
Francis Walsh Intermediate School
Feasibility Report



Submitted to:
Mr. James B. Cosgrove
First Selectman
Town of Branford
1019 Main Street
Branford, Connecticut 06405



Perkins Eastman

Feasibility Report

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1. Executive Summary

1.1 Introduction

Constructed in 1970, the existing Francis Walsh Intermediate School facility is dated and does not accommodate the tenets of 21st century education. However, the building is robust and well maintained. The most critical issues that must be addressed included code and accessibility compliance, heating, cooling, lighting, and technological requirements. Additionally, Connecticut State High Performance Guidelines, and LEED® requirements such as access to views, daylighting, and acoustical separation in learning spaces cannot be met by this building. To this end, the Town of Branford has retained a team of architects and building engineers to investigate the condition of the 45-year old Intermediate School, and develop cost-effective measures to address these issues.

1.2 Feasibility Report Scope

This report's scope will evaluate the existing Francis Walsh Intermediate School facility, addressing the following three options—suitability to renovate to an “as new” facility, building a new school on site, and a hybrid option, which renovates some of the existing building, and adds a new academic wing.

1.3 Feasibility Report Team

Project Management

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2. Existing Building Evaluation Report

2.1 Evaluation Report Scope

This evaluation of the existing Francis Walsh Intermediate School building and site included the following scope—code compliance and building condition for health, safety, welfare, and accessibility as determined by applicable codes and the Connecticut State Statutes. The attached code analysis is included for the existing structure, as well as each design concept for detail compliance.

This report is a summary of the A/E team’s walk-through of the existing Intermediate School and campus at 185 Damascus Rd, Branford, Connecticut 06405. The evaluation also included whether this property is appropriate for a “renovate-as-new” school facility.

We encourage the Town of Branford to undergo a period of due-diligence to evaluate this property sufficiently. Additional study is recommended regarding the following—availability of future required utility services and infrastructure, a site and building Environmental Phase-1, 2, and 3 Report, and a thorough review of the existing Hazardous Material Manifest.

2.2 Applicable Building Codes

The following is a listing of applicable Codes within the jurisdiction of the work:

- 2003 International Building Code
- 2003 International Mechanical Code
- 2011 NFPA 70 National Electrical Code
- 2003 ICC/ANSI A 117.1
- 2009 International Energy Conservation Code
- 2005 Connecticut Supplement
- 2009 Connecticut Supplement
- 2011 Connecticut Supplement
- 2003 International Fire Code
- 2003 NFPA 101
- 2003 NFPA 1 Uniform Fire Code
- 2010 Connecticut Fire Prevention Code
- 2009 Connecticut Amendment
- 2012 Connecticut Amendment
- 2013 Connecticut Amendment
- Section 504, Rehabilitation Act 1973, including 504 regulations
- Americans with Disabilities Act
- Accessibility Guidelines and 2010 ADA
- Standards for Accessible Design
- Current Public Health Code
- Current OSHA – Title 29/Labor

3. Description of Existing Facility

3.1 Existing Facility Description

- The existing two-story educational and assembly use building is approximately 191,000¹ gross square feet. Constructed in 1970, it is located on a relatively flat 29.01-acre site. Additionally, the design and construction of the building preceded the implementation of the ADA accessibility code and legislation.
- As with many schools built in this time, the design of the Francis Walsh Intermediate School incorporated the “open classroom” approach, which advocated for limited to no exterior facing windows. Instead, the design utilized clerestory glazing and a few narrow vision windows to integrate natural light.
- Since its construction, the structure has undergone a number of improvements to address acoustic separation, including semi-permanent partitions that defined areas for conventional classroom layouts and acoustically isolated learning spaces within the building. Recently, the building was completely re-roofed.
- The building’s site incorporates several athletic fields, tennis courts, parking, and vehicular circulation. Private homeowners and wetlands border the site to the south, east, and west. Damascus Road and a small portion of undeveloped land and a private residence border the property to the north.
- An enrollment study performed in 2012 by Peter Prowda indicates a substantial decrease in enrollment through 2022, starting from a projected 915 students in 2016, and decreasing to 834 students in 2022.
- The following evaluation describes the building envelope’s existing conditions, detailed use-group specifics, finishes, accessibility, site layout, and building systems evaluations.

¹ Although the previous feasibility report published by another A/E firm in 2013 used a figure of 243,000 sf for this building, careful measurement and examinations of the existing drawings and tax assessments revealed the actual square footage to be 191,000.

3.2 Exterior Building Envelope Description

The existing Intermediate School's envelope consists primarily of unit masonry cavity walls, which often include high clerestory glazing at the ceiling line. Existing drawings indicate these walls incorporate 1" rigid insulation. Existing walls may require additional lateral bracing.

A few areas of floor-to-ceiling windows are interspersed throughout the façade. We estimate the glazing comprises 10 percent or less of the total façade area.

Roof framing is primarily a two directional space frame, supported by steel columns, with Tectum decking, insulation, and an EPDM roofing membrane. Recently the roofing was replaced with rubber membrane, and with the exception of a few exhaust fans, appears entirely free of mechanical equipment. At least one seismic joint is apparent on the roof, which separates the academic area from the common spaces.



Typical exterior wall with window

View of roof and clerestory glazing



3.3 Detailed Use-Group Areas

3.3.1 Classroom Wings, Education Occupancy

Located in the existing academic block, the majority of the classrooms use thin, semi-permanent partitions. These spaces are distributed around the first- and second-story academic area in the southern portion of the building. The partitions do not meet ANSI 12–60, a Connecticut State requirement providing acoustical separation from potential sound sources. The classrooms are not equipped with windows—a condition that is known to impact student performance and staff morale. In addition, this does not comply with both the USGBC LEED® and Connecticut High Performance Building Guidelines. Classrooms range in size and configuration; some are overly generous, others cramped. In addition, some classrooms do not have doors.

A block of recently constructed ground floor, one-story educational spaces appear to address some measure of acoustical isolation.

Science classrooms appear to contain adequately sized casework and utilities; however, the casework is aging and needs replacement. An underused greenhouse with operable glazing is accessible through one of the science rooms, and appears to be in reasonable condition.

Interior classroom spaces and ramp



Located in the center of the southern academic portion of the building, the existing Media Center is very large with a dramatic, double-height space. It is connected by multiple stairs to the second floor academic area, and is separated from a lecture hall by a generous balcony/mezzanine area. Given the current thinking and trends related to media centers, this area is significantly oversized.

Technology rooms are scattered among other classrooms, and appear to serve the School's needs adequately.

3.3.2 Assembly Area Occupancies:

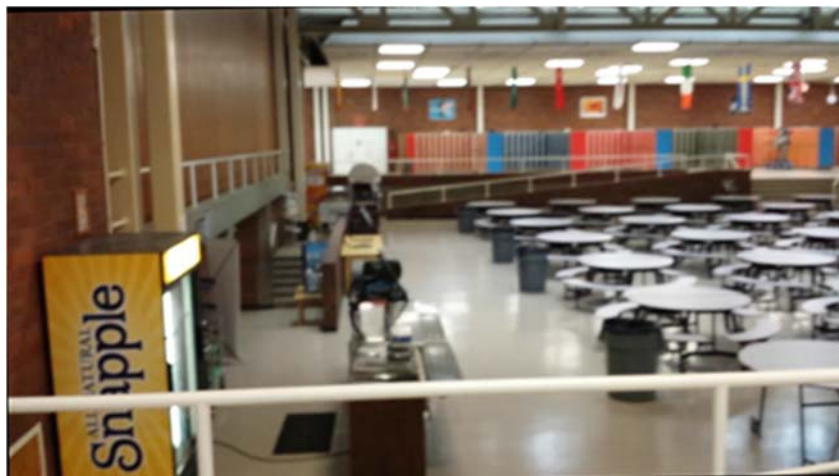
A tiered lecture hall is equipped with an operable partition, subdividing it from the adjacent cafeteria. A second operable partition enables two halves of the room to function independently if needed. The lecture hall is accessed from the mezzanine stairs, and from the main locker commons floor via ramps. There are several accessible wheelchair areas.

Lecture hall



The existing cafeteria is large, open, and centrally located. It connects to large, wide locker commons on two sides, with the lecture hall on the north, and with a small performance platform on the south side. The cafeteria includes clerestory windows, has an exposed ceiling with decorative light fixtures, and is accessed by a system of ramps and stairs that comprise the east and west perimeters.

Cafetorium looking towards sunken servery



The building's two gyms, consisting of a small auxiliary gym and a large main gym space, are in very good condition, comprised of hardwood floors, CMU walls with high clerestory windows on one side, and exposed tectum decking.

A large indoor natatorium is in very good condition, including a grandstand/bleacher area, with CMU walls, tile flooring, and exposed tectum deck, clerestory window on one side, accessible changing room/toilet area, and an elevated air-handling unit in one corner of the room.

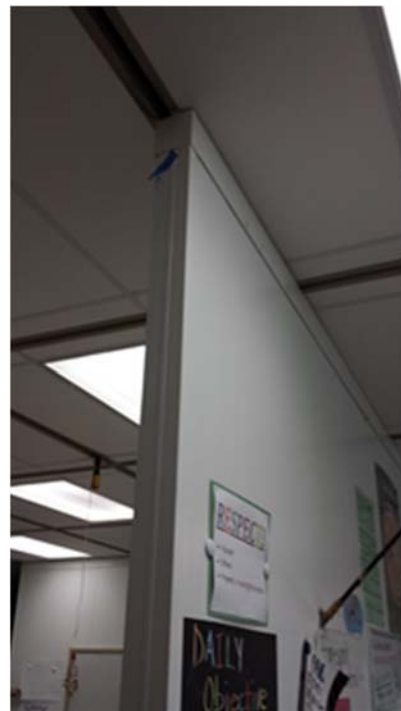
3.4 Building Interior Finishes

Many ceilings in this building are finished with Tectum. Either the deck is exposed in the larger spaces, or the material is applied to the underside of space frames in smaller rooms. A portion of the Tectum space frames were replaced with conventional acoustical tile and grids. The approximate 5'x 5' space frame module does not accommodate a typical 2' acoustical ceiling grid module. In many areas, the fluorescent lighting was updated. Some of the original indirect lighting fixtures remain in the media center commons and cafeteria.

The original partitions were built using concrete masonry units, and while many classrooms were enclosed, the classrooms in the southern portion of the building used thin GWB partitions, approximately 4" deep. These appear to stop at the face of the hung ceiling, or to approximately 9' in spaces with higher ceilings. Although these partitions are in good condition, it is unlikely they comply with the ANSI 12-60 requirements for learning spaces.

A mix of VCT, vinyl sheet flooring, carpet, ceramic and quarry tile, athletic wood sports flooring, and bare concrete is used throughout the School in typical middle school configurations. All appear to be sound condition and in good repair

Classroom partition in academic wing



Typical ceiling conditions, showing Tectum, ACT, and space frame lighting



3.5 Accessibility

The School's circulation, entrance doors, handrails, guardrails, and ramp pitches do not comply with universal accessibility standards. In addition, areas with stair-only access must be mitigated in the major restoration/renovation plan.

Although appropriately sloped, the ramps to the sunken cafeteria area appear longer than the maximum 30' length required by code. In addition, the existing stair is the only access portal to the server.

Access to the lecture hall is provided by ramps that are too steep by current standards, or by stairs from the mezzanine above.

The locker rooms near the gym and pool are split between two levels. One of the locker rooms and the natatorium is accessible only by stairs. In addition, the natatorium has not been improved or renovated. On one side of the pool, the raised observation deck, and a handicapped dressing room is accessible from the corridor. However, an accessible route is not provided between this area and the pool.

The gymnasiums are accessible from the main corridor. We have not determined if the bleachers in the main gymnasium meet current accessibility standards.

Overall, the restrooms do not meet accessibility standards for ambulatory and handicapped stalls, fixtures, grab bars, or clearances. Doors to the restrooms do not have adequate pull-side clearances.

The television station and other areas below the media workroom are not accessible, because the stairs provide the only accessible route.

Multiple stairs and a single elevator provide access to the second floor spaces that include faculty and classroom spaces.

The A/V and other communications systems will require updating in order to accommodate assistive listening and other accessibility components.

3.6 Building and Fire Code

Egress from the building to a public way appears to be compliant with current building code. Corridor and door widths appear adequate to the occupancy loads, and both egress access and path of common travel appear to be within prescribed distances from all points within the building.

Given the area and occupancy, building construction type, the overall square footage—191,000, and the absence of sprinklers in some of the building, the existing structure may not conform to the International Code Council's *Allowable Building Height and Area Limitations, Section/Table 503*. The following components will be crucial to attaining conformance with the code: replacement/addition of a sprinkler system, fire separations, and/or the addition of fireproofing material.

The stage and lecture hall finishes will need to be replaced, since the retracting wood partitions and existing stage curtains probably do not meet the current requirements.

3.7 Security

Both challenges and opportunities exist in meeting the State's current standards for public school security. Among the mandatory and critical points of compliance identified by the *Report of the School Safety Infrastructure Council*, dated June 27, 2014, which is mandatory for Connecticut public schools effective July 1, 2014 (per Public Act 13-3), the following areas are of most concern:

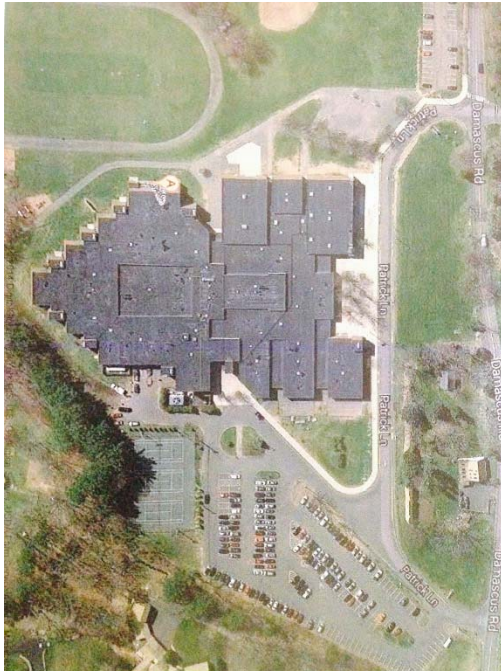
- **School site**—signage, cameras, fencing, lighting, landscaping, and hardscaping should be upgraded to assist in controlling access to the school site, the demarcation of public/private zones, and enabling visual access to the entire site and building.
- **Parking areas, and vehicular and pedestrian routes**—reconsider parking, delivery, and bus and parent drop-off areas and routes to provide separation and easy supervision, as well as the ability to close down vehicular access to certain areas when not in use.
- **Communications systems**—the current infrastructure and alarm system is likely to require updates to comply with the Public Act.
- **School exterior**—the building provides too many points of egress to be monitored for security purposes. Many are hidden from general view and from many vantage points. To comply with SSIC recommendations, the replacement of entry glazing with ballistic rated glass is required.
- **School interior**—add cameras, door hardware, BMS integration of locks, fire alarm, and security technology to the building. The design of the main entrance should force visitors into a controlled area, such as the main office.

Francis Walsh Intermediate School

Perkins Eastman

3.8 Site Evaluation

3.8.1 Location



Francis Walsh Intermediate School is located on Damascus Road across from Patrick Lane. Damascus Road is a well-travelled east/west artery that leads to Post Road. The parcel is 29.01–acres and is located in a residential zone (R-4). The adjacent parcels to the north, west, and southwest are also in the R-4 zone. The adjacent parcels on the south and east are in the Pine Orchard zone.

3.8.2 Flood Plain

A large portion of the parcel on the western edge is in a 500–year flood plain as per the FEMA map. This area includes the existing running track (in poor condition) and athletic fields. Any development schemes that include building expansion or extensive development in the flood plain will require careful consideration and evaluation. A State Flood Management Certification review process will be required to determine if development is permitted within the flood plain.



3.8.3 Vehicular Circulation and Parking

A one-way circulation drive provides vehicle access to the school. Damascus Road provides the entry and exit to the site. The existing asphalt pavement is in good condition.

The bus and car circulation follow the same path for the morning drop-off. The buses stack along the front sidewalk and drop-off students close to the east-side school entrance. In addition, parents drop-off students along the front sidewalk, or close to the east entrance. Vehicular traffic interferes with the bus circulation.



Buses stack along the front sidewalk for afternoon pick-up. They arrive in two stages of 12-buses each. The students taking the buses are discharged from the front of the school. The east-side entrance is used by the parents to pick-up their children.

A concrete sidewalk from the school and along the entrance drive provides pedestrian access to Damascus Road. The concrete and curbing is in poor condition. An asphalt sidewalk at the east side parking lot provides additional pedestrian access to Damascus Road, but is not handicapped accessible. This asphalt is in poor condition.

The main parking lot is located on the east side of the parcel. There are approximately 193 parking spaces, including four handicapped spaces. Additional handicapped parking is required. The existing asphalt pavement is in good condition. An additional parking lot with approximately 41 parking spaces is located at the northwest corner of the parcel adjacent to Damascus Road. Handicapped parking is not provided at this location. The existing asphalt is in poor condition.



3.8.4 Athletic Facilities

The athletic facilities include three tennis courts, two basketball courts, a cinder running track, football field, soccer field, and two baseball/softball fields. Swings and an outdoor exercise area are located at the rear of the parcel.

The tennis courts are in fair condition. The basketball court goals are in poor condition. The pavement surface is cracked and uneven. The running track is in poor condition. All of the athletic fields are natural turf fields. The turf is generally in poor condition.



3.8.5 Site Lighting

The entrance drive lighting and parking lights appear to be adequate. Lights are also present at the tennis courts. Recommendations include lighting upgrades to improve efficiency.

3.8.6 General Landscape

The existing landscaping around the School is sparse. Several of the shade trees at the front of the school are in poor condition. An excessive amount of pavement limits the number of landscaped areas with shrubs at the School's front entrance.

The entrance drive and parking areas have few trees, and as a result provide little shade. The lawn areas around the school are in fair to poor condition. There are many worn areas with no lawn.

3.8.7 Utilities

Underground utilities entering at the eastern edge of the boiler room serve the School, and include municipal water, sanitary sewer, natural gas, power, and communication wiring. In the subsequent design phases, investigations should include the condition, capacity, and location of all underground utilities.

3.9 MEP Evaluations

3.9.1 HVAC Systems

Two Cleaver-Brooks boilers provide the space heating. The units are in fair condition, with natural gas burners circulating 30 percent propylene glycol hot water. A multiple zone loop configuration provides the hydronic supply by the boilers. The building is split into three zones, (east, west, and north), each with two pumps in a duty/standby operation. The zoned pumps serve the perimeter radiators located throughout the building, classrooms, offices, indoor air handlers, and cabinet unit heaters located in the corridors, lavatories, and vestibules. Local thermostats control the perimeter heat in each classroom. Self-contained thermostats control the cabinet unit heaters.



Existing Boilers

The horizontal boiler stack and vertical chimney appear to be in fair condition. Inspection of the chimney interior lining is recommended.



Classroom Perimeter Radiators

The space cooling is provided via a Trane water-cooled chiller and a water side economizer during the colder seasons that circulates 30 percent propylene glycol chilled water. The condenser water loop consists of a Baltimore Air Coil cooling tower and a single circulation pump. The chilled water is circulated to the existing handlers via two circulation pumps.



Water-cooled Chiller



Cooling Tower

Indoor air handlers, hung from the structure above throughout the building, provide air conditioning to the spaces throughout the building. The cooling capacities are sufficient for the expected space cooling load requirements. The existing air handler within the pool is not meeting the space loads and therefore required replacement.



Pool Air-Handling Unit

Each air-handling unit has its own set of ventilation and relief hoods on the roof. This brings in outside air and maintains building pressure. The bathrooms and kitchen have dedicated exhaust fans.



The home economics classroom area does not have dedicated exhausts for the ranges; the Fire Marshal has commented on this condition during previous inspections.

Home Economics Classroom Area

A Trane Building Management System with a central workstation provides both DDC and pneumatic controls. We recommend replacing the existing pneumatic controls, where they exist, with DDC controllers.

3.9.2 Plumbing and Fire Protection Systems

The fully sprinklered building system was installed in 1971 (44-years old). The sprinkler heads are old and will need to be replaced when they reach 50-years old. Today's standards integrate white concealed-type sprinkler heads for aesthetics; this also decreases vandalism. During the new ceilings installation, the sprinkler heads and branch piping will be replaced to accommodate the new grid and pad locations. Sprinkler mains may require relocation to accommodate new ductwork. A 10" fire service enters the building on the north side. An original fire pump exists to pressurize the system due to low water pressure. There is a CO₂ system protecting the Dial Access room and underfloor space near the media area. A gaseous FM-200 type system should replace the existing system. According to the original plans, a sprinkler system does not exist in the gym and pool area.

Natural gas from Southern Connecticut Gas Company services the building with two-psi service. Water service is a public supply with a 4" main entering the boiler room. The meter is located in an underground vault near the street.

Two indirect domestic water storage tanks feed the existing plumbing system, which in turn is fed from the boiler located in the mechanical room. In non-heating months, a large heating boiler must operate in order to heat a small summer hot water load. Tanks have a life expectancy of about 10-years, and will soon require replacement. New designs will utilize stand-a-lone gas-fired water heaters separate from the boiler, which will allow deactivation during the months not requiring heat. Two booster pumps pressurize the domestic plumbing system to a maximum of 80-psi per code due to low water pressure. Sanitary piping in the basement is pumped via a sewage ejector station in the floor.

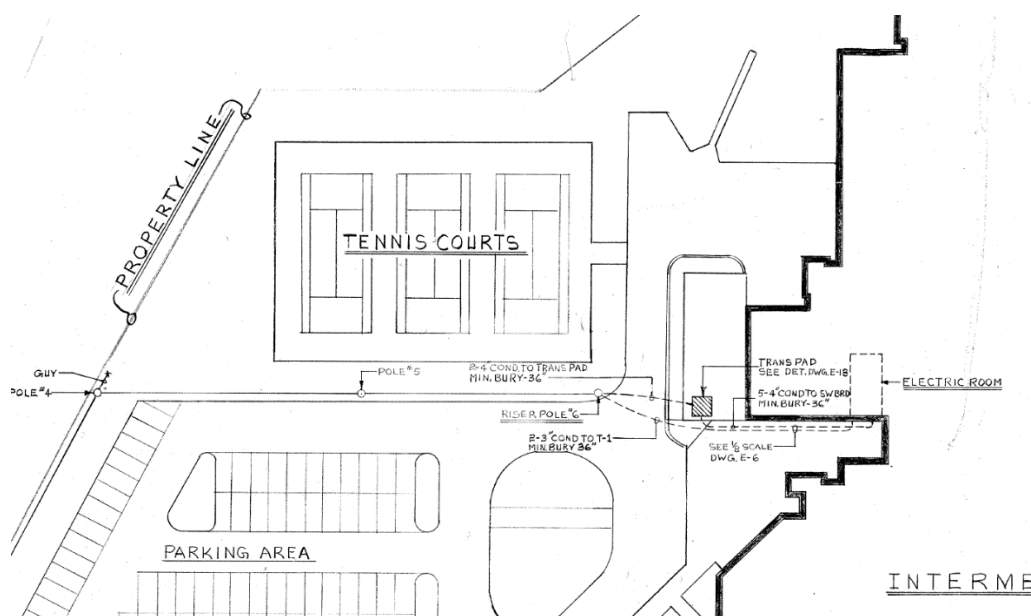
The original plumbing fixtures are still in use. As a result, they are not ADA accessible, or energy efficient, or NSF, and were manufactured with lead parts. Water piping is copper tube with leaded soldering. Sanitary and storm piping is XHCI (extra heavy cast iron). The science classrooms are equipped with acid neutralization tanks and Durion piping.



Domestic Hot Water Heaters

3.9.3 Electrical Systems

The School's existing electrical service is routed via an overhead high-voltage pole line beginning along Damascus Road, continuing around the east side of the site, and eventually to a riser pole near the northwest corner of the tennis courts. The high voltage line then drops down the riser pole and routes underground in two-4" C to a pad-mounted exterior transformer. From the transformer, the secondary service conduits route underground to the main electrical room, where they terminate in a 3000 Amp, 480Y/277V switchboard. The overhead lines and pad-mounted transformer may be owned by the utility company and could be re-used if the building is renovated.



Electrical Service Routing into Building

The main switchboard is original to the building. It contains fused switches and is in need of replacement. The expected useful life of electrical equipment is approximately 25–30 years. Due to the degraded reliability and safety concerns, replacement is recommended. Modern switchboards contain reliable digital trip circuit breakers, do not require fuse replacement after faults, and have readily available replacement parts. The re-use of the service entrance conductors is possible after a service replacement, however testing is recommended to ensure the conductor insulation is in good and acceptable condition. The electrical switchboard should be replaced with modern digital trip circuit breakers, ground fault protection, and surge suppression for reliability and safety of the electrical system.

From the switchboard, power is distributed through a multitude of step-down transformers (480 > 208Y/120V) and panel boards located throughout the building. Since the majority of this equipment is original to the building, it should be replaced due to age and potential reliability issues. If the renovation option is selected, it is unlikely the conduits and conductors would be re-used, since the interior layout changes would not be conducive to the existing equipment locations and sizes. Many existing panel boards are also full, which decreases ease of adding new electrical circuits.

Fluorescent, metal halide, and LED lighting sources are provided throughout the School. To reduce energy consumption, the lighting sources have been retrofitted and upgraded over the years as technology has progressed. Although this was a positive and cost-effective method of reducing operating costs, the fixture locations did not change, and there are many areas that are currently under or over lit, or do not have optimal lighting fixture layouts. If the building is renovated, it is recommended that all new lighting and controls be provided to ensure a long lifespan, optimal energy efficiency, and proper light levels for the students, staff, and administration.

Less Than Ideal Lighting Layout (Example)



A central battery system, original to the building, and standalone emergency battery pack fixtures provide emergency lighting in the School. Many areas of the building will require emergency lighting under current codes. For example, the classrooms around the media center should have additional egress lighting installed. If the renovation option is selected, we recommend the removal of the existing central battery system, and battery packs integral to the new light fixtures be provided in all areas of egress.



The building mounted exterior lighting fixtures and pole mounted site lights appear to have been replaced recently with high efficiency LED fixtures. It is unknown if these fixtures were provided with battery backup at the exterior egress doors. If not, battery backup should be added to meet the current egress lighting code.

Exit signage appears to be code compliant throughout the building, although additional signs should be added for clarity in some of the larger spaces, such as the media center.

Occupancy sensors are located on lighting circuits throughout the building, however additional sensors should be provided with to meet current energy codes, including the corridors. Photocells with daylight harvesting dimming should also be installed against window walls to comply with current energy codes.

The existing stage lighting system is antiquated and requires replacement with a modern, digitally controlled theatrical lighting system appropriate for a middle school. LED stage lighting fixtures are now available and are cost competitive, which would provide significant energy savings when in use.

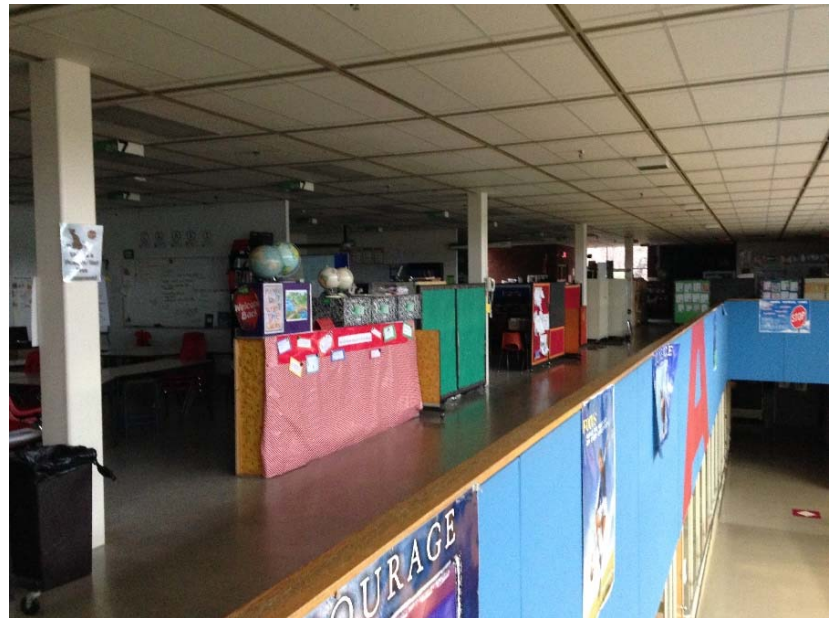
Silent Knight manufactured the fire alarm control panel. The fire alarm devices throughout the building appear to be original to the building, or at least 25–years old. The placement and quantity of the fire alarm devices in many locations around the building do not meet code. Many of the exterior doors do not have pull stations, and many of the rooms do not have adequate audio/visual coverage per current NFPA requirements. Smoke detectors should be added to all electrical, IT, and storage rooms. All areas of assembly require a voice-evacuation system. The replacement of the entire system is recommended with a modern, digital, and addressable fire alarm system with devices located according to the current

NFPA standards. This will increase fire safety within the School, and will improve fire department response

Lack of Exit Signage and Fire Alarm Devices

In general, the classrooms do not have adequate quantities of outlets. When the school was designed, classrooms did not require robust electrical services. Additional outlets will avoid the use of surge strips and extension cords.

The school does not have lightning protection system installed; the installation of a UL Master Label® system (with surge suppression) for optimal protection of electronics within the building is recommended.



A natural gas or diesel backup generator should be provided to back up all IT equipment, and refrigeration and HVAC equipment to provide freeze protection. If desired, the generator could also provide back up for egress lighting, this would eliminate the need for integral battery backup light fixtures.

The large expanse of existing roof space would be ideal for the installation of a photovoltaic system. Since there are heavy subsidies available for photovoltaic systems at this time, the Town of Branford should consider the idea of a power purchase agreement, with a system hosted on the roof. This would eliminate the need for capital expenditure, and would reduce energy costs within the building.



Expansive Roof – Ideal for Photovoltaic System (Solar Panels)

Code Analysis

Project Description

An existing, non-separated mixed-use two-story 191,000 SF Intermediate School located in Branford, Connecticut

Chapter 3: Occupancies

	Section	Description	Allowed/Req'd	Provided	Remarks
	302.1	Occupancy	E - Educational A-1, A-2, A-3 – Assembly B - Business		
	302.1.1	Incidental Use	Boiler rooms, laboratories – Sprinkler system and smoke barrier		
	302.2.1	Accessory Use	Assembly areas		
	302.3	Mixed Occupancies	NFPA 13R	Provided	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/Req'd	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	Two 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	One 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		
419	Group E			
419.2	Fire Barriers	Exception 1 – Sprinkler System		

Chapter 5: General Building Heights and Areas

Section	Description	Allowed/Req'd	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	$A_a = A_t + [A_t + I_f / 100] + [A_t + I_s / 100]$ Assembly(A-1): $A_a = 38,250$ SF Assembly(A-2, A-3): $A_a = 42,750$ SF Education(E): $A_a = 65,250$ SF		Need 2 Separated Education Areas
506.2	Area Modification	Frontage Increase $I_f = 100[F \setminus P - 0.25]W / 30$ $I_f = 50\%$		
506.3	Area Modification	Automatic sprinkler system increase = 300%		

Chapter 6: Construction Classification

Section	Description	Allowed/Req'd	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/Req'd	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/Req'd	Provided	Remarks
	903.2.1	Group A	Automatic Sprinkler System will 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 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		
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Chapter 10: Means of Egress

	Section	Description	Allowed/Req'd	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	Two or more occupancies utilize same means of egress, meet more stringent requirements		
	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



Francis Walsh Intermediate School

Perkins Eastman

	1010.4	Ramp Rise	Max rise 30"t		
	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		
	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 one means of egress		
	1014.3	Boiler, Incinerator and Furnace Rooms	>500 SF requires two exits		
	1014.6	Stage Means of Egress	One means of egress at each side of stage required		
	1015.1 Table	Exit Access Travel Distance	A, E - 250 ft w/sprinkler		
	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 two exits w 1-500 occupant load three 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/Req'd	Provided	Remarks
	1106	Parking & Passenger Loading Facilities			
	1106.5.1	Van Space	One for every six 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		

Architectural Program

4.1 Draft Architectural Program

In order to address both the District's goal of determining the extent and cost of possible improvements at the Walsh Intermediate School, and develop a reasonable and comparative study of options, the design team relied on customary educational space allocations for intermediate schools serving and anticipated student enrollment of 1,000 students.

While space standards vary widely from community-to-community, the team recognized the existing facility provided a level of space allocation and expectation that is larger and more generous than is provided in today's programs or funded by fiscally conservative districts.

In addition, the Connecticut State Space Standards have not been updated to reflect current public school programs and educational spaces, therefore the space allocation used in the option study in all cases exceed the State's space standards. This fact is universal in almost every school project undertaken by Districts across the State.

For the Walsh Intermediate School, the design team developed an anticipated project square footage by blending the existing space allocations in the existing structure with those of recently completed fifth, sixth, seventh, and eighth grade school facilities throughout the region.

Using the anticipated enrollment and assuming the students are distributed equally in each of the four grades, we were able to calculate the number of standard classrooms needed to serve the student population. This calculation provided the number of square feet required for the classrooms.

Continuing this methodology, we allocated spaces for other educational and activity spaces, as well as areas for support and mechanical equipment.

In total, we calculated the project's educational program square footage would be approximately 157,500 square feet. This number includes an appropriate net to gross multiplier for circulation, structure, and stairs.

In addition to the educational program, the design team was also directed to provide space allocations for the central administration offices. For this space, we calculated an approximate space requirement approximating 7,000 square feet.

For the purposes of this comparative analysis, the total project gross square footage is approximately 164,500 square feet. The existing Walsh Intermediate School facility contains approximately 191,500 square feet, a difference of approximately 26,950 square feet of excess space, based on regional allocations of school and central offices.

The design team did not undertake an exhaustive programming and space allocation effort with the District for this study. We recommend the Town's School Administration and the Board of Education



develop detailed Educational Specifications, and prepare a highly accurate space needs program before seeking funding allocations. This space program may indicate space needs that vary significantly from the assumptions used for this study.

Notwithstanding, the assumed square footages used for this study provides the Town with a reasonable and practical instrument to compare options and its costs.

Concept #1: Renovate existing building as new

5.1 Design Narrative

This concept requires updating the existing building completely, including addressing the accessibility, code, security, and safety issues described above. This concept retains the basic footprint and layout of the School.

The present site configuration would remain much the same, with the repair of hard surfaces, lighting, addition of cameras, and a streamlined separation for bus and parent drop-off. Parking and routes to the building must be accessible, and repairs to tennis courts, running track, and fields should be considered.

Internally, the media center would move to the northern portion of the building, with an addition of an outdoor courtyard in the space previously occupied by the media center. This would provide light and views to classrooms located on the interior of the building. The exterior façade would be penetrated by glazing, to allow classrooms on the exterior perimeter to receive light and views. Several internal “commons” spaces would be created at the hubs of traditionally partitioned, separated classrooms.

The fifth grade area would be separated architecturally from the other classroom spaces, allowing more privacy for the younger children. The existing gyms, pool, and music areas would receive light renovations; the administration would be moved to an area closer to the School’s main front entrance. The Board of Education office space would be accommodated in the northern portion of what is now the industrial arts area. Finishes, technology, and mechanical systems should be updated.

Pros

- Leverages an existing, robust, well-maintained building
- Avoids most site, parking, and field relocation costs; the site’s function will be similar to its present condition
- The available, unused square footage in the existing building will provide internal swing space to house classes, while portions of the School are under construction
- Provides “commons” areas for each grade, since the existing space allows repurposed areas
- Lowest estimated gross project costs, lowest estimated Town contribution
- Significantly lower demolition costs

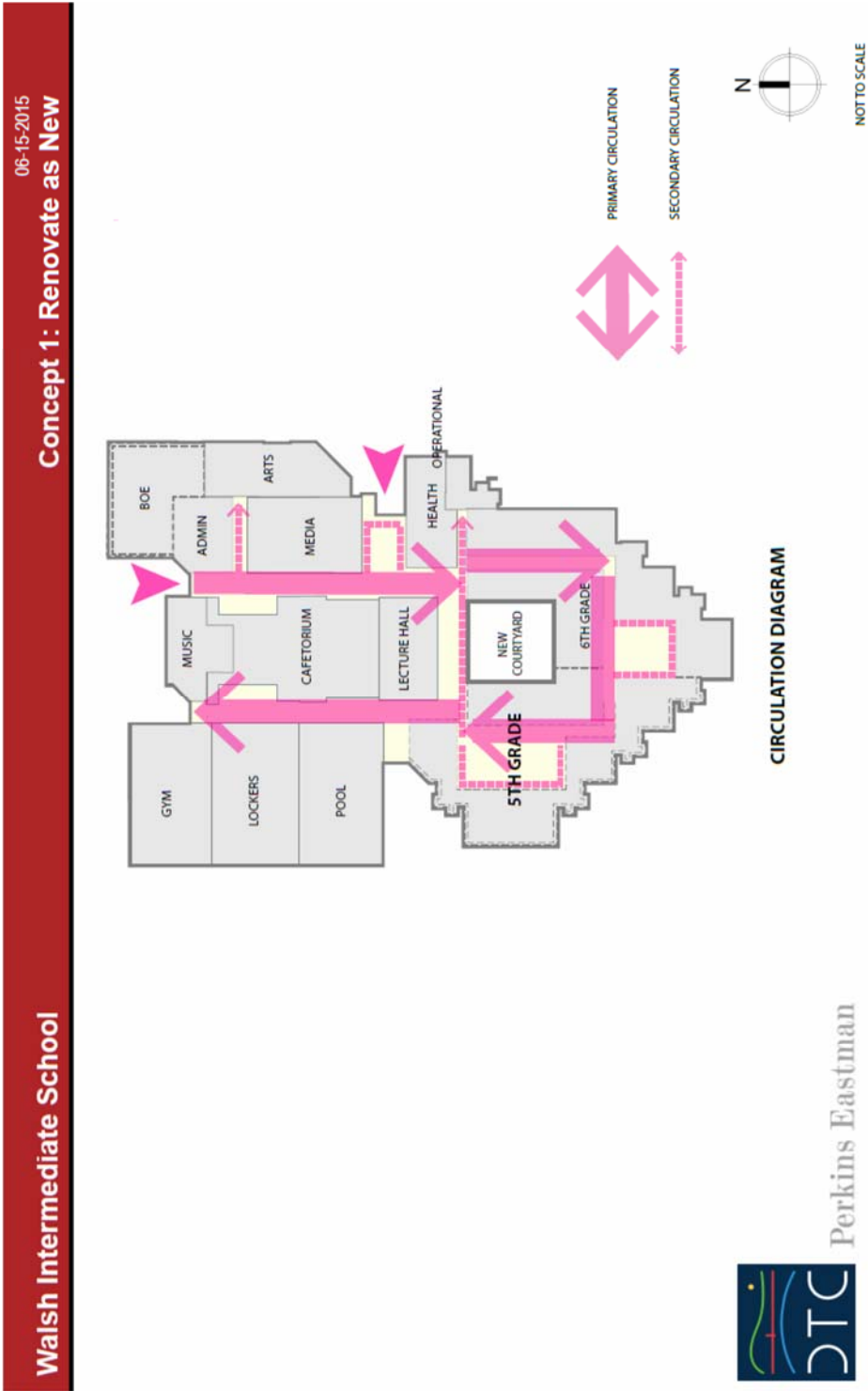
Cons

- The phased construction will extend the Project schedule
- More disruption to the School is likely, since areas will be renovated in place and students shifted to and from the swing spaces
- Final configuration of the academic area exit stairs will be very difficult to secure
- Lacks a transformational “new image” for the community
- Construction is riskier, due to extent of renovation

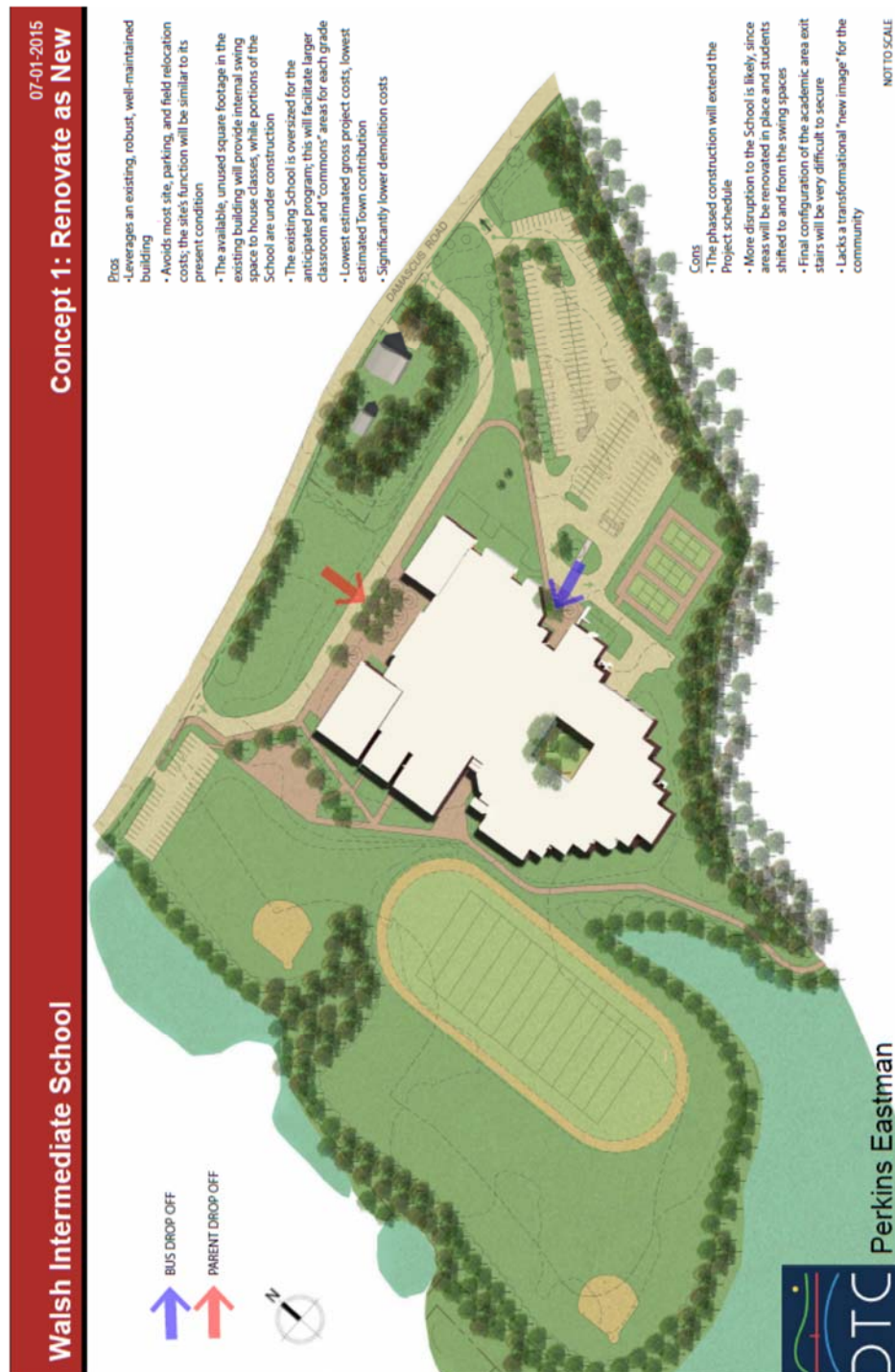
5.2 Proposed Architectural Floor Plans







5.3 Proposed Site Design Layout



5.4 Code Analysis

As mentioned in the building evaluation, code updates to the existing School should address finishes, fire alarm integration, a school-wide sprinkler system, door and hardware upgrades, and possible fire separations. New egress diagrams and paths should be calculated, and the number of exits carefully balanced with the security concerns outlined above.

5.5 Proposed Phasing

The Francis Walsh Intermediate School is unusual, because it includes a large, underutilized area that could be used as a swing space for housing classrooms during the renovations to the academic wing. Based on a preliminary phasing schedule, one-third of the School's classrooms could be accommodated in this area (See schedule section in Appendix).

6.0 Concept Design—Engineering Components—Option 1

6.1 Site/Civil Improvements

Under Concept 1—Renovate-as-New—the Intermediate School campus will be renovated and improved in these areas:

- New separate exit drive for bus traffic
- The existing one way exit drive will become a two-way entrance and exit drive for parent drop-off
- New parking lot and building landscape plantings

6.2 Plumbing Systems

General

The design of the new plumbing systems will conform to the International Plumbing Code, Americans with Disability Act, State of Connecticut Water Conservations Standards, and the Educational Specifications for the new School.



Energy Conservation

The International Plumbing Code requirements will be utilized to develop conservation solutions. Additional solutions should be explored to create higher energy savings, such as using ultra-low flow fixtures. Provisions for the physically handicapped as required by the International Building Code and State of Connecticut will be

included. The potable water supply must be protected against backflow, back-siphonage, cross connection, and other unsanitary conditions.

Roof Drainage

The design will incorporate a combination of exterior downspouts, courtyard catch basins, roof drains (primary and secondary) connected to interior rain leaders, and storm drain piping. All downspouts and rain leaders will connect into the underground storm drain-piping systems terminating in the site, storm drainage system. Disposal will connect into the site drainage system, which is separated from the sanitary sewer.

Sanitary Drainage

The drainage of the plumbing fixtures, sinks, showers, drinking fountains, and floor drains will be piped to the sanitary building drain; all fixtures and drains will be vented to the atmosphere.

Solids drainage in all of the art room fixtures will be discharged through an appropriate solids separator. Disposal will be through a connection to the building sanitary sewer system, which will be separate from the storm sewer system. Floor drains will be cast iron body with trap primer connection, appropriate inlet strainer, and interior drain.

Acid Waste System

Acid waste and vent piping will be polypropylene. A central acid waste neutralization tank with monitoring will be provided for all science and prep room sinks.

Radon Removal System

A radon system is required for all New Haven County Schools that are publicly funded by Connecticut's Office of School Facility Unit. The system will consist of an active soil depressurization system, a radon suction pit, schedule 40 PVC vent piping, and a radon fan located on the roof. A separate radon system—totaling four systems—will be provided in each wing of the building.

Kitchen Waste System

A separate kitchen waste system will drain to an onsite, external underground 5,000-gallon grease separator for waste. The waste line will then connect to the exterior sanitary system.

Domestic Water System

Cold water will be piped to all plumbing fixtures, showers, drinking fountains, lawn hydrants, classroom sinks, and safety shower-eye wash stations.

Hot water will be piped to each plumbing fixture and the classroom sinks. The design criteria will comply with the State of Connecticut and Appendix "D" of the National Plumbing Code, based on friction loss charts with a maximum of eight-feet per second velocity.

Cross Connection Protection Devices

The main domestic water service entrance will be protected with an automatically operating assembly of a pressure differential relief valve, located between two positive seating check valves. It will be equipped with an inlet strainer, inlet and outlet gate valves, and test cocks. The unit will be all bronze construction with non-corrosive internal parts, and 150 psi WWP.

Piping Supports

The building structure will be used to support the piping. The design of all supports will comply with the Manufacturers Standardization Society (MSS) Standard Practice SP-69.

Natural Gas Piping and Equipment

A new natural gas connection will be provided from the existing site distribution system. A new meter will be located outside of the boiler room. New piping will be provided from the meter to the School as required to serve the equipment layout.

The domestic water heater equipment will be connected to the natural gas service. The fuel service provider will supply the emergency shut-off system for the water heaters, commercial kitchen, fuel cell, and science labs.

Domestic Water Heater

Domestic hot water will be provided to the building through two, high efficiency, gas-fired, 400-gallon tanks with an input rating of 600 MBH and 600 GPH recovery.

To ensure hot water availability to all fixtures at all times, a hot water recirculation system will be provided.

6.3 Fire Protection

General

The existing fire protection systems will be replaced with an automatic wet pipe sprinkler system to protect the building, office areas, classrooms, gymnasium, workrooms, storage areas, and contents. The public water main will supply the site piping system, which will feed the new sprinkler system.

The fire protection systems will be designed and installed in accordance with the State of Connecticut Building Code, the State of Connecticut Fire Safety Code, NFPA Standards, and the Town of Branford Fire Marshal.

The design criteria will incorporate the Town of Branford's insurance company requirements and NFPA Standards.

The fire protection system will include a hydraulically balanced sprinkler system throughout the entire building. A standpipe system will also be provided at each exit stairway with hose valves at the intermediate landings.

The fire main service will be located within the ground floor fire pump room. The fire protection system installation will comply with the NFPA 13, 14, local authorities, and the insurance carrier's requirements. The fire pump will be located in a dedicated two-hour rated room, with backflow preventer, alarm check valve, test header, flow meter, etc.

Fire Sprinklers

A wet pipe system will be utilized to sprinkle the entire School. Limited areas that are subject to freezing will be protected with dry sidewall heads and/or dry alarm valves.

Materials

The specification for the piping will be Schedule 40 black steel pipe and threaded fittings.

Sprinkler heads will be UL Listed, FM Approved automatic type; upright, concealed pendent, pendent or sidewall to meet conditions, and of proper temperature rating. The deflector will be marked to indicate position.

The valve supervisory devices will be UL Listed, FM Approved, and tamperproof signaling initiating switches arranged to detect closed valve position.

An automatic alarm valve will be located on each sprinkler riser, complete with all trim, including water flow "alarm" switch and water gong.

The fire suppression system will be integrated with the hood. It will be a UL Listed, FM Approved, pre-engineered liquid agent cartridge-operated type, with a fixed nozzle agent distribution network.



6.4 Heating, Ventilating and Air Conditioning Systems

Central Plant

The existing 600-ton chiller, cooling tower, plate frame heat exchanger for the water side economizer, and associated pumps will remain. This equipment will be re-evaluated during the design process to confirm that the required building loads will be met.

If a new central cooling plant is required, it will be based on a water-cooled chiller, cooling tower, and water side economizer, similar to the existing plant.

The existing hot water distribution, including boilers and pumps, will remain. However, re-evaluation during the design process will confirm the system is adequate to meet the new building loads. If new heating equipment is required, high efficiency condensing boilers with NEMA Premium® efficiency pumps will be utilized.

The existing pool heating equipment will remain, however a new fuel cell, similar to the Branford High School Trigeneration System will be used to reduce the pool equipment's energy consumption. If used, this system will also provide a source of renewable energy for the School.

New DDC controls will replace the existing pneumatic controls, and report to a central workstation for monitoring and alarms.

A new plate frame heat exchanger and pumps will be provided to produce secondary chilled water distributed at 56 degrees Fahrenheit, and returning at 64 degrees Fahrenheit to the chilled beams. Increasing the chilled water temperature will help prevent condensation within the spaces.

Air Distribution

Air distribution will be provided by a chilled beam system, which will be included in all of the concepts. Each space will be provided with ceiling-mounted chilled beam sized for the room load and a variable air volume box (VAV) to control the ventilation air to the space. This will also allow for demand control ventilation, and allow for a reduction in the size of the main air handling equipment.

All air treatment units installed inside the building will be modular by design and made of 2" double wall construction. The outside air treatment units will distribute air to spaces served by the chilled beams and consist of:



- Mixing and intake/discharge plenums
- Filter sections
- Energy Recover Wheel
- Desiccant Wheel
- NEMA Premium Supply Fan
- NEMA Premium Return Fan
- Cooling coil
- Heating coil

All ductwork, except for showers, labs, and kitchen exhaust, will be galvanized and suited for 4" WG. Critical spaces will be provided with acoustical lining, while all other ductwork will be insulated. Kitchen exhaust will be made of welded construction with fire wrap and cleanouts. Showers and labs will be made of stainless steel. Support of the School's STEM program may include allowing students to examine how the HVAC system reacts when classroom temperature settings are adjusted. Expansion will be facilitated through the DDC controls system to allow students to observe how the building operates throughout the year.

6.5 Electrical Systems

Electrical Service

Existing underground primary electric service will be reused and accessed from the street (the service—circa 1972—has not been evaluated). The service will be routed through the pad-mounted utility step-down transformer to a 3,000-amp 480/277V, three-phase, four-wire, wye-connected secondary service main switchboard. The transformer will remain in its exterior location, and the new switchboard will be located in the main electrical room.

Distribution Equipment

The service entrance will terminate in a switchboard lineup. All circuit breakers will be insulated-case type. Breakers of 1200 amps and smaller will be group-mounted. A TVSS system will be installed at the main service entrance to reduce harmful voltage irregularities entering the building service.



A 480/277V, three-phase, four-wire distribution system will be provided throughout the School to serve the mechanical equipment and lighting panelboards.

A 208/120V, three-phase, four-wire distribution system will be provided throughout the school to serve panelboards for receptacles, fractional

horsepower motors, miscellaneous 120V lighting, and miscellaneous equipment.

Electrical closets will be strategically located throughout the building. Each closet will contain a 480/277V panel(s), a transformer(s), and 208/120V panel(s). Dedicated transformers and panelboards will be provided for computer loads in classrooms, labs, and telecom rooms.

Stand-by Generator

A new 500kW, 480/277V, stand-by generator will be provided to serve the life safety lighting, kitchen, gym, boiler and heating controls, fire alarm, telecom closets, security, telephone, paging/intercom, and other miscellaneous equipment. The generator will be located at the exterior, near the incoming utility feeds.

The stand-by generator will be housed in a walk-in weatherproof, 25dBA reduction, at a 3' sound attenuated enclosure with an integral skid mounted 24-hour fuel tank, and a 30 percent radiator mounted load bank.

Three automatic transfer switches will be located in the main emergency electrical room, and will incorporate the controls to start the generator when needed and under test conditions.

A series of 480/277V and 208/120V panels will be strategically located throughout the facility to accommodate the required emergency loads.

Panelboards and Branch Circuits

Panelboards for both the 208/120V and 480/277V branch circuit distribution power will be installed in electrical closets throughout the building. Load centers will not be used. To allow for future growth, a minimum of 25 percent free branch space will be provided in all of the Panelboards.

All branch circuit wiring for lighting, HVAC equipment, and receptacle power will originate at the respective panelboards. Homeruns, to the first device back-box will be in conduit type MC Cable type permitted thereafter. Numerous receptacles will be provided throughout the School.

Classrooms will be provided with normal convenience outlets, as well as separate circuits for computer outlets as required.

Lighting

Interior lighting will utilize energy efficient LED fixtures conforming to the 2009 International Energy Conservation Code. IES standards will be used to estimate the appropriate lighting levels. As feasible, occupancy sensors will be provided to ensure the lights not remain on in unused spaces. Daylight harvesting will be provided in all areas with vertical fenestrations.

Lighting in classrooms will be pendant-hung continuous row, direct/indirect LED type fixtures. A dimmable system with daylight harvesting will be provided and accommodate 40 to 60 foot-candles.

Lighting in general corridors will be 2x4 LED prismatic type linear fixtures, with lighting levels at 20 to 30 foot-candles.

Recessed 2x2, LED type prismatic troffers will illuminate the office and administrative areas. The system will include occupancy sensors and wall-mounted switch controls. Lighting levels will be 40 to 60 foot-candles.

Lighting in all service areas will be 2x4, LED prismatic type troffers. Light levels will be 20 to 30 foot-candles.

Gym lighting will be high output LED, ceiling mounted strips. Light levels will be in the 50 to 75 foot-candle range.

Building-mounted, LED security lighting will be provided on the exterior building facades, and at each entry/egress point.

The site lighting for the access road and exterior parking lots will use LED lamp types.

6.6 Technology and Security Systems

Emergency Lighting and Exit Signs

Emergency lighting will be fed from the emergency generator system, using UL 924 relays. Universal mount exit signs will be LED illuminated with cast aluminum housing.

Fire Alarm

An intelligent, addressable, network fire alarm system with the required peripheral devices will be installed in compliance with ADA regulations. Voice evacuation will be provided throughout the School. As required by the local Fire Marshal, main fire alarm LCD graphic annunciator panels (FAGAP) will be located by the front entry. The main fire alarm control panel (FACP) will be located in the emergency electrical room.

Manual pull stations will be installed in the egress paths at exterior doors and at entrances to the stairwells. Audible and visual signaling devices will be installed in classrooms, corridors, toilets, cafeteria, gymnasium, etc. Visual-only signaling devices will be installed in all conference rooms, workrooms, storage rooms, etc. A partial smoke detection system is also included in the project.

Lightning Protection System

The existing building and new addition will be provided with a new lightning protection system in accordance with NFPA 780 and all local codes.

Technology

Utility Connections and Interfaces

The site utility contractor will provide conduit from the utility poles/service points to the building for:

- Telephone company service
- Cable company service
- Fiber optic district-wide backbone access
- Spare

The utility company will bring the service feed cables into the building. The termination/demarcation space will be allocated for the utilities within the MDF. The communications raceway will be routed into the MDF, if possible, under building code and construction conditions.

Cabling Within the School

Fiber-optic distribution cables will run from the main equipment room to each of the technology wiring rooms. The District standard provides a minimum of two cables per faceplate. This configuration may not apply to the wireless locations. The wireless interface outlets will be located above the ceiling at strategic locations.

A typical classroom cable configuration will consist of a teacher position, student computer connections, and one printer location. In addition, a wireless location will be included.

The District labeling standard is in place and functioning, and will be respected and specified as a part of this project. It consists of two digits indicating the floor and serving wiring closet, three digits identifying the room number, and two digits identifying the specific cable drop and number.

Public Address

A public address system will be installed throughout the facility. Individual speakers will be located in classrooms, closed rooms, and public areas including corridors and gathering spaces. The system will be equipped and configured in zones to allow paging and announcements to occur in specific rooms, areas, or in groups of areas.

The system will be equipped with a telephone system interface. This will allow authorized users (with access codes) to access the paging system and initiate announcements from any telephone throughout the School. This will ensure the appropriate personnel may make emergency announcements from anywhere within the facility. The public address system will include master clock synchronization time input. In the event class change tones are implemented, synchronization with the clock system will be ensured.

Master Clock System

A master clock system will be implemented throughout the school. The system will synchronize with the Navy clock, or other time standard source. It will provide time corrections/synchronization outputs to the public address system and to other systems as required.

Telephone System

Voice Over Internet Protocol (VOIP) will use the LAN infrastructure for the telephone system. Classroom telephone sets will be located on the teacher's desk. Cabling to these locations will be provided through the base building contract. The Town of Branford will provide the telephone sets and related equipment. UPS and generator power will be provided to secure telephone system operation in the event of power loss.

Video Distribution

Video distribution, including the CATV, will be digital and will run as an application on the LAN infrastructure.

Electronic Security System

The project will include an Intrusion Detection System (IDS) with alarm point monitoring, real-time interrogation, and reporting of field-based electronic security sensors. An Access Control System (ACS) will electronically grant or deny access to certain and specific doors and entryways based on user credentials.

A Video Surveillance System (VSS) will electronically monitor and digitally record video feeds originating from file-based video surveillance cameras. An intercom over IP (IoIP) system will provide secure intercom communications between field sub-stations and master stations located throughout the School.

Concept 2A: New building, retaining Gyms and Pool

7.1 Design Narrative

This concept involves the demolition of most of the existing building; retaining the gyms and pool area.

Parking will be expanded on the northern portion of the site, with a separate entrance for parent drop-off near the north side of the building. A second entrance for buses will connect to the eastern side of the School with a separate exit located past two new sports fields to the northeast of the site. A small parking lot will be added near these fields. The existing running track and field will be relocated further to the southwest of its current position.

Gyms and pools will receive minimal renovation, but the locker area will be altered significantly to address accessibility and other issues. The new Board of Education space will be located adjacent to the gym/pool area, and close to Media, Arts, and Cafetorium. Two wings of classroom will extend from the center, housing the fifth and sixth grades in separate wings on the first floor, with seventh and eighth grades on the second floor.

Mitigating accessibility, code, security, and safety issues easily done in this concept since the bulk of the School will be purpose-built. Daylight and views will also be easily integrated. Unlike Concept 1, the parking and drop-off areas will be straightforward. New finishes and systems will be incorporated.

Pros

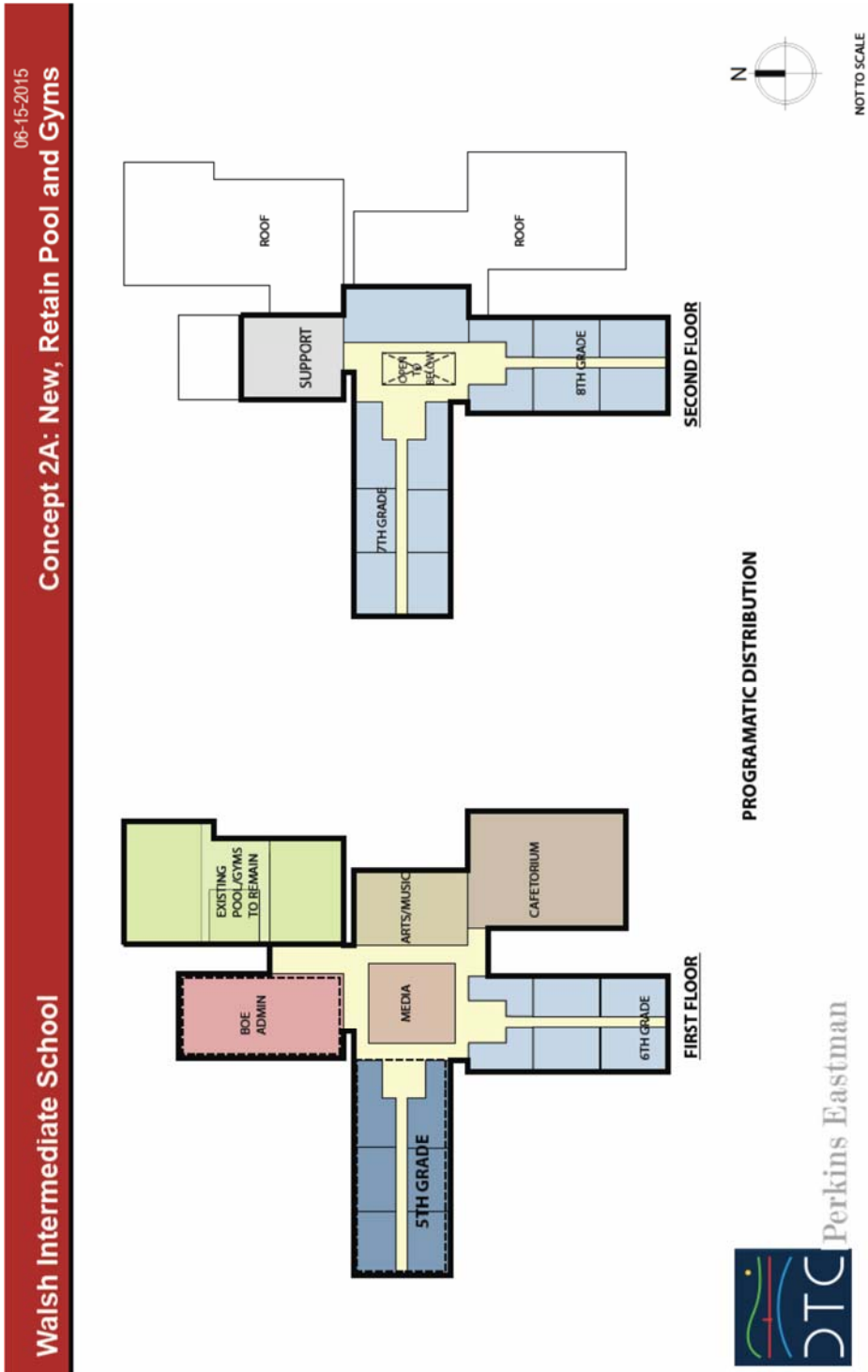
- Retains elements of existing building that are in good condition— pool, auxiliary gym, which are unlikely to be reimbursable under an all-new scheme
- Facilitates improved separation between parent and bus drop-off
- Provides a higher estimated reimbursement rate than Concept 2B—All New
- Clear phasing plan; new academic area can be constructed before removing most of the existing building
- More straightforward security design than the Concept 1 solution

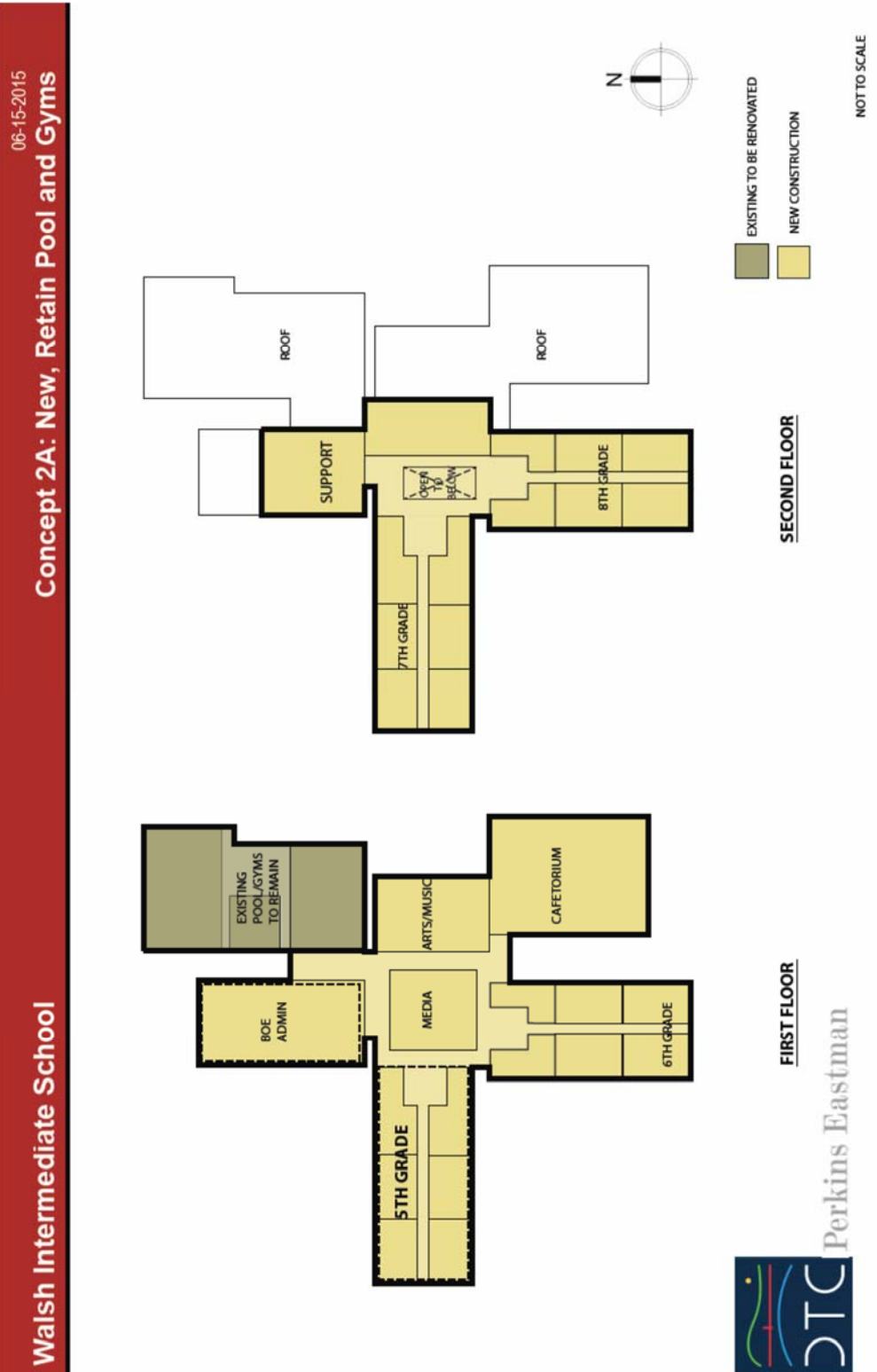
Cons

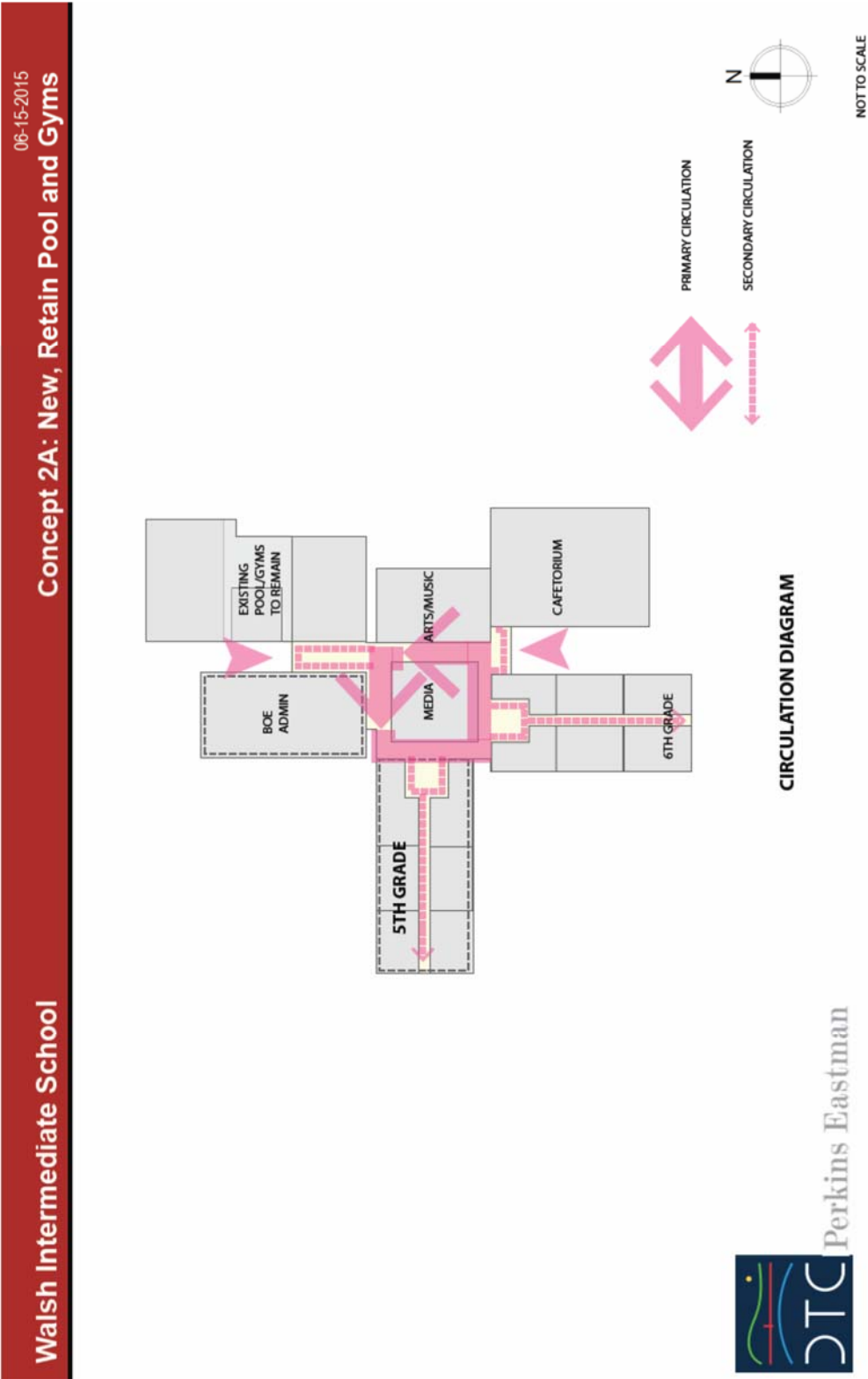
- High gross project costs
- High site costs resulting from the relocation of fields and parking
- The new construction must be sited near the wetlands setbacks and neighboring residential properties, while maintaining the existing building



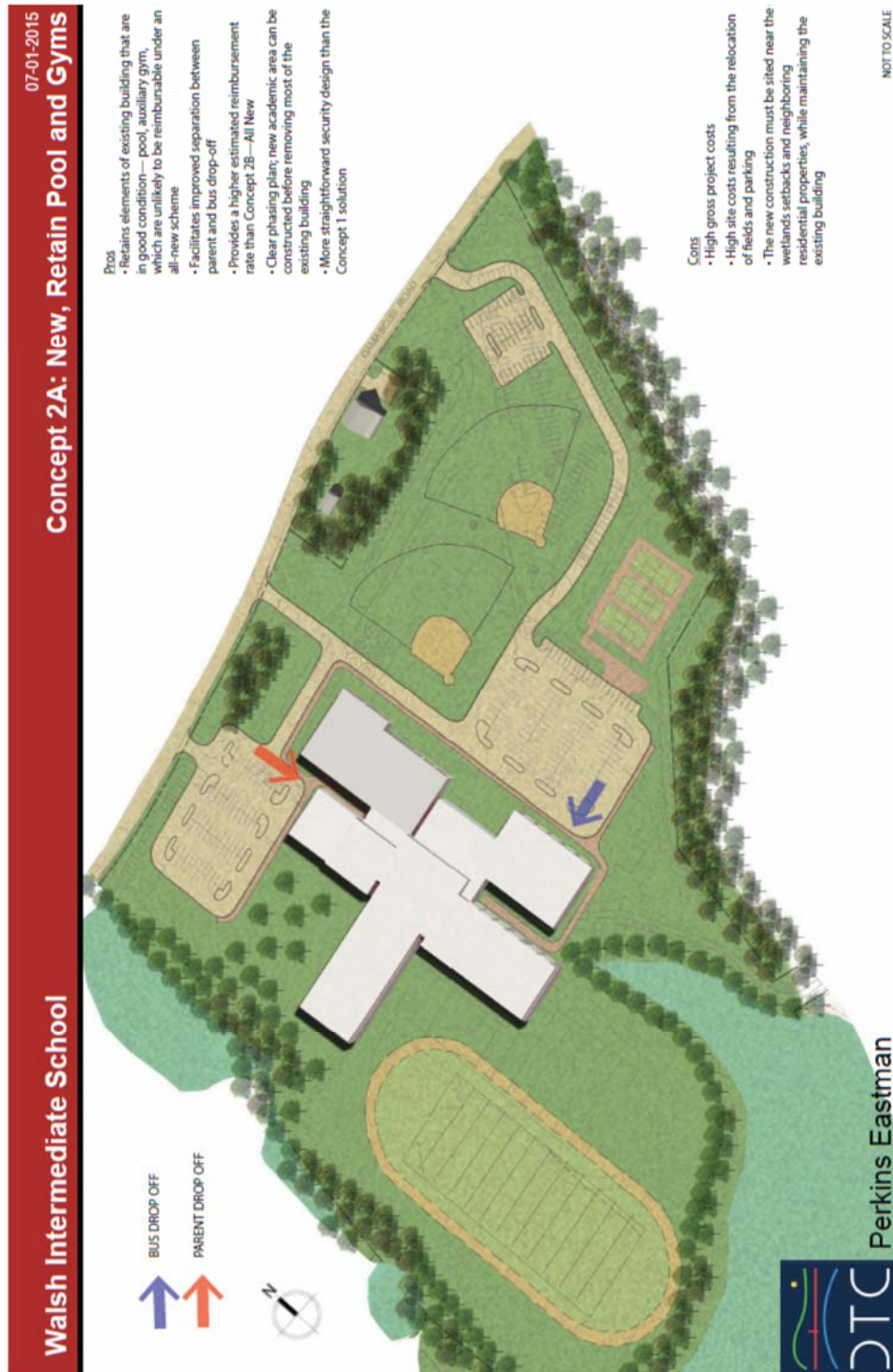
7.2 Proposed Architectural Floor Plans







7.3 Proposed Site Design Layout





Francis Walsh Intermediate School

Perkins Eastman

7.4 Code Analysis

Egress and accessibility can be easily achieved in this purpose-built building.

7.3 Proposed Phasing

In this concept, the existing building will remain fully functional as the new building is completed. The phased renovation of the gym/pool area will be completed over a summer. Upon its completion, the children will be moved into the new building, and the existing building will be demolished. (See schedule section in the Appendix).

8. Concept Design—Engineering Components—Option 2A

8.1 Site/Civil Improvements

For Concept Design 2A, the renovation and improvement of the Campus includes:

- New separate entrance drive for bus traffic from Damascus Road
- New staff parking lot north of the new school addition
- New staff parking east of the new school addition
- New running track and athletic field
- New baseball fields (two) and adjacent parking lot
- New parking lot and building landscape plantings

8.2 Plumbing Systems

General

The design of all plumbing systems will comply with the International Plumbing Code, Americans with Disability Act, State of Connecticut Water Conservation Standards, and the Educational Specifications for the new School.

Energy Conservation

The International Plumbing Code requirements will be utilized to develop conservation solutions. Additional methods will be explored to create higher energy savings, such as using ultra-low flow fixtures. Provisions for the physically handicapped as required by the International Building Code and State of Connecticut will be included. Potable water supply will be protected against backflow, back-siphonage, cross connection, and other unsanitary conditions.

Sanitary Drainage

The drainage of the plumbing fixtures, sinks, showers, drinking fountains, and floor drains will be piped to the sanitary building drain; all fixtures and drains will be vented to the atmosphere.

Solids drainage in all of the art room fixtures will be discharged through an appropriate solids separator. Disposal will be through a connection to the building sanitary sewer system, which will be separate from the storm sewer system. Floor drains will be a cast iron body with a trap primer connection, appropriate inlet strainer, and interior drain.



Acid Waste System

Acid waste and vent piping will be polypropylene. A central acid waste neutralization tank with monitoring will be provided for all science and prep room sinks.

Radon Removal System

A radon system is required for all New Haven County Schools funded by the Connecticut Office of School Facility Unit. The system will consist of an active soil depressurization system, a radon suction pit, schedule 40 PVC vent piping, and a radon fan located on the roof. A separate radon system—totaling four systems—will be provided in each wing of the building.

Kitchen Waste System

A separate kitchen waste system will drain to an onsite, external underground 5,000-gallon grease separator for waste. The waste line will then connect to the exterior sanitary system.

Domestic Water System

Cold water will be piped to all plumbing fixtures, showers, drinking fountains, lawn hydrants, classroom sinks, and safety shower-eye wash stations.

Hot water will be piped to each plumbing fixture and the classroom sinks. The design criteria will comply with the State of Connecticut and Appendix "D" of the National Plumbing Code, based on friction loss charts with a maximum of eight-feet per second velocity.

Cross Connection Protection Devices

Main domestic water service entrance will be protected with a reduced pressure backflow preventer (RPD), automatically operating assembly of pressure differential relief valve, located between two positive seating check valves, equipped with inlet strainer, inlet and outlet gate valves, and test cocks. It will be all bronze construction with non-corrosive internal parts and 150 psi WWP.

Piping Supports

The building structure will be used to support the piping. The design of all supports will comply with the Manufacturers Standardization Society (MSS) Standard Practice SP-69.

Natural Gas Piping and Equipment

A new natural gas connection will be provided from the existing site distribution system. A new meter will be located outside of the boiler room. New piping will be provided from the meter to the School as required to serve the equipment layout.

The domestic water heater equipment will be connected to the natural gas service. The fuel service provider will supply the emergency shut-off system for the water heaters, commercial kitchen, fuel cell, and science labs.

Domestic Water Heater

Domestic hot water will be provided to the building through two, high efficiency, gas-fired, 400-gallon tanks with an input rating of 600 MBH and 600 GPH recovery.

To ensure hot water availability to all fixtures at all times, a hot water recirculation system will be provided.

Rainwater Harvesting System

A rainwater harvesting recycling system will be considered to reuse rainwater collected from the roof drains to flush the water closets and urinals. An approved reservoir for collecting the rainwater will be constructed of durable, nonabsorbent, and corrosion-resistant materials. The reservoir will be atmospheric and vented to the exterior. Access openings will be provided to facilitate the inspection and cleaning of its interior.

The reservoir holding capacity will be a minimum of twice the volume of water required to meet the daily flushing requirements of the fixtures supplied with rainwater. The reservoir will be sized to limit the retention time of gray water to 72-hours maximum.

Rainwater entering the reservoir will pass through an approved filter such as a media, sand, or diatomaceous earth filter. It will be disinfected by an approved method, employing one or more disinfectants such as chlorine, iodine, or ozone. Potable water will be supplied as an alternative source for the rainwater system, which will be protected against backflow. There will be a full-open valve on the makeup water supply line to the reservoir.

The collection reservoir will be equipped with an overflow pipe of the same diameter as the influent pipe for the rainwater. The overflow will be connected directly to the stormwater drainage system. A drain will be located at the lowest point of the collection reservoir and then connected to the stormwater drainage system. The drain and the overflow pipe will be the same diameter, and will be provided with a full-open valve.

A food-grade vegetable dye will be used to dye the rainwater blue or green before it is supplied to the fixtures. All rainwater distribution piping and reservoirs will be identified as containing nonpotable water. Piping identification will also be provided.

8.3 Fire Protection

General

Fire protection systems will be renovated, updated, or replaced with an automatic wet pipe sprinkler system as necessary to provide protection for the building, office areas, classrooms, gymnasium, workrooms, storage areas, and contents. The public water main will supply the site piping system, which will feed the new sprinkler system.

The fire protection systems will be designed and installed in accordance with the State of Connecticut Building Code, the State of Connecticut Fire Safety Code, NFPA Standards, and the Town of Branford Fire Marshal.

The design criteria will incorporate the Town of Branford's insurance company requirements and NFPA Standards.

The fire protection system will include a hydraulically balanced sprinkler system throughout the entire building. A standpipe system will also be provided at each exit stairway with hose valves at the intermediate landings.

The fire main service will be located within the ground floor fire pump room. The fire protection system installation will comply with the NFPA 13, 14, local authorities, and the insurance carrier's



requirements. The fire pump will be located in a dedicated two-hour rated room, with backflow preventer, alarm check valve, test header, flow meter, etc.

Fire Sprinklers

A wet pipe system will be utilized to fully sprinkle the School. Limited areas that are subject to freezing will be protected with dry sidewall heads and/or dry alarm valves.

Materials

The specification for the piping will be Schedule 40 black steel pipe and threaded fittings.

Sprinkler heads will be UL Listed, FM Approved automatic type; upright, concealed pendent, pendent or sidewall to meet conditions, and of proper temperature rating. The deflector will be marked to indicate position.

The valve supervisory devices will be UL Listed, FM Approved, and tamperproof signaling initiating switches arranged to detect closed valve position.

An automatic alarm valve will be located on each sprinkler riser, complete with all trim, including water flow "alarm" switch and water gong.

The fire suppression system will be integrated with the hood. It will be a UL Listed, FM Approved, pre-engineered liquid agent cartridge-operated type, with a fixed nozzle agent distribution network.

8.4 Heating, Ventilating and Air Conditioning Systems

Central Plant

The existing 600-ton chiller, cooling tower, plate frame heat exchanger for the water side economizer, and associated pumps are intended to remain, however they will be re-evaluated during the design process to confirm the equipment will meet the loads required for the School.

If a new central cooling plant is required, it will be based on a water-cooled chiller, cooling tower, and water side economizer, similar to the existing plant.

The existing hot water distribution system, including boilers and pumps, are also intended to remain. However, the system will be re-evaluated during the design process to confirm it will meet the new building loads. If new heating equipment is required, high efficiency condensing boilers with NEMA Premium® efficiency pumps will be utilized.

The existing pool heating equipment will remain, however a new fuel cell, similar to the Branford High School Trigeneration System will be used to reduce energy consumption. If used, this system will also provide a source of renewable energy for the School.

New DDC controls will replace the existing pneumatic controls, and report to a central workstation for monitoring and alarms.

A new plate frame heat exchanger and pumps will be provided to produce secondary chilled water distributed at 56 degrees Fahrenheit, and returning at 64 degrees Fahrenheit to the chilled beams. Increasing the chilled water temperature will help prevent condensation within the spaces.

Air Distribution

Air distribution will be provided by a chilled beam system, which is included in all of the concepts. Each space will be provided with ceiling-mounted chilled beam sized for the room load and a variable air volume box (VAV) to control the ventilation air to the space. This will also allow for demand control ventilation, and allow for a reduction in the size of the main air handling equipment.

All air treatment units installed inside the building will be modular by design and made of 2" double wall construction. The outside air treatment units will distribute air to spaces served by the chilled beams and consist of:

- Mixing and intake/discharge plenums
- Filter sections
- Energy Recover Wheel
- Desiccant Wheel
- NEMA Premium Supply Fan
- NEMA Premium Return Fan
- Cooling coil
- Heating coil

Units consisting of the following sections will serve the cafetorium, gym, and pool:

- Mixing and intake/discharge plenums
- Filter sections
- NEMA Premium Supply Fan
- NEMA Premium Relief Fan
- Cooling coil
- Heating coil

For Concept 2A, a variable refrigerant volume system (VRF) provides an alternative. New air cooled condensers capable of



simultaneous heating and cooling will be installed on the roof of the new building and dedicated outside air units, as mentioned above, will be provided.

All ductwork, except for showers, labs, and kitchen exhaust, will be galvanized and suited for 4" WG. Critical spaces will be provided with acoustical lining, while all other ductwork will be insulated. The kitchen exhaust will be made of welded construction with fire wrap and cleanouts. Showers and labs will be made of stainless steel.

All exhaust fans will be provided with direct drive motors and roof mounted.

Support of the School's STEM program may include allowing students to examine how the HVAC system reacts when classroom temperature settings are adjusted. Expansion will be facilitated through the DDC controls system to allow students to observe how the building operates throughout the year.

8.5 Electrical Systems

Electrical Service

Existing underground primary electric service will be reused and accessed from the street (the service—circa 1972—has not been evaluated). The service will be routed through the pad-mounted utility step-down transformer to a 3,000-amp 480/277V, three-phase, four-wire, wye-connected secondary service main switchboard. The transformer will remain in its exterior location, and the new switchboard will be located in the main electrical room.

Distribution Equipment

The service entrance will terminate in a switchboard lineup. All circuit breakers will be insulated-case type. Breakers of 1200 amps and smaller will be group-mounted. A TVSS system will be installed at the main service entrance to reduce harmful voltage irregularities entering the building service.

A 480/277V, three-phase, four-wire distribution system will be provided throughout the School to serve the mechanical equipment and lighting panelboards.

A 208/120V, three-phase, four-wire distribution system will be provided throughout the school to serve panelboards for receptacles, fractional horsepower motors, miscellaneous 120V lighting, and miscellaneous equipment.

Electrical closets will be strategically located throughout the building. Each closet will contain a 480/277V panel(s), a transformer(s), and 208/120V panel(s). Dedicated transformers and panelboards will be provided for computer loads in classrooms, labs, and telecom rooms.

Stand-by Generator

A new 500kW, 480/277V, stand-by generator will be provided to serve the life safety lighting, kitchen, gym, boiler and heating controls, fire alarm, telecom closets, security, telephone, paging/intercom, and other miscellaneous equipment. The generator will be located at the exterior, near the incoming utility feeds.



The stand-by generator will be housed in a walk-in weatherproof, 25dBA reduction, at a 3' sound attenuated enclosure with an integral skid mounted 24-hour fuel tank, and a 30 percent radiator mounted load bank.

Three automatic transfer switches will be located in the main emergency electrical room, and will incorporate the controls to start the generator when needed and under test conditions.

A series of 480/277V and 208/120V panels will be strategically located throughout the facility to accommodate the required emergency loads.

Panelboards and Branch Circuits

Panelboards for both the 208/120V and 480/277V branch circuit distribution power will be installed in electrical closets throughout the building. Load centers will not be used. To allow for future growth, a minimum of 25 percent free branch space will be provided in all of the panelboards.

All branch circuit wiring for lighting, HVAC equipment, and receptacle power will originate at the respective panelboards. Homeruns, to the first device back-box will be in conduit type MC Cable type permitted thereafter. Numerous receptacles will be provided throughout the School.

Classrooms will be provided with normal convenience outlets, as well as separate circuits for computer outlets as required.

Lighting

Interior lighting will utilize energy efficient LED fixtures conforming to the 2009 International Energy Conservation Code. IES standards will be used to estimate the appropriate lighting levels. As feasible, occupancy sensors will be provided to ensure the lights not remain on in unused spaces. Daylight harvesting will be provided in all areas with vertical fenestrations.

Lighting in classrooms will be pendant-hung continuous row, direct/indirect LED type fixtures. A dimmable system with daylight harvesting will be provided and accommodate 40 to 60 foot-candles.

Lighting in general corridors will be 2x4 LED prismatic type linear fixtures, with lighting levels at 20 to 30 foot-candles.

Recessed 2x2, LED type prismatic troffers will illuminate the office and administrative areas. The system will include occupancy sensors and wall-mounted switch controls. Lighting levels will be 40 to 60 foot-candles.

Lighting in all service areas will be 2x4, LED prismatic type troffers. Light levels will be 20 to 30 foot-candles.

Gym lighting will be high output LED, ceiling mounted strips. Light levels will be in the 50 to 75 foot-candle range.

Building-mounted, LED security lighting will be provided on the exterior building facades, and at each entry/egress point.

The site lighting for the access road and exterior parking lots will use LED lamp types.

8.6 Technology and Security Systems

Emergency Lighting and Exit Signs

Emergency lighting will be fed from the emergency generator system, using UL 924 relays. Universal mount exit signs will be LED illuminated with cast aluminum housing.

Fire Alarm

An intelligent, addressable, network fire alarm system with the required peripheral devices will be installed in compliance with ADA regulations. Voice evacuation will be provided throughout the School. As required by the local Fire Marshal, main fire alarm LCD graphic annunciator panels (FAGAP) will be located by the front entry. The main fire alarm control panel (FACP) will be located in the emergency electrical room.

Manual pull stations will be installed in the egress paths at exterior doors and at entrances to the stairwells. Audible and visual signaling devices will be installed in classrooms, corridors, toilets, cafeteria, gymnasium, etc. Visual-only signaling devices will be installed in all conference rooms, workrooms, storage rooms, etc. A partial smoke detection system is also included in the project.

Lightning Protection System

The existing building and new addition will be provided with a new lightning protection system in accordance with NFPA 780 and all local codes.

Technology

Utility Connections and Interfaces

Conduit from the utility poles/service points to the building will be provided by the site utility contractor for the following:

- Telephone company service
- Cable company service
- Fiber optic district-wide backbone access
- Spare

The utility company will bring the service feed cables into the building. The termination/demarcation space will be allocated for the utilities within the MDF. The communications raceway will be routed into the MDF, if possible, under building code and construction conditions.

Cabling Within the School

Fiber-optic distribution cables will run from the main equipment room to each of the technology wiring rooms. The District standard provides a minimum of two cables per faceplate. This configuration may not apply to the wireless locations. The wireless interface outlets will be located above the ceiling at strategic locations.

A typical classroom cable configuration will consist of a teacher position, student computer connections, and one printer location. In addition, a wireless location will be included.

The District labeling standard is in place and functioning, and will be respected and specified as a part of this project. It consists of two digits indicating the floor and serving wiring closet, three digits identifying the room number, and two digits identifying the specific cable drop and number.

Public Address

A public address system will be installed throughout the facility. Individual speakers will be located in classrooms, closed rooms, and public areas including corridors and gathering spaces. The system will be equipped and configured in zones to allow paging and announcements to occur in specific rooms, areas, or in groups of areas.

The system will be equipped with a telephone system interface. This will allow authorized users (with access codes) to access the paging system and initiate announcements from any telephone throughout the School. This will ensure the appropriate personnel may make emergency announcements from anywhere within the facility. The public address system will include master clock synchronization time input. In the event class change tones are implemented, synchronization with the clock system will be ensured.

Master Clock System

A master clock system will be implemented throughout the school. The system will synchronize with the Navy clock, or other time standard source. It will provide time corrections/synchronization outputs to the public address system and to other systems as required.

Telephone System

Voice Over Internet Protocol (VOIP) will use the LAN infrastructure for the telephone system. Classroom telephone sets will be located on the teacher's desk. Cabling to these locations will be provided through the base building contract. The Town of Branford will provide the telephone sets and related equipment. UPS and generator power will be provided to secure telephone system operation in the event of power loss.

Video Distribution

Video distribution, including the CATV, will be digital and will run as an application on the LAN infrastructure.

Electronic Security System

The project will include an Intrusion Detection System (IDS) with alarm point monitoring, real-time interrogation, and reporting of field-based electronic security sensors. An Access Control System (ACS) will electronically grant or deny access to certain and specific doors and entryways based on user credentials.

A Video Surveillance System (VSS) will electronically monitor and digitally record video feeds originating from file-based video surveillance cameras. An intercom over IP (IoIP) system will provide secure intercom communications between field sub-stations and master stations located throughout the School.

Concept 2B: Entirely New building

9.1 Design Narrative

This Concept involves the demolition of the entire existing building, replacing it with a new building elsewhere on the site.

In order to achieve the best phasing, the building should be located to the southeast of the existing building. New parking will be located near the building, and integrate a separation of parent and bus drop-off traffic. The running track and associated field will be relocated into the footprint of the demolished school building, and a new field and parking lot added to the northeastern portion of the site.

Similar in arrangement to Concept 2A, this building will have a new purpose-built gymnasium as a wing, close to the Cafetorium and Arts areas. A new Board of Education space will also be included as shown in Concept 2A.

Pros

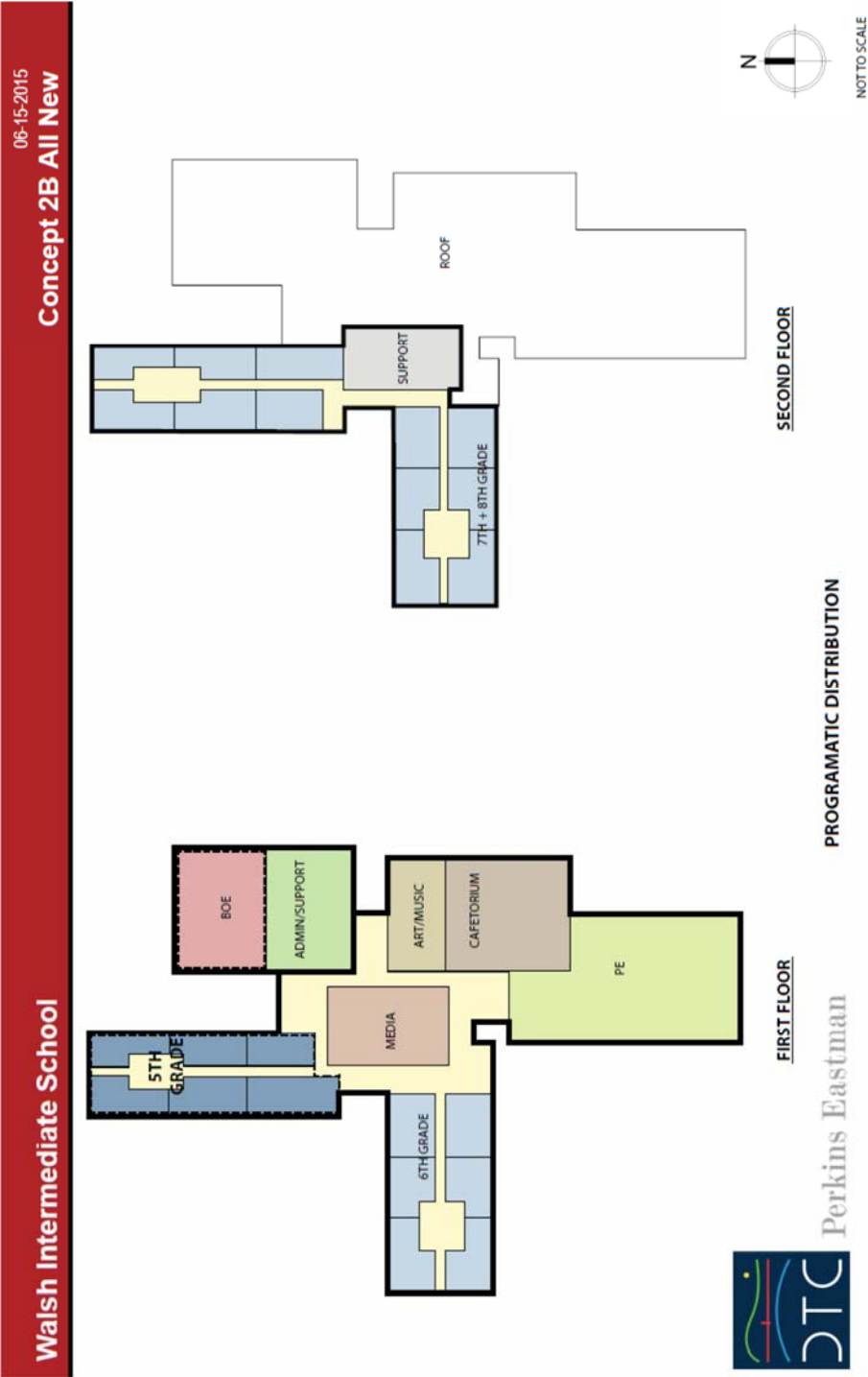
- Facilitates improved separation between parent and bus drop-off
- Fully new, purpose-built school will provide a more efficient space layout than other options
- Transforms the School's image in the community
- Building security is easier to implement than other concepts

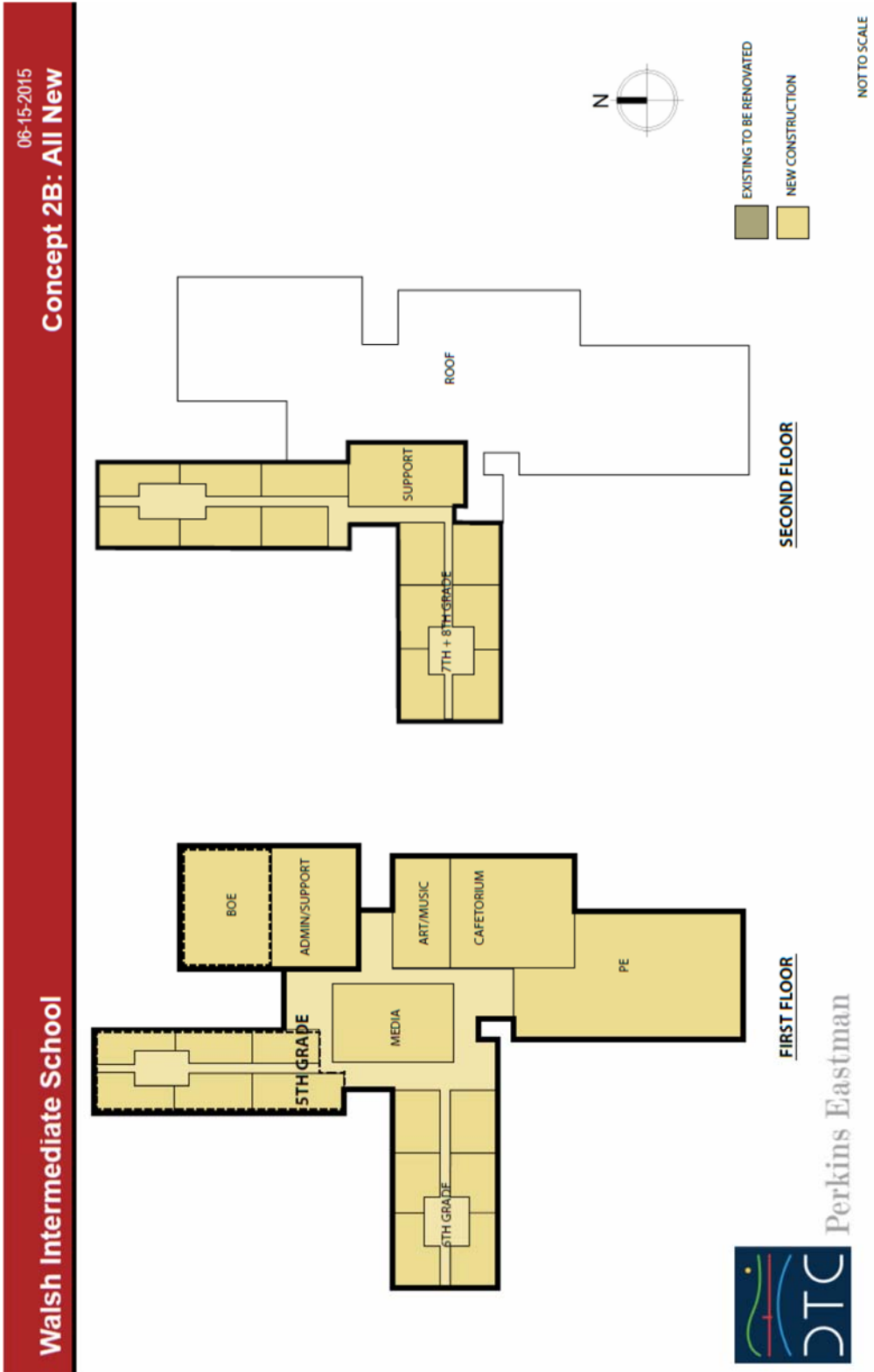
Cons

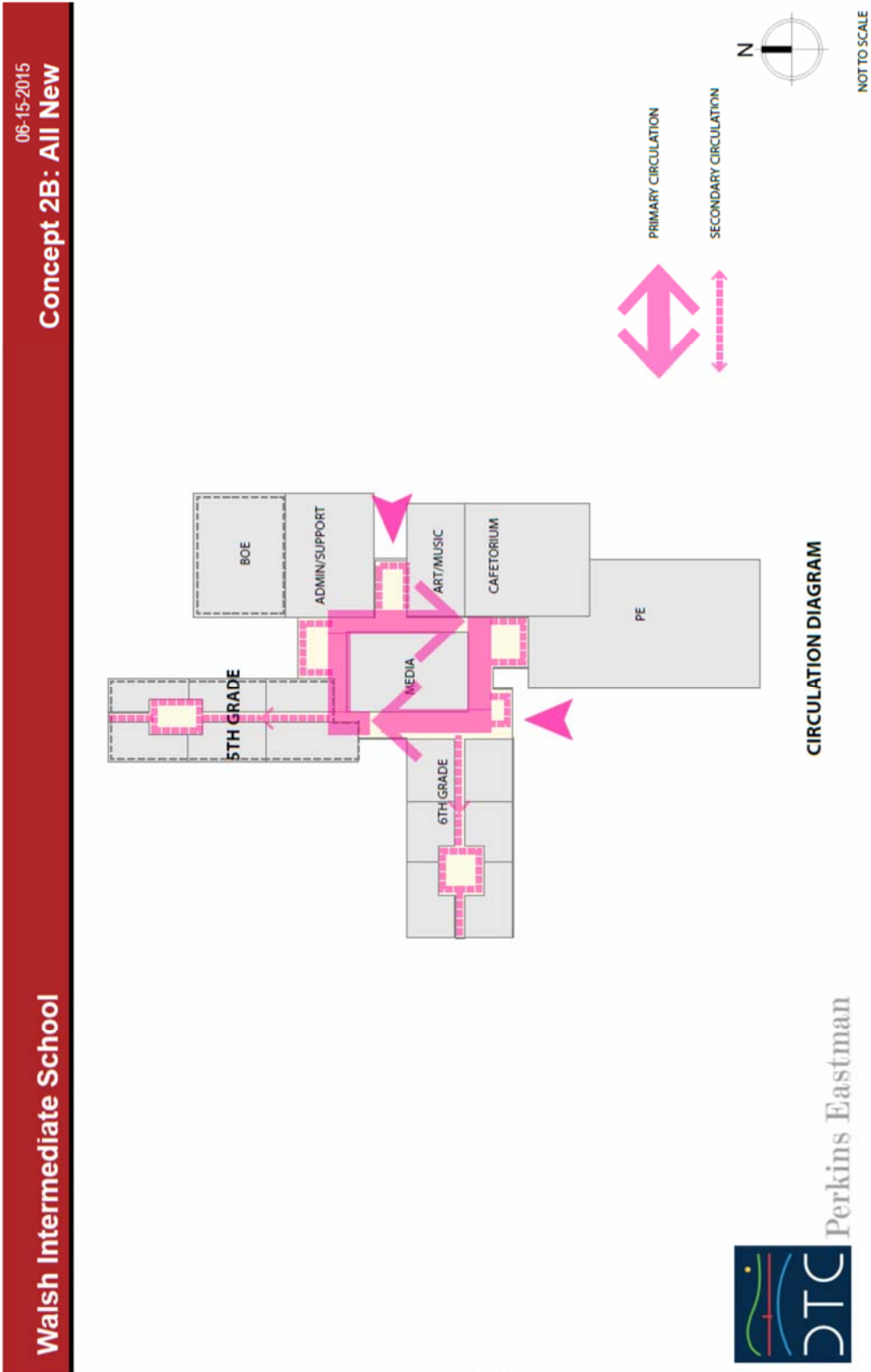
- Highest gross project costs
- High site costs resulting from the relocation of fields and parking
- The new construction must be sited near the wetlands setbacks and neighboring residential properties, while maintaining the existing building



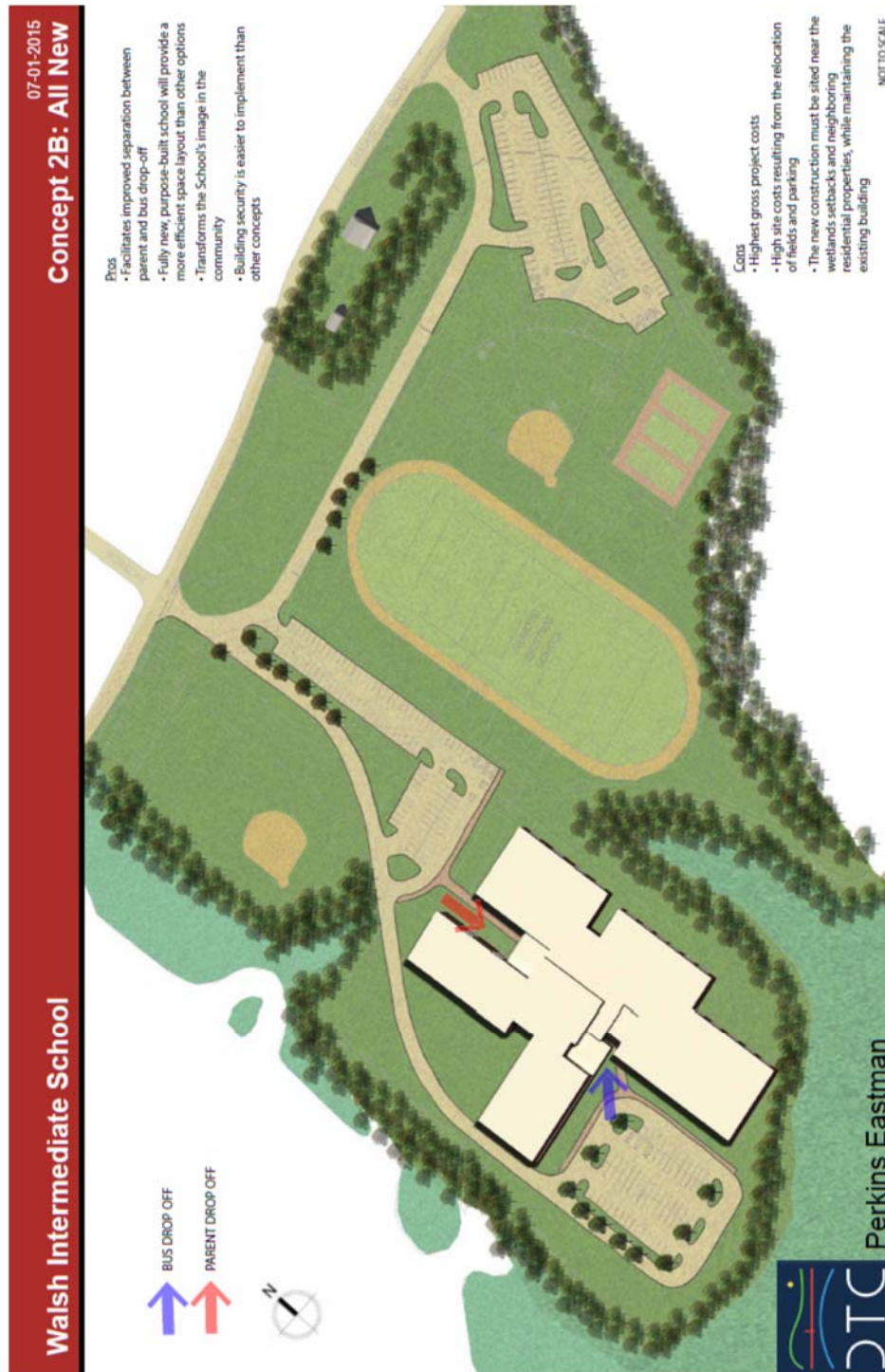
9.2 Proposed Architectural Floor Plans







9.3 Proposed Site Design Layout



9.4 Code Analysis

Egress and accessibility should be easily achieved in this purpose-built building.

9.5 Proposed Phasing

In this concept, the existing building will remain fully functional as the new building is completed. The existing building will be demolished while the new building is occupied (See schedule section in the Appendix).

10. Concept Design—Engineering Components—Option 2B

10.1 Site/Civil Improvements

For Concept 2B, the Campus will be renovated and improved in these areas:

- New separate loop drive for bus traffic
- New staff parking lot located north of the new School building
- New staff parking located south of the new School building
- New running track and athletic field
- New baseball field and renovated adjacent parking lot
- New parking lot and building landscape plantings

10.2 Plumbing Systems

General

The design of the new plumbing systems will conform to the International Plumbing Code, Americans with Disability Act, State of Connecticut Water Conservations Standards, and the Educational Specifications for the new School

Energy Conservation



The International Plumbing Code requirements will be utilized to develop conservation solutions. Additional solutions will be explored to create higher energy savings, such as using ultra-low flow fixtures. Provisions for the physically handicapped as required by the International Building Code and State of Connecticut will be included. Potable water supply will be protected against backflow, back-siphonage, cross connection, and other unsanitary conditions.

Sanitary Drainage

The drainage of the plumbing fixtures, sinks, showers, drinking fountains, and floor drains will be piped to the sanitary building drain; all fixtures and drains will be vented to the atmosphere.

Solids drainage in all of the art room fixtures will be discharged through an appropriate solids separator. Disposal will be through a connection to the building sanitary sewer system, which will be separate from the storm sewer system. Floor drains will be cast iron body with trap primer connection, appropriate inlet strainer, and interior drain.

Acid Waste System

Acid waste and vent piping will be polypropylene. A central acid waste neutralization tank with monitoring will be provided for all science and prep room sinks.

Radon Removal System

A radon system is required for all New Haven County Schools that are funded by the Connecticut Office of School Facility Unit. The system will consist of an active soil depressurization system, a radon suction pit, schedule 40 PVC vent piping, and a radon fan located on the roof. A separate radon system—totaling four systems—will be provided in each wing of the building.

Kitchen Waste System

A separate kitchen waste system will drain to an onsite, external underground 5,000-gallon grease separator for waste. The waste line will then connect to the exterior sanitary system.

Domestic Water System

Cold water will be piped to all plumbing fixtures, showers, drinking fountains, lawn hydrants, classroom sinks, and safety shower-eye wash stations.

Hot water will be piped to each plumbing fixture and the classroom sinks. The design criteria will comply with the State of Connecticut and Appendix "D" of the National Plumbing Code, based on friction loss charts with a maximum of eight-feet per second velocity..

Cross Connection Protection Devices

The main domestic water service entrance will be protected with an automatically operating assembly of a pressure differential relief valve, located between two positive seating check valves. It will be

equipped with an inlet strainer, inlet and outlet gate valves, and test cocks. The unit will be all bronze construction with non-corrosive internal parts, and 150 psi WWP.

Piping Supports

The building structure will be used to support the piping. The design of all supports will comply with the Manufacturers Standardization Society (MSS) Standard Practice SP-69.

Natural Gas Piping and Equipment

A new natural gas connection will be provided from the existing site distribution system. A new meter will be located outside of the boiler room. New piping will be provided from the meter to the School as required to serve the equipment layout.

The domestic water heater equipment will be connected to the natural gas service. The fuel service provider will supply the emergency shut-off system for the water heaters, commercial kitchen, fuel cell, and science labs.

Domestic Water Heater

Domestic hot water will be provided to the building through two, high efficiency, gas-fired, 400-gallon tanks with an input rating of 600 MBH and 600 GPH recovery.

To ensure hot water availability to all fixtures at all times, a hot water recirculation system will be provided.

Rain Water Harvesting System

A rainwater harvesting recycling system will be considered to reuse rainwater collected from the roof drains to flush the water closets and urinals. An approved reservoir for collecting the rainwater will be constructed of durable, nonabsorbent, and corrosion-resistant materials. The reservoir will be atmospheric and vented to the exterior. Access openings will be provided to facilitate the inspection and cleaning of its interior.

The reservoir holding capacity will be a minimum of twice the volume of water required to meet the daily flushing requirements of the fixtures supplied with rainwater. The reservoir will be sized to limit the retention time of gray water to 72-hours maximum.

Rainwater entering the reservoir will pass through an approved filter such as a media, sand, or diatomaceous earth filter. It will be disinfected by an approved method employing one or more disinfectants such as chlorine, iodine, or ozone. Potable water will be supplied as an alternative source

for the rainwater system, which will be protected against backflow. There will be a full-open valve on the makeup water supply line to the reservoir.

The collection reservoir will be equipped with an overflow pipe of the same diameter as the influent pipe for the rainwater. The overflow will be connected directly to the stormwater drainage system. A drain will be located at the lowest point of the collection reservoir and then connected to the stormwater drainage system. The drain and the overflow pipe will be the same diameter, and will be provided with a full-open valve.

A food-grade vegetable dye will be used to dye the rainwater blue or green before it is supplied to the fixtures. All rainwater distribution piping and reservoirs will be identified as containing nonpotable water. Piping identification will also be provided.

10.3 Fire Protection

General

A new automatic wet pipe sprinkler system will be provided in this Concept to protect the building, office areas, classrooms, gymnasium, workrooms, storage areas, and contents. The public water main will supply the site piping system, which will feed the new sprinkler system.

The fire protection systems will be designed and installed in accordance with the State of Connecticut Building Code, the State of Connecticut Fire Safety Code, NFPA Standards, and the Town of Branford Fire Marshal.

The design criteria will incorporate the Town of Branford's insurance company requirements and NFPA Standards.

The fire protection system will include a hydraulically balanced sprinkler system throughout the entire building. A standpipe system will also be provided at each exit stairway with hose valves at the intermediate landings.

The fire main service will be located within the ground floor fire pump room. The fire protection system installation will comply with the NFPA 13, 14, local authorities, and the insurance carrier's requirements. The fire pump will be located in a dedicated two-hour rated room, with backflow preventer, alarm check valve, test header, flow meter, etc.

Fire Sprinklers

A wet pipe system will be utilized to sprinkle the entire School. Limited areas that are subject to freezing will be protected with dry sidewall heads and/or dry alarm valves.

Materials

The specification for the piping will be Schedule 40 black steel pipe and threaded fittings.

Sprinkler heads will be UL Listed, FM Approved automatic type; upright, concealed pendent, pendent or sidewall to meet conditions, and of proper temperature rating. The deflector will be marked to indicate position.

The valve supervisory devices will be UL Listed, FM Approved, and tamperproof signaling initiating switches arranged to detect closed valve position.

An automatic alarm valve will be located on each sprinkler riser, complete with all trim, including water flow "alarm" switch and water gong. The fire suppression system will be integrated with the hood. It will be a UL Listed, FM Approved, pre-engineered liquid agent cartridge-operated type, with a fixed nozzle agent distribution network.

10.4 Heating, Ventilating and Air Conditioning Systems

Central Plant

The new central cooling plant will include a water-cooled chiller, cooling tower and water side economizer.

The new heating equipment will utilize high efficiency condensing boilers with NEMA Premium[®] efficiency pumps.

New DDC controls will be utilized and report to a central workstation for monitoring and alarms.

A new plate frame heat exchanger and pumps will be provided to produce secondary chilled water distributed at 56 degrees Fahrenheit, and returning at 64 degrees Fahrenheit to the chilled beams. Increasing the chilled water temperature will help prevent condensation within the spaces.

Air Distribution

Air distribution will be provided by a chilled beam system, which is included in all of the concepts. Each space will be provided with ceiling-mounted chilled beam sized for the room load and a variable air volume box (VAV) to control the ventilation air to the space. This will also allow for demand control ventilation, and allow for a reduction in the size of the main air handling equipment.

All air treatment units installed inside the building will be modular by design and made of 2" double wall construction. The outside air treatment units will distribute air to spaces served by the chilled beams and consist of:

- Mixing and intake/discharge plenums
- Filter sections
- Energy Recover Wheel
- Desiccant Wheel
- NEMA Premium Supply Fan
- NEMA Premium Return Fan
- Cooling coil
- Heating coil

The units consisting of the following sections will serve the cafetorium and gym:

- Mixing and intake/discharge plenums
- Filter sections
- NEMA Premium Supply Fan
- NEMA Premium Relief Fan
- Cooling coil
- Heating coil

All ductwork, except for showers, labs, and kitchen exhaust, will be galvanized and suited for 4" WG. Critical spaces will be provided with acoustical lining, while all other ductwork will be insulated. The kitchen exhaust will be made of welded construction with fire wrap and cleanouts. Showers and labs will be made of stainless steel. All exhaust fans will be provided with direct drive motors and roof mounted.

Support of the School's STEM program may include allowing students to examine how the HVAC system reacts when classroom temperature settings are adjusted. Expansion will be facilitated through the DDC controls system to allow students to observe how the building operates throughout the year.

10.5 Electrical Systems

Electrical Service

Existing underground primary electric service will be reused and accessed from the street (the service— circa 1972—has not been evaluated). The service will be routed through the pad-mounted utility step-down transformer to a 3,000-amp 480/277V, three-phase, four-wire, wye-connected secondary service main switchboard. The transformer will remain in its exterior location, and the new switchboard will be located in the main electrical room.[CH1]



Distribution Equipment

The service entrance will terminate in a switchboard lineup. All circuit breakers will be insulated-case type. Breakers of 1200 amps and smaller will be group-mounted. A TVSS system will be installed at the main service entrance to reduce harmful voltage irregularities entering the building service.

A 480/277V, three-phase, four-wire distribution system will be provided throughout the School to serve the mechanical equipment and lighting panelboards.

A 208/120V, three-phase, four-wire distribution system will be provided throughout the school to serve panelboards for receptacles, fractional horsepower motors, miscellaneous 120V lighting, and miscellaneous equipment.

Electrical closets will be strategically located throughout the building. Each closet will contain a 480/277V panel(s), a transformer(s), and 208/120V panel(s). Dedicated transformers and panelboards will be provided for computer loads in classrooms, labs, and telecom rooms.

Stand-by Generator

A new 500kW, 480/277V, stand-by generator will be provided to serve the life safety lighting, kitchen, gym, boiler and heating controls, fire alarm, telecom closets, security, telephone, paging/intercom, and other miscellaneous equipment. The generator will be located at the exterior, near the incoming utility feeds.

The stand-by generator will be housed in a walk-in weatherproof, 25dBA reduction, at a 3' sound attenuated enclosure with an integral skid mounted 24-hour fuel tank, and a 30 percent radiator mounted load bank.

Three automatic transfer switches will be located in the main emergency electrical room, and will incorporate the controls to start the generator when needed and under test conditions.

A series of 480/277V and 208/120V panels will be strategically located throughout the facility to accommodate the required emergency loads.

Panelboards and Branch Circuits

Panelboards for both the 208/120V and 480/277V branch circuit distribution power will be installed in electrical closets throughout the building. Load centers will not be used. To allow for future growth, a minimum of 25 percent free branch space will be provided in all of the Panelboards.



All branch circuit wiring for lighting, HVAC equipment, and receptacle power will originate at the respective panelboards. Homeruns, to the first device back-box will be in conduit type MC Cable type permitted thereafter. Numerous receptacles will be provided throughout the School.

Classrooms will be provided with normal convenience outlets, as well as separate circuits for computer outlets as required.

Lighting

Interior lighting will utilize energy efficient LED fixtures conforming to the 2009 International Energy Conservation Code. IES standards will be used to estimate the appropriate lighting levels. As feasible, occupancy sensors will be provided to ensure the lights not remain on in unused spaces. Daylight harvesting will be provided in all areas with vertical fenestrations.

Lighting in classrooms will be pendant-hung continuous row, direct/indirect LED type fixtures. A dimmable system with daylight harvesting will be provided and accommodate 40 to 60 foot-candles.

Lighting in general corridors will be 2x4 LED prismatic type linear fixtures, with lighting levels at 20 to 30 foot-candles.

Recessed 2x2, LED type prismatic troffers will illuminate the office and administrative areas. The system will include occupancy sensors and wall-mounted switch controls. Lighting levels will be 40 to 60 foot-candles.

Lighting in all service areas will be 2x4, LED prismatic type troffers. Light levels will be 20 to 30 foot-candles.

Gym lighting will be high output LED, ceiling mounted strips. Light levels will be in the 50 to 75 foot-candle range.

Building-mounted, LED security lighting will be provided on the exterior building facades, and at each entry/egress point.

The site lighting for the access road and exterior parking lots will use LED lamp types.

10.6 Technology and Security Systems

Emergency Lighting and Exit Signs

Emergency lighting will be fed from the emergency generator system, using UL 924 relays. Universal mount exit signs will be LED illuminated with cast aluminum housing.

Fire Alarm

An intelligent, addressable, network fire alarm system with the required peripheral devices will be installed in compliance with ADA regulations. Voice evacuation will be provided throughout the School. As required by the local Fire Marshal, main fire alarm LCD graphic annunciator panels (FAGAP) will be located by the front entry. The main fire alarm control panel (FACP) will be located in the emergency electrical room.

Manual pull stations will be installed in the egress paths at exterior doors and at entrances to the stairwells. Audible and visual signaling devices will be installed in classrooms, corridors, toilets, cafeteria, gymnasium, etc. Visual-only signaling devices will be installed in all conference rooms, workrooms, storage rooms, etc. A partial smoke detection system is also included in the project.

Lightning Protection System

The new building will be provided with a lightning protection system in accordance with NFPA 780 and all local codes.

Technology

Utility Connections and Interfaces

The site utility contractor will provide conduit from the utility poles/service points to the building for the following:

- Telephone company service
- Cable company service
- Fiber optic district-wide backbone access
- Spare

The utility company will bring the service feed cables into the building. The termination/demarcation space will be allocated for the utilities within the MDF. The communications raceway will be routed into the MDF, if possible, under building code and construction conditions.

Cabling Within the School

Fiber-optic distribution cables will run from the main equipment room to each of the technology wiring rooms. The District standard provides a minimum of two cables per faceplate. This configuration may not apply to the wireless locations. The wireless interface outlets will be located above the ceiling at strategic locations.

A typical classroom cable configuration will consist of a teacher position, student computer connections, and one printer location. In addition, a wireless location will be included.

The District labeling standard is in place and functioning, and will be respected and specified as a part of this project. It consists of two digits indicating the floor and serving wiring closet, three digits identifying the room number, and two digits identifying the specific cable drop and number.

Public Address

A public address system will be installed throughout the School. Individual speakers will be located in classrooms, closed rooms, and public areas including corridors and gathering spaces. The system will be equipped and configured in zones to allow paging and announcements to occur in specific rooms, areas, or in groups of areas.

The system will be equipped with a telephone system interface. This will allow authorized users (with access codes) to access the paging system and initiate announcements from any telephone throughout the School. This will ensure the appropriate personnel may make emergency announcements from anywhere within the facility. The public address system will include master clock synchronization time input. In the event class change tones are implemented, synchronization with the clock system will be ensured.

Master Clock System

A master clock system will be implemented throughout the school. The system will synchronize with the Navy clock, or other time standard source. It will provide time corrections/synchronization outputs to the public address system and to other systems as required.

Telephone System

Voice Over Internet Protocol (VOIP) will use the LAN infrastructure for the telephone system. Classroom telephone sets will be located on the teacher's desk. Cabling to these locations will be provided through the base building contract. The Town of Branford will provide the telephone sets and related equipment. UPS and generator power will be provided to secure telephone system operation in the event of power loss.

Video Distribution

Video distribution, including the CATV, will be digital and will run as an application on the LAN infrastructure.



Electronic Security System

The project will include an Intrusion Detection System (IDS) with alarm point monitoring, real-time interrogation, and reporting of field-based electronic security sensors. An Access Control System (ACS) will electronically grant or deny access to certain and specific doors and entryways based on user credentials.

A Video Surveillance System (VSS) will electronically monitor and digitally record video feeds originating from file-based video surveillance cameras. An intercom over IP (IoIP) system will provide secure intercom communications between field sub-stations and master stations located throughout the School.

Concept 3: New/Renovate Hybrid

11.1 Design Narrative

This Concept involves demolishing approximately half of the existing building, and replacing it with a new building elsewhere on the site.

In this approach, a new academic wing will be added to the eastern side of the existing building, adjacent to the current industrial arts area, but separated from it by a courtyard. Parking will be relocated to provide parent drop-off near the front of the building. Bus and parking will be relocated to the southern portion of the building, in the footprint of the demolished previous academic area. A new lobby will be located at the southernmost tip of the remaining existing building, to provide a gathering zone for bus drop-off and pick-up, and as auxiliary space adjacent to the proposed server.

Gyms, pool, cafetorium, servery, arts program area, administration, and Board of Education spaces will be included in the remaining portion of the existing building, with relatively light renovation.

Classrooms, media center, and other academic spaces will be located in the new two-story academic wing, which will connect in several places to the remaining existing building.

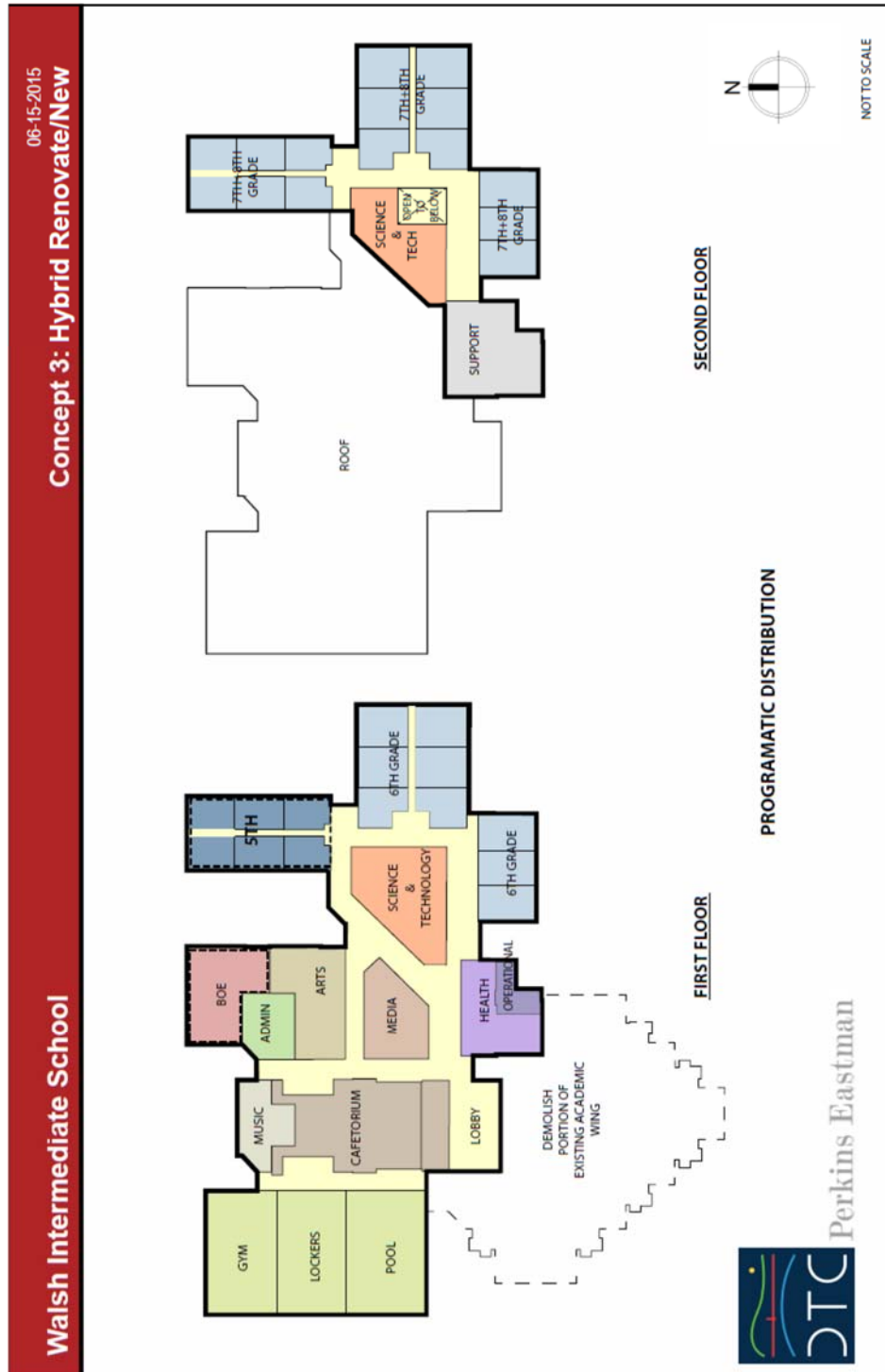
Pros

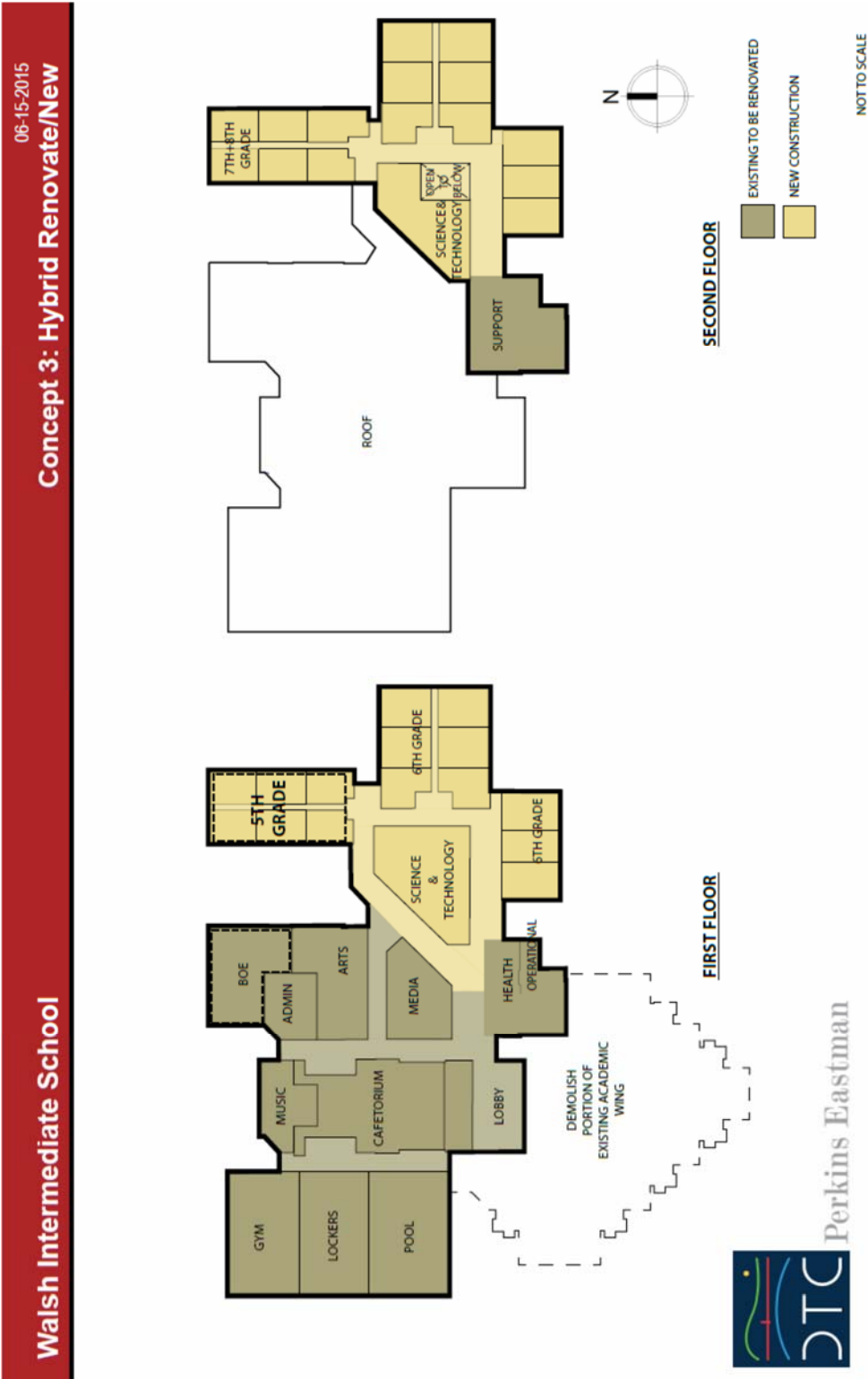
- Retains elements of existing building that are in good condition, and allows for the efficient reconfiguration of academic spaces
- Provides excellent separation between parent and bus drop-off traffic
- Creates a new configuration of academic space and transforms the School's image in the community
- Minimizes the relocation of fields and parking compared to the Concepts 2A and 2B solutions
- Streamlines construction phasing—schedule is anticipated to be shorter and logistically easier than Concept 1
- More straightforward security design than the Concept 1 solution
- Parking is located nearer to fields than in Concept 1

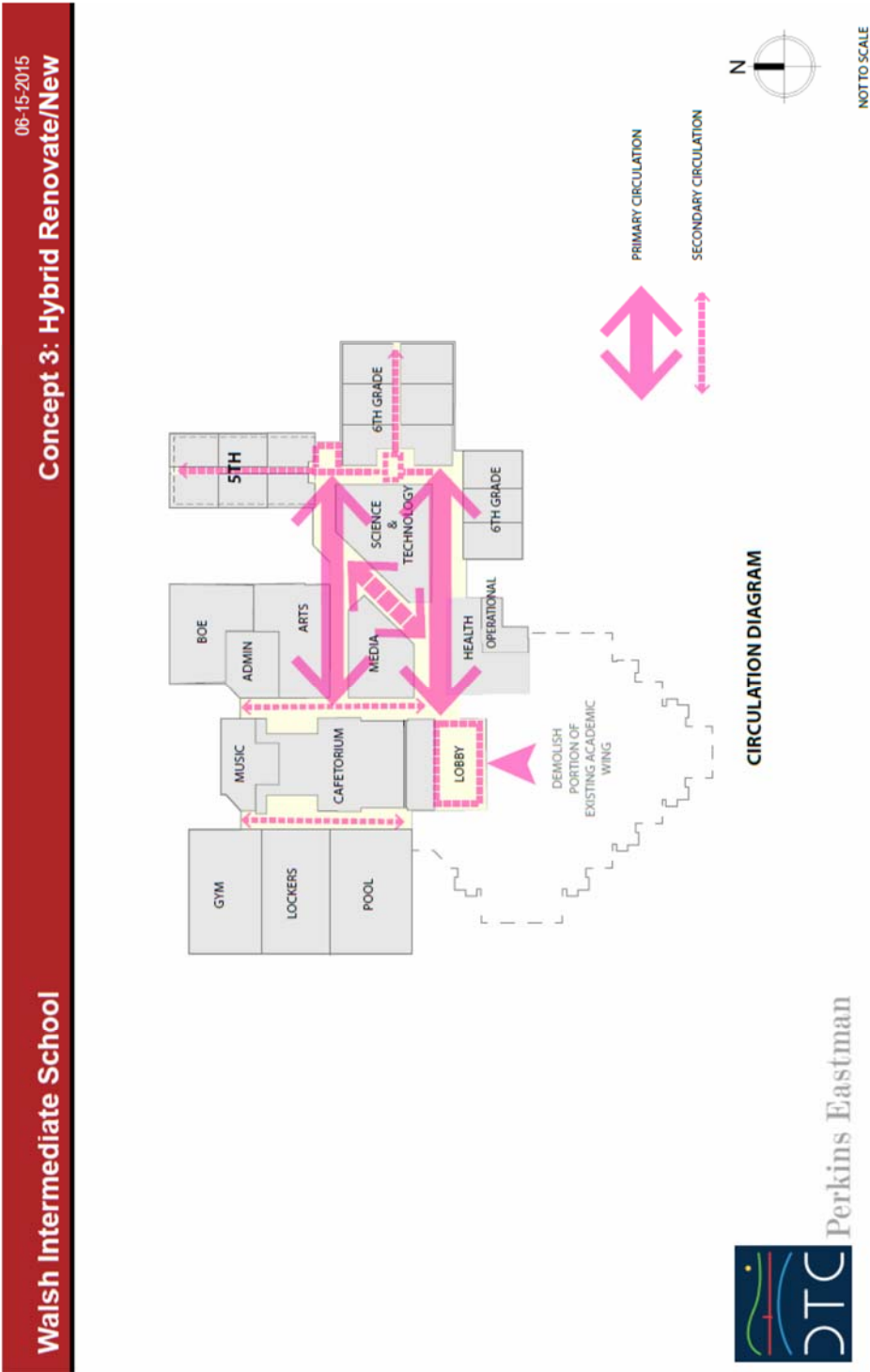
Cons

- Does not leverage the existing high-quality arts and cafeteria spaces
- Demolishes existing academic areas
- Lengthy phasing plan
- Loss of recently replaced roofing

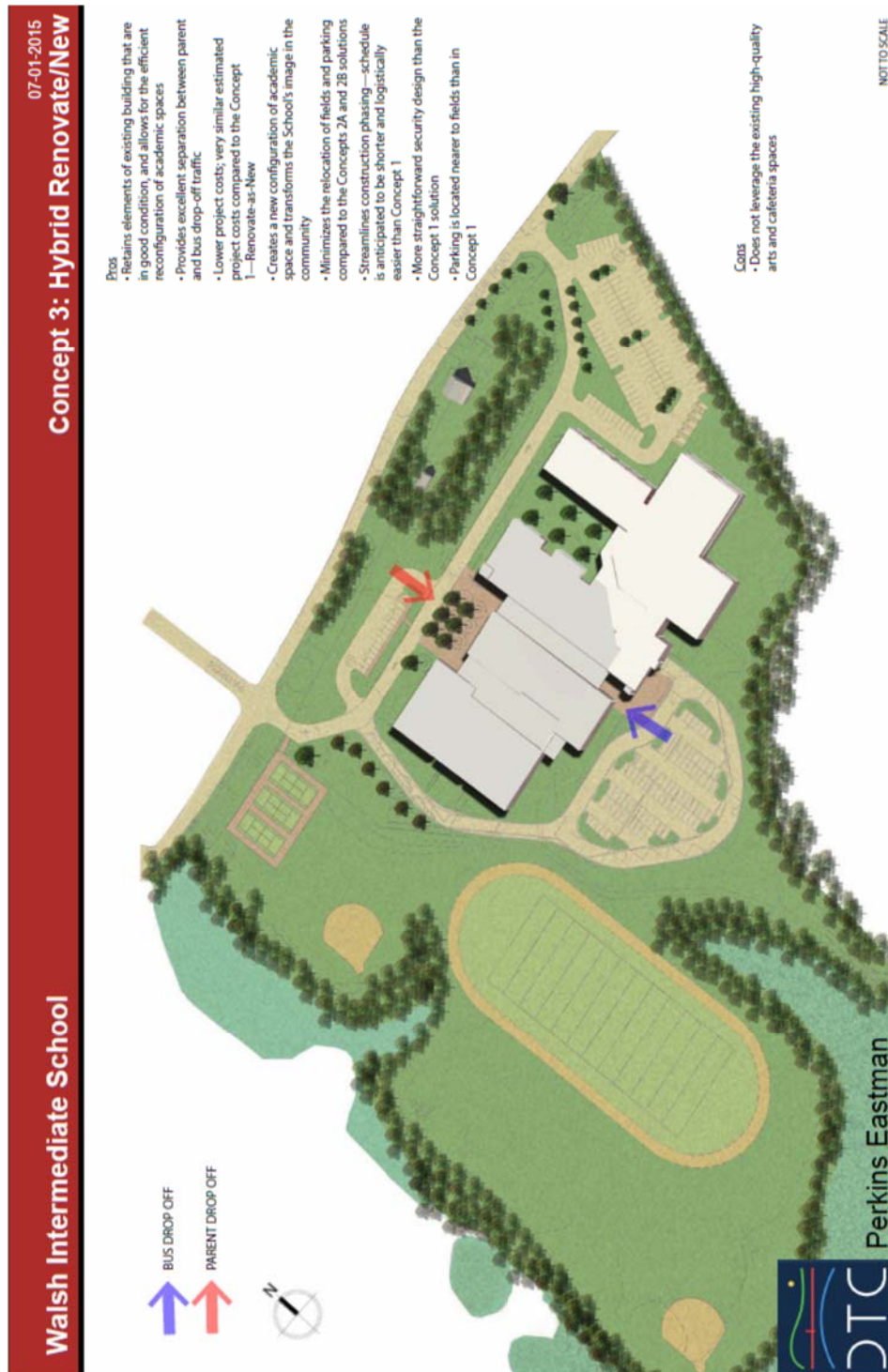
11.2 Proposed Architectural Floor Plans







11.3 Proposed Site Design Layout



11.4 Code Analysis

Egress and accessibility are easily achieved in this configuration, while maintaining a limited number of easily monitored exits for security purposes.

11.5 Proposed Phasing

In this concept, the existing building will remain fully functional as the new addition is completed. The academic portion of the existing building will be demolished, while the new building is occupied (See schedule section in the Appendix).

12. Concept Design—Engineering Components—Option 3

12.1 Site/Civil Improvements

For Concept 3—New Intermediate School, retain Pool and BOE space—the Middle School campus will be renovated and improved in these areas:

- New separate loop drive for bus traffic
- New staff parking lot south of the school building
- Renovated staff parking east of the new school addition
- New parking lot and building landscape plantings

12.2 Plumbing Systems

General

The design of all plumbing systems will comply with the International Plumbing Code, Americans with Disability Act, State of Connecticut Water Conservations Standards, and the Educational Specifications for the new School.

Energy Conservation

The International Plumbing Code requirements will be utilized to develop conservation solutions. Additional solutions will be explored to create higher energy savings, such as using ultra-low flow fixtures. Provisions for the physically handicapped as required by the International Building Code and State of Connecticut will be included. Potable water supply will be protected against backflow, back-siphonage, cross connection, and other unsanitary conditions.



Sanitary Drainage

The drainage of the plumbing fixtures, sinks, showers, drinking fountains, and floor drains will be piped to the sanitary building drain; all fixtures and drains will be vented to the atmosphere.

Solids drainage in all of the art room fixtures will be discharged through an appropriate solids separator. Disposal will be through a connection to the building sanitary sewer system, which will be separate from the storm sewer system. Floor drains will be cast iron body with trap primer connection, appropriate inlet strainer, and interior drain.

Acid Waste System

Acid waste and vent piping will be polypropylene. A central acid waste neutralization tank with monitoring will be provided for all science and prep room sinks.

Radon Removal System

A radon system is required for all New Haven County Schools that are funded by the Connecticut Office of School Facility Unit. The system will consist of an active soil depressurization system, a radon suction pit, schedule 40 PVC vent piping, and a radon fan located on the roof. A separate radon system—totaling four systems—will be provided in each wing of the building.

Kitchen Waste System

A separate kitchen waste system will drain to an onsite, external underground 5,000-gallon grease separator for waste. The waste line will then connect to the exterior sanitary system.

Domestic Water System

Cold water will be piped to all plumbing fixtures, showers, drinking fountains, lawn hydrants, classroom sinks, and safety shower-eye wash stations.

Hot water will be piped to each plumbing fixture and the classroom sinks. The design criteria will comply with the State of Connecticut and Appendix "D" of the National Plumbing Code, based on friction loss charts with a maximum of eight-feet per second velocity.

Cross Connection Protection Devices

The main domestic water service entrance will be protected with an automatically operating assembly of a pressure differential relief valve, located between two positive seating check valves. It will be equipped with an inlet strainer, inlet and outlet gate valves, and test cocks. The unit will be all bronze construction with non-corrosive internal parts, and 150 psi WWP.

Piping Supports

The building structure will be used to support the piping. The design of all supports will comply with the Manufacturers Standardization Society (MSS) Standard Practice SP-69.

Natural Gas Piping and Equipment

A new natural gas connection will be provided from the existing site distribution system. A new meter will be located outside of the boiler room. New piping will be provided from the meter to the School as required to serve the equipment layout.

The domestic water heater equipment will be connected to the natural gas service. The fuel service provider will supply the emergency shut-off system for the water heaters, commercial kitchen, fuel cell, and science labs.

Domestic Water Heater

Domestic hot water will be provided to the building through two, high efficiency, gas-fired, 400-gallon tanks with an input rating of 600 MBH and 600 GPH recovery.

To ensure hot water availability to all fixtures at all times, a hot water recirculation system will be provided.

Rain Water Harvesting System

A rainwater harvesting recycling system will be considered to reuse rainwater collected from the roof drains to flush the water closets and urinals. An approved reservoir for collecting the rainwater will be constructed of durable, nonabsorbent, and corrosion-resistant materials. The reservoir will be atmospheric and vented to the exterior. Access openings will be provided to facilitate the inspection and cleaning of its interior.

The reservoir holding capacity will be a minimum of twice the volume of water required to meet the daily flushing requirements of the fixtures supplied with rainwater. The reservoir will be sized to limit the retention time of gray water to 72-hours maximum.

Rainwater entering the reservoir will pass through an approved filter such as a media, sand, or diatomaceous earth filter. It will be disinfected by an approved method employing one or more disinfectants such as chlorine, iodine, or ozone. Potable water will be supplied as an alternative source for the rainwater system, which will be protected against backflow. There will be a full-open valve on the makeup water supply line to the reservoir.

The collection reservoir will be equipped with an overflow pipe of the same diameter as the influent pipe for the rainwater. The overflow will be connected directly to the stormwater drainage system. A drain will be located at the lowest point of the collection reservoir and then connected to the stormwater drainage system. The drain and the overflow pipe will be the same diameter, and will be provided with a full-open valve.

A food-grade vegetable dye will be used to dye the rainwater blue or green before it is supplied to the fixtures. All rainwater distribution piping and reservoirs will be identified as containing nonpotable water. Piping identification will also be provided.

12.3 Fire Protection

General

The existing fire protection systems will be replaced with an automatic wet pipe sprinkler system to protect the building, office areas, classrooms, gymnasium, workrooms, storage areas, and contents. The public water main will supply the site piping system, which will feed the new sprinkler system.

The fire protection systems will be designed and installed in accordance with the State of Connecticut Building Code, the State of Connecticut Fire Safety Code, NFPA Standards, and the Town of Branford Fire Marshal.

The design criteria will incorporate the Town of Branford's insurance company requirements and NFPA Standards.

The fire protection system will include a hydraulically balanced sprinkler system throughout the entire building. A standpipe system will also be provided at each exit stairway with hose valves at the intermediate landings.

The fire main service will be located within the ground floor fire pump room. The fire protection system installation will comply with the NFPA 13, 14, local authorities, and the insurance carrier's requirements. The fire pump will be located in a dedicated two-hour rated room, with backflow preventer, alarm check valve, test header, flow meter, etc.

Fire Sprinklers

A wet pipe system will be utilized to sprinkle the entire School. Limited areas that are subject to freezing will be protected with dry sidewall heads and/or dry alarm valves.



Materials

The specification for the piping will be Schedule 40 black steel pipe and threaded fittings.

Sprinkler heads will be UL Listed, FM Approved automatic type; upright, concealed pendent, pendent or sidewall to meet conditions, and of proper temperature rating. The deflector will be marked to indicate position.

The valve supervisory devices will be UL Listed, FM Approved, and tamperproof signaling initiating switches arranged to detect closed valve position.

An automatic alarm valve will be located on each sprinkler riser, complete with all trim, including water flow "alarm" switch and water gong.

The fire suppression system will be integrated with the hood. It will be a UL Listed, FM Approved, pre-engineered liquid agent cartridge-operated type, with a fixed nozzle agent distribution network.

12.4 Heating, Ventilating & Air Conditioning Systems

Central Plant

The existing 600-ton chiller, cooling tower, plate frame heat exchanger for the water side economizer, and associated pumps will remain. This equipment will be re-evaluated during the design process to confirm that the required building loads will be met.

If a new central cooling plant is required, it will be based on a water-cooled chiller, cooling tower, and water side economizer, similar to the existing plant.

The existing hot water distribution, including boilers and pumps, will remain. However, re-evaluation during the design process will confirm the system is adequate to meet the new building loads. If new heating equipment is required, high efficiency condensing boilers with NEMA Premium[®] efficiency pumps will be utilized. [CH2]

The existing pool heating equipment will remain, however a new fuel cell, similar to the Branford High School Trigeneration System will be used to reduce the pool equipment's energy consumption. If used, this system will also provide a source of renewable energy for the School.

New DDC controls will replace the existing pneumatic controls, and report to a central workstation for monitoring and alarms.

A new plate frame heat exchanger and pumps will be provided to produce secondary chilled water distributed at 56 degrees Fahrenheit, and returning at 64 degrees Fahrenheit to the chilled beams. Increasing the chilled water temperature will help prevent condensation within the spaces.

Air Distribution

Air distribution will be provided by a chilled beam system, which is included in all of the concepts. Each space will be provided with ceiling-mounted chilled beam sized for the room load and a variable air volume box (VAV) to control the ventilation air to the space. This will also allow for demand control ventilation, and allow for a reduction in the size of the main air handling equipment.

All air treatment units installed inside the building will be modular by design and made of 2" double wall construction. The outside air treatment units will distribute air to spaces served by the chilled beams and consist of:

- Mixing and intake/discharge plenums
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All ductwork, except for showers, labs, and kitchen exhaust, will be galvanized and suited for 4" WG. Critical spaces will be provided with acoustical lining, while all other ductwork will be insulated. The kitchen exhaust will be made of welded construction with fire wrap and cleanouts. Showers and labs will be made of stainless steel. Support of the School's STEM program may include allowing students to examine how the HVAC system reacts when classroom temperature settings are adjusted. Expansion will be facilitated through the DDC controls system to allow students to observe how the building operates throughout the year.

12.5 Electrical Systems

Electrical Service

Existing underground primary electric service will be reused and accessed from the street (the service—circa 1972—has not been evaluated). The service will be routed through the pad-mounted utility step-down transformer to a 3,000-amp 480/277V, three-phase, four-wire, wye-connected secondary service main switchboard. The transformer will remain in its exterior location, and the new switchboard will be located in the main electrical room.

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Lightning Protection System

The existing building and new addition will be provided with a new lightning protection system in accordance with NFPA 780 and all local codes.

Technology

Utility Connections and Interfaces

Conduit from the utility poles/service points to the building will be provided by the site utility contractor for the following:

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Video Distribution

Video distribution, including the CATV, will be digital and will run as an application on the LAN infrastructure.



Electronic Security System

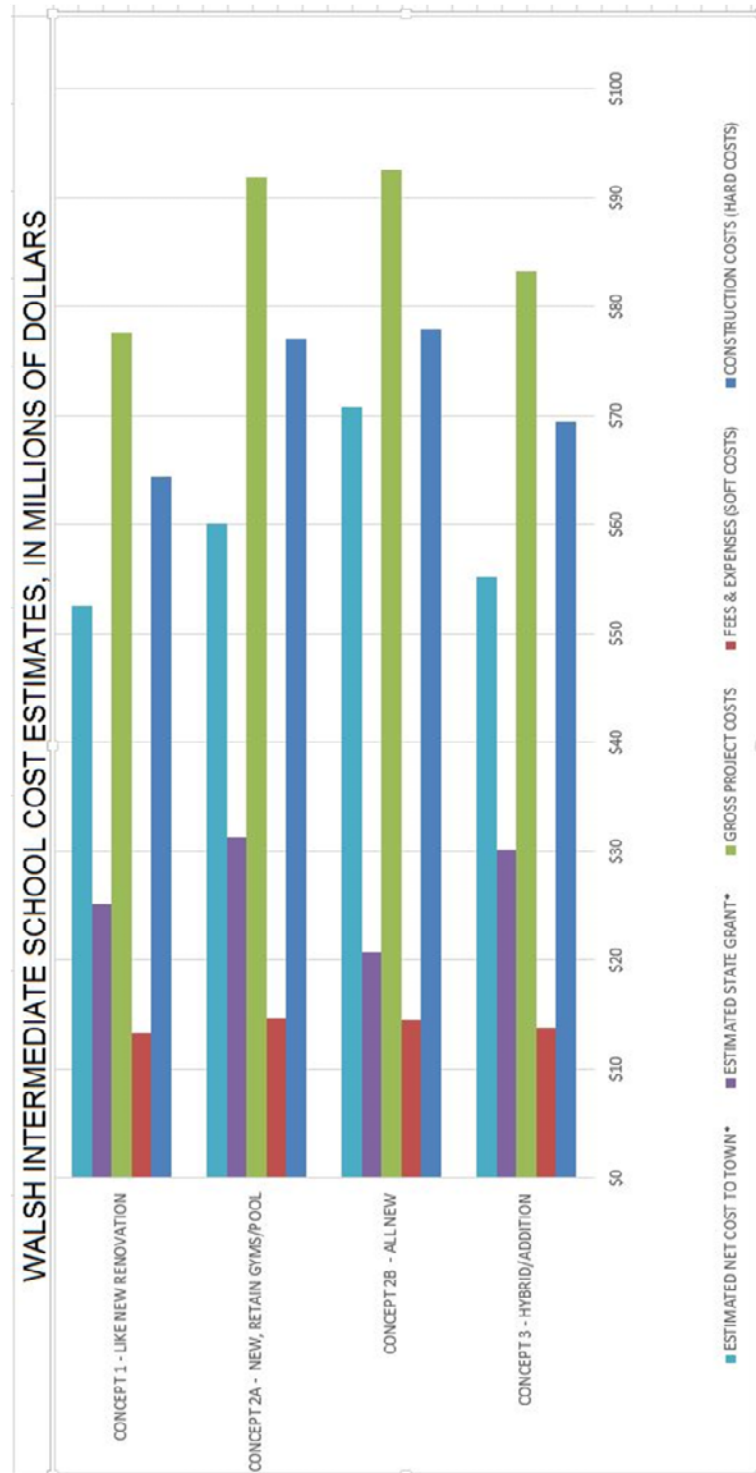
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A Video Surveillance System (VSS) will electronically monitor and digitally record video feeds originating from file-based video surveillance cameras. An intercom over IP (IoIP) system will provide secure intercom communications between field sub-stations and master stations located throughout the School.

Cost Estimate

13.1 Summary of Estimated Project Cost and Schedule

	CONCEPT 1 LIKE-NEW RENOVATION (INCLUDES BOE, POOL & AUX GYM)	CONCEPT 2A BUILD NEW SCHOOL ADDITION - RETAIN GYMS & POOL, (INCLUDES BOE OFFICES)	CONCEPT 2B BUILD ALL NEW SCHOOL W/ BOE OFFICES ON SITE (NO POOL OR AUX. GYM)	CONCEPT 3 HYBRID / ADDITION RENOVATION (RETAINS POOL & AUX. GYM, & BOE)
RENOVATED AREA (SF)	166,500	26,000	0	80,000
NEW AREA (SF)	0	130,000	149,000	80,000
TOTAL RENOVATED AND NEW AREA (SF)	166,500	156,000	149,000	160,000
COST SUMMARY	(in millions)	(in millions)	(in millions)	(in millions)
CONSTRUCTION COSTS (HARD COSTS)	\$64.303	\$77.116	\$77.955	\$69.445
FEES & EXPENSES (SOFT COSTS)	\$13.287	\$14.742	\$14.609	\$13.830
GROSS PROJECT COSTS	\$77.590	\$91.858	\$92.564	\$83.274
ESTIMATED STATE GRANT*	\$25.093	\$31.320	\$20.670	\$30.206
ESTIMATED NET COST TO TOWN*	\$52.497	\$60.080	\$70.795	\$55.211
* Subject to State Approvals & Final Audit				
EST. PROJECT COMPLETION DATE	September 1, 2020	November 1, 2019	June 1, 2019	November 1, 2019



Sustainable Design/CT High Performance/LEED

14.1 Sustainable Design

In all of the preceding design concepts, the heating/cooling equipment will be right-sized, and designed for long-term efficiency. Durable, recycled content, recyclable, and locally available materials will be integrated whenever possible. Since all concepts also involve adding more fenestration to the project, an energy model will be needed to balance solar gain with cooling loads, passive shading structures, and other sustainable options.

14.2 Connecticut High Performance Building Standards

This project is subject to the requirements of Connecticut High Performance Buildings, according to Public Acts 06-187 Section 70, 07-213 Section 5, 07-242 Section 10, and 07-249 Section 15.

14.3 LEED® Certification

This project, according to PA 07-242, must be designed to LEED Silver® equivalency.

14.4 Photovoltaic

This project will make design accommodations for roof mounted solar arrays—installed in the future—by third-party power purchasing agreements (PPA).



State Reimbursement Analysis

CONCEPT 1 - RENOVATE AS NEW

SPACE STANDARDS WORKSHEET

This worksheet should be completed and submitted with the application for any N (new), E (extension), A (alteration), or RENO (renovation) project, or combination of such types of project.

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	56	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

- Under the column headed "Projected Enrollment", find the range within which your school's highest projected 8 year enrollment falls.
- Using the figures on that line, complete the grid below for only those grades housed within the school.

Pre-K	_____	6	250
K	_____	7	250
1	_____	8	250
2	_____	9	_____
3	_____	10	_____
4	_____	11	_____
5	250	12	_____
(a) Total (grades Pre-K through 12)			1000
(b) Number of grades housed			4
(c) Average [(a)/(b)]			250
(d) Highest Projected 8-year Enrollment			1000
(e) Maximum Square Footage [(c) x (d)]			168,000 SF

- Total square footage at completion of project:

- Existing area constructed pre-1950. 191,000 SF
- Multiply "a." by 80% 152,800 SF
- Area (at completion of project) constructed 1950 or later. 0 SF
- Square footage for space standards computation (b+c). 152,800 SF

If line 2(e) is greater than line 3(d) there is no grant reduction.

If line 3(d) is greater than line 2(e), divide line 2(e) by line 3(d). _____ *

* This factor will be used to reduce total eligible costs because of space in excess of the maximum eligible for reimbursement.

If a project exceeds the standards solely as the result of extraordinary programmatic requirements, the superintendent may submit a request to the Commissioner for a waiver. A detailed list of space allocations for all extraordinary programs with explanations must be included with the request.

**CONCEPT 2A - NEW, RETAINING
GYMS AND POOL**

SPACE STANDARDS WORKSHEET

This worksheet should be completed and submitted with the application for any N (new), E (extension), A (alteration), or RENO (renovation) project, or combination of such types of project.

**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

- Under the column headed "Projected Enrollment", find the range within which your school's highest projected 8 year enrollment falls.
- Using the figures on that line, complete the grid below for only those grades housed within the school.

Pre-K	_____	6	<u>250</u>
K	_____	7	<u>250</u>
1	_____	8	<u>250</u>
2	_____	9	_____
3	_____	10	_____
4	_____	11	_____
5	<u>250</u>	12	_____
(a) Total (grades Pre-K through 12)			<u>1000</u>
(b) Number of grades housed			<u>4</u>
(c) Average [(a)/(b)]			<u>250</u>
(d) Highest Projected 8-year Enrollment			<u>1000</u>
(e) Maximum Square Footage [(c) x (d)]			<u>168,000 SF</u>

3. Total square footage at completion of project:

a. Existing area constructed pre-1950.	<u>26,000 SF</u>
b. Multiply "a." by 80%	<u>20,800 SF</u>
c. Area (at completion of project) constructed 1950 or later.	<u>156,000 SF</u>
d. Square footage for space standards computation (b+c).	<u>176,800 SF</u>

If line 2(e) is greater than line 3(d) there is no grant reduction.

If line 3(d) is greater than line 2(e), divide line 2(e) by line 3(d). 0.95 *

* This factor will be used to reduce total eligible costs because of space in excess of the maximum eligible for reimbursement.

If a project exceeds the standards solely as the result of extraordinary programmatic requirements, the superintendent may submit a request to the Commissioner for a waiver. A detailed list of space allocations for all extraordinary programs with explanations must be included with the request.

CONCEPT 2B - ALL NEW

SPACE STANDARDS WORKSHEET

This worksheet should be completed and submitted with the application for any N (new), E (extension), A (alteration), or RENO (renovation) project, or combination of such types of project.

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

- Under the column headed "Projected Enrollment", find the range within which your school's highest projected 8 year enrollment falls.
- Using the figures on that line, complete the grid below for only those grades housed within the school.

Pre-K	_____	6	<u>250</u>
K	_____	7	<u>250</u>
1	_____	8	<u>250</u>
2	_____	9	_____
3	_____	10	_____
4	_____	11	_____
5	<u>250</u>	12	_____
(a) Total (grades Pre-K through 12)			<u>1000</u>
(b) Number of grades housed			<u>4</u>
(c) Average [(a)/(b)]			<u>250</u>
(d) Highest Projected 8-year Enrollment			<u>1000</u>
(e) Maximum Square Footage [(c) x (d)]			<u>168,000 SF</u>

- Total square footage at completion of project:

- Existing area constructed pre-1950. 0 SF
- Multiply "a." by 80% 0 SF
- Area (at completion of project) constructed 1950 or later. 149,000 SF
- Square footage for space standards computation (b+c). 149,000 SF

If line 2(e) is greater than line 3(d) there is no grant reduction.

If line 3(d) is greater than line 2(e), divide line 2(e) by line 3(d). _____ *

* This factor will be used to reduce total eligible costs because of space in excess of the maximum eligible for reimbursement.

If a project exceeds the standards solely as the result of extraordinary programmatic requirements, the superintendent may submit a request to the Commissioner for a waiver. A detailed list of space allocations for all extraordinary programs with explanations must be included with the request.

**CONCEPT 3 - HYBRID
RENOVATION/NEW**

SPACE STANDARDS WORKSHEET

This worksheet should be completed and submitted with the application for any N (new), E (extension), A (alteration), or RENO (renovation) project, or combination of such types of project.

**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

- Under the column headed "Projected Enrollment", find the range within which your school's highest projected 8 year enrollment falls.
- Using the figures on that line, complete the grid below for only those grades housed within the school.

Pre-K	_____	6	<u>250</u>
K	_____	7	<u>250</u>
1	_____	8	<u>250</u>
2	_____	9	_____
3	_____	10	_____
4	_____	11	_____
5	<u>250</u>	12	_____
(a) Total (grades Pre-K through 12)			<u>1000</u>
(b) Number of grades housed			<u>4</u>
(c) Average [(a)/(b)]			<u>250</u>
(d) Highest Projected 8-year Enrollment			<u>1000</u>
(e) Maximum Square Footage [(c) x (d)]			<u>168,000 SF</u>

- Total square footage at completion of project:

- Existing area constructed pre-1950. 75,000 SF
- Multiply "a." by 80% 60,000 SF
- Area (at completion of project) constructed 1950 or later. 80,000 SF
- Square footage for space standards computation (b+c). 140,000 SF

If line 2(e) is greater than line 3(d) there is no grant reduction.

If line 3(d) is greater than line 2(e), divide line 2(e) by line 3(d). _____ *

* This factor will be used to reduce total eligible costs because of space in excess of the maximum eligible for reimbursement.

If a project exceeds the standards solely as the result of extraordinary programmatic requirements, the superintendent may submit a request to the Commissioner for a waiver. A detailed list of space allocations for all extraordinary programs with explanations must be included with the request.

Document Limitations and Qualifications

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Perkins Eastman and DTC assert our review of this Report for the existing Francis Walsh Intermediate School is subject to monetary, schedule, and scope constraints, with limitations, qualifications, and conditions as authorized by the Town of Branford. 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 actual knowledge of the subject matter after such inquiry is considered reasonable given the parameters listed above^[CH3].

For this report, the architect/engineering team conducted the physical inspection and observation of the building with limited visual inspection and observation of the existing surface materials and the building construction. ^[CH4]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 facility. As such, the development of conceptual designs and associated budget estimates for the correction of identified deficiencies is based on the overview of observation and is limited by the Feasibility Report parameters.