

Lightning Protection

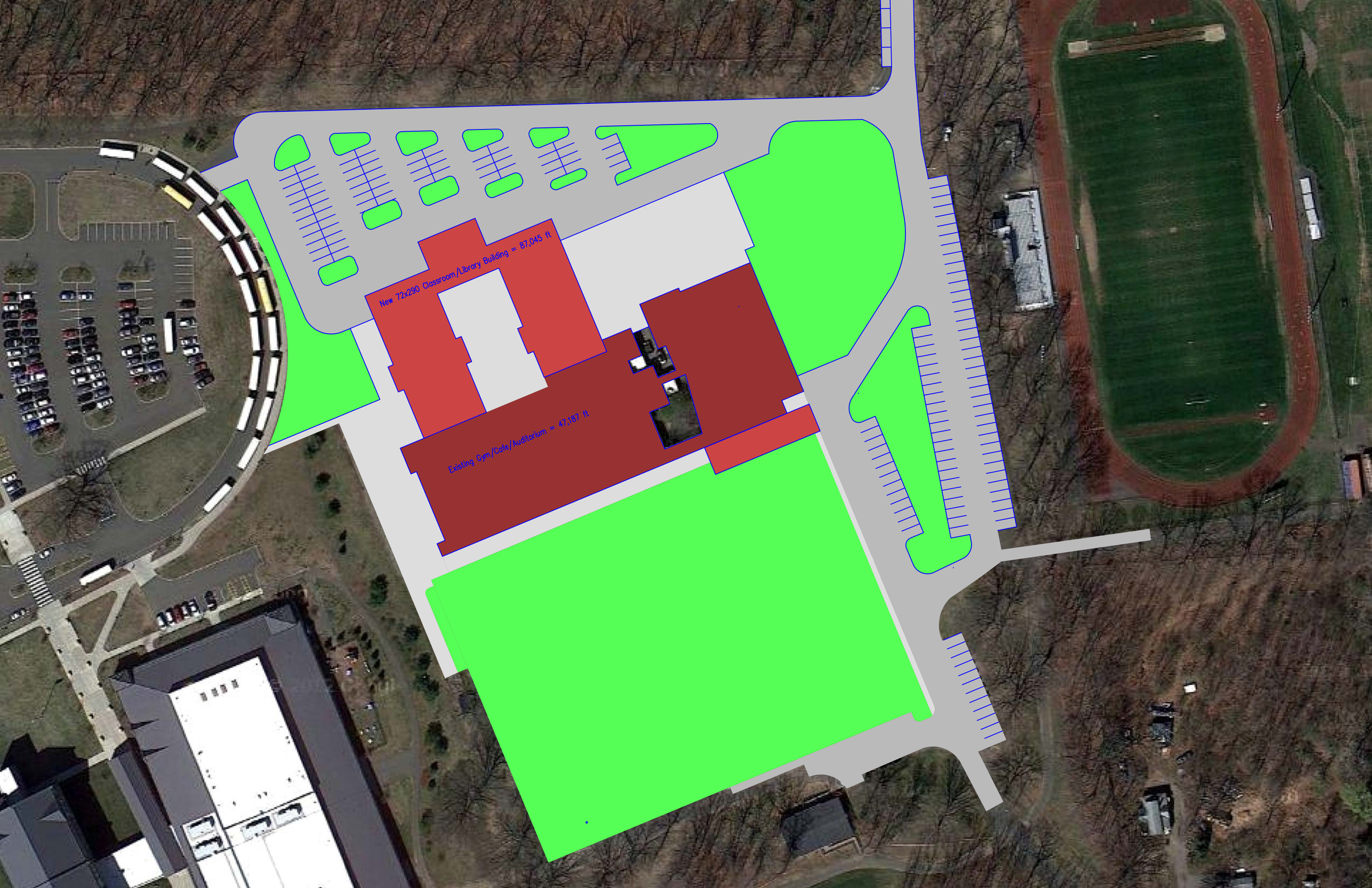
- A UL Master label listed lighting protection system will be provided, consisting of air terminals, down conductors and connections to the building grounding system and structure.

Fire Alarm System

- A new fully addressable Fire Alarm system will be provided, consisting of: control panels and power supplies; smoke and heat detectors; audio/visual devices; manual pull stations; monitoring and control devices; magnetic door holders; elevator recall devices; tamper and flow switches; remote annunciation panels; voice evacuation equipment; wiring; and raceway.
- Fire alarm MC cable will be specified for all concealed spaces. Where exposed or in unfinished spaces, wiring will be in conduit.
- Locations for devices will be in accordance with NFPA and ADA requirements and will include:
- Smoke detectors in all storage rooms, corridors, electric closets and telecommunication rooms.
- Manual pull stations at all exit doors.
- Notification appliances in all occupied spaces.
- Elevator recall devices.
- Heat detectors in mechanical rooms

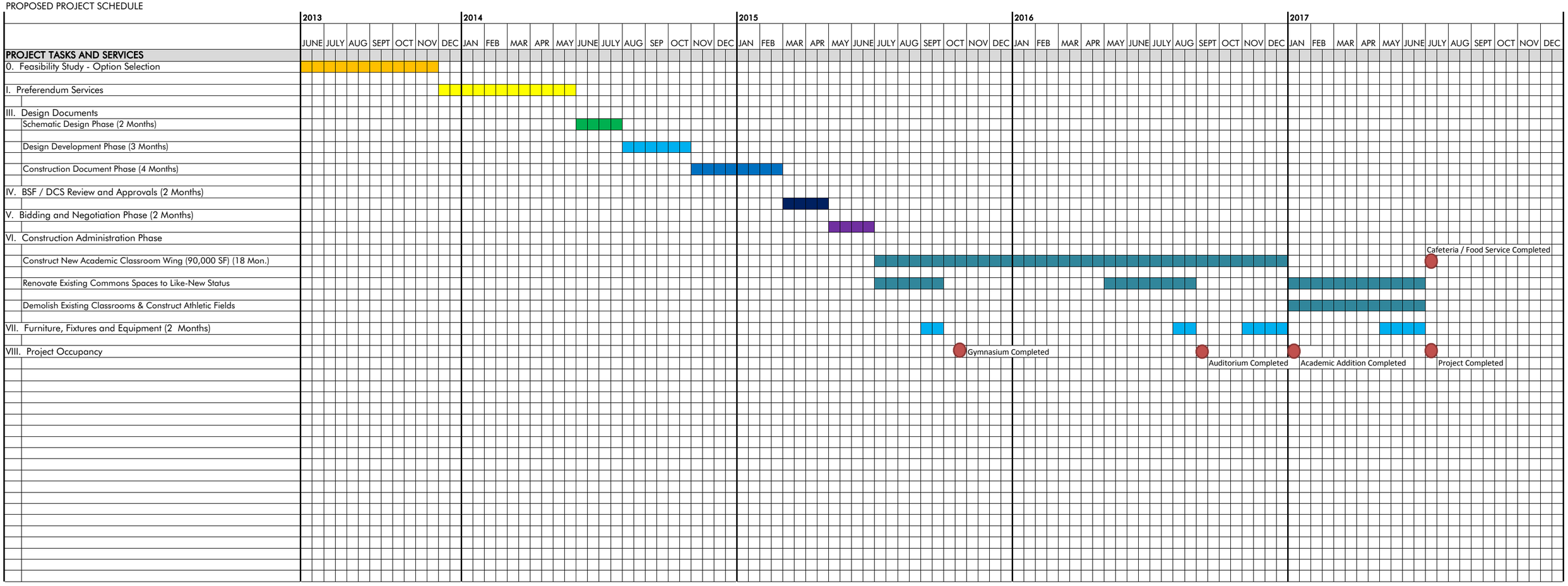
Low Voltage Systems / Telecom

- A new area of refuge system will be provided, including call stations in designated stairwells, annunciation at the main building entrance, and connection to the town's central dispatch via phone lines.
- Telecommunications system cabling and jack locations to be determined by owner.
- Telecommunications equipment and UPS requirements to be determined by owner.
- Electrical contractor will provide cable tray, raceways and boxes to accommodate owner's telecommunications system design.
- CCTV cameras on site.


New 72x290 Classroom/Library Building = 87,045 ft
Existing Gym/Cafe/Auditorium = 47,187 ft

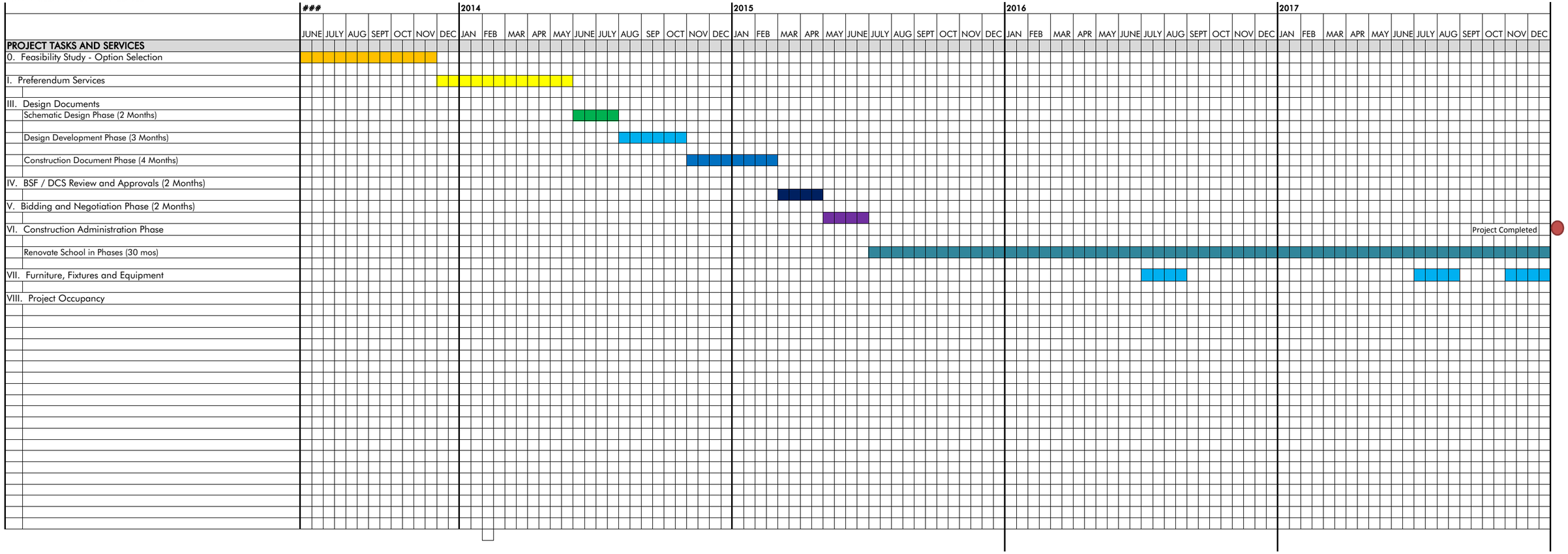
North Haven Middle School
Option 4- Hybrid Concept Feasibility Study
PROPOSED PROJECT SCHEDULE

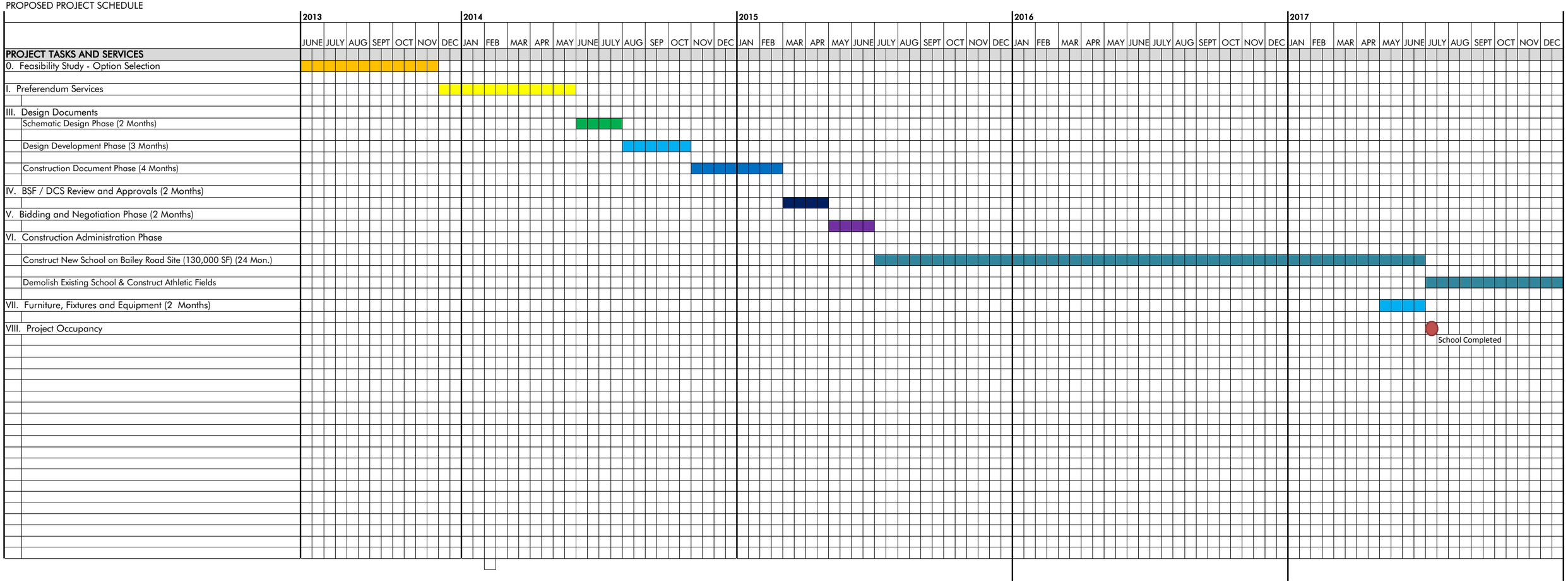
PERKINS EASTMAN
November 6, 2013



North Haven Middle School
Option 1- Like New Renovation
PROPOSED PROJECT SCHEDULE

PERKINS EASTMAN
November 6, 2013



North Haven Middle School
Option 3- All New School Feasibility Study
PROPOSED PROJECT SCHEDULE

PERKINS EASTMAN
November 6, 2013