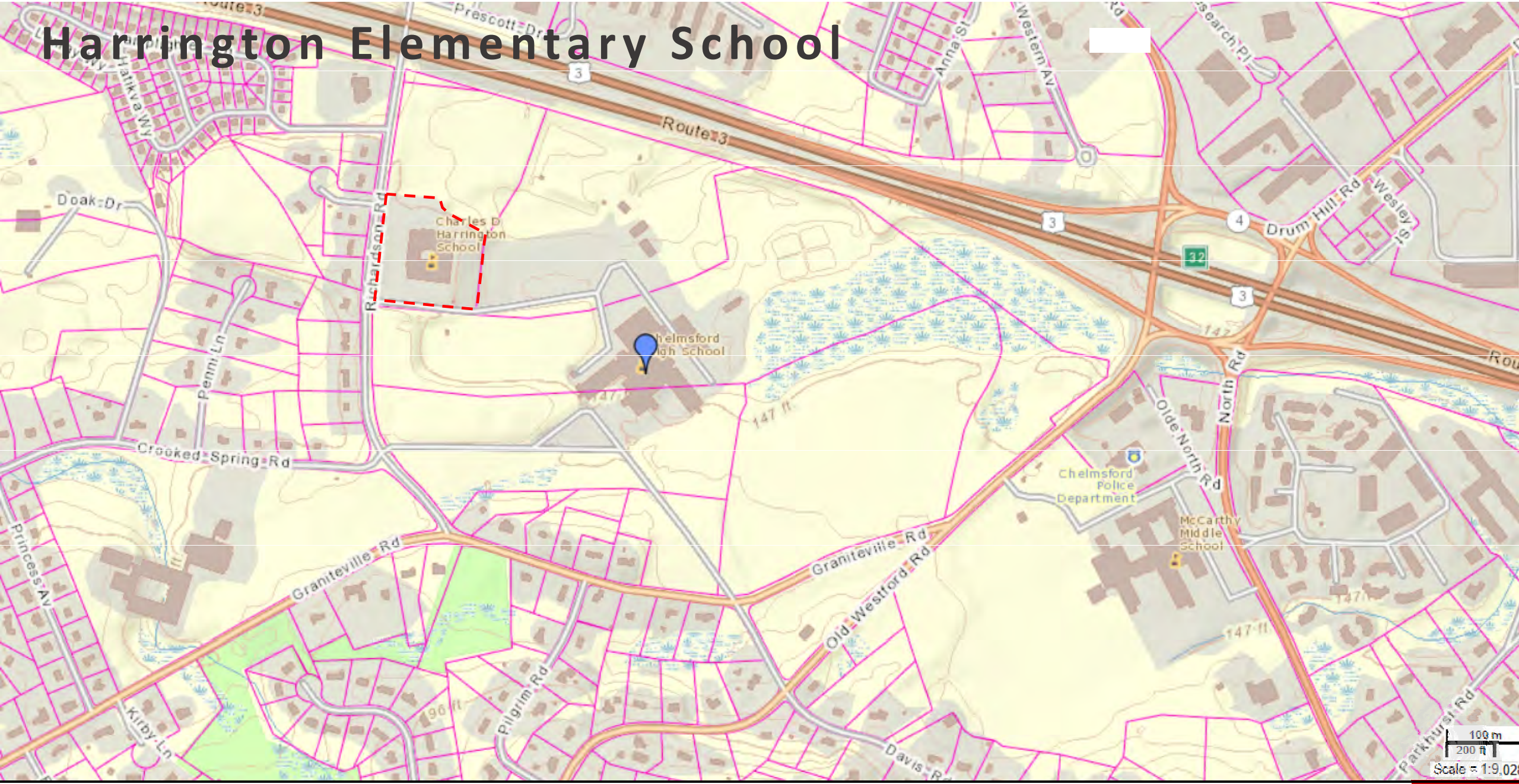
Harrington Elementary School



Dore & Whittier Architects Inc.

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Harrington Elementary School

ARCHITECTURAL ASSESSMENT

GENERAL DESCRIPTION

The school is located at 120 Richardson Road and was designed by The Architects Collaborative in 1967. (Image 1). The building shares the campus with the Chelmsford High School. Recent upgrades include the mechanical systems and new boilers, window replacement in 2004 and complete reroofing in 2011.

The building is two story facility. The "at grade" level has a gross floor area of approximately 30,221 gross square feet and a total building area of approximately 60,441 gross sq. ft.

The building is generally described as a concrete and cmu structure, with load-bearing interior and exterior walls. The structure is not fireproofed, and as such best fits the description of a Type II-B construction as defined by the current building code. The building does not have fire suppression sprinkler system throughout.

The current enrollment is approximately 465 students in grades K-4. Peak staff during the day numbers approximately 67.5 FTE.

The building survey for this report was conducted on February 16, 2016.

Image 1

Image 2

Image 3

GENERAL CODE CONSIDERATIONS

As an occupied building with approved occupancies, significant code upgrades are not required in order to continue using the building, unless specifically identified as issues requiring remediation by the Building Inspector. However, as the building currently stands, any plans for significant renovations or additions should be planned with awareness of the following limitations.

As the building is currently not sprinklered and is in excess of 7500 square feet in gross area, it is likely that any significant planned renovations or additions would require the inclusion of fire sprinklers throughout the building, per MGL chapter 148.

Image 4

Image 5

Image 6

A more in-depth analysis of the building occupancies and strategies to satisfy building height and area limitations would be required to confirm code requirements.

Based on the construction type, building area, and lack of sprinkler systems, the current code would require that different occupancy areas such as the gym or cafeteria be separated from other spaces via fire rated partition walls and doors.

Building codes have been modified since the building was constructed. Existing building codes allow the building to continue to be used without mandatory upgrades (unless specific items have been identified by the Building Inspector) under its existing use. However, should the facility undergo renovations it will likely trigger additional upgrade requirements. The following upgrades should be considered for full compliance with the current building codes:

- Addition of a full automatic fire suppression system (sprinkler) throughout the facility.
- Upgrades to the building structural system to meet seismic requirements
- Full compliance with accessibility codes
- Installation of an new elevator to meet code required size (able to fit a full size gurney).

ACCESSIBILITY

The Harrington Elementary School has multiple conditions that are considered non-accessible or do not meet the current Massachusetts Architectural Access Board Rules (MAAB) or the Americans with Disabilities Act (2010) Standards (ADA).

EXTERIOR SITE AND BUILDING ENTRANCE

The front entrance has been made accessible via a concrete ramp that provides access to the front door that is located approximately 18” below the sidewalk. The ramp appears to meet accessibility for slope and handrails. A second ramp to a side door does not provide the appropriate height railings for accessibility.

INTERIOR SPACES

The front entrance provides a large lobby space with access to the front office and the elevator. The elevator dimensions meet the requirements for accessibility.

Several toilet rooms and fixtures have been upgraded in an effort to meet accessibility. However, as these improvements are implemented care should be given to verifying that the proper heights and clearances are identified for fixtures and accessories.

Renovations and repairs to the toilet rooms needed to meet accessibility requirements include:

- Provide proper clearance around all fixtures
- Provide the proper mounting heights for sinks, toilets and urinals for elementary school aged students in restrooms located in the classroom wings
- Provide grab bars as required and correct mounting heights for grab bars that are not properly installed
- Correct the mounting heights and locations of toilet accessories including toilet paper, paper towel and soap dispensers
- Provide appropriate faucet controls
- Provide insulation at all hot water piping

In addition to restroom fixtures the drinking fountains, classroom, and office sinks that are provided for student or staff use must meet accessibility requirements. The classroom sink shown in Image11 does not provide the clear area below the sink for handicap accessibility.

Stairs, handrails, and guardrails have requirements that must be met for accessibility. At the Harrington School there are three stairways for common use. Each of these stairs have non-conforming handrails that should be replaced.

Per current accessibility codes access to performance areas such as stages and platforms must be provided with an accessible route that coincides with the access route for performers or other users. This route can be achieved via a

Image 7

Image 8

Image 9

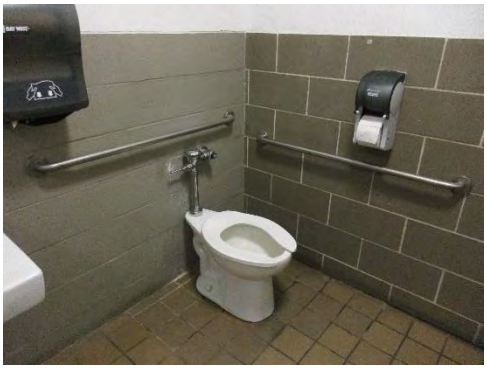

Image 10

Image 11

Image 12

Image X

Image 13

ramp or lift. In the case of Harrington School, a lift, although a more expensive solution, would be the most space efficient.

Door hardware is required to be operable with a closed fist. Often this is done by changing knobs to levers or push / pull hardware that meets the requirements of ADA and MAAB. Push / pull floor clearances are also required for doors with latches and closing devices. The dimensional clearance varies based on the approach to the door. The clearance area to operate the door has been provided in many areas throughout the building. However, in some areas this clearance is not provided. Consideration should be given to improving correcting this condition. Repairing this condition often requires removing walls and expanding the area around the door. In some cases simply changing the swing of the door may resolve or improve the existing condition.

In general permanent rooms, stairways, and other spaces require signage that identify the room by number. Signs are required to be mounted on the latch side of the door, at the appropriate height and in Braille. This type of signage appears to be missing throughout the school facility.

An outdoor courtyard is located in the center of the building. Due to the time of year of our visit we were not able to assess the full accessibility of the courtyard. However, the following issues have been noted: the entrance and exit doors to the courtyard are not accessible, there are steps and grade changes that make accessing this space difficult, walking paths must be checked for use of proper surface material and pitch, areas in the courtyard that are used for teaching spaces must provide handicap accessibility for students and teachers.

Recommendations for upgrades to meet accessibility include:

- Provide elevator controls to meet accessibility including Braille signage, audible and visible signals.
- Replace handrails at stairways with rounded handrails that extend the proper dimension beyond the top and bottom landing
- Provide handicap accessible lift or ramp to the performance stage
- Replace door hardware with levers or other accessible hardware.
- Review all door hardware including closers and locking devices.
- Review door swing clearances and push / pull clearances
- Provide signage both inside and outside the building to meet ADA / MAAB needs
- Provide a ramp and accessible paths in courtyard

Image 14

Image 15

EXTERIOR

FOUNDATION

Foundations are poured in-place concrete. It is assumed the foundation walls are generally in good condition. However, evidence of spalling and exposure of re-bar is evident in a few locations. These areas should be repaired to prevent further damage

Bulleted List of Specific Issues

- Spalling of concrete and exposure of re-bar

Bulleted List of Recommendations

- Repair walls to prevent further damage
- Regrade around foundation wall to prevent pooling of water and to establish positive drainage

Image 16

Image 17

Image 18

Image 19

Image 20

Image 21

WALLS

The building is poured-in-place concrete frame with brick infill walls. The brick and mortar exterior veneer has a cmu backup. The precast concrete floor and roof project beyond the exterior walls. Exterior brick walls have several areas of severe cracking. The structural rebar in the poured-in-place concrete has become exposed and will continue to deteriorate without repairs.

Bulleted List of Specific Issues

- There is moisture penetration at the concrete stair tower resulting in the peeling of the paint on the inside surface of the wall
- In one location, the chipping of the concrete frame has created a condition of unsupported brick
- There are several areas of severe cracking on the brick and mortar veneer. (Image 16, 17, 20, & 21). This condition should be investigated further to determine if moisture is getting behind the brick or if other stresses are causing the brick to fail in these areas.
- There are several areas where the precast concrete cantilevers are spalling and in some cases exposing the rebar. (Image 23). Deterioration of the concrete will increase as the steel continues to rust and expand.
- Cracking exists in some of the concrete structural frame.
- At a few areas on the exterior wall the brick control joint caulking is starting to deteriorate.
- There are a few areas where the steel angle supporting the precast concrete band above the second floor windows is rusting. (Image 24)
- There are several areas where the paint on the soffits are flaking and falling off.

Bulleted List of Recommendations

- Repair damaged brick and mortar, replace cracked bricks and clean weeps.
- Where the precast cantilevers are spalling or damaged, patch and repair to prevent further damage.
- Repair cracking in concrete frames

- At areas where the existing control joint caulking is deteriorating remove old caulking and install new caulking in the joint.
- At the supporting steel angles remove rust, paint and repair adjacent damaged surfaces.
- Scrape down old paint from underside of the soffits and repaint with exterior grade enamel paint.

Image 22

WINDOWS

The school underwent a window replacement in 2004. The primary exterior window type is aluminum with insulated glazing with operable section. The windows as a whole are in good to excellent condition.

Bulleted List of Specific Issues

- There are window locations where the caulking is missing and the backer rod is exposed or missing. (Image 25)
- Some concrete window sills are cracking

Image 23

Bulleted List of Recommendations

- Install backer rod and caulking where missing
- Repair concrete window sills to prevent further damage

Image 24

DOORS

The exterior doors were replaced in 2004. The exterior doors consist of aluminum storefront and curtainwall doors, as well as hollow metal doors with hollow metal frames. The doors are in good condition. Door hardware and frames appear to be in good condition

Bulleted List of Specific Issues

- At the loading dock hollow metal doors the paint is fading completely off the doors.

Image 25

Bulleted List of Recommendations

- Repaint loading dock doors.

Image 26

Image 27

Image 28

Image 29

LOUVERS / VENTS /OTHER OPENINGS

There are several different louvers and vents around the building. In general, the louvers are in fair condition architecturally but is unknown if they are operating as intended. Some vents have obvious signs of bird nesting which impedes the ability of the vent to operate properly.

Bulleted List of Specific Issues

- The intake louvers for the unit heaters in the classrooms do not have insect screens.
- Some of the lower steel grate louvers have become dented and damaged as well as oxidized.
- Nesting has caused damage to the louvers

Bulleted List of Recommendations

- Install insect screens at unite heaters
- Remove nesting and damage to louvers and vents caused by nesting.
- Replace damaged vents and screens and confirm operational condition of vents and louvers

ROOF

The school underwent a complete reroofing project in 2004. The roof was replaced down to the existing concrete roof deck. The roof membrane is .060" thick PVC membrane fully adhered. The roof also has solar PV arrays attached to the roof. Due to adverse weather conditions and the roof being snow covered the team was not able to assess the roof. Maintenance did not report any issues with the roof.

WALKS / RAMPS / STEPS & RAILINGS

There are several conditions where the sidewalks, steps, ramps and railings need maintenance, repair or replacement to prevent injury or further damage.

Bulleted List of Specific Issues

- Steps at main entrance are in poor condition and deteriorating.
- Area of water flow toward drains has damaged the concrete sidewalk creating potential tripping hazards and preventing the proper flow of water

- Railings at ramps and stairs are rusting and posts are loose
- Rebar in concrete pads and the loading dock have become exposed and are rusting, creating additional spalling of the concrete structures

Bulleted List of Recommendations

- Patch and repair concrete entrance steps
- Repair sidewalks and drains to prevent damage to sidewalks and ponding of water
- Repair or replace stair and ramp railings
- Replace concrete pads where rebar has become exposed
- Repair loading dock condition where re-bar has become exposed and is spalling the concrete

Image 30

Image 31

Image 32

Image 33

Image 34

Image 35

Image 36

Image 37

INTERIOR

FLOORING

The predominate flooring throughout the school is VCT. Carpet tiles are used in the library and in the administration areas. A 6”x6” quarry tile is used in most of the bathrooms. A 6”x6” quarry tile was used in the kitchen. There is a resilient wood floor system in the gymnasium and a wood floor on the stage. All of the custodial, storage, and other back of house spaces are concrete flooring with a combination of exposed concrete, sealed concrete, and epoxy painted finishes.

Bulleted List of Specific Issues

- There are areas of cracking and chipping of the VCT flooring around the school. (Image 34).
- The topping on the stair treads is completely worn off exposing raw concrete. (Image 35)
- The 6”x6” quarry tile in all the bathrooms is very dirty and the grout joints have become stained. (Image 36). This is typical in all bathrooms.
- Tile around floor drains in restrooms has chipped and broken
- Where walls were removed in restrooms to provide accessibility the flooring is uneven and the flooring material inconsistent. (image 36)
- The non-slip strips that have been added to the kitchen floor near the sink and other wet areas has peeled and is lifting off the floor. These loose strips could cause tripping and the worn strips will no longer function as anti-slip material. (image 39)
- The sheet goods flooring used on the stage access stairs is breaking off the nosings.
- In most of the areas of epoxy painted concrete floor the paint is showing severe wear and is exposing the raw concrete.
- The wood stage flooring is showing its age as there are several areas of deep gouges and several areas where the finish is rubbing off exposing raw wood. The flooring in some places feels “spongy” or soft. (Image 40)
- Removable entrance mats are used at the main entrance for walk off. These mats can become loose or curled and lead to tripping.

Bulleted List of Recommendations

- Remove and replace broken and damaged VCT tiles.
- Remove what is left of the existing topping on the stair treads and install raised rubber tile on the stairs
- Clean all ceramic tile floors and grout joints in bathrooms and kitchen
- Repair chipped and broken floor tiles.
- Replace drain covers as needed.
- Remove non-slip flooring strips in the kitchen and replace with non-slip mats or replace 6x6 tile with quarry tile with a greater slip resistant surface
- Review the cause for the lifting of the VCT tile in the cafetorium. Repair and replace tile.
- Replace stair treads on stairs that lead to the stage area.
- Replace existing stage flooring with a resilient wood flooring system.
- Where walls have been removed grind surface and install flooring to match existing. (image 38)
- Repair epoxy floor surfaces or painted concrete surfaces to protect concrete floors

Image 38

Image 39

Image 40

Image 41

WALLS AND PARTITIONS

The interior walls mainly consist of load bearing cmu walls and some poured in place concrete walls. Interior walls on the first floor terminate at the underside of the second floor precast floor planks, and the second floor walls terminate at the underside of the precast roof deck planks. Some classrooms have folding wall partitions that are no longer operable and remain in the closed position. In some classrooms and office spaces there are brick walls or CMU piers with brick facing.

Bulleted List of Specific Issues

- In some of the rooms the cmu walls have severe cracking in the corners or along the face of the cmu wall (Image 42 & Image 43)
- In locations where walls have been removed the wall has not been refinished to match existing.

Image 42

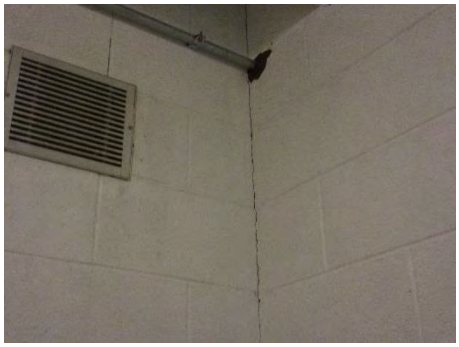

Image 43

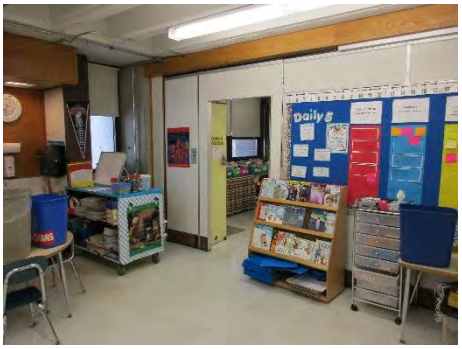

Image 44

Image 45

- In a few areas in the building there are some separation cracks where poured in place concrete walls meet CMU walls. (Image 43)
- Folding partition walls are in fair condition and not used as operable walls. These walls do not provide the sound separation between classrooms that a permanent wall would have.
- In many locations where pipes penetrate walls or floors the holes have been left open. Where these holes connect occupied spaces to storage areas, or are between the floor and ceiling filling the holes with fire safe materials is required (image 45).
- Improper cleaning methods have left walls stained. This is especially evident at the base of walls and in restrooms

Bulleted List of Recommendations

- In the rooms where the CMU is cracking in the corners and along the wall surface further investigate the cause of cracking. Repair cracks in CMU walls to prevent further damage.
- In areas where walls have been removed grind down the remaining portions of the demolished wall to be flush with existing adjacent walls and finish to match existing adjacent walls.
- Caulk and fill holes in walls with fire rated materials.
- Clean and repaint CMU walls.
- Remove movable partition walls and install new permanent construction with sound insulation.

CEILINGS

The primary ceiling type throughout the school is exposed precast concrete planks with acoustic panels adhered to the underside of the concrete between the troffer and in some cases along the sides of the troffers as well. The kitchen and kitchen support spaces have dropped ceiling tiles.

Bulleted List of Specific Issues

- There is some staining along the top of the rib of the concrete panels. The source of the staining should be reviewed to prevent further staining
- In areas where acoustical panels have been glued to the concrete planks the glue should be reviewed for

asbestos material, exposed glue dabs should be removed.
- The ceilings in the kitchen are in very poor condition, many tiles are falling, stained or broken
- Kitchen ceilings are required to be of washable or "scrubbable" material
- Holes and former junction boxes exist in the ceiling throughout the building, these should be patched or covered with metal covers

Bulleted List of Recommendations

- Consider where possible installing an acoustical drop ceiling to provide better acoustics, more even light and improved aesthetics
- Review and repair source of ceiling staining in the kitchen area
- Replace all kitchen ceiling tiles with washable / "scrubbable" ceiling tiles

Image 46

Image 47

DOORS / INTERIOR GLAZING

Most classroom, office and restroom doors are solid wood, with hollow metal frames. A few office spaces have painted hollow metal doors with hollow metal frames. Hallway and stairway doors are metal doors with wire glass in hollow metal frames. In general, classroom and office doors and frames are in good condition. However, most doors do not have accessible door hardware (knobs vs lever). Hallway doors are in good to fair condition however wire glass is no longer a preferred choice for doors in these locations. These doors also show considerable wear due to their location. Frames in these locations show rusting at the base.

Where interior glazing is present the glazing is wire glass and frame are painted hollow metal. The windows are in good condition, however wire glass is not recommended for these locations and is no longer allowed by code.

Image 48

Bulleted List of Specific Issues

- Many of the doors have scuff marks from use. Wood doors would benefit from a kick plate at the bottom of the door and hallway doors could be repainted.
- Most doors have knob hardware that should be replaced with handicap accessible hardware.

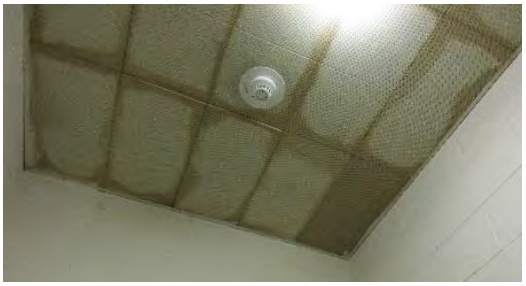

Image 49

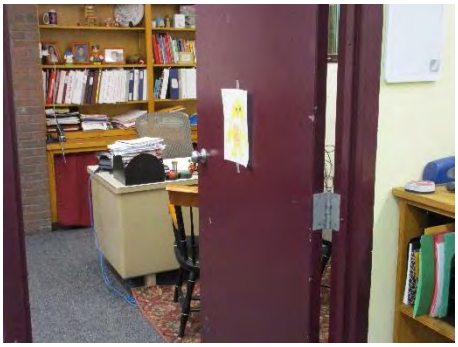

Image 50

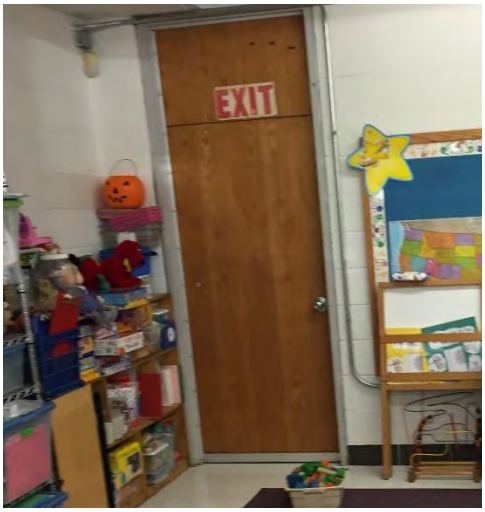

Image 51

Image 52

- Doors and interior windows with wire glazing should be replaced.
- Many of the metal frames show signs of rust at the base of the frames

Bulleted List of Recommendations

- Refinish wood doors
- Repaint metal doors
- Replace door hardware
- Replace doors and interior windows with wire glass and replace with tempered glass
- Repair and refinish hollow metal frames to prevent further rusting

FIXTURES & FURNISHINGS (BUILT-IN)

Built in fixtures and furniture includes shelving in classrooms, teacher wardrobes, and sinks and cabinetry. Students have hooks and shelves in the hall for backpacks and coats. In general, the wood fixtures are worn and in need of refinishing. The classroom sink cabinetry is not accessible and book shelves and teacher wardrobes do not appear to provide enough storage options in the classrooms.

Toilet partitions are in poor to very poor condition. Several partitions are rusted, missing pieces.

Bulleted List of Specific Issues

- Worn and dated wood finishes
- Non accessible cabinets and counters
- Damaged and rusting toilet partitions

Bulleted List of Recommendations

- Replace toilet partitions
- Refinish woodwork for shelving and wardrobes
- Replace counter and cabinets

FUNCTIONAL USE OF SPACE

The former loading area has been renovated as an OT/ PT teaching space. Other one on one and small group teaching is taking place in the corridors and in the stairwell. Former storage areas have been converted to provide additional teaching areas.

Bulleted List of Specific Issues

- Teaching in corridors and stairways
- Teaching in former storage closets
- Teaching in former loading area

Bulleted List of Recommendations

- Consider Master Plan options to provide additional classroom or teaching spaces

Image 53

Image 54

Image 55

Image 56

Image 57

Image 58

Image 59

Image 60

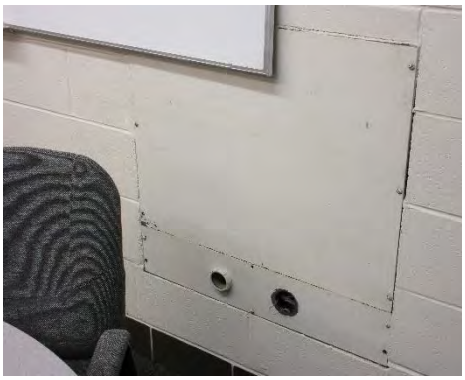

Image 61

CIVIL ENGINEERING ASSESSMENT

Nitsch Engineering has performed research of the existing site conditions at the Harrington Elementary School located at 120 Richardson Road in Chelmsford, Massachusetts. Nitsch Engineering has used Chelmsford GIS and design drawings provided by the Town. Nitsch Engineering gathered information during a site visit conducted by Brittney Veeck, EIT on February 17, 2016 and a site visit conducted by Dave Conway, PE on March 4, 2016.

Image 1

GENERAL SITE DESCRIPTION

The existing Harrington Elementary School is located at 120 Richardson Road, Chelmsford, Massachusetts. The site is bounded by Richardson Road to the West, the Northwest Expressway (Route 3) to the North, and the High School site to the south and east.

There is an access road to the south of the building that runs from Richardson Road to the High School site. There are two driveway entrances/exits to the Harrington Elementary School on Richardson Road.

There are fields to the north of the building and a small wooded area at the northwest corner of the site.

Image 2

EXISTING SITE UTILITIES

STORM DRAINAGE

Chelmsford GIS shows that there are no public closed drainage systems in the streets adjacent to Harrington Elementary School.

Image 3

Record plans show two stormwater discharge points. One of the stormwater discharge points is to a drywell to the southeast of the school building (Image 1) and the other is through a headwall into the wooded area along the eastern edge of the site.

Image 4

Stormwater runoff from the parking lot and driveway to the north and west of the site is collected in catch basins and directed to the headwall discharge. Stormwater runoff from the parking lot and driveway to the east and south of the building is collected in catch basins and directed to the

Image 5

Image 6

Image 7

Image 8

drywell. Stormwater runoff from the building roof appears to be directed to the drywell.

SEWER

There is a sewer main in Richardson Road. GIS shows the sewer service for Harrington exiting the building along the north face and connecting with the sewer service from the high school. The sewer service then flows north to the edge of the property before connecting into the sewer main in Richardson Road. Three sewer manholes were observed on site in the same locations as shown on the GIS (Image 2 and 3).

No grease trap was observed on site, however a grease trap is located inside the kitchen.

WATER

The Town of Chelmsford is split up into three separate water districts: the Chelmsford Water District, the North Chelmsford Water District, and the East Chelmsford Water District.

There is a water main in Richardson Road that the water service for the building likely connects to.

There is a fire hydrant to the west of the school along Richardson Road that has a water valve showing it connects to a water main in Richardson Road (Image 4 and 5). Another hydrant was observed to the east of the building (Image 6).

NATURAL GAS

There is a gas meter located along the north face of the building near the eastern corner (Image 7).

There is a generator located to the east of the building near the gas meter (Image 6).

ELECTRICAL

There is a transformer located to the north of the building along the driveway (Image 8).

There are solar panels located on a slope to the east of the building which appear to contribute solar power energy to

Harrington Elementary School along the east face of the building (Image 9).

There is electrical equipment located along the southern face of the building that may connect to the solar panels (Image 10).

Image 9

Image 10

EXISTING SITE CONDITIONS

SOILS

Based on the Natural Resources Conservation Service (NRCS) Middlesex County Soil Survey the site of the Harrington Elementary School property is on soil classified as Udorthents Urban Land Complex.

PAVEMENT/CURBING

The asphalt pavement within the site is in generally good condition. There is some accumulation of sediment in paved areas onsite (Image 11 and 12).

Walkways onsite are asphalt and are generally in fair condition.

Curb onsite is vertical granite curb. Much of the curb onsite was covered in snow at the time of the site visit; however, the curb that was observed was in good condition.

Image 11

PLAYFIELDS

The Harrington Elementary School Fields discussion is included in the Chelmsford High School discussion.

Image 12

PERMITTING CONCERNS

The Harrington Elementary School appears to discharge stormwater directly to a wetland. Work onsite may require permitting and approval from the Chelmsford Conservation Commission. The site is within a Zone II Wellhead protection Area. The site does not appear to be in a FEMA Flood Zone.

RECOMENDATIONS

- Mill and overlay sections of pavement where cracking/degradation has occurred.

STRUCTURAL – HARRINGTON ELEMENTARY SCHOOL

The purpose of this report is to assess the structure of the existing building, comment on the existing structure and comment on the structural integrity of the building.

Basis of the Report

This report is based on visual observations during our site visit on February 16, 2016. During the visit we did not remove any finishes or take measurements; so, our understanding of the structure is limited.

Existing Conditions

The Harrington Elementary School and Byam Elementary are very similar in their construction. Harrington school was constructed in 1968 and is a two-story structure.

We observed the exterior sidewalk construction and noted various cracks. We observed exterior metal railings and noted deterioration to the post-bases.

We observed the exterior concrete columns and noted moderate spalling. At the underside of the floor structure above, we observed significant condensation and did not observe any signs of rust. The construction appeared to be painted at some time in the recent past. We observed signs of past repairs to the concrete façade. In other locations, we observed spalls and exposed reinforcing with no sign of past repairs.

The structure, for the most part, consists of pan-joist concrete rib floors supported on concrete columns.

We observed half-height interior masonry walls in the bathrooms. When a future renovation is planned, these walls would need to be evaluated and anchored to the main structure.

Recommendations:

No recommendations listed.

HVAC ASSESSMENT

HOT WATER PLANT

The Harrington Elementary School is heated by a hot water boiler plant consisting of three (3) gas fired hot water boilers, hot water pumps, accessories, breeching, combustion air ductwork, and controls. The boilers were manufactured by Aerco, with an estimated heating capacity of 1,706 MBH output, and maximum input of 2,000 MBH each. The boilers were installed in 2002 and appear to be in very good condition. The boiler flue gases are vented through the use of a stainless steel breeching through the roof. Combustion air for the boilers is provided through the use of insulated sheet metal vent ducts. (Image 1, 2 & 3)

Image 1 – Hot Water Boilers

Image 2 – Boiler Flue Vents

Hot water is distributed from the boiler to the building heating equipment by a pair of base mounted end suction hot water pumps that are equipped with VFD drives. The pumps appear to have been re-built in recent years with new motors; however, the pumps appear to be nearing the end of their useful service life. The hot water piping and insulation located within the main boiler room appears to be in fair condition. However, the majority of the hot water distribution piping and insulation located throughout the building is original to the building and in fair to poor condition. (Image 4, & 5)

Image 3 – Boiler Breeching

ADMINISTRATIVE OFFICES

The offices are heated, ventilated and air conditioned by packaged thru wall air conditioning (PTAC) units with hot water heating coils. The PTAC units appear to be in fair condition. The offices with exterior walls are ventilated naturally through the use of operable windows. (Image 6)

SUPPLEMENTAL AC SYSTEMS

The majority of the building is not air-conditioned. Besides some of the Administration offices, which are served by PTAC units, the technology classroom is served by a ductless split system AC unit. The split system AC unit appears to be have been installed in 2013 and was

Image 4 – Hot Water Pumps

manufactured by Sanyo. The unit appears to be in good condition. (Image 11)

Image 5 – Hot Water Pump VFD Drives

CLASSROOMS

Ceiling suspended horizontal classroom unit ventilators are utilized for the heating and ventilation requirements of the majority the classroom spaces. The unit ventilators are manufactured by MagicAire and appear to have been recently installed in 2013. There are approximately fourteen (14) unit ventilators located on the first floor and nineteen (19) unit ventilators located on the second floor, for a combined total of (33) unit ventilators. Ventilation air is introduced to each of these units through a wall-mounted louver. Some of the louvers appear to be in need of cleaning, repair, and/or replacement. Each unit is equipped with a hot water heating coil, supply fan and filter. The units are in very good condition. The classroom spaces are provided with exhaust systems to remove any outdoor air that is introduced through the unit ventilators which helps maintain a neutral pressure within the space. Most of the classrooms are served by central roof mounted exhaust fan systems. The majority of classrooms with exterior walls also have perimeter hot water fin tube radiation. The fin tube radiation appears to be originally installed equipment and is generally past its expected useful service life. Some of the fin tube radiation enclosure grilles are damaged and dirty. (Image 7, 8, 9, & 10)

Image 6 – Administration Office PTAC Unit

Image 7 – Typical Classroom Unit Ventilator

CAFETERIA AND KITCHEN

The Cafeteria is heated by an indoor heating and ventilation unit. The unit is provided with a hot water coil, supply fan and filter section and was manufactured by Herman Nelson/American Air Filter (Model AUDIvent H-11-LPWSYA). The Kitchen is provided with heating, and make-up air ventilation by an indoor heating and ventilation unit. The unit is provided with a hot water coil, supply fan and filter section and was manufactured by Herman Nelson/American Air Filter. The Cafeteria and Kitchen H&V units are located on a mezzanine support platform located above the Kitchen. Both of the H&V units and associated ductwork appears to

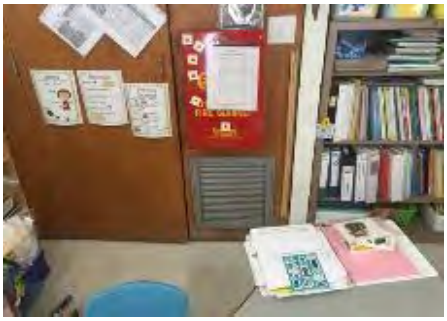

Image 8 – Typical Classroom Exhaust Grille

be originally installed equipment that is over 50 years old, in poor condition and past their expected useful service life. Galvanized sheet metal ductwork is distributed from the airhandling units to sidewall diffusers in the Cafeteria and ceiling diffusers in the Kitchen. The Cafeteria has low wall return grille and the Kitchen has a kitchen exhaust hood. The kitchen exhaust hood is connected to a roof mounted exhaust air fan. The exhaust air fan and hood appear to be in good physical condition. (Image 12, 13, & 14)


Image 9 – Library Unit Ventilator

GYM

The Gym is served by two (2) indoor heating and ventilation units that are located in the adjacent Gym storage room. The H&V units are ceiling suspended units. The units each have a hot water coil, supply fan and filter section and were manufactured by Herman Nelson/American Air Filter. Galvanized sheet metal ductwork is distributed from the airhandling unit to the Gym. Supply air diffusers are located on the sidewall, and low floor return air registers are installed in the gym. The indoor air-handling units and associated ductwork appears to be originally installed equipment that is over 50 years old, in poor condition and past their expected useful service life. (Image 15, 16, & 17)


Image 10 – Unit Ventilator Louver

EXHAUST SYSTEMS

The majority of classroom spaces are exhausted through roof mounted exhaust fans. There are also dedicated exhaust fans which are roof mounted for areas such as the gang toilets, kitchen hood, storage rooms and the large group spaces such as the Gym and Cafeteria These areas utilize a galvanized sheet metal duct distribution system from the space to the roof mounted exhaust fans. There are approximately 34 roof mounted exhaust fans. The majority of the exhaust fans appear to be in very good condition, with most appearing to have been recently replaced. The majority of exhaust fans were manufactured by Loren Cook. The majority of exhaust ductwork appears to be originally installed ductwork that is past its expected useful service life. (Image 19)


Image 11 – Ductless AC Unit (Technology Class Room)


Image 12 – Cafeteria Supply Diffusers

RESTROOMS

The restrooms are heated by hot water convector units that appear to be in fair to poor condition. The restrooms are typically exhausted by ceiling or sidewall exhaust air grilles that are connected to exhaust air fans that are located on the Roof. Some of the exhaust air grilles were soiled. (Image 18)

Image 13 – Kitchen Make-up Air Supply Diffusers

ENTRYWAYS AND CORRIDORS

The main entryways are heated by hot water convector units that appear to be originally installed equipment; some of the unit heaters show signs of corrosion on the cabinets. The majority of corridors are not provided with code required fresh air ventilation. The corridors are heated by a combination of hot water convectors and fin tube radiation that appears to be in poor to fair condition. (Image 20, & 21)

Image 14 – Kitchen Exhaust Hood

CONTROLS

The majority of the building HVAC systems and the heating plant are controlled by a combination DDC (direct digital control) and pneumatic control system. The ATC control system was upgraded during the 2013 HVAC system renovation project. The DDC/ATC system was manufactured by Trend Controls and installed by FMC Control Technologies. The Control system has a DDC (direct digital control) front-end controller, DDC equipment controllers, and network type thermostats. The majority of the renovated heating and ventilation system have DDC controls. However there are still some pneumatic control systems installed for the existing H&V equipment that were not replaced during the recent renovation. The pneumatic compressor appears to be in good condition. (Image 22, & 23)

Image 15 – Gym Sidewall Supply Diffusers

RECOMMENDATIONS

In general, the school's heating and ventilation equipment is in good condition as the boilers and unit ventilators have recently been replaced. A new DDC system was also recently installed. However, the majority of the existing hot water piping, gym and cafeteria heating and ventilation units, and

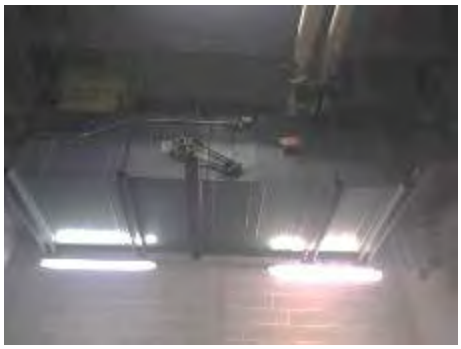

Image 16 — Gym H&V Unit

terminal heating equipment is originally installed equipment. Based upon our site observations and review of the existing system, we offer the following recommendations for HVAC system repairs and/or renovations:

- The existing hot water plant including, hot water boilers, accessories and controls, should continue to be maintained in accordance with manufacturers recommendations.
- New hot water pumps should be installed.
- The existing classroom unit ventilators should continue to be maintained in accordance with manufacturer recommendations
- The Cafeteria H&V Unit and Kitchen Make-Up indoor air-handling unit located in the Mezzanine area above the Kitchen should be replaced.
- Rooftop exhaust air fans should continue to be maintained.
- Existing ductwork and air distribution devices should be cleaned.
- Existing cabinet unit heaters, hot water fin tube radiation, and convectors should be replaced. New hot water branch piping and valves with insulation should be provided.
- Existing hot water supply and return piping outside of boiler room should be replaced with new insulated piping.
- Alternatively, existing hot water piping system should be drained and pressure tested and faulty valves and pipe sections should be replaced and insulated. Damaged piping insulation should be replaced.
- Ventilation air systems should be provided for the corridors.
- Copy room areas should be exhausted to the outdoors.

Image 17 –Gym H&V Unit

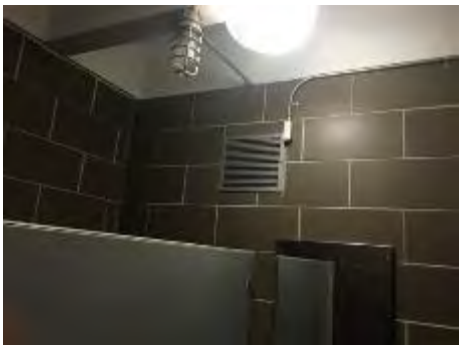

Image 18 –Restroom Exhaust Grille

Image 19 – Roof Exhaust Air Fans

Image 20 – Entryway Hot Water Unit Heater

- A high efficiency AC system should be installed to replace the administration PTAC units.
- Mechanical ventilation should be provided for the following interior areas of the buildings: Administration interior offices, Library interior office, and Teacher's SPED Workroom.
- The ATC system should be further upgraded to replace all remaining pneumatic controls with new DDC controls.

Image 21 – Corridor Hot Water Unit Heater

Image 22 – Pneumatic Compressor

Image 23 – ATC Controls and Control Panel

ELECTRICAL ASSESSMENT

EXISTING SYSTEMS

The existing systems of this facility range from original vintage, approximately 47 years old, to upgrades and/or add-ons recently installed including fire alarm, branch circuit panelboards, lighting, and photovoltaics. Although new devices, equipment, and fixtures were provided, generally the existing wiring, raceways, and boxes were reused. While the facility is well maintained and clean, the systems do not reflect nor meet the needs of a modern day facility. Code changes over the years have resulted in existing systems that do not meet today's electrical codes. Most of the existing systems are not suited for expansion due to the incompatibility of new technologies. Replacement parts are no longer available for many of the systems.

We recommend replacement of all the electrical systems for this facility under a renovation program.

Image 1 — Utility Pole Riser

Image 2 — Pad Mount Transformer

Image 3 — Main Switchgear

Image 4 — Main Breaker

ELECTRICAL DISTRIBUTION SYSTEMS

The service is fed from a utility pole riser on Richardson Road to a utility company owned pad mounted transformer adjacent to the building (Image 1 & 2).

A 1,200 ampere, 120/280 volt, 3 phase, 4 wire service serves the building. The main service equipment is located within the building's boiler room. The switchboard consists of a main/C.T. cabinet and a main distribution section, distribution style construction. The equipment is of original vintage and manufactured by General Electric. No ground was observed at the building's main water service, which is a code requirement (Image 3, 4, & 5).

Branch circuit panelboards vary from original General Electric panelboards, that are in poor condition, to recently installed General Electrical panelboards that are in good condition. There has been some additional branch circuitry added throughout the school. New power branch circuits are installed in color coded conduits, "Blue" (Image 6, 7, 8, & 9).

Image 5 — Main Distribution

Image 6 — Original G.E.P.8

Image 7 — Updated G.E.P.8

Image 8 — New Branch Circuit Install

INTERIOR LIGHTING

Corridor lighting consists of surface mounted fluorescent fixtures with acrylic lenses and other surface mounted cylinders and sconces. Corridor lighting is controlled via line voltage switches at the ends of the corridor. (Image 10)

Classroom lighting consists of surface mounted fluorescent fixtures with acrylic lenses. Light levels appear adequate in the classrooms. Each classroom has been equipped with a wireless Lutron occupancy sensor and two low voltage switches that control a line voltage power pack (Image 11, & Image 17).

Restrooms contain ceiling mounted fluorescent round fixtures with PLT lamps; many lenses are broken on these fixtures. Light levels in the restrooms are very low (Image 15).

Gym lighting and cafeteria lighting consists of high output, 2x4 fluorescent high bays. Light levels seem adequate. It was noted that one fixture in the gym was not working (Image 12, & Image 14).

Incandescent track heads are used to light the platform in the cafetorium for performances (Image 13).

In general, the interior lighting is in poor condition. Most switching has been replaced with switch style occupancy sensors. Multiple rooms were noted as not having received the occupancy sensor switch upgrade (Image 16).

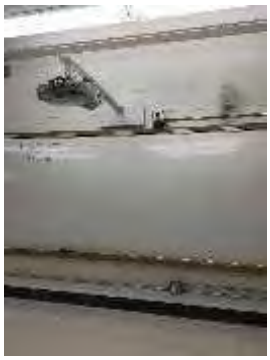
Image 9 – New Receptacles Installed


Image 10 – Corridor Lighting


Image 11 – Classroom Lighting


Image 12 – Cafetorium Lighting


Image 13 – Platform Track Lights


Image 14 – Gym Lighting


15 – Example of Damaged Lenses


Image 16 – Occupancy Sensor Switch

Image 17 — Typ. Low Voltage Classroom Switches

Image 18 — Pole Mounted LED Flood

Image 19 — Bldg. Mounted LED Flood

Image 20 — Canopy LED Fixture

EXTERIOR LIGHTING

The site is lit with a combination of recently installed pole and building mounted LED flood lighting. Under the main canopy, existing lighting has been upgraded to LED lighting. Decorative globe fixtures on pedestrian height poles are located at the main entry walkway (Image 18, 19, 20, & 21).

In general, the exterior lighting is in fair condition; however, it does not meet any dark sky requirements. Exterior lighting is controlled via a time clock.

EMERGENCY STANDBY SYSTEM

A Caterpillar P110E fired generator, 100 kW, 120/208 volt, in a weather-proof, sound attenuated enclosure is installed adjacent to the building within a fenced in enclosure. The generator feeds an ASCO transfer switch and serves emergency lighting, as well as other loads. The emergency system does not comply with current electrical code as the emergency equipment is not separated from normal equipment (Image 22, 23, & 24).

FIRE ALARM SYSTEM

The fire alarm system consists of an addressable FCI S3 Series control panel. The control panel is located in the lobby. Horn/strobes are ADA compliant and located throughout the school. Manual pull stations also seem to be compliant (Image 25, 26, & 27).

The detector does not meet NFPA72 spacing in rooms with beams. Also, a detector device should be in each space "Full Coverage," which did not seem to be the case. E-use groups require speaker/strobes, which means this school does not comply with current code.

An exterior master box #32 and knox box are located at the main entrance (Image 28).

LIGHTNING PROTECTION SYSTEM

The facility does not have a lightning protection system.

PHOTOVOLTAIC SYSTEM

The facility contains a recently installed grade-mounted and roof- mounted photovoltaic system.

The roof mounted panels are self-ballasted. There are four inverters, selection Model PV175-208, 300 kw system total (Image 29, 30, & 31).

DATA / TELEPHONE / CLASSROOM INTERCOM / CLOCK

There are four IDF rooms and one MDF room. The MDF room serves each IDF room in a star topology with 62.5 - micron multi-mode fiber.

In general, data wiring is Cat5 throughout the building. IDF data racks are generally installed in existing storage or janitor closets; emergency branch circuits have been run to each rack (Image 33-37).

The school's telephone system is a hosted system. Handsets in the school are manufactured by Polycom.

The existing clock system is a standard electric time clock and seems to be operational; however, this system is obsolete.

A Rauland tele-center paging system head-end is located in the MDF room. A Valcom paging interface is used to interface the hosted system to the paging system and has been problematic (Image 38).

Most classrooms are equipped with A/U control systems for projector, document camera, and computer connections. Each also contains a sound reinforcement system. Projectors are ceiling mount type (Image 32, 39, 41, & 42).

Image 21 — Decorative Globe Fixture

Image 22 — Generator

Image 23 — Automatic Transfer Switch

Image 24 — Emergency Panel


Image 25 — Fire Alarm Control Panel


Image 26 — Horn / Strobe


Image 27 - Pull Station


Image 28 — Master Box & Knox Box

The cafetorium's existing Dukane local sound system is no longer in use. A portable system is used. The portable system is not tied into the fire alarm system which is a code requirement. (Image 40)

A system of surface raceways has been installed to accommodate the various communications cables added over the years. There are numerous locations where communications cables are run exposed. (Image 43)

SECURITY

The building contains an Aiphone intercom door communication system at the main entry that is in fair condition. (Image 46, & 48)

The building also contains an intrusion system, CCTV cameras, and an access control system.

The intrusion system is a Honeywell system and is operational; however, appears to be in poor condition. (Image 47, & 49)

CCTV cameras are located on the exterior covering the building perimeter. They are connected to an S2 video management system; the head-end is located at the central administration office. (Image 45)

Access control is manufactured by S2 and there are micro-nodes located in the IDF closets to serve the access controlled doors. The system's head-end is located at the central administration office. (Image 44)


Image 29 – Roof Mounted System


Image 30 – Grade Mounted System


Image 31 – Inverters


Image 32 – Typical Projector Set-up


Image 33 – IDF #3


Image 34 – IDF #2


Image 35 – IDF #1


Image 36 – IDF #4


Image 37 - MDF


Image 38 – Paging System


Image 39 – Computer Lab Wiring


Image 40 – Portable Local Sound System

Image 41 – Classroom Data Wiring

Image 42 – A/U Control System

Image43 – Exposed Data Wiring

Image 44 – Access Controller

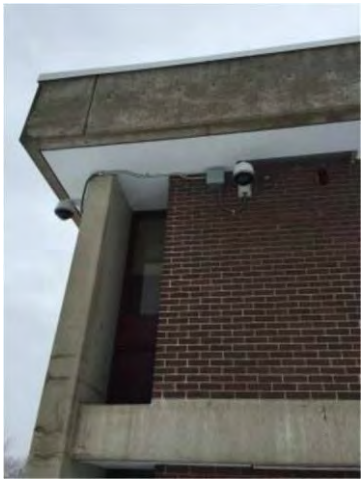

Image 45 – CCTV Cameras

Image 46 – AI Phone Intercom at Main Entrance

Image 47 – Intrusion Keypad

Image 48 – Intercom Master Station

Image 49 – Intrusion System Panel

PLUMBING ASSESSMENT

GENERAL ASSESSMENT

Presently, the plumbing systems serving the building are cold water, hot water, sanitary, waste and vent system, storm drain piping, and natural gas. Municipal sewer and municipal water service the building.

FIXTURES

Water closets are wall hung vitreous china with manual flush valves. (Image 1)

Urinals are wall hung vitreous china with automatic sensor type flush valves. (Image 2)

Lavatories are wall hung vitreous china. The lavatories are fitted with hot and cold water faucets (Image 3)

Janitors sinks are floor mounted mop receptors. Faucets are equipped with vacuum breakers.

Drinking fountains are stainless steel surface mounted with chiller. (Image 4)

Classroom sinks are stainless steel drop-in type with hot and cold water faucet with gooseneck. Classroom sinks include a bubbler. (Image 5)

Kitchen area fixtures are in fair condition. The pot washing sink is not piped to a grease interceptor. (Image 6)

WATER SYSTEM

The domestic water service is located in the Mechanical Room. The service appears to be 4" in size and includes a meter and two (2) reduced pressure backflow preventers in parallel. (Image 7)

Piping is copper tubing with sweat joints. The majority of piping is insulated but not labeled. In general, the original gate valves are in poor condition. (Image 8)

Image 1 — Wall Hung Water Closet

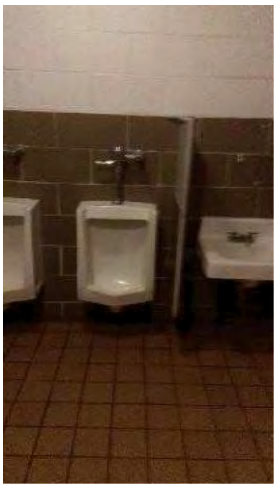

Image 2 — Urinals

Image 3 — Lavatories

Image 4 — Drinking fountain

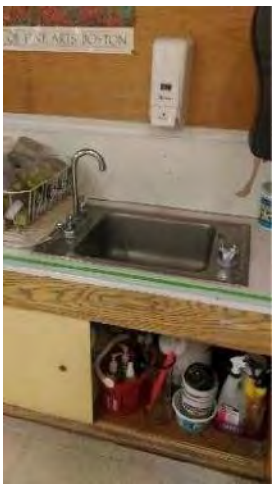

Image 5 — College Sink

Image 6 — Pot Wash Sink

The main building domestic hot water is generated through a pair of gas-fired standard efficiency non-condensing water heaters. The water heaters have a natural gas input of 77,000 BTUH each and a water storage capacity of 100 gallons each (Image 9).

A thermostatic mixing valve is not provided for the building domestic hot water system. The domestic hot water system is recirculated. There is no expansion tank on the cold water make-up to the water heater.

GAS

Building is serviced by an elevated pressure natural gas service. The gas service, regulator and meter is located on the exterior in a caged area. Gas main distribution is 4" in size. A sub meter is installed dedicated to an emergency generator (Image 10).

Gas is supplied to heating boilers, water heater, kitchen equipment and emergency generator.

Gas piping is black steel with either welded or threaded joints depending on pipe size.

SANITARY DRAINAGE SYSTEM

In general, cast iron is used for sanitary drainage. Piping and fittings above slab are no-hub with coupling joints and bell & spigot. Where visible, the cast iron pipe appears to be in poor condition. Smaller pipe sizes appear to be copper for waste (Image 11).

ROOF DRAINAGE SYSTEM

The flat roofs are collected by roof drains and interior cast iron rain leaders. The roof and drains are in fair condition. Portions of the horizontal rain leader piping is insulated (Image 12).

RECOMMENDATIONS

Plumbing fixtures meet current code for water conservation. However, new high-efficiency low flow fixtures could be installed to reduce water consumption.

In general, existing cast iron drainage piping can be re-used if sized appropriately. We recommend video inspection of existing drains to confirm integrity.

- Provide reduced pressure backflow preventers at Janitor's closet soap dispenser.
- Local sewer may require Kitchen waste be directed to exterior grease trap.
- Install a high efficiency water heater including master mixing valve, recirculated hot water and expansion tank on cold water make-up line.
- Sanitary waste, vent and storm drainage piping should be video-taped to determine condition.
- Original domestic water piping should be replaced. Domestic water piping shall be insulated, labeled and isolated with tagged brass ball valves. The valve tags should be charted for ease of maintenance.

Image 7 — Water Meter

Image 8 — Water Piping

Image 9 — Water Heaters

Image 10 – Gas Meter

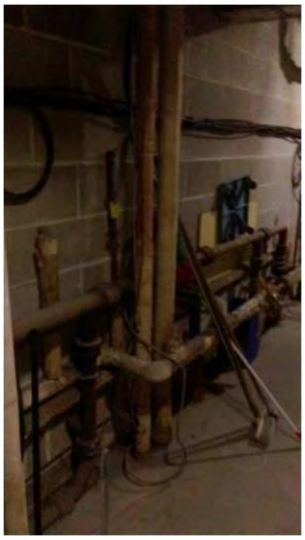

Image 11 – Sanitary Waste

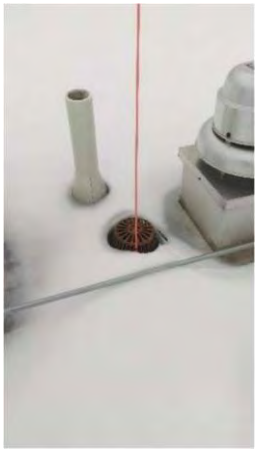

Image 12 – Roof Drain

FOODSERVICE EQUIPMENT ASSESSMENT

GENERAL ASSESSMENT

The Harrington Elementary school serves approximately 460 students in grades k through 4. This facility, as with some of the other lower schools the kitchen equipment appears to be more of a serving kitchen with limited cooking capability. Much of the area sits idle including what was the dish room but is now being used as storage.

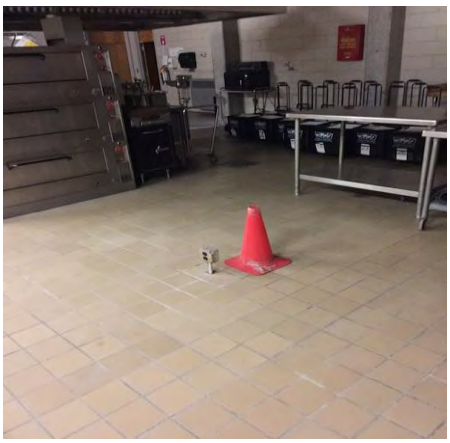

Image 1

The school's cafeteria kitchen serves the typical school lunch program in a single serving line configuration. The serving and support equipment are mostly outdated. Floors and walls are constructed of the appropriate materials and have held up well.

The ceilings are not compliant with current health code (Image 2).

Image 2

KITCHEN EQUIPMENT

During the site visit we noticed many pieces of equipment were missing. In places where equipment was removed tripping hazards exist where unused utility stubs are located.

Tripping Hazard (Image 1):

- Stubbed Up electrical service that is no longer used.

Non-compliant Ceilings (Image 2):

- Ceiling tiles are porous and failed in some locations.

Antiquated Equipment (Image 3):

- The cooking equipment is composed of a convection oven and a combination kettle and steamer. The pressure steamer shown in this image is a pressure steamer. This type of steamer is no longer in common use.

Image 3

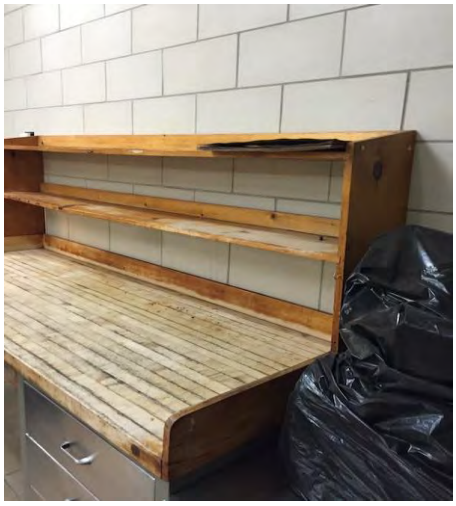

Image 4

Image 5

Image 6

- In addition to the steam equipment there is a two-burner range located behind the steamer. Neither the range nor the hood plenum is protected by a fire suppression system. Modern NFPA 96 codes require protection at cooking surfaces that produce grease laden vapors. That protection must also extend to the hood plenum and duct work.

Wood tables (Image 4 & 5):

- Wood topped table can be seen in this image. Wood topped work surfaces are not allowed in a kitchen unless the wood surface is being used as part of a scratch baking program. There is no scratch baking taking place in this kitchen.

- Image 5 is a close up of the table shown in Image 4. Mold can be seen growing where the wood slats are glued together. This kitchen is mainly a warming kitchen so the risk is low, but all wood topped tables should be eliminated to prevent the possibility of contamination.

- The walk-in cooler panels and doors are outdated and inefficient. The condensing units for the walk-in coolers and freezer are located indoors, resulting in noise and heat being rejected into the indoor space. There is visible corrosion on the surface of the walk- in pales.

Serving line (Image 6):

- The serving line is a single serving line with milk at the beginning and the check out/cash station at the end.

- Note the wood material work board attached to the serving counter. Wood is a restricted material in a commercial kitchen environment and no longer allowed as a cutting surface.

- The sneeze shield on the serving counter does not comply with current sneeze guard standards.
- Mechanical cooling is not provided for in this serving counter.

Dish washroom (Image 7 and 8):

- Similar to Byman, the dish room has long been abandoned for its intended purpose of washing trays and utensils. It is currently being used for dry goods storage and in this case, appears to double as a snack sales window and cleaning supplies area.
- It is not clear if the dish washing equipment is still operational. Often these rooms are converted when the machine fails and the replacement cost is prohibitive. Even if the dishwasher was operational given its age and idle situation, the seals within the unit would have dried out and it is not likely this machine would function well. Also, new machines are much more efficient. It is often better to replace rather than to repair older machines.

Image 7

Image 8

RECOMMENDATIONS

1. Eliminate all wood surfaces and replace with appropriate stainless steel tables and work surfaces.
2. Add appropriate mobile worktables to provide for additional flexible work surfaces.
3. Redeploy the dish room by eliminating the equipment from the dish room to provide for additional storage so this space can function as needed.
4. Replace the antiquated cooking equipment and exhaust hood to better prepare and cook food at this facility.

5. Supply a new fire suppression system for the hood system, complete with a tie in to the building fire alarm system.

6. As a stand alone full service kitchen we estimate a complete equipment fit out to cost approximately
$325,000

1.0 INTRODUCTION:

UEC has been providing comprehensive asbestos services since 2001 and has completed projects throughout New England. We have completed projects for a variety of clients including commercial, industrial, municipal, and public and private schools. We maintain appropriate asbestos licenses and staff with a minimum of twenty years of experience.

As part of the proposed renovation and demolition project, UEC was contracted by Dore & Whittier Architects to conduct the following services at the Harrington Elementary School, Chelmsford, MA:

- Inspection and Testing for Asbestos Containing Materials (ACM);
- Inspection for Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures;
- Inspection for Lead Based Paint (LBP).

Information included in this report was based on the AHERA Management Plans and on a determination inspection performed by UEC. Limited testing was performed as part of this study. It is recommended that once a detailed scope of work is identified for a renovation or a demolition project, a comprehensive Environmental Protection Agency (EPA) NESHAP inspection including asbestos testing for all suspect materials and testing for other hazardous materials including, Polychlorinated Biphenyls (PCB's) and Lead Based Paint (LBP) should be performed, which would provide a more accurate hazardous materials abatement costs and scope.

Additional testing and abatement plans for EPA review are required to be performed should PCB's be found in the caulking.

The scope of work included the inspection of accessible ACM, collection of bulk samples from materials suspected to contain asbestos, determination of types of ACM found and cost estimates for remediation. Bulk samples analyses for asbestos were performed using the standard Polarized Light Microscopy (PLM) in accordance with EPA standard. Bulk samples were collected by Massachusetts licensed asbestos inspector Mr. Jason Becotte (AI-034963) and analyzed by a Massachusetts licensed laboratory EMSL, Woburn, MA.

Refer to samples results.

2.0 FINDINGS:

The regulations for asbestos inspection are based on representative sampling. It would be impractical and costly to sample all materials in all areas. Therefore, representative samples of each homogenous area were collected and analyzed or assumed.

All suspect materials were grouped into homogenous areas. By definition a homogenous area is one in which the materials are evenly mixed and similar in appearance and texture throughout. A homogeneous area shall be determined to contain asbestos based on findings that the results of at least one sample collected from that area shows that asbestos is present in an amount >1% in accordance with EPA regulations. All suspect materials that contain any amount of asbestos must be considered asbestos if it is scheduled to be removed per the Department of Environmental Protection (DEP) regulations.

Number of Samples Collected

Five (5) bulk samples were collected from the following materials suspected of containing asbestos:

Type and Location of Material

1. Brown 9” x 9” vinyl floor tile at exit hall
2. White 12” x 12” vinyl floor tile at exit hall
3. Hard joint insulation at boiler room
4. Interior vertical caulking at boiler room
5. Exterior expansion joint caulking

Samples Results

Type and Location of Material	Sample Result
1. Brown 9” x 9” vinyl floor tile at exit hall	8% Asbestos
2. White 12” x 12” vinyl floor tile at exit hall	No Asbestos Detected
3. Hard joint insulation at boiler room	No Asbestos Detected
4. Interior vertical caulking at boiler room	5% Asbestos
5. Exterior expansion joint caulking	6% Asbestos

3.0 OBSERVATION AND COST ESTIMATES:

OBSERVATIONS:

All ACM must be removed by a Massachusetts licensed asbestos abatement contractor under the supervision of a Massachusetts licensed project monitor prior to any renovation or demolition activities that might disturb the ACM.

1. 9” x 9” Vinyl floor tile and mastic were previously found to contain asbestos.
2. White expansion joint was previously found to contain asbestos.
3. Black sink coating was previously found to contain asbestos.
4. Pink sink coating was previously found to contain asbestos.
5. Tan cement caulking was previously found to contain asbestos.
6. Interior door framing caulking was previously found to contain asbestos.
7. Roof drain pipe insulation was previously found to contain asbestos.
8. Insulation inside boilers was assumed to contain asbestos.
9. Interior vertical caulking was found to contain asbestos.
10. Exterior expansion joint caulking was found to contain asbestos.
11. Glue holding blackboard was assumed to contain asbestos.
12. All remaining suspect materials were found not to contain asbestos.
13. Underground sewer pipe was assumed to contain asbestos.
14. Damproofing on exterior and foundation walls was assumed to contain asbestos. The demolition contractor will have to segregate the ACM from non-ACM building surfaces for proper disposal in an EPA approved landfill that does not recycle.
15. Roofing materials were assumed to contain asbestos. The demolition contractor will have to segregate the ACM from non-ACM building surfaces for proper disposal in an EPA approved landfill that does not recycle.
16. Painted surfaces were assumed to be LBP. All LBP activities performed, including waste disposal, should be in accordance with applicable Federal, State, or local laws, ordinances, codes or regulations governing evaluation and hazard reduction. In the event of discrepancies, the most protective requirements prevail. These requirements can be found in OSHA 29 CFR 1926-Construction Industry Standards, 29 CFR 1926.62-Construction Industry Lead Standards, 29 CFR 1910.1200-Hazards Communication, 40 CFR 261-EPA Regulations.
17. Visual inspection of various equipments such as light fixtures, thermostats, exit signs and switches was performed for the presence of PCB’s and mercury. Ballasts in light fixtures were assumed not

to contain PCB's. Tubes, thermostats, exit signs and switches were assumed to contain mercury. It would be very costly to test those equipments and dismantling would be required to access. Therefore, the above mentioned equipments should be disposed in an EPA approved landfill.

18. Caulking materials were assumed to contain PCB's.

COST ESTIMATES:

The cost includes removal and disposal of all accessible ACM and an allowance for removal of inaccessible or hidden ACM that may be found during the demolition or renovation project.

Location	Material	Approximate Quantity	Cost Estimate ($)
Various Locations	9" x 9" Vinyl Floor Tile and Mastic	53,500 SF	267,500.00
	White Expansion Joint	1,000 LF	10,000.00
	Door Framing Caulking	1,000 LF	10,000.00
	Sinks	29 Total	2,900.00
	Blackboards	Unknown	8,000.00
	Hidden ACM	Unknown	25,000.00
	Miscellaneous Hazardous Materials	Unknown	25,000.00
Mechanical Room	Grey Pipe Packing	100 SF	2,500.00
Gymnasium	Roof Drain Joint Insulation	3 LF	500.00
Boiler Room	Boilers	3 Total	25,000.00
Exterior	Expansion Joint Caulking	Unknown	25,000.00
	Transite Sewer Pipes	Unknown[1]	50,000.00
	Roofing Materials	60,440 SF	60,440.00
	Damproofing on Exterior/Foundation Walls	Unknown[1]	115,000.00
PCB's Remediation[2]			25,000.00
Estimated costs for ACM Inspection and Testing Services			7,500.00
Estimated costs for PCB's Testing and Abatement Plans Services[2]			25,000.00
Estimated costs for Design, Construction Monitoring and Air Sampling Services			75,660.00
		Total:	**760,000.00**

[1]: Part of total Demolition and Excavation.
[2]: Should results exceed EPA limit.

4.0 DESCRIPTION OF SURVEY METHODS AND LABORATORY ANALYSES:

Asbestos samples were collected using a method that prevents fiber release. Homogeneous sample areas were determined by criteria outlined in EPA document 560/5-85-030a.

Bulk material samples were analyzed using PLM and dispersion staining techniques with EPA method 600/M4-82-020.

5.0 LIMITATIONS AND CONDITIONS:

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

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

Inspected By:

Jason Becotte
Asbestos Inspector (AI-034963)

CAPITAL IMPROVEMENT PLAN

	HARRINGTON SCHOOL	Health, Safety & Welfare	Code Compliance	Functional Use of Building or Site	Handicap Accessibility	Extending the Life of the Building (Maintenance)	Energy Efficiency / Energy, Water Saving	Hazardous Material Abatement	Estimated Project Cost (5/2016 $)	High Priority (1-3 yrs) 2017-2020	Medium Priority (4-6 yrs) 2020-2023	Low Priority (7-10 yrs) 2023-2033 or under a full renovation project	On Going Maintenance	Notes / Total
	GSF 60,442													
1	**Site & Civil**													
1.01	Provide additional parking and accessible spaces, near front entrance		x						$7,590		$7,590			
1.02	Access to the playground, accessibility of playground equipment				x				$75,900		$75,900			
1.03	Accessible route, curb cuts, ramps				x				$37,950		$37,950			
1.04	Stormwater discharge needs to be changed so that it doesn't discharge directly to a wetland.		x						$75,900		$75,900			
1.05	Mill and overlay sections of pavement where cracking/ degradation has occurred			x		x			$30,360			$30,360		
	TOTAL									**0**	**$197,340**	**$ 30,360.00**	**$ -**	**227700**
2	**Structural Elements**													
2.01	Anchor partial height masonry walls at toilet rooms to structure, or remove and replace with toilet partitions					x			$11,385	$11,385				
	TOTAL									**$11,385**	**$0**	**0**	**0**	**$11,385**
3	**Exterior Architectural Elements**													
2.01	Replace metal handrail post bases at exterior due to degradation					x			$2,277	$2,277				
2.02	Repair spalling at exterior concrete columns					x			$15,180	$15,180				
2.03	Repair spalling at exterior concrete façade					x			$138,442	$138,442				
3.01	Replace handrails at ramp at side entrance with railings at appropriate height for accessibility				x				$5,693	$5,693				
3.02	Repair foundation walls to prevent further spalling and additional damage					x			$11,537		$11,537			
3.03	Regrade around foundation walls to prevent pooling of water and to establish positive drainage					x			$138,442		$138,442			
3.04	Repair damaged brick and mortar, replace cracked bricks and clean weeps					x			$1,358,458				$1,358,458	
3.05	Patch and repair precast cantilevers where they are spalling or damaged					x			$15,180	$15,180				
3.06	Repair cracking in concrete frames					x			$22,770		$22,770			
3.07	Replace caulking at control joints					x			$37,950				$37,950	
3.08	Repair and repaint damaged surfaces of supporting steel angles					x			$15,180				$15,180	
3.09	Scrape and repaint soffits with exterior grade enamel paint					x			$48,455				$48,455	
3.10	Install backer rod and caulking at windows where it is missing					x			$15,180				$15,180	
3.11	Repair concrete window sills					x			$37,950		$37,950			
3.12	Scrape and repaint loading dock doors					x			$759				$759	
3.13	Install insect screens at unit heaters	x				x			$6,148	$6,148				

3.14	Clean debris from birds and rodents out of louvers	x				x			$4,099				$4,099	
3.15	Replace damaged vents and screens to ensure operational condition of vents and louvers					x			$7,590	$7,590				
3.16	Patch and repair concrete entrance steps	x			x	x			$12,144	$12,144				
3.17	Repair sidewalks and drains to ensure proper drainage and avoid damage to sidewalks	x		x		x			$15,180	$15,180				
3.18	Repair or replace stair and ramp railings				x	x			$30,360		$30,360			
3.19	Replace concrete pads where rebar is exposed					x			$7,590		$7,590			
3.20	Repair loading dock where rebar is exposed and concrete is spalling					x			$9,867		$9,867			
	TOTAL									**$217,833**	**258515.4**	**0**	**1480080.36**	**$1,956,429**
4	**Interior Architectural Elements**													
4.01	Update elevator to meet current codes for a full-size gurney and location of controls		x		x				$303,600			$303,600		
4.02	Provide proper clearance around all toilet fixtures for accessibility				x				$204,930	$204,930				
4.03	Provide fixtures and accessories at proper heights for accessibility for elementary students				x				$17,078	$17,078				
4.04	Provide grab bars and mount at correct heights				x				$20,493	$20,493				
4.05	Provide appropriate faucet controls for accessibility				x				$13,662	$13,662				
4.06	Provide insulation at plumbing at sinks for accessibility				x				$10,247	$10,247				
4.07	Replace handrails at incorrect heights for accessibility and ensure they are rounded and extend the proper distance at the top and bottom treads of the stairs				x				$28,690			$28,690		
4.08	Provide access to the performance area via a lift or ramp without leaving the room to conform to accessibility codes				x				$68,310			$68,310		
4.09	Install signage for permanent rooms that meets current accessibility codes.				x				$20,493			$20,493		
4.10	Provide accessible doors and walkways to the interior courtyard				x				$31,878			$31,878		
4.11	Provide audible and visual signals for elevator to meet current codes		x						$15,180			$15,180		
4.12	Replace door hardware with levers or other accessible hardware		x		x				$91,080	$91,080				
4.13	Review all locking devises and closer hardware to meet code		x		x				$36,432	$36,432				
4.14	Revised door swing clearances for accessible push/pull requirements				x				$569,250			$569,250		
4.15	Remove and replace damaged VCT					x			$312,946				$312,946	
4.16	Repair topping on concrete stair treads					x			$28,463		$28,463			
4.17	Install rubber treads on stair treads	x				x			$12,524		$12,524			
4.18	Deep clean tile floors and grout joints in kitchen and toilet rooms					x			$35,977				$35,977	
4.19	Repair or replace damaged floor tiles in toilet rooms					x			$177,500				$177,500	
4.20	Replace damaged floor drain covers					x			$2,732				$2,732	
4.21	Replace non-slip flooring strips in kitchen with non-slip mats	x	x		x				$759	$759				
4.22	Replace worn quarry tile with tile with greater slip resistance	x				x			$71,726	$71,726				

4.23	Repair or replace lifting VCT in cafetorium					x			$29,184				$29,184	
4.24	Replace stair treads leading to the platform area	x				x			$2,459			$2,459		
4.25	Replace stage flooring system with resilient wood flooring system					x			$35,294			$35,294		
4.26	Repair patching at floor where walls have been removed; install flooring to match existing in toilet rooms					x			$7,590			$7,590		
4.27	Repair or repaint epoxy and painted floors in back of house areas					x			$23,150				$23,150	
4.28	Repair cracks in CMU walls to prevent further damage					x			$7,590		$7,590			
4.29	Remove remnants of removed walls by grinding smooth and patching finish to match adjacent walls in toilet rooms					x			$15,180	$15,180				
4.30	Seal holes in fire rated walls with fire rated products					x			$9,108	$9,108				
4.31	Clean and repaint CMU walls					x			$22,770				$22,770	
4.32	Remove moveable partitions and replace with permanent, sound-rated walls					x			$38,254		$38,254			
4.33	Install acoustical ceiling where possible					x			$478,170		$478,170			
4.34	Repair source of water staining in kitchen area and repair ceiling					x			$7,590	$7,590				
4.35	Replace kitchen ceiling with scrubable ceiling tiles		x						$23,074	$23,074				
4.36	Refinish wood doors					x			$15,484		$15,484			
4.37	Repaint metal doors					x			$3,340				$3,340	
4.38	Replace wired glass in doors and windows with tempered glass		x						$5,465			$5,465		
4.39	Repair and refinish hollow metal frames to prevent further rusting					x			$34,155				$34,155	
4.40	Replace toilet partitions					x			$49,183	$49,183				
4.41	Refinish woodwork for shelving and wardrobes					x			$61,479	$61,479				
4.42	Replace counters and cabinets					x			$262,310	$262,310				
4.43	Provide additional classrooms or teaching spaces to meet educational program needs		x							$0				
	TOTAL									$ 894,330	$ 580,483	$1,088,209	$ 641,752	$ 3,204,774
5	**Mechanical - HVAC**													
5.01	Continue to maintain the existing hot water plant (including hot water boilers, accessories and controls) in accordance with manufacturers recommendations					x							0	
5.02	Install new hot water pumps			x					$11,385				11385	
5.03	Continue to maintain the existing classroom unit ventilators in accordance to manufacturer recommendations					x							0	
5.04	Replace the cafeteria H&V Unit and kitchen make-up indoor air-handling unit located in the mezzanine area above the kitchen.					x			$53,130	$53,130				
5.05	Maintain rooftop exhaust air fans.					x			$9,108				9108	
5.06	Clean existing ductwork and air distribution devices					x			$22,770	$22,770				

	5.07	Replace existing cabinet unit heaters, hot water fin tube radiation and convectors. New hot water branch piping and valves with insulation should be provided.					x			$645,150			$645,150		
	5.08	Replace existing hot water supply and return piping outside of the boiler room with insulated piping					x			$27,324		$27,324			
	5.09	Drain and pressure test existing hot water piping system. Faulty valves and pipe sections should be replaced and insulated. Damaged piping insulation should be replaced					x			$37,950		$37,950			
	5.10	Provide ventilation air systems for the corridors			x					$75,900			$75,900		
	5.11	Exhaust to the outdoors from copy room areas		x						$15,180			$15,180		
	5.12	Install a high efficiency AC system to replace the administration PTAC units								$45,540			$45,540		
	5.13	Install mechanical ventilation for the administration interior offices, library interior offices and teachers' SPED workroom								$227,700		$227,700			
	5.14	Upgrade the ATC system with new DDC controls instead of pneumatic controls			x					$459,954	$459,954				
		TOTAL									**$ 535,854**	**$ 292,974**	**$ 781,770**	**$ 20,493**	**$ 1,631,091**
6	**Electrical**														
	6.01	Replacement of all electrical systems for this facility under a renovation program						x		$607,200		$607,200			
	6.02	Install electrical ground per code requirements		x						$7,590	$7,590				
	6.03	Upgrade lighting in toilet rooms	x							$10,930	$10,930				
	6.04	Repair non functioning lighting fixture(s) located in the gymnasium					x			$4,175	$4,175				
	6.05	Install occupancy switch upgrades in remaining rooms						x		$45,540	$45,540				
	6.06	Upgrade exterior lighting to meet dark sky requirements		x						$45,540			$45,540		
	6.07	Upgrade emergency standby system so that emergency equipment is separated from normal equipment to meet electrical code		x						$136,620			$136,620		
	6.08	Install lightning protection system		x						$40,986	$40,986				
	6.09	Upgrade clock system because existing system is obsolete								$45,540	$45,540				
	6.10	Upgrade sound system in cafetorium to a system tied to fire alarm per code requirements		x						$45,540	$45,540				
	6.11	Install communications cables in protected raceways.		x						$91,080	$91,080				
	6.12	Upgrade intrusion system, existing system is in poor condition.	x		x					$379,500	$379,500				
		TOTAL									**$ 670,880**	**$ 607,200**	**$ 182,160**	**$ -**	**$ 1,460,240**
7	**Plumbing**														
	7.01	Upgrade to newer high-efficiency low flow fixtures throughout to reduce water consumption						x		$227,700	$227,700				
	7.02	Provide reduced pressure backflow preventers at janitor's closet soap dispenser						x		$4,554	$4,554	complete			
	7.03	Redirect kitchen waste to exterior grease trap		x						$22,770	$22,770				
	7.04	Install a high efficiency water heater including master mixing valve, recirculated hot water and expansion tank on cold water make-up line.						x		$53,130			$53,130		
	7.05	Video-tape sanitary, waste, vent and storm drainage piping to verify condition					x			$4,554				$4,554	
	7.06	Replace original domestic water piping with labeled, insulated and isolated piping with brass ball valves. Chart valve tags for ease of maintenance.					x			$341,550			$341,550		
		TOTAL									$255,024	$0	$394,680	$4,554	$654,258

8	**Fire Protection**														
	8.01	Upgrade fire protection system so that spacing in rooms with beams meets current code. Speakers and strobes are required for this use group.		x						$18,975			$0		review condition
	8.02	Install fire suppression system (sprinklers) throughout the facility	x	x						$598,376			$598,376		
		TOTAL									$0	$0	$598,376	$0	$598,376
9	**Hazardous Material**														
	9.01	HazMat pricing - UEC report dated March 7th 2016							x	$1,153,680			$1,153,680		
	9.01	Remove and replace 9"x9" vinyl floor tile and mastic that contain asbestos							x						
	9.02	Remove and replace white expansion joint previously found to contain asbestos							x						
	9.03	Remove and replace black sink coating previously found to contain asbestos							x						
	9.04	Remove and replace pink sink coating previously found to contain asbestos							x						
	9.05	Remove and replace tan cement caulking previously found to contain asbestos							x						
	9.06	Remove and replace interior door caulking previously found to contain asbestos							x						
	9.07	Remove and replace roof drain pipe insulation previously found to contain asbestos							x						
	9.08	Remove and replace insulation inside boilers that is assumed to contain asbestos							x						
	9.09	Remove and replace interior vertical caulking found to contain asbestos							x						
	9.10	Remove and replace exterior expansion joint caulking found to contain asbestos							x						
	9.11	Remove and replace glue holding blackboards that is assumed to contain asbestos							x						
	9.12	Remove and replace underground sewer pipe that is assumed to contain asbestos							x						
	9.13	Remove and replace damproofing on exterior and foundation walls that is assumed to contain asbestos							x						
	9.14	Remove and replace roofing materials that are assumed to contain asbestos							x						
	9.15	Remove and replace all painted surfaces that are assumed to contain LBP							x						Haz/Mat includes cost associated with complete renovation or demolition; additional costs are included should results exceed EPA limits
	9.16	Remove and replace tube lights, thermostats, exit signs and switches that are assumed to contain mercury							x						
	9.17	Remove and replace caulking materials that are assumed to contain PCBs							x						
		TOTAL									$0	$0	$1,153,680	$0	$1,153,680

GENERAL NOTES

1. Refer to each section of the Report for more detailed information. Before moving forward with a specific project, a detailed review of the scope of work and a re-assessment of the cost estimate for that scope should be performed.

2. Some items should be completed in combination with other items. Some of these suggestions may be noted above. We recommend that once a scope of work is desired to be pursued, a mini-study should be done to confirm which work should be done together. See the next general note below for additional information.

3. Due to the conceptual nature of these recommendations and estimates and the complexity of existing conditions, several solutions may be provided to achieve the end result. Existing conditions in some areas may limit the ability to fully implement the proposed scope of work. Part or all of this work may trigger other renovation requirements related to code, seismic, sprinklers or handicap accessibility. Once a determination is made to move forward with a specific improvement line item, a mini study specific to the scope of work should be done to confirm the scope of work, prepare sketches as necessary and prepare a refined cost estimate.