Feasibility Study & Long Range Plan
Norwood Public Schools

Town of Norwood, MA

Final Volume

September 2017

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Volume One

I. Introduction

Long Range Study

Beginning in the fall of 2016, the Town of Norwood requested the services of Ai3 Architects, LLC, and consultants to assess the existing conditions of its public schools. This included all five community elementary schools, early education center, single middle school, and adult education center. The study aims to establish a feasibility and masterplan for Norwood. Demographic and population trends in the town, site conditions, structural integrity and state of building systems, and overall program distribution per building are all contributing research factors; the results of which are included in this study.

Norwood Public Schools

The Norwood Pblic School System is a Pre-k to grade 12 district with approximately 2,600 students. Besides the high school, seven buildings are currently being occupied as schools and one building houses the district offices and community programs.

James R. Savage Educational Center
District Offices & Community Programs
122,000 square feet
Constructed in 1972

Coakley Middle School
Grades 6-8, approx. 756 students
128,000 square feet
Constructed in 1972

Balch Elementary School
Grades 1-5, approx. 306 students
51,800 square feet
Constructed in 1913, with additions in 1965

Callahan Elementary School
Grades 1-5, approx. 230 students
33,500 square feet
Constructed in 1930, with additions and renovations in 1954 and 1981

Cleveland Elementary School
Grades 1-5, approx. 349 students
49,000 square feet
Constructed in 1958 with an addition in 1965

John P. Oldham Elementary School
Grades 1-5, approx. 218 students
39,500 square feet
Constructed in 1962

Prescott Elementary School
Grades 1-5, approx. 262 students
36,000 square feet
Constructed in 1958

Willett Early Childhood Center
Grades pre-k and kindergarten
38,500 square feet
Constructed in 1968

Project Goals & Schedule

I. October 2016
- Begin development of AutoCAD floor plans for each existing school
- Review existing building reports and documents

II. November 2016
- Begin demographic analysis for long range enrollment projections
- Prepare space summaries for existing buildings
- Continue development of AutoCAD floor plans
- Begin site analysis of existing schools
- Begin building analysis of existing schools

III. December 2016
- Meet with school administration and building principals (one-on-one)

IV. January 2017
- Finalize site analysis of existing
- Finalize demographic analysis
- Finalize structural analysis of existing
- Finalize mechanical, electrical, and plumbing analysis of existing
- Finalize existing building analyses
- Finalize existing space summaries

V. February 2017
- Present preliminary options for educational programming and master plan
- Present draft report

VI. March 2017
- Schedule community presentations for town response

VII. April & May 2017
- Develop alternatives and present in community forum
- Establish course of action for implementing chosen solutions

VIII. June & July 2017
- Submit draft study to the Town of Norwood

IX. August 2017
- Present summary of study with Building Committee recommendations to the Norwood School Committee

X. September 2017
- Submit final study to the Town of Norwood

II. Evaluation of Existing Conditions

Foreword & Outlook

The Town of Norwood operates five elementary schools for grades 1 through 5, an early childhood learning center for grades pre-kindergarten and kindergarten, and a single middle school for grades 6 through 8. Most of these schools are more than 50 years old, with two of the elementary schools near the 100-year-old status. Each of these schools were designed long ago under the "Industrial Revolution" model with isolated classrooms stacked along a double-loaded corridor full of lockers or storage cubicles. Since the time of their design, there has been much change in the organizational and educational strategies employed in an educational environment, and there has been significant advancement in our understanding of the environmental factors that can influence teaching and learning.

Additionally, many decades of focus on energy conservation have yielded dramatic improvements in the physical components and systems of a modern school building, resulting in buildings which are much more energy efficient than those constructed 50 years ago. Our goal in evaluating each of the existing Norwood schools is not only to assist the reader in understanding any physical deterioration of the buildings' components or systems that must be addressed in the future, but to also inform the reader about the environmental, educational, energy efficiency, and organizational deficiencies that exist within the buildings when compared to a modern 21st Century school facility.

School Learning Environments

The ideal elementary school educational environment includes many key factors. Modern 21st Century elementary schools include flexible classrooms that utilize "Laboratories for Learning" where all the necessary environmental factors, technology integration, and spatial configurations work to create "ideal" environments. These modern classrooms allow teachers to introduce "real world" examples of instructional material through the seamless integration of video internet technology. They also allow students to present and facilitate with their peers, giving them invaluable exposure to learning, presentation, and collaboration skills. Technology can be energized quickly and efficiently through teacher facilitator stations. Lighting, ventilation, and carbon dioxide levels are all monitored and adjusted automatically to create ideal environmental conditions. Teachers have collaborative planning and work areas that allow them to share critical planning and development ideas for their coursework. Cross discipline instruction and work areas are integrated into the academic environment in a manner similar to that of a corporate planning and work environment. Core facilities such as library/media centers have become highly advanced media retrieval centers and are located in close proximity to all academic functions to allow for key sharing of valuable resources. Academic zones are organized for quiet separation from noisier zones such as cafeterias and gymnasiums. Their layouts and plan organizations are structured to promote integration of science, technology, engineering, math, and the arts. Corridors and hallways are organized and designed to create "experience

and exposure" in addition to providing functional movement patterns. Performing and practical arts facilities include highly advanced opportunities for students to explore their talents at a critical age when many of their future professional talents are evolving.

Sense of School Community

One of the most critical measures of any elementary school is the strength of its internal school community. The educators for Norwood public schools currently work enthusiastically and collaborate on a daily basis to overcome the challenges associated with an outdated school facility. The organizational attributes of a 21st Century elementary school environment can foster school community by creating a learning environment that promotes safety, identity, personalization, pride, belonging, support, and confidence. The facility must be organized so that it accommodates student needs from morning arrival until end-of-day departure. The students must feel a personal connection to the staff and other students of their community, and such connection begins at arrival. The current school building has some attributes of an inviting arrival experience, but future planning should consider options for making this an even more welcoming and safe experience. The need for student exhibition of work and personalization of space will also be a key ingredient in strengthening the sense of school community, as the entire building should become a canvas for the display of learning and student activity. Students and teachers must see the fruits of their efforts surrounding them at all times, reinforcing their sense of purpose and personalizing the school environment.

Indoor/Outdoor Educational Connections

The 21st Century elementary school must include wellness goals for students, staff, and families through educational connections to nutrition, local sourcing of food, and the science of farming. Successful farm-to-school programs are growing rapidly across the country. They provide meaningful connections between the farm and the classroom, providing valuable real-world, hands-on learning about the economy, business, nutrition, and wellness. They provide yet another argument for blurring the lines between indoor and outdoor space as students incorporate large-scale community gardens into their project-based learning assignments. This allows the entire school community to become active in garden design and involved with the growing of plants and vegetables through multiple facets of the curriculum using dedicated plant and vegetable growth areas throughout both the indoor and outdoor school environments. The connection of indoor and outdoor spaces is also important in creating a vibrant and energized educational environment for other academic pursuits. Students become more engaged in utilizing available outdoor space if an effort is made to ensure the appropriate visual and physical connections. Outdoor space has tremendous value beyond recreational use, as it can provide project space, social space, classrooms, study areas, and other support areas for the educational environment. Indoor/outdoor connections must be reinforced through the use of transparency in key student activity and movement areas such as the student commons, Maker/Builder spaces, and obviously, the academic classrooms.

An Inclusive Academic Environment for all Students

Norwood public schools include a considerable and expanding special education population. These students, many of them with high-needs, require special

Example of a typical academic instructional space rich in space and natural daylight

consideration in the design of flexible and inclusive academic environments. As teachers and administrators continue to develop more successful models for inclusionary programming, it is imperative that the physical space be designed to support these strategies. In fact, our experience suggests that the physical arrangement of a classroom environment will largely determine if and how inclusion will happen. Creating an inclusive learning environment isn't just about changing attitudes, support systems, and activities; it is also about rearranging the physical space to accommodate the various needs that exceptional children have.

Academic Learning Neighborhoods

Although the current facility does allow for some grouping of grade-level academic neighborhoods, the classrooms themselves have very little connectivity to their respective neighborhoods. The educational curriculum at the elementary schools already supports a model for organizing by grade level academic neighborhoods. Future planning of this facility should work to support the concept of grade-level "Teaching and Learning Neighborhoods", essentially creating small grade-level 'schools within the school'. These neighborhoods should contain flexible education classrooms and a "Neighborhood Commons" space to facilitate inquiry, presentation, community, project-based learning, teaming, and STEAM. Each neighborhood should include opportunities for small group work and study areas which will allow students to move in and out of the classroom area without interruption. Special Education should be fully integrated into the academic realm, including specialized spaces for reading, resource, and daily living. The physical organization of the neighborhood classrooms is key, as the proximity of each team to collaboration and work space is critical, but the physical arrangement must also promote flexibility as well as the movement of students through other neighborhood areas to observe projects, activity, and learning.

A Collaborative Environment for Teachers

Technology has greatly assisted collaboration among teachers and staff; however, the power of face-to-face interaction has yet to be replicated by technology. Human interaction is everything, especially in a creative, innovative, and knowledge-intensive sector such as education. Practice shows that a variety of environments with different qualities are necessary for a successful and intelligent work environment. Informal human interaction is one of the key drivers of knowledge exchange. In the creative

industries, spatial and workplace culture are directly linked with productivity. Space planning and knowledge management are the keys to successful workplace design. The strength of any creative organization is shaped as much by the day-to-day chance contact of its members as it is by formal gatherings such as scheduled appointments. In fact, innovation in the workplace is often the result of informal, 'unplanned' interaction. Critical information leading to educational innovation often comes from such informal encounters between teachers from varying disciplines and backgrounds. The design of the elementary and middle school(s) must include strategies which promote this interaction while also supporting a variety of professional activities. For example, although teachers clearly need support space in close proximity to students, there must also be spaces which have controlled sound and/or visual separation from students. Additionally, teachers are no longer tied to their desks but rather they have a 'home' in the workplace where they are able to organize their activities across a variety of environments with a range of different qualities which they share with their colleagues. The efficiency of sharing these multi-tasking spaces is another advantage of this approach since it can drastically reduce redundancy of spaces within the school. It is important to integrate teachers with students while simultaneously allowing them to control their presence and privacy in order to protect their position in the social hierarchy of the school.

Beyond S.T.E.A.M.

There has been much talk about STEAM and the need to integrate Science, Technology, Engineering, Arts, and Math within the academic environment. The well-planned 21st Century elementary school can provide a blueprint for how all of these disciplines can integrate with each other, while simultaneously breaking down the necessary academy and neighborhood structure. Advanced resources in the areas of media arts, graphic arts, and engineering can be shared by all academic neighborhoods, while rapidly-advancing technology is seamlessly integrated into each classroom, commons area, Maker/Builder space, and presentation area. Technology now allows for the integration of all resources into any area of the building without the need for a designated lab or technology area. The focus can now be on the size, location, and organization of a space since the most advanced technology applications are made available to students in all areas of the building.

Flexible Project and Instructional Space

In order to prepare students for successful adulthood in the 21st Century, educational environments must work to engage all learning types in a blended learning environment where students have opportunities to learn in multiple styles but are also guided by teachers in completing self-directed inquiry and investigation through research and hands-on activities. Today, teachers are being asked to expand their roles beyond a "sage on the stage" and to become a "guide on the side", with strategies that encourage students to be self-motivated investigators who are able to problem-solve in the 21st Century, preparing them for jobs that have not yet even been created. This expanded responsibility of educators to both deliver instructional content as well as guide the student learner as an investigator is key to creating successful life-long learners, and can be fostered through the development of a thoughtful and well-designed educational environment. The Norwood public schools staff includes an energized and collaborative team that understands the evolving social and educational demands of the 21st Century. Their strengths can be reinforced through the creation of spaces that promote a variety of learning styles and activities to help facilitate the necessary

Example of a flexible project lab and instructional space in present-day school design

teaching, learning, research, and investigation. There are many challenges associated with delivering a project-based, hands-on curriculum that supports self-directed investigation, but the physical environment should not be one of these challenges. The "traditional classroom" limits the delivery of modern instruction as it was conceived during the Industrial Revolution when one-size-fits-all was the prevailing school of thought. This particular notion of classroom learning fails to recognize the spatial requirements of hands-on student inquiry, investigation, and application. Each academic neighborhood requires a spatial extension of the classroom that provides the spatial and functional amenities necessary to develop and present projects, thus blurring any physical or visual boundaries between instruction and application. Very few modern businesses or scientific spaces segregate instruction from application. Students and teachers must be able to collaborate in an environment where hands-on learning occurs seamlessly in the instructional environment. The thought that you learn in one space and then execute in another space is flawed, as these two acts often occur simultaneously. Providing an appropriately flexible space is one of the key ingredients in fostering this educational process. This process also requires sufficient space to maintain "works-in-progress" where student projects can evolve in phases over an extended period of time without the limitations associated with having to break down and store projects on a daily basis. Student projects should be able to remain on display in a sort of "working classroom" that evolves daily, remaining on exhibit for observation, study, and discussion and promoting a collaborative environment where students and staff can be energized by their peer group. This arrangement can work to integrate application and instruction by creating the necessary Maker/Builder/Learner space that will serve as an extended classroom application lab for each neighborhood, and will also help to support and promote social interaction, academic investigation, and student exhibits and presentations.

Architectural Analysis

Balch Elementary School

Balch Elementary School, constructed in 1913, is the oldest operating school facility in Norwood. Two additions have been constructed during its lifetime: a classroom addition in 1923, followed by a cafeteria and gym addition in 1965. The facility currently houses approximately 300 students in first through fifth grades.

Like all of Norwood's elementary schools, Balch Elementary is a relatively small neighborhood school with a strong level of parent involvement. This is generally a strong formula for a successful elementary school, as it allows teachers and administrators to know each of the students well and to create a personalized and welcoming educational environment. The original building layout and design is certainly dated, as it follows an "Industrial Revolution" model of thinking where classrooms are stacked along corridors as isolated learning environments without connectivity to other classrooms or other related support areas. However, despite any individual spatial deficiencies or organizational challenges that may be identified herein, ultimately the small student population and significantly sized building facility provide a viable educational environment where students and teachers work enthusiastically to create a personalized environment where students feel a sense of identity and teachers can have a good knowledge of each individual student's needs, challenges, and abilities.

Our primary recommendations for the Balch Elementary School will likely include future renovations to modernize the building, and comprehensive renovations to some of the major building systems and components. We would also stress that one of the primary reasons that small deficiencies within individual program areas are acceptable is because the small-sized student body allows teachers to create a student-focused environment where the unique student population of Balch can experience a tailored educational program targeted at an evolving and ever-changing student population.

General

Located on a small three-acre site, the Balch building is landlocked between a community baseball field and dense neighborhood. Its location in South Norwood, within a densely-populated area of immigrant families occupying smaller affordable houses, allows many of the students walking access to the school. It is a well-maintained facility on the interior and there has been some investment in maintaining the building's exterior through window replacement and repair of exterior systems and components. Additionally, failing boilers have been replaced but the basic heating distribution system remains as circa 1913. Because the maintenance staff at the facility have done an excellent job repairing and maintaining the building's interior finishes, the overall appearance of the building's interior is very good, but this can be deceptive in defining the building's overall condition. Many of the major building systems lurking behind the nicely maintained interior finishes have now reached or surpassed their intended life expectancy and will have to be addressed in

the near future. The 100-year-old building lacks many of the educational amenities featured in a modern 21st Century elementary school. The building will soon require comprehensive renovation to many of the major building systems and components in order to avoid costly failures which may also disrupt the teaching and learning environment. Depending on the magnitude of proposed renovations, some additional code compliance and regulatory requirements will be triggered as part of the required renovations. Required renovations may also trigger a number of handicap accessibility requirements throughout the building. Additionally, if the Town wishes to receive reimbursement funding from the Massachusetts School Building Authority (MSBA) for any proposed project which goes beyond window, roof, or boiler replacement, the project will have to fully address educational deficiencies within the school such as undersized classrooms, lack of specialized classrooms, insufficient special education space, and outdated classroom amenities. Despite the inherent character and charm of the vintage Balch School, this kind of 100-year-old facility generally requires a rather comprehensive renovation of building systems, unless the Town is willing to address unanticipated and disruptive system repair and replacement on an emergency basis. A comprehensive renovation to address all issues for decades to come is a significant project, and extends well beyond a series of capital improvements.

Educational Plan Organization

The Balch Elementary School is a 51,800 square feet, three-story facility, with a student population of about 300. The physical size and available classrooms suggest that it has a maximum capacity of approximately 300-325 students under current educational standards and MSBA (Massachusetts School Building Authority) guidelines. This suggests that there is no current overcrowding at Balch, and that the primary focus of the analysis will be on the building's physical condition, building systems, environmental quality, educational organization, and safety and security.

The basement level of the building is a mix of service, support, and academic spaces. The Music Classroom, located on this level, occupies a space which is open to the egress stairs (no longer allowed by the Massachusetts building code) and adjacent to the boiler, custodian, and toilet rooms. Though the rooms are generous, their basement level location limits natural daylight in many of these spaces to small windows which are above eye level, resulting in rooms which are undesirable for full day occupancy. Approximately half of the basement level footprint is only a crawl space for access to piping distribution and building systems. The main (first) floor of the building includes the primary building entry point and the administrative offices. These offices are unusually small and limiting, even for a building of this era, resulting in significant functional and administrative challenges. Parents, students, and office equipment often spill out into the corridor and down the hallway, and administrators and secretaries must squeeze into cramped work areas. The library, cafeteria, and gymnasium are all located on the main floor level and occupy excellent functional and centralized locations. Academic classrooms exist on the main and second floor levels and are nicely clustered to help break down the scale of the grade-level academic neighborhoods. Support offices are distributed throughout the main and second floors; their adequacy will be evaluated as part of the educational analysis.

The current building plan, constituted under an Industrial Revolution model, isolates each classroom from its surrounding neighborhood classrooms and support spaces and has limited flexibility. The existing classrooms, at an average of 700 square feet, are significantly smaller than the Massachusetts School Building Authority (MSBA)

Despite the inherent charm of Balch Elementary School, the building requires a comprehensive renovation due to its age

minimum of 900 square feet and fall well below numerous other educational guidelines which recommend 900-1,000 square feet for an elementary school classroom in order to provide sufficient space for flexibility and the various programs associated with inclusion of all students. All 21st Century school initiatives call for elementary schools with larger, more flexible classrooms and significantly more connectivity between the classrooms and their associated support spaces within the academic neighborhood. These strategies should be considered when evaluating options for future renovation and long-term use of the Balch Elementary School building.

The building's main floor level is located above the surrounding site elevation by approximately half of a floor level, burying the basement by approximately 7 feet. This was a popular approach in the 1900s, when it was felt that burying a lower floor level (partial basement) was a cost-effective means for reducing the building height and thus reducing the amount of exposed exterior wall that had to be constructed. Unfortunately, this approach provides two major challenges to modern handicap accessibility and building security requirements: (1) It requires an elaborate system of ramping and/or elevators to provide accessibility at the building's primary entrance, and (2) It presents security challenges in that it allows someone to enter the building and immediately be inside the classroom corridor with students without any requirement to pass through an administrative control point. The location of the building's main administration area is convenient to the front entry along Washington Street, and is central to both side parking lots. However, the building's lack of a control vestibule in this area does not provide the required observation and control of visitors entering the building. The School Department is to be commended for adding a video entry system at this main door in recent years; however, future plans should evaluate modifications that provide a higher level of security for students and staff. The 1965 cafeteria and gymnasium addition includes an entry lobby directly off the main parking lot. Although this entry is excellent for promoting and supporting community use of the space, it also requires security considerations to ensure that this highly utilized entry does not allow unwanted visitors. Upon entry, one immediately has access to the two largest gathering spaces in the building, spaces which are occupied by students for much of the day. This condition should be evaluated as part of any future planning. School security and safety strategies have evolved dramatically over the past ten years. Currently, the primary entry point to the building is monitored via the video entry system mentioned above, but this is not a comprehensive solution to building security. Remaining entry points to the building should be monitored via camera and/or latch contacts that notify office administrators if any point along the

building's perimeter has been compromised.

The existing building layout includes the original and traditional "H" configuration that was constructed in 1913 and is representative of a typical school at that time. The 1923 classroom addition and the 1965 cafeteria and gymnasium addition were well placed and help to support a more modern approach to school organization. Additionally, the classroom addition results in an organization of classroom groups into small academic grade-level neighborhoods. However, these classroom neighborhoods do not include common areas for student projects, exhibits, or team teaching. They also lack project-based learning labs, small group instruction rooms, teacher planning areas, and student/teacher work areas which are common in modern elementary school environments. The undersized classrooms are stacked along a corridor with no strategy for organizing them into teams or academic neighborhoods. There are a few individual offices, but there is no incorporation of planning areas for faculty and staff and no incorporation of smaller group rooms to support testing, working in pairs, or small group instruction.

The student dining area is located on the main level of the building. It includes a small stage on the south end and lacks the flexibility often incorporated into a modern student dining, socialization, and learning area. It was designed as a 1960s model for student dining, which assumed students would sit in rows along linear tables and eat in shifts. Today, the modern cafeteria serves many purposes for students and staff and is designed as a flexible space which provides all-day usage for exhibit, presentation, projects, and student socialization. Modernization of the current cafeteria for increased flexibility should be considered as part of any future planning for the building. There is no auditorium at Balch Elementary, as the small stage in the cafeteria functions as the available performance space in the building. This is not uncommon, even by today's standards, but several improvements could be made to enhance its use for student presentations and performances.

The Library/Media Center is located on the main floor level and has a desirable central location within the building. As this space was originally two classrooms that have since been joined, it lacks the transparency often associated with the Media Center and its surrounding academic environment. The function of a media center has changed dramatically since the days of a "library" with numerous volumes of books. The modern media center focuses students more on digital media, video production, and broadcasting, and provides young learners an opportunity to utilize their electronic savvy to develop projects and presentations through hands-on development. The current Media Center lacks many of the amenities necessary for these activities and should be reviewed as part of renovation considerations and future educational planning and programming. Overall, there is limited space within the building devoted to media and video applications, though the school has devoted a second-floor classroom to computer lab space. A modern elementary school environment would include sufficiently-sized classrooms and wireless computer access such that every classroom becomes a lab, rendering the use of dedicated computer labs as obsolete. However, these spaces tend to make excellent video production or broadcasting studios, which do require fixed amenities and equipment.

The appearance of a white-colored deposit over the surface of the exterior brick may be efflorescence

Exterior Envelope
(Foundation, Walls, Roof, Windows, and Doors)

Foundation
The exterior poured concrete foundation walls appear to be in good condition with only minor cracking at a few locations. The school has a basement. (Refer to structural evaluation for additional information.)

Walls
The exterior envelope of the building has seen little change since its original construction, with the 103-year-old exterior walls remaining very much as they were originally constructed. These walls consist of face brick and cut or cast stone panels, carvings, and water table. The face brick is backed up with concrete masonry unit blocks which are exposed on the interior of the building in many locations. The appearance of a white-colored deposit locally or uniformly over the surface may be efflorescence, the surface deposition of soluble salts. There are numerous sources for the soluble salts which create the hazy appearance. Salts can originate from mortar, improper cleaning agents, rising dampness, de-icing salts, chemical landscaping treatments, and air pollution.

Both the face brick and the stone show some signs of efflorescence. This is a salt residue which generally indicates some form of moisture problem, salt migration, and/or sub-florescence. It should be considered a symptom which should be investigated in more detail as part of any proposed renovations in an effort to identify the source of the soluble salts and/or moisture. Corrective action should then be taken to eliminate both if possible.

The cast stone shows some evidence of staining, likely a result of moisture run-off from current or prior metals that were either attached to the building or were utilized as part of the internal structural support of the walls or lintels over the windows. The cast stone also exhibits minor spalling or chipping which could be the result of human vandalism or freeze/thaw spalling for a building of this age. It does not appear to be a serious problem at this time. Except for the modifications required with the incorporation of the new building additions in connections to the additions in 1923 and 1965, the building's masonry façade remains virtually unchanged since the original construction. The existing mortar joints in the brick are somewhat chalky, deteriorating, and missing in places. The two most important qualities of mortar

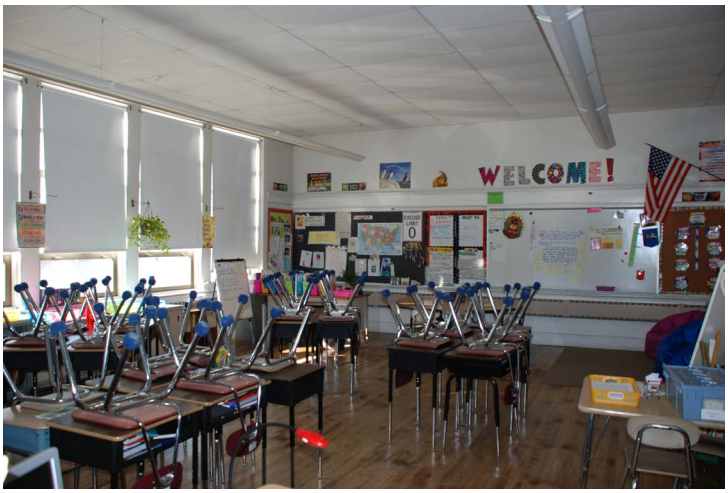
are its ability to bond to masonry (brick) and its internal strength. A sign of poorly made mortar can be random cracking at the bond joint. The Balch Elementary School does not suffer from this condition. At the time that the original Balch School was constructed, the standard mortar for masonry was a mixture of sand and pure lime or lime-pozzolan-sand. These low-strength mortars gave masonry the ability to absorb considerable strain. Accordingly, the tendency to crack was reduced and when cracks did appear in the mortar joints, they were capable of chemical reconstitution or self-healing. Thus, mortar joints of this era are able to survive for a very long time. However, the one disadvantage of this (soft) mortar composition is long-term exposure to moisture. Over time, the joint deteriorates and becomes even softer than its original composition. This deterioration is compounded by increased exposure to moisture such as a leaking downspout. The mortar deterioration at the Balch Elementary School is not a sign of an unsound wall, but instead is a result of years of exposure and simply requires re-pointing of the necessary joints. The newly installed joints must be of the same composition such that they can flex with or act in a similar way to the rest of the joint. Additionally, it is important to recognize that mortar acts as a drainage system to equalize hydrostatic pressure within the masonry wall. Nothing should be done to reduce its porosity and thereby block water flow to the exterior surface. For this reason, sealants applied directly to the brick surface are rarely a good idea and do not represent a long-term solution.

Re-pointing the exterior wall surfaces, combined with limited masonry renovation, will allow the building's exterior wall system to remain functional for many decades. The original construction drawings, combined with recent field observation, indicate that the building exterior wall does not have a cavity or weeping system for drainage of water absorbed by the brick. This was common in 1900s construction, as the masonry was intended to equalize any hydrostatic pressure through its own porosity, as described above. However, the bricks and mortar joints should be monitored routinely for signs of significant moisture infiltration which is beyond the designed/intended limits of the wall. Because of the potential failures inherent in non-cavity wall construction, it is no longer practiced in modern building construction. Another primary deficiency in the original exterior wall construction is the absence of insulation. This is another common practice of the 1900s which is no longer allowed under the current building or energy code, and consideration should be given to this topic as part of any proposed comprehensive renovation of the building. The basement level of the building includes exterior window grates that were added subsequent to the original construction. These show evidence of deterioration and water damage and their repair and/or replacement should be considered as part of any proposed renovations.

Building reports maintained by the Facilities Department indicate that the front steps were re-pointed in 2016. A site inspection has confirmed this work.

Roof

The roofing system at the Balch Elementary School has been replaced on multiple occasions, as would be true of any building of this age. The last replacement occurred in 2002 and included a rubber membrane system (EPDM - ethylene propylene diene monomer) over the entire roof area. It does not appear that any insulation has ever been added to the roof system. Though the replacement may be considered a recent capital project, the life expectancy of a rubber membrane roof is approximately 20 years, which means the existing roof will need to be addressed again within the next five to ten years. There is evidence of water ponding on the roof above the first-floor



Classrooms are small and do not include common areas for student projects, exhibits, or team teaching

offices, which often results in early deterioration of any joints or seam in this area. Any plans for a comprehensive renovation in the future should include complete replacement of the existing roof systems, and an analysis of the benefits associated with adding insulation to the roof should be performed to ensure it complies with current energy code requirements. This may require some removal of the existing roofing system (down to the structural deck) in order to expose a substrate which is appropriate for attachment of the new insulation. This removal would also assist in removing prior roofing layers which add unnecessary weight to the roof and lower its snow-load carrying capacity.

Windows

In 2002, the exterior windows of the building were replaced with single-hung aluminum windows with insulated glass. The ground floor windows were covered with metal mesh screen for protection. These new windows significantly improved the thermal characteristics of the building and eliminated moisture infiltration that was occurring around the old windows. However, although the 2002 replacement window system represented the respectable industry standards at the time, it is important to note that recent focus on energy conservation has since resulted in the Commonwealth's adoption of significantly higher energy code standards. These standards yielded much higher performing windows and glass within the industry. The potential benefits and requirements for new windows should be evaluated as part of any comprehensive renovation to the current facility. The window system would likely be almost 20 years old at that time and would certainly not meet current standards. Additionally, improvements required by the energy code continue to evolve and it is possible that replacement might be a requirement at that time.

Doors

As part of the window replacement project, the exterior doors to the building were also replaced. The doors are constructed of metal and have vision panels inserted within metal frames. Overall, the door systems remain in good condition.

Interior
(Floors, Walls, Doors, and Ceilings)

Floors
There are numerous floor materials throughout the building. These finishes include the following: painted concrete on the ground floor, original hardwood on the first and second floor corridors and second floor classrooms, carpeting in the main office, and Vinyl Asbestos Tile (VAT) in the first-floor classrooms, library, and cafeteria. The floors in the toilet rooms are ceramic tile and base.

Although the Vinyl Asbestos Tile (VAT) is non-friable and poses no threat to the students or staff, most school systems have developed schedules for periodic removal and replacement of such finishes over time with the ultimate goal of full abatement of asbestos containing materials. Areas within the building that still contain some asbestos materials, like the library (was this abated 2005?), cafeteria, and classrooms, should be considered as part of any future renovation plans. The hardwood floors in the corridors and classrooms are mismatched in appearance, squeaky, and could benefit from re-attachment, sanding, and refinishing as part of any future renovation. Painted concrete floors are chipped and often covered with area rugs in order to increase comfort for the students and to decrease noise levels associated with reverberation on the hard surfaces. The joints between dissimilar flooring materials, including ceramic tile in toilet rooms, often vary significantly in height resulting in abrupt flooring transitions. These abrupt transitions create handicap accessibility challenges and will need to be addressed as part of any future renovations.
The wood flooring in the gymnasium visually appears to be in fair condition, showing signs of wear as a result of its many years of service. The system has likely been sanded many times, reducing its overall thickness and strength. Many of these older gym wood flooring systems had a limited number of wood sleepers (support members) underneath and relied heavily on the integrity of the finished tongue-and-groove wood flooring. The current system has exceeded its intended life expectancy and should be further reviewed as part of any future renovations.

Walls
The ground floor interior walls are painted brick or concrete masonry units (CMU), and the first and second floor interior walls are CMU with painted plaster applied. Given the age of the building, the walls are in good condition. However, there is evidence of moisture infiltration which should be further explored to determine its extents. Numerous retrofitted systems had to be installed in exposed conduit and piping as opportunities to conceal these systems within the existing walls were limited. Exposed systems include wiring for fire alarms, power, light switches, and smart boards. These systems would typically be fully encased within the walls.

There are no lockers or storage units outside of the classrooms, resulting in storage congestion within classrooms which are already undersized. There are also a very limited number of custodial and/or storage closets, resulting in small closets being crammed with a mix of materials, cleaning products, and equipment. This makes accessing the items inefficient and cumbersome.

The walls within the cafeteria are painted CMU and are in good condition. They currently incorporate one band of 4’-0” high acoustical panels for sound absorption in the space.

The hardwood floors in the corridors and classrooms are mismatched in appearance, squeaky, and require refinishing

The walls in the gymnasium are painted CMU with no bleachers. The walls of the space do not have any acoustical treatment for absorbing or reflecting sound in the space.

Doors

The interior painted wood doors with hollow metal frames throughout the school are original and are in poor-to-fair condition. Hollow metal doors are present in the addition. Many of them show signs of wear and chipped paint. The current door hardware lacks many of the modern safety and security features and is difficult to operate. Therefore, the staff currently applies a magnetic strip to retract the latching mechanism during the school day, and will remove the strip if locking is required as a security measure. The classroom doors vary in style but all have some amount of glass within the door or as part of a transom panel above the door. These older doors provide very little acoustical separation between the corridor and classroom when compared to modern doors and construction standards. Although the glass found in the corridors represents typical standards (wired glass) at the time it was installed, modern codes, regulations, and standards would require that this glass be fire rated and provide a greater degree of fire separation between the classroom and the exit corridor. The doors from the corridor to the egress stairs also lack compliance with modern codes, regulations, and standards and do not provide the necessary fire ratings for protection of the egress stairways.

Most of the original door hardware appears to have been replaced over time. However, as regulations have continued to evolve over the recent past, much of the door hardware remains non-compliant and is further discussed in the handicap accessibility portion of this report.

Ceilings

The original ceiling system consisted of plaster applied to wire lath. This system is still present in the gymnasium and cafeteria, with striated cracking apparent. Structural roof framing in these areas is exposed and painted. 2x2 acoustic lay-in style ceiling tile (ACT) with grid has since been installed in corridors, most likely with the addition of the sprinkler system and lighting updates. The ceiling tile is poorly installed at the main entry, where it warps upward to accommodate the curved transom window over the main entry doors. The ACT in the kitchen shows signs of water damage. The typical classroom appears to have a 2x2 acoustical fiber board panel which replicates the appearance of an antique tin ceiling. These tiles and their glue attachment

should be evaluated for asbestos content, as many similar products produced from the 1930s through the 1970s did have some asbestos content. Although the tiles should be evaluated, they pose no immediate threat to students and staff as they are non-friable and appear to have been painted several times. Acoustical ceiling or wall treatments would better enhance the sound quality of these learning environments, as the multiple layers of paint on the ceiling tile have likely compromised much of their acoustical qualities. Any upgrades to the building's mechanical, electrical, plumbing, or installation of a fire suppression system, will require that the 2x2 lay-in ceilings be removed and replaced and will also likely require new lay-in ceiling with grid in all areas that do not currently have such.

Energy Conservation

The Balch Elementary School was constructed in 1913, well before the historic energy shortages of the 1970s and escalating oil prices of 2005. The emergence of a new energy code in 2000, which promoted an increased knowledge of exterior building envelope construction techniques and materials, has dramatically changed the way in which buildings are designed to deal with energy efficiency issues. Massachusetts State Building Code Sections 3407.1 and 3407.2 require that alterations of an existing building in which the use group is not changed must comply to the energy conservation values detailed in Table 3407 of the code for any building elements (walls, windows, doors, roofs, and mechanical systems) which are altered during renovation.

Environmental Quality

In the past fifteen years, there have been tremendous advancements in the understanding of the various environmental factors that influence building occupants. These factors have been proven to be extremely important in the elementary school buildings where students may spend most of their day in a single 600-800 sq. ft. classroom. Factors such as natural lighting, quality artificial lighting, fresh air ventilation levels, evenly distributed heating and cooling temperatures, and acoustical performance all work to enhance the educational environment. The Balch Elementary School classrooms include limited implementation of these key factors. Though natural light is present in many of the upper story classrooms, they are undersized and lack modern ventilation and lighting levels.

Educational, Spatial and Organizational Capacity

Capacity at an elementary school can be calculated in several ways, including multiplying the number of available general classrooms and support areas by the appropriate number of students in each classroom. Balch Elementary School has a current capacity of approximately 300-325 students. Dividing the total building square footage by the student population provides an approximate amount of square feet being provided for each student, which is another benchmark for determining the general student capacity of the building.

Our analysis of the current Balch Elementary School suggests that, although the building may require significant renovations and improvements in the future, it is appropriately sized (overall) to accommodate the current enrollment. However, this does not mean that some areas of the building do not feel overcrowded, as its inefficient floor plan configuration does result in some shortages of space to specific program areas. These inefficiencies should be evaluated as part of any proposed future renovations. Any overcrowding conditions can lead to a very stressful environment where it is difficult to deliver a modern educational program.

Student dining is one such area still containing Vinyl Asbestos Tile (VAT), a hazardous material

In addition, the following conditions exist:

Main Office/Entrance

As mentioned previously within this report, the main office currently has no direct supervision (other than a single video monitor) of visitors who approach and enter the building. This allows an intruder who gains access to a single door to be able to enter the remainder of the building without any direct visual observation by the staff, including access to student-filled hallways and stairways. The gymnasium and cafeteria wing, which includes significant community use and interaction, has also been identified within this report as having some inherent security and safety challenges which should be further addressed.

Nurse's Suite

The nurse's suite is undersized and inadequate for medical exams and resting space.

Library Media Center

The library is located on the main floor. Although it occupies an effective central location, it is significantly undersized and lacks the modern amenities associated with a 21st Century education resource. There is little difference between the set-up of the library and a typical general classroom.

Classroooms

The size, configuration, organization, environmental quality, and instructional amenities within the classroom are critical to successful teaching and learning. All classrooms currently have wi-fi and smart boards, but their small, rigid size leaves them crowded with students and materials. None of the classrooms provide the kind of flexibility common in a 21st Century elementary school classroom. Overall, these classrooms appear very much like they would have almost 100 years ago, lacking many of the most recent advancements in educational instruction.

Special Education

The current Special Education Program is extremely undersized and is utilizing inadequate space for instructional, tutorial, and testing areas. These programs are not well distributed throughout the building and their locations present a significant challenge to the staff's ability to provide inclusion for the students. Additionally, many of the rooms do not meet the required space, accommodations, and organization to

meet current State recommendations and guidelines.

Science Classrooms
There are no classrooms or labs devoted to the teaching of science exclusively. This is not necessarily unusual, but it is unusual not to have more support amenities in the classrooms to enhance science instruction to elementary school students.

Art Classroom
There are no classrooms or spaces devoted to the teaching or display of art exclusively.

Music Classroom
The music classroom is a single, dark, basement-level room and is open on two sides to circulation space servicing the boiler, custodian, and toilet rooms. Other than the ACT lay-in ceiling, it contains no acoustical elements or individual practice spaces to control sound. It is undersized and has limited areas for storage.

Teacher and Group Planning/Collaboration Areas
Space for teacher planning and collaboration is limited to one small room. There is no integration of planning or collaboration space throughout the school, and no space devoted to faculty dining or services. The copy machine is impractically located in the corridor next to the main entry as a result of insufficient work space. Spaces to accommodate teacher socialization can ultimately contribute to the improvement of the school's educational philosophy through the sharing of ideas, as previously detailed in this report.

Kitchen
The kitchen at the school serves as the food preparation kitchen for all the Town's elementary schools. Food is prepared here and brought to the other elementary schools that have warming kitchens. Given the demand, the kitchen is outdated and undersized. The freezer and cooler have been replaced and there are no dishwashers.

Receiving and Storage
Storage space in the school is extremely limited. The loading dock is coupled with hardscaped play areas, which is a dangerous combination.

Recent Capital Improvements

Roof
The roof was completely replaced in 2002 and is currently EPDM.

Masonry
Masonry façade repair occurred in 2002.

Interiors
In 2013, lighting in the classrooms, library, and cafeteria was replaced.

Windows
Complete window and exterior door replacement occurred in 2002.

HVAC
One of two boilers was replaced in 2006.

Site
The parking lot was replaced in 2006. Ample parking is available to accommodate the school.

Security
Surveillance cameras were added in 2008.
Card access systems were added in 2013.

Massachusetts State Building Code:
780 CMR and Life Safety Issues

The Massachusetts State Building Code (780 CMR) has been updated and amended several times since the construction of the building. The State Board of Building Regulations and Standards regularly updates and amends its regulations. Based on these regulations, the following were found to be in non-compliance:

- Occupied spaces (classrooms and offices) currently provide an entrance from within an egress stairway.
- Egress stairway enclosures, including door assemblies, require a minimum one-hour fire separation assembly.
- Two means of egress from spaces having an occupant load of greater than 50.
- Fire extinguishers
- The existing building is in excess of the allowable square footage or height requirements as set forth in Table 503 for a building of 3b Construction.
- Fire separation assembly between Use Group E (Educational) and Use Group A-3 (Assembly – Cafeteria, Gymnasium) (one hour fire separation required).
- Handrail and guardrail at egress stairways.

Handicap Accessibility

Requirements for handicap accessibility in building planning and design were non-existent in 1913 when this building was originally designed. However, on January 26, 1992, the Department of Justice implemented Title III of the Americans with Disabilities Act (ADA) into Public Law. This legislation "prohibits discrimination on the basis of disability by private entities in places of public accommodation." The legislation requires all new places of public accommodation, including schools, to be readily accessible to and usable by persons with disabilities upon design and construction. Existing structures being renovated that exceed 30% of the equitized assessment of the building or its replacement value must fully comply with the regulations for new construction. Additionally, on September 1, 1996, the Commonwealth of Massachusetts developed its own accessibility regulations: 521 CMR Architectural Access Board (AAB), which in some instances is more restrictive than ADA guidelines. The ADA and AAB regularly update and amend their regulations. Based on these regulations, the following were found to be in non-compliance or not accessible to the disabled:

- All doors leading to all rooms in the school, including classrooms, gymnasium, library, administration, etc. Non-conforming knob-type hardware currently exists. Lever handles are required.
- The main public entrances to the building are not accessible.
- All entries into classrooms require clear floor space adjacent to latch side of the door for entry and exit.

- The building has functional program throughout its three floors without an elevator and only one lift.
- Check-in counter at Administration Office
- Lack of proper interior building signage (braille).
- Toilet and shower rooms
- Water fountains
- Library Circulation Desk
- Ramps must be added with the proper handicap slope and handrails.
- All stairs (handrails and nosing)
- Alarms and strobes within classrooms
- Access to stage from main floor within cafeteria.

Each of the inaccessible features listed above has an impact on the ability of disabled students or members of the community to access various spaces throughout the school independently. Disabled persons may include students with a permanent handicap condition, students that are temporarily disabled from athletic activity, and parents, staff, or other visitors that could have any form of disability. Any future plans should incorporate as many items as possible to accommodate disabled people to the fullest extent possible.

Proposed Space Summary- Elementary School

Balch Elementary School	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**12,148**			**0**			**0**			**0**		**15**	**15,000**	
(List classrooms of different sizes separately)																
Pre-Kindergarten w/ toilet													1,200		-	1,100 SF min - 1,300 SF max
Kindergarten w/ toilet													1,200	3	3,600	1,100 SF min - 1,300 SF max
General Classrooms - Grade 1	715	4	2,860										950	12	11,400	900 SF min - 1,000 SF max
General Classrooms - Grade 2	721	3	2,163													
General Classrooms - Grade 3	693	4	2,772													
General Classrooms - Grade 4	753	3	2,259													
General Classrooms - Grade 5	698	3	2,094													
SPECIAL EDUCATION			**3,714**			**0**			**0**			**0**			**4,530**	
(List rooms of different sizes separately)																
Self-Contained SPED			0										950	3	2,850	8% of pop. in self-contained SPED
Self-Contained SPED - toilet			0										60	3	180	
Resource Room			0										500	2	1,000	1/2 size Gen. Clrm.
Small Group Room / Reading			0										500	1	500	1/2 size Gen. Clrm.
Sped Pull-Out Inclusion	785	1	785													
Sped Pull-Out Inclusion	486	1	486													
Title 1 Literacy Reading Specialist	840	1	840													
OT/PT & Comm. Action Group	262	1	262													
Speech / Language	174	1	174													
Sped Sub-Separate	681	1	681													
ELL	200	1	200													
ELL Title 1	286	1	286													
ART & MUSIC			**1,660**			**0**			**0**			**0**			**2,500**	
Art Classroom - 25 seats	694	1	694										1,000	1	1,000	assumed schedule 2 times / week / student
Art Workroom w/ Storage & kiln	99	1	99										150	1	150	
Music Classroom / Large Group - 25-50 seats	867	1	867										1,200	1	1,200	assumed schedule 2 times / week / student
Music Practice / Ensemble			0										75	2	150	
HEALTH & PHYSICAL EDUCATION			**2,968**			**0**			**0**			**0**			**6,300**	
Gymnasium	2,438	1	2,438										6,000	1	6,000	6000 SF Min. Size
Gym Storeroom	248	1	248										150	1	150	
Health Instructor's Office w/ Shower & Toilet	282	1	282										150	1	150	
MEDIA CENTER			**1,460**			**0**			**0**			**0**			**2,241**	
Media Center / Reading Room	1,460	1	1,460										2,241	1	2,241	
DINING & FOOD SERVICE			**4,830**			**0**			**0**			**0**			**5,783**	
Cafeteria / Dining	2,753	1	2,753										2,618	1	2,618	2 seatings - 15SF per seat
Stage	874	1	874										1,000	1	1,000	
Chair / Table / Equipment Storage	0	0	0										316	1	316	
Kitchen	1,203	1	1,203										1,649	1	1,649	1600 SF for first 300 + 1 SF/student Add1
Staff Lunch Room	0	0	0										200	1	200	20 SF/Occupant
MEDICAL			**187**			**0**			**0**			**0**			**510**	
Medical Suite Toilet													60	1	60	
Nurses' Office / Waiting Room	187	1	187										250	1	250	
Examination Room / Resting			0										100	2	200	
ADMINISTRATION & GUIDANCE			**1,009**			**0**			**0**			**0**			**2,064**	
General Office / Waiting Room / Toilet	284	1	284										325	1	325	
Teachers' Mail and Time Room			0										100	1	100	
Duplicating Room	152	1	152										150	1	150	
Records Room			0										110	1	110	
Principal's Office w/ Conference Area	83	1	83										375	1	375	
Principal's Secretary / Waiting			0										125	1	125	
Assistant Principal's Office			0										120	0	-	

Space Summary

Balch Elementary School

Supervisory / Spare Office			0										120	1	120	
Conference Room			0										250	1	250	
Guidance Office			0										150	1	150	
Adjustment Counselor / Psychologist			0													
Guidance Storeroom			0										35	1	35	
Teachers' Work Room	278	1	278										325	1	325	
Storage	212	1	212													
CUSTODIAL & MAINTENANCE			**1,454**			**0**			**0**			**0**			**1,949**	
Custodian's Office	60	1	60										150	1	150	
Custodian's Workshop	788	1	788										375	1	375	
Custodian's Storage			0										375	1	375	
Recycling Room / Trash			0										400	1	400	
Receiving and General Supply	356	1	356										216	1	216	
Storeroom	250	1	250										233	1	233	
Network / Telecom Room			0										200	1	200	
OTHER			**4,591**			**0**			**0**			**0**			**0**	
Other *(specify)*																
Boiler	966	1	966													
Equipment Garage	594	1	594													
Lobby (Flr0)	414	1	414													
Lobby (Flr1)	200	1	200													
Storage (off Music)	366	1	366													
Storage (off Cust. Workroom)	89	1	89													
Storage (off Sub. Separate)	86	1	86													
Storage (Flr0)	793	1	793													
Storage (Flr0)	655	1	655													
Storage (Flr1)	428	1	428													
Total Building Net Floor Area (NFA)			**34,021**			**0**			**0**			**0**			**40,876**	
Proposed Student Capacity / Enrollment			349												**349**	
Total Building Gross Floor Area (GFA)[2]			54,017												**60,825**	
Grossing factor (GFA/NFA)			**1.59**									**#DIV/0!**			**1.49**	

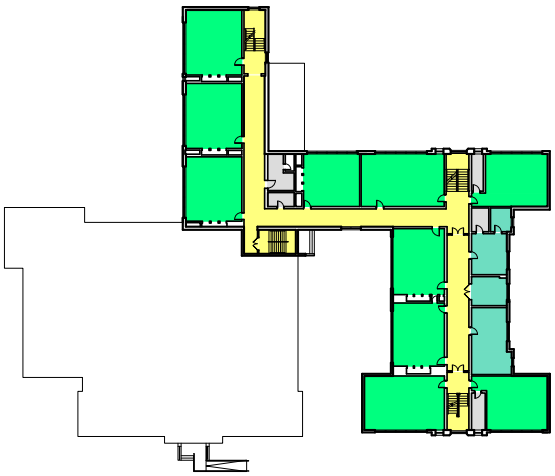
[1] **Individual Room Net Floor Area (NFA)** Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

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

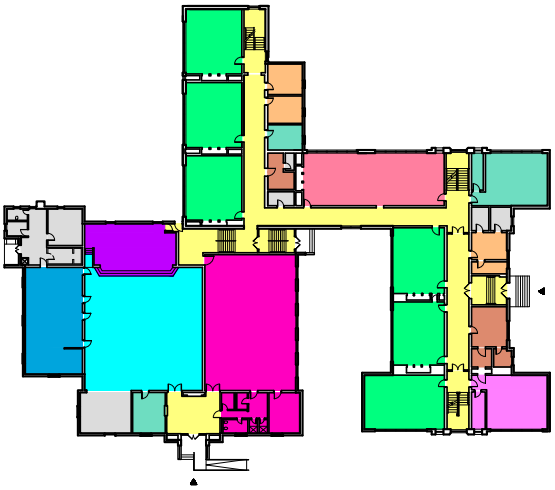
Balch Elementary School

- 306 students
- 51,800 square feet

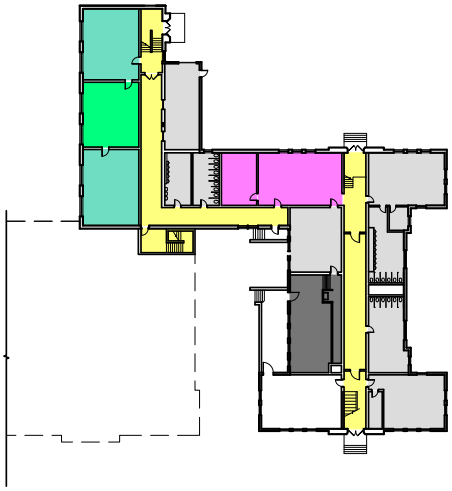
media center
physical education
music & arts
auditorium or stage
kitchen & servery
student dining
special eduation
general classroom
circulation
administration/services
staff planning & support
custodial/toilets
building equipment



second floor



first floor



ground floor

Structural Analysis

Balch Elementary School

This report is based on a review of the available drawings of the additions to the original construction prepared by Korslund, LeNormand & Quann, Inc., dated August 18, 1965, and a visit to the site on December 1, 2016.

Existing Conditions

Balch School is essentially a three story structure with a Gymnasium and Auditorium. The original school was constructed in 1913 with additions in 1965. The structure is performing well for the most part. The Gymnasium roof construction consists of long span metal joists which span from masonry wall to masonry wall. Other areas of roof construction consist of roof panels on wide flange steel beams.

We did not observe any excessive vibration due to foot fall on the concrete slab on grade.

We did not observe any signs of excessive foundation settlement or significant distress in the structure.

We observed the red brick exterior façade and noted staining.

In the basement, we observed round structural columns and brick masonry walls. The basement floor consists of cast in place concrete.

In the boiler room, we observed a metal stair and noted moderate to heavy deterioration to the base of the metal stringer. The lowest tread and various other treads exhibited damage due to impact loading.

We observed the exterior masonry wall from inside the basement and noted significant deterioration due to moisture infiltration. This deterioration consists of open mortar joints, peeling paint, and movement in the brick units. From the exterior of the building, we noted steel lintels which exhibited light rusting and peeling paint, especially at the loading dock. At various building corners, we observed light cracking in the masonry and in the concrete foundation walls.

Exterior railing posts' bases exhibited moderate deterioration and peeling paint.

At the upper floors, we observed light cracking and separation in the masonry walls.

Through a hole in the finishes at the underside of the floor structure, we viewed diagonal wood plank decking on wood joists. On the upper floors, we perceived creaking in the floor finishes.

Systems Analysis

Balch Elementary School

Fire Protection

There is currently fire protection system in this building, but the only sprinkler heads are located in hallways & and stairways. No classrooms have sprinkler protection.

Plumbing

Sanitary
The existing system is cast iron hub piping, the piping has deteriorated is in some places, and has been replaced with new hub-less piping, the overall system is in working condition.

Water Heaters
There is (1) A.O Smith 40 Gallon gas water heater (2009) that feeds the school. It is in working condition

Plumbing Fixtures
Currently all the fixtures are aged, and most do not meet ADA requirement, and will need to be replaced, but are in working condition.
The water fountains do not meet ADA requirements.
The kitchen contains three floor mounted Grease Traps, 1 of the 3 have been installed in 2016 along with a new 3 pot sink. The other 2 are in working condition, but due to age replacement maybe required.

Recommendations

- Replacement of plumbing fixtures to comply with ADA, and low flow due to age
- Gas supply for kitchen equipment requires emergency shut off
- Grease traps appear to be functional, but replacement maybe needed
- Depending on the renovations, a larger water heater maybe need to meet the new demand

HVAC

The Balch Elementary School is heated by hot water produced by two oil fired sectional cast iron boilers. Each boiler utilizes no. 2 heating oil as its fuel source.

Boilers
The first boiler was manufactured by the HB Smith Company, model 28A-14. This boiler has a heating output of 3,098 MBH. This boiler is fitted with an oil burner manufactured by the John Zink Company with combustion control being maintained by an Autoflame combustion control system.

The second boiler was manufactured by Buderus, model GE615/12. This boiler

has a net IBR heating output of 2,454 MBH. This boiler is fitted with an oil burner manufactured by the John Zink Company with combustion control being maintained by an Autoflame combustion control system.

Both boilers appear to be in good condition and are fully operational.

Heating oil is stored in underground, double-wall fiberglass tanks, monitored by a code compliant leak detection system. Heating oil is supplied to the boiler burners through a duplex pump set, which appears to be in good condition and fully operational.

Hot Water Circulation Pumps
Hot water is circulated throughout the school by a pair of base mounted end suction pumps manufactured by Bell & Gossett. These pumps are fully operational and appear to be in good condition and properly maintained.

Duplex Air Compressor for ATC
The control system for this school is pneumatic with compressed air being produced by a duplex air compressor as manufactured by Quincy. The air compressor is in good condition and appears to have been installed within the last five (5) years.

Unit Ventilators
The classrooms are furnished with classroom unit ventilators outfitted with hot water heating coils. The unit ventilators provide the classrooms with heat and ventilation. The unit ventilators are original vintage and although they are still operational, they have outlived their useful service life.

Recommendations
- The main heating plant is in good condition and should be capable of providing reliable operation into the foreseeable future provided proper maintenance is continued
- However, the other components of the HVAC system such as the classroom unit ventilators have outlived their useful service life and are due for replacement

Electrical

Electric Service
The primary electric service which originates from an electric utility co. pole feeds the transformer in the transformer vault via underground conduit/cabling. The electric service appears to be original to the building and appears to be in poor condition.

Normal Power System
The main circuit breaker is fed by the transformer located in the transformer vault. The main circuit breaker rated at 600 amp, 120/208 volt, three phase, four wire feeds panelboards located in the Main Electric Room as well as panelboards throughout the building. Most of the normal power distribution is manufactured by General Electric. The normal power system appears to be original to the building and appears to be in poor condition.

Emergency Power System
The building does not have an emergency generator.

Emergency lighting consists of emergency battery units with integral light heads, remote emergency light heads (mix of single and dual heads), and exit signs with integral batteries.

Emergency System - Deficiencies as it relates to current Codes:

- Inadequate interior emergency lighting coverage
- Some exit signs are made of paper with word EXIT on them
- Some remote emergency light heads are single head; dual heads are required
- No emergency lighting outside egress doors

The emergency lighting appears to be original to the building and is in poor condition. As described above, the emergency lighting does not meet current Codes.

Fire Alarm

The addressable fire alarm control panel as manufactured by Fire Lite Alarms series MS-9200UDLS does not appear to be original to the building. The fire alarm system consists of an exterior municipal master box, smoke detectors, heat detectors, duct smoke detectors, pull stations, strobes, and horn/strobes.

Fire Alarm - Deficiencies as it relates to current Codes:

- Inadequate detector coverage
- Points of egress without pull stations
- Pull stations not at ADA heights
- Inadequate strobe coverage as required by ADA in Conference rooms, Toilet rooms, and Assembly spaces including Classrooms
- Notification appliances are horns; Speakers are required to provide voice evacuation throughout the building
- Most of the interior Corridor doors are pried open and do not have magnetic door holders

The fire alarm system appears to be in fair condition. As described above, the fire alarm system does not meet current Codes.

Lighting

Interior

The interior lighting consists of surface mounted, pendant, recessed, and fluorescent downlights. Exit signs provide for direction to paths of egress. Lighting is not the most efficient as it relates to current standards. The interior lighting appears to be in fair condition.

Exterior

Lighting consists of wall packs, wall mounted floodlights, and site lighting on poles. Some of the lighting fixtures are original to the building with high intensity discharge lamps, while some of the lighting fixtures have been replaced with LED type. Most of the exterior lighting appears to be in good condition.

Switching

Most of the lighting in spaces is controlled by local wall switches, with some occupancy sensors.

Lighting - Deficiencies as it relates to current Codes:

- The current building switching does not meet the International Energy Conservation Code.
- Automatic shutoff of lighting fixtures is required.
- Daylight harvesting is required in certain spaces as indicated in the International Energy Conservation Code.

The switching appears to be original to the building and is in fair condition. As described above, the switching does not meet current Codes.

Receptacles

Receptacles are ground type. Receptacles have been added over the years through the use of EMT conduit with surface boxes, tele-power poles, plugmold, and wiremold. Receptacles appear to be in fair condition.

Lightning Protection

The building does not have a lightning protection system which would include air terminals on the roof with downlead conductors to ground and surge protection.

Bi-directional Amplifier System

The building does not have a bi-directional amplifier system which would include an amplifier and cabling above ceilings for amplifying police and fire alarm radio signals as required by the International Building Code.

Wiring

Wiring is made up of MC cabling, FA MC cabling, EMT, Rigid, and PVC conduit.

Site Analysis

Balch Elementary School

Existing Conditions

Balch Elementary School, herein referred to as the Site, consists of one (1) building structure constructed in 1913 along with two additions, one built in 1923 and a second in 1966, and one renovation completed inside the school for a new library in 2004. The Site is located at 1170 Washington Street, in Norwood, MA. The Site is 3.33± acres on Assessors Map 9 / Block 7A / Lot 48 (Appendix B, Existing Conditions Balch Elementary School Feasibility Study). The School currently accommodates approximately 390 students. The Site is accessed via two driveways off Washington Street to the west. The Site is furnished with paved parking areas and driveways, a playground, paved surfaces with painted courts for games, and a seating plaza.

The Site is bounded by residential properties to the north and south, Eliot Park to the east, and Washington Street to the west. There are several commercial properties west of Washington Street. The school does not have a buffer between neighboring properties.

Circulation and Parking

The school is oriented along an east-west axis. The main entry to the school is on the west side of the building accessed from Washington Street and is set back from the road approximately 150 feet (Appendix A Photo 1). The Site is accessed via one two-way drive and two one-way driveways from Washington Street. The north one-way entrance and exit are used for the bus route, service route, and primary parent parking (Photo 8). There is a dedicated bus pick-up and drop-off area along the north side of the building (Photos 5 and 6). The east third of the parking lot is unmarked; it is currently used for both vehicle circulation and student recreation. The south entrance contains a circular driveway for drop offs and a small parking area (Photo 7).

The parking capacity requirement for schools as a “Place of Public Assembly” is one (1) space for every 3 person capacity in according to Section 6.1.3.B of the Zoning Bylaw. Aerial imagery and Site verification shows 21 marked parking spaces in the south lot and 57 marked parking spaces in the north lot. Additional unmarked parking spaces are also in use. Four (4) accessible spaces are required for the existing quantity of designated parking spaces, one (1) of which is to be designated as van accessible. Three (3) accessible parking spaces are distributed between the two (2) parking areas; however, none of the parking spaces are marked as van accessible. The accessible parking space in the south parking lot has an accessible path of travel to an accessible building entrance in the auditorium (Photo 4). The other two (2) parking spaces are located near an accessible entrance to the north of the school (Photo 3). The parking facilities do not adequately serve the school. The school is not handicap accessible at the front entrance as there are stairs and no ramp (Photo 1). There is a crosswalk across Washington Street to the main school entrance (Photo 2) and one crosswalk

on Site from the accessible parking spaces to the pedestrian walk along the north side of the school (Photo 5). The crosswalk to the accessible spaces does not have a transition ramp. Circulation is directed by painted traffic arrows (Photos 5 and 6). There are entrance, exit, and dropoff signs which direct circulation and signs which designate parking areas for visitors and staff. Accessible parking is designated with pavement makings, but no signage. Detectable warning panels are present at the transition curbs (Photo 8).

Zoning Regulations

According to the "Zoning Map of the Town of Norwood, MA." dated April 28, 2015, the Site is located in an area zoned General Residence (G). Educational facilities are allowed within a zone G according to the "Town of Norwood Zoning Bylaw" Section 3.1. The Zoning Ordinance indicates the following dimensional requirements would control the development on this Site:

G – General Residence:
10,000 square feet minimum lot area
90 feet minimum lot frontage
20 feet minimum front yard setback
15 feet minimum side yard setback
30 feet minimum rear yard setback
30 feet maximum building height
35% maximum lot cover*
25% minimum open space**
*The percentage of lot area covered by structures.
**Lot area not covered by any structure or by paving other than that limited to recreational use.
Currently there is approximately 18% lot cover and 25% open space

Soils

Existing soils were evaluated based on the USDA Natural Resource Conservation Services Web Soil Survey. Below is a description of the soils that are shown throughout the Site as shown on the web soil survey (Appendix C, NRCS Soil Survey- Balch Elementary). The majority of the Site currently developed with the building, parking lots, and playground primarily consists of unrated Urban Land (Map Unit 602). A small portion of the Site including a portion of the northern parking lot is Merrimac-Urban land complex (Map Unit 626B) characterized as having a rapid infiltration rate, and typically more than six feet to a restrictive feature. Confirmatory soil borings and test pits for the purpose of stormwater infiltration and building foundations have not been performed.

Topography

The topography of the Site generally slopes down west to east from elevation 70 at the school toward the east side of the parking lot at elevation 65, although the Site is essentially level. Sedimentation is evident at several low spots within the paved parking lot. On the east property line there is a steep 5-foot elevation change down to Eliot Park. Record topographic maps and historical aerials as seen in Appendix D and E (dated 1894 through present day) show the wetland area east of the Site similar to the presently mapped location. There do not appear to be topographic changes which indicate that the school and parking areas have been constructed on filled wetlands

or a landfill.

Wetlands

After review of the Massachusetts GIS data layers, (MassGIS) there appear to be wetlands along the Neponset River located east of the property in the undisturbed wooded areas. The wetlands have a 100-foot regulatory buffer zone and the river has a 200-foor Riverfront Area which extends approximately halfway through Eliot Park (Existing Conditions Balch Elementary School Feasibility Study). Any construction in the 200-foot riverfront area and the 100-foot wetland buffer zone is subject to the Massachusetts Wetlands Protection Act. Projects that affect wetlands are required to file and NOI with the EPA and obtain an Order of Conditions with the local Conservation Commission.

After review of the MassGIS certified and potential vernal pools layers, the Site does not appear to have potential or certified vernal pools as defined by the Natural Heritage and Endangered Species Program (NHESP). If it is determined in an environmental review that a vernal pool exists on the Site, the local regulations require a 100-foot No-Disturbance Zone around the upland area edge or the wetland area edge that encompasses the vernal pool.

According to the Flood Insurance Rate Maps available through FEMA (Federal Emergency Management Agency), the Site is entirely outside the flood zone. The athletic fields east of the Site are located entirely in “Zone X – Other Areas” (Figure 4). A “Zone X – Other Areas” is defined by FEMA as areas determined to be outside of the 0.2% annual chance flood. There are no restrictions for development in the Zone X area.

Rare Species & Cultural Resources

Information regarding rare species was obtained from the MassGIS Rare Species and Priority Habitat data layer showing data recorded by the NHESP in the State Registry. There is no known NHESP mapped habitat on Site based on available MassGIS data maps. Utilities Potable water, sanitary sewer, storm drain, and electric conduits are all located in Washington Street. There appears to be a sanitary manhole on the south side of the building. Further investigation is required to confirm if and where the sanitary line connects into the municipal system and if there is an
existing grease trap for the kitchen waste. There is one existing drainage structure in the southern parking lot and four existing drainage
structures on the west edge of the north parking lot and play area (Photo 9). The existing drainage system provides little to no treatment or attenuation of stormwater prior to discharging to the municipal system. Site lighting is minimal, with floodlights mounted on the front of the building. Overhead wires connect somewhat obtrusively to the front façade. There is no overhead lighting within the parking or play areas. There is one fire hydrant on the southwest corner of the Site and one hydrant at the intersection of St. George Street and Washington Street.

Athletic Facilities

The school has three primary outdoor recreation areas: a new play set, an adjacent paved play area,
and a seating area (Photo 12). The play equipment is set within a fiber mulch bed

edged with timbers (Photo 10). The pavement used for service and bus circulation is also painted with hopscotch and foursquare (Photo 11). The Site is adjacent to Eliot Park, a public softball and skate park. These fields are well lit and are in good condition: the chain link fencing is new, and the grass is in good condition.

Landscaping

Mature shade trees flank the front entrance. The front foundation is planted with mature yews and rhododendrons. There is Landscape Island in the circular driveway in the south parking lot. Two large maples shade the front left lawn area. The grass is in fair condition. Concrete along Washington Street had been recently repaired with an attractive brick edging added. Concrete leading to the building is in fair condition (Photo 2). There is a four-foot black vinyl chain link fence along the east property line in good condition. There is an eight-foot chain link fence along the south perimeter of the site in poor condition. There is an eight-foot chain link fence along the eastern half of the north property line in fair condition. There is a four-foot fence on the western half of the northern property line in poor condition flanked by a wooden fence of the adjacent abutting property.

Summary

There are no constraints which prohibit this Site from serving as a viable location for a newly
constructed school or an expansion of the existing Balch Elementary. Design considerations should include improved circulation and expansion of parking as necessary to meet zoning regulations, improved accessibility, and separation of recreational areas, parking, and dedicated circulationroutes. Design considerations should also include improved infrastructure, including lighting, and athletic facilities consistent with the school's needs. Any increase in impervious area will require stormwater management consistent with onsite soils. Development should include recognition of the wetland resource areas and consideration for their buffer zones in regards to development. We would recommend these considerations be made part of future development options. However, we do not believe there are any constraints which preclude this Site from being a viable candidate for future school development.

Recommendations

The following Site improvements are recommended for consideration:

- Study of the vehicular circulation (cars, buses, emergency vehicles, and deliveries) to evaluate the effectiveness of the traffic layout and determine improvements. Such
  improvements may include the re-striping of the drives and parking areas, improved signage, as well as additional curbing. The study should also evaluate condition of vehicular and pedestrian hardscapes, and consider accessibility to the building, play areas, and park to the rear of the Site.
- Add Site lighting for safety and security, consider placing existing wiring underground. Solar lighting may be considered.
- Investigate Site utilities and drainage structures to ascertain their condition and capacities as they relate to Massachusetts DEP and Local Regulations.
- Rehabilitate lawns and install irrigation.
- Replace old and damaged Site furnishings. Consider additional Site furnishings such as tables, more benches, bike racks, etc.

Appendix A

Photo 1: Front Entrance

Photo 5: Drop-Off

Photo 9: Drainage Structure

Photo 2: Front Concrete Walk

Photo 6: Drop-Off

Photo 10: Playground

Photo 3: North Accessible Entrance

Photo 7: South Parking Lot

Photo 11: Paved Play Area

Photo 4: South Accessible Entrance

Photo 8: North Parking Lot

Photo 12: Patio

Architectural Analysis

Callahan Elementary School

Cornelius M. Callahan Elementary School is the second oldest school in Norwood, constructed in 1930. One addition has been constructed during its lifetime so far: the northeast wing, in 1954. This wing currently includes the cafeteria, kitchen, and five classrooms. A modular was added in 1990 to use as a library. The facility currently houses approximately 210 students in grades first through fifth grades.

Like all of Norwood's elementary schools, Callahan Elementary is a relatively small neighborhood school with a strong level of parent involvement. This is generally a strong formula for a successful elementary school, as it allows teachers and administrators to know each of the students well and to create a personalized and welcoming educational environment. The original building layout and design is certainly dated, as it follows an "Industrial Revolution" model of thinking where classrooms are stacked along corridors as isolated learning environments without connectivity to other classrooms or other related support areas. However, despite any individual spatial deficiencies or organizational challenges that may be identified herein, ultimately the small student population and significantly sized building facility provide a viable educational environment where students and teachers work enthusiastically to create a personalized student environment. In this type of smaller elementary school, students feel a strong sense of identity, and teachers can have a good knowledge of each individual student's needs, challenges, and abilities.

Our primary recommendations for the Callahan Elementary School will likely include future renovations to modernize the building and comprehensive renovations to some of the major building systems and components. We would also stress that one of the primary reasons that small deficiencies within individual program areas are acceptable is because of the small-sized student body. This allows teachers to create a student-focused environment where the unique student population of Callahan can experience a tailored educational program targeted at an evolving and ever-changing student population.

General

Located on a ten-acre site, the Callahan building is set apart from its neighborhood by an expansive field to the northwest and dense tree cover wrapping around it to the east. It is a well-maintained facility on the interior, and there has been some investment in maintaining the building's exterior through window and door replacement and the upkeep of site components. Though the steam heating distribution system remains as circa 1920s, it was upgraded in 2015 with the replacement of failing boilers. Because steam heating systems are no longer incorporated into new construction, those qualified to service them are scarce and parts can be difficult to obtain. They do not respond as quickly to the thermal needs of the occupants, and being almost 100 years old, the existing heating system has surpassed its intended life expectancy. Because the maintenance staff at the facility have done an excellent job repairing and maintaining the building's interior finishes, the overall appearance of the building's

interior is very good, but this can be deceptive in defining the building's overall condition. Many of the major building systems lurking behind the nicely maintained interior finishes have now reached or surpassed their intended life expectancy and will have to be addressed in the near future. The 86-year-old building lacks many of the educational amenities featured in a modern 21st Century elementary school. The building will soon require comprehensive renovation to many of the major building systems and components in order to avoid costly failures which may also disrupt the teaching and learning environment. Depending on the magnitude of proposed renovations, some additional code compliance and regulatory requirements will be triggered as part of the required renovations. Required renovations may also trigger a number of handicap accessibility requirements throughout the building. Additionally, if the Town wishes to receive reimbursement funding from the Massachusetts School Building Authority (MSBA) for any proposed project which goes beyond window, roof, or boiler replacement, the project will have to fully address educational deficiencies within the school such as undersized classrooms, lack of specialized classrooms, insufficient special education space, and outdated classroom amenities. Despite the inherent character and charm of the vintage Callahan, this kind of 86-year-old-facility generally requires a rather comprehensive renovation of building systems, unless the Town is willing to address unanticipated and disruptive system repair and replacement on an emergency basis. A comprehensive renovation to address all issues for decades to come is a significant project, and may extend well beyond a series of capital improvements.

Educational Plan Organization

The Callahan Elementary School is a 33,500 square feet, two-story facility, with a student population of approximately 210 students. The physical size and available classrooms suggest that it has a maximum capacity of approximately 220 students under current educational standards and MSBA (Massachusetts School Building Authority) guidelines. This suggests that there is no current overcrowding at Callahan and that the primary focus of the analysis will be on the building's physical condition, building systems, environmental quality, educational organization, and safety and security.

The ground floor is primarily for service, except for the cafeteria, two classrooms, and one SPED classroom. Entry to the music classroom is done either directly from the cafeteria or through an egress stair. Though social spaces, the locations of the cafeteria and music room are oppressive and dark; natural daylight into the cafeteria is limited given its northern orientation. The other half of the ground floor level is just crawl space. The main floor includes administrative space so minute, it borders on dysfunctional. The plan is U-shaped, with academic classrooms primarily along the exterior wall of the first floor and the gymnasium at the center of the shape.
The current building plan, constituted under an Industrial Revolution model, isolates each classroom and support spaces, with limited flexibility. The current organization of classrooms, along the U-shape, provides an opportunity for the creation of academic neighborhoods but instead, these rooms operate as separate entities. The existing classrooms, at an average of 600 square feet, are significantly smaller than the Massachusetts School Building Authority (MSBA) minimum of 900 square feet and fall well below numerous other educational guidelines which recommend 900-1,000 square feet for an elementary school classroom to provide sufficient space for flexibility and the various programs associated with inclusion of all students. The four first-floor classrooms within the 1954 addition are closer to the target square footage

Though full of charm, the classrooms at Callahan are insufficient in size, lack flexibility, and contain no support spaces

but are still undersized, though the incorporation of single user toilets between classrooms was advantageous. All 21st Century school initiatives call for elementary schools with larger, more flexible classrooms and significantly more connectivity between the classrooms and their associated support spaces within the academic neighborhood. These strategies should be considered when evaluating options for future renovation and long-term use of the Callahan Elementary School building.

Topography of the site slopes from the front entry at the southwest down to the back of the building. Therefore, the building's main floor level is located above the surrounding site elevation by approximately half of a floor level, burying the basement by approximately 7'. This was a popular approach in the 1900s when it was felt that burying a lower floor level (partial basement) was a cost-effective means for reducing the building height and thus reducing the amount of exposed exterior wall that had to be constructed. Unfortunately, this approach provides two major challenges to modern handicap accessibility and building security requirements: (1) It requires an elaborate system of ramping and/or elevators to provide accessibility at the building's primary entrance, and (2) It presents security challenges in that it allows someone to enter the building and immediately be inside the classroom corridor with students without any requirement to pass through an administrative control point. The location of the building's main administration area is convenient to the front entry along Garfield Avenue and centralized between the side parking lot and play fields. However, the building's lack of a control vestibule in these areas does not provide the required observation and control of visitors entering the building. The School Department is to be commended for the addition of a video entry system at this main door in recent years; however, future plans should evaluate modifications that provide a higher level of security for students and staff. Upon entry, one immediately has access to the two largest gathering spaces in the building, spaces which are occupied by students for most of the day. This condition should be evaluated as part of any future planning. School security and safety strategies have evolved dramatically over the past ten years. Currently, the primary entry point to the building is monitored via the video entry system mentioned above, but this is not a comprehensive solution to building security. Remaining entry points to the building should be monitored via camera and/or latch contacts that notify office administrators if any point along the building's perimeter has been compromised.

The existing building layout includes the original and traditional "U" configuration that was constructed in 1930 and is representative of a typical school at that time. The

addition of the cafeteria/classroom wing in 1954 does not appear to be the result of any focused planning and design, but merely a fulfillment of necessity at the time. In fact, the location and layout of this addition limits continued expansion. Furthermore, these classroom arrangements do not include common areas for student projects, exhibits, or team teaching. They also lack project-based learning labs, small group instruction rooms, teacher planning areas, and student/teacher work areas which are common in modern elementary school environments. The undersized classrooms are stacked along a corridor with no strategy for organizing them into teams or academic neighborhoods. There are a few individual offices, but there is no incorporation of planning areas for faculty and staff and no incorporation of smaller group rooms to support testing, partnering, or small group instruction.

The student dining area is located on the main level of the building under a waffle slab roof structure. It includes a small stage on the north end but lacks the flexibility often incorporated into a modern student dining, socialization, and learning area. It was designed as an early 20th Century model for student dining, which assumed students would sit in rows along linear tables and eat in shifts. Today, the modern cafeteria serves many purposes for students and staff and is designed as a flexible space which provides all-day usage for exhibit, presentation, projects, and student socialization. Modernization of the current cafeteria for increased flexibility should be considered as part of any future planning for the building. There is no auditorium at Callahan Elementary as the small stage in the cafeteria functions as the available performance space in the building. This is not uncommon, even by today's standards, but several improvements could be made to enhance its use for student presentation and performance.

The Library/Media Center is located on the main floor level in the 1990 modular addition. As this space was a prefabricated box, it lacks the transparency often associated with the media center and its surrounding academic environment. The function of a media center has changed dramatically since the days of a "Library" with numerous volumes of books. The modern media center focuses students more on digital media, video production, and broadcasting, and provides young learners an opportunity to utilize their electronic talents to develop projects and presentations through hands-on development. Though the current media center is equipped with a comprehensive computer lab and smart board technology, it lacks many of the amenities necessary for these activities and should be reviewed as part of renovation considerations and future educational planning and programming. Overall, there is limited space within the building devoted to media and video applications. A modern elementary school environment would include sufficiently sized classrooms and wireless computer access such that every classroom becomes a lab, rendering the use of dedicated computer labs as obsolete. However, existing spaces like these tend to make excellent video production or broadcasting studios, which do require fixed amenities and equipment.

Exterior Envelope
(Foundation, Walls, Roof, Windows, and Doors)

Foundation
The 1930 building is primarily a one-story building over a major crawl space. Portions of the footprint are two-story, utilizing the crawl space level. Exterior, and perhaps interior, bearing walls are unreinforced brick. (Refer to structural evaluation for additional information.)

The exterior envelope has seen little change since its original construction

Walls

The exterior envelope of the building has seen little change since its original construction, with the 86-year-old exterior walls remaining very much as they were originally constructed. These walls consist of face brick and cut or cast stone panels, carvings, and water table. The face brick is backed up with concrete masonry unit blocks, which are exposed on the interior of the building in many locations. The appearance of a whitish deposit locally or uniformly over the surface may be efflorescence, the surface deposition of soluble salts. There are numerous sources for the soluble salts which create the hazy appearance; salts can originate from mortar, improper cleaning agents, rising damp, de-icing salts, chemical landscaping treatments and air pollution. Both the face brick and the stone show some signs of efflorescence. This is a salt residue which generally indicates some form of moisture problem, salt migration and/or sub-florescence. It should be considered a symptom which should be investigated in more detail as part of any proposed renovations in an effort to identify the source of the soluble salts and/or moisture. Corrective action should then be taken to eliminate both if possible.

The cast stone shows some evidence of staining, likely a result of moisture run-off from current or prior metals that were either attached to the building or were utilized as part of the internal structural support of the walls or lintels over the windows. The cast stone also exhibits minor spalling or chipping, which could be the result of human vandalism or may be a result of freeze/thaw spalling for a building of this age. It does not appear to be a serious problem at this time. Except for the modifications required with the incorporation of the new building additions in 1954, the building masonry façade remains virtually unchanged since the original construction.

The existing mortar joints in the brick are somewhat chalky, deteriorating, and missing in places. The two most important qualities of mortar are its ability to bond to masonry (brick) and its internal strength. A sign of poorly made mortar can be random cracking at the bond joint; Callahan Elementary School does not suffer from this condition. At the time that the original Callahan was constructed, the standard mortar for masonry was a mixture of sand and pure lime or lime-pozzolan-sand. These low-strength mortars gave masonry the ability to absorb considerable strain. Accordingly, the tendency to crack was reduced and when cracks did appear in the mortar joints, they were capable of chemical reconstitution or self-healing. Thus, mortar joints of this era were capable of surviving for a very long time. However, the

one enemy of this (soft) mortar composition is long-term exposure to moisture. Over time, the joint deteriorates and becomes even softer than its original composition. This deterioration is compounded by increased exposure to moisture such as a leaking downspout. The mortar deterioration at Callahan Elementary School is not a sign of an unsound wall but instead is a result of years of exposure and simply requires repointing of the necessary joints. The newly installed joints must be of the same composition such that they can flex with or act in a similar way to the rest of the joint. Additionally, it is important to recognize that mortar acts as a drainage system to equalize hydrostatic pressure within the masonry wall. Nothing should be done to reduce its porosity and thereby block water flow to the exterior surface. For this reason, sealants applied directly to the brick surface are rarely a good idea and do not represent a long-term solution.

Repointing the exterior wall surfaces, combined with limited masonry renovation, will allow the building's exterior wall system to remain functional for many decades. The original construction drawings combined with recent field observation indicate that the building exterior wall does not have a cavity or weeping system for drainage of water absorbed by the brick. This was common in 1900s construction as the masonry is intended to equalize any hydrostatic pressure through its own porosity, as described above. However, the bricks and mortar joints should be monitored routinely for signs of significant moisture infiltration which is beyond the designed/intended limits of the wall. Because of the potential failures inherent in non-cavity wall construction, it is no longer practiced in modern building construction. Another primary deficiency in the original exterior wall construction is the absence of insulation. This is another common practice of the 1900s but is no longer allowed under the current building or energy code and consideration should be given to this topic as part of any proposed comprehensive renovation of the building. The basement level of the building includes exterior window grates that were added after the original construction. These show evidence of deterioration and water damage and their repair and/or replacement should be considered as part of any proposed renovations.

Building reports maintained by the Facilities Department indicate that the front steps were re-pointed in 2016. A site inspection has confirmed this work.

Roof

The roofing system at Callahan Elementary School has been replaced on multiple occasions, as would be true of any building of this age. The last replacement occurred in 2002 and included a rubber membrane system (EPDM - ethylene propylene diene monomer) over the entire roof area, excluding the gymnasium, front entry vestibule and prefabricated addition, which are pitched and covered with asphalt shingles. Three skylights over the 1954 addition were covered as part of the roofing update. It does not appear that any insulation has ever been added to the roof system. Though the replacement may be considered a recent capital project, the life expectancy of a rubber membrane roof is approximately 20 years, which means the existing roof will need to be addressed again within the next five to ten years. Any plans for a comprehensive renovation in the future should include complete replacement of the existing roof systems and an analysis of the benefits associated with adding insulation to the roof such that it complies with current energy code requirements. This may require some removal of the existing roofing system (down to the structural deck) to expose a substrate which is appropriate for attachment of the new insulation. This removal would also assist in removing prior roofing layers which add unnecessary weight to the roof and lower its snow-load carrying capacity.

The roofing system over the gymnaisum is pitched and covered with asphalt shingles

Windows

In 1995, the exterior windows of the building were replaced with single-hung aluminum windows. In some cases, these windows are too difficult to open given their size and location on the wall. The ground floor windows are covered with metal mesh screen for protection. Windows along the gymnasium corridor are covered with a hard, translucent plastic on the inside. Although the system represented the respectable industry standards in 1995, the recent focus on energy conservation has since resulted in the Commonwealth's adoption of significantly higher energy code standards. These standards yielded much higher performing windows and glass within the industry, and the potential benefits and requirements for new windows should be evaluated as part of any comprehensive renovation to the current facility. The window system would likely be almost 20 years old at that time and would certainly not meet new standards. Additionally, improvements required by the energy code continue to evolve and it is possible that replacement might be a requirement at that time.

Doors

As part of the window replacement project, the exterior doors to the building were also replaced. The doors are constructed of metal and have vision panels inserted within metal frames. Overall the door systems remain in good condition.

Interior

(Floors, Walls, Doors, and Ceilings)

Floors

There are numerous floor materials throughout the building. These finishes include the following: painted concrete, original hardwood on the ground and first floor corridors, and Vinyl Asbestos Tile (VAT) in the stairwells, classrooms, library, and cafeteria. The floors in the toilet rooms are painted concrete without a base.

Although the vinyl asbestos tile (VAT) is non-friable and poses no threat to the students or staff, most school systems have developed schedules for periodic removal and replacement of such finishes over time with the ultimate goal of full abatement of asbestos containing materials. Areas within the building that still contain some asbestos materials, like the library, cafeteria, and classrooms, should be considered as part of any future renovation plans. The hardwood floors in the corridors and

classrooms are mismatched in appearance, squeaky, and could benefit from re-attachment, sanding, and refinishing as part of any future renovation. Painted concrete floors are chipped and loud from reverberation on the hard surfaces. The joints between dissimilar flooring materials, including ceramic tile in toilet rooms, often vary significantly in height, resulting in abrupt flooring transitions. These abrupt transitions create handicap accessibility challenges and will need to be addressed as part of any future renovations.

The wood flooring in the gymnasium visually appears to be in fair condition, showing signs of wear as a result of its many years of service. The system has likely been sanded many times, reducing its overall thickness and strength. Many of these older gym wood flooring systems had a limited number of wood sleepers (support members) underneath and relied heavily on the integrity of the finished tongue-and-groove wood flooring. The current system has exceeded its intended life expectancy and should be further reviewed as part of any future renovations.

Walls

The ground floor interior walls in the 1954 addition are concrete masonry units (CMU) with glazed tile applied, and the original building interior walls are CMU with painted plaster applied. Given the age of the building, the walls are in good condition. However, there is evidence of moisture infiltration, which should be further explored to determine its extents. The paint on classroom walls has been well-maintained and is often a task of typical maintenance upkeep. Numerous retrofitted systems had to be installed in exposed conduit and piping as opportunities to conceal these systems within the existing walls were limited. Exposed systems include wiring for fire alarms, power, light switches, and smart boards. These systems would typically be fully encased within the walls.

There are no lockers or storage units outside of the classrooms resulting in storage congestion within classrooms which are already undersized. There are also a very limited number of custodial and/or storage closets resulting in small closets being crammed with a mix of materials, cleaning products, and equipment. This makes accessing the items inefficient and cumbersome.

The walls within the cafeteria are CMU with glazed tile, in good condition. There are currently no acoustical panels for sound absorption in the space.
The walls in the gymnasium are plastered CMU with a wood wainscot, but no bleachers. The walls of the space do not have any acoustical treatment for absorbing or reflecting sound in the space.

Doors

The interior painted wood doors with hollow metal frames throughout the school are original, and are in poor-to-fair condition. Hollow metal doors are present in the addition. Many of them show signs of wear and chipped paint. The current door hardware lacks may of the modern safety and security features and is difficult to operate. Therefore, the staff currently applies a magnetic strip to retract the latching mechanism during the school day, and will remove the strip if locking is required as a security measure. The classroom doors vary in style but all have some amount of glass within the door or as part of a transom panel above the door. These older doors provide very little acoustical separation between the corridor and classroom when compared to modern doors and construction standards. Although the glass found in the corridors represents typical standards (wired glass) at the time it was

The main floor corridors are finished with Asbestos Ceiling Tile, a hazardous material, that show signs of water damage

installed, modern codes, regulations, and standards would require that this glass be fire rated and provide a greater degree of fire separation between the classroom and the exit corridor. The doors from the corridor to the egress stairs also lack compliance with modern codes, regulations, and standards and do not provide the necessary fire ratings for protection of the egress stairways.

Most of the original door hardware appears to have been replaced over time. However, as regulations have continued to evolve over the recent past, much of the door hardware remains non-compliant and is further discussed in the handicap accessibility portion of this report.

Ceilings

The original ceiling system consisted of plaster applied to the roof structure. The gymnasium wood rafters and joists of the pitched roof are painted and exposed to view. The cafeteria has no finished ceiling but instead exposes the waffle slab, piping, and various conduits. Main floor corridors have asbestos ceiling tile. Although the asbestos ceiling tile is non-friable and poses no immediate threat to students or staff, it shows signs of water damage and discoloration. Classrooms have hard, plastered ceilings. Acoustical ceiling or wall treatments would better enhance the sound quality of these learning environments. Any upgrades to the building's mechanical, electrical, plumbing, or installation of a fire suppression system will require that the plaster ceilings be removed and replaced and will also likely require new lay-in ceiling with grid in all areas that do not currently have such.

Energy Conservation

The Callahan Elementary School was constructed in 1930, well before the historic energy shortages of the 1970s and escalating oil prices of 2005. The emergence of a new energy code in 2000, which promoted an increased knowledge of exterior building envelope construction techniques and materials, has dramatically changed the way in which buildings are designed to deal with energy efficiency issues. Massachusetts State Building Codes 3407.1 and 3407.2 require that alterations of an existing building in which the use group is not changed, must comply to the energy conservation values detailed in Table 3407 of the code for any building elements (walls, windows, doors, roofs, or mechanical systems) which are altered during renovation.

Environmental Quality

In the past fifteen years, there have been tremendous advancements in the understanding of the various environmental factors that influence building occupants. These factors have been proven to be extremely important in the school buildings where students may spend most of their day in a single 600-800 sq. ft. classroom. Factors such as natural lighting, quality artificial lighting, fresh air ventilation levels, evenly distributed heating and cooling temperatures, and acoustical performance all work to enhance the educational environment. The Callahan Elementary School classrooms include limited implementation of these key factors. Though natural light is present in many of the upper story classrooms, they are undersized, not air conditioned, and their dormant hazardous materials could begin to off-gas over-time, decreasing the quality of the indoor air.

Educational, Spatial and Organizational Capacity

Capacity at the elementary school can be calculated in several ways, including multiplying the number of available general classrooms and support areas by the appropriate number of students in each classroom. Callahan Elementary School has a current capacity of approximately 230 students. Dividing the total building square footage by the student population provides an approximate amount of square feet being provided for each student, which is another benchmark for determining the general student capacity of the building.

Our analysis of the current Callahan Elementary School suggests that, although the building may require significant renovations and improvements in the future, it is appropriately sized (overall) to accommodate the current enrollment. However, this does not mean that some areas of the building do not feel overcrowded, as its inefficient floor plan configuration does result in some shortages of space to specific program areas. These inefficiencies should be evaluated as part of any proposed future renovations. Any overcrowding conditions can lead to a very stressful environment where it is difficult to deliver a modern educational program.

In addition, the following conditions exist:

Main Office/Entrance
As mentioned previously within this report, the main office currently has no direct supervision (other than a single video monitor) of visitors who approach and enter the building. This allows an intruder who gains access to a single door to be able to enter the remainder of the building without any direct visual observation by the staff, including access to student-filled hallways and stairways. The cafeteria wing, which includes significant community use and interaction, has also been identified within this report as having some inherent security and safety challenges which should be further addressed.

Nurse's Suite
The nurse's suite is undersized and inadequate for medical exam and resting space.

Library Media Center
The Library/Media Center is located on the main floor level in the 1990 modular addition. Though it provides a comprehensive computer lab with smart board, the library lacks the modern amenities associated with a 21st Century education resource.

It is the size of two classrooms conjoined but does not include many of the necessary support spaces.

Classrooms
The size, configuration, organization, environmental quality, and instructional amenities within the classroom are critical to successful teaching and learning. All classrooms have wi-fi and smart boards, but their small, rigid size leaves them crowded with students and materials. None of the classrooms provide the kind of flexibility common in a 21st Century elementary school classroom. Overall, these classrooms appear very much like they would have almost 100 years ago, lacking many of the most recent advancements in educational instruction.

Special Education
There is one classroom per floor for special education. They are stacked in plan and adjacent to a secondary staircase. The current Special Education Program does not allow for individualized instructional, tutorial, and testing areas. Additionally, many of the rooms do not meet the required space, accommodations, and organization to meet current State recommendations and guidelines.

Science Classrooms
There are no classrooms or labs devoted to the teaching of science exclusively. This is not necessarily unusual, but it is unusual not to have more support amenities in the classrooms to enhance science instruction to elementary school students.

Art Classrooms
There are no classrooms or spaces devoted to the teaching or display of art exclusively.

Music Classrooms
The music classroom is not located near any other classrooms and is only accessed through the cafeteria or egress stair. It contains no acoustical elements or individual practice spaces to control sound. It is undersized and is limited on storage.

Teacher and Group Planning/Collaboration Areas
Space for teacher planning and collaboration is not designated anywhere in the school. Besides a small faculty break room off the cafeteria, there is no integration of planning or collaboration space. The copy machine is impractically located in the egress stair far from administration. Spaces to accommodate teacher socialization can ultimately contribute to the improvement of the school's educational philosophy through the sharing of ideas, as previously detailed in this report.

Kitchen
The kitchen at the school only serves as a warming kitchen for food that is prepared elsewhere and delivered.

Receiving and Storage
Storage space in the school is extremely limited. There is no loading deck or receiving area outlined.

Recent Capital Improvements

Roof
The original roof was completely replaced in 2004 and is currently EPDM.

Interiors
In 2000, the boys' and girls' bathrooms were renovated.

Windows
Complete window and exterior door replacement occurred in 1995. In 2010, lighting in the classrooms, library, and cafeteria were replaced.

HVAC
Two new boilers were installed in 2015. In the same year, the steam distribution system was also upgraded to minimize its cacophony.

Site
The parking lot was replaced in 2008. Not enough parking is available to accommodate the school.

Security
Surveillance cameras were added in 2008.
Card access systems were added in 2013.

Massachusetts State Building Code:
780 CMR and Life Safety Issues

The Massachusetts State Building Code (780 CMR) has been updated and amended several times since the construction of the building. The State Board of Building Regulations and Standards regularly updates and amends its regulations. Based on these regulations, the following items were found to be in non-compliance:

- Occupied spaces (classrooms and offices) currently provide an entrance from within an egress stairway.
- Egress stairway enclosures, including door assemblies, require a minimum one-hour fire separation assembly.
- Two means of egress from spaces having an occupant load of greater than 50.
- Fire extinguishers
- The existing building is in excess of the allowable square footage or height requirements as set forth in Table 503 for a building of 3b Construction.
- Fire separation assembly between Use Group E (Educational) and Use Group A-3 (Assembly – Cafeteria, Gymnasium) (one hour fire separation required).
- Handrail and guardrail at egress stairways.

Handicap Accessibility

Requirements for handicap accessibility in building planning and design were non-existent in 1913 when this building was originally designed. However, on January 26, 1992, the Department of Justice implemented Title III of the Americans with Disabilities Act (ADA) into Public Law. This legislation "prohibits discrimination on the basis of disability by private entities in places of public accommodation." The legislation requires all new places of public accommodation, including schools, to be readily accessible to and usable by persons with disabilities upon design and construction. Existing structures being renovated that exceed 30% of the equitized assessment of the building or its replacement value must fully comply with the regulations for new construction. Additionally, on September 1, 1996, the Commonwealth of

Massachusetts developed its own accessibility regulations: 521 CMR Architectural Access Board (AAB), which in some instances is more restrictive than ADA guidelines. The ADA and AAB regularly update and amend their regulations. Based on these regulations, the following items were found to be in non-compliance or not accessible to the disabled:

- All doors leading to all rooms in the school including classrooms, gymnasium, library, administration, etc. Non-conforming knob-type hardware currently exists. Lever handles are required.
- The main public entrances to the building are not accessible.
- All entries into classrooms require clear floor space adjacent to latch side of the door for entry and exit.
- The building has functional program throughout its two floors without an elevator or lift.
- Lack of proper interior building signage (braille).
- Toilet and shower rooms
- Water fountains
- Ramps must be added with the proper handicap slope and handrails.
- All stairs (handrails and nosing)
- Alarms and strobes within classrooms.
- Access to stage from main floor within gymnasium.

Each of the inaccessible features listed above has an impact on the ability of disabled students or members of the community to access various spaces throughout the school independently. Disabled persons may include students with a permanent handicap condition, students that are temporarily disabled from athletic activity, and parents, staff, or other visitors that could have any form of disability. Any future plans should incorporate as many items as possible to accommodate disabled people to the fullest extent possible.

Existing Space Summary- Elementary School

Callahan Elementary School	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**7,616**			**0**			**0**			**0**		**10**	**10,000**	
(List classrooms of different sizes separately)																
Pre-Kindergarten w/ toilet			0										1,200		-	1,100 SF min - 1,300 SF max
Kindergarten w/ toilet			0										1,200	2	2,400	1,100 SF min - 1,300 SF max
General Classrooms - Grade 1-5			0										950	8	7,600	900 SF min - 1,000 SF max
Grade 1 Classroom	874	2	1,748													
Grade 2 Classroom	887	2	1,774													
Grade 3 Classroom	565	2	1,130													
Grade 4 Classroom	600	2	1,200													
Grade 5 Classroom	588	3	1,764													
SPECIAL EDUCATION			**3,951**			**0**			**0**			**0**			**3,020**	
(List rooms of different sizes separately)																
Self-Contained SPED			0										950	2	1,900	8% of pop. in self-contained SPED
Self-Contained SPED - toilet			0										60	2	120	
Resource Room			0										500	1	500	1/2 size Gen. Clrm.
Small Group Room / Reading			0										500	1	500	1/2 size Gen. Clrm.
Therapeutic Academic Social (T.A.S.C.)	975	1	975													
ELL	883	1	883													
Title 1	632	1	632													
Sped	546	1	546													
Sped	621	1	621													
Reading Room	294	1	294													
ART & MUSIC			**920**			**0**			**0**			**0**			**2,500**	
Art Classroom - 25 seats			0										1,000	1	1,000	assumed schedule 2 times / week / student
Art Workroom w/ Storage & kiln			0										150	1	150	
Music Classroom / Large Group - 25-50 seats			0										1,200	1	1,200	assumed schedule 2 times / week / student
Music Practice / Ensemble			0										75	2	150	
Art / Music	920	1	920													
HEALTH & PHYSICAL EDUCATION			**2,869**			**0**			**0**			**0**			**6,300**	
Gymnasium	2,446	1	2,446										6,000	1	6,000	6000 SF Min. Size
Gym Storeroom	125	2	250										150	1	150	
Health Instructor's Office w/ Shower & Toilet	173	1	173										150	1	150	
MEDIA CENTER			**1,473**			**0**			**0**			**0**			**2,020**	
Media Center / Reading Room	1,188	1	1,188										2,020	1	2,020	
Remedial Reading	285	1	285													
DINING & FOOD SERVICE			**3,415**			**0**			**0**			**0**			**4,725**	
Cafeteria / Dining	1,559	1	1,559										1,725	1	1,725	2 seatings - 15SF per seat
Stage	339	1	339										1,000	1	1,000	
Chair / Table / Equipment Storage	538	1	538										200	1	200	
Kitchen	765	1	765										1,600	1	1,600	1600 SF for first 300 + 1 SF/student Add'l
Staff Lunch Room	214	1	214										200	1	200	20 SF/Occupant
MEDICAL			**199**			**0**			**0**			**0**			**410**	
Medical Suite Toilet	22	1	22										60	1	60	
Nurses' Office / Waiting Room	177	1	177										250	1	250	
Examination Room / Resting			0										100	1	100	
ADMINISTRATION & GUIDANCE			**471**			**0**			**0**			**0**			**2,015**	
General Office / Waiting Room / Toilet			0										300	1	300	
Teachers' Mail and Time Room			0										100	1	100	
Duplicating Room			0										150	1	150	
Records Room			0										110	1	110	
Principal's Office w/ Conference Area	248	1	248										375	1	375	
Principal's Secretary / Waiting			0										125	1	125	

Space Summary

Callahan Elementary School

Assistant Principal's Office			0										120	0	-	
Supervisory / Spare Office			0										120	1	120	
Conference Room			0										250	1	250	
Guidance Office	223	1	223										150	1	150	
Guidance Storeroom			0										35	1	35	
Teachers' Work Room			0										300	1	300	
CUSTODIAL & MAINTENANCE			**268**			**0**			**0**			**0**			**1,900**	
Custodian's Office			0										150	1	150	
Custodian's Workshop			0										375	1	375	
Custodian's Storage	29	1	29										375	1	375	
Recycling Room / Trash			0										400	1	400	
Receiving and General Supply	239	1	239										200	1	200	
Storeroom			0										200	1	200	
Network / Telecom Room			0										200	1	200	
OTHER			**1,623**			**0**			**0**			**0**			**0**	
Other *(specify)*																
Boiler	554	1	554													
Storage (Flr0)	399	1	399													
Storage (Flr0)	538	1	538													
Storage (Flr1)	132	1	132													
Total Building Net Floor Area (NFA)			**22,805**						**0**			**0**			**32,890**	
Proposed Student Capacity / Enrollment			230												**230**	
Total Building Gross Floor Area (GFA)[2]			33,399												**41,400**	
Grossing factor (GFA/NFA)			**1.46**									**#DIV/0!**			**1.26**	

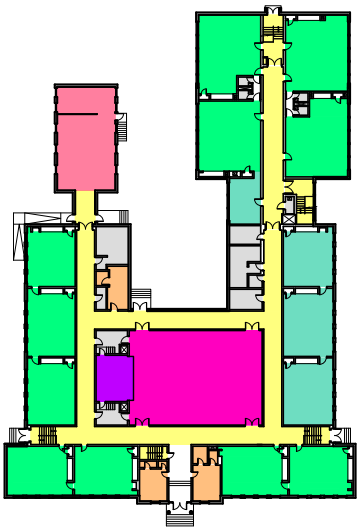
[1] **Individual Room Net Floor Area (NFA)** Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

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

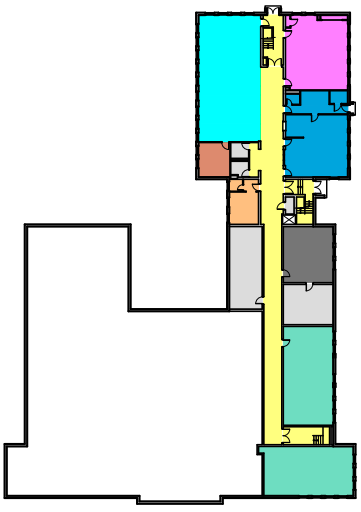
Callahan Elementary School

- 230 students
- 33,500 square feet

media center
physical education
music & arts
auditorium or stage
kitchen & servery
student dining
special eduation
general classroom
circulation
administration/services
staff planning & support
custodial/toilets
building equipment



first floor



ground floor

Structural Analysis

Callahan Elementary School

This report is based on a review of the available drawings of the additions to the original construction prepared by Harry J. Korslund Architects, dated July 12, 1995; and, a visit to the site on November 8th, 2016.

Existing Conditions

The school is essentially a two story structure with a Gymnasium, Library, and Stage. The original school was constructed in 1930 with additions and renovations completed in 1954 and 1981. The structure is performing well for the most part. The construction consists of cast in place reinforced concrete waffle two way floor slabs. The gymnasium roof construction consists of wood planking on wood joists spanning between a ridge and the walls.

The façade of the building consists of red brick masonry for the most part. At various window locations, we observed exposed steel lintels and noted moderate rusting and peeling paint. We observed various cracks in the façade and exposed portions of the foundation walls which are not a major structural concern. At various corners of the red brick masonry façade, we observed signs of past spalls.

We observed the exterior front entry stair construction and noted significant deterioration and debris on the grade adjacent to the stair.

We observed various exterior metal railing posts and noted light corrosion on the bottom of the posts. We also noted rust staining on the supporting exterior concrete ramp. In other locations, we observed signs of past repairs to the post bases, as evidenced by a cementitious patch at the concrete post base. In a separate location, we observed impact damage to a metal railing. It appears that this railing was damaged by a light vehicular collision.

The construction of the modular classroom on the rear of the building consists of wood framing for the most part. We observed a crawlspace under the modular classroom structure and noted soils which can hold moisture. We noted light impact damage to the plywood skirt that surrounds the base of the modular classroom. On one side of the modular classroom, we observed a wood-frame exterior stair and we did not observe metal connectors attaching the stringers to the platform.

On the roof, we observed a red brick chimney and noted light to moderate staining. The roof drain bodies appeared to be clear of debris for the most part.

We did not note any signs of excessive vibration due to footfall; however, we did note an audible creak in various areas of the wood flooring. We did not note any significant settlement of the foundation system.

Systems Analysis

Callahan Elementary School

Fire Protection

There is currently fire protection in this building, but does not meet NFPA.

Plumbing

Sanitary
The existing system is cast iron hub piping, the piping has deteriorated is in some places, and has been replaced with new hub-less piping, the overall system is in working condition.

Water Heaters
In the Callahan school there are multiple electric water heaters located around the building to feed different parts of the school:

- Ruud 50 Gallon Electric Water Heater (2015) with HWR
- Ruud 23 Gallon Electric Water Heater (2013) feeds pot sink in kitchen
- Ruud 6 Gallon Electric Water Heater feed Classroom Sink

Plumbing Fixtures
Currently all the fixtures are aged, and most do not meet ADA requirement, and will need to be replaced, but are in working condition. The water fountains do not meet ADA requirements.

Recommendations

- Replacement of plumbing fixtures to comply with ADA, and low flow due to age
- Gas supply for kitchen equipment requires emergency shut off
- Depending on the renovations, a larger water heater maybe need to meet the new demand

HVAC

The Callahan Elementary School is heated by steam produced by two (2) recently installed, dual fuel, sectional cast iron boilers. Each boiler utilizes natural gas or no. 2 heating oil as its fuel source.

Boilers
The boilers were manufactured by the HB Smith Company, model 28HE-08. These boilers have heating output of 1,726 MBH each. The boilers are fitted with burners manufactured by Powerflame with combustion control being maintained by an Autoflame combustion control system. The boilers are in excellent condition and are fully operational

Heating oil is stored in an indoor above ground tank, located within the building.

Duplex Air Compressor for ATC
The control system for this school is pneumatic with compressed air being produced by a duplex air compressor as manufactured by Quincy. The air compressor is in good condition and appears to have been installed within the last five (5) years.

Unit Ventilators
The classrooms are furnished with classroom unit ventilators outfitted with steam heating coils. The unit ventilators provide the classrooms with heat and ventilation. The unit ventilators are original vintage and although they are still operational, they have outlived their useful service life. Additional heat is provided by cast iron radiators installed at exterior walls throughout the school.

Recommendations
- The main heating plant is in excellent condition and should be capable of providing reliable operation into the foreseeable future provided proper maintenance is continued.
- However, the other components of the HVAC system such as the classroom unit ventilators have outlived their useful service life and are due for replacement.

Electrical

Electric Service
The primary electric service which originates from an electric utility co. pole feeds an electric utility co. pad mounted transformer via underground conduit/cabling. The electric service appears to be original to the building and appears to be in poor condition.

Normal Power System
The main distribution panelboard is fed by the electric utility co. pad mounted transformer. The main distribution panelboard rated at 800 amp, 120/208 volt, three phase, four wire is located in Maintenance and feeds panelboards in the Main Electric Room as well as panelboards throughout the building. Some of the normal power distribution is original to the building while some of the existing panelboards including the main distribution panelboard have been replaced with new, as manufactured by Siemens and General Electric. The normal power system original panelboards appear to be in poor condition, while the newer panelboards appear to be in good condition.

Emergency Power System
The building does not have an emergency generator.

Emergency lighting consists of emergency battery units with integral light heads, remote emergency light heads (mix of single and dual heads), and exit signs with integral batteries.

Emergency System - Deficiencies as it relates to current Codes:
- Inadequate interior emergency lighting coverage
- Some exit signs are made of paper with word EXIT on them
- Some remote emergency light heads are single head; dual heads are required
- No emergency lighting outside egress doors

The emergency lighting appears to be original to the building and is in poor condition.

As described above, the emergency lighting does not meet current Codes.

Fire Alarm

The conventional sixteen zone fire alarm control panel as manufactured by Notifier series 500 does not appear to be original to the building. The fire alarm system consists of an exterior municipal master box, smoke detectors, heat detectors, duct smoke detectors, pull stations, strobes, and horn/strobes.

Fire Alarm - Deficiencies as it relates to current Codes:

- Inadequate detector coverage
- Points of egress without pull stations
- Pull stations not at ADA heights
- Inadequate strobe coverage as required by ADA in Conference rooms, Toilet rooms, and Assembly spaces including Classrooms
- Notification appliances are horns; Speakers are required to provide voice evacuation throughout the building
- Most of the interior Corridor doors are pried open and do not have magnetic door holders

The fire alarm system appears to be in fair condition. As described above, the fire alarm system does not meet current Codes.

Lighting

Interior

The interior lighting consists of surface mounted, pendant, recessed, and fluorescent downlights. Exit signs provide for direction to paths of egress. Lighting is not the most efficient as it relates to current standards. The interior lighting appears to be in fair condition.

Exterior

Lighting consists of wall packs, wall mounted floodlights, and site lighting on poles. Some of the lighting fixtures are original to the building with high intensity discharge lamps, while some of the lighting fixtures have been replaced with LED type. Most of the exterior lighting appears to be in good condition.

Switching

Most of the lighting in spaces is controlled by local wall switches, with some occupancy sensors.

Lighting - Deficiencies as it relates to current Codes:

- The current building switching does not meet the International Energy Conservation Code.
- Automatic shutoff of lighting fixtures is required.
- Daylight harvesting is required in certain spaces as indicated in the International Energy Conservation Code.

The switching appears to be original to the building and is in fair condition. As described above, the switching does not meet current Codes.

Receptacles

Receptacles are ground type. Receptacles have been added over the years through the use of EMT conduit with surface boxes, tele-power poles, plugmold, and wiremold. Receptacles appear to be in fair condition.

Lightning Protection

The building does not have a lightning protection system which would include air terminals on the roof with downlead conductors to ground and surge protection.

Bi-directional Amplifier System

The building does not have a bi-directional amplifier system which would include an amplifier and cabling above ceilings for amplifying police and fire alarm radio signals as required by the International Building Code.

Wiring

Wiring is made up of MC cabling, FA MC cabling, EMT, Rigid, and PVC conduit.

Site Analysis

Callahan Elementary School

Existing Conditions

The Cornelius M. Callahan Elementary School, herein referred to as the Site, consists of one (1) building structure constructed in 1930 with an addition built in 1954. The Site is located at 90 Garfield Avenue, in Norwood MA. The Site is 10.83± acres on Assessors Map 4 / Block 11 / Lot B7 (Appendix B, Existing Conditions Cornelius M. Callahan Elementary School Feasibility Study). The school currently accommodates approximately 315 students. The Site is accessed via two driveways off Garfield Avenue. The Site is furnished with paved parking areas and driveways, playgrounds, paved surfaces with painted courts for games such as foursquare, two small basketball courts, and an unmarked natural grass athletic field.

The Site is bounded by residential properties to the north and south west, a residential complex to the east, Pleasant Street to the south and Garfield Avenue to the west. There are residential properties south of Pleasant Street and the west of Garfield Avenue. The school is buffered from the neighboring properties to the east and southeast by thick, deciduous vegetation and by the grass fields to the north.

Circulation and Parking

The school is oriented on a southwest- northeast axis. The main entrance faces Garfield Avenue and is set back from the road approximately 100-feet (Appendix A, Photo 1). The Site is accessed off Garfield Avenue via one two-way drive south of the school building, and a one-way entrance and exit north of the building. The north playground area and athletic fields can also be accessed off Roosevelt Avenue via an uncontrolled lot.

There are two primary parking facilities, a south parking lot with standard bay parking spaces (Photo 2), and a northern lot with angled spaces (Photo 3) along the athletic fields. Additionally, there are parallel parking spaces along Garfield Avenue (Photo 4). The parking capacity requirement for schools as a “Place of Public Assembly” is one (1) space for every 3 person capacity in according to Section 6.1.3.B of the Zoning Bylaw. Onsite parking is currently inadequate and congested. Aerial imagery shows 55 parking spaces in the in the south lot, 30 parking spaces in the north lot, and 19 off Site parallel parking spaces along Garfield Avenue. The small 40’x60’ uncontrolled parking lot at the end of Roosevelt Avenue may provide additional parking although it is unmarked. Four (4) accessible parking spaces are required for the existing quantity of designated parking spaces, one (1) of which to be designated as van accessible. Four (4) accessible spaces are distributed between the two parking areas (Photos 5 and 6), however, none are marked as van accessible. None of the accessible parking spaces have an accessible path of travel to an accessible building entrance. The school is not handicap accessible at the front entrance as there are stairs and no ramp (Photo 1). There is an accessible entrance adjacent to the south parking lot (Photo 7); there are two accessible spaces near this entrance, however there is not an accessible route

to the spaces (Photo 5). There are two (2) crosswalks across Garfield Avenue to the north and south corners of the main school entrance. There are no on Site crosswalks provided to the accessible parking spaces. There are transition curbs at the crosswalks, but no detectable warning panels.

Circulation is directed by painted traffic arrows and signage throughout the site (Photo 6). A sign at the entrance of the southern parking lot designates Employee and Bus use only. Signs designate a pick-up drop-off area south of the landscape area at the front of the school. Circulation through the southern parking lot is directed by painted traffic arrows (Photo 8). Circulation through the northern parking lot is directed by an "ENTER" sign at the entrance, a "DO NOT ENTER" sign at the exit, and by painted traffic arrows. Accessible parking spaces are designated with pavement makings, and the two spaces in the northern lot have signs.

There are dumpsters in the south parking lot near the south east corner of the building. There is a service access road that loops the rear of the building from the south parking lot around the east and north side of the building and terminates at a striped section of the north parking lot.

Zoning Regulation

According to the "Zoning Map of the Town of Norwood, MA." dated April 28, 2015, the Site is located in an area zoned General Residence (G). Educational facilities are allowed within a zone G according to the "Town of Norwood Zoning Bylaw" Section 3.1. The Zoning Ordinance indicates the following dimensional requirements would control the development on this Site:

G – General Residence:
10,000 square feet minimum lot area
90 feet minimum lot frontage
20 feet minimum front yard setback
15 feet minimum side yard setback
30 feet minimum rear yard setback
30 feet maximum building height
35% maximum lot cover*
25% minimum open space**
*The percentage of lot area covered by structures.
**Lot area not covered by any structure or by paving other than that limited to recreational use.
Currently there is approximately 0.06% lot cover and 32% open space

Soils

Existing soils were evaluated based on the USDA Natural Resource Conservation Services Web Soil Survey. Below is a description of the soils that are shown throughout the Site as shown on the web soil survey (Appendix C, NRCS Soil Survey). The majority of the Site currently developed with the building, parking lots, and athletic fields consists of Charlton-Hollis-Urban Land complex (Map Unit 602) characterized as having a rapid infiltration rate, and typically more than six feet to a restrictive feature. A small portion of the undeveloped woodlands along the north property line consists of unrated Urban Land. Confirmatory soil borings and test pits for the purpose of stormwater infiltration and building foundations have not been performed.

Topography

The topography of the Site generally slopes down away from the building to the east from elevation 135 at the school to elevation 110. There are no curbs along the edges of the south parking lot, and water generally flows off the pavement and into the landscaped areas.

Record USGS topographic maps and historical aerials seen in Appendix D and E (dated 1894 through present day) do not show wetlands in proximity to the site. There do not appear to be topographic changes which indicate that the school and parking areas do not appear to have been constructed on filled wetlands or a landfill.

Wetlands

After review of the Massachusetts GIS data layers, (MassGIS) there appear to be wetlands along the Neponset River located in the north east corner of the Site in the undisturbed wooded areas. The wetlands have a 100-foot regulatory buffer zone which extends approximately to the edge of the wooded area (Cornelius M. Callahan Elementary School Existing Conditions). Any construction in the 100-foot wetland buffer zone is subject to the Massachusetts Wetlands Protection Act. Projects that affect wetlands are required to file and NOI with the EPA and obtain an Order of Conditions with the local Conservation Commission.

After review of the MassGIS certified and potential vernal pools layers, the Site does not appear to have potential or certified vernal pools as defined by the Natural Heritage and Endangered Species Program (NHESP). If it is determined in an environmental review that a vernal pool exists on the Site, the local regulations require a 100-foot No-Disturbance Zone around the upland area edge or the wetland area edge that encompasses the vernal pool.

According to the Flood Insurance Rate Maps available through FEMA (Federal Emergency Management Agency), the Site is entirely outside the 0.2% annual chance flood zone.

Rare Species & Cultural Resources

Information regarding rare species was obtained from the MassGIS Rare Species and Priority Habitat data layer showing data recorded by the NHESP in the State Registry. There is no known NHESP mapped habitat on Site based on available MassGIS data maps.

Utilities

Available utilities located in Garfield Avenue are currently unconfirmed, although a visible water gate implies that potable water is accessed from the street rather than a well. There is an unmarked manhole in Garfield Avenue where the school may tie into the municipal system. Further investigation is required to confirm this connection and if there is an existing grease trap for the kitchen waste. There is one existing drainage structure in the southern parking lot. A portion of the south parking lot near the entrance does not have curbs, and stormwater appears to flow overland to the landscape areas south of the paved area and infiltrate. Stormwater from the north parking lot appears to flow overland into Garfield Avenue to be collected by

the municipal drainage infrastructure. Sedimentation is evident at several low spots within the paved parking lots.

H.I.D. type, photocell is used for Site lighting. Site lighting is in good condition, although minimal, with no lighting within parking areas or playfields. Entrances and walkways are not well lit.

Currently a low pressure natural gas service is being used for domestic hot water and kitchen equipment. There are three fire hydrants within the Site's frontage on Garfield Avenue.

Athletic Facilities

There is a general-purpose grass field on the Site with a baseball diamond in the south west corner (Photo 9). The grass is in fair condition, with no irrigation present. The backstop and chain link fence around the field is in good condition (Photo 10). There are two basketball courts with an 8-foor black vinyl chain link fence around three of the sides, open on the south east side facing the school (Photo 11). On the north and east sides of the building, there are paved play areas with painted markings (Photo 12). There is a playground in the northwest corner of the site. The play equipment is set within a fiber mulch bed edged with timbers and is in good condition.

Landscaping

A few large shade trees at the front of the Site effectively frame the building. Evergreen shrub plantings at the foundation are in good condition and are fairly well organized. Lawns are generally in fair condition, excluding an exposed area on the northwest corner of the building where erosion is evident. The pavement throughout the Site is in fair condition, with surface cracks and patches throughout. The memorial benches flanking the front entrance of the school are in good condition (Photo 13). Bike racks, tables, and other Site furnishings are not present.

Summary

There are no constraints which prohibit this Site from serving as a viable location for a newly constructed school or an expansion of the existing Cornelius M. Callahan School. Design considerations should include improved circulation in the south parking lot, expansion of parking as necessary to meet zoning regulations, and improved accessibility. Design considerations should also include improved infrastructure, including exterior lighting, and athletic facilities consistent with the school's needs. Any increase in impervious area will require stormwater management consistent with onsite soils. Development should include recognition of the wetland resource area and consideration for the buffer zone in regards to development. We would recommend these considerations be made part of future development options. However, we do not believe there are any constraints which preclude this Site from being a viable candidate for future school development.

Recommendations

The following Site improvements are recommended for consideration:

- Conduct a study of vehicular circulation, parking, pedestrian circulation, and handicap

accessibility in order to quantify the effectiveness of the existing system and determine
improvements. At a minimum, restriping and perhaps re-paving of parking and pedestrian
areas should be considered.
• Add additional Site lighting for safety, security, and expanded use of athletic facilities.
Consider placing existing wiring underground. Solar lighting may be considered.
• Investigate Site utilities and drainage structures to ascertain their condition and capacities as
they relate to Massachusetts DEP and Local Regulations.
• Extend irrigation to play fields.
• Install Site furnishings (benches, tables, bike racks, signage, etc.).
• Study the adequacy of existing play areas.

Appendix A


Photo 1: Front Entrance


Photo 5: South Lot Accessible Parking


Photo 9: Grass Athletic Field


Photo 2: South Parking Lot


Photo 6: North Lot Accessible Parking


Photo 10: Base Ball Backstop


Photo 3: North Parking Lot


Photo 7: South Accessible Entrance


Photo 11: Basket Pall Court


Photo 4: Parallel Parking


Photo 8: South Parking Lot Circulation


Photo 12: Paved Play Area

Photo 13: Memorial Benches

Architectural Analysis

Cleveland Elementary School

Cleveland Elementary School is one of two elementary schools built in Norwood in 1958. The twin school to the Cleveland School is the Prescott; however, one major difference is the Cleveland School received a significant eight classroom addition in 1965 in order to accommodate rapid growth of its neighborhood. The school includes approximately 350 pupils in grades 1 through 5.

Like all of Norwood's elementary schools, Cleveland Elementary is a relatively small neighborhood school with a strong level of parent involvement. This is generally a strong formula for a successful elementary school, as it allows teachers and administrators to know each of the students well and to create a personalized and welcoming educational environment. The original building layout and design also included a forward-thinking environment that includes many of the organizational strategies that would be incorporated into a modern elementary school. It includes appropriately sized classrooms organized around a shared common area. It also includes significant natural lighting into almost all areas. The entry lobby provides a personalized and welcoming entry experience and the recent modifications to the lobby to create an open welcoming station are a very nice improvement.

There are a few programmatic building challenges at the Cleveland Elementary School. It was originally designed to accommodate approximately 250 students. The 1965 addition of eight classrooms accommodated an additional 150 students with no modifications to the size of core facilities such as the cafeteria and gymnasium spaces. The insufficient size of these spaces is compounded by the fact that they are located directly outside of academic classrooms. When the school only accommodated 250 students, it was assumed that schedules could be coordinated to avoid loud disruptive activities directly outside of the classrooms. Although not a particularly well accepted theory, this approach was manageable when the school population was very small. However, it does not work well with an additional 100 students as the undersized cafeteria and gymnasium spaces are occupied the entire day with loud activities and are directly adjacent to the academic classrooms. Additionally, the original building and the 1965 addition could not have anticipated the expanding needs for special education and, therefore, did not include appropriate space for the support of these programs. These programs have taken over classroom space and have resulted in the loss of academic neighborhood "common areas" originally built into the floor plan. These common areas have now been taken over by instructional needs, giving the feeling of an overcrowded building and eliminating the flexibility that could be afforded by the common areas.

Our primary programmatic recommendation for the Cleveland Elementary School would be to expand the building to provide for the additional space that should have been added in 1965 and which is now critical to a functional and modern elementary school program. The excellent organization of the original 1958 building and the 1965 addition make it possible to expand the school to accommodate the additional program space while simultaneously creating an excellent 21st Century

learning environment. The addition of multipurpose/dining space, fitness space, and specialized support classrooms for special education would allow the spaces in the building to be restored to their original purpose and function and would create an excellent organizational and functional layout.

General

Located on an 18-acre site, the Cleveland building is well-situated within its surrounding residential neighborhood. It has a baseball field to the back and is surrounded by dense tree cover on most sides. It is a well-maintained facility on the interior and there has been some investment in maintaining the building with projects such as window replacement, boiler replacement, and the repair of some interior components. Though the maintenance staff has done a great job of keeping Cleveland Elementary fully functioning, the age of the building systems requires consideration for addressing the building systems and components that have not been replaced or renovated to date; either in a single comprehensive replacement project or as part of a general understanding that these systems need to be incorporated into a well-funded and strategic maintenance and replacement program over several years.

Educational Plan Organization

The Cleveland Elementary School is a 49,000 square feet, single-story facility, with a student population of about 350. The physical size and available classrooms suggest that it has the capacity to accommodate these students but is undersized in critical support areas such as dining area, fitness area, and special education instruction classrooms. These undersized support areas are causing significant challenges to the operation of the general academic classrooms, as defined above.

The building style exhibits an architecture of its era. Oriented on a north-south axis, the building is essentially a barbell, with the 1965 classroom addition at one end and the gymnasium at the other. The main entry, off Nichols Street, is perpendicular to the main corridor and leads to the cafeteria. Though there is a clear axis of circulation, many of the classrooms are directly off other programmed spaces; for example, five classrooms are accessed by way of the cafeteria, and three are accessed through the gymnasium. Not only are these adjacencies a potential disturbance during learning periods, they also offer no secured separation if the gymnasium or cafeteria were to be used by the community. Because of their location along the exterior wall, every classroom receives natural daylight. The administration counter, cafeteria, and gymnasium are all easily located from the main entrance.

The original building plan organizes each classroom neighborhood around a central common area. Although this has been compromised by overcrowding and the need to utilize the common area as an instructional space, the original design is an excellent model for elementary school instruction and could be restored to its intended use and function if the overcrowding is resolved through the creation of additional specialized program space. The current organization of classrooms, along the barbell and wing addition, provides an excellent opportunity for the creation of academic neighborhoods but instead their use and flexibility is compromised to accommodate specialized program needs. The existing classrooms, at an average of 900 square feet, generally fall within acceptable guidelines for an elementary school classroom, including those guidelines established by the Massachusetts School Building Authority (MSBA). In order to take full advantage of these classrooms, the common space should

Due to over-crowding and lack of storage space, the open corridors previously intended for group use are unable to be used as such

be made available as an extension of classroom learning. All 21st Century school initiatives call for elementary schools with appropriately sized flexible classrooms and significantly more connectivity between the classrooms and their associated support spaces within the academic neighborhood. These strategies could be achieved within the current plan if additional specialized program space was made available through an addition to the current building.

The building is single-story and is located on an essentially level site. Fortunately, this helps to facilitate handicap accessibility throughout the building and site. All classrooms have the option of exiting directly to the outdoors. This was a common practice during the time that the Cleveland School was designed and remains somewhat popular today in the design of small elementary schools where the desired program involves outdoor learning and fitness opportunities. It does present a small security challenge as technology and administrative policies must be implemented to insure that unwanted visitors are kept out and students are kept in. The security of entries that are not part of the building's primary entry can pose a security threat, but policy and procedure at the Cleveland School manages this threat, and the benefits of direct exterior access outweigh the challenges. The School Department has installed a new video entry system at the main entrance vestibule in recent years and has re-organized the lobby space to introduce a critical checkpoint and direct observation of all visitors by staff. As part of future planning, the District may want to consider more exterior cameras for operation of the building's other entries, or perhaps place all exterior doors which are outside of the main entry vestibule on a system which monitors their closed/open position. This would provide notification to administrators if any point along the building's perimeter has been compromised.

The 1965 classroom addition was well placed and helps to support a more modern approach to school organization. Furthermore, the classroom addition results in an organization of classroom groups into small academic grade-level neighborhoods. However, these potential classroom neighborhoods are not being used as such. Though the original building layout included common areas for student projects, exhibits, or possibly cross-discipline instruction, the lack of available specialized space within the building has resulted in the installation of book shelves and a computer lab within this space. The building now lacks project-based learning labs, small group instruction areas, teacher planning areas, and student/teacher work areas which are common in modern elementary school environments. These spaces could all be provided within the academic neighborhoods if they were restored to their intended

function. The crowded classroom neighborhoods are currently stacked along a corridor with no available space for an academic team or neighborhood. There are a few individual offices, but there is no incorporation of planning areas for faculty and staff and no incorporation of smaller group rooms to support testing, partnering, or small group instruction.

The student dining area is located on the main level of the building. It is grossly undersized as it was originally designed to support approximately 250 students and was not increased in 1965 when eight additional classrooms were added to the building. It includes a small stage on the south end but lacks the flexibility often incorporated into a modern student dining, socialization, and learning area. It was designed as a 1960s model for student dining, which assumed students would sit in rows along linear tables and eat in shifts. Today, the modern cafeteria serves many purposes for students and staff and is designed as a flexible space which provides all-day usage for exhibit, presentation, projects, and student socialization. Modernization of the current cafeteria for increased flexibility should be considered as part of any future planning for the building. There is no auditorium at Cleveland Elementary as the small stage in the cafeteria functions as the available performance space in the building. This is not uncommon, even by today's standards, but several improvements could be made to enhance its use for student presentation and performance.

The Library/Media Center is located on the main floor level and has a desirable central location within the building. As this space was originally two classrooms that have since been joined, it lacks the transparency often associated with a media center and its surrounding academic environment. The function of a media center has changed dramatically since the days of a "Library" with numerous volumes of books. The modern media center focuses students more on digital media, video production, and broadcasting, and provides young learners an opportunity to utilize their electronic savvy to develop projects and presentations through hands-on development. The current Media Center lacks many of the amenities necessary for these activities and should be reviewed as part of renovation considerations and future educational planning and programming. Overall, there is limited space within the building devoted to media and video applications, though the school has converted corridor space to a computer lab. A modern elementary school environment would include sufficiently sized classrooms and wireless computer access such that every classroom becomes a lab, rendering the use of dedicated computer labs as obsolete and allowing this space to serve a new educational purpose.

Exterior Envelope
(Foundation, Walls, Roof, Windows, and Doors)

Foundation
The school is constructed on a concrete slab which appears to be in good condition. (Refer to structural evaluation for additional information.)

Walls
The exterior envelope (exterior masonry wall construction) of the building is a 58-year-old envelope. The envelope consists of face brick with masonry back-up support. Exterior walls include continuous stacked window units in the classrooms and have a pre-cast concrete infill system. The grates within this pre-cast system have stained the panels from years of water depositing.

The exterior envelope is composed of brick bays and continuous stacked window units within a pre-cast concrete infill system

Except for the 1965 addition, the building masonry façade remains virtually unchanged since the original construction. The brick walls are in good condition with no signs of spalling or efflorescence. There are no significant cracks in the walls themselves, but some of the exterior concrete-plaster soffits have begun to crack or leak in places. The negative slope of the soffits toward the window units could prove problematic if perimeter flashing and sealants fail. The 58-year-old original construction documents indicate that the exterior envelope of the building consists of face brick and masonry back-up support. Unlike exterior masonry walls of today, no cavity between the brick and masonry back-up exists which can lead to a rapid decline in the exterior wall condition if the brick and mortar joints are not routinely monitored for signs of moisture infiltration. Cavity wall design is important because it disconnects the path temperature and water can take to infiltrate the inside finishes and allows an additional layer of insulating air between the exterior and interior wall systems. Except for the pre-fabricated window system which drains behind the pre-cast panel, there is no weeping system for drainage of water absorbed by the brick. Re-pointing, combined with limited masonry renovation, would allow the building's exterior wall system to remain water-tight for many years.

The absence of insulation within the exterior building envelope creates an inefficient exterior wall. For the temperate climate of Massachusetts, insulation within the exterior envelope should be at least three inches thick to achieve a suitable R-value. This level of insulation in the exterior wall significantly increases the building's ability to remain warm in the winter and also helps the building to remain cooler in the late spring, summer, and early fall, creating a more comfortable building environment. Under the current building code, some areas of the uninsulated building envelope might need to be addressed as part of any proposed comprehensive renovation of the building.

As mentioned, the exterior wall of each classroom includes a continues band of window panels. A portion of these panels is designed with an intake grille to integrate mechanical ventilation through the precast panel to the inside. The windows reach all the way to the ceiling of each classroom, providing a very effective means of allowing natural daylight to permeate deep into the rooms. This is a significant component in creating an excellent classroom environment.

Roof

The roofing system at Cleveland Elementary School has been replaced on multiple

occasions, as would be true of any building of this age. The last replacement occurred in 2002 and included a rubber membrane system (EPDM - ethylene propylene diene monomer) over the entire roof area. It does not appear that any insulation has ever been added to the roof system. Though the replacement may be considered a recent capital project, the life expectancy of a rubber membrane roof is approximately 20 years, which means the existing roof will need to be addressed again within the next five to ten years. Any plans for a comprehensive renovation in the future should include complete replacement of the existing roof systems and an analysis of the benefits associated with adding insulation to the roof such that it complies with current energy code requirements. This may require some removal of the existing roofing system (down to the structural deck) in order to expose a substrate which is appropriate for attachment of the new insulation. This removal would also assist in removing prior roofing layers which add unnecessary weight to the roof and lower its snow-load carrying capacity.

Windows

In 2002, the exterior windows of the building were replaced with fixed aluminum windows, with operable hopper style windows in some sections. These new windows significantly improved the thermal characteristics of the building and eliminated moisture infiltration that was occurring around the old windows. However, although the 2002 replacement window system represented the respectable industry standards at the time, it is important to note that recent focus on energy conservation has since resulted in the Commonwealth's adoption of significantly higher energy code standards. These standards yielded much higher performing windows and glass within the industry, and the potential benefits and requirements for new windows should be evaluated as part of any comprehensive renovation to the current facility. The window system would likely be almost 20 years old at that time and would certainly not meet new standards. Additionally, improvements required by the energy code continue to evolve and it is possible that replacement might be a requirement at that time.

Doors

As part of the window replacement project, the exterior doors to the building were also replaced. The doors are constructed of metal and have vision panels inserted within metal frames. Overall the door systems remain in good condition.

Interior

(Floors, Walls, Doors, and Ceilings)

Floors

There are numerous floor materials throughout the building. These finishes include the following: painted concrete in service spaces, Vinyl Composition Tile in corridors, and Vinyl Asbestos Tile (VAT) in the classrooms, library, kitchen and cafeteria. The floors in all toilet rooms are ceramic tile without a base, rehabilitated in 2002.

Although the Vinyl Asbestos Tile (VAT) is non-friable and poses no threat to the students or staff, most school systems have developed schedules for periodic removal and replacement of such finishes over time, with the ultimate goal of full abatement of asbestos containing materials. Areas within the building that still contain some asbestos materials, like the library, cafeteria, and classrooms, should be considered as part of any future renovation plans. The joints between dissimilar flooring materials, including ceramic tile in toilet rooms, often vary significantly in height resulting in

The most recent capital improvements for lighting and flooring are still in good condition

abrupt flooring transitions. These abrupt transitions create handicap accessibility challenges and will need to be addressed as part of any future renovations.

The resilient wood flooring in the gymnasium is in brand-new condition, having been replaced in 2016.

Walls

The corridor interior walls are exposed brick or painted Concrete Masonry Units (CMU). In double height spaces, the CMU appears to be cracking, perhaps due to a lack of control joints, and subject to mortar failure in some places. Also in these spaces are limited sound absorbing panels high on the walls. Classroom walls are also painted CMU with sound absorbing panels on any available wall space. There is evidence of moisture infiltration which should be further explored to determine its extents. The school has a history of burst pipes and whether this has led to internal damage is indeterminate. Numerous retrofitted systems had to be installed in exposed conduit and piping as opportunities to conceal these systems within the existing walls were limited. Exposed systems include wiring for fire alarms, power, light switches, and smart boards. These systems would typically be fully encased within the walls.

There are no lockers or storage units outside of the classrooms, resulting in storage congestion within classrooms which are already filled. This has led to an overflow of everything from extra desks and books to maintenance equipment, copy machines, and reams of paper piled up in whatever free corner is available. This alternative makes accessing items inefficient and cumbersome.

The walls in the gymnasium are painted CMU with no bleachers. The walls of the space do not have any acoustical treatment for absorbing or reflecting sound in the space. The north wall is full glass, fixed windows with some operable hoppers like the classrooms.

Doors

The interior wood doors with hollow metal frames throughout the school are original, including those in the addition from 1965. Hollow metal frames with wired-glass vision panels hold corridor double doors. Though the metal frames are durable and regularly painted, the original hollow wood doors do not provide good acoustical separation between the classroom and corridor under current construction standards, especially if the school continues to use its corridors as programmed spaces. Solid

core doors would decrease sound transmission and increase safety and durability. Although the glass found in the corridors represents typical standards (wired glass) at the time it was installed, modern codes, regulations, and standards would require that this glass be fire rated and provide a greater degree of fire separation between the classroom and the exit corridor. In some cases, storage rooms are enclosed only by a curtain on a rod, which offers students an opportunity to hide or injure themselves. Additionally, storage is enclosed by partition walls within corridors that completely block the accessible approach of an emergency exit.

Most of the original door hardware appears to have been replaced over time. However, as regulations have continued to evolve over the recent past, much of the door hardware remains non-compliant and is further discussed in the handicap accessibility portion of this report.

Ceilings

Classroom ceilings are the original plaster suspended below a small mechanical passage. There are skylights in the classrooms that have been covered up by the 2002 roof replacement. The main corridor in the original building is partially the same plaster system, and changes to a 2x2 lay-in style Acoustic Ceiling Tile (ACT) with grid at the wing addition. The addition's first ceiling was an asbestos containing ceiling tile that is now covered by the newer ACT. Beyond the lobby of the addition, the ACT drops another foot to allow warm air to circulate above the ceiling. This development was a result of a burst pipe that, at the time, led to indoor air quality issues. The ceilings in the gymnasium are paneling, above an exposed steel roof structure, and with a painted finish. The same system is used in the double height portion of the corridors and above the cafeteria trusses. Acoustical ceiling or wall treatments would better enhance the sound quality of these learning environments as the multiple layers of paint on the ceiling tile have likely compromised much of their acoustical qualities. Any upgrades to the building's mechanical, electrical, plumbing, or installation of a fire suppression system will require that the 2x2 lay-in ceilings be removed and replaced and will also likely require new lay-in ceiling with grid in all areas that do not currently have such.

Energy Conservation

The Cleveland Elementary School was constructed in 1958, well before the historic energy shortages of the 1970s and escalating oil prices of 2005. The emergence of a new energy code in 2000, which promoted an increased knowledge of exterior building envelope construction techniques and materials, has dramatically changed the way in which buildings are designed to deal with energy efficiency issues. Massachusetts State Building Codes 3407.1 and 3407.2 require that alterations of an existing building in which the use group is not changed, must comply to the energy conservation values detailed in Table 3407 of the code for any building elements (walls, windows, doors, roofs, or mechanical systems) which are altered during renovation.

Environmental Quality

In the past fifteen years, there have been tremendous advancements in the understanding of the various environmental factors that influence building occupants. These factors have been proven to be extremely important in the school buildings where students may spend most of their day in a single 700-900 sq. ft. classroom. Factors such as natural lighting, quality artificial lighting, fresh air ventilation levels,

The library media center is centrally located, but undersized and lacks modern amenities and resources

evenly distributed heating and cooling temperatures, and acoustical performance all work to enhance the educational environment. The Cleveland Elementary School classrooms already include many of these factors as classrooms have significant natural lighting, access to natural ventilation, and newly installed indirect/direct artificial lighting. They do not include modern mechanical systems that would modulate the ventilation and fresh air in the classroom, and they do not include air-conditioning; however, they do provide a very nice academic classroom environment and have been maintained well.

Educational, Spatial And Organizational Capacity

Capacity at an elementary school can be calculated in several ways, including multiplying the number of available general classrooms and support areas by the appropriate number of students in each classroom. Although the Cleveland Elementary School has the classroom capacity to support approximately 350 students, it lacks several specialized support spaces. This has resulted in the displacement of key academic spaces and does not allow the school to function as initially designed. The building requires an expanded dining/multipurpose area, expanded fitness area, and additional special education and support spaces in order to accommodate all of the additional students that came as a result of the eight-classroom addition in 1965.

Our analysis of the current Cleveland Elementary School suggests that it can be a great learning environment with some renovations and some proposed expansion of key program areas. Even in its current overcrowded condition, it provides a great learning experience for the students of this neighborhood. Its forward-thinking floor plan provides many opportunities if the overcrowding were to be resolved. Proposed renovations to some areas, technology infusion throughout the building, and expanded program areas should be part of future considerations. The current overcrowding conditions likely create a stressful environment at times as teachers and students work enthusiastically toward delivering a modern educational program.

In addition, the following conditions exist:

Main Office/Entrance

Administration is only the Principal's office and secretary area, but acts as a knuckle between the gymnasium and cafeteria. As mentioned previously within this report, the main office currently has no direct supervision (other than a single video monitor)

of visitors who approach and enter the building, though the administration counter itself has recently been moved out into the lobby and reconfigured to allow direct visibility of visitors upon their entry into the building. This is a significant improvement to the original design configuration.

Nurse's Suite

The nurse's suite is directly off the secretary area. It is undersized and inadequate for medical exam and resting space.

Library Media Center

The library is located along the main axis next to the nurse's suite. It faces an appealing corridor garden. Though it occupies an excellent central location and receives excellent natural daylighting, it is somewhat undersized and lacks the modern technology and media amenities associated with a 21st Century education resource. Some consideration should be made for improvements to this space as part of any future renovations.

Classroooms

The size, configuration, organization, environmental quality, and instructional amenities within the classroom are critical to successful teaching and learning. All classrooms have wi-fi and smart boards and also have significant natural daylighting. They have also received recent upgrades to indirect/direct pendant light fixtures that provide an excellent source of artificial light. They are reasonably sized, although their size is on the lower end of acceptable educational standards. Their flexibility could be greatly enhanced if the common areas and support spaces referred to herein were restored to their original purpose. Overall, these classrooms provide a very good academic environment and could be made even better through a few thoughtful renovations.

Special Education

The current Special Education Program is extremely undersized and is utilizing inadequate space for instructional, tutorial, and testing areas. These programs are not well distributed throughout the building and their locations present a significant challenge to the staff's ability to provide inclusion for the students. Additionally, many of the rooms do not meet the required space, accommodations, and organization to meet current State recommendations and guidelines.

Science Classrooms

There are no classrooms or labs devoted to the teaching of science exclusively. This is not necessarily unusual in an elementary school, but consideration should be made for providing more support amenities in the classrooms to enhance science instruction to elementary school students.

Art Classrooms

Art class is instructed in one of the open corridor spaces along the main axis. This is not ideal. Art is one of the spaces that should be included as part of an expanded building program. Providing art with a better specialized space would restore the currently utilized area back to an academic neighborhood commons which was its intended and designed use.

Music Classroom

There are no classrooms devoted to the teaching of music exclusively. This is not

unusual as it was likely that the stage at the cafeteria was initially intended for this use. However, overcrowded dining space and extended lunch periods compromise the use of this space for music instruction.

Teacher And Group Planning and Collaboration Areas
Space for teacher planning and collaboration is limited to one small room accessed through the main entry vestibule. There is no integration of planning or collaboration space throughout the school and no space devoted to faculty dining or services. Spaces to accommodate teacher socialization can ultimately contribute to the improvement of the school's educational philosophy through the sharing of ideas, as previously detailed in this report.

Kitchen
The kitchen at the school only serves as a warming kitchen for food that is prepared elsewhere and delivered.

Receiving And Storage
Storage space in the school is extremely limited and the amount of storage packed throughout the school is both a fire and safety hazard.

Recent Capital Improvements

Roof
The roof was completely replaced in 2002 and is currently EPDM. In 2009, snow guards were added and gutters were replaced.

Interiors
In 2015, lighting in the cafeteria and outside was replaced with LED bulbs. Floors in the corridors, nurse's suite, and gym are brand-new.

Windows
Complete window and exterior door replacement occurred in 2002.

HVAC
Both boilers were replaced in 2000.

Security
Surveillance cameras were added in 2008.
Card access systems were added in 2013.

Massachusetts State Building Code:
780 CMR and Life Safety Issues

The Massachusetts State Building Code (780 CMR) has been updated and amended several times since the construction of the building. The State Board of Building Regulations and Standards regularly updates and amends its regulations. Based on these regulations, the following items were found to be in non-compliance:

- Two means of egress from spaces having an occupant load of greater than 50.
- Fire extinguishers
- Fire separation assembly between Use Group E (Educational) and Use Group A-3 (Assembly – Cafeteria, Gymnasium) (one hour fire separation required).

Handicap Accessibility

Requirements for handicap accessibility in building planning and design were non-existent in 1958 when this building was completed. However, on January 26, 1992, the Department of Justice implemented Title III of the Americans with Disabilities Act (ADA) into Public Law. This legislation "prohibits discrimination on the basis of disability by private entities in places of public accommodation." The legislation requires all new places of public accommodation, including schools, to be readily accessible to and usable by persons with disabilities upon design and construction. Existing structures being renovated that exceed 30% of the equitized assessment of the building or its replacement value must fully comply with the regulations for new construction. Additionally, on September 1, 1996, the Commonwealth of Massachusetts developed its own accessibility regulations: 521 CMR Architectural Access Board (AAB), which in some instances is more restrictive than ADA guidelines. The ADA and AAB regularly update and amend their regulations. Based on these regulations, the following items were found to be in non-compliance or not accessible to the disabled:

- All doors leading to all rooms in the school including classrooms, gymnasium, library, administration, etc. Non-conforming knob-type hardware currently exists. Lever handles are required.
- The school is handicap accessible. Handicap parking is near the front entrance, but the sidewalk pavement and curbs are in poor condition.
- All entries into classrooms require clear floor space adjacent to latch side of the door for entry and exit.
- Check-in counter at Administration Office.
- Lack of proper interior building signage (braille).
- Toilet and shower rooms
- Water fountains
- Library Circulation Desk
- Alarms and strobes within classrooms.
- Access to stage from main floor within Cafeteria.

Each of the inaccessible features listed above has an impact on the ability of disabled students or members of the community to access various spaces throughout the school independently. Disabled persons may include students with a permanent handicap condition, students that are temporarily disabled from athletic activity, and parents, staff, or other visitors that could have any form of disability. Any future plans should incorporate as many items as possible to accommodate disabled people to the fullest extent possible.

Proposed Space Summary- Elementary School

Over MSBA Guidelines

Under MSBA Guidelines

Cleveland Elementary School	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**15,575**			**0**			**0**			**0**		**15**	**15,000**	
(List classrooms of different sizes separately)																
Pre-Kindergarten w/ toilet													1,200		-	1,100 SF min - 1,300 SF max
Kindergarten w/ toilet													1,200	3	3,600	1,100 SF min - 1,300 SF max
General Classrooms - Grade 1	1,064	4	4,256										950	12	11,400	900 SF min - 1,000 SF max
General Classrooms - Grade 2	1,000	3	3,000													
General Classrooms - Grade 3	919	3	2,757													
General Classrooms - Grade 4	903	3	2,709													
General Classrooms - Grade 5	911	3	2,733													
Self-Contained Classroom Toilets	40	3	120													
SPECIAL EDUCATION			**5,917**			**0**			**0**			**0**			**4,530**	
(List rooms of different sizes separately)																
Self-Contained SPED			0										950	3	2,850	8% of pop. in self-contained SPED
Self-Contained SPED - toilet	47	2	94										60	3	180	
Resource Room	1,338	1	1,338										500	2	1,000	1/2 size Gen. Clrm.
Small Group Room / Reading			0										500	1	500	1/2 size Gen. Clrm.
Pragmatic Learning Center - Grade 1/2	1,338	1	1,338													
Pragmatic Learning Center - Grade 3	896	1	896													
Pragmatic Learning Center - Grade 4/5	989	1	989													
Literacy Center	757	1	757													
Speech / OT	413	1	413													
Storage	46	2	92													
ART & MUSIC			**1,839**			**0**			**0**			**0**			**2,500**	
Art Classroom - 25 seats	938	1	938										1,000	1	1,000	assumed schedule 2 times / week / student
Art Workroom w/ Storage & kiln			0										150	1	150	
Music Classroom / Large Group - 25-50 seats	901	1	901										1,200	1	1,200	assumed schedule 2 times / week / student
Music Practice / Ensemble			0										75	2	150	
HEALTH & PHYSICAL EDUCATION			**2,813**			**0**			**0**			**0**			**6,300**	
Gymnasium	2,751	1	2,751										6,000	1	6,000	6000 SF Min. Size
Gym Storeroom	62	1	62										150	1	150	
Health Instructor's Office w/ Shower & Toilet			0										150	1	150	
MEDIA CENTER			**1,554**			**0**			**0**			**0**			**2,245**	
Media Center / Reading Room	881	1	881										2,245	1	2,245	
Reading Nook	673	1	673													
DINING & FOOD SERVICE			**4,276**			**0**			**0**			**0**			**5,792**	
Cafeteria / Dining	2,936	1	2,936										2,625	1	2,625	2 seatings - 15SF per seat
Stage	546	1	546										1,000	1	1,000	
Chair / Table / Equipment Storage	0	0	0										317	1	317	
Kitchen	794	1	794										1,650	1	1,650	1600 SF for first 300 + 1 SF/student Add1
Staff Lunch Room	0	0	0										200	1	200	20 SF/Occupant
MEDICAL			**451**			**0**			**0**			**0**			**510**	
Medical Suite Toilet													60	1	60	
Nurses' Office / Waiting Room	451	1	451										250	1	250	
Examination Room / Resting			0										100	2	200	
ADMINISTRATION & GUIDANCE			**1,510**			**0**			**0**			**0**			**2,065**	
General Office / Waiting Room / Toilet			0										325	1	325	
Teachers' Mail and Time Room			0										100	1	100	
Duplicating Room			0										150	1	150	
Records Room			0										110	1	110	
Principal's Office w/ Conference Area	205	1	205										375	1	375	
Principal's Secretary / Waiting	328	1	328										125	1	125	
Assistant Principal's Office			0										120	0	-	

Space Summary

Cleveland Elementary School

Supervisory / Spare Office			0										120	1	120	
Conference Room	270	1	270										250	1	250	
Guidance Office			0										150	1	150	
Adjustment Counselor / Psychologist	413	1	413													
Guidance Storeroom			0										35	1	35	
Teachers' Work Room	254	1	254										325	1	325	
Storage	40	1	40													
CUSTODIAL & MAINTENANCE			**315**			**0**			**0**			**0**			**1,950**	
Custodian's Office			0										150	1	150	
Custodian's Workshop			0										375	1	375	
Custodian's Storage	141	1	141										375	1	375	
Recycling Room / Trash			0										400	1	400	
Receiving and General Supply	174	1	174										217	1	217	
Storeroom			0										233	1	233	
Network / Telecom Room			0										200	1	200	
OTHER			**2,667**			**0**			**0**			**0**			**0**	
Other *(specify)*																
Boiler	777	1	777													
Dressing Room	120	1	120													
Lobby	495	1	495													
Outdoor Storage	90	1	90													
Storage	295	2	590													
Storage	140	1	140													
Storage	71	5	355													
Storage	25	4	100													
Total Building Net Floor Area (NFA)			**36,917**			**0**			**0**			**0**			**40,892**	
Proposed Student Capacity / Enrollment			349												**350**	
Total Building Gross Floor Area (GFA)[2]			48,272												**60,958**	
Grossing factor (GFA/NFA)			**1.31**									**#DIV/0!**			**1.49**	

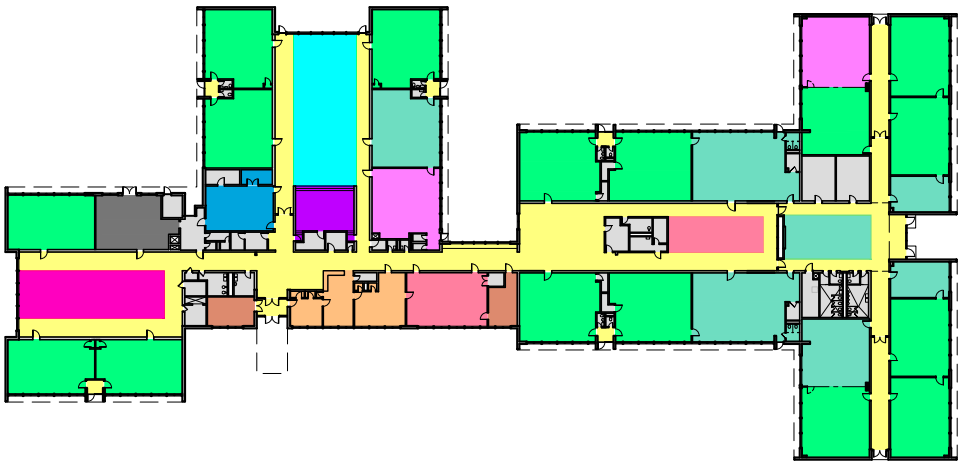
[1] **Individual Room Net Floor Area (NFA)** Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

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

Cleveland Elementary School

- 349 students
- 49,000 square feet

media center
physical education
music & arts
auditorium or stage
kitchen & servery
student dining
special eduation
general classroom
circulation
administration/services
staff planning & support
custodial/toilets
building equipment



first floor

Structural Analysis

Cleveland Elementary School

This report is based on a review of the available drawings of the additions to the original construction prepared by Korslund, LeNormand & Quann, Inc., dated February 15, 1965, and a visit to the site on December 1, 2016.

Existing Conditions

F.A. Cleveland Elementary School is essentially a one story structure with a Gymnasium and Cafeteria. The original school was constructed in 1958 with additions in 1965. The structure is performing well for the most part. The roof construction consists of kinked structural steel beams that create the shape of a gable roof. The roof beams span wall to wall. The Cafeteria roof construction consists of long span metal joists.

We did not observe any excessive vibration due to foot fall on the concrete slab on grade.

We did not observe any signs of excessive foundation settlement or significant distress in the structure. We observed moderate to heavy cracking in various locations of the masonry construction.

The exterior façade construction consists of a red brick with precast concrete elements. We observed steel lintels over openings and noted light deterioration and peeling paint. At the base of the brick façade, we observed the cast in place concrete foundations and noted moderate cracks and spalling concrete.

Systems Analysis

Cleveland Elementary School

Fire Protection

Currently there is no Fire Protection system in the building.

Plumbing

Sanitary
The existing system is cast iron hub piping, the piping has deteriorated is in some places, and has been replaced with new hub-less piping, the overall system is in working condition.

Water Heaters
In the Cleveland school there is (1) Ruud 50 Gallon Gas Water Heater (2009) that feeds the school, and It is in working condition.

Plumbing Fixtures
Currently all the fixtures are aged, and most do not meet ADA requirement, and will need to be replaced, but are in working condition. The water fountains do not meet ADA requirements.

Recommendations
- Replacement of plumbing fixtures to comply with ADA, and low flow due to age
- Gas supply for kitchen equipment requires emergency shut off
- Depending on the renovations, a larger water heater maybe need to meet the new demand

HVAC

The Cleveland Elementary School is heated by hot water produced by two (2) dual fuel, sectional cast iron boilers. Each boiler utilizes natural gas or no. 2 heating oil as its fuel source.

Boilers
The boilers were manufactured by the Burham, model PV1114WLL. These boilers have a net IBR output of 2,374 MBH each. The boilers are fitted with burners manufactured by Webster with combustion control being maintained by an Autoflame combustion control system. The boilers are in good condition and are fully operational.

Heating oil is stored in underground, double-wall fiberglass tanks, monitored by a code compliant leak detection system. Heating oil is supplied to the boiler burners through a duplex pump set, which appears to be in good condition and fully operational.

Hot Water Circulation Pumps

Hot water is circulated throughout the school by a pair of base mounted end suction pumps. These pumps are fully operational and appear to be in good condition and properly maintained.

Duplex Air Compressor for ATC

The control system for this school is pneumatic with compressed air being produced by a duplex air compressor as manufactured by Quincy. The air compressor is in good condition and appears to have been installed within the last five (5) years.

Unit Ventilators

The classrooms are furnished with classroom unit ventilators outfitted with hot water heating coils. The unit ventilators provide the classrooms with heat and ventilation. The unit ventilators are original vintage and although they are still operational, they have outlived their useful service life.

The gymnasium is heated by a combination of four (4) unit ventilators, a horizontal unit ventilator and fintube radiation.

Heat and ventilation for the cafetorium is provided by unit ventilators. Additional heat is provided by fintube radiation installed high along the exterior wall.

Recommendations

- The main heating plant is in good condition and should be capable of providing reliable operation for at least another five to ten years provided proper maintenance is continued.
- However, the other components of the HVAC system such as the classroom unit ventilators have outlived their useful service life and are due for replacement.

Electrical

Electric Service

The primary electric service originates from electric utility co. pole mounted transformers on an electric utility co. pole. The electric service enters the building via underground conduit/cabling. The electric service appears to be original to the building and appears to be in poor condition.

Normal Power System

The main disconnect switch is fed by the electric utility co. pole mounted transformers. The main disconnect switch rating is not indicated, however it is assumed to be rated at 400 amps, 120/208 volt, three phase, four wire. It feeds panelboards located in the Main Electric Room as well as panelboards throughout the building. The normal power distribution is a mix of panelboards manufactured by Federal Pacific and Square D. The normal power system appears to be original to the building and appears to be in poor condition.

Emergency Power System

The building has a 120 volt, single phase, 1 kW natural gas generator, manufactured by Onan, which Staff indicated is no longer in service. Emergency lighting consists of emergency battery units with integral light heads, remote emergency light heads (mix of single and dual heads), and exit signs with integral batteries.

Emergency System - Deficiencies as it relates to current Codes:

- Inadequate interior emergency lighting coverage
- Some exit signs are made of paper with word EXIT on them
- Some remote emergency light heads are single head; dual heads are required
- No emergency lighting outside egress doors

The emergency lighting appears to be original to the building and is in poor condition. As described above, the emergency lighting does not meet current Codes.

Fire Alarm

The conventional eight zone fire alarm control panel as manufactured by Notifier does not appear to be original to the building. The fire alarm system consists of an exterior municipal master box, smoke detectors, heat detectors, duct smoke detectors, pull stations, strobes, and horn/strobes.

Fire Alarm - Deficiencies as it relates to current Codes:

- Inadequate detector coverage
- Points of egress without pull stations
- Pull stations not at ADA heights
- Inadequate strobe coverage as required by ADA in Conference rooms, Toilet rooms, and Assembly spaces including Classrooms
- Notification appliances are horns; Speakers are required to provide voice evacuation throughout the building
- Most of the interior Corridor doors are pried open and do not have magnetic door holders

The fire alarm system appears to be in fair condition. As described above, the fire alarm system does not meet current Codes.

Lighting

Interior

The interior lighting consists of surface mounted, pendant, recessed, and fluorescent downlights. Exit signs provide for direction to paths of egress. Lighting is not the most efficient as it relates to current standards. The interior lighting appears to be in fair condition.

Exterior

Lighting consists of wall packs, wall mounted floodlights, and site lighting on poles. Some of the lighting fixtures are original to the building with high intensity discharge lamps, while some of the lighting fixtures have been replaced with LED type. Most of the exterior lighting appears to be in good condition.

Switching

Most of the lighting in spaces is controlled by local wall switches, with some occupancy sensors.

Lighting - Deficiencies as it relates to current Codes:

- The current building switching does not meet the International Energy Conservation Code
- Automatic shutoff of lighting fixtures is required

- Daylight harvesting is required in certain spaces as indicated in the International Energy Conservation Code

The switching appears to be original to the building and is in fair condition. As described above, the switching does not meet current Codes.

Receptacles

Receptacles are ground type. Receptacles have been added over the years through the use of EMT conduit with surface boxes, tele-power poles, plugmold, and wiremold. Receptacles appear to be in fair condition.

Lightning Protection

The building does not have a lightning protection system which would include air terminals on the roof with downlead conductors to ground and surge protection.

Bi-directional Amplifier System

The building does not have a bi-directional amplifier system which would include an amplifier and cabling above ceilings for amplifying police and fire alarm radio signals as required by the International Building Code.

Wiring

Wiring is made up of MC cabling, FA MC cabling, EMT, Rigid, and PVC conduit.

Site Analysis

Cleveland Elementary School

Existing Conditions

The F.A. Cleveland Elementary School, herein referred to as the Site, consists of one structure constructed in 1958 with an addition built in 1965. The Site is located at 33 George F. Willett Parkway, in Norwood, MA. The Site is 18.42± acres on Assessors Map 11/ Block 2 / Lot D6 (Appendix B, Existing Conditions F.A. Cleveland Elementary School Feasibility Study). The School currently accommodates approximately 490 students. The Site is accessed via a driveway off George Willet Parkway and a secondary driveway off Nicholas Street. In addition to the school, the Site is furnished with paved parking areas and driveways, playground, and two baseball fields.

The Site is bounded by residential properties to the east and south, George Willett Parkway to the west and Nichols Street to the north. There are residential properties west of George Willet Parkway and north of Nichols Street. The school is buffered from the neighboring properties by thick, deciduous vegetation and the ball fields to the northeast and southeast.

Circulation and Parking

The school is oriented along a north-south axis. The main entry to the school is on the west side of the building accessed via George Willet Parkway and is set back from the road approximately 250 feet (Appendix A, Photo 1). The Site is accessed via one two-way drive off George Willet Parkway and one one-way entrance off Nichols Street. The two-way entrance connects to the main parking lot and a one-way drop off loop in front of the main entrance used for the drop off/ pick up (Photos 2 and 3). Bus parking bays are located south of the loop around the west parking lot and striping is in good condition (Photos 4 and 7). There is a second drop off area accessed via Nichols Street. The service area is accessed from Nichols Street. All sides of the building are accessible to emergency vehicles.

There are two primary parking facilities. There is one parking lot off the main circulation loop on the west side of the building (Photo 4) and one lot on the east side of the building both with standard bay parking (Photo 5). The parking capacity requirement for schools as a “Place of Public Assembly” is one (1) space for every 3 person capacity in according to Section 6.1.3.B of the Zoning Bylaw. Onsite parking is currently inadequate. Aerial imagery shows 32 parking spaces in the west lot and 28 marked parking spaces in the east and north lots. Additional unmarked parking spaces are also in use. Three (3) accessible spaces are required for the existing quantity of designated parking spaces. Two (2) accessible parking spaces are located on the loop near the front doors areas (Photo 6); however, neither parking space is marked as van accessible. The accessible parking spaces have an accessible path of travel to the main building entrance.

There is a crosswalk across George F. Willet Parkway. Circulation is directed by painted

traffic arrows and signs all in good condition (Photo 4). Detectable warning panels are not present at any of the
transition curbs.

Zoning Regulation

According to the "Zoning Map of the Town of Norwood, MA." dated April 28, 2015, the Site is located in an area zoned Single Residence (S2). Educational facilities are allowed within a zone S2 according to the "Town of Norwood Zoning Bylaw" Section 3.1. The Zoning Ordinance indicates the
following dimensional requirements would control the development on this Site:

S2 – Single Residence:
15,000 square feet minimum lot area
125 feet minimum lot frontage
30 feet minimum front yard setback
20* feet minimum side yard setback
35 feet minimum rear yard setback
30 feet maximum building height
25% maximum lot cover**
25% minimum open space**
*15- foot minimum side yard for building portions less than 15 feet in height
**The percentage of lot area covered by structures.
***Lot area not covered by any structure or by paving other than that limited to recreational use.
Currently there is approximately 18% lot cover and 25% open space

Soils

Existing soils were evaluated based on the USDA Natural Resource Conservation Services Web Soil Survey. Below is a description of the soils that are shown throughout the Site as shown on the web soil survey (Appendix C, NRCS Soil Survey). The western portion of the Site currently developed with the school building, parking lots and southern baseball field consists of Udorthents, sandy (Map Unit 653) characterized as having a rapid infiltration rate, and typically more than six feet to a restrictive feature. The eastern portion of the Site including the northern baseball field and undeveloped wooded area primarily consists of Canton-Urban land complex (Map Unit 628C) also characterized as having a rapid infiltration rate. The southwestern corner of the site including a portion of the southern baseball field and undeveloped wooded area consist of Scituate fine sandy loam (Map Unit 315B) characterized as having a very slow infiltration rate. Confirmatory soil borings and test pits for the purpose of stormwater infiltration and building foundations have not been performed.

Topography

The topography of the Site generally pitches to the southeast from elevation 150 at the northeast corner to elevation 115 along the southwest side in the wooded area, although the Site is essentially level. Stormwater flows away from the building in all directions with one exception at the eastern side of the building where there is a low spot that floods in extreme storm events.

Record USGS topographic maps and historical aerials seen in Appendix D and E

(dated 1894 through present day) show Ellis Pond south of the Site, but do not show wetlands in proximity to the site. There do not appear to be topographic changes which indicate that the school and parking areas have been constructed on filled wetlands or a landfill.

Wetlands

After review of the Massachusetts GIS data layers, (MassGIS) there appear to be wetlands along the southwest property line in the undisturbed wooded areas. The wetlands have a 100-foot regulatory buffer zone which extends approximately 40-feet into the southern baseball field and over approximately one third of the service parking area south of the school (see F.A. Cleveland Elementary School Existing Conditions). Any construction in the 100-foot wetland buffer zone is subject to the Massachusetts Wetlands Protection Act. Projects that affect wetlands are required to file and NOI with the EPA and obtain an Order of Conditions with the local Conservation Commission.

After review of the MassGIS certified and potential vernal pools layers, the Site does not appear to have potential or certified vernal pools as defined by the Natural Heritage and Endangered Species Program (NHESP). If it is determined in an environmental review that a vernal pool exists on the Site, the local regulations require a 100-foot No-Disturbance Zone around the upland area edge or the wetland area edge that encompasses the vernal pool.

According to the Flood Insurance Rate Maps available through FEMA (Federal Emergency Management Agency), the Site is entirely outside the flood zone.

Rare Species & Cultural Resources

Information regarding rare species was obtained from the MassGIS Rare Species and Priority Habitat data layer showing data recorded by the NHESP in the State Registry. There is no known NHESP mapped habitat on Site based on available MassGIS data maps.

Utilities

Available utilities on George F. Willet Parkway are currently unconfirmed, although a visible water gate implies that potable water is accessed from the street rather than a well. There is a Sewer Manhole in Nichols Street where the school sewer likely connects into the municipal system.

Roof runoff is directed to downspouts and connected into catch basins located in the parking lot then to the municipal drainage system south of the site in the George F. Willet Parkway. Surface drainage is directed by swales to drain inlets at the south of the Site. The existing drainage system provides
little to no treatment or attenuation of stormwater prior to discharging to the municipal system.

Site lighting is minimal, with surface mounted incandescent floodlights mounted on the building and near doorways. There is no overhead lighting within the parking or play areas.

Currently a low pressure natural gas service is being used for domestic hot water and kitchen equipment.

There are three fire hydrants on George F. Willet Parkway: one at its intersection with Walpole Street, one approximately 350-feet south of the school access drive, and one at the entrance to the school. There are two fire hydrants on Site, one on the drop off loop to the school's front entrance, and one at the one way exit onto Nichols Street.

Athletic Facilities

There are six primary recreational facilities on Site. There are two softball fields with skinned infields. One field is approximately 150-foot at the northeast corner of the site and the other is an an approximately 300-foot field in the south of the site (Photo 9). The outfield of the southern softball field is used as a multipurpose field (Photo 10). The soccer goals are in good condition. The service parking lot is used as a basketball court with a hoop and backstop on the north side. There are also two basketball hoops in the west parking lot along the bus drop off area (Photos 7 and 8). There are two playground areas, one near the front entrance (Photo 13) and one behind the school to the east of the site (Photo 12). The front playground has a slide and other climbing-type play structures. The playground at the back of the building has new play structures set in a bed of mulch. There is a drainage structure in the play area which frequently clogs with mulch. The pavement in the rear of the building is also used as a play area and is painted with hopscotch and foursquare (Photo 11). The grass fields are in fair to good condition.

Landscaping

Shade trees are spotted throughout the site but paved areas receive little or no shade. Plantings along the front are somewhat overgrown and lack cohesion. Lawns are generally in good condition. Bituminous curbs are crumbling or nonexistent in areas. Pavement is in fair to good condition.

Summary

There are no constraints which prohibit this Site from serving as a viable location for a newly constructed school, or an expansion of the existing F.A. Cleveland Elementary School. Design considerations should include a study of existing parking and site circulation in order to determine if improvements are necessary. At minimum, additional accessible spaces should be designated to meet ADA regulations. Design considerations should also include improved infrastructure, including athletic field lighting, and athletic facilities consistent with the school's physical education program and the after school needs. Any increase in impervious area will require stormwater management consistent with onsite soils. Development should include recognition of the wetland resource area and consideration for the buffer zone. We would recommend these considerations be made part of future development options However, we do not believe there are any constraints which preclude this Site from being a viable candidate for future school development.

Recommendations

The following site improvements are recommended for consideration:

- Study of the vehicular circulation (cars, buses, emergency, and deliveries)

to evaluate the effectiveness of the layout and determine improvements. Such improvements will include the restriping of the drives and parking areas. Pedestrian access should be considered at the same time.

• Add additional site and field lighting for safety and security, and consider placing existing wiring underground.

• Investigate site utilities/drainage structures to ascertain their condition and capacities as they relate to current codes and functioning.

• The physical education program and the after-school use of the fields should be evaluated to determine the adequacy of the existing facilities.

• Extend irrigation to all play fields.

Appendix A

Photo 1: Front Entrance

Photo 2: Drop Off Loop

Photo 3: Drop Off Loop

Photo 4: West Parking Lot and Bus Cue

Photo 5: North East Parking Lot

Photo 6: Accessible Parking

Photo 7: Basket Ball Hoop and West Parking Lot

Photo 8: Basket Ball Court and Service Parking

Photo 9: South Base Ball Field

Photo 10: Soccer Field

Photo 11: Paved Play Area

Photo 12: East Playground

Photo 13: West Playground

Architectural Analysis

Oldham Elementary School

The John P. Oldham School is the northernmost and "youngest" of the functioning Norwood elementary schools, constructed in 1962. Two modular classrooms were added in the 1990s. The facility currently houses approximately 220 students in grades first through fifth grades.

Like all of Norwood's elementary schools, Oldham Elementary is a relatively small neighborhood school with a strong level of parent involvement. This is generally a strong formula for a successful elementary school as it allows teachers and administrators to know each of the students well and to create a personalized and welcoming educational environment. The original building layout and design also included a forward-thinking environment that includes many of the organizational strategies that would be incorporated into a modern elementary school. It includes appropriately sized classrooms organized into two academic areas which share access to common core facilities. It also includes significant natural lighting into almost all areas. The entry lobby provides a personalized and welcoming entry experience and is sufficiently sized to handle the flow of student and visitor traffic.

There are advantages and disadvantages of a small 220 pupil school, but research and the evidence from performance of small schools suggests that the advantages far outweigh the disadvantages. The advantages include a small school population where teachers and students all know each other extremely well and can become part of a personalized school environment that provides a true sense of identity and belonging. The disadvantage is that a small school often has to share many resources and cannot expect to have spaces that are solely dedicated to instruction areas such as art, music, and even a library/media center. Ironically, Oldham has the best of both worlds as it is a small school that still includes many of the specialized instruction areas that are generally only found in a larger school environment. In small schools these resources often have to be blended into general academic learning areas, but Oldham has the benefit of having dedicated spaces for most of these programs. Additionally, small schools must have flexible use of dining and fitness areas, without the benefit of a large dedicated gymnasium space or cafeteria, but Oldham has these dedicated spaces also. The Oldham School design locates the cafeteria and gymnasium spaces on a common core circulation spine with relatively easy access from the academic classrooms.

Our primary programmatic recommendation for the Oldham Elementary School would be selective future renovations that modernize the interior environment. The Town is fortunate to have this spacious and well organized elementary facility, and should take all necessary steps to keep it in good condition. The quality of construction at Oldham is lower than some of the other buildings, but investing the funding and maintenance to keep it in good condition will prove valuable to the Norwood Public Schools.

General

Located on a 15.5-acre site, the Oldham building has a compact footprint per its site. The school is surrounded by residential neighborhoods on three sides with an open field to the south and dense tree cover to the east. A new apartment development has since been built to the north of the school. It is a well-maintained facility on the interior and there has been some investment in maintaining the building with projects such as window replacement and the repair of some interior components. Though the maintenance staff has done a great job of keeping Oldham Elementary fully functioning, the age of the building systems requires consideration for addressing the building systems and components that have not been replaced or renovated to date; either in a single comprehensive replacement project or as part of a general understanding that these systems need to be incorporated into a well-funded and strategic maintenance and replacement program over several years.

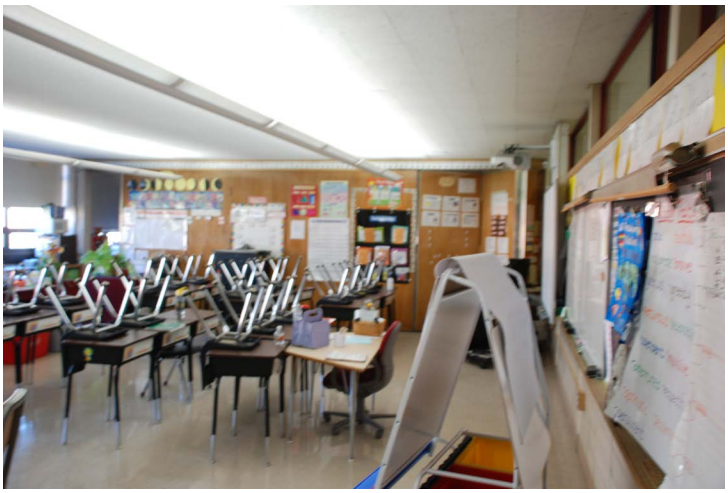
Educational Plan Organization

The Oldham Elementary School is a 39,500 square foot, single-story facility, with a student population of about 220. The physical size and available classrooms suggest that it has the capacity to accommodate the current student population and it includes a significant number of appropriately sized support spaces.

The building style exhibits an architecture of its era. Community type spaces, like the gymnasium, stage, and cafeteria, are located along the main north-south axis. Three classroom wings span off the main axis in a finger plan. Unlike the Prescott or Cleveland Schools, all programs are contained within individual classrooms, without programmed corridor space. The use of double loaded corridors and separate wings is an efficient organization; in addition, natural daylight is received in every classroom. The administration counter is directly in front of the main entry upon arrival. There is adequate parking space around the site, though most parking is located on the western elevation which has no aesthetic appeal.

The current building plan, constituted under an Industrial Revolution model, isolates each classroom and support spaces, with limited flexibility. The current organization of classrooms along the finger plan provides an opportunity for the creation of academic neighborhoods but, instead, these rooms operate as separate entities. The existing classrooms, at an average of 900 square feet, fall in line with the Massachusetts School Building Authority (MSBA) minimum of 900 square feet for elementary school classrooms. They also include significant natural daylighting. All 21st Century school initiatives call for elementary schools with larger, more flexible classrooms and significantly more connectivity between the classrooms and their associated support spaces within the academic neighborhood. These strategies should be considered when evaluating options for future renovation and long-term use of the Oldham Elementary School building.

The site slopes gradually from the north to the south, with a low point at the edge of the play field adjacent to the loop road. There are no curbs along the outer edges of paved areas and water generally flows away from the building into paved swales or to the low point. The building is entirely on one floor; however, some non-compliant handicap ramps are utilized to facilitate accessibility. All classrooms have the option of exiting directly to the outdoors as this was a common practice during the time that the Oldham School was designed, and remains somewhat popular today in the design



Three classroom wings span off of a main axis

of small elementary schools where the desired program involves outdoor learning and fitness opportunities. It does present a small security challenge as technology and administrative policies must be implemented to ensure that unwanted visitors are kept out and students are kept in. The security of entries that are not part of the building's primary entry can pose a security threat, but policy and procedure at the Oldham School manages this threat and the benefits of direct exterior access outweigh the challenges. The School Department has installed a new video entry system at the main entrance vestibule in recent years and has re-organized the lobby space to introduce a critical checkpoint and direct observation of all visitors by staff. As part of future planning, the District may want to consider more exterior cameras for operation of the building's other entries, or perhaps place all exterior doors which are outside of the main entry vestibule on a system which monitors their closed/ open position. This would provide notification to administrators if any point along the building's perimeter has been compromised.

The classroom configuration results in an organization of classroom groups into two academic neighborhoods. The existing building layout provides no common area for student projects, exhibits, or cross-discipline instruction directly adjacent to the classrooms; however, as previously mentioned, the building floor plan does allow for a number of support program spaces.

The student dining area is located on the main level of the building. It includes a small stage on the south end, but lacks the flexibility often incorporated into a modern student dining, socialization, and learning area. It was designed as a 1960s model for student dining which assumed students would sit in rows along linear tables and eat in shifts. Today, the modern cafeteria serves many purposes for students and staff and is designed as a flexible space which provides all-day usage for exhibit, presentation, projects, and student socialization. Modernization of the current cafeteria for increased flexibility should be considered as part of any future planning for the building. There is no auditorium at Oldham Elementary as the small stage in the cafeteria functions as the available performance space in the building. This is not uncommon, even by today's standards, but several improvements could be made to enhance its use for student presentation and performance.

The Library/Media Center is located to the right of the main entry. It is appropriately sized but would ideally be more closely integrated with the academic environment and other specialized instructional areas that it might serve. The function of a

media center has changed dramatically since the days of a "Library" with numerous volumes of books. The modern media center focuses students more on digital media, video production, and broadcasting, and provides young learners an opportunity to utilize their electronic savvy to develop projects and presentations through hands-on development. The current media center lacks many of the amenities necessary for these activities and should be reviewed as part of renovation considerations and future educational planning and programming. Overall, there is limited space within the building devoted to media and video applications, though the school has devoted one wall within the library for computer usage, and one modular classroom for use as a computer lab. A modern elementary school environment would include sufficiently sized classrooms and wireless computer access such that every classroom becomes a lab, rendering the use of dedicated computer labs as obsolete. However, these spaces tend to make excellent video production or broadcasting studios, which do require fixed amenities and equipment.

Exterior Envelope
(Foundation, Walls, Roof, Windows, and Doors)

Foundation
The school is constructed on a concrete slab. Where the slab edge is exposed, reddish-brown spots are visible. This could be evidence of failing reinforcement due to a lack of concrete cover. (Refer to structural evaluation for additional information.)

Walls
The exterior envelope (exterior masonry wall construction) of the building is a 54-year-old envelope. The envelope consists of face brick with masonry back-up support. Due to the change in grade between the three wings, exposed foundation walls are obvious where grade meets the building above the floor level. Ceramic tile has been directly applied to the higher foundation walls; these tiles have since been painted. Exterior walls are regimented by a recent window replacement project, which uses brick masonry to raise the windowsills. Except for the addition of the brick windowsills, the building masonry façade remains virtually unchanged since the original construction. The plaster canopies at the front of the school are in disrepair. The original construction blueprints indicate that the building exterior wall has a modest cavity for drainage of water absorbed by the brick. The face brick shows some signs of efflorescence, the appearance of a whitish deposit locally or uniformly over the brick exterior, the surface deposition of soluble salts. There are numerous sources for the soluble salts which create the hazy appearance; salts can originate from mortar, improper cleaning agents, rising damp, de-icing salts, chemical landscaping treatments or air pollution. It should be considered a symptom which should be investigated in more detail as part of any proposed renovations in an effort to identify the source of the soluble salts and/or the moisture. Corrective action should then be taken to eliminate both if possible.

The absence of insulation within the exterior building envelope creates an inefficient exterior wall. For the temperate climate of Massachusetts, insulation within the exterior envelope should be at least three inches thick to achieve a suitable R-value. This level of insulation in the exterior wall significantly increases the building's ability to remain warm in the winter, and also helps the building to remain cooler in the late spring, summer, and early fall, creating a more comfortable building environment. Under the current building code, some areas of the uninsulated building envelope might need to be addressed as part of any proposed comprehensive renovation of

Due to the change in grade between the three winds, exposed foundations walls are obvious

the building.

As mentioned, the exterior wall of each classroom includes a continuous band of window panels. A portion of these panels is designed with an intake grille to integrate mechanical ventilation through the precast panel to the inside. The windows reach all the way to the ceiling of each classroom, providing a very effective means of allowing natural daylight to permeate deep into the rooms. This is a significant component in creating an excellent classroom environment.

Roof

The roofing system at Oldham Elementary School has been replaced on multiple occasions, as would be true of any building of this age. The last replacement occurred in 2002 and included a rubber membrane system (EPDM - ethylene propylene diene monomer) over the entire roof area. It does not appear that any insulation has ever been added to the roof system. Though the replacement may be considered a recent capital project, the life expectancy of a rubber membrane roof is approximately 20 years, which means the existing roof will need to be addressed again within the next five to ten years. Any plans for a comprehensive renovation in the future should include complete replacement of the existing roof systems and an analysis of the benefits associated with adding insulation to the roof such that it complies with current energy code requirements. This may require some removal of the existing roofing system (down to the structural deck) in order to expose a substrate which is appropriate for attachment of the new insulation. This removal would also assist in removing prior roofing layers which add unnecessary weight to the roof and lower its snow-load carrying capacity.

Windows

In 1995, the exterior windows of the building were replaced with fixed aluminum windows, including operable hopper windows in some areas. These new windows significantly improved the thermal characteristics of the building and eliminated moisture infiltration that was occurring around the old windows. However, although the 1995 replacement window system represented the respectable industry standards at the time, it is important to note that recent focus on energy conservation has since resulted in the Commonwealth's adoption of significantly higher energy code standards. These standards yielded much higher performing windows and glass within the industry and the potential benefits and requirements for new windows should be evaluated as part of any comprehensive renovation to the current facility. The

window system would likely be almost 20 years old at that time and would certainly not meet new standards. Additionally, improvements required by the energy code continue to evolve, and it's possible that replacement might be a requirement at that time.

Doors

As part of the window replacement project, the exterior doors to the building were also replaced. The doors are constructed of metal, and have vision panels inserted within metal frames. Overall the door systems remain in good condition.

Interior

(Floors, Walls, Doors, and Ceilings)

Floors

There are numerous floor materials throughout the building. These finishes include the following: painted concrete in service spaces, Vinyl Composition Tile in the main corridor and cafeteria, and Vinyl Asbestos Tile (VAT) in the classrooms and their corridors. The library and the modular classrooms are carpeted. The floors in the kitchen and all toilet rooms are ceramic tile without a base.

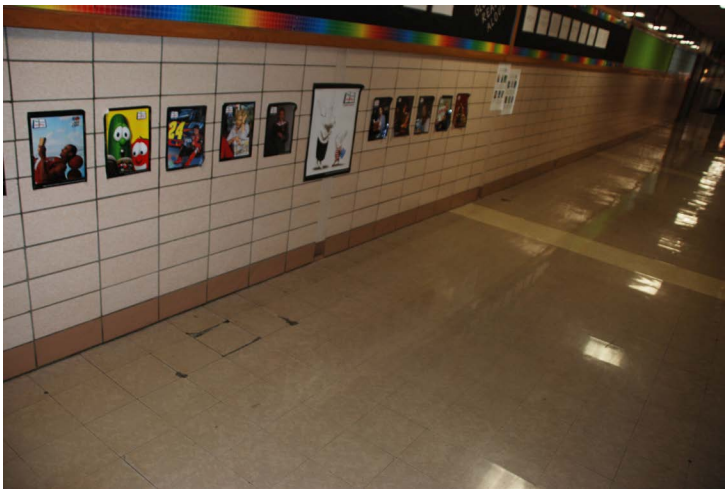
Although the vinyl asbestos tile (VAT) is non-friable and poses no threat to the students or staff, most school systems have developed schedules for periodic removal and replacement of such finishes over time, with the ultimate goal of full abatement of asbestos containing materials. Areas within the building that still contain some asbestos materials, like the classrooms, should be considered as part of any future renovation plans. The joints between dissimilar flooring materials, including ceramic tile in toilet rooms, often vary significantly in height resulting in abrupt flooring transitions. These abrupt transitions create handicap accessibility challenges and will need to be addressed as part of any future renovations.

The wood flooring in the gymnasium visually appears to be in fair condition, showing signs of wear as a result of its many years of service. The system has likely been sanded many times, reducing its overall thickness and strength. Many of these older gym wood flooring systems had a limited number of wood sleepers (support members) underneath and relied heavily on the integrity of the finished tongue-and-groove wood flooring. The current system has exceeded its intended life expectancy and should be further reviewed as part of any future renovations.

Walls

The corridor interior walls are painted concrete masonry units (CMU) in a stacked bond, exposed brick, or structural glazed facing tile. Classroom walls are also painted CMU with no sound absorbing panels. Given the age of the building, the walls are in good condition. However, there is evidence of moisture infiltration, which should be further explored to determine its extents. Numerous retrofitted systems had to be installed in exposed conduit and piping as opportunities to conceal these systems within the existing walls were limited. Exposed systems include wiring for fire alarms, power, light switches, and smart boards. These systems would typically be fully encased within the walls.

There are no lockers or storage units outside of the classrooms, resulting in storage congestion within classrooms which are already filled.



The Vinyl Asbestos Tile (VAT) throughout the corridors is a hazardous material that will cause harm upon degradation

The walls in the gymnasium are painted CMU with no bleachers. The short side of the space is entirely covered with wood paneling. There is little material for absorbing or reflecting sound in the space. The west wall has clerestory windows across its full length.

Doors

The interior wood doors with hollow metal frames throughout the school are original. Most classroom doors have vision panels and a transom above. Though the metal frames are durable and regularly painted, the original hollow wood doors do not provide good acoustical separation between the classroom and corridor under current construction standards. Solid core doors would decrease sound transmission and increase safety plus durability. Although the glass found in the corridors represents typical standards (wired glass) at the time it was installed, modern codes, regulations, and standards would require that this glass be fire rated and provide a greater degree of fire separation between the classroom and the exit corridor.

Most of the original door hardware appears to have been replaced over time. However, as regulations have continued to evolve over the recent past, much of the door hardware remains non-compliant and is further discussed in the handicap accessibility portion of this report.

Ceilings

The ceilings in the gymnasium and cafeteria are a Tectum panel above an exposed steel roof structure with a painted finish. Classroom ceilings are either the original plaster suspended below a small mechanical passage, a 2x2 lay-in style acoustic ceiling tile (ACT) system with grid, or asbestos ceiling tile. The corridors are ACT. Acoustical ceiling or wall treatments would better enhance the sound quality of these learning environments. Any upgrades to the building's mechanical, electrical, plumbing, or installation of a fire suppression system will require that the 2x2 lay-in ceilings be removed and replaced and will also likely require new lay-in ceiling with grid in all areas that do not currently have such.

Energy Conservation

The Oldham Elementary School was constructed in 1962, before the historic energy shortages of the 1970s and escalating oil prices of 2005. The emergence of a new energy code in 2000, which promoted an increased knowledge of exterior building

envelope construction techniques and materials, has dramatically changed the way in which buildings are designed to deal with energy efficiency issues. Massachusetts State Building Codes 3407.1 and 3407.2 require that alterations of an existing building in which the use group is not changed must comply to the energy conservation values detailed in Table 3407 of the code for any building elements (walls, windows, doors, roofs, or mechanical systems) which are altered during renovation.

Environmental Quality

In the past fifteen years, there have been tremendous advancements in the understanding of the various environmental factors that influence building occupants. These factors have been proven to be extremely important in the school buildings where students may spend most of their day in a single 600-800 sq. ft. classroom. Factors such as natural lighting, quality artificial lighting, fresh air ventilation levels, evenly distributed heating and cooling temperatures, and acoustical performance all work to enhance the educational environment. The Oldham Elementary School classrooms include limited implementation of these key factors. Though natural light is present in many of the upper story classrooms, they are undersized and not air conditioned.

Educational, Spatial and Organizational Capacity

Capacity at an elementary school can be calculated in several ways, including multiplying the number of available general classrooms and support areas by the appropriate number of students in each classroom. Oldham Elementary School has a current capacity of approximately 220 students, including the necessary support programs and spaces. Dividing the total building square footage by the student population provides an approximate amount of square feet being provided for each student, which is another benchmark for determining the general student capacity of the building.

Our analysis of the current Oldham Elementary School suggests that the building should receive strategic renovations and improvements in the future in order to maintain its continued existence and service. Its efficient floor plan configuration results in a very functional organization that provides sufficient space in most program areas.

In addition, the following conditions exist:

Main Office/Entrance
Administration is primarily the front desk, the Principal's office, and a small conference room. As mentioned previously within this report, the administration counter is easily located across from the main entrance but currently has no direct supervision (other than a single video monitor) of visitors who approach and enter the building. If a visitor parks in the west parking lot and gains entry through an open cafeteria or gym door, then he/she can access the rest of the school without any direct visual observation by the staff, including access to student-filled classrooms and hallways.

Nurse's Suite
The nurse's suite is part of the administration area but is undersized and inadequate for medical exam and resting space.

Library Media Center
The library is immediate to the main entrance. It is well-organized but lacks many of the modern amenities associated with a 21st Century education resource.

Classroooms
The size, configuration, organization, environmental quality, and instructional amenities within the classroom are critical to successful teaching and learning. All classrooms have wi-fi and smart boards, and also have significant natural daylighting. They have also received recent upgrades to indirect/direct pendant light fixtures that provide an excellent source of artificial light. They are reasonably sized, although their size is on the lower end of acceptable educational standards. Overall, these classrooms provide a very good academic environment and could be made even better through a few thoughtful renovations.

Special Education
The current Special Education Program is slightly undersized and is utilizing converted space for instructional, tutorial, and testing areas. These programs should be reviewed as part of any planned renovations as some minor configuration might greatly enhance the size and location of these support areas.

Science Classrooms
There are no classrooms or labs devoted to the teaching of science exclusively. This is not necessarily unusual in an elementary school, but consideration should be made for providing more support amenities in the classrooms to enhance science instruction to elementary school students.

Art Classrooms
Art has a dedicated classroom located at the end of the center wing.

Music Classroom
Music has a dedicated classroom located at the end of the south wing.

Teacher and Group Planning Collaboration Areas
Space for teacher planning and collaboration is limited to one small room accessed through the custodial hall. There is no integration of planning or collaboration space throughout the school and no space devoted to faculty dining or services. Spaces to accommodate teacher socialization can ultimately contribute to the improvement of the school's educational philosophy through the sharing of ideas, as previously detailed in this report.

Kitchen
The kitchen at the school only serves as a warming kitchen for food that is prepared elsewhere and delivered.

Receiving And Storage
Proximity of the loading dock to the custodial suite and kitchen is convenient but storage space is limited.

Recent Capital Improvements

Roof
The roof was completely replaced in 2002 and is currently EPDM. In 2009, snow

guards were added and gutters were replaced.

Interiors
In 2012, lighting in the classrooms, library, cafeteria, and gymnasium were replaced, as were the main corridor lights in 2013. Outside lighting was replaced with LED bulbs in 2016.

Windows
Complete window and exterior door replacement occurred in 1995.

HVAC
Replacement of HVAC in one modular classroom in 2015.

Security
Surveillance cameras were added in 2008.
Card access systems were added in 2013.

Massachusetts State Building Code:
780 CMR and Life Safety Issues

The Massachusetts State Building Code (780 CMR) has been updated and amended several times since the construction of the building. The State Board of Building Regulations and Standards regularly updates and amends its regulations. Based on these regulations, the following items were found to be in non-compliance:

- Two means of egress from spaces having an occupant load of greater than 50.
- Fire extinguishers
- Fire separation assembly between Use Group E (Educational) and Use Group A-3 (Assembly – Cafeteria, Gymnasium) (one hour fire separation required).

Handicap Accessibility

Requirements for handicap accessibility in building planning and design were non-existent when this building was originally designed. However, on January 26, 1992, the Department of Justice implemented Title III of the Americans with Disabilities Act (ADA) into Public Law. This legislation "prohibits discrimination on the basis of disability by private entities in places of public accommodation." The legislation requires all new places of public accommodation, including schools, to be readily accessible to and usable by persons with disabilities upon design and construction. Existing structures being renovated that exceed 30% of the equitized assessment of the building or its replacement value must fully comply with the regulations for new construction. Additionally, on September 1, 1996, the Commonwealth of Massachusetts developed its own accessibility regulations: 521 CMR Architectural Access Board (AAB), which in some instances is more restrictive than ADA guidelines. The ADA and AAB regularly update and amend their regulations. Based on these regulations, the following items were found to be in non-compliance or not accessible to the disabled:

- All doors leading to all rooms in the school including classrooms, gymnasium, library, administration, etc. Non-conforming knob-type hardware currently exists. Lever handles are required.
- The school is handicap accessible. Handicap parking is not near the front

entrance, though.
- All entries into classrooms require clear floor space adjacent to latch side of the door for entry and exit.
- Check-in counter at Administration Office.
- Lack of proper interior building signage (braille).
- Toilet and shower rooms
- Water fountains
- Library Circulation Desk
- Alarms and strobes within classrooms.
- Access to stage from main floor within Cafeteria.

Each of the inaccessible features listed above has an impact on the ability of disabled students or members of the community to access various spaces throughout the school independently. Disabled persons may include students with a permanent handicap condition, students that are temporarily disabled from athletic activity, and parents, staff, or other visitors that could have any form of disability. Any future plans should incorporate as many items as possible to accommodate disabled people to the fullest extent possible.

Proposed Space Summary- Elementary School

Oldham Elementary School	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**11,661**			**0**			**0**			**0**		**9**	**9,050**	
(List classrooms of different sizes separately)																
Pre-Kindergarten w/ toilet													1,200		-	1,100 SF min - 1,300 SF max
Kindergarten w/ toilet			0										1,200	2	2,400	1,100 SF min - 1,300 SF max
General Classrooms - Grade 1-6			0										950	7	6,650	900 SF min - 1,000 SF max
Grade 1 Classroom	965	3	2,895													
Grade 2 Classroom	960	2	1,920													
Grade 3 Classroom	974	3	2,922													
Grade 4 Classroom	978	2	1,956													
Grade 5 Classroom	968	1	968													
Grade 5 Classroom (Modular)	1,000	1	1,000													
SPECIAL EDUCATION			**2,731**			**0**			**0**			**0**			**3,020**	
(List rooms of different sizes separately)																
Self-Contained SPED			0										950	2	1,900	8% of pop. in self-contained SPED
Self-Contained SPED - toilet			0										60	2	120	
Resource Room			0										500	1	500	1/2 size Genl. Clrm.
Small Group Room / Reading			0										500	1	500	1/2 size Genl. Clrm.
SPED Pull-Out	1,217	1	1,217													
SPED Learning Center	310	1	310													
SPED Conf. / Psych.	265	1	265													
Reading Specialist	939	1	939													
			0													
ART & MUSIC			**3,166**			**0**			**0**			**0**			**2,425**	
Art Classroom - 25 seats	974	1	974										1,000	1	1,000	assumed schedule 2 times / week / student
Art Workroom w/ Storage & kiln			0										150	1	150	
Music Classroom / Large Group - 25-50 seats	1,238	1	1,238										1,200	1	1,200	assumed schedule 2 times / week / student
Music Practice / Ensemble			0										75	1	75	
Music Classroom	954	1	954													
HEALTH & PHYSICAL EDUCATION			**2,396**			**0**			**0**			**0**			**6,300**	
Gymnasium	2,396	1	2,396										6,000	1	6,000	6000 SF Min. Size
Gym Storeroom			0										150	1	150	
Health Instructor's Office w/ Shower & Toilet			0										150	1	150	
MEDIA CENTER			**994**			**0**			**0**			**0**			**2,020**	
Media Center / Reading Room	994	1	994										2,020	1	2,020	
DINING & FOOD SERVICE			**4,093**			**0**			**0**			**0**			**4,635**	
Cafeteria / Dining	2,040	1	2,040										1,635	1	1,635	2 seatings - 15SF per seat
Stage	751	1	751										1,000	1	1,000	
Chair / Table / Equipment Storage			0										200	1	200	
Kitchen	894	1	894										1,600	1	1,600	1600 SF for first 300 + 1 SF/student Add'l
Staff Lunch Room	408	1	408										200	1	200	20 SF/Occupant
MEDICAL			**244**			**0**			**0**			**0**			**410**	
Medical Suite Toilet			0										60	1	60	
Nurses' Office / Waiting Room	244	1	244										250	1	250	
Examination Room / Resting			0										100	1	100	
ADMINISTRATION & GUIDANCE			**844**			**0**			**0**			**0**			**2,015**	
General Office / Waiting Room / Toilet			0										300	1	300	
Teachers' Mail and Time Room			0										100	1	100	
Duplicating Room			0										150	1	150	
Records Room			0										110	1	110	
Principal's Office w/ Conference Area	115	1	115										375	1	375	
Principal's Secretary / Waiting			0										125	1	125	
Assistant Principal's Office			0										120	0	-	

Space Summary

Oldham Elementary School

Supervisory / Spare Office			0										120	1	120	
Conference Room	154	1	154										250	1	250	
Guidance Office	265	1	265										150	1	150	
Guidance Storeroom	310	1	310										35	1	35	
Teachers' Work Room			0										300	1	300	
CUSTODIAL & MAINTENANCE			**0**			**0**			**0**			**0**			**1,900**	
Custodian's Office			0										150	1	150	
Custodian's Workshop			0										375	1	375	
Custodian's Storage			0										375	1	375	
Recycling Room / Trash			0										400	1	400	
Receiving and General Supply			0										200	1	200	
Storeroom			0										200	1	200	
Network / Telecom Room													200	1	200	
OTHER			**4,119**			**0**			**0**			**0**			**0**	
Other *(specify)*																
Lobby	1,322	1	1,322													
Boiler	767	1	767													
Vault	126	1	126													
Incinerator	191	1	191													
Storage	394	1	394													
Storage	385	1	385													
Computer Lab (Modular)	934	1	934													
Total Building Net Floor Area (NFA)			**30,248**			**0**			**0**			**0**			**31,775**	
Proposed Student Capacity / Enrollment			218												**218**	
Total Building Gross Floor Area (GFA)[2]			41,745												**39,240**	
Grossing factor (GFA/NFA)			**1.38**									**#DIV/0!**			**1.23**	

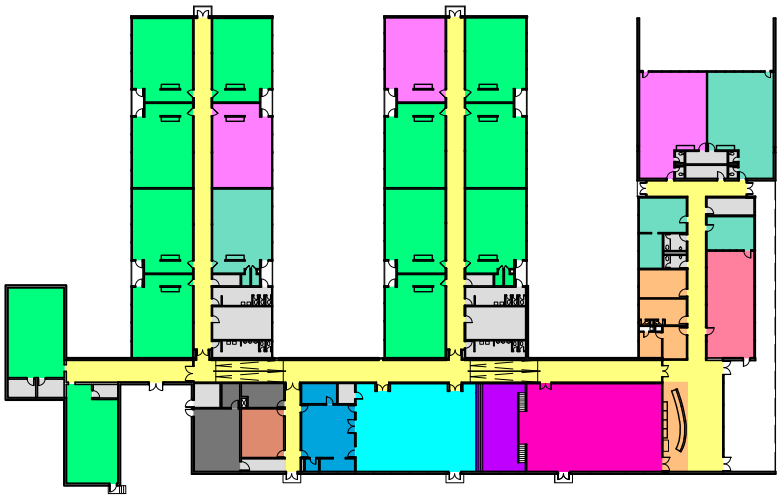
[1] **Individual Room Net Floor Area (NFA)** Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

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

Oldham Elementary School

- 218 students
- 39,500 square feet

media center
physical education
music & arts
auditorium or stage
kitchen & servery
student dining
special eduation
general classroom
circulation
administration/services
staff planning & support
custodial/toilets
building equipment



first floor

Structural Analysis

Oldham Elementary School

This report is based on a review of the available drawings of the original construction prepared by Stoner Associates, Architects, and a visit to the site on November 8, 2016.

Existing Conditions

The John P. Oldham Elementary School is essentially a single story structure with a Gymnasium, Library, and Cafetorium. The original school was constructed in 1962. The structure is performing well for the most part. The Gymnasium roof construction consists of kinked structural steel beams framing wall to wall. The roof is pitched in the shape of a gable roof.

We did not observe any excessive vibration due to foot fall on the concrete slab on grade.

We did not observe any signs of excessive foundation settlement or significant distress in the structure. We observed light cracking in various locations of the masonry construction.

We observed square painted steel columns on the exterior of the building and noted light rust staining at the bases of the columns.

We observed the exterior red brick façade and noted light deterioration to the joints.

We observed staining on the brick façade. We observed control joints and noted dry deteriorating joint material.

We observed visible portions of the cast in place concrete foundations from the exterior of the building and noted moderate cracks and spalled concrete. In various locations, we observed exposed foundation drain construction.

At the rear of the building, we observed modular classroom buildings. We did not observe foundations supporting wood posts at the wood-framed stair at the modular classroom buildings. We did not observe metal connectors at the wood-framed stair landing.

We observed a lean-to wood structure on the rear of the building. The structure is supported off of the building veneer and we did not observe a positive anchorage of the sheathing to the supporting structure. This appears to be a temporary structure intended to shield utilities from the elements.

The first floor structure consists of a concrete slab on grade and we observed one moderate crack in the slab.

Structural Analysis

Oldham Elementary School

Fire Protection

Currently there is no Fire Protection system in the building.

Plumbing

Sanitary
The existing system is cast iron hub piping, the piping has deteriorated is in some places, and has been replaced with new hub-less piping, the overall system is in working condition.

Water Heaters
In the Oldham Elementary school there is (1) Ruud 50 Gallon Gas Water Heater (2014) that feeds the school, and It is in working condition.

Plumbing Fixtures
Currently all the fixtures are aged, and most do not meet ADA requirement, and will need to be replaced, but are in working condition. The water fountains do not meet ADA requirements. The kitchen contains (1) floor mounted grease trap. Grease trap is functional, however it may require future replacement.

Recommendations
- Replacement of plumbing fixtures to comply with ADA, and low flow due to age
- Gas supply for kitchen equipment requires emergency shut off
- Depending on the renovations, a larger water heater maybe need to meet the new demand

HVAC

The Oldham Elementary School is heated by hot water produced by two (2) dual fuel, sectional cast iron boilers. Each boiler utilizes natural gas or no. 2 heating oil as its fuel source.

Boilers
The boilers were manufactured by Weil-McLain, model 88. These boilers have an output of 1,632 MBH each. The boilers are fitted with burners manufactured by Industrial Combustion. The boilers are in good condition and are fully operational.

Heating oil is stored in underground, double-wall fiberglass tanks, monitored by a code compliant leak detection system. Heating oil is supplied to the boiler burners through a duplex pump set, which appears to be in good condition and fully operational.

Hot Water Circulation Pumps

Hot water is circulated throughout the school by a pair of base mounted end suction pumps. Both pumps are operational. One pump appears to be in poor condition while the other pump appears to have been replaced sometime within the last few years. The pumps are located under a grated catwalk, which hinders maintenance.

Duplex Air Compressor for ATC

The control system for this school is pneumatic with compressed air being produced by a duplex air compressor as manufactured by Quincy. The air compressor is in good condition and appears to have been installed within the last five (5) years.

Unit Ventilators

The classrooms are furnished with classroom unit ventilators outfitted with hot water heating coils. The unit ventilators provide the classrooms with heat and ventilation. The unit ventilators are original vintage and although they are still operational, they have outlived their useful service life.

The gymnasium is heated by a combination of four (4) unit ventilators, a horizontal unit ventilator and fintube radiation.

Heat and ventilation for the cafetorium is provided by unit ventilators. Additional heat is provided by fintube radiation installed high along the exterior wall.

Recommendations

- The main heating plant is in good condition and should be capable of providing reliable operation for at least another five to ten years provided proper maintenance is continued.
- However, the other components of the HVAC system such as the classroom unit ventilators have outlived their useful service life and are due for replacement.

Electrical

Electric Service

The primary electric service originates from electric utility co. pole mounted transformers on an electric utility co. pole. The electric service enters the building via underground conduit/cabling. The electric service appears to be original to the building and appears to be in poor condition.

Normal Power System

The main disconnect switch is fed by the electric utility co. pole mounted transformers. The main disconnect switch rating is not indicated, however it is assumed to be rated at 400 amps, 120/208 volt, three phase, four wire. It feeds panelboards located in the Main Electric Room as well as panelboards throughout the building. The normal power distribution is a mix of panelboards manufactured by Federal Pacific and Square D. The normal power system appears to be original to the building and appears to be in poor condition.

Emergency Power System

The building does not have an emergency generator.

Emergency lighting consists of emergency battery units with integral light heads,

remote emergency light heads (mix of single and dual heads), and exit signs with integral batteries.

Emergency System - Deficiencies as it relates to current Codes:

- Inadequate interior emergency lighting coverage
- Some exit signs are made of paper with word EXIT on them
- Some remote emergency light heads are single head; dual heads are required
- No emergency lighting outside egress doors

The emergency lighting appears to be original to the building and is in poor condition. As described above, the emergency lighting does not meet current Codes.

Fire Alarm

The addressable fire alarm control panel as manufactured by Fire Lite Alarms series MS-9200 does not appear to be original to the building. The fire alarm system consists of an exterior municipal master box, smoke detectors, heat detectors, duct smoke detectors, pull stations, strobes, and horn/strobes.

Fire Alarm - Deficiencies as it relates to current Codes:

- Inadequate detector coverage
- Points of egress without pull stations
- Pull stations not at ADA heights
- Inadequate strobe coverage as required by ADA in Conference rooms, Toilet rooms, and Assembly spaces including Classrooms
- Notification appliances are horns; Speakers are required to provide voice evacuation throughout the building
- Most of the interior Corridor doors are pried open and do not have magnetic door holders

The fire alarm system appears to be in fair condition. As described above, the fire alarm system does not meet current Codes.

Lighting

Interior

The interior lighting consists of surface mounted, pendant, recessed, and fluorescent downlights. Exit signs provide for direction to paths of egress. Lighting is not the most efficient as it relates to current standards. The interior lighting appears to be in fair condition.

Exterior

Lighting consists of wall packs, wall mounted floodlights, and site lighting on poles. Some of the lighting fixtures are original to the building with high intensity discharge lamps, while some of the lighting fixtures have been replaced with LED type. Most of the exterior lighting appears to be in good condition.

Switching

Most of the lighting in spaces is controlled by local wall switches, with some occupancy sensors.

Lighting - Deficiencies as it relates to current Codes:

- The current building switching does not meet the International Energy

Conservation Code
• Automatic shutoff of lighting fixtures is required
• Daylight harvesting is required in certain spaces as indicated in the International Energy Conservation Code

The switching appears to be original to the building and is in fair condition. As described above, the switching does not meet current Codes.

Receptacles
Receptacles are ground type. Receptacles have been added over the years through the use of EMT conduit with surface boxes, tele-power poles, plugmold, and wiremold. Receptacles appear to be in fair condition.

Lightning Protection
The building does not have a lightning protection system which would include air terminals on the roof with downlead conductors to ground and surge protection.

Bi-directional Amplifier System
The building does not have a bi-directional amplifier system which would include an amplifier and cabling above ceilings for amplifying police and fire alarm radio signals as required by the International Building Code.

Wiring
Wiring is made up of MC cabling, FA MC cabling, EMT, Rigid, and PVC conduit.

Site Analysis

Oldham Elementary School

Existing Conditions

The Oldham Elementary School, herein referred to as the Site, consists of one structure constructed in 1962 with additions built in 1990 and 1993. A portable classroom has been added to the rear. The Site is located at 165 Prospect Street, in Norwood, MA. The Site is 15.56± acres on Assessors Map 14 / Block 4 / Lot 2 (Appendix B, Existing Conditions Oldham Elementary School Feasibility Study). The Site currently accommodates approximately 390 students. The Site is accessed via a driveway off Alpine Road with a secondary exit off Pine Street. The Site is furnished with paved parking areas and driveways, playgrounds, paved surfaces with painted courts for games such as basketball and foursquare, a diamond athletic fields for softball and baseball, and an unmarked grass athletic field.

The Site is bounded by residential properties to the east and west, Prospect Street to the south, and a residential development to the north. There are residential properties south of Prospect Street. The school is buffered from the neighboring properties by thick, deciduous vegetation and the athletic fields to the south.

Circulation and Parking

The school is oriented along a northwest-southeast axis. The main entry to the building faces Alpine Road and is set back less than 50 feet (Appendix A, Photo 1). Site traffic is circulated through two single one-way loops in front of the main entrance. The larger loop is used for both buses and parent drop off. There is also a smaller inside loop which appears to be for parent drop off (Photo 2). There is a one way exit onto Pine Street at the back of the parking lot north west of the building (Photo 3). This access road is closed to automobiles during the times students are arriving. There is a service area at the back of the parking lot near the northwest corner of the building. This area becomes inaccessible when the parking lot is full. There is emergency vehicle access to the east, south, and west sides of the building, but no access to the north side of the building.

There are two primary parking facilities. The main circulation loop on the south side of the building has parking around the south side of the loop (Photo 4), and there is an attached parking lot on the west side of the building (Photo 5). The parking capacity requirement for schools as a “Place of Public Assembly” is one (1) space for every 3 person capacity in according to Section 6.1.3.B of the Zoning Bylaw. Aerial imagery shows 74 marked parking spaces throughout the site. Three (3) accessible spaces are required for the existing quantity of designated parking spaces, one (1) of which to be designated as van accessible. Two (2) accessible spaces are located at the front entrance (Photo 1); however, neither is marked as van accessible. Both accessible parking spaces have an accessible path of travel to the building main entrance.

There are two crosswalks on the drop off loop south of the building (Photos 2 and

4). These crosswalks do not connect to pedestrian walks. There is also a painted pedestrian lane in the Pine Street connector road (Photo 3). Most students enter the site from a public path that connects to the Pine Street access road. Signs and pavement markings direct all vehicular traffic flow and are in good condition (Photo 2). Detectable warning panels are not present at any of the transition curbs.

Zoning Regulation

According to the "Zoning Map of the Town of Norwood, MA." dated April 28, 2015, the Site is located in an area zoned Single Residence 2 (S2). Educational facilities are allowed within a zone S2 according to the "Town of Norwood Zoning Bylaw" Section 3.1. The Zoning Ordinance indicates the following dimensional requirements would control the development on this Site:

S2 – Single Residence 2:
- 15,000 square feet minimum lot area
- 125 feet minimum lot frontage
- 30 feet minimum front yard setback
- 20 feet minimum side yard setback
- 35 feet minimum rear yard setback
- 30 feet maximum building height
- 25% maximum lot cover*
- 25% minimum open space**

*The percentage of lot area covered by structures.

**Lot area not covered by any structure or by paving other than that limited to recreational use.

Currently there is approximately 7% lot cover and 76% open space

Soils

Existing soils were evaluated based on the USDA Natural Resource Conservation Services Web Soil Survey. Below is a description of the soils that are shown throughout the Site as shown on the web soil survey (Appendix C, NRCS Soil Survey). The southern portion of the site, currently developed with the baseball and soccer fields, and the drop off loop is Udorthents, loamy (Map Unit 654) characterized as having a rapid infiltration rate. The northern portion of the site developed with the school and north parking lot is unrated Urban land (Map Unit 602). The undeveloped wooded are along the north east property line is unrated Charlton-Hollis-Urban land complex (Map Unit 630C). Confirmatory soil borings and test pits for the purpose of stormwater infiltration and building foundations have not been performed.

Topography

The topography of the Site generally pitches north to south from elevation 190 at the north property line toward the wetlands along the west property line at elevation 165 at the south east corner of the Site.

Record USGS topographic maps and historical aerials seen in Appendix D and E (dated 1894 through present day) show a stream running east to west through the site. Topographic maps appear to indicate the school and parking areas have been constructed on a filled wetland.

Wetlands

After review of the Massachusetts GIS data layers, (MassGIS), there do not appear to be wetlands within 100-feet of the property. After review of the MassGIS certified and potential vernal pools layers, the Site does not appear to have potential or certified vernal pools as defined by the Natural Heritage and Endangered Species Program (NHESP). If it is determined in an environmental review that a vernal pool exists on the Site, the local regulations require a 100-foot No-Disturbance Zone around the upland area edge or the wetland area edge that encompasses the vernal pool.

According to the Flood Insurance Rate Maps available through FEMA (Federal Emergency Management Agency), the entire site is outside a 0.2% annual chance of flooding.

Rare Species & Cultural Resources

Information regarding rare species was obtained from the MassGIS Rare Species and Priority Habitat data layer showing data recorded by the NHESP in the State Registry. There is no known NHESP mapped habitat on Site based on available MassGIS data maps.

Utilities

Available utilities on Alpine Parkway and Prospect Street are currently unconfirmed, although visible water gates in Alpine Road and in Prospect Street imply that potable water is accessed from the street rather than a well. There are several drain manholes on site and in Alpine Road and Prospect Street which implies stormwater overflows into the municipal system. There are also several sewer manholes in Alpine Road and in Prospect Street which imply that the sewer connects into the municipal system.

Currently a low pressure natural gas service is being used for domestic hot water and kitchen equipment.

Roof runoff is collected by downspouts and is directed to catch basins in the parking lots. Stormwater is collected in the parking lots by a series of catch basins and directed to the municipal system in Springvale Road. There is a swale along the north side of the drop off loop which directs water to a catch basin which connects into the municipal system (Photo 6). The existing drainage system provides little to no treatment or attenuation of stormwater prior to discharging.

There is overhead lighting along alpine road from its intersection with Springvale Road Site to the beginning of the circulation loop. The only other site lighting is two flood lights at the front entrance.

Athletic Facilities

The Site contains a baseball field and an open grass field used for soccer (Photos 7 and 8). The baseball facility is in good condition. The backstop and chain link fence appear to be new. The soccer field is in fair condition, but has poor drainage. The grass overall is in fair condition. There are two playground areas set within a fiber mulch bed edged with timbers (Photos 9 and 10). Play area equipment is minimal with only a few minor structures present. There is also a small basketball court and a paved play area.

Landscaping

The Site has shade trees at the perimeter, but little landscaping throughout. There are low plantings at the south east side of the building. Curbs and pavement are in poor condition, with signs of wear including surface cracks, patches, and low points on the drives and sidewalks.

Summary

There are no constraints which prohibit this Site from serving as a viable location for a newly constructed school or an expansion of the existing Oldham Elementary School. Design considerations should review circulation and parking as necessary to meet zoning and accessibility regulations. Design considerations should also include improved infrastructure, including lighting for improved site safety and increase use off athletic facilities. Any increase in impervious area will require stormwater management consistent with onsite soils. We would recommend these considerations be made part of future development options. However, we do not believe there are any constraints which preclude this Site from being a viable candidate for future school development.

Recommendations

The following Site improvements are recommended for consideration:

- Study of the vehicular circulation (cars, buses, emergency, and deliveries) to evaluate the effectiveness of the layout and determine improvements. Such improvements will include the restriping of the drives and parking areas. Pedestrian access should be considered at the same time.
- Add additional site lighting for safety and security, and consider placing existing wiring underground.
- Investigate site utilities/drainage structures to ascertain their condition and capacities as they relate to current codes and functioning.
- Extend irrigation to all play fields.
- Replace rusted chain link fencing and backstops. Other site improvements (benches, tables, bike racks, signage, etc.) should be considered.
- Prepare a topographic survey for the site to permit an analysis of the grading of the site.
- Enhancing the appearance of the school grounds by additional landscaping.

Appendix A

Photo 1: Front Entrance and Accessible Parking

Photo 2: Drop Off Loop

Photo 3: Front Concrete Walk

Photo 4: South Loop Parking

Photo 5: Northwest Parking Lot

Photo 6: Drainage Swale

Photo 7: Soccer Field

Photo 8: Baseball Field

Photo 9: Playground Equipment and Paved Play Area

Photo 10: Paved Play Area

Architectural Analysis

Prescott Elementary School

The Charles J. Prescott Elementary School is one of two elementary schools built in Norwood in 1958. The facility currently houses first through fifth grades. The twin school to the Prescott School is the Cleveland School; however, one major difference is the Cleveland received a significant eight classroom addition in 1965 in order to accommodate rapid growth of its neighborhood. The Prescott School did not receive an addition and remains in its original configuration. The school includes approximately 260 pupils in grades 1 through 5.

Like all of Norwood's elementary schools, Prescott Elementary is a relatively small neighborhood school with a strong level of parent involvement. This is generally a strong formula for a successful elementary school as it allows teachers and administrators to know each of the students well and to create a personalized and welcoming educational environment. The original building layout and design also included a forward-thinking environment that includes many of the organizational strategies that would be incorporated into a modern elementary school. It includes appropriately sized classrooms organized around a shared common area. It also includes significant natural lighting into almost all areas. The entry lobby provides a personalized and welcoming entry experience, and the recent modifications to the lobby to create an open welcoming station is a very nice improvement.

There are advantages and disadvantages of a small 260 pupil school, but research and the evidence from performance of small schools suggests that the advantages far outweigh the disadvantages. The advantages include a small school population where teachers and students all know each other extremely well and can become part of a personalized school environment that provides a true sense of identity and belonging. The disadvantage is that a small school has to share many resources and cannot expect to have spaces that are solely dedicated to instruction areas such as art, music, and even a library/media center. In small schools, these resources have to be blended into general academic learning areas. Additionally, small schools must have flexible use of dining and fitness areas without the benefit of a large dedicated gymnasium space or cafeteria. The Prescott School design locates the cafeteria and gymnasium spaces directly outside of academic classrooms. It is assumed that schedules can be coordinated to avoid loud disruptive activities directly outside of the classrooms and that when these activities are not occurring, the classrooms will have the opportunity to utilize this space as a commons or work area. Although some educators may not fully endorse this approach to school design, there are many examples of successful small schools that utilize this approach; and it appears that the teachers and administrators at Prescott have done a very good job managing their available space. This approach would not be manageable if the current population grew. One program challenge that the building does face is its lack of dedicated special education space. These programs have to be creatively integrated into a 1958 building that could not have anticipated the expanding needs for special education and, therefore, did not include appropriate space for the support of these programs. These programs have taken over classroom space and have resulted in the loss of some available space

originally built into the floor plan. For example, the common areas have now been taken over by instructional needs, giving the feeling of a slightly overcrowded building and eliminating the flexibility that could be afforded by the common areas. Although this overlapping of space may give the building a slight sense of overcrowding, it is a common phenomenon in small schools (260 pupils or less) and is one of the trade-offs associated with the advantage of having a small student body.

Our primary programmatic recommendation for the Prescott Elementary School would be selective future renovations that modernize the interior environment. Some consideration should be made for a small future addition if it is determined that this could provide significant program advantages. However, such addition would not be targeted at expanding the student population as this would require re-evaluation of many core support facilities such as those now required at the Cleveland as a result of the extra classrooms that exist on that campus.

General

Located on a ten-acre site, the Prescott building is flanked on both ends by ball fields and situated in a residential neighborhood. There is a border of tree cover on the north and west sides. It is a well-maintained facility on the interior and there has been some investment in maintaining the building with projects such as window replacement, boiler replacement, and new flooring. Though the maintenance staff has done a great job of keeping Prescott Elementary fully functioning, the age of the building systems requires consideration for addressing the building systems and components that have not been replaced or renovated to date; either in a single comprehensive replacement project or as part of a general understanding that these systems need to be incorporated into a well-funded and strategic maintenance and replacement program over several years.

Educational Plan Organization

The Prescott Elementary School is a 36,000 square foot, single-story facility, with a student population of about 260. The physical size and available classrooms suggests that it has the capacity to accommodate these students, but due to its small size, creative programming is sometimes required in order to share overlapping spaces.

The building style exhibits an architecture of its era. Oriented on a north-south axis, the building is essentially the same as the Cleveland School, without its 1965 addition. The main entry, off Richland Road, is perpendicular to the main corridor and leads to the cafeteria. Though there is a clear axis of circulation, many of the classrooms are directly off other programmed spaces. For example, five classrooms are accessed by way of the cafeteria and three are accessed through the gymnasium. These adjacencies provide potential disturbance during learning periods, but also offer some of the advantages previously mentioned herein. The adjacency does not provide separation of program if the gymnasium or cafeteria were to be used by the community, but this also can sometimes be utilized as an advantage if, for example, parents are being invited to see student exhibits and also visit classrooms. Because of their location along the exterior wall, every classroom receives natural daylight. The administration counter, cafeteria, and gymnasium are all easily located from the main entrance.

The original building plan organizes each classroom neighborhood around a central

Common areas directly off of classrooms are used to supplement rigid program, rather than provide flexibility

common area. Although this has been compromised by the need to utilize the common area as a support space, the original design is an excellent model for elementary school instruction and could be restored to its intended use with the addition of a small amount of specialized program space. The current organization of classrooms provides an excellent opportunity for the creation of academic neighborhoods. The existing classrooms, at an average of 900 square feet, generally fall within acceptable guidelines for an elementary school classroom, including those guidelines established by the Massachusetts School Building Authority (MSBA). In order to take full advantage of these classrooms, the common space should be made available as an extension of classroom learning. All 21st Century school initiatives call for elementary schools with appropriately sized flexible classrooms and significantly more connectivity between the classrooms and their associated support spaces within the academic neighborhood. These strategies could be achieved within the current plan if more specialized program space was available.

The building is single-story and is located on an essentially level site. Fortunately, this helps to facilitate handicap accessibility throughout the building and site. All classrooms have the option of exiting directly to the outdoors as this was a common practice during the time that the Prescott School was designed and remains somewhat popular today in the design of small elementary schools where the desired program involves outdoor learning and fitness opportunities. It does present a small security challenge as technology and administrative policies must be implemented to ensure that unwanted visitors are kept out and students are kept in. The security of entries that are not part of the building's primary entry can pose a security threat, but policy and procedure at the Prescott School manages this threat and the benefits of direct exterior access outweigh the challenges. The School Department has installed a new video entry system at the main entrance vestibule in recent years and has re-organized the lobby space to introduce a critical checkpoint and direct observation of all visitors by staff. As part of future planning, the District may want to consider more exterior cameras for operation of the building's other entries, or perhaps place all exterior doors which are outside of the main entry vestibule on a system which monitors their closed/open position. This would provide notification to administrators if any point along the building's perimeter has been compromised.

The classroom configuration results in an organization of classroom groups into small academic grade-level neighborhoods. Though the original building layout included common areas for student projects, exhibits, or possibly cross-discipline instruction;

the lack of available specialized space within the building has resulted in the installation of a library, art room, and computer lab within this space. This is not unusual, as again one of the disadvantages of such a small student body is the requirement to share and overlap within many of these spaces.

The student dining area is located on the main level of the building. It includes a small stage on the south end but lacks the flexibility often incorporated into a modern student dining, socialization, and learning area. It was designed as a 1960s model for student dining, which assumed students would sit in rows along linear tables and eat in shifts. Today, the modern cafeteria serves many purposes for students and staff and is designed as a flexible space which provides all-day usage for exhibit, presentation, projects, and student socialization. Modernization of the current cafeteria for increased flexibility should be considered as part of any future planning for the building. There is no auditorium at Prescott Elementary as the small stage in the cafeteria functions as the available performance space in the building. This is not uncommon, even by today's standards, but several improvements could be made to enhance its use for student presentation and performance.

The Library/Media Center is located within an area that was originally intended as a student commons and is not an enclosed, dedicated space. However, this is not uncommon in a small elementary school and has some advantages as it allows for close integration with the academic classrooms. The function of a media center has changed dramatically since the days of a "Library" with numerous volumes of books. The modern media center focuses students more on digital media, video production, and broadcasting, and provides young learners an opportunity to utilize their electronic savvy to develop projects and presentations through hands-on development. The current Media Center lacks many of the amenities necessary for these activities and should be reviewed as part of renovation considerations and future educational planning and programming. Overall, there is limited space within the building devoted to media and video applications, though the school has converted corridor space to a computer lab. A modern elementary school environment would include sufficiently sized classrooms and wireless computer access such that every classroom becomes a lab, rendering the use of dedicated computer labs as obsolete, and allowing this space to serve a new educational purpose.

Exterior Envelope
(Foundation, Walls, Roof, Windows, and Doors)

Foundation
The school is constructed on a concrete slab, which appears to be in good condition. (Refer to structural evaluation for additional information.)

Walls
The exterior envelope (exterior masonry wall construction) of the building is a 58-year-old envelope. The envelope consists of face brick with masonry back-up support. Exterior walls include continuous stacked window units in the classrooms and have a pre-cast concrete infill system. The grates within this pre-cast system have stained the panels from years of water depositing.

The building masonry façade remains virtually unchanged since the original construction. The brick walls are in good condition, with no signs of spalling or efflorescence. There are no significant cracks in the walls themselves, but some

A portion of the infill pre-cast panels along the exterior envelope are designed with an intake grille for mechanical ventilation

of the exterior concrete-plaster soffits have begun to crack or leak in places. The negative slope of the soffits toward the window units could prove problematic if perimeter flashing and sealants fail. The 58-year-old original construction documents indicate that the exterior envelope of the building consists of face brick and masonry back-up support. Unlike exterior masonry walls today, no cavity between the brick and masonry back-up exists which can lead to a rapid decline in the exterior wall condition if the brick and mortar joints are not routinely monitored for signs of moisture infiltration. Cavity wall design is important because it disconnects the path temperature and water can take to infiltrate the inside finishes and allows an additional layer of insulating air between the exterior and interior wall systems. Except for the pre-fabricated window system which drains behind the pre-cast panel, there is no weeping system for drainage of water absorbed by the brick. Re-pointing, combined with limited masonry renovation, would allow the building's exterior wall system to remain water-tight for many years.

The absence of insulation within the exterior building envelope creates an inefficient exterior wall. For the temperate climate of Massachusetts, insulation within the exterior envelope should be at least three inches thick to achieve a suitable R-value. This level of insulation in the exterior wall significantly increases the building's ability to remain warm in the winter and also helps the building to remain cooler in the late spring, summer, and early fall, creating a more comfortable building environment. Under the current building code, some areas of the uninsulated building envelope might need to be addressed as part of any proposed comprehensive renovation of the building.

As mentioned, the exterior wall of each classroom includes a continues band of window panels. A portion of these panels is designed with an intake grille to integrate mechanical ventilation through the precast panel to the inside. The windows reach all the way to the ceiling of each classroom, providing a very effective means of allowing natural daylight to permeate deep into the rooms. This is a significant component in creating an excellent classroom environment.

Roof

The roofing system at Prescott Elementary School has been replaced on multiple occasions, as would be true of any building of this age. The last replacement occurred in 2002 and included a rubber membrane system (EPDM ethylene propylene diene monomer) over the entire roof area. It does not appear that any insulation has ever

been added to the roof system. Though the replacement may be considered a recent capital project, the life expectancy of a rubber membrane roof is approximately 20 years, which means the existing roof will need to be addressed again within the next five to ten years. Any plans for a comprehensive renovation in the future should include complete replacement of the existing roof systems and an analysis of the benefits associated with adding insulation to the roof such that it complies with current energy code requirements. This may require some removal of the existing roofing system (down to the structural deck) in order to expose a substrate which is appropriate for attachment of the new insulation. This removal would also assist in removing prior roofing layers which add unnecessary weight to the roof and lower its snow-load carrying capacity.

Windows

In 2002, the exterior windows of the building were replaced with fixed aluminum windows, with operable hopper style windows in some sections. These new windows significantly improved the thermal characteristics of the building and eliminated moisture infiltration that was occurring around the old windows. However, although the 2002 replacement window system represented the respectable industry standards at the time, it is important to note that recent focus on energy conservation has since resulted in the Commonwealth's adoption of significantly higher energy code standards. These standards yielded much higher performing windows and glass within the industry, and the potential benefits and requirements for new windows should be evaluated as part of any comprehensive renovation to the current facility. The window system would likely be almost 20 years old at that time, and would certainly not meet new standards. Additionally, improvements required by the energy code continue to evolve, and it's possible that replacement might be a requirement at that time.

Doors

As part of the window replacement project, the exterior doors to the building were also replaced. The doors are constructed of metal and have vision panels inserted within metal frames. Overall the door systems remain in good condition.

Interior

(Floors, Walls, Doors, and Ceilings)

Floors

There are numerous floor materials throughout the building. These finishes include the following: painted concrete in service spaces, Vinyl Composition Tile (VCT) in corridors, kitchen, and cafeteria, and Vinyl Asbestos Tile (VAT) in the classrooms and library. The floors in the all toilet rooms are ceramic tile without a base.

Although the Vinyl Asbestos Tile (VAT) is non-friable and poses no threat to the students or staff, most school systems have developed schedules for periodic removal and replacement of such finishes over time with the ultimate goal of full abatement of asbestos containing materials. Areas within the building that still contain some asbestos materials, like the library and classrooms, should be considered as part of any future renovation plans. The joints between dissimilar flooring materials, including ceramic tile in toilet rooms, often vary significantly in height resulting in abrupt flooring transitions. These abrupt transitions create handicap accessibility challenges and will need to be addressed as part of any future renovations.

Flooring in student dining was replaced from hazardous Vinyl Asbestos Tile (VAT) to Vinyl Composition Tile (VCT)

The resilient wood flooring in the gymnasium is in brand-new condition, having been replaced in 2016.

Walls

The corridor interior walls are exposed brick or painted concrete masonry units (CMU). In these spaces are limited sound absorbing panels high on the walls. Classroom walls are also painted CMU with sound absorbing panels on any available wall space. Numerous retrofitted systems had to be installed in exposed conduit and piping as opportunities to conceal these systems within the existing walls were limited. Exposed systems include wiring for fire alarms, power, light switches, and smart boards. These systems would typically be fully encased within the walls.

There are no lockers or storage units outside of the classrooms resulting in storage congestion within classrooms which are already filled. This has led to an overflow of everything from extra desks and books to maintenance equipment, copy machines, and reams of paper piled up in whatever free corner is available. This alternative makes accessing items inefficient and cumbersome.

The walls in the gymnasium are painted CMU with no bleachers. The walls of the space do not have any acoustical treatment for absorbing or reflecting sound in the space. The north wall is full glass; fixed windows with some operable hoppers like the classrooms.

Doors

The interior wood doors with hollow metal frames throughout the school are original. Hollow metal frames with wired-glass vision panels hold corridor double doors. Though the metal frames are durable and regularly painted, the original hollow wood doors do not provide good acoustical separation between the classroom and corridor under current construction standards, especially if the school continues to use its corridors as programmed spaces. Solid core doors would decrease sound transmission and increase safety plus durability. Although the glass found in the corridors represents typical standards (wired glass) at the time it was installed, modern codes, regulations, and standards would require that this glass be fire rated and provide a greater degree of fire separation between the classroom and the exit corridor. In some cases, storage is enclosed by partition walls within corridors that completely block the accessible approach of an emergency exit.

Most of the original door hardware appears to have been replaced over time. However, as regulations have continued to evolve over the recent past, much of the door hardware remains non-compliant and is further discussed in the handicap accessibility portion of this report.

Ceilings

Classroom and corridor ceilings are the original plaster suspended below a small mechanical passage. There are skylights in the classrooms that have been covered up by the 2002 roof replacement. The ceilings in the gymnasium are paneling, above an exposed steel roof structure, and with a painted finish. The same system is used in the double height portion of the corridors and above the cafeteria trusses. Acoustical ceiling or wall treatments would better enhance the sound quality of these learning environments, as the multiple layers of paint on the ceiling tile have likely compromised much of their acoustical qualities. Any upgrades to the building's mechanical, electrical, plumbing, or installation of a fire suppression system will require that the 2x2 lay-in ceilings be removed and replaced and will also likely require new lay-in ceiling with grid in all areas that do not currently have such.

Energy Conservation

The Prescott Elementary School was constructed in 1958, well before the historic energy shortages of the 1970s and escalating oil prices of 2005. The emergence of a new energy code in 2000, which promoted an increased knowledge of exterior building envelope construction techniques and materials, has dramatically changed the way in which buildings are designed to deal with energy efficiency issues. Massachusetts State Building Codes 3407.1 and 3407.2 require that alterations of an existing building in which the use group is not changed must comply to the energy conservation values detailed in Table 3407 of the code for any building elements (walls, windows, doors, roofs, or mechanical systems) which are altered during renovation.

Environmental Quality

In the past fifteen years, there have been tremendous advancements in the understanding of the various environmental factors that influence building occupants. These factors have been proven to be extremely important in the school buildings where students may spend most of their day in a single 700-900 sq. ft. classroom. Factors such as natural lighting, quality artificial lighting, fresh air ventilation levels, evenly distributed heating and cooling temperatures, and acoustical performance all work to enhance the educational environment. The Prescott Elementary School classrooms already include many of these factors as classrooms have significant natural lighting, access to natural ventilation, and newly installed indirect/direct artificial lighting. They do not include modern mechanical systems that would modulate the ventilation and fresh air in the classroom, and they do not include air-conditioning; however, they do provide a very nice academic classroom environment and have been maintained well.

Educational, Spatial and Organizational Capacity

Capacity at an elementary school can be calculated in several ways, including multiplying the number of available general classrooms and support areas by the appropriate number of students in each classroom. Prescott Elementary School has a current capacity of approximately 260 students. Dividing the total building square

Noise transmitting partial-height partition walls have been implemented in an effort to create additional classroom space

footage by the student population provides an approximate amount of square feet being provided for each student, which is another benchmark for determining the general student capacity of the building.

Our analysis of the current Prescott Elementary School suggests that the building may require some renovations and improvements in the future in order to modernize the academic environment. Its efficient floor plan configuration allows many program spaces to be shared and to overlap with others. The shared spaces should be evaluated as part of any proposed future renovations and considerations should be made for a small addition if it is determined that this would provide significant program relief. In addition, the following conditions exist:

Main Office/Entrance

Administration is only the Principal's office and secretary area, but acts as a knuckle between the gymnasium and cafeteria. As mentioned previously within this report, the main office currently has no direct supervision (other than a single video monitor) of visitors who approach and enter the building, though the administration counter itself has recently been moved out into the lobby and reconfigured to allow direct visibility of visitors upon their entry into the building. This is a significant improvement to the original design configuration.

Nurse's Suite

The nurse's suite is directly off the secretary area; it is a small area but this is typical for a school of only 260 pupils.

Library Media Center

The library is in the corridor, with shelving flanking the walls. It is significantly undersized and lacks the modern amenities associated with a 21st Century education resource. It could be argued that its location has some advantages in terms of availability to the students, but not having a dedicated space can also prohibit some program options.

Classrooms

The size, configuration, organization, environmental quality, and instructional amenities within the classroom are critical to successful teaching and learning. All classrooms have wi-fi and smart boards, and also have significant natural daylighting. They have also received recent upgrades to indirect/direct pendant light fixtures that

provide an excellent source of artificial light. They are reasonably sized, although their size is on the lower end of acceptable educational standards. Their flexibility could be greatly enhanced if the common areas and support spaces referred to herein were restored to their original purpose. Overall, these classrooms provide a very good academic environment and could be made even better through a few thoughtful renovations.

Special Education
The current Special Education Program is spread between a couple of locations throughout the school. Many of the rooms are divided by partial height partition walls, which is disorienting and offers no privacy. The current Special Education Program is extremely undersized and is utilizing inadequate space for instructional, tutorial and testing areas. Additionally, many of the rooms do not meet the required space, accommodations, and organization to meet current State recommendations and guidelines.

Science Classrooms
There are no classrooms or labs devoted to the teaching of science exclusively. This is not necessarily unusual in an elementary school, but consideration should be made for providing more support amenities in the classrooms to enhance science instruction to elementary school students.

Art Classrooms
Art class is instructed in one of the open corridor spaces along the main axis.

Music Classroom
There is one half classroom that is extremely undersized for music instruction.

Teacher and Group Planning Collaboration Areas
Space for teacher planning and collaboration is limited to one small room accessed through the main entry vestibule. There is no integration of planning or collaboration space throughout the school and no space devoted to faculty dining or services. Spaces to accommodate teacher socialization can ultimately contribute to the improvement of the school's educational philosophy through the sharing of ideas, as previously detailed in this report.

Kitchen
The kitchen at the school only serves as a warming kitchen for food that is prepared elsewhere and delivered.

Receiving And Storage
Storage space in the school is extremely limited and the amount of storage packed throughout the school is both a fire and safety hazard.

Recent Capital Improvements

Roof
The roof was completely replaced in 2002 and is currently EPDM. In 2009, snow guards were added and gutters were replaced.

Interiors
Lighting in the cafeteria and outside was replaced with LED bulbs. Floors in the

There is no integration of planning or collaboration space throughout the school, for either students or staff

corridors, nurse's suite, cafeteria, and gym are brand-new.

Windows
Complete window and exterior door replacement occurred in 2004.

HVAC
Both boilers were replaced in 2004.

Security
Surveillance cameras were added in 2008.
Card access systems were added in 2013.

Massachusetts State Building Code:
780 CMR and Life Safety Issues

The Massachusetts State Building Code (780 CMR) has been updated and amended several times since the construction of the building. The State Board of Building Regulations and Standards regularly updates and amends its regulations. Based on these regulations, the following items were found to be in non-compliance:

- Two means of egress from spaces having an occupant load of greater than 50.
- Fire extinguishers
- Fire separation assembly between Use Group E (Educational) and Use Group A-3 (Assembly – Cafeteria, Gymnasium) (one hour fire separation required).
- Handrail and guardrail at egress stairways.

Handicap Accessibility

Requirements for handicap accessibility in building planning and design were non-existent when this building was originally designed. However, on January 26, 1992, the Department of Justice implemented Title III of the Americans with Disabilities Act (ADA) into Public Law. This legislation "prohibits discrimination on the basis of disability by private entities in places of public accommodation." The legislation requires all new places of public accommodation, including schools, to be readily accessible to and usable by persons with disabilities upon design and construction. Existing structures being renovated that exceed 30% of the equitized assessment of the building or its replacement value must fully comply with the regulations

for new construction. Additionally, on September 1, 1996, the Commonwealth of Massachusetts developed its own accessibility regulations: 521 CMR Architectural Access Board (AAB), which in some instances is more restrictive than ADA guidelines. The ADA and AAB regularly update and amend their regulations. Based on these regulations, the following items were found to be in non-compliance or not accessible to the disabled:

- All doors leading to all rooms in the school including classrooms, gymnasium, library, administration, etc. Non-conforming knob-type hardware currently exists. Lever handles are required.
- The school is handicap accessible. Handicap parking is near the front entrance, but the sidewalk pavement and curbs need repair.
- All entries into classrooms require clear floor space adjacent to latch side of the door for entry and exit.
- Check-in counter at Administration Office.
- Lack of proper interior building signage (braille).
- Toilet and shower rooms
- Water fountains
- Library Circulation Desk
- Alarms and strobes within classrooms.
- Access to stage from main floor within Cafeteria.

Each of the inaccessible features listed above has an impact on the ability of disabled students or members of the community to access various spaces throughout the school independently. Disabled persons may include students with a permanent handicap condition, students that are temporarily disabled from athletic activity, and parents, staff, or other visitors that could have any form of disability. Any future plans should incorporate as many items as possible to accommodate disabled people to the fullest extent possible.

Proposed Space Summary- Elementary School

Prescott Elementary School	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**12,729**			**0**			**0**			**0**		**11**	**10,950**	
(List classrooms of different sizes separately)																
Pre-Kindergarten w/ toilet													1,200		-	1,100 SF min - 1,300 SF max
Kindergarten w/ toilet			0										1,200	2	2,400	1,100 SF min - 1,300 SF max
General Classrooms - Grade 1-6			0										950	9	8,550	900 SF min - 1,000 SF max
Grade 1 Classroom	992	3	2,976													
Grade 2 Classroom	1,064	2	2,128													
Grade 3 Classroom	962	3	2,886													
Grade 4 Classroom	1,003	2	2,006													
Grade 5 Classroom	911	3	2,733													
SPECIAL EDUCATION			**2,930**			**0**			**0**			**0**			**3,020**	
(List rooms of different sizes separately)																
Self-Contained SPED			0										950	2	1,900	8% of pop. in self-contained SPED
Self-Contained SPED - toilet			0										60	2	120	
Resource Room			0										500	1	500	1/2 size Genl. Clrm.
Small Group Room / Reading			0										500	1	500	1/2 size Genl. Clrm.
SPED Sub. Separate K-2	1,338	1	1,338													
SPED Speech / Reading	1,338	1	1,338													
ELL / Adjustment Counselor	254	1	254													
ART & MUSIC			**505**			**0**			**0**			**0**			**2,500**	
Art Classroom - 25 seats	505	1	505										1,000	1	1,000	assumed schedule 2 times / week / student
Art Workroom w/ Storage & kiln			0										150	1	150	
Music Classroom / Large Group - 25-50 seats			0										1,200	1	1,200	assumed schedule 2 times / week / student
Music Practice / Ensemble			0										75	2	150	
			0													
HEALTH & PHYSICAL EDUCATION			**2,871**			**0**			**0**			**0**			**6,300**	
Gymnasium	2,751	1	2,751										6,000	1	6,000	6000 SF Min. Size
Gym Storeroom			0										150	1	150	
Health Instructor's Office w/ Shower & Toilet			0										150	1	150	
Dressing Room	120	1	120													
MEDIA CENTER			**755**			**0**			**0**			**0**			**2,020**	
Media Center / Reading Room	755	1	755										2,020	1	2,020	
DINING & FOOD SERVICE			**4,276**			**0**			**0**			**0**			**4,965**	
Cafeteria / Dining	2,936	1	2,936										1,965	1	1,965	2 seatings - 15SF per seat
Stage	546	1	546										1,000	1	1,000	
Chair / Table / Equipment Storage			0										200	1	200	
Kitchen	794	1	794										1,600	1	1,600	1600 SF for first 300 + 1 SF/student Add'l
Staff Lunch Room			0										200	1	200	20 SF/Occupant
MEDICAL			**451**			**0**			**0**			**0**			**510**	
Medical Suite Toilet			0										60	1	60	
Nurses' Office / Waiting Room	451	1	451										250	1	250	
Examination Room / Resting			0										100	2	200	
ADMINISTRATION & GUIDANCE			**533**			**0**			**0**			**0**			**2,015**	
General Office / Waiting Room / Toilet			0										300	1	300	
Teachers' Mail and Time Room			0										100	1	100	
Duplicating Room			0										150	1	150	
Records Room			0										110	1	110	
Principal's Office w/ Conference Area	205	1	205										375	1	375	
Principal's Secretary / Waiting	328	1	328										125	1	125	
Assistant Principal's Office			0										120	0	-	
Supervisory / Spare Office			0										120	1	120	
Conference Room			0										250	1	250	

Space Summary

Prescott Elementary School

Guidance Office			0										150	1	150	
Guidance Storeroom			0										35	1	35	
Teachers' Work Room			0										300	1	300	
CUSTODIAL & MAINTENANCE			**190**			**0**			**0**			**0**			**1,900**	
Custodian's Office			0										150	1	150	
Custodian's Workshop			0										375	1	375	
Custodian's Storage			0										375	1	375	
Recycling Room / Trash			0										400	1	400	
Receiving and General Supply	190	1	190										200	1	200	
Storeroom			0										200	1	200	
Network / Telecom Room													200	1	200	
OTHER			**1,286**			**0**			**0**			**0**			**0**	
Other *(specify)*																
Boiler	777	1	777													
Exterior Storage	89	1	89													
Storage	140	1	140													
Storage	70	4	280													
Total Building Net Floor Area (NFA)			**26,526**			**0**			**0**			**0**			**34,180**	
Proposed Student Capacity / Enrollment			262												**262**	
Total Building Gross Floor Area (GFA)[2]			34,248												**47,160**	
Grossing factor (GFA/NFA)			**1.29**									**#DIV/0!**			**1.38**	

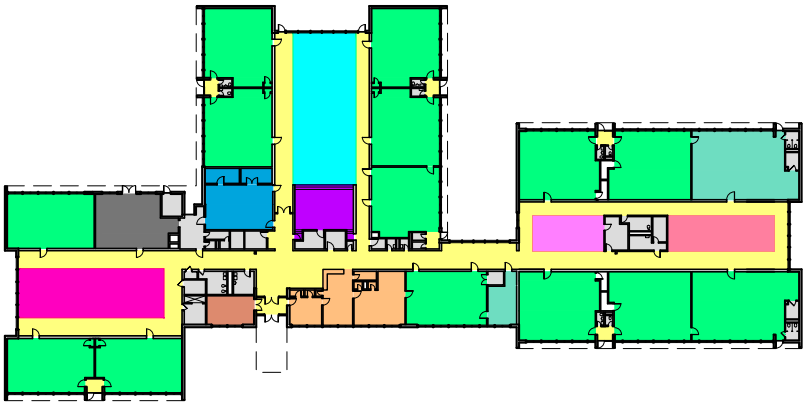
[1] **Individual Room Net Floor Area (NFA)** Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

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

Prescott Elementary School

- 262 students
- 36,000 square feet

media center
physical education
music & arts
auditorium or stage
kitchen & servery
student dining
special eduation
general classroom
circulation
administration/services
staff planning & support
custodial/toilets
building equipment



first floor

Structural Analysis

Prescott Elementary School

This report is based on a review of the available drawings of the original construction prepared by Korslund, LeNorman & Guann, Inc., and a visit to the site on November 8, 2016.

Existing Conditions

The Prescott School is essentially a single story structure with a Gymnasium, Library, and Cafetorium. The original school was constructed in 1958. The structure is performing well for the most part. The roof construction consists of kinked structural steel beams that create the shape of a gable roof. The roof beams span wall to wall. The Cafetorium roof construction consists of metal roof deck on open web metal joists spanning wall-to-wall. At the main entrance, we observed exterior steel canopies.

We did not observe any excessive vibration due to foot fall on the concrete slab on grade.

We did not observe any signs of excessive foundation settlement or significant distress in the structure. We observed light cracking in various locations of the masonry construction.

We observed the exterior façade of the building and noted staining and moderate deterioration to mortar joints. In one corner, we observed cracked red brick masonry which is not a major structural concern. We observed precast concrete elements in the exterior façade.

We observed exterior round painted steel columns and noted moderate rust and deterioration to the base of the columns.

Systems Analysis

Prescott Elementary School

Fire Protection

Currently there is no Fire Protection system in the building.

Plumbing

Sanitary
The existing system is cast iron hub piping, the piping has deteriorated is in some places, and has been replaced with new hub-less piping, the overall system is in working condition.

Water Heaters
In the Prescott school there is (1) Ruud 80 Gallon Gas Water Heater (2006) that feeds the school, and It is in working condition.

Plumbing Fixtures
Currently all the fixtures are aged, and most do not meet ADA requirement, and will need to be replaced, but are in working condition. The water fountains do not meet ADA requirements. The kitchen contains (1) floor mounted grease trap. Grease trap is functional, however it may require future replacement.

Recommendations
- Replacement of plumbing fixtures to comply with ADA, and low flow due to age
- Gas supply for kitchen equipment requires emergency shut off
- Depending on the renovations, a larger water heater maybe need to meet the new demand
- Depending on the renovations, the existing 2” water service may need to be increased to meet the new demand

HVAC

The Prescott Elementary School is heated by hot water produced by dual fuel sectional cast iron boilers. Each boiler utilizes no. 2 heating oil or natural gas as its fuel source.

Boilers
The first boiler was manufactured by Weil-McLain, model 988. This boiler has a net I.B.R. heating output of 1,892 MBH. This boiler is fitted with a burner manufactured by Webster. The second boiler was manufactured by Buderus, model GE615/10. This boiler has a net IBR heating output of 1,950 MBH. This boiler is fitted with a burner manufactured by Webster. Both boilers appear to be in good condition and are fully operational.

Heating oil is stored in underground, double-wall fiberglass tanks, monitored by a code

compliant leak detection system. Heating oil is supplied to the boiler burners through a duplex pump set, which appears to be in good condition and fully operational.

Hot Water Circulation Pumps
Hot water is circulated throughout the school by a pair of base mounted end suction pumps manufactured by Bell & Gossett. These pumps are fully operational and appear to be in good condition and properly maintained.

Duplex Air Compressor for ATC
The control system for this school is pneumatic with compressed air being produced by a duplex air compressor as manufactured by Quincy. The air compressor is in good condition and appears to have been installed within the last five (5) years.

Unit Ventilators
The classrooms are furnished with classroom unit ventilators manufactured by Herman-Nelson, outfitted with hot water heating coils. The unit ventilators provide the classrooms with heat and ventilation. The unit ventilators are original vintage and although they are still operational, they have outlived their useful service life.

Recommendations
- The main heating plant is in good condition and should be capable of providing reliable operation for at least another five to ten years provided proper maintenance is continued.
- However, the other components of the HVAC system such as the classroom unit ventilators have outlived their useful service life and are due for replacement.

Electrical

Electric Service
The primary electric service originates from electric utility co. pole mounted transformers on an electric utility co. pole. The electric service enters the building via underground conduit/cabling. The electric service appears to be original to the building and appears to be in poor condition.

Normal Power System
The main disconnect switch is fed by the electric utility co. pole mounted transformers. The main disconnect switch is rated at 400 amps, 120/208 volt, three phase, four wire. It feeds panelboards located in the Main Electric Room as well as panelboards throughout the building. The normal power distribution is manufactured by Square D. The normal power system appears to be original to the building and appears to be in poor condition.

Emergency Power System
The building does not have an emergency generator.

Emergency lighting consists of emergency battery units with integral light heads, remote emergency light heads (mix of single and dual heads), and exit signs with integral batteries.

Emergency System - Deficiencies as it relates to current Codes:
- Inadequate interior emergency lighting coverage

- Some exit signs are made of paper with word EXIT on them
- Some remote emergency light heads are single head; dual heads are required
- No emergency lighting outside egress doors

The emergency lighting appears to be original to the building and is in poor condition. As described above, the emergency lighting does not meet current Codes.

Fire Alarm

The addressable fire alarm control panel as manufactured by Fire Lite Alarms series MS-9200 does not appear to be original to the building. The fire alarm system consists of an exterior municipal master box, smoke detectors, heat detectors, duct smoke detectors, pull stations, strobes, and horn/strobes.

Fire Alarm - Deficiencies as it relates to current Codes:

- Inadequate detector coverage
- Points of egress without pull stations
- Pull stations not at ADA heights
- Inadequate strobe coverage as required by ADA in Conference rooms, Toilet rooms, and Assembly spaces including Classrooms
- Notification appliances are horns; Speakers are required to provide voice evacuation throughout the building
- Most of the interior Corridor doors are pried open and do not have magnetic door holders

The fire alarm system appears to be in fair condition. As described above, the fire alarm system does not meet current Codes.

Lighting

Interior

The interior lighting consists of surface mounted, pendant, recessed, and fluorescent downlights. Exit signs provide for direction to paths of egress. Lighting is not the most efficient as it relates to current standards. The interior lighting appears to be in fair condition.

Exterior

Lighting consists of wall packs, wall mounted floodlights, and site lighting on poles. Some of the lighting fixtures are original to the building with high intensity discharge lamps, while some of the lighting fixtures have been replaced with LED type. Most of the exterior lighting appears to be in good condition.

Switching

Most of the lighting in spaces is controlled by local wall switches, with some occupancy sensors.

Lighting - Deficiencies as it relates to current Codes:

- The current building switching does not meet the International Energy Conservation Code
- Automatic shutoff of lighting fixtures is required
- Daylight harvesting is required in certain spaces as indicated in the International Energy Conservation Code

The switching appears to be original to the building and is in fair condition. As described above, the switching does not meet current Codes.

Receptacles

Receptacles are ground type. Receptacles have been added over the years through the use of EMT conduit with surface boxes, tele-power poles, plugmold, and wiremold. Receptacles appear to be in fair condition.

Lightning Protection

The building does not have a lightning protection system which would include air terminals on the roof with downlead conductors to ground and surge protection.

Bi-directional Amplifier System

The building does not have a bi-directional amplifier system which would include an amplifier and cabling above ceilings for amplifying police and fire alarm radio signals as required by the International Building Code.

Wiring

Wiring is made up of MC cabling, FA MC cabling, EMT, Rigid, and PVC conduit.

Site Analysis

Prescott Elementary School

Existing Conditions

The Charles J Prescott Elementary School, herein referred to as the Site, consists of one (1) building structure constructed in 1958 located at 66 Richland Road in Norwood, MA. The Site is approximately 10.32± acres on Assessors Map 20 / Block 6 / Lot 2, with the driveway to the school on Assessors Map 20 / Block 3 / Lot 1 (Appendix A, Existing Conditions Charles J. Prescott School Feasibility Study). The school currently accommodates approximately 387 students. The Site is accessed via a driveway off Richland Road to the west with a secondary gated entrance to the east at Cherrywood Drive that is closed off. The Site is furnished with paved parking areas and driveways, playgrounds, paved surfaces with painted courts for games such as basketball and foursquare, and two diamond athletic fields for softball and baseball.

The Site is bound to the north, east, and west by residential properties and to the south by Old Farm Road. South of old farm road are residential properties. The school is buffered from the neighboring properties by thick, deciduous vegetation and the ball fields to the north and southeast.

Circulation and Parking

The school is oriented along a northeast-southwest axis. The main entry to the school is on the west side of the building accessed from Richland Road and is setback from the road approximately 325 feet. (Appendix A, Photo 1) The main site entrance drive is a two-way road to the front entrance leading to a circular drop-off area at the main entry to the building. (Photo 2) This circular drop-off is tight for buses, which must proceed to a large play area to in order to turn around and exit the site. A gate closes off access from Cherrywood Drive and Neponset Street. (Photo 3)

Pedestrian walkways are provided around the entire building, though they cross some parking and service areas. (Photo 4) Fire access is not present to the west and south of the building. The service area with trash and recycling is in close proximity to a paved play area. (Photo 5) Pavement around the site is in poor to fair condition, with cracks and damaged bituminous curbs. Visitor and staff parking is located near the main entrance drop-off and northwest of the school, with and overflow lot to the northeast. (Photo 6) The overflow parking by the service area is poorly defined. The parking capacity requirement for schools as a “Place of Public Assembly” is one (1) space for every 3 person capacity in according to Section 6.1.3.B of the Zoning Bylaw. Aerial imagery shows 9 parking spaces at the front entry, 52 parking spaces in the northwest lot, and approximately 11 parking spaces in the northeast overflow lot for a total of 72 parking spaces. Three (3) accessible parking spaces are required for the existing quantity of designated parking spaces, one (1) of which must be designated as van-accessible. The site currently accommodates the accessible space requirements with the exception of specifically designating a van-accessible space. Accessible parking spaces have both pavement marking and signage. (Photo 7) Accessible walkways are

located around the site but some are in need of repair, particularly at the rear of the building. The school is handicap accessible.

Zoning Regulations

According to the "Zoning Map of the Town of Norwood, MA." dated April 28, 2015, the Site is located in an area zoned General Residence (G). Educational facilities are allowed within a zone G according to the "Town of Norwood Zoning Bylaw" Section 3.1. The Zoning Ordinance indicates the following dimensional requirements would control the development on this Site:

G – General Residence:
- 10,000 square feet minimum lot area
- 90 feet minimum lot frontage
- 20 feet minimum front yard setback
- 15 feet minimum side yard setback
- 30 feet minimum rear yard setback
- 30 feet maximum building height
- 35% maximum lot cover
- 25% minimum open space

Soils

Existing soils were evaluated based on the USDA Natural Resource Conservation Services Web Soil Survey. Below is a description of the soils that are shown throughout the Site as shown on the web soil survey (Appendix C, NRCS Soil Survey). The majority of the Site currently developed with the building, parking lots, and playground primarily consists of Udorthents, sandy (Map Unit 653) with a Hydrologic Soil Group (HSG) rating of A which is very permeable. Confirmatory soil borings and test pits for the purpose of stormwater infiltration and building foundations have not been performed.

Topography

The topography of the Site generally pitches from northeast to southwest. It ranges from elevation 85 near the neighborhood on Driftwood Circle down to elevation 70 near the neighborhood on Kings Road, which over a distance of approximately 800 feet makes the site is essentially level. There are swales present that direct stormwater around the perimeter of the building to low points along the southwest side of the site. (Photos 8 and 9)

Record USGS topographic maps and historical aerials seen in Appendix D and E (dated 1894 through present day) do not show wetlands in proximity to the site. There do not appear to be topographic changes which indicate that the school and parking areas have been constructed on filled wetlands or a landfill.

Wetlands

After review of the Massachusetts GIS data layers, (MassGIS) there does not appear to be any wetlands in the vicinity of the Prescott School property. After review of the MassGIS certified and potential vernal pools layers, there does not appear to be any potential or certified vernal pools on or near the site as defined by the Natural Heritage and Endangered Species Program (NHESP).

According to the Flood Insurance Rate Maps available through FEMA (Federal Emergency Management Agency), the Site is entirely outside the flood zone.

Rare Species and Cultural Resources

Information regarding rare species was obtained from the MassGIS Rare Species and Priority Habitat data layer showing data recorded by the NHESP in the State Registry. There is no known NHESP mapped habitat on Site based on available MassGIS data maps.

Utilities

Available utilities in Richland Road are unconfirmed. There is one fire hydrant located on the northwestern corner of the building. An additional hydrant is located at the southwest corner of the school, adjacent to the play area (Photo 11 and 12). A visible water gate implies that potable water is accessed from the street rather than a well. (Photo 13) Sanitary sewer service from the building connects to the existing sewer main in Richland Road. Further investigation is required to confirm if and where the sanitary line connects into the municipal system and if there is an existing grease trap for the kitchen waste. The storm drainage collected in catch basins from the site also connect to an existing drain main in Richland Road. Stormwater from the roof is routed underground to catch basins located at the front of the site. (Photo 10)

Site lighting is minimal. Overhead lighting is not present in the parking areas. The play fields are not lit.

Athletic Facilities

The two baseball/softball fields are used for practice (Photos 14 and 15). Basketball backstops and fences are in good condition. The grass is in fair condition. On the southeast side of the building, there are two basketball hoops in good condition, and a miniature basketball court with two additional hoops, also in good condition (Photos 16 and 17). There is a playground on the east side of the building, and a playground on the west side of the building near the drop off loop. The play equipment in both facilities is new play equipment and in good condition. This playsets are set in fiber-mulch area, edged by timbers (Photos 18 and 19).

Landscaping

The minimal plantings along the front of the building consist primarily of yews and crabapples (Photo 20). The site has few mature shade trees. There are no plantings along the rear of the building. Overall, there is a lack of a coherent landscape plan. Lawns are generally in good condition. Pavement is in fair condition at best.

Recommendations

The following site improvements are recommended for consideration:

- Study of the vehicular circulation (cars, buses, emergency, and deliveries) to evaluate the effectiveness of the layout and determine improvements. Such improvements will include the re-striping of the drives and parking areas. Pedestrian access and locations of play areas should be considered at the same time.

• The physical education program and the after school use of the fields should be evaluated to determine the adequacy of the existing facilities.
• Investigate site utilities/drainage structures to ascertain their condition and capacities as they relate to current codes and functioning.
• Add additional site lighting for safety and security, and consider placing existing wiring underground.
• Prepare a topographic survey for the site to permit an analysis of the grading of the site.
• Replace rusted chain link fencing; other site improvements (benches, tables, bike racks, etc.) should be considered.
• Enhancing the appearance of the school grounds by additional landscaping.

Appendix A


Photo 1: Front Entrance


5:Service Area in Close Proximity to Paved Play Area


Photo 9: Swale Headwall


Photo 2: Entrance Drive and Circular Drop Off


Photo 6: Northern Parking Area


Photo 10: Onsite Catch Basin


Photo 3: Gated Access to Cherrywood Drive


Photo 7: Accessible Parking


Photo 11: Southwest Fire Hydrant


Photo 4: Pedestrian Walkway at Parking Area


Photo 8: Swale Along Southwest School Perimeter


Photo 12: Northwest Fire Hydrant

Photo 13: Water Gate

Photo 14: Southeast Baseball Field

Photo 15: Northeast Baseball Field

Photo 16: Southeast Basketball Hoops

Photo 17: Southeast Basketball Court

Photo 18: Play Area

Photo 19: Play Area

Photo 20: Trees Along West Side of Building

Architectural Analysis

Willett Early Childhood Center

The George F. Willett building operates as the Early Childhood Learning Center for the Town of Norwood. Constructed in 1968, the facility currently houses approximately 385 Pre-K and Kindergarten students. It has one modular classroom, added in 2013, that is used as an OT/PT room.

The Willett School reflects the Town's commitment to early childhood learning and is an excellent example of the high demand for such services. The Willett is a former elementary school facility and therefore was an appropriate building for the creation of the Town's early childhood learning center. Since inception, the population among PK/K students participating in this program has quadrupled, while the available space has remained the same. Currently there are 385 students in a building that was designed to accommodate 280 students. The former gymnasium has been subdivided into classrooms and the former cafeteria stage has been converted to a classroom. The overall building is significantly overcrowded and the Town will have to make some decisions regarding the future of this program and the commitment to allow its current capacity, and interest in allowing that capacity, to continue to expand. The Massachusetts School Building Authority (MSBA) does not participate in reimbursement funding for dedicated early childhood learning centers, so any commitments to this facility would be funded 100% by the Town of Norwood.

Our primary programmatic recommendation for the Willett Early Childhood Center will be dependent on the Town's commitment to maintain or expand this program. Thus far, the Town has been able to utilize an existing elementary school to house this program and, therefore, has only incurred the costs of staffing and maintenance. We will be making recommendations for general renovations, but any recommendations for expansion of the facility would be contingent upon direction from the Town.

General

Located on a spacious 22-acre site, the Willett Center is bordered by dense tree cover on all sides. Beyond the trees, residential neighborhoods are only to the south and west, and a large cemetery to the east. It is a well-maintained facility on the interior and there has been some investment in maintaining the building with projects such as window replacement, floor replacement, and the repair of some interior components. Though the maintenance staff has done a great job of keeping Willett fully functioning, the age of the building systems requires consideration for addressing the building systems and components that have not been replaced or renovated to date; either in a single comprehensive replacement project or as part of a general understanding that these systems need to be incorporated into a well-funded and strategic maintenance and replacement program over several years.

Educational Plan Organization

The Willett Early Childhood Center is a 38,500 square foot, single-story facility, with a

student population of about 385. Since the last building study in 2000, the school has quadrupled in attendance. The physical size and available classrooms suggest that it has a capacity of approximately 280 students under current educational standards and guidelines. It is able to accommodate the current overcrowding through the use of ad-hoc classrooms created by sub-dividing the gymnasium. This is the reason that enrollment as high as the current 385 students can be accommodated.

In plan, the building is essentially divided into three square volumes along a north-south axis. The central volume contains shared programs: the cafeteria, stage, library, main office, nurse, and gymnasium. The other volumes, one to the north and one to the south, both contain classrooms around a central service core of toilet and storage rooms. The southernmost volume has two additional classrooms that sink a half-floor in elevation to accommodate the grade change. Because classrooms border the exterior wall, all have access to at least one window and natural daylight. Public site circulation and the main entry is along the west side of the building, which conveniently locates a 138-car parking lot between the building and play field. A service road is hidden along the east side. Upon entering, the administration counter is to the immediate left, in the central volume, and access to the cafeteria is straight ahead.

The current building plan, constituted under an Industrial Revolution model, isolates each classroom and support spaces, with limited flexibility. The current organization of classrooms, within two volumes around a central core, provides an opportunity for the creation of academic neighborhoods, but instead these rooms operate as separate entities. The existing classrooms, at an average of 900 square feet, fall below typical guidelines for kindergarten and pre-kindergarten classrooms (1,000-1,200 square feet). All 21st Century school initiatives call for kindergarten and pre-kindergarten classrooms that are large and flexible allowing for multiple groupings and activities within the classroom. These strategies should be considered when evaluating options for future renovation and long-term use of the Willett Early Childhood building.

The site is fairly level with a moderate rise to the front of the building. Water generally flows away from the building in all directions. Parking areas have no curbs and water flows freely from them. The building is entirely on one floor, except for the sunken classrooms, which prevent it from being entirely accessible. There are no steps to inhibit access to the front entry but the paved slope exceeds the maximum slope defined by ADA guidelines. Though there is an exit at each extreme end of the main axis, these are distant from the administration counter. Visitors entering the building from any entry other than the front, surpassing the main office check-in, create a significant potential security threat. Unfortunately, school security has changed dramatically over the past ten years. The School Department is to be commended for the addition of a video entry system at the main door in recent years; however, future plans should evaluate modifications that provide a higher level of security for students and staff because this is not a comprehensive solution. Remaining entry points to the building should be monitored via camera and/or latch contacts that notify office administrators if any point along the building's perimeter has been compromised.

The exponential growth of Willett's population prevents it from using any of its shared spaces for student projects, exhibits, or cross-discipline instruction. The separate classroom volumes could be organized into teams or academic neighborhoods; however, they are not being used as such. Beyond the Principal's office and a single, small conference room, the center lacks project-based learning labs, small group

Crowded classrooms are stacked along a corridor with no strategy for organizing them into neighborhoods or teams

instruction rooms, teacher planning areas, and student/teacher work areas which are common in modern elementary school environments. The crowded classrooms are stacked along a corridor with no strategy for organizing them into teams or academic neighborhoods. There are a few individual offices, but there is no incorporation of planning areas for faculty and staff and no incorporation of smaller group rooms to support testing, partnering, or small group instruction.

The student dining area is located in the middle of the building, but like the rest of the school, it is extremely overcrowded as a result of a growing student population. Because the school's programs exceed its available space, the cafeteria is regularly partitioned off for classes. These partial height partitions offer no privacy, sound attenuation, or spatial organization. Today, the modern cafeteria serves many purposes for students and staff and is designed as a flexible space which provides all-day usage for exhibit, presentation, projects, and student socialization; not just as extra storage space. Modernization of the current cafeteria for increased flexibility should be considered as part of any future planning for the building. There is no auditorium at the Willett building so the small stage in the cafeteria would typically function as the available performance space. However, as a result of the overcrowding, it must function as a program space for SPED and ELL classes.

The Library/Media Center has been ousted from its original space by the need for more classroom space. It has been moved to the gym and created through the use of partial height partitions. Not only is this solution an imposition on library learning, it also prohibits use of the full gymnasium for physical activity. The library lacks any meaningful integration to the academic environment or other specialized instructional areas that it might serve. It does not include many of the necessary support spaces and there is limited space devoted to media. The function of a media center has changed dramatically since the days of a "Library" with numerous volumes of books. The modern media center focuses students more on digital media, video production, and broadcasting, and provides young learners an opportunity to utilize their electronic savvy to develop projects and presentations through hands-on development. The current Media Center lacks many of the amenities necessary for these activities and should be reviewed as part of renovation considerations and future educational planning and programming. Overall, there is limited space within the building devoted to media and video applications, though the school has devoted a second-floor classroom to computer lab space. A modern elementary school environment would include sufficiently sized classrooms and wireless computer access

such that every classroom becomes a lab, rendering the use of dedicated computer labs as obsolete. However, these spaces tend to make excellent video production or broadcasting studios, which do require fixed amenities and equipment.

Exterior Envelope
(Foundation, Walls, Roof, Windows, and Doors)

Foundation
The Willett School is a one-story, slab-on-grade, steel framed building with unreinforced exterior masonry bearing walls. The gymnasium and cafeteria are also supported by unreinforced masonry walls. (Refer to structural evaluation for additional information.)

Walls
The exterior envelope (exterior masonry wall construction) of the building is a 48-year-old envelope. The envelope consists of face brick with masonry back-up support. Exterior walls have pre-cast panels both above and below the window units, located with no apparent reasoning. The four-pane windows are fixed on the top lights, and operable on the bottom, but most of these have air conditioner units in them. The exterior walls around the gymnasium are clad in a corrugated metal paneling at the top.

Building masonry façade repair is listed as a recent capital project in 2006. However, the mortar appears to have receded since. Repointing the exterior wall surfaces, combined with limited masonry renovation, will allow the building's exterior wall system to remain functional for many decades. Unlike exterior masonry walls today, no cavity between the brick and masonry back-up exists, which can lead to a rapid decline in the exterior wall condition if the brick and mortar joints are not routinely monitored for signs of moisture infiltration. Cavity wall design is important because it disconnects the path temperature and water can take to infiltrate the inside finishes and allows an additional layer of insulating air between the exterior and interior wall systems. Except for the pre-fabricated window system which drains behind the pre-cast panel, there is no weeping system for drainage of water absorbed by the brick. Re-pointing, combined with limited masonry renovation would allow the building's exterior wall system to remain water-tight for many years.

The absence of insulation within the exterior building envelope creates an inefficient exterior wall. For the temperate climate of Massachusetts, insulation within the exterior envelope should be at least three inches thick to achieve a suitable R-value. This level of insulation in the exterior wall significantly increases the building's ability to remain warm in the winter and also helps the building to remain cooler in the late spring, summer, and early fall creating a more comfortable building environment. Under the current building code, some areas of the uninsulated building envelope might need to be addressed as part of any proposed comprehensive renovation of the building.

As mentioned, the exterior wall of each classroom includes a continuous band of window panels. A portion of these panels is designed with an intake grille to integrate mechanical ventilation through the precast panel to the inside. The windows reach all the way to the ceiling of each classroom, providing a very effective means of allowing natural daylight to permeate deep into the rooms. This is a significant component in creating an excellent classroom environment.

Though masonry facade repair is a recent capital improvement, the mortar appears to have receeded since

Roof

The roofing system at the Willett Early Childhood Center has been replaced on multiple occasions, as would be true of any building of this age. The last replacement occurred in 2004, and included a rubber membrane system (EPDM - ethylene propylene diene monomer) over the entire roof area. It does not appear that any insulation has ever been added to the roof system. Though the replacement may be considered a recent capital project, the life expectancy of a rubber membrane roof is approximately 20 years, which means the existing roof will need to be addressed again within the next five to ten years. Any plans for a comprehensive renovation in the future should include complete replacement of the existing roof systems and an analysis of the benefits associated with adding insulation to the roof such that it complies with current energy code requirements. This may require some removal of the existing roofing system (down to the structural deck) in order to expose a substrate which is appropriate for attachment of the new insulation. This removal would also assist in removing prior roofing layers which add unnecessary weight to the roof and lower its snow-load carrying capacity.

Windows

The windows on the original building are steel sashes, mostly fixed windows with an operable awning on the bottom of the units. Unlike the other school buildings in Norwood, there has been no window upgrade at the Willett Center. The system remains in decent condition; however, it is possible that portions of the system would have to be replaced if a fully compliant comprehensive renovation is completed at the facility. The windows would not meet the new standards. Additionally, even more stringent energy code requirements will be in place prior to the commencement of any proposed renovations to the school.

Doors

All the exterior doors are original. They are metal doors in hollow metal frames with original hardware.

Interior

(Floors, Walls, Doors, and Ceilings)

Floors

Almost all floor materials throughout the building are Vinyl Asbestos Tile (VAT): the

classrooms, corridors, and cafeteria to name a few. The VAT is in poor condition. The kitchen is a glazed tile and service spaces have concrete floors. In the modular classrooms, the flooring is Vinyl Composition Tile (VCT). The floors in all toilet rooms are ceramic tile.

Although the Vinyl Asbestos Tile (VAT) is non-friable and poses no threat to the students or staff, most school systems have developed schedules for periodic removal and replacement of such finishes over time with the ultimate goal of full abatement of asbestos containing materials. Areas within the building that still contain some asbestos materials, like the cafeteria and classrooms, should be considered as part of any future renovation plans. The joints between dissimilar flooring materials, including ceramic tile in toilet rooms, often vary significantly in height resulting in abrupt flooring transitions. These abrupt transitions create handicap accessibility challenges and will need to be addressed as part of any future renovations.

The wood flooring in the gymnasium visually appears to be in fair condition, showing signs of wear as a result of its many years of service. The system has likely been sanded many times, reducing its overall thickness and strength. Many of these older gym wood flooring systems had a limited number of wood sleepers (support members) underneath and relied heavily on the integrity of the finished tongue-and-groove wood flooring. The current system has exceeded its intended life expectancy and should be further reviewed as part of any future renovations.

Walls

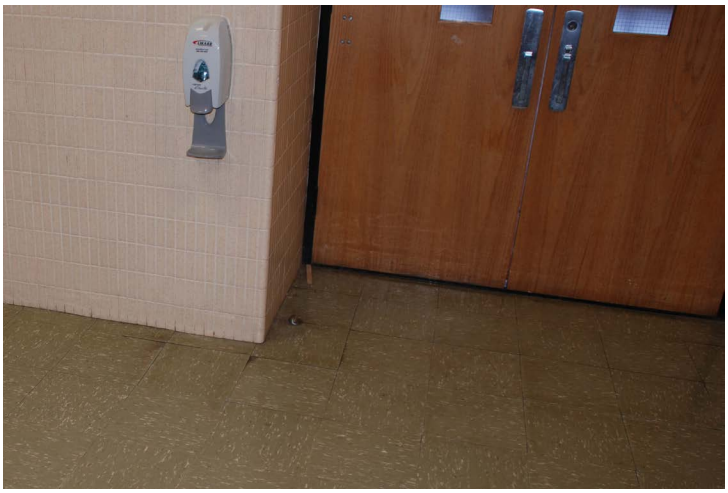
The corridor interior walls are concrete masonry units (CMU) with either structural glazed facing tile or exposed brick. Kitchen walls are tiled as well. Classroom walls are painted plaster on CMU with no sound absorbing panels. The plaster has chipped off in some locations. Numerous retrofitted systems had to be installed in exposed conduit and piping as opportunities to conceal these systems within the existing walls were limited. Exposed systems include wiring for fire alarms, power, light switches, and smart boards. These systems would typically be fully encased within the walls. There are constructed partition walls for the administrative offices, which appear to be gypsum wallboard on metal studs.

There are no lockers or storage units outside of the classrooms, resulting in storage congestion within classrooms which are already undersized. There are also a very limited number of custodial and/or storage closets resulting in small closets being crammed with a mix of materials, cleaning products, and equipment. This makes accessing the items inefficient and cumbersome.

The walls in the gymnasium are painted CMU with wood paneling and wall pads on the short sides. The long walls are brick regulated by full height fixed windows on the exterior side. The two CMU courses on all sides are exposed and unfinished. There are no bleachers or material for absorbing or reflecting sound in the space.

Doors

The interior wood doors with hollow metal frames throughout the school are original. The classroom entry doors do not have vision panels, but do have side lights and a transom. Though the metal frames are durable and regularly painted, the original hollow wood doors and transoms do not provide good acoustical separation between the classroom and corridor under current construction standards, especially if the school continues to use its corridors as programmed spaces. Solid core doors would



Almost all flooring materials are Vinyl Asbestos Tile and the varying thresholds between could pose accessibility challenges

decrease sound transmission and increase safety plus durability. Although the glass found in the corridors represents typical standards (wired glass) at the time it was installed, modern codes, regulations, and standards would require that this glass be fire rated and provide a greater degree of fire separation between the classroom and the exit corridor. In some cases, storage rooms are enclosed only by a curtain on a rod, which offers students an opportunity to hide or injure themselves. Additionally, storage is enclosed by partition walls within corridors that completely block the accessible approach of an emergency exit.

Most of the original door hardware appears to have been replaced over time. However, as regulations have continued to evolve over the recent past, much of the door hardware remains non-compliant and is further discussed in the handicap accessibility portion of this report.

Ceilings

The ceilings in the cafeteria are 1x1 ceiling tile, with no grid, adhered to the deck. These tiles and their glue attachment should be evaluated for asbestos content as many similar products produced from the 1930s through the 1970s did have some asbestos content. Although the tiles should be evaluated, they pose no immediate threat to students and staff, as they are non-friable and appear to have been painted several times. It appears to be failing where systems have since been installed and some water damage is present. The gymnasium is the exposed steel roof structure with a painted finish and purely industrial aesthetic. Classroom ceilings are the original plaster with hairline cracks. Newer looking 2x2 lay-in acoustic ceiling tile (ACT) with grid is in the corridors. Acoustical ceiling or wall treatments would better enhance the sound quality of these learning environments as the multiple layers of paint on the ceiling tile have likely compromised much of their acoustical qualities. Any upgrades to the building's mechanical, electrical, plumbing, or installation of a fire suppression system will require that the 2x2 lay-in ceilings be removed and replaced and will also likely require new lay-in ceiling with grid in all areas that do not currently have such.

Energy Conservation

The Willett Early Childhood Center was constructed in 1968, before the historic energy shortages of the 1970s and escalating oil prices of 2005. The emergence of a new energy code in 2000, which promoted an increased knowledge of exterior building envelope construction techniques and materials, has dramatically changed the way

in which buildings are designed to deal with energy efficiency issues. Massachusetts State Building Codes 3407.1 and 3407.2 require that alterations of an existing building in which the use group is not changed must comply to the energy conservation values detailed in Table 3407 of the code for any building elements (walls, windows, doors, roofs, or mechanical systems) which are altered during renovation.

Environmental Quality

In the past fifteen years, there have been tremendous advancements in the understanding of the various environmental factors that influence building occupants. These factors have been proven to be extremely important in the school buildings where students may spend most of their day in a single 700-900 sq. ft. classroom. Factors such as natural lighting, quality artificial lighting, fresh air ventilation levels, evenly distributed heating and cooling temperatures, and acoustical performance all work to enhance the educational environment. The Willett classrooms already include many of these factors as classrooms have significant natural lighting, access to natural ventilation, and newly installed indirect/direct artificial lighting. They do not include modern mechanical systems that would modulate the ventilation and fresh air in the classroom and they do not include air-conditioning; however, they do provide a very nice academic classroom environment and have been maintained well.

Educational, Spatial and Organizational Capacity

Capacity at an elementary school or childhood center can be calculated in several ways, including multiplying the number of available general classrooms and support areas by the appropriate number of students in each classroom. The Willett Early Childhood Center has a current capacity of approximately 350 students. Dividing the total building square footage by the student population provides an approximate amount of square feet being provided for each student, which is another benchmark for determining the general student capacity of the building.

Our analysis of the current Willett Center suggests that the building may require significant renovations and improvements in the future to accommodate enrollment. Its inefficient floor plan configuration results in some shortages of space to specific program areas, and feels overcrowded. These inefficiencies should be evaluated as part of any proposed future renovations. Any overcrowding conditions can lead to a very stressful environment where it is difficult to deliver a modern educational program.

In addition, the following conditions exist:

Main Office/Entrance

As mentioned previously within this report, the administration counter is easily located next to the main entrance. Administration is only the front desk, the Principal's office, and secretary area. As mentioned previously within this report, the main office currently has no direct supervision (other than a single video monitor) of visitors who approach and enter the building, though the administration counter itself is easily located from the main entrance. This allows an intruder who gains access to a single door to be able to enter a significant portion of the building without any direct visual observation by the staff, including access to student-filled hall ways.

Nurse's Suite

Community spaces, like student dining and its stage, have been compromised in order to accomodate academic programs

The nurse's suite is across from the administration counter. It is undersized and missing the adequate support spaces for medical examination and resting space.

Library Media Center

The unofficial library is significantly undersized and lacks the modern amenities associated with a 21st Century education resource. Any renovation should analyze the current organization of the school and better incorporate the library.

Classroooms

The size, configuration, organization, environmental quality, and instructional amenities within the classroom are critical to successful teaching and learning. Many of the Willett classrooms are undersized for pre-kindergarten and kindergarten functions. This limits the flexibility of programs and activities that can be offered.

Special Education

The current Special Education Program is undersized and is utilizing inadequate space for instructional, tutorial, and testing areas. These programs are not well distributed throughout the building and their locations present a significant challenge to the staff's ability to provide inclusion for the students. Additionally, many of the rooms do not meet the required space, accommodations, and organization to meet current State recommendations and guidelines.

Art Classrooms

Art instruction is done in the classrooms, which is not uncommon in a dedicated PK/K environment.

Music Classroom

Music instruction is done in the classrooms, gymnasium, or cafeteria; which is not uncommon in a dedicated PK/K environment.

Teacher and Group Planning Collaboration Areas

Space for teacher planning and collaboration is limited to one small room accessed through the main entry vestibule. There is no integration of planning or collaboration space throughout the school and no space devoted to faculty dining or services. Spaces to accommodate teacher socialization can ultimately contribute to the improvement of the school's educational philosophy through the sharing of ideas, as previously detailed in this report.

Kitchen
The kitchen at the school only serves as a warming kitchen for food that is prepared elsewhere and delivered.

Receiving And Storage
Proximity of the loading dock to the custodial suite and kitchen are convenient and a storage space is available. The service road is accessed on the eastern side of the building.

Recent Capital Improvements

Roof
The roof was completely replaced in 2004 and is currently EPDM.

Masonry
Masonry façade repair occurred in 2006.

Interiors
In 2010, lighting in the classrooms and gymnasium was upgraded. Floors have been replaced.

Security
Surveillance cameras were added in 2008.
Card access systems were added in 2012.

Massachusetts State Building Code:
780 CMR and Life Safety Issues

The Massachusetts State Building Code (780 CMR) has been updated and amended several times since the construction of the building. The State Board of Building Regulations and Standards regularly updates and amends its regulations. Based on these regulations, the following items were found to be in non-compliance:

- Two means of egress from spaces having an occupant load of greater than 50.
- Fire extinguishers
- Fire separation assembly between Use Group E (Educational) and Use Group A-3 (Assembly – Cafeteria, Gymnasium) (one hour fire separation required).

Handicap Accessibility

Requirements for handicap accessibility in building planning and design were non-existent when this building was originally designed. However, on January 26, 1992, the Department of Justice implemented Title III of the Americans with Disabilities Act (ADA) into Public Law. This legislation "prohibits discrimination on the basis of disability by private entities in places of public accommodation." The legislation requires all new places of public accommodation, including schools, to be readily accessible to and usable by persons with disabilities upon design and construction. Existing structures being renovated that exceed 30% of the equitized assessment of the building or its replacement value must fully comply with the regulations for new construction. Additionally, on September 1, 1996, the Commonwealth of Massachusetts developed its own accessibility regulations: 521 CMR Architectural

Access Board (AAB), which in some instances is more restrictive than ADA guidelines. The ADA and AAB regularly update and amend their regulations. Based on these regulations, the following items were found to be in non-compliance or not accessible to the disabled:

- All doors leading to all rooms in the school including classrooms, gymnasium, library, administration, etc. Non-conforming knob-type hardware currently exists. Lever handles are required.
- Not all classrooms are handicap accessible.
- All entries into classrooms require clear floor space adjacent to latch side of the door for entry and exit.
- Check-in counter at Administration Office.
- Lack of proper interior building signage (braille).
- Toilets
- Water fountains
- Library Circulation Desk
- Alarms and strobes within classrooms.
- Access to stage from main floor within Cafeteria.

Each of the inaccessible features listed above has an impact on the ability of disabled students or members of the community to access various spaces throughout the school independently. Disabled persons may include students with a permanent handicap condition, students that are temporarily disabled from athletic activity, and parents, staff, or other visitors that could have any form of disability. Any future plans should incorporate as many items as possible to accommodate disabled people to the fullest extent possible.

Proposed Space Summary- Elementary School

Over MSBA Guidelines

Under MSBA Guidelines

George F. Willett Center	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**16,364**			**0**			**0**			**0**		**20**	**20,000**	
(List classrooms of different sizes separately)																
Pre-Kindergarten w/ toilet			0										1,200		-	1,100 SF min - 1,300 SF max
Kindergarten w/ toilet	1,055	3	3,165										1,200	4	4,800	1,100 SF min - 1,300 SF max
General Classrooms - Grade PK-K			0										950	16	15,200	900 SF min - 1,000 SF max
Kindergarten	888	10	8,880													
Integrated Pre-School	905	4	3,620													
Integrated Pre-School	699	1	699													
SPECIAL EDUCATION			**3,145**			**0**			**0**			**0**			**4,530**	
(List rooms of different sizes separately)																
Self-Contained SPED			0										950	3	2,850	8% of pop. in self-contained SPED
Self-Contained SPED - toilet			0										60	3	180	
Resource Room			0										500	2	1,000	1/2 size Gen. Clrm.
Small Group Room / Reading			0										500	1	500	1/2 size Gen. Clrm.
Self-Contained Pre-school	595	1	595													
Quiet Room	184	1	184													
Sped & ELL	662	1	662													
Sped Motor Room	512	1	512													
Motor Skills	931	1	931													
Sped	261	1	261													
ART & MUSIC			**0**			**0**			**0**			**0**			**2,575**	
Art Classroom - 25 seats			0										1,000	1	1,000	assumed schedule 2 times / week / student
Art Workroom w/ Storage & kiln			0										150	1	150	
Music Classroom / Large Group - 25-50 seats			0										1,200	1	1,200	assumed schedule 2 times / week / student
Music Practice / Ensemble			0										75	3	225	
HEALTH & PHYSICAL EDUCATION			**3,097**			**0**			**0**			**0**			**6,300**	
Gymnasium	2,763	1	2,763										6,000	1	6,000	6000 SF Min. Size
Gym Storeroom	167	2	334										150	1	150	
Health Instructor's Office w/ Shower & Toilet			0										150	1	150	
MEDIA CENTER			**988**			**0**			**0**			**0**			**2,695**	
Media Center / Reading Room	988	1	988										2,695	1	2,695	
DINING & FOOD SERVICE			**3,962**			**0**			**0**			**0**			**6,687**	
Cafeteria / Dining	2,547	1	2,547										3,375	1	3,375	2 seatings - 15SF per seat
Stage			0										1,000	1	1,000	
Chair / Table / Equipment Storage	253	1	253										350	1	350	
Kitchen	825	1	825										1,750	1	1,750	1600 SF for first 300 + 1 SF/student Add'l
Staff Lunch Room	337	1	337										213	1	213	20 SF/Occupant
MEDICAL			**310**			**0**			**0**			**0**			**510**	
Medical Suite Toilet			0										60	1	60	
Nurses' Office / Waiting Room	310	1	310										250	1	250	
Examination Room / Resting			0										100	2	200	
ADMINISTRATION & GUIDANCE			**818**			**0**			**0**			**0**			**2,315**	
General Office / Waiting Room / Toilet			0										375	1	375	
Teachers' Mail and Time Room			0										100	1	100	
Duplicating Room			0										150	1	150	
Records Room			0										110	1	110	
Principal's Office w/ Conference Area	143	1	143										375	1	375	
Principal's Secretary / Waiting	116	1	116										125	1	125	
Assistant Principal's Office			0										120	0	-	
Supervisory / Spare Office	151	1	151										120	1	120	
Conference Room	242	1	242										250	1	250	
Guidance Office			0										150	2	300	

Space Summary

Willett Early Childhood Center

Guidance Storeroom	166	1	166										35	1	35
Teachers' Work Room			0										375	1	375
CUSTODIAL & MAINTENANCE			**497**			**0**			**0**			**0**			**2,050**
Custodian's Office			0										150	1	150
Custodian's Workshop			0										375	1	375
Custodian's Storage			0										375	1	375
Recycling Room / Trash			0										400	1	400
Receiving and General Supply	244	1	244										250	1	250
Storeroom	253	1	253										300	1	300
Network / Telecom Room			0										200	1	200
OTHER			**980**			**0**			**0**			**0**			**0**
Other *(specify)*															
Equipment Room	240	1	240												
Exterior Storage	130	1	130												
Incinerator	96	1	96												
Storage	233	1	233												
Storage	88	2	176												
Custodian	35	3	105												
Total Building Net Floor Area (NFA)			**29,851**			**0**			**0**			**0**			**47,662**
Proposed Student Capacity / Enrollment			385												**450**
Total Building Gross Floor Area (GFA)[2]			38,117												**73,125**
Grossing factor (GFA/NFA)			**1.28**									**#DIV/0!**			**1.53**

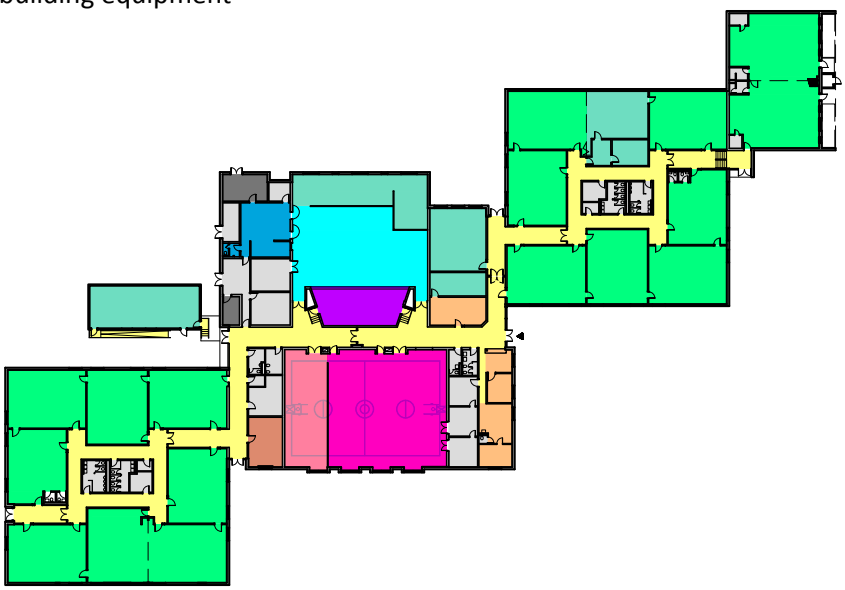
[1] **Individual Room Net Floor Area (NFA)** Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

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

Willett Early Childhood Center

- 385 students
- 38,500 square feet

media center
physical education
music & arts
auditorium or stage
kitchen & servery
student dining
special eduation
general classroom
circulation
administration/services
staff planning & support
custodial/toilets
building equipment



first floor

Structural Analysis

Willett Early Childhood Center

This report is based on a review of the available drawings of the original construction prepared by Korslund, LeNormand & Quann, Inc., dated April 11, 1967, and a visit to the site on December 1, 2016.

Existing Conditions

George F. Willett Early Childhood Center is essentially a one story structure with a large Playroom and Cafetorium. The original school was constructed in 1968 with modular additions in 2014. The structure is performing well for the most part.

We did not observe any excessive vibration due to foot fall on the concrete slab on grade.

We observed light cracking in the floor finishes.

We did not observe any signs of excessive foundation settlement or significant distress in the structure.

On the exterior, we observed the red brick façade and noted staining. We observed precast concrete elements in the building façade and noted rust staining on the surface. At the base of the red brick, we observed concrete foundation walls and noted moderate spalling.

We observed the roof structure and noted corrugated metal roof deck and open web metal joists. In the gym, we observed long span metal joists. The gymnasium was being used as a library. The walls of the gymnasium consist of masonry and we did not note positive anchorage between the walls and the roof structure.

On the roof, we observed a red brick chimney and noted staining and light deterioration to the mortar joints. We observed small patches of ice on the roof and standing water. We observed roof drains and noted light debris in the drains. We observed a metal roof ladder and noted moderate rusting and peeling paint.

We observed various expansion joints throughout the structure.

Systems Analysis

Willett Early Childhood Center

Fire Protection

Currently there is no Fire Protection system in the building.

Plumbing

Sanitary
The existing system is cast iron hub piping, the piping has deteriorated is in some places, and has been replaced with new hub-less piping, the overall system is in working condition.

Water Heaters
There is (1) Ruud 80 Gallon electric water heater (5-17-10) that feeds the school. It is in working condition.

Plumbing Fixtures
Currently all the fixtures are aged, and most do not meet ADA requirement, and will need to be replaced, but are in working condition. The water fountains do not meet ADA requirements, and there is some that are not in working condition.

Recommendations
- Replacement of plumbing fixtures to comply with ADA, and low flow due to age
- Gas supply for kitchen equipment requires emergency shut off
- Depending on the renovations, a larger water heater maybe need to meet the new demand

HVAC

The Willett is an electrically heated facility and as such, has no central boiler plant.

Duplex Air Compressor for ATC
The control system for this building is pneumatic with compressed air being provided by an air compressor, which was manufactured by Quincy. The air compressor is fully operational and appears to be in very good condition.

Unit Ventilators
The classrooms are furnished with classroom unit ventilators outfitted with electric resistance heating coils. The unit ventilators provide these spaces with heat and ventilation. The unit ventilators were manufactured by Herman-Nelson/AAF. The unit ventilators are original vintage and although they are still operational, they have outlived their useful service life.

The Cafetorium is heated by classroom unit ventilators installed at the building

perimeter with air conditioning being provided by two (2) small packaged rooftop units, which appear to have been installed in 2000.

Air conditioning is provided in other locations throughout the school by window air conditioners. This method of air conditioning is not very efficient, cannot provide even distribution of conditioned air and typically noise levels exceed recommended limits for teaching and office environments.

The gymnasium is heated and ventilated by four (4) unit ventilators installed on the exterior wall.

Recommendations

- Although the HVAC systems are fully operational and appear to be well maintained, they have outlived their useful service life and are considered inefficient by current standards
- Therefore, it is our recommendation that the HVAC systems should be replaced as part of any major renovation or expansion project

Electrical

Electric Service

The primary electric service which originates from an electric utility co. pole feeds an electric utility co. pad mounted transformer via underground conduit/cabling. The electric service appears to be original to the building and appears to be in poor condition.

Normal Power System

The switchboard is fed by the electric utility co. pad mounted transformer. The switchboard rated at 2000 amp, 120/208 volt, three phase, four wire feeds panelboards located in the Main Electric Room as well as panelboards throughout the building. Most of the normal power distribution is manufactured by Cutler Hammer. The normal power system appears to be original to the building and appears to be in poor condition.

Emergency Power System

The building has a 120/208 volt, three phase, four wire, 5 kW propane generator as manufactured by Kohler. The generator provides power to the emergency lighting via automatic transfer switch manufactured by Asco and a panelboard. The generator, automatic transfer switch, and the emergency panelboard are located in the Main Electric Room.

Emergency System - Deficiencies as it relates to current Codes:

- Emergency panelboards need to have dedicated two hour rated emergency electric rooms and cannot share space with normal panelboards
- Emergency panelboards require two hour feeders such as MI Cable and are required to be housed in two hour rated electric rooms
- Emergency panelboards are required to be protected by surge suppressors

The emergency power distribution appears to be original to the building and is in poor condition. As described above, the emergency power system does not meet current Codes.

Fire Alarm

The addressable fire alarm control panel as manufactured by Fire Lite Alarms series MS-9200UDLS does not appear to be original to the building. The fire alarm system consists of an exterior municipal master box, smoke detectors, heat detectors, duct smoke detectors, pull stations, strobes, and horn/strobes.

Fire Alarm - Deficiencies as it relates to current Codes:

- Inadequate detector coverage
- Points of egress without pull stations
- Pull stations not at ADA heights
- Inadequate strobe coverage as required by ADA in Conference rooms, Toilet rooms, and Assembly spaces including Classrooms
- Notification appliances are horns; Speakers are required to provide voice evacuation throughout the building
- Most of the interior Corridor doors are pried open and do not have magnetic door holders

The fire alarm system appears to be in fair condition. As described above, the fire alarm system does not meet current Codes.

Lighting

Interior

The interior lighting consists of surface mounted, pendant, recessed, and fluorescent downlights. Exit signs provide for direction to paths of egress. Lighting is not the most efficient as it relates to current standards. The interior lighting appears to be in fair condition.

Exterior

Lighting consists of wall packs, wall mounted floodlights, and site lighting on poles. Some of the lighting fixtures are original to the building with high intensity discharge lamps, while some of the lighting fixtures have been replaced with LED type. Most of the exterior lighting appears to be in good condition.

Switching

Most of the lighting in spaces is controlled by local wall switches, with some occupancy sensors.

Lighting - Deficiencies as it relates to current Codes:

- The current building switching does not meet the International Energy Conservation Code
- Automatic shutoff of lighting fixtures is required
- Daylight harvesting is required in certain spaces as indicated in the International Energy Conservation Code

The switching appears to be original to the building and is in fair condition. As described above, the switching does not meet current Codes.

Receptacles

Receptacles are ground type. Receptacles have been added over the years through the use of EMT conduit with surface boxes, tele-power poles, plugmold, and wiremold. Receptacles appear to be in fair condition.

Lightning Protection

The building does not have a lightning protection system which would include air terminals on the roof with downlead conductors to ground and surge protection.

Bi-directional Amplifier System

The building does not have a bi-directional amplifier system which would include an amplifier and cabling above ceilings for amplifying police and fire alarm radio signals as required by the International Building Code.

Wiring

Wiring is made up of MC cabling, FA MC cabling, EMT, Rigid, and PVC conduit.

Site Analysis

Willett Early Childhood Center

Existing Site Conditions

The George F. Willett Early Childhood Center consists of one (1) structure constructed in 1968 located at 100 Westover Parkway, in Norwood, MA. The Site is 22.89± acres on Assessors Map 12 / Block 1J / Lot 58 (Appendix B, Existing Conditions George F. Willett Early Childhood Center Feasibility Study). The Willett School accommodates approximately 78 students. The Site is accessed via Westover Parkway, which runs through the property at the southwest corner of the Site. The Site is furnished with paved parking areas and driveways, paved and non-paved playgrounds, a plaza, and a baseball field.

The Site is bound by The Winter Street Leaf Composting and Brush Disposal Facility located to the north of the Site through approximately 200 of woodlands, and the Highland Cemetery located to the east through the same woodland area. The Site is bound by residential properties south of the Site, and Westover Parkway to the west of the Site. Residential properties are located west of Westover Parkway.

Circulation and Parking

The school is oriented along a north-south axis. The main entry to the building faces the parking area to the west and is set back from Westover Parkway approximately 200 feet (Appendix A, Photo 1). Site traffic is circulated through a single two-way drive, which has an attached parking area (Photos 2 and 3). The service area and parent drop off area is accessed from a separate road that runs along the eastern side of the building (Photo 4). The bus drop off area is located along the west face of the school, indicated by painted markings. The eastern road has striping that indicates two-way traffic, but otherwise traffic on Site is one way, indicated only by painted arrows.

There are two primary parking facilities (Photo 2 and 3). The main circulation loop on the west side of the building has angled parking, and the north parking lot has standard bay parking. Additionally, a small amount of parking spaces are located just off of the eastern access road for service vehicles. The parking capacity requirement for schools as a “Place of Public Assembly” is one (1) space for every 3 person capacity in according to Section 6.1.3.B of the Zoning Bylaw. Aerial imagery shows 80 marked parking spaces in the north lot, 26 marked parking spaces in the angled lot, and 5 marked spaced in the lot adjacent to the east access road. Five (5) accessible spaces are required for the existing quantity of designated parking spaces, one (1) of which to be designated as van accessible. Six (6) accessible spaces are distributed between the two parking areas (Photos 5 and 6), however, none are marked as van accessible. Four (4) of the accessible parking spaces have an accessible path of travel between the spaces, two of which appear to have an accessible path of travel to a building entrance.

Crosswalks are absent at all pedestrian crossings. Signage is largely absent on Site,

with the exception of accessible parking signage and "no parking" signs. The main entrance to the school appears steep and should be confirmed for ADA accessibility (Photo 1). Detectable warning panels are not present at any of the transition curbs, and the sidewalk access at the west side of the school does not have any transition ramp to the school's sidewalks. The transition ramp for the angled accessible parking is in poor condition and lacks a crosswalk to it (Photo 7).

Zoning Regulations

According to the "Zoning Map of the Town of Norwood, MA." dated April 28, 2015, the Site is located in an area zoned Single Residence 2 (S2). Educational facilities are allowed within a zone S2 according to the "Town of Norwood Zoning Bylaw" Section 3.1. The Zoning Ordinance indicates the following dimensional requirements would control the development on this Site:

S2 – Single Residence 2:

15,000 square feet minimum lot area
125 feet minimum lot frontage
30 feet minimum front yard setback
20 feet minimum side yard setback
35 feet minimum rear yard setback
30 feet maximum building height
25% maximum lot cover
25% minimum open space
**The percentage of lot area covered by structures.
***Lot area not covered by any structure or by paving other than that limited to recreational use.
Currently there is approximately 4% lot cover and 74% open space.

Soils

Existing soils were evaluated based on the USDA Natural Resource Conservation Services Web Soil Survey. Below is a description of the soils that are shown throughout the Site as shown on the web soil survey (attached NRCS Soil Survey). The majority of the Site currently developed with the building, parking lot, and baseball field consists of Canton-Urban land complex (Map Unit 628C) characterized as having a rapid infiltration rate, and typically more than six feet to a restrictive feature. The undeveloped woodlands in the northern portion of the Site consists of Canton fine sandy loam (Map Unit 420B) characterized by moderate infiltration rates. A small portion of the Site along the western border of the Site is Ridgebury fine sandy loam (Map Unit 71B) characterized as having a very slow, nearly impermeable infiltration rate, and a high groundwater table. Confirmatory soil borings and test pits for the purpose of stormwater infiltration and building foundations have not been performed.

Topography

The topography of the Site generally pitches east to west from elevation 190 at the south east property line toward the wetlands along the west property line at elevation 150. The developed area is essentially level, with the western edge of the parking lot just above elevation 150 and the eastern edge of the service access drive at elevation 160. There is a steep hill in the woodlands to the east of the school cresting at elevation 190. Sedimentation is evident at several low spots throughout the site.

Record topographic maps and historical aerials (dated 1894 through present day) show the wetland areas west and north of the Site similar to the presently mapped location. There do not appear to be topographic changes which indicate that the school and parking areas do not appear to have been constructed on filled wetlands or a landfill.

Wetlands

After review of the Massachusetts GIS data layers, (MassGIS) there appear to be wetlands along the Germany Brook located west and north of the property in the undisturbed wooded areas. There are also two isolated wetlands on the east border of the Site between the school and the cemetery. The wetlands have a 100-foot regulatory buffer zone and the river has a 200-foor Riverfront Area which extends into the parking lot of the school (See George F. Willett Early Childhood Center Existing Conditions). Any construction in the 200-foot riverfront area and the 100-foot wetland buffer zone is subject to the Massachusetts Wetlands Protection Act. Projects that affect wetlands are required to file and NOI with the EPA and obtain an Order of Conditions with the local Conservation Commission.

After review of the MassGIS certified and potential vernal pools layers, the Site does not appear to have potential or certified vernal pools as defined by the Natural Heritage and Endangered Species Program (NHESP). If it is determined in an environmental review that a vernal pool exists on the Site, the local regulations require a 100-foot No-Disturbance Zone around the upland area edge or the wetland area edge that encompasses the vernal pool.

According to the Flood Insurance Rate Maps available through FEMA (Federal Emergency Management Agency), the wetlands to the west of the parking area are located within “Zone AE”. The wetlands north of the parking area are located the in “Zone X”. A “Zone AE” is defined by FEMA as an area with a 1% annual chance of flooding, and a “Zone X” is defined as areas with a 0.2% annual chance of flooding. The area directly around the Germany Brook is also labeled as a ‘Zone AE – Regulated Floodway”, which is defined as a channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Rare Species & Cultural Resources

Information regarding rare species was obtained from the MassGIS Rare Species and Priority Habitat data layer showing data recorded by the NHESP in the State Registry. There is no known NHESP mapped habitat on Site based on available MassGIS data maps.

Utilities

Available utilities on Westover Parkway are currently unconfirmed, although a visible water gate implies that potable water is accessed from the street rather than a well. drain manhole is also visible on the parkway; however it is more likely that this is part of a localized system draining into the brook rather than a larger stormwater system. Details of the existing sewer system are largely unknown at this time, with the nearest sewer manhole several hundred feet away from the Site.

Roof runoff is collected by downspouts and roof drains and is directed to catch basins

in the parking lots. The parking areas do not have curbs, and stormwater appears to flow overland to the landscape areas west of the paved area and infiltrate. Further investigation is required to identify where the stormwater is discharged, although stormwater appears to generally be directed to Germany Brook. The existing drainage system provides little to no treatment or attenuation of stormwater prior to discharging.

Site lighting is limited to the parking area, which is comprised of 3 poles with attached flood lights. Overhead electrical wires connect through the roof of the school to the poles along Westover parkway.

Athletic Facilities

There is a baseball field on the Site, which has a backstop and fences that appear to be in good condition (Photo 10). There is no athletic field lighting. The grass is in fair condition. Play equipment is in good condition, set within a fiber-mulch area, edged by timbers (Photos 8 and 9).

Landscaping

Mature oaks obscure the front façade of the structure. There are no landscape islands in the parking lots so most of the pavement is in direct sun. Shrub plantings around the school consist of rhododendron and other small evergreens. The brick plaza area adjacent to the baseball field contains a variety of plantings, and appears to have been installed more recently than the surrounding landscaping. Lawns are generally in good condition. Pavement throughout the Site is in fair condition with surface cracks, low spots, and patches throughout. Site fencing is limited to the 4 foot chain link fencing around playgrounds, and the fencing around the baseball field.

Summary

There are no constraints which prohibit this Site from serving as a viable location for a newly constructed school, or an expansion of the existing George F. Willett Early Childhood Center. Design considerations should include improved circulation and expansion of parking as necessary to meet zoning regulations and improve accessibility. Design considerations should also include improved infrastructure, including lighting, and athletic facilities consistent with the school's physical education program and the after school needs. Any increase in impervious area will require stormwater management consistent with onsite soils. Development should include recognition of the wetland resource areas and consideration for their buffer zones and flood storage, especially in the case of the existing parking area which currently infringes into the riverfront and wetland buffer zones. We would recommend these considerations be made part of future development options. However, we do not believe there are any constraints which preclude this Site from being a viable candidate for future school development.

Recommendations

The following Site improvements are recommended for consideration:

- Study of the vehicular circulation (cars, buses, emergency, and deliveries) to evaluate the effectiveness of the layout and determine improvements. Such improvements may include the re-striping of the drives and parking areas,

improved signage, as well as additional curbing. The study should also evaluate condition of vehicular and pedestrian hardscapes, and consider accessibility to the building, play areas, and baseball field to the rear of the Site.

• Add Site lighting for safety and security, consider placing existing wiring underground.

Solar lighting may be considered.

• Investigate Site utilities/drainage structures to ascertain their condition and capacities as they relate to Massachusetts DEP and Local Regulations.

• Rehabilitate lawns and install irrigation.

• Replace old and damaged Site furnishings. Consider additional Site furnishings such as tables, benches, bike racks, etc.

Appendix A

Photo 1: Front Entrance

Photo 2: Circulation Loop

Photo 3: Circulation Loop and Attached North Parking

Photo 4: Service Drive and Parent Drop Off

Photo 5: Loop Parking Accessible Parking

Photo 6: North Parking Lot Accessible Parking

Photo 7: Transition Ramp

Photo 8: Play Area

Photo 9: Play Area

Photo 10: Patio and Baseball Fence

Architectural Analysis

Coakley Middle School

As mentioned previously, the existing Phillip O. Coakley Middle School is the only middle school servicing the students in the Town of Norwood. Students in grades 6 through 8 face significant social, educational, and psychological challenges as they transition from elementary school to high school. Districts across the Commonwealth and across the country are recognizing that the educational environment they provide for their middle school students and teachers may possibly be the most critical environment within their PK-12 system, with many districts focusing on new, flexible, forward-thinking environments that provide all of the appropriate spaces and amenities to support students and teachers. Unfortunately for the Town of Norwood, the Coakley Middle School is the poorest performer within the District in terms of its ability to provide a modern 21st Century educational environment. It is significantly overcrowded and lacks even the most basic educational space such as appropriate general and specialized classrooms. It does not include the appropriately sized and located special education classrooms and support spaces.

It includes none of the hands-on learning spaces typically embedded within a modern middle school academic neighborhood, with only a single former wood shop having been converted to the only applied learning opportunity for students within the building. Teachers and administrators are trying desperately to develop typical S.T.E.A.M. (Science, Technology, Engineering, Art, Math) integration within the building but a lack of appropriate space makes this extremely challenging. A modern middle school would include dedicated S.T.E.A.M. spaces integrated within the science and academic classroom areas in order to provide interdisciplinary instruction. The Coakley Middle School includes none of this space and is too overcrowded to be able to convert or re-organize any existing space for such use. The modern middle school environment recognizes the critical need for language instruction in an expanded global economy, but unfortunately Coakley Middle School has no such space and faces significant challenges to such instruction as teachers transport language instruction around the building in order to find an available classroom. One of the universally accepted components to an appropriate and thriving middle school environment is teacher collaboration space. Research confirms that middle school environments that provide appropriate and dedicated space for teachers to collaborate on student challenges, instructional strategies, student needs, and interdisciplinary opportunities result in better student/teacher relationships where each student is well known and receives a customized educational experience that results in improved academic and social performance. Unfortunately, the Coakley Middle School lacks any appropriate space for such collaboration and planning and the overcrowded nature of the building makes it impossible to find such space.

The physical organization of the building results in dark, narrow internal corridors with no natural lighting or way-finding strategies. The plan includes multiple internal classrooms with no natural lighting or ventilation. At the time that the building was designed and constructed, architects and engineers theorized that mechanical ventilation alone was sufficient for these spaces and natural daylight was not

necessary; however, we now know this is not true and such practice violates most of the commonly accepted standards for appropriate educational classrooms. The school also relies on six modular classrooms that have been in place for a couple of decades. The use of these classrooms to expand the school population without the addition of the necessary support spaces exacerbates the overcrowding challenges.

The numerous other challenges of the Coakley Middle School environment are detailed herein. It is important to note that like all of Norwood's other school buildings, the Coakley Middle School is very well maintained and the challenges identified herein have nothing to do with the maintenance of the building or the Town's commitment to maintaining the facility over the past decades.

The Coakley Middle School will be identified in the Master Plan recommendations as the highest priority for the Town of Norwood. A comprehensive renovation and expansion or a new replacement school for the Coakley Middle School should be part of the immediate planning future of the Town.

General

The Coakley Middle School building was constructed in 1974 and serves 765 pupils in grades 6 through 8. It shares its site with fields used by Norwood youth sports. It is located off Washington Street, an arterial street spanning across Norwood on a north-south axis. The Coakley Middle School is organized along the same axis and faces Washington Street with Balch Elementary to its northwest and residential neighborhoods all along the west. For the most part, the middle school's fourteen acres are surrounded by play fields and vegetation. There are parking lots on the north and south ends of the site, so a visitor's approach is primarily from the point of view of the service spaces. The specific parameters and amenities of the site are further detailed within the specific site report herein.

The current building materials and systems have been well maintained, although they are now well over 40 years old. The building includes air conditioning and a sprinkler system, features that do not exist in the Town's elementary schools. Its corridors and classrooms are clean and well-maintained, although the size, number, and configuration present numerous challenges to a modern middle school environment. Interior materials do show signs of their age as both floor and wall tiles are cracking in many locations. This damage is purely aesthetic and any proposed recommendations for replacement would be cosmetic. Roof and window replacements, heating and ventilation modifications in the auditorium, and lighting upgrades have proven to be practical investments targeted at extending the life of the building in its current configuration and condition. These projects have been completed over the past decade; however, much of the building's HVAC equipment is outdated and is nearing the end of its life expectancy. The physical building is also very inefficient as it continues to operate on its original all-electric systems; something that would never be incorporated into a modern facility. The building requires a comprehensive renovation of its mechanical, electrical, and plumbing (MEP) systems and components that have not been addressed to date. The renovation and replacement of these systems will be very invasive, and will require selective demolition and restoration in many areas. This kind of work is likely to trigger additional building code compliance in many other areas of the building. In addition to the previously mentioned challenges, academic classrooms are undersized and lack many modern technology and communication amenities. Special education programs lack sufficient

Students in middle school face significant social, educational, and psychological challenges as they transition from elementary to high school; none of which are facilitated by the design of Coakley Middle School

space and are not integrated into the general academic classroom; deficiencies that would not meet Massachusetts Department of Elementary and Secondary Education (MA DESE) guidelines and requirements. Additionally, if the Town wishes to receive reimbursement funding from the Massachusetts School Building Authority (MSBA) for any proposed comprehensive renovation of the middle school, the project would have to fully address the numerous educational and spatial deficiencies identified herein, such as its undersized classrooms, lack of general classrooms, lack of project-based learning labs, insufficient S.T.E.A.M. integration space, interior classrooms with no daylight, elimination of modular classrooms, lack of specialized classrooms, lack of teacher and student collaboration space, insufficient special education space, and outdated classroom amenities.

Plan Organization

The Coakley Middle School is a 122,000 square foot, two-story split level facility, with an additional 6,100 square feet when including the modular classrooms. It is almost identical to the Savage Educational Center in North Norwood which is used for the Town's School District and various programs. The Savage Educational Center was originally a twin middle school to the Coakley, as the Town operated two middle schools. The Coakley currently services well over 765 students, well beyond its acceptable capacity based on modern middle school educational guidelines.

Essentially, the building is composed of three units and symmetry in plan per unit is prevalent. Unit A houses the auditorium and main administration offices, Unit B has a donut shaped circulation pattern that includes the academic classrooms organized around a centrally-located, double-height library space, and Unit C is the gymnasium with locker rooms and the cafeteria on the ground floor. This kind of separation of program through a greater division of building units allows for closing off one unit from another during after-school hours use. Public entry is achieved through Unit A, adjacent to the main office and accessible via compliant ramps. A secondary, accessible, main entry point is optional at Unit C, if, for example, only the gymnasium was required to be open. Although the building does include an elevator, numerous stairs and level changes throughout the building create many areas that do not provide accessibility compliance.

Exterior Envelope
(Foundation, Walls, Roof, Windows, and Doors)

Foundation

The building is constructed on a split-level, cast-in-place concrete slab raised on piles. (Refer to structural evaluation for additional information.)

Walls

The 42-year-old original construction documents indicate that the exterior envelope of the building consists of face brick, one inch of insulation, and masonry back-up support. There has been no major capital investment in restoring the envelope since its construction, which is common, but does mean that it is due for repointing and restoration in many areas. Unlike exterior masonry walls today, no cavity between the brick and masonry back-up exists, which can lead to a rapid decline in the exterior wall condition if the brick and mortar joints are not routinely monitored for signs of moisture infiltration. Cavity wall design is important because it disconnects the path temperature and water can take to infiltrate the inside finishes and allows an additional layer of insulating air between the exterior and interior wall systems. Beyond through-wall flashing at floor levels, there is no weeping system for drainage of water absorbed by the brick. Re-pointing, combined with limited masonry renovation, would allow the building's exterior wall system to remain water-tight for many years.

The one inch of insulation is very insufficient in protecting the heat loss and gain at exterior walls. For the temperate climate of Massachusetts, insulation within the exterior envelope should be at least three times as thick as the existing insulation to achieve a higher R-value. Not only is this important in keeping the cold temperature out of the building in the winter, but also in keeping the conditioned interior air in during the spring, summer, and fall; as part of maintaining a more energy efficient and comfortable interior building environment. Under the current building code, the quantity of insulation in many components of the exterior wall system would need to be addressed as part of any proposed comprehensive renovation of the building.

The windows along the main administration suite, Unit A, are single-hung with a precast lintel and bordered by bricks proud of the exterior face. The upper portion of the auditorium in this location is clad in a more contemporary metal panel. Exterior walls of the classroom wing, Unit B, include windows within a pre-cast concrete panel infill system. Clerestory windows at the gym of Unit C are a translucent fiber-reinforced polymer panel typically referred to by the trade name "Kalwall", as this company was the primary manufacturer of this panel at the time of construction. These panels were highly utilized at the time but are much less prevalent today as better technology exists to achieve the same end result and a better aesthetic appearance. As is common with this product, the polymer material has yellowed and faded with age. The polymer panels continue down the wall in approximately 4' strips giving the appearance of full height glass from within. Above these panels, the face brick shows some evidence of staining, likely a result of moisture run-off from current or prior metals that were either attached to the building or were utilized as part of the internal structural support of the walls or lintels over the windows.

Roof

The roofing system at Coakley Middle School was last replaced in 2002 and included a rubber membrane system (EPDM - ethylene propylene diene monomer) over the entire roof area. Though there may be as many as three re-roofing layers at this point in time, it does not appear that any insulation has ever been added to the roof system. Though the replacement may be considered a recent capital project, the life

Unlike masonry walls today, no cavity between the brick and masonry back-up exists, which can lead to thermal and moisture issues

expectancy of a rubber membrane roof is approximately 20 years, which means the existing roof will need to be addressed again within the next five to ten years. Any plans for a comprehensive renovation in the future should include complete replacement of the existing roof systems and an analysis of the benefits associated with adding insulation to the roof such that it complies with current energy code requirements. If the original insulation has not been increased, the total 2" thickness is highly insufficient by today's energy standards and should be improved. A resolution may require some removal of the existing roofing system (down to the structural deck) to expose a substrate which is appropriate for attachment of the new insulation. This removal would also assist in removing prior roofing layers which add unnecessary weight to the roof and lower its snow-load carrying capacity.

Windows

In 2008, the exterior windows of the building were replaced with a combination of fixed and hopper aluminum windows. This is a high-quality system which has done a good job stopping the deterioration of the building's exterior. Although the system represented the best of industry standards in 2008, the recent focus on energy conservation in the Commonwealth has since resulted in the Commonwealth's adoption of significantly higher energy code standards. The system remains in excellent condition; however, it is possible that portions of the system might have to be replaced if a fully compliant comprehensive renovation is completed at the facility. The system would be over ten years old at that time and the windows would not meet the new standards. Additionally, even more stringent energy code requirements will be in place prior to the commencement of any proposed renovations to the middle school.

Doors

All the exterior doors are hollow metal doors with metal frames and original hardware. Overall the building would benefit from a full replacement of doors. Accommodations for the handicapped must be included in the upgrade, including door hardware and access requirements.

Interior

(Floors, Walls, Doors, and Ceilings)

Floors

The majority of the building's floor finishes are Vinyl Asbestos Tile (VAT), including the

corridors, classrooms, cafeteria, and offices. Though efforts by the maintenance staff have kept these floors in good condition, asbestos is considered a hazardous material and, for a school, abatement is recommended in order to avoid the possibility of the product becoming friable. The library and modular classrooms are carpeted.

At some entries, the floor surface is tile in the same color as the exposed brick interior walls. This is the material for staircases as well and, overall, this product creates a dark atmosphere that is not consistent with the bright, dynamic, well-lighted interiors of a modern middle school. The floors in the toilet rooms and kitchen are ceramic tile.

The gymnasium wood athletic flooring is in good condition for its age and shows only limited signs of wear. However, it has likely been sanded many times and its long-term viability should be evaluated as part of any comprehensive renovation.

Walls

Interior walls along the building's perimeter are concrete masonry units (CMU) that have been finished with plaster. This is apparent as modern retrofitted amenities are all exposed including wiring for power, light switches, and interactive whiteboards. Interior partition walls are plaster on metal studs. Because much of the interior walls are covered with marker and tack boards, they have been well-preserved. There are a handful of classrooms with operable walls covered in a felt acoustic finish, but these are generally kept closed.

The corridors are a combination of tile, exposed brick, and plaster on metal stud which has been patched and painted. The corridor walls within the classroom sector are lined with full-height lockers, a very "Industrial Revolution" practice which is no longer prevalent in middle school design. Technology and media devices have greatly reduced the required storage area for student books and personal items and corridors in a modern middle school are more highly utilized for small group learning, tutoring, and independent study.

The walls in the kitchen and cafeteria areas are concrete masonry units (CMU) or ceramic tile. There is no acoustical treatment on the walls for absorbing or reflecting sound in the space.

The walls in the gymnasium are painted CMU with wood bleachers on each side and a band of wood paneling from the floor to about eight feet high on the wall. The wood bleachers show signs of wear and tear. The walls of the space do not have any acoustical treatment for absorbing or reflecting sound in the space. Piping and wiring is exposed.

Doors

The interior painted wood doors with hollow metal frames throughout the school are original. Many of them show signs of wear and chipped paint. These older doors provide very little acoustical separation between the corridor and classroom when compared to modern doors and construction standards. Although the glass found in the corridors represents typical standards (wired glass) at the time it was installed, modern codes, regulations, and standards would require that this glass be fire rated and provide a greater degree of fire separation between the classroom and the exit corridor. The doors from the corridor to the egress stairs also lack compliance with modern codes, regulations, and standards and do not provide the necessary fire ratings for protection of the egress stairways.

Typical classroom entries along the corridor offer no sense of activity or personality and are essentially uninviting

Most of the original door hardware appears to have been replaced over time. However, as regulations have continued to evolve over the recent past, much of the door hardware remains non-compliant and is further discussed in the handicap accessibility portion of this report.

Ceilings

Plaster, lay-in 2x2 and 2x4 acoustic ceiling tile (ACT) with grid, and 1x1 ACT are the most common ceiling systems throughout Coakley Middle School. The condition of the 2x2 ACT, above the main entry lobby and cafeteria, is the best of these three material choices. The classroom and corridor 1x1 tile is mismatched where replacement has occurred and broken in some places. Plaster ceilings, like the one in the auditorium, are dirty and would benefit from re-surfacing. Acoustical ceiling or wall treatments would better enhance the sound quality of these learning environments as the multiple layers of paint on the ceiling tile have likely compromised much of their acoustical qualities. Any upgrades to the building's mechanical, electrical, plumbing, or installation of a fire suppression system will require that the 2x2 lay-in ceilings be removed and replaced and will also likely require new lay-in ceiling with grid in all areas that do not currently have such.

Energy Conservation

The Coakley Middle School building was constructed in 1974, during the historic energy shortages of the 1970s and escalating oil prices of 2005. The emergence of a new energy code in 2000, which promoted an increased knowledge of exterior building envelope construction techniques and materials, has dramatically changed the way in which buildings are designed to deal with energy efficiency issues. Massachusetts State Building Codes 3407.1 and 3407.2 require that alterations of an existing building in which the use group is not changed, must comply to the energy conservation values detailed in Table 3407 of the code for any building elements (walls, windows, doors, roofs, or mechanical systems) which are altered during renovation.

Environmental Quality

In the past fifteen years, there have been tremendous advancements in the understanding of the various environmental factors that influence building occupants. These factors have been proven to be extremely important to students who may

spend most of their day in a single 700-900 sq. ft. classroom. Factors such as natural lighting, quality of artificial lighting, fresh air ventilation levels, evenly distributed heating and cooling temperatures, and acoustical performance all work to enhance the professional and educational environments. The Coakley's facilities include limited implementation of these key factors, and in-fact include many classroom spaces which lack appropriate natural lighting and ventilation by today's standards. This creates less than ideal conditions for many students and teachers.

Middle School Learning Environments

The ideal middle school educational environment includes many key factors. Modern 21st Century middle schools include flexible classrooms that utilize "Laboratories for Learning" where all the necessary environmental factors, technology integration, and spatial configurations work to create "ideal" environments. These modern classrooms allow teachers to introduce "real world" examples of instructional material through the seamless integration of video internet technology. They also allow students to present and facilitate with their peers, giving them invaluable exposure to learning, presentation, and collaboration skills. Technology can be energized quickly and efficiently through teacher facilitator stations. Lighting, ventilation, and carbon dioxide levels are all monitored and adjusted automatically to create ideal environmental conditions. Teachers have collaborative planning and work areas that allow them to share critical planning and development ideas for their coursework. Cross-discipline instruction and project-based, hands-on learning and work areas are integrated into the academic environment in a manner similar to that of a corporate planning and work environment. Core facilities such as library/media centers have become highly advanced media retrieval centers and are located in close proximity to all academic functions to allow for key sharing of valuable resources. Academic zones are organized for quiet separation from noisier zones such as cafeterias and gymnasiums. Their layouts and plan organizations are structured to promote integration of science, technology, engineering, math, and the arts. Corridors and hallways are organized and designed to create "experience and exposure", in addition to providing functional movement patterns. These corridors, previously considered noisy areas that should be lined with student lockers, are now more heavily utilized as the classroom space becomes extended to provide independent learning and tutorial areas. Performing and practical arts facilities include highly advanced opportunities for students to explore their talents at a critical age when many of their future professional talents are evolving.

Educational, Spatial and Organizational Capacity

Capacity at the middle school can be calculated in several ways, including multiplying the number of available general classrooms and support areas by the appropriate number of students in each classroom and adding accommodations for specialized instruction. Capacity can also be calculated by evaluating the available square feet per student and comparing that to generally accepted educational standards. A third method for calculating the appropriate capacity is to utilize the MSBA's established guidelines and standards. Regardless of the methodology utilized, the Coakley Middle School is significantly overcrowded and undersized for the current population and lacks many critical program spaces and components.

In addition, the following conditions exist:

Rooms originally unintended as classroom space are being used as such, without access to fresh air or daylight

Main Office/Entrance

The administration offices are located to the immediate left of the main entry. All offices and support areas are undersized per today's standards and the area is dark, narrow, and crowded during most parts of the day. There are no opportunities to exhibit student work or to appropriately establish the identity and personality of the school. Although this may not seem important to some, research indicates that high performing middle schools thrive on personalization and identity and such characteristics begin at the student entry point into the building. The narrow dark entry into the Coakley Middle School with its dark finishes and lack of natural lighting, crowded lobby and waiting area, and insufficient student and administrator support spaces, performs poorly when compared to the modern middle school environment. It also lacks the necessary guidance, testing, conference, psychologist, and parent support spaces that are provided in a modern middle school environment.

Nurse's Suite

The nurse's suite is in the central core of Unit B, adjacent to the library. It lacks storage space and a separate nurse's office but includes the minimal space necessary for student resting.

Library Media Center

The library is a double-height space on the ground floor and central to Unit B, bordered by classrooms on all four sides. It receives no natural lighting or ventilation.

Classroooms

The size, configuration, organization, environmental quality, and instructional amenities within the classroom are critical to successful teaching and learning. All classrooms have internet access and smart boards but are undersized based on multiple educational guidelines and standards, including MSBA's standards. There are no non-traditional classrooms available for flexible instruction, although operable walls in some areas were originally intended for this prior to the significant overcrowding. Classrooms typically must organize and operate in a 1970s fashion, as there is no space available to accommodate interdisciplinary collaboration and instruction. There are numerous interior classrooms without natural light or ventilation, which would not exist under modern educational guidelines and standards. The building is not organized to support academic teams or neighborhoods as its functional arrangement is counter to this modern approach and it also lacks many of the necessary support spaces. Academic classroom areas include no hands-on, project-based learning and

instruction areas, commonly referred to as "Maker/Builder' spaces in the modern middle school environment.

The rear sets of risers in the auditorium are set up to serve as private lecture halls if desired, separated by curtains.

Modular classrooms intended as temporary structures have become permanent fixtures for the school. Their foundation system was not designed for such prolonged exposure and their existence has exceeded life expectancy. They cannot be considered as available space under an MSBA compliant renovation or expansion as they do not provide an appropriate and long-term educational environment for students and teachers.

Special Education

The Massachusetts Department of Secondary and Elementary Education (MA DESE) has evolved significantly since the time when the Coakley Middle School was designed and planned. Additionally, all educational delivery and support surrounding special education has become significantly more targeted and strategic. This results in numerous additional spaces and programs, most of which need to be strategically incorporated into the general academic classroom areas. Available space within the Coakley Middle School for special education typically includes the conversion of spaces that were initially intended for some other purpose. This results in spaces that are undersized, insufficient, and poorly located; lacking the amenities that would be incorporated into a modern program. Significant efforts have been made by teachers and administrators to create the best possible conditions considering the physical limitations of the existing building. However, the utilized spaces do not meet current state recommendations and guidelines for size, location, or number.

Science Classrooms

There are five science classrooms with shared prep and storage rooms on the first floor. The classrooms are significantly undersized based on current educational guidelines and MSBA guidelines and recommendations. The labs also lack any integration to other disciplines or a project-based engineering lab that would allow for hands-on learning. Students in modern middle school science programs integrate engineering, math, technology, art, and science in the development of projects that demonstrate the integration of building, engineering, presentation, and creativity. These projects require available space and appropriate organization and integration of the academic classrooms. Unfortunately, the Coakley Middle School is designed to isolate science instruction in a remote environment without the necessary space for application projects. The small size of the science classrooms, combined with their location and organization, presents a significant challenge to modern middle school science instruction.

Art Classrooms

There are two art classrooms located in Unit A, adjacent to the music classroom and across from the auditorium. Although the appropriate number of spaces are provided, these spaces are undersized based on current educational guidelines. Their location adjacent to the music classroom and auditorium provide adjacencies that were popular in the 1970s; however, art is typically more closely integrated with science, engineering, and other disciplines in a modern middle school environment. These adjacencies tend to facilitate more use of creativity within cross-curriculum instruction. Storage space is very limited when compared to educational guidelines,

Classrooms meant for special education, collaboration, or distance learning have acoustical, organizational, and spatial problems

and there is no separate room for the pottery kiln.

Music Classroom

The single music classroom resides in Unit A, adjacent to the auditorium stage. Four individual practice rooms separate the music room from the corridor. There is an auxiliary office for the instructor and two small storage rooms for equipment. Although the room has a nice adjacency to the auditorium, it is significantly undersized based on MSBA guidelines and recommendations.

Teacher and Group Planning Collaboration Areas

There is no space available for teachers to collaborate, conference, or work. The space at the middle school designated for teachers includes only one small teacher's room off the custodial hall and a small faculty dining room off the cafeteria. This is a small fraction of the necessary space and is grossly inadequate when compared to modern educational guidelines.

Technology has greatly assisted collaboration among teachers and staff; however, the power of face-to-face interaction has yet to be replicated by technology. Human interaction is everything, especially in a creative, innovative, and knowledge-intensive sector such as education. The strength of any creative organization is shaped as much by the day-to-day chance contact of its members as it is by formal gatherings such as scheduled appointments. Critical information leading to educational innovation often comes from informal encounters between teachers from varying disciplines and backgrounds. These same interactions result in teachers being much more familiar with each student's needs, challenges, and daily routine. The design of any modern 21st Century middle school includes strategies which promote this interaction while also supporting a variety of professional activities. Additionally, teachers are no longer tied to their desks but rather they have a 'home' in the workplace where they are able to organize their activities across a variety of environments with a range of different qualities which they share with their colleagues.

Distance Learning and Student Presentation Theaters

Many modern middle schools incorporate advancements in technology that allow students to exchange ideas, information, and resources with other students around the world. These learning and presentation opportunities do not exist in the current Coakley Middle School. Though there are two computer labs, students today are beyond learning basic computing and keyboarding skills, and the current labs are

not representative of the advanced facilities that would appear in a modern middle school. The teachers and students would have much more appropriate opportunities in a modern environment that made technology use and application available throughout the building, including the application of advanced technologies in areas such as media production, robotics, digital arts, graphic arts, digital communication, and various engineering applications.

Receiving And Storage
Receiving is accessed by way of the north parking lot, Unit C. Storage space in the school is limited to the point that boxes of paper and music stands are being stored together under the stairways. This method of storage creates a cluttered appearance, but more importantly compromises the use and emergency egress function of the fire-rated stairway.

Recent Capital Improvments

Roof
The roof was completely replaced in 2005.

HVAC
The auditorium's heating and ventilation system was replaced in 2002.

Interiors
In 2009, lighting in the gymnasium was replaced. Some lighting in the corridors, locker rooms, and the auditorium lighting control panel was also replaced over the past decade.

Windows
Complete window replacement occurred in 2008.

Site
All outdoor lights were replaced with LED lighting in 2016.

Security
Surveillance cameras were added in 2008.
Card access systems were added in 2013.

Massachusetts State Building Code:
780 CMR and Life Safety Issues

The Massachusetts State Building Code (780 CMR) has been updated and amended a number of times since the construction of the building. The State Board of Building Regulations and Standards regularly updates and amends its regulations. Based on these regulations, the following items were found to be in non-compliance:

- Occupied spaces (classrooms and offices) currently provide an entrance from within an egress stairway.
- Egress stairway enclosures, including door assemblies, require a minimum one-hour fire separation assembly.
- Two means of egress from spaces having an occupant load of greater than 50.
- Fire extinguishers
- Fire separation assembly between Use Group E (Educational) and Use Group A-3

(Assembly – Cafeteria, Gymnasium) (one hour fire separation required).
- Handrail and guardrail at egress stairways.
- Electrical panels in classrooms and corridors.

Handicap Accessibility

Requirements for handicap accessibility in building planning and design were non-existent in the early 1970s when this building was originally designed. However, on January 26, 1992, the Department of Justice implemented Title III of the Americans with Disabilities Act (ADA) into Public Law. This legislation "prohibits discrimination on the basis of disability by private entities in places of public accommodation." The legislation requires all new places of public accommodation, including schools, to be designed and constructed so as to be readily accessible to and usable by persons with disabilities. Existing structures being renovated that exceed 30% of the equitized assessment of the building or its replacement value must fully comply with the regulations for new construction. Additionally, on September 1, 1996, the Commonwealth of Massachusetts developed its own accessibility regulations: 521 CMR Architectural Access Board (AAB), which in some instances is more restrictive than ADA guidelines. The ADA and AAB regularly update and amend their regulations. Based on these regulations, the following items were found to be in non-compliance or not accessible to the disabled:

- All doors leading to all rooms in the school including classrooms, gymnasium, library, administration, etc. Non-conforming knob-type hardware currently exists. Lever handles are required.
- All entries into classrooms require clear floor space adjacent to latch side of the door for entry and exit.
- Check-in counter at Administration Office.
- Lack of proper interior building signage (braille).
- Toilet and shower rooms
- Drinking fountains
- Library Circulation Desk
- All stairs (handrails and nosing)
- Alarms and strobes within classrooms.
- Accessible path to upper floor
- Accessible path inside main entry
- Existing elevator is not accessible.

Each of the inaccessible features listed above has an impact on the ability of disabled students or members of the community to access various spaces throughout the school independently. Disabled persons may include students with a permanent handicap condition, students that are temporarily disabled from athletic activity, and parents, staff, or other visitors that could have any form of disability. Any future plans should incorporate as many items as possible to accommodate disabled people to the fullest extent possible.

Proposed Space Summary- K - 8 Schools

Coakley Middle School	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**30,162**			**0**			**0**			**0**		**48**	**41,260**	
(List classrooms of different sizes separately)																
Pre-Kindergarten w/ toilet			0										1,200		-	1,100 SF min - 1,300 SF max
Kindergarten w/ toilet			0										1,200	0	-	1,100 SF min - 1,300 SF max
General Classrooms - Grades 1-5			0										950	0	-	900 SF min - 1,000 SF max
General Classrooms - Grades 6-8			0										950	34	32,300	
Science Classroom / Lab			0										1,200	7	8,400	1 period / day / student
Prep room			0										80	7	560	
Grade 8 Classrooms	786	8	6,288													
Grade 8 Science Classroom	980	1	980													
Grade 8 Science Classroom	955	1	955													
Grade 8 Science Classroom	791	1	791													
Grade 7 Classrooms	787	10	7,870													
Grade 7 Science Classroom	1,031	1	1,031													
Grade 7 Science Classroom	802	1	802													
Grade 6 Classroom	818	5	4,090													
Grade 6 Classroom	742	1	742													
Grade 6 Classroom	598	1	598													
Grade 6 Science Classroom	1,195	1	1,195													
Grade 6 Science Classroom	991	1	991													
Grade 6 Science Classroom	749	1	749													
Science Prep	263	1	263													
Science Prep	209	1	209													
Language Lab	842	1	842													
Foreign Language	965	1	965													
Foreign Language	801	1	801													
SPECIAL EDUCATION			**5,629**			**0**			**0**			**0**			**9,060**	
(List rooms of different sizes separately)																
Self-Contained SPED - Grades 6-8			0										950	6	5,700	8% of pop. in self-contained SPED
Self-Contained SPED - Grades 1-5			0										950	0	-	8% of pop. in self-contained SPED
Self-Contained SPED - Grades 1-5 toilet			0										60	0	-	
Self-Contained SPED - Grades 6-8 toilet			0										60	6	360	
Resource Room - Grades 6-8			0										500	4	2,000	
Resource Room - Grades 1-5			0										500	0	-	
Small Group Room / Reading	198	1	198										500	2	1,000	1/2 size Genl. Clrm.
Sped P.A.C.S.	1,139	1	1,139													
Sped Behavioral T.A.S.C.	802	1	802													
Sped Pragmatic Learning Center	773	1	773													
Sped Academic Support	456	2	912													
Sped Teachers Room	268	1	268													
Sped Teachers Room	156	1	156													
Literacy - ELL	784	1	784													
Visual Impairment 1:1	154	1	154													
Literacy	202	1	202													
Sped Adaptive PE	158	1	158													
Sped Storage	83	1	83													
ART & MUSIC			**4,091**			**0**			**0**			**0**			**3,800**	
Art Classroom - Grades 1-5			0										1,000	0	-	assumed schedule 2 times / week / student
Art Classroom - Grades 6-8			0										1,200	2	2,400	assumed use - 50% population 2 times / week
Art Classroom	1,040	1	1,040													
Art Classroom	928	1	928													
Art Workroom w/ Storage & kiln			0										150	2	300	
Art Storage	165	1	165													
Art Storage	50	1	50													
Band / Chorus - 100 seats			0										1,500	1	1,500	
Music Classroom / Large Group - 25-50 seats	1,128	1	1,128										1,200	0	-	assumed schedule 2 times / week / student
Music Practice / Ensemble - Grades 1-5			0										75	0	-	
Music Practice / Ensemble - Grades 6-8	86	4	344										200	-2	(400)	
Music Office	192	1	192													
Music Storage	122	2	244													
VOCATIONS & TECHNOLOGY			**3,421**			**0**			**0**			**0**			**6,400**	
Tech Clrm. - (E.G. Drafting, Business)			0										1,200	2	2,400	Assumed use - 25% Population - 5 times/week
Tech Shop - (E.G. Consumer, Wood)			0										2,000	2	4,000	Assumed use - 25% Population - 5 times/week
S.T.E.M. Wood Shop	1,528	1	1,528													
S.T.E.M.	1,176	1	1,176													
Planning Center	349	1	349													

Space Summary

Coakley Middle School

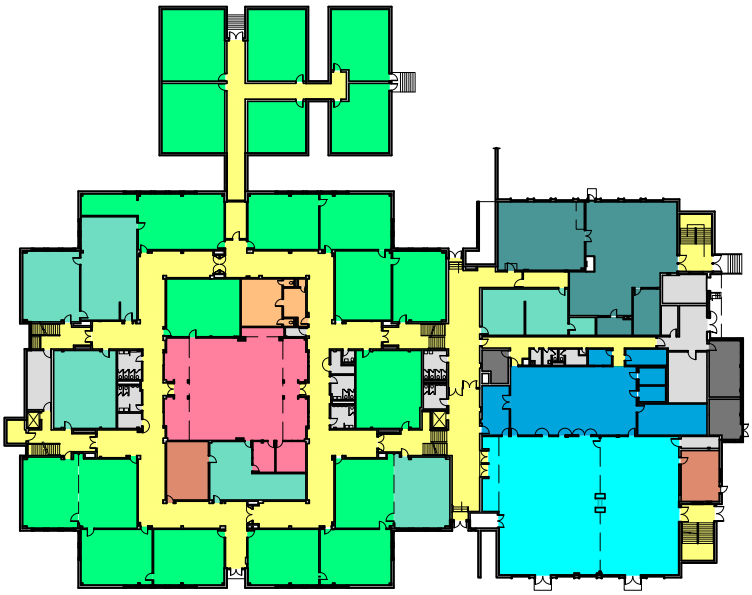
Storage	246	1	246										
Office	122	1	122										
HEALTH & PHYSICAL EDUCATION			**13,815**			**0**			**0**			**0**			**8,400**	
Gymnasium	9,938	1	9,938							6,000	1	6,000	6000 SF Min. Size
Gym Storeroom	132	1	132							150	1	150	
Health Instructor's Office w/ Shower & Toilet			0							250	1	250	
Girls Health Office with Shower	107	1	107										
Boys Health Office with Shower	124	1	124										
Boys Health Office	89	1	89										
Locker Rooms - Boys / Girls w/ Toilets			0							1,000	2	2,000	
Girls Locher Room with Toilets	1,894	1	1,894										
Boys Locker Room with Toilets	1,531	1	1,531										
MEDIA CENTER			**3,210**			**0**			**0**			**0**			**4,727**	
Media Center/Reading Room	3,210	1	3,210							4,727	1	4,727	
DINING & FOOD SERVICE			**10,288**			**0**			**0**			**0**			**10,067**	
Cafeteria / Dining	5,143	1	5,143							5,670	1	5,670	2 seatings - 15SF per seat
Kitchen	2,844	1	2,844							2,056	1	2,056	1600 SF for first 300 + 1 SF/student Add'l
Chair / Table / Equipment Storage			0							452	1	452	200 SF for first 300 + .333 SF/student Add'l
Staff Lunch Room	389	1	389							289	1	289	200 SF for first 400 + .25 SF/student Add'l
Stage	1,912	1	1,912							1,600	1	1,600	
MEDICAL			**567**			**0**			**0**			**0**			**710**	
Medical Suite Toilet	17	2	34							60	1	60	
Nurses' Office / Waiting Room	148	1	148							250	1	250	
Examination Room / Resting	385	1	385							100	4	400	
ADMINISTRATION & GUIDANCE			**3,420**			**0**			**0**			**0**			**3,406**	
Principal's Office w/ Conference Area	159	1	159							375	1	375	
Principal's Secretary / Waiting	468	1	468							125	1	125	
Assistant Principal's Office - AP1	137	1	137							150	1	150	
Assistant Principal's Office - AP2	129	1	129							150	0	-	
General Office / Waiting Room / Toilet	100	1	100							478	1	478	
Conference room	132	1	132							350	1	350	
Teachers' Mail and Time Room			0							100	1	100	
Duplicating Room			0							200	1	200	
Records Room			0							200	1	200	
Supervisory / Spare Office			0							150	1	150	
General Waiting Room			0							100	1	100	
Guidance Office			0							150	4	600	
Guidance Storeroom			0							50	1	50	
Teachers' Work Room	488	1	488							528	1	528	
Resource Room	770	1	770										
School Resource	117	1	117										
Testing	121	1	121										
Timeout	219	1	219										
Foreign Language Teacher Room	152	1	152										
Office	107	4	428										
CUSTODIAL & MAINTENANCE			**791**			**0**			**0**			**0**			**2,231**	
Custodian's Office	97	1	97							150	1	150	
Custodian's Workshop			0							250	1	250	
Custodian's Storage	393	1	393							375	1	375	
Storeroom			0							504	1	504	
Recycling Room / Trash			0							400	1	400	
Receiving and General Supply	301	1	301							352	1	352	
Network / Telecom Room			0							200	1	200	
OTHER			**10,608**			**0**			**0**			**0**			**0**	
Other *(specify)*													
Auditorium	8,320	1	8,320										
Stage Storage	109	1	109										
Computer Lab	1,004	1	1,004										
Transfer Vault	241	1	241										
Switch Room	351	1	351										
Outdoor Storage	255	1	255										
P.T.O. Storage	91	1	91										
Storage	93	1	93										
Storage	72	2	144										
Total Building Net Floor Area (NFA)			**86,002**			0			0			0			**90,061**	
Proposed Student Capacity / Enrollment			756									756			**756**	Enter grade enrollments to the right
Total Building Gross Floor Area (GFA)[2]			125,382		GSF of existing			GSF new	0			0			**135,091**	
Grossing factor (GFA/NFA)			**1.46**								(estimate)				**1.50**	

[1] **Individual Room Net Floor Area (NFA)** Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

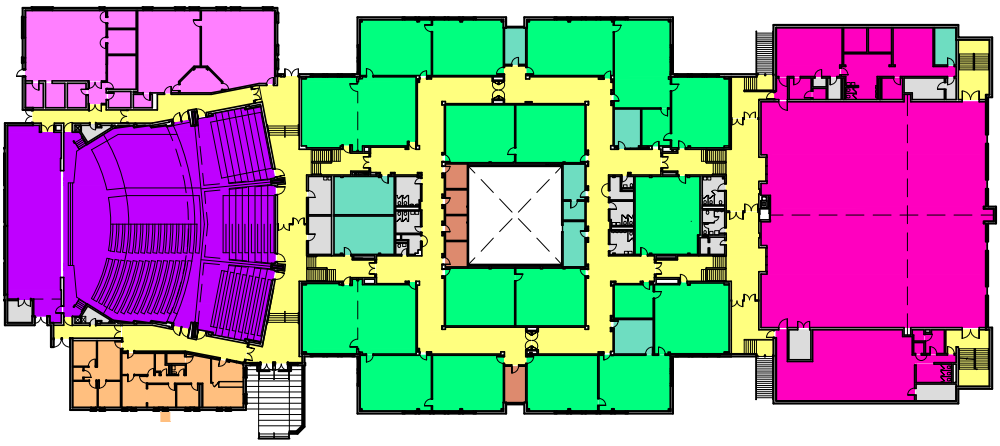
[2] **Total Building Gross Floor Area (GFA)** Includes the entire building gross square footage measured from the outside face of exterior walls

Coakley Middle School
- 756 students
- 128,000 square feet

media center
physical education
music & arts
auditorium or stage
kitchen & servery
student dining
special eduation
general classroom
circulation
administration/services
staff planning & support
custodial/toilets
building equipment



second floor



first floor

Structural Analysis

Coakley Middle School

This report is based on a review of the available drawings of the original construction prepared by Korslund, LeNormand & Quann, Inc., dated September 11, 1972, and a visit to the site on November 8, 2016.

Existing Conditions

The Dr. Philip O. Coakley Middle School is essentially a two story structure with a Gymnasium, Library, and Auditorium. The original school was constructed in 1972. The structure is performing well for the most part. The roof construction consists of corrugated metal roof deck on open web bar joists spanning between masonry walls on concrete foundations. The Gymnasium roof construction consists of 1 ½ in. deep 20 gage metal roof deck on steel framing including steel trusses. In one location, we observed a cast in place concrete rib-slab structure. The foundation consists of reinforced cast in place concrete spread footings for the most part. Concrete grade beams support the exterior facade. The lowest level consists of a 4 in. thick concrete slab on grade.

We observed the exterior red brick and precast concrete façade elements and noted light staining. We observed control joints and noted moderate cracking in the joint material.

We observed cast in place concrete retaining walls on the exterior of the building and noted that the metal railings along the top exhibited peeling paint and moderate rusting.

We observed steel lintels in the exterior façade and noted light rusting and peeling paint.

At the loading dock, we observed signs of weathering evidenced by scaling concrete and rust-stained steel elements.

At the rear of the building, we observed wood-framed modular classrooms. We observed plywood skirt siding around the base of the modular buildings and noted signs of weathering and light moisture damage.

We observed a wood-framed stair case and landing at the modular classrooms and noted various broken metal connectors. The stair railings deflected when lightly loaded horizontally by the author of this report.

Systems Analysis

Coakley Middle School

Fire Protection

There is currently fire protection in this building, but does not meet NFPA.

Plumbing

Sanitary
The existing system is cast iron hub piping, the piping has deteriorated is in some places, and has been replaced with new hub-less piping, during the visit the sanitary piping outside of room# B121 keeps clogging up, and causing backups, the pipe has been cleaned, and a camera has been run to investigate the issue. It appears the pipe has settled and created a low point in the pipe underground.

Water Heaters
In the Coakley Middle school there is (1) Electric Water Heater that feeds the school, and It is in working condition.

Plumbing Fixtures
Currently all the fixtures are aged, and most do not meet ADA requirement, and will need to be replaced, but are in working condition. The water fountains do not meet ADA requirements. The kitchen contains (2) floor mounted grease trap. Grease trap is functional, however it may require future replacement.

Recommendations
- Replacement of plumbing fixtures to comply with ADA, and low flow due to age
- Gas supply for kitchen equipment requires emergency shut off
- Depending on the renovations, a larger water heater maybe need to meet the new demand
- Replacing sanitary piping underground in room# B121.

HVAC

The Coakley Middle is an electrically heated facility and as such, has no central boiler plant.

Duplex Air Compressor for ATC
The control system for this building is pneumatic with compressed air being provided by an air compressor. The air compressor is fully operational and appears to be in good condition.

Air Conditioning
This school is air conditioned by means of packaged rooftop units, which supply conditioned air through a system of ductwork and delivered to the spaces by ceiling

diffusers. The rooftop units are operational but many of the units exhibit extensive rusting of the casing. Furthermore, installed units are considered very inefficient by current standards.

Unit Ventilators

The classrooms are furnished with classroom unit ventilators outfitted with electric resistance heating coils. The unit ventilators provide these spaces with heat and ventilation. The unit ventilators were manufactured by Nesbitt. The unit ventilators are original vintage and although they are still operational, they have outlived their useful service life.

Recommendations

- Although the HVAC systems are fully operational and appear to be maintained, they have outlived their useful service life and are considered inefficient by current standards
- Therefore, it is our recommendation that the HVAC systems should be replaced as part of any major renovation or expansion project

Electrical

Electric Service

The primary electric service which originates from an electric utility co. pole feeds the transformer in the transformer vault via underground conduit/cabling. The electric service appears to be original to the building and appears to be in poor condition.

Normal Power System

The switchboard is fed by the transformer located in the transformer vault. The switchboard rated at 4000 amp, 277/480 volt, three phase, four wire feeds panelboards located in the Main Electric Room as well as panelboards throughout the building. Dry-type transformers are located throughout the building and are used to step down to feed 120/208 volt, three phase, four wire panelboards and loads. Most of the normal power distribution is manufactured by General Electric. The normal power system appears to be original to the building and appears to be in poor condition.

Emergency Power System

The building has a 120/208 volt, three phase, four wire, 60 kW natural gas generator as manufactured by Kohler. The generator provides power to the emergency lighting via automatic transfer switch, transformer, and panelboard as manufactured by General Electric. The generator, automatic transfer switch, transformer, and the emergency panelboard are located in the Main Electric Room.

Emergency System - Deficiencies as it relates to current Codes:

- Emergency panelboards need to have dedicated two hour rated emergency electric rooms and cannot share space with normal panelboards.
- Emergency panelboards require two hour feeders such as MI Cable and are required to be housed in two hour rated electric rooms.
- The generator is natural gas fired which according to the National Electric Code cannot serve emergency loads as natural gas is considered to be an interruptible fuel source. Diesel generators can serve emergency loads.
- Emergency panelboards are required to be protected by surge suppressors.

The emergency power distribution appears to be original to the building and is in poor

condition. As described above, the emergency power system does not meet current Codes.

Fire Alarm

The addressable fire alarm control panel as manufactured by Notifier series AFP-200 does not appear to be original to the building. The fire alarm system consists of an exterior municipal master box, smoke detectors, heat detectors, duct smoke detectors, pull stations, strobes, and horn/strobes.

Fire Alarm - Deficiencies as it relates to current Codes:

- Inadequate detector coverage
- Points of egress without pull stations
- Pull stations not at ADA heights
- Inadequate strobe coverage as required by ADA in Conference rooms, Toilet rooms, and Assembly spaces including Classrooms
- Notification appliances are horns; Speakers are required to provide voice evacuation throughout the building
- Most of the interior Corridor doors are pried open and do not have magnetic door holders

The fire alarm system appears to be in fair condition. As described above, the fire alarm system does not meet current Codes.

Lighting

Interior

The interior lighting consists of surface mounted, pendant, recessed, and fluorescent downlights. Exit signs provide for direction to paths of egress. Lighting is not the most efficient as it relates to current standards. The interior lighting appears to be in fair condition.

Exterior

Lighting consists of wall packs, wall mounted floodlights, and site lighting on poles. Some of the lighting fixtures are original to the building with high intensity discharge lamps, while some of the lighting fixtures have been replaced with LED type. Most of the exterior lighting appears to be in good condition.

Switching

Most of the lighting in spaces is controlled by local wall switches, with some occupancy sensors.

Lighting - Deficiencies as it relates to current Codes:

- The current building switching does not meet the International Energy Conservation Code
- Automatic shutoff of lighting fixtures is required
- Daylight harvesting is required in certain spaces as indicated in the International Energy Conservation Code

The switching appears to be original to the building and is in fair condition. As described above, the switching does not meet current Codes.

Receptacles

Receptacles are ground type. Receptacles have been added over the years through the use of EMT conduit with surface boxes, tele-power poles, plugmold, and wiremold. Receptacles appear to be in fair condition.

Lightning Protection

The building does not have a lightning protection system which would include air terminals on the roof with downlead conductors to ground and surge protection.

Bi-directional Amplifier System

The building does not have a bi-directional amplifier system which would include an amplifier and cabling above ceilings for amplifying police and fire alarm radio signals as required by the International Building Code.

Wiring

Wiring is made up of MC cabling, FA MC cabling, EMT, Rigid, and PVC conduit.

Site Analysis

Coakley Middle School

Existing Conditions

The Dr. Philip Coakley Middle School, herein referred to as the Site, consists of one (1) structure constructed in 1969 located at 1315 Washington Street, in Norwood, MA. The Site is 69.46± acres on Assessors Map 8 / Block 1 / Lots B1, B1A, C1, C16, and E1, and Block 1D / Lot 24 (Appendix B, Existing Conditions Dr. Philip Coakley Middle School Feasibility Study). The Site is not currently being used as a school. It is being rented by a number of organizations including a senior center, daycare center, the Norwood Educational Center, and the Mass Criminal Justice Training Center. The Site is accessed via Washington Street. In addition to the school, the Site is furnished with paved parking areas and driveways, paved running track, four tennis courts, an outdoor pool, a playground, four baseball fields, and three soccer fields, one of which is in the outfield of a baseball field.

The Site is bounded by residential development to the north and south, Washington Street to the east, and a Massachusetts Bay Transportation Authority easement to the west. There is residential development located to the east of Washington Street. The school is buffered from the neighboring properties on all sides by thick, deciduous vegetation and the athletic fields.

Circulation and Parking

The building is oriented along an east-west axis. The main entry to the building is on the west side of the facility accessed via Washington Street and is set back from the road approximately 50 feet (Appendix A, Photo 1). The Site is accessed via two two-way drives off Washington Street (Photo 2). The drive along the east face of the building is a dedicated one-way southbound drop-off area (Photo 3). There is a second drop-off area along the south face of the building divided from the two-way traffic by a concrete island (Photo 4). There is an unpaved service drive off Washington Street at the north end of the site that leads to the athletic fields at the rear of the property. A service building and parking area is located to the west of the main school building near the running track. The main building is accessible to emergency vehicles on the north east and south of the building. The rear of the building is not accessible to emergency vehicles.

There are three parking areas, a lot north of the facility (Photo 5), a lot south of the facility (Photo 6), along the east drop off area near the front entrance to the building (Photo 7), along the south west drive near the service building, and a lot via the separate entrance dedicated to the pool facility. The parking capacity requirement for schools as a “Place of Public Assembly” is one (1) space for every 3 person capacity in according to Section 6.1.3.B of the Zoning Bylaw. Aerial imagery shows there are 292 parking spaces distributed around the schools four parking areas. Seven (7) accessible spaces are required for the existing quantity of designated parking spaces. There are eight accessible parking spaces, six of which are in proximity to the main entrance

(Photo 8), and two are in the pool parking lot. The building is handicap accessible at the main entrance. The rear doorways of the building leading to the play areas are not accessible.

There are crosswalks across Washington Street in proximity of both access drives and across each access drive to the facility. On Site, there are four additional crosswalks. There is a cross walk from the northeast corner of the building to the sidewalk on the north side of the north access drive. There is a crosswalk from the accessible parking spaces to the main entrance to the building. There is a crosswalk from the southeast corner of the facility to the sidewalk on the south side of the south access drive. There is a crosswalk from the south parking lot across the south drop off area to the sidewalk on the south side of the building (Photo 9). The crosswalks to the accessible spaces, at the north and southeast corners of the building, and on the south side of the building have transition ramps and detectable warning panels. The crosswalks to the north and south of the access drives do not have detectable warning panels. Site circulation is directed by painted traffic arrows and signage (Photo 3). Accessible parking is designated with pavement makings, but no signage (Photo 8).

Zoning Regulations

According to the "Zoning Map of the Town of Norwood, MA." dated April 28, 2015, the Site is located in an area partially zoned General Residence (G) and Multifamily (M). Educational facilities are allowed within both zones G and M according to the "Town of Norwood Zoning Bylaw" Section 3.1. The Zoning Ordinance indicates the following dimensional requirements would control the development on this Site:

G – General Residence:
- 10,000 square feet minimum lot area
- 90 feet minimum lot frontage
- 20 feet minimum front yard setback
- 15 feet minimum side yard setback
- 30 feet minimum rear yard setback
- 30 feet maximum building height
- 35% maximum lot cover
- 25% minimum open space

M – Multifamily:
- 10,000 square feet minimum lot area
- 50 feet minimum lot frontage
- 0 feet minimum front yard setback
- 10 feet minimum side yard setback
- 10 feet minimum rear yard setback
- 40 feet maximum building height
- 70% maximum lot cover
- 10% minimum open space
- 0.67 max floor area ratio
- **The percentage of lot area covered by structures.
- ***Lot area not covered by any structure or by paving other than that limited to recreational use.

Currently there is approximately 2% lot cover and 86% open space. Because the zoning regulations do not specify which zone takes precedence, the more stringent of the two dimensional requirements shall be met.

Soils

Existing soils were evaluated based on the USDA Natural Resource Conservation Services Web Soil Survey. Below is a description of the soils that are shown throughout the Site as shown on the web soil survey (Appendix C, NRCS Soil Survey). The Site consists of several soil types. The east part of the site currently developed with the building and parking lots is Canton-Urban Land complex (Map Unit 628C) characterized as having a rapid infiltration rate, and typically more than six feet to a restrictive feature. The northeast portion of the site currently developed with the soccer fields and tennis courts is Udorthents, loamy (Map Unit 654) characterized as having a rapid infiltration rate, and typically more than six feet to a restrictive feature. The northern undeveloped portion of the site consisting of tree cover and the Hawes Brook is Rippowam silt loam (Map Unit 4) characterized by highly saturated soils with a poor infiltration rate due to the high water table. The north western portion of the site developed with the northwest baseball field is Haven silt loam (Map Unit 251B) characterized by moderate infiltration rates. The southwestern portion of the site partially developed with the service area and one of the smaller baseball fields but mostly undeveloped with tree cover, is Paxton fine sandy loam (Map Units 305B and 305C) characterized by a slow infiltration rate and a high water table. At the south west of the site there are two pockets of Whitman fine sandy loam (Map Unit 73A) characterized as having an extremely slow infiltration rate, especially when saturated. The south portion of the site undeveloped with an open field is Woodbridge fine sandy loam (Map Unit 310B) characterized by a slow infiltration rate due to the high water table. Confirmatory soil borings and test pits for the purpose of stormwater infiltration and building foundations have not been performed.

Topography

The topography of the Site generally pitches south to north from elevation 135 at the southern property line toward Hawes Brook at elevation 65. Record topographic maps and historical aerials in Appendix D (dated 1894 through present day) show the wetland area and Hawes Brook north of the Site similar to the presently mapped location.

Record USGS topographic maps and historical aerials seen in Appendix D and E (dated 1894 through present day) show Hawes Brook north of the Site, but do not show wetlands in proximity to the site. There do not appear to be topographic changes which indicate that the school and parking areas have been constructed on filled wetlands or a landfill.

Wetlands

After review of the Massachusetts GIS data layers, (MassGIS) there appear to be wetlands along Hawes brook located along the north property line in the undisturbed wooded areas and in the undisturbed wooded area southwest of the baseball fields. The northern wetlands have a 100-foot regulatory buffer zone and the brook has a 200-foor Riverfront Area which extends into the outfield of the northernmost baseball field and the swimming pool. The southern wetlands have a 100-foot regulatory buffer zone which extends into the southwestern most baseball field (see Coakley Middle School Existing Conditions). Any construction in the 200-foot riverfront area and the 100-foot wetland buffer zone is subject to the Massachusetts Wetlands Protection Act. Projects that affect wetlands are required to file and NOI with the EPA and obtain

an Order of Conditions with the local Conservation Commission.

After review of the MassGIS certified and potential vernal pools layers, the Site does not appear to have potential or certified vernal pools as defined by the Natural Heritage and Endangered Species Program (NHESP). If it is determined in an environmental review that a vernal pool exists on the Site, the local regulations require a 100-foot No-Disturbance Zone around the upland area edge or the wetland area edge that encompasses the vernal pool.

According to the Flood Insurance Rate Maps available through FEMA (Federal Emergency Management Agency), the northern portion of the Site including the swimming pool is partially within a in "Zone X – Other Flood Areas" (FIRMette- 1315 Washington Street). A "Zone X – Other Flood Areas" is defined by FEMA as areas of 0.2% annual chance flood. The area north of this along Hawes Brook is within a "Zone AE Floodway". A "Zone AE Floodway" is defined by FEMA as the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachments so that the 1% annual chance of flood can be carried without substantial increases in flood heights.

Rare Species & Cultural Resources

Information regarding rare species was obtained from the MassGIS Rare Species and Priority Habitat data layer showing data recorded by the NHESP in the State Registry. There is no known NHESP mapped habitat on Site based on available MassGIS data maps.

Utilities

Further investigation is required in order to identify the existing municipal utilities in Washington Street.

Site lighting is minimal with overhead lighting absent in the parking areas. Further investigation is required to identify where the sanitary line connects into the municipal system and if there is an existing grease trap for the kitchen waste. Currently a low pressure gas service is used for domestic hot water, home economic and lavatory equipment.

Roof runoff is collected by downspouts and roof drains. The downspouts are cracked, leak, and require redirection of rain flow at the grade level. Roof drains have broken domes, missing domes, and, due to ponding, are ineffective. Roof drain replacement will be required. In general, stormwater is directed to several drainage structures in the paved parking lots and drives. Further investigation is required to identify where the stormwater is discharged. The existing drainage system provides little to no treatment or attenuation of stormwater prior to discharging.

Site lighting is minimal, with floodlights mounted on the front of the building. There is some overhead lighting within the parking areas; however, many lights have been removed. There is overhead lighting at the baseball fields. Further investigation is required to identify the age and quality of the system.

There are four fire hydrants on Site around the building; two are located on the southeast corner of the building, one is near the front entrance and one is near the

northwest corner of the building.

Athletic Facilities

The Site has several recreational and athletic facilities including one (1) varsity baseball field, one (2) varsity softball fields, and two (2) junior varsity baseball fields, a running track, a multipurpose rectangular field, tennis courts, and an outdoor pool. The multipurpose rectangular field is directly behind the building and is in fair condition. The varsity baseball field is located furthest northwest from the school and appears to be in good condition. The varsity softball fields are located to the northwest of the school, east of the varsity baseball field. The outfields of the varsity softball fields appear to be used for multipurpose rectangular fields and are worn and bare. One of the varsity softball fields appears to have a chain link fence backstop. The two junior varsity baseball fields are located southwest of the school and appear to be in good condition. Both fields have chain link fence backstops and outfield fences. The fields do not have dedicated accessible parking and none of the fields appear to have an accessible route to the fields or spectator seating. There is a bituminous track north of the junior varsity fields. The track is not striped and appears to be in poor condition. The varsity fields are well lit (Photo 10). There are four tennis courts enclosed in an eight-foot chain link fence. The tennis facility appears to be in good condition. There is an outdoor pool facility with separate parking north of the Coakley facility which appears to be in good condition.

Landscaping

There are plantings along the front of the building that have not been maintained and are overgrown. There are no landscape islands in the parking lots so most of the pavement is in direct sun. Bike racks are in poor condition. Lawns are generally in fair condition. Concrete walks are in fair condition throughout the Site. The pavement in the parking lots is in fair condition with surface cracks throughout. The two way drive and sidewalk appears to have been recently paved, and the parking striping and directional arrow markings appear to be new. There is a landscape patio near the front entrance with pavers, a flag pole, and granite benches. Pavement in the north and south parking lots are in poor condition. Pavement along the drop off areas on the east and south sides of the building appear to be in recently repaved. The concrete walk along the east side of the building appears to be new. The bituminous walk on the west side of the building appears to be in poor condition (Photos 2- 6, and 11).

Summary

There are no constraints which prohibit this Site from serving as a viable location for a newly constructed school, a renovation, or an expansion of the existing building. Design considerations should include investigation to existing utilities infrastructure, including athletic lighting, lighting in parking areas, and sewer improvements consistent with the school's needs. Any increase in impervious area will require stormwater management consistent with onsite soils. Development should include recognition of the wetland resource areas and consideration for their buffer zones in regards to development. We would recommend these considerations be made part of future development options. However, we do not believe there are any constraints which preclude this Site from being a viable candidate for future school development.

Recommendations

The following site improvements are recommended for consideration:

- Study of the vehicular circulation (cars, deliveries, and fire access) to evaluate the effectiveness of the layout as it relates to the various building uses, and to determine improvements.
- Repair or replace existing bituminous paving and curbing in parking lots and concrete walks in disrepair.
- The athletic fields and the running track should be studied for overall layout, conditions and site accessibility.
- Add additional site lighting for safety, security, and expanded use of athletic facilities.
- Investigate site utilities/drainage structures to ascertain their condition and capacities as they relate to Massachusetts DEP and Local Regulations.
- Improve Site aesthetics with additional landscaping. Investigate existing irrigation to ascertain condition and propose improvements.
- Replace fences, seating, and bike racks in disrepair.

Appendix A

Photo 1: Front Entrance


Photo 4: South Drop Off


Photo 7: South Parking Lot


Photo 2: Access Drive


Photo 5: North Parking Lot


Photo 8: Accessible Parking

Photo 3: East Drop Off


Photo 6: Front Entrance Parking


Photo 9: Cross Walk

Photo 10: Athletic Field and Athletic Lighting

Photo 11: Pavement Condition

Architectural Analysis

Savage Educational Center

The existing Savage Educational Center was originally designed, constructed, and occupied as one of two middle schools in Norwood. Today, it functions as office, storage, and recreational space utilized by multiple entities, including: the Norwood School District, Department of Building & Grounds, Extended Day program, SPED programs (LEAD), Employment & Training Resources, and the organization of school lunch services and transportation. The building was constructed in 1969 and shares its site with the Norwood Senior Center, constructed subsequent to the Savage Center and attached via a connector corridor to create cohesion in both function and appearance. The Senior Center utilizes part of the Savage's facility on occasion but is not a part of this feasibility study. The site is also used to park school buses.

The Savage Center and its specific function and purpose poses a number of questions for the Town. As with many Town-owned buildings that are no longer required due to a declining population, the available space within the building is now utilized for a number of important functions. However, the building is technically underutilized in terms of the available space and the efficiency of maintaining such a large building/ facility. As part of the planning process, multiple new or revised functions may be considered for this facility, including its continued use servicing current programs and functions.

The Savage Center is off Prospect Street, an arterial street in Norwood. It is located near Oldham Elementary which is just northeast and also on Prospect Street. Its 17-acre site is surrounded by residential neighborhoods on three sides and conservation land to the northwest. The site slopes gently from east to west. Storm water is directed to various catch basins that all eventually lead to a low point to the western side of the basketball courts. Bituminous curbing is damaged in places and there is no curbing at all bordering the limited parking areas.

It is a well-maintained facility and there has been some investment in maintaining the building with projects such as roof replacement and lighting upgrades. However, the clean, well-maintained appearance can be deceiving, as many major building components and systems are original and have reached the end of their anticipated life expectancy. Many former classrooms within the facility are now utilized as storage rooms. The auditorium no longer acts as a performance space and is instead utilized as the set-building workshop for Norwood High School. The building is open year-round in order to accommodate the offices, functions, and departments within but there is no air conditioning and the interior environment becomes very uncomfortable when temperatures peak in the late spring, summer, and early fall. The building requires a comprehensive renovation of its mechanical, electrical, and plumbing (MEP) systems and components that have not been addressed to date. The renovation and replacement of these systems will be very invasive, and will require selective demolition and restoration in many areas. This kind of work is likely to trigger additional building code compliance in many other areas of the building. Because the Savage Center only services a limited number of school programs, it is unlikely that

a Massachusetts School Building Authority (MSBA) grant reimbursement would be available for renovations to this facility, unless its programmed use is substantially changed.

Plan Organization

The Savage Educational Center is a 122,000 square foot, two-story split level facility. It is almost identical to Coakley Middle School in South Norwood which accommodates the Town's middle school program. If the Savage Center was still utilized as a school, it would accommodate approximately 650-700 students, depending on the specific program. However, as it is identical to the Coakley School, it also includes the same organizational deficiencies and challenges that make the Coakley a poor 21st Century middle school, including undersized classrooms, interior classrooms with no natural light or ventilation, lack of support space, etc. As mentioned previously, the current Savage building is underutilized and in fact many of the existing classrooms are empty.

Essentially, the building is composed of three units, and symmetry in plan per unit is prevalent. Unit A houses the auditorium and School District offices. Unit B is a donut organization with classrooms utilized as offices around the exterior and a double height office space (former library) in the middle. Unit C is the gymnasium with locker rooms and what used to be the cafeteria, is now used for an after-school program. Public entry is achieved through Unit A, but because the building has so many different functions, it can be very difficult for visitors to locate the desired program or office. This main entry point at Unit A is not accessible and typically those requiring accessibility accommodations have to enter through the Senior Center. Once inside, the user is met with further challenges for accessibility as there is no elevator at this entry and three stair lifts have been installed to provide alternative accessibility. A card access system was added to the building entry in 2013 but because the Savage Center is used for various community education programs the front entry is never locked during normal business hours. This condition presents a security challenge for the offices and childcare programs in operation throughout the building.

Exterior Envelope
(Foundation, Walls, Roof, Windows, and Doors)

Foundation
The building is constructed on a split-level, cast-in-place concrete slab raised on piles. (Refer to structural evaluation for additional information.)

Walls
The 47-year-old original construction documents indicate that the exterior envelope of the building consists of face brick, one inch of insulation, and masonry back-up support. There has been no major capital investment in restoring the envelope since its construction; which is common, but does mean that it is due for repointing and restoration in many areas. Unlike exterior masonry walls today, no cavity between the brick and masonry back-up exists which can lead to a rapid decline in the exterior wall condition if the brick and mortar joints are not routinely monitored for signs of moisture infiltration. Cavity wall design is important because it disconnects the path temperature and water can take to infiltrate the inside finishes and allows an additional layer of insulating air between the exterior and interior wall systems. Beyond through-wall flashing at floor levels, there is no weeping system for drainage of water absorbed by the brick. Re-pointing, combined with limited masonry renovation, would allow

Exterior walls at the Savage Center show the results of no weeping sytem or cavity wall construction

the building's exterior wall system to remain water-tight for many years.

The one inch of insulation is very insufficient in protecting the heat loss and gain at exterior walls. For the temperate climate of Massachusetts, insulation within the exterior envelope should be at least three times as thick as the existing insulation to achieve a higher R-value. Not only is this important in keeping the cold temperature out of the building in the winter but also in keeping the conditioned interior air in during the spring, summer, and fall, as part of maintaining a more energy efficient and comfortable interior building environment. Under the current building code, the quantity of insulation in many components of the exterior wall system would need to be addressed as part of any proposed comprehensive renovation of the building.

The windows along the District Administration offices, Unit A, are single-hung with a precast lintel and bordered by bricks proud of the exterior face. The upper portion of the auditorium in this location is clad in a more contemporary metal panel. Exterior walls of the classroom wing, Unit B, include windows within a pre-cast concrete panel infill system. Clerestory windows at the gym, Unit C, are a translucent fiber-reinforced polymer panel typically referred to by the trade name "Kalwall" as this company was the primary manufacturer of this panel at the time of construction. These panels were highly utilized at the time but are much less prevalent today as better technology exists to achieve the same end result and a better aesthetic appearance. As is common with this product, the polymer material has yellowed and faded with age. The polymer panels continue down the wall in approximately 4' strips, giving the appearance of full height glass from within. Above these panels, the face brick shows some evidence of staining, likely a result of moisture run-off from current or prior metals that were either attached to the building or were utilized as part of the internal structural support of the walls or lintels over the windows.

Roof

The roofing system at the Savage Center was last replaced in 2002, and included a rubber membrane system (EPDM - ethylene propylene diene monomer) over the entire roof area. Though there may be as many as three roofs layered by now, it does not appear that any insulation has ever been added to the roof system. Though the replacement may be considered a recent capital project, the life expectancy of a rubber membrane roof is approximately 20 years, which means the existing roof will need to be addressed again within the next five to ten years. Any plans for a comprehensive renovation in the future should include complete replacement of the

existing roof systems and an analysis of the benefits associated with adding insulation to the roof such that it complies with current energy code requirements. If only the original insulation exists, then the total 2" thickness is highly insufficient by today's energy standards. A resolution may require some removal of the existing roofing system (down to the structural deck) to expose a substrate which is appropriate for attachment of the new insulation. This removal would also assist in removing prior roofing layers which add unnecessary weight to the roof and lower its snow-load carrying capacity.

Windows

The windows previously described within the exterior wall system are original and have not yet been replaced. With a focus on energy conservation, the Commonwealth now adheres to significantly higher energy code standards. The current window system is very inefficient and should be considered for replacement if the facility is to continue to be utilized as a Town or School Department resource.

Doors

All the exterior doors are hollow metal doors with metal frames and original hardware. Overall the building would benefit from a full replacement of doors. Accommodations for the handicapped must be included in the upgrade, including door hardware and access requirements.

Interior

(Floors, Walls, Doors, and Ceilings)

Floors

The majority of the building's floor finishes are Vinyl Asbestos Tile (VAT), including the corridors, classrooms, and offices. In areas used for daycare programs, much of the VAT has been covered with area carpeting. Although the VAT is non-friable and poses no threat to the students or staff, most school systems have developed schedules for periodic removal and replacement of such finishes over time with the ultimate goal of full abatement of asbestos containing materials.

At some entries, the surface is terrazzo flooring in good condition. The floors in the toilet rooms and kitchen are ceramic tile.

The gymnasium, primarily utilized as a community resource, includes a wood athletic flooring that is in poor condition with several areas of damage. There are signs of wear as a result of its many years of service. The system has likely been sanded many times, reducing its overall thickness and strength. Many of these older gym wood flooring systems had a limited number of wood sleepers (support members) underneath and rely heavily on the integrity of the finished tongue-and-groove wood flooring. The current flooring system has likely received more abuse from the community use and the tendency to get more dirt, abrasion, etc. on a community-use gymnasium floor.

Walls

Interior walls along the building's perimeter are CMU that has been finished with plaster. This is apparent as modern retrofitted amenities are all exposed including wiring for power, light switches, and interactive whiteboards. Interior partition walls are plaster on metal studs. Because much of the interior walls are covered with marker and tack boards, they have been well-preserved.

The corridors are a mismatch of finishes between brick, plaster, and glaszed tile; all lined with obsolete lockers

The corridors are a combination of tile, exposed brick, and plaster on metal stud which has been patched and painted. The corridor walls within the classroom/office sector are lined with lockers, all obsolete given the current use of the building.

The walls in the formerly kitchen and cafeteria areas are CMU, either painted or tiled. Much of the cafeteria area, which is now used for daycare programs, is partitioned off with partial height light wood framing. The interior columns are furred out in plaster. There is no acoustical treatment on the walls for absorbing or reflecting sound in the space.

The walls in the gymnasium are painted CMU with wood bleachers on each side and a band of wood paneling from the floor to about 8' up the wall. The wood bleachers show signs of wear and tear. The walls of the space do not have any acoustical treatment for absorbing or reflecting sound in the space. Piping and wiring is exposed.

Doors

The existing interior doors are the original doors, for the most part. Typical interior doors are solid core wood in hollow metal frames. Vision panels are wired glass. Many of the doors show signs of wear. The doors from the corridor to the egress stairs would not meet current fire rating and contain excess glazing within the sidelights and transom. They may remain as long as there is no renovation in this area, but would have to meet current fire separation requirements if they were replaced or the area was renovated.

A majority of the door hardware remains non-compliant, would need to be replaced, and is further discussed in the handicap accessibility portion of this report.

Ceilings

Plaster 2x2 acoustic ceiling tile (ACT), and 1x1 ACT are the most common ceiling systems throughout the Savage Center. The condition of the 2x2 ACT, above the main entry lobby for example, is the best of these three material choices. The classroom/office and corridor 1x1 tile is mismatched throughout, broken, or outright missing. Plaster ceilings, like the one in the auditorium, are in poor condition, cracking and scantily patched in many places. Any upgrades to the building's mechanical, electrical, plumbing, or installation of a fire suppression system will require these ceilings to be removed and replaced with new ACT ceilings. Such ceilings offer better acoustical control as well.

Energy Conservation

The Savage Center building was constructed in 1969, right before the historic energy shortages of the 1970s and escalating oil prices of 2005. The emergence of a new energy code in 2000, which promoted an increased knowledge of exterior building envelope construction techniques and materials, has dramatically changed the way in which buildings are designed to deal with energy efficiency issues. Massachusetts State Building Codes 3407.1 and 3407.2 require that alterations of an existing building in which the use group is not changed must comply to the energy conservation values detailed in Table 3407 of the code for any building elements (walls, windows, doors, roofs, or mechanical systems) which are altered during renovation.

Environmental Quality

In the past fifteen years, there have been tremendous advancements in the understanding of the various environmental factors that influence building occupants. These factors have been proven to be extremely important to occupants who may spend most their day in a single room. Factors such as natural lighting, quality of artificial lighting, fresh air ventilation levels, evenly distributed heating and cooling temperatures, and acoustical performance all work to enhance the professional and educational environments. The Savage Center's facilities include limited implementation of these key factors, leaving occupants uncomfortable throughout the day.

Recent Capital Improvments

Roof
The roof was completely replaced in 2002.

Interiors
In 2009, lighting in the gymnasium was replaced.

Site
All outdoor lights were replaced with LED lighting in 2016.

Security
Surveillance cameras were added in 2008.
Card access systems were added in 2013.

Massachusetts State Building Code:
780 CMR and Life Safety Issues

The Massachusetts State Building Code (780 CMR) has been updated and amended a number of times since the construction of the building. The State Board of Building Regulations and Standards regularly updates and amends its regulations. Based on these regulations, the following items were found to be in non-compliance:

- Occupied spaces (classrooms and offices) currently provide an entrance from within an egress stairway.
- Egress stairway enclosures, including door assemblies, require a minimum one-hour fire separation assembly.

- Two means of egress from spaces having an occupant load of greater than 50.
- Fire extinguishers
- Fire separation assembly between Use Group E (Educational) and Use Group A-3 (Assembly – Cafeteria, Gymnasium) (one hour fire separation required).
- Handrail and guardrail at egress stairways.
- Electrical panels in classrooms and corridors.

Handicap Accessibility

Requirements for handicap accessibility in building planning and design were non-existent in the 1960s when this building was originally designed. However, on January 26, 1992, the Department of Justice implemented Title III of the Americans with Disabilities Act (ADA) into Public Law. This legislation "prohibits discrimination on the basis of disability by private entities in places of public accommodation." The legislation requires all new places of public accommodation, including schools, to be designed and constructed so as to be readily accessible to and usable by persons with disabilities. Existing structures being renovated that exceed 30% of the equitized assessment of the building or its replacement value must fully comply with the regulations for new construction. Additionally, on September 1, 1996, the Commonwealth of Massachusetts developed its own accessibility regulations: 521 CMR Architectural Access Board (AAB), which in some instances is more restrictive than ADA guidelines. The ADA and AAB regularly update and amend their regulations. Based on these regulations, the following items were found to be in non-compliance or not accessible to the disabled:

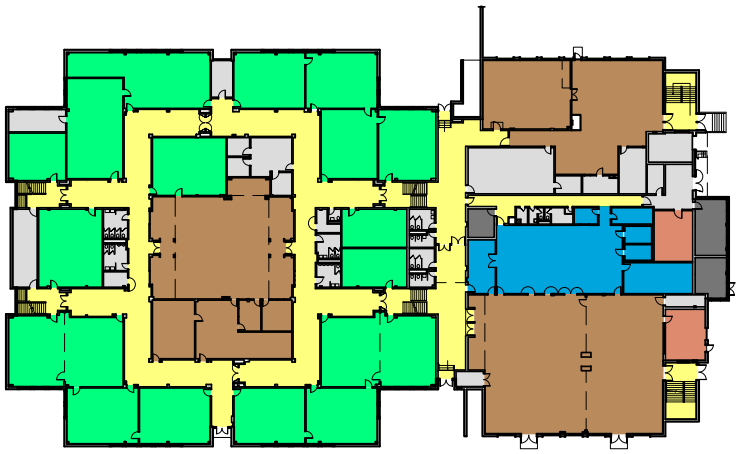
- All doors leading to offices and public spaces require lever handles for ease of handicap accessibility.
- The main public entrance to the building is not accessible.
- All entries into classrooms require clear floor space adjacent to latch side of the door for entry and exit.
- There is no elevator.
- Lack of proper interior building signage (braille).
- Toilet and shower rooms
- Water fountains
- Ramps must be reconfigured for proper handicap slope and handrails.
- All stairs (handrails and nosing)
- Alarms and strobes within offices and public spaces.

Each of the inaccessible features listed above has an impact on the ability of disabled students or members of the community to access various spaces throughout the school independently. Disabled persons may include students with a permanent handicap condition, students that are temporarily disabled from athletic activity, and parents, staff, or other visitors that could have any form of disability. Any future plans should incorporate as many items as possible to accommodate disabled people to the fullest extent possible.

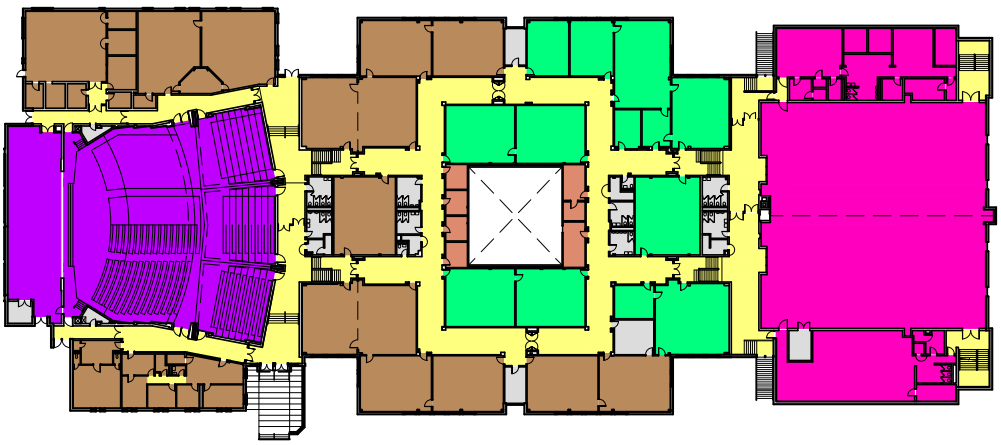
Savage Educational Center

- not used by students
- 122,000 square feet

media center
physical education
music & arts
auditorium or stage
kitchen & servery
student dining
special eduation
general classroom
circulation
administration/services
staff planning & support
district offices/programs
custodial/toilets
building equipment



second floor



first floor

Structural Analysis

Savage Educational Center

This report is based on a review of the available drawings of the original construction prepared by Korslund, LeNormand & Quann, Inc., dated September 11, 1972, and a visit to the site on December 1, 2016.

Existing Conditions

James R. Savage Educational Center is essentially a two story structure with a Gymnasium, Library, and Auditorium. The original school was constructed in 1972. The structure is performing well for the most part. The roof construction consists of corrugated metal roof deck on open web bar joists spanning between masonry walls on concrete foundations. The Gymnasium roof construction consists of 1 ½ in. deep 20 gage metal roof deck on steel framing including steel trusses. In one location, we observed a cast in place concrete rib-slab structure. The foundation consists of reinforced cast in place concrete spread footings for the most part. Concrete grade beams support the exterior facade. The lowest level consists of a 4 in. thick concrete slab on grade. The building houses Norwood Public Schools Administration offices.

We did not observe any excessive vibration due to foot fall on the concrete slab on grade.

We did not observe any signs of excessive foundation settlement or significant distress in the structure. We observed moderate cracking in the interior masonry walls and their associated control joints. We did not observe a positive connection between the tops of the masonry walls and the roof structure.

We observed exterior metal hand rails and noted severe deterioration to the post bases, which should be replaced. We observed exterior painted steel building columns that exhibited light to moderate deterioration at the column-bases. On the exterior façade, we observed steel lintels that exhibited light rusting and peeling paint. We observed precast concrete lintels that exhibited heavy deterioration and spalling. We observed cracking in the masonry and concrete foundation walls at various building corners.

We observed signs of past repairs to the roof structure, which includes fairly new wide flange steel beams propped up tight to the underside of original open web metal roof joists. Through discussions with the maintenance personnel, we understand that this roof reinforcement was installed to resist excessive rooftop snow loads. The reinforcement is visible in the Stage area. The roof drains appeared to be free of debris for the most part. We observed standing water on various areas of the roof. In various locations, the standing water was against the exterior wall of upper roofs. One area of roof construction consisted of a stone ballast.

In the attic space, we observed sheathing acting as a platform for access to mechanical equipment.

Systems Analysis

Savage Educational Center

Fire Protection

The existing building is not provided with a fire protection/sprinkler system.

Plumbing

Sanitary
The existing system is cast iron hub piping, the piping has deteriorated is in some places, and has been replaced with new hub-less piping, the overall system is in working condition.

Water Heaters
In the Savage Center there is multiple electric water heaters located around the building to feed different parts of the school. There is also 2 abandoned larger water heaters that once use to feed the showers that no longer are used. All of the smaller water heaters are in working condition.

Plumbing Fixtures
Currently all the fixtures are aged, and most do not meet ADA requirement, and will need to be replaced, but are in working condition. The whole school is on bottle water, as all the water fountains have been disconnected due to the fact that there is too much lead in the water.

Recommendations
- Replacement of plumbing fixtures to comply with ADA, and low flow due to age
- Gas supply for kitchen equipment requires emergency shut off
- Depending on the renovations, a larger water heater maybe need to meet the new demand

HVAC

The Savage Center is an electrically heated facility and as such, has no central boiler plant.

Duplex Air Compressor for ATC
The control system for this building is pneumatic with compressed air being provided by an air compressor, which was manufactured by Champion. The air compressor is fully operational and appears to be in good condition.

Air Conditioning
Air conditioning is provided by window air conditioners. This method of air conditioning is not very efficient, cannot provide even distribution of conditioned air and typically noise levels exceed recommended limits for teaching and office environments.

The school committee space is fully air conditioned by means of a packaged rooftop unit manufactured by Lennox. This unit was installed in approx. 2002 (based on info provided during survey) and appears to be in fair condition.

Various areas of the school are also air conditioned by ductless split fancoil units. These units appear to have been installed sometime within the last five (5) years and appear to be in good condition.

Unit Ventilators

The former classrooms are furnished with classroom unit ventilators outfitted with electric resistance heating coils. The unit ventilators provide these spaces with heat and ventilation. The unit ventilators were manufactured by Schemanauer, which is no longer in business making parts very hard to obtain. The unit ventilators are original vintage and although they are still operational, they have outlived their useful service life.

The auditorium is heated and ventilated by two (2) Schemanauer vertical air handling units installed in a mechanical mezzanine space. Although these units are operational and in good condition, they have outlived their useful service life.

Recommendations

- Although the HVAC systems are fully operational and appear to be well maintained, they have outlived their useful service life and are considered inefficient by current standards
- Therefore, it is our recommendation that the HVAC systems should be replaced as part of any major renovation or expansion project

Electrical

Electric Service

The primary electric service which originates from an electric utility co. pole feeds the transformer in the transformer vault via underground conduit/cabling. The electric service appears to be original to the building and appears to be in poor condition.

Normal Power System

The switchboard is fed by the transformer located in the transformer vault. The switchboard rated at 3000 amp, 277/480 volt, three phase, four wire feeds panelboards located in the Main Electric Room as well as panelboards throughout the building. Dry-type transformers are located throughout the building and are used to step down to feed 120/208 volt, three phase, four wire panelboards and loads. Most of the normal power distribution is manufactured by Westinghouse. The normal power system appears to be original to the building and appears to be in poor condition.

Emergency Power System

The building has a 120/208 volt, three phase, four wire, 25 kW natural gas generator as manufactured by Kohler. The generator provides power to the emergency lighting via automatic transfer switch, transformer, and panelboard as manufactured by Westinghouse. The generator, automatic transfer switch, transformer, and the emergency panelboard are located in the Main Electric Room.

Emergency System - Deficiencies as it relates to current Codes:

- Emergency panelboards need to have dedicated two hour rated emergency electric rooms and cannot share space with normal panelboards.
- Emergency panelboards require two hour feeders such as MI Cable and are required to be housed in two hour rated electric rooms.
- The generator is natural gas fired which according to the National Electric Code cannot serve emergency loads as natural gas is considered to be an interruptible fuel source. Diesel generators can serve emergency loads.
- Emergency panelboards are required to be protected by surge suppressors.

The emergency power distribution appears to be original to the building and is in poor condition. As described above, the emergency power system does not meet current Codes.

Fire Alarm

The addressable fire alarm control panel as manufactured by Fire Lite Alarms series MS-9200UDLS does not appear to be original to the building. The fire alarm system consists of an exterior municipal master box, smoke detectors, heat detectors, duct smoke detectors, pull stations, strobes, and horn/strobes.

Fire Alarm - Deficiencies as it relates to current Codes:

- Inadequate detector coverage
- Points of egress without pull stations
- Pull stations not at ADA heights
- Inadequate strobe coverage as required by ADA in Conference rooms, Toilet rooms, and Assembly spaces including Classrooms
- Notification appliances are horns; Speakers are required to provide voice evacuation throughout the building
- Most of the interior Corridor doors are pried open and do not have magnetic door holders

The fire alarm system appears to be in fair condition. As described above, the fire alarm system does not meet current Codes.

Lighting

Interior

The interior lighting consists of surface mounted, pendant, recessed, and fluorescent downlights. Exit signs provide for direction to paths of egress. Lighting is not the most efficient as it relates to current standards. The interior lighting appears to be in fair condition.

Exterior

Lighting consists of wall packs, wall mounted floodlights, and site lighting on poles. Some of the lighting fixtures are original to the building with high intensity discharge lamps, while some of the lighting fixtures have been replaced with LED type. Most of the exterior lighting appears to be in good condition.

Switching

Most of the lighting in spaces is controlled by local wall switches, with some occupancy sensors.

Lighting - Deficiencies as it relates to current Codes:

- The current building switching does not meet the International Energy Conservation Code
- Automatic shutoff of lighting fixtures is required
- Daylight harvesting is required in certain spaces as indicated in the International Energy Conservation Code

The switching appears to be original to the building and is in fair condition. As described above, the switching does not meet current Codes.

Receptacles

Receptacles are ground type. Receptacles have been added over the years through the use of EMT conduit with surface boxes, tele-power poles, plugmold, and wiremold. Receptacles appear to be in fair condition.

Lightning Protection

The building does not have a lightning protection system which would include air terminals on the roof with downlead conductors to ground and surge protection.

Bi-directional Amplifier System

The building does not have a bi-directional amplifier system which would include an amplifier and cabling above ceilings for amplifying police and fire alarm radio signals as required by the International Building Code.

Wiring

Wiring is made up of MC cabling, FA MC cabling, EMT, Rigid, and PVC conduit.

Site Analysis

Savage Educational Center

Existing Conditions

James R. Savage Educational Center, herein referred to as the Site, consists of one (1) building structure located at 275 Prospect Street in Norwood, MA. The Site is 17.3± acres on Assessors Map 13 / Block 4 / Lot A1 (Appendix B, Existing Conditions James Savage Center Feasibility Study). The Savage Educational Center serves as a free Day care and Nursery. The facility is also in use as the Norwood Senior Center, and Massachusetts One-Stop Career Center (Photos 1, 2, and 3). The Site is accessed via one two way two driveway off Prospect Street to the east and one one-way entrance off Irving Street to the northeast. The Site is furnished with paved parking areas and driveways, a playground, basketball courts, and a bus depot.

The Site is bounded by town owned properties including a playground to the north, and residential properties to the east, south and west. The school is buffered from the neighboring properties by thick, deciduous vegetation on the north, east and west sides.

Circulation and Parking

The school is oriented along an east-west axis. The main entry to the school is on the east side of the building, and is set back from the drop off road by less than 50 feet (Appendix A, Photo 1). The main Site entrance drive is a two-way road from Prospect Street on the east side of the Site. The access road leads to a drop off and parking loop along the northeast face of the building (Photos 4 and 5). Parent and bus drop-off are not differentiated with signs or pavement markings. There is an attached parking lot on the east side of the building and a service area and bus depot on the northwest side of the building (Photos 6 and 7). There is a secondary one-way entrance to the northwest side of the drop off loop from Irving Street and an unmarked service route from the west corner of the Site to the bus depot (Photos 8 and 9).

Pedestrian walkways are provided around the northeast and east sides of the building, though they are not all accessible (Photo 10). All sides of the building have fire access. There is a service drive along the west and south sides of the school (Photo 11). The dumpster area is on the west side of the school near a service door (Photo 12). Pavement around the Site is in poor to fair condition, with cracks and damaged bituminous and concrete (Photo 13). The concrete sidewalk at the front entrance has been recently replaced (Photo 1).

The parking capacity requirement for schools as a “Place of Public Assembly” is one (1) space for every 3 person capacity in according to Section 6.1.3.B of the Zoning Bylaw. Aerial imagery and Site verification shows 42 angled spaces and 38 parallel parking spaces along the drop off loop, and 124 parking spaces in the lots on the east side of the building. Seven (7) accessible spaces are required for the existing quantity of designated parking spaces, two (2) of which are to be designated as van

accessible. Twelve accessible parking spaces are distributed between the parking areas; however, none of the parking spaces are marked as van accessible. The two (2) accessible parking spaces in the southeast lot have an accessible path of travel to an accessible building entrance (Photo 14). The six (6) parking spaces near the entrance to the Norwood Senior Center and the four (4) parallel spaces near the James Savage Educational Center do not have an accessible route to an accessible entrance (Photos 15 and 16). The school is not handicap accessible at the front entrance as there are stairs and no ramp (Photo 1).

There is a crosswalk across the primary entrance at Prescott Street to the main school entrance and no crosswalks on Site. Circulation is directed by painted traffic arrows and signs (Photos 17, 18 and 19). Accessible parking is designated with pavement makings and signs (Photos 14-16). Detectable warning panels are not present at any of the transition curbs (Photo 20).

Zoning Regulations

According to the "Zoning Map of the Town of Norwood, MA." dated April 28, 2015, the Site is located in an area zoned Single Residence (S). Educational facilities are allowed within a zone S according to the "Town of Norwood Zoning Bylaw" Section 3.1. The Zoning Ordinance indicates the following dimensional requirements would control the development on this Site:

S – General Residence:
- 10,000 square feet minimum lot area
- 90 feet minimum lot frontage
- 20 feet minimum front yard setback
- 15 feet minimum side yard setback
- 30 feet minimum rear yard setback
- 30 feet maximum building height
- 25% maximum lot cover*
- 25% minimum open space**
- *The percentage of lot area covered by structures.
- **Lot area not covered by any structure or by paving other than that limited to recreational use.
- Currently there is approximately 13% lot cover and 46% open space

Soils

Existing soils were evaluated based on the USDA Natural Resource Conservation Services Web Soil Survey. Below is a description of the soils that are shown throughout the Site as shown on the web soil survey (Appendix C, NRCS Soil Survey- Balch Elementary). The majority of the Site consists of unrated Charlton- Hollis- Urban land complex (Map Unit 630C). A small portion of the Site along the northern property line is Whitman fine sandy loam, soil class D (Map Unit 73A) characterized as having a very slow, almost impermeable, infiltration rate due to saturation of soils. Confirmatory soil borings and test pits for the purpose of stormwater infiltration and building foundations have not been performed.

Topography

The topography of the Site generally slopes south to north from elevation 210 at the south propertyline toward the wetlands north of the property at elevation 190,

although the Site is essentially level. Sedimentation is evident throughout the paved areas (Photo 21).

Record topographic maps and historical aerials as seen in Appendix D (dated 1894 through present day) show the wetland area north of the Site similar to the presently mapped location. There do not appear to be topographic changes which indicate that the school and parking areas have been constructed on filled wetlands or a landfill.

Wetlands

After review of the Massachusetts GIS data layers, (MassGIS) there appear to be wetlands north of the property in the undisturbed wooded area. The wetlands have a 100-foot regulatory buffer zone which extends into the bus depot parking lot and the basketball courts (Existing Conditions James Savage Educational Center Feasibility Study). Any construction in the 100-foot wetland buffer zone is subject to the Massachusetts Wetlands Protection Act. Projects that affect wetlands are required to file and NOI with the EPA and obtain an Order of Conditions with the local Conservation Commission.

After review of the MassGIS certified and potential vernal pools layers, the Site does not appear to have potential or certified vernal pools as defined by the Natural Heritage and Endangered Species Program (NHESP). If it is determined in an environmental review that a vernal pool exists on the Site, the local regulations require a 100-foot No-Disturbance Zone around the upland area edge or the wetland area edge that encompasses the vernal pool.

According to the Flood Insurance Rate Maps available through FEMA (Federal Emergency Management Agency), the Site is entirely outside the flood zone.

Rare Species & Cultural Resources

Information regarding rare species was obtained from the MassGIS Rare Species and Priority Habitat data layer showing data recorded by the NHESP in the State Registry. There is no known NHESP mapped habitat on Site based on available MassGIS data maps.

Utilities

Available utilities on Prospect Street are currently unconfirmed.

There are three fire hydrants on Site; one hydrant is located on the southwest corner of the building near the service door, one is located on the north side of the building halfway around the drop off loop, and the third is located near the entrance to the Senior Center (Photos 22-24). A visible water gate implies that potable water is accessed from the street rather than a well (Photo 25).

There is a sanitary manhole on the south side of the building (Photo 26). Further investigation is required to confirm if and where the sanitary line connects into the municipal system and if there is an existing grease trap for the kitchen waste.

There are several catch basins throughout the paved area where stormwater is directed (Photo 27). There is a drainage swale along the service drive on the south

side of the building which directs stormwater to a catch basin (Photo 28). There are several drainage structures visible in Prospect Street which implies stormwater from the Site is directed to the municipal system. The existing drainage system appears to provide little to no treatment or attenuation of stormwater prior to discharging to the municipal system.

Site lighting is minimal, with floodlights mounted on the building (Photo 29). There is no overhead lighting within the parking or play areas (Photo 30).

Athletic Facilities

The school has a multipurpose grass field, with a fiber mulch bed, but play equipment appeared to have been removed (Photos 31 and 32). The grass is in fair condition. There is a basketball court with six hoops enclosed in an eight-foot chain link fence (Photo 33). The basketball backstops and fence are in poor condition and ponding is evident throughout the courts.

Landscaping

Site Landscaping is minimal. There is a flagpole and mature trees in the circulation loop (Photo 4). There are low shrubs along the north side of the building (Photo 1). The grass is in fair to poor condition with several base spots in the landscape lawns and recreational field south of the building (Photo 34). The bituminous walks are in fair to poor condition throughout the Site.

Summary

There are no constraints which prohibit this Site from serving as a viable location for a newly constructed school or an expansion of the existing Balch Elementary. Design considerations should include improved expansion of parking as necessary to meet zoning regulations, and improved accessibility. Design considerations should also include improved infrastructure, including pavement and curbing repairs and replacement, lighting, and athletic facilities consistent with the school's needs. Any increase in impervious area will require stormwater management consistent with onsite soils. Development should include recognition of the wetland resource area and consideration for the buffer zone in regards to development. We would recommend these considerations be made part of future development options. However, we do not believe there are any constraints which preclude this Site from being a viable candidate for future school development.

Recommendations

The following Site improvements are recommended for consideration:

- Study of the vehicular circulation (cars, buses, emergency vehicles, and deliveries) to evaluate the effectiveness of the traffic layout and determine improvements. Such improvements may include pavement patching or replacement, the re-striping of the drives and parking areas, improved signage, as well as replacement, repair, and additional curbing. The study should also evaluate condition of vehicular and pedestrian hardscapes, and consider accessibility to the building, and play areas.
- Study of Site lighting for safety and security, consider placing existing wiring underground. Solar lighting may be considered.

• Investigate Site utilities and drainage structures to ascertain their condition and capacities as they relate to Massachusetts DEP and Local Regulations.
• Rehabilitate lawns and install irrigation.
• Replace old and damaged Site furnishings. Consider additional Site furnishings such as playground equipment, tables, benches, bike racks, etc.

Appendix A


Photo 1: Front Entrance to Savage Educational Center

Photo 5: Drop Off Area


Photo 9: Service Exit

Photo 2: Front Entrance to Norwood Senior Center


Photo 6: East Parking Lot


Photo 10: Pedestrian Walks


Photo 3: Front Entrance to Career Center


Photo 7: Bus Depot


Photo 11: Service Road


Photo 4: Drop Off Loop


Photo 8: Alternate Entrance


Photo 12: Dumpster Area

Photo 13: Damaged Pavement

Photo 14: Accessible Parking

Photo 15: Accessible Parking

Photo 16: Accessible Parking

Photo 17: Accessible Parking Sign

Photo 18: Circulation Signs

Photo 19: Circulation Striping

Photo 20: Curb Ramps

Photo 21: Sedimentation

Photo 22: Fire Hydrant

Photo 23: Fire Hydrants

Photo 24: Fire Hydrant

Photo 25: Water Gate

Photo 26: Sanitary Manhole

Photo 27: Catch Basins

Photo 28: Drainage Swale

Photo 29: Site Lighting

Photo 30: Site Lighting

Photo 31: Grass Field

Photo 32: Fiber Mulch Play Area

Photo 31: Grass Field

Photo 32: Fiber Mulch Play Area

Photo 33: Basketball Court

Photo 34: Grass Condition

III. Evaluation Results

Recognizing Deficiencies

Balch, Callahan, Oldham, and Precott Elementary Schools

Given the age of each building within this study, many of the same deficiencies are present, and thus the same recommendations are described. To the passive observer, the buildings seem to be in decent condition, well-maintained and clean. However, greater attention should be paid to the following at Balch, Callahan, Oldham, and Prescott Elementary Schools:

- Schedule replacement for major building systems and components
  - Steam radiators become more difficult to maintain the older they get due to a lack of experienced repairmen and available service parts
  - Systems with greater energy efficiency are available today, and essential in LEED accredited schools
- Evaluate technology improvement options
  - Improvements in terms of technology as a resource for students, but also as a tool for the operation of building system control
  - Evaluate security systems and/or implement smart hardware capable of increased protection
- Review detailed space needs
  - Maintaining a comfortable student-per-square-foot ratio at each school will prevent stress on building amenities and functions
- Site and building related improvements
  - Regular attention to hardscapes, drainage, runoff conditions, and playscapes of higher quality will prevent the constant need for exterior improvements
- Renovate educational environments
  - Phase improvements to allow for continued use of each building, if desired, and maintain awareness of code compliant access

Rather than making the same individual improvements across all buildings, there is also the potential for consolidation. Research and the evidence from performance of small 200-pupil schools suggests both advantages and disadvantages.

The advantages include:

- A small school population where teachers, students, and parents all know each other extremely well
- Sense of a personalized school environment that provides a true sense of identity and belonging

The disadvantages include:

- A small school often has to share many resources and cannot expect to have spaces that are solely dedicated to instruction, art, music, and a library/media center

- Small schools must have flexible use of dining and fitness areas, without the benefit of a large dedicated gymnasium space or cafeteria

Consideration of both, as well as additional alternatives are presented later in this study.

Cleveland Elementary School

Cleveland Elementary School is one such example of an uncomfortable student-per-square-foot ratio. The 1965 wing addition is a source of population stress rather than relief. It is recommended, in addition to the recommendations made above, that the building be expanded to provide for the community space required to relieve the existing congestion.

Willett Early Education Center

Early education is a critical stage for children in which they establis social, behavioral, and learning tendencies that will follow them throughout their education. These educational needs are encumbered by the physical constraints of Norwood's current early education facility, the Willett Early Education Center. These deficiencies include:

- Under-sized classrooms
- Insufficient special education space
- Dysfunctional library and gymnasium
- Overcrowding in every sense

Coakley Middle School

Coakley Middle School is riddled with deficiencies that affect the social, educational, and psychological well-being of its population. The building itself not only inhibits students from overcoming these challenges, but contributes to the difficulty of adjusting to them. These deficiencies include:

- Antiquated program organization
- Isolated classrooms
- Lack of connectivity and transparency
- No collaborative work spaces
- Inadequate STEM facilities
- Limited elective courses due to significant overcrowding
- Under-sized core classrooms
- Poor classroom acoustics
- Lack of student resources
- Insufficient special education space
- Very limited natural light
- Poor indoor air quality
- Uninviting community spaces
- Disorienting layout

Cleveland Elementary School

The following diagram is a visual representation of the under-sized spaces within Cleveland Elementary, which are shown in blue. It is apparent that the majority of rooms are inadequate per the guidelines of the Massachusetts School Building Authority (the MSBA).

Cleveland Elementary School
- 349 students
- 49,000 square feet

sf = MSBA guidelines
sf > MSBA guidelines
sf < MSBA guidelines

first floor

Though most classrooms in the original portion of the building are sized accordingly, those added in 1965 are too small. The MSBA recommends 950 square feet per classroom. Also lacking are all of the shared spaces, due to this increase in school population; the gym is one-third the size recommended by the MSBA, and the library is so small that it would not even function properly as one individual classroom. Though the cafeteria is numerically large enough, the circulation required to access the five classrooms directly off of it affects the practicality of its overall layout.

Existing Space Summary

Over MSBA Guidelines

Under MSBA Guidelines

Cleveland Elementary School	Existing Conditions			MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**15,575**		**15**	**15,000**	
(List classrooms of different sizes separately)							
Pre-Kindergarten w/ toilet				1,200		-	1,100 SF min - 1,300 SF max
Kindergarten w/ toilet				1,200	3	3,600	1,100 SF min - 1,300 SF max
General Classrooms - Grade 1	1,064	4	4,256	950	12	11,400	900 SF min - 1,000 SF max
General Classrooms - Grade 2	1,000	3	3,000				
General Classrooms - Grade 3	919	3	2,757				
General Classrooms - Grade 4	903	3	2,709				
General Classrooms - Grade 5	911	3	2,733				
Self-Contained Classroom Toilets	40	3	120				
SPECIAL EDUCATION			**5,917**			**4,530**	
(List rooms of different sizes separately)							
Self-Contained SPED			0	950	3	2,850	8% of pop. in self-contained SPED
Self-Contained SPED - toilet	47	2	94	60	3	180	
Resource Room	1,338	1	1,338	500	2	1,000	1/2 size Genl. Clrm.
Small Group Room / Reading			0	500	1	500	1/2 size Genl. Clrm.
Pragmatic Learning Center - Grade 1/2	1,338	1	1,338				
Pragmatic Learning Center - Grade 3	896	1	896				
Pragmatic Learning Center - Grade 4/5	989	1	989				
Literacy Center	757	1	757				
Speech / OT	413	1	413				
Storage	46	2	92				
ART & MUSIC			**1,839**			**2,500**	
Art Classroom - 25 seats	938	1	938	1,000	1	1,000	assumed schedule 2 times / week / student
Art Workroom w/ Storage & kiln			0	150	1	150	
Music Classroom / Large Group - 25-50 seats	901	1	901	1,200	1	1,200	assumed schedule 2 times / week / student
Music Practice / Ensemble			0	75	2	150	
HEALTH & PHYSICAL EDUCATION			**2,813**			**6,300**	
Gymnasium	2,751	1	2,751	6,000	1	6,000	6000 SF Min. Size
Gym Storeroom	62	1	62	150	1	150	
Health Instructor's Office w/ Shower & Toilet			0	150	1	150	
MEDIA CENTER			**1,554**			**2,245**	
Media Center / Reading Room	881	1	881	2,245	1	2,245	
Reading Nook	673	1	673				
DINING & FOOD SERVICE			**4,276**			**5,792**	
Cafeteria / Dining	2,936	1	2,936	2,625	1	2,625	2 seatings - 15SF per seat
Stage	546	1	546	1,000	1	1,000	
Chair / Table / Equipment Storage	0	0	0	317	1	317	
Kitchen	794	1	794	1,650	1	1,650	1600 SF for first 300 + 1 SF/student Add'l
Staff Lunch Room	0	0	0	200	1	200	20 SF/Occupant
MEDICAL			**451**			**510**	
Medical Suite Toilet				60	1	60	
Nurses' Office / Waiting Room	451	1	451	250	1	250	
Examination Room / Resting			0	100	2	200	
ADMINISTRATION & GUIDANCE			**1,510**			**2,065**	
General Office / Waiting Room / Toilet			0	325	1	325	
Teachers' Mail and Time Room			0	100	1	100	
Duplicating Room			0	150	1	150	
Records Room			0	110	1	110	
Principal's Office w/ Conference Area	205	1	205	375	1	375	
Principal's Secretary / Waiting	328	1	328	125	1	125	
Assistant Principal's Office			0	120	0	-	
Supervisory / Spare Office			0	120	1	120	
Conference Room	270	1	270	250	1	250	
Guidance Office			0	150	1	150	
Adjustment Counselor / Psychologist	413	1	413				
Guidance Storeroom			0	35	1	35	
Teachers' Work Room	254	1	254	325	1	325	
Storage	40	1	40				
CUSTODIAL & MAINTENANCE			**315**			**1,950**	
Custodian's Office			0	150	1	150	
Custodian's Workshop			0	375	1	375	
Custodian's Storage	141	1	141	375	1	375	
Recycling Room / Trash			0	400	1	400	
Receiving and General Supply	174	1	174	217	1	217	
Storeroom			0	233	1	233	
Network / Telecom Room			0	200	1	200	
OTHER			**2,667**			**0**	
Other *(specify)*							
Boiler	777	1	777				
Dressing Room	120	1	120				
Lobby	495	1	495				
Outdoor Storage	90	1	90				
Storage	295	2	590				
Storage	140	1	140				
Storage	71	5	355				
Storage	25	4	100				
Total Building Net Floor Area (NFA)			**36,917**			**40,892**	
Proposed Student Capacity / Enrollment			349			**350**	
Total Building Gross Floor Area (GFA)[2]			48,272			**60,958**	
Grossing factor (GFA/NFA)			**1.31**			**1.49**	

According to net and gross square footage recommendations by the MSBA, Cleveland Elementary is under-sized as a whole.

Visual Evidence of Deficiencies

Tight square foot per student ratio

Insufficient media center and community space

Formerly centralized, shared spaces are overrun with the need for storage

Corridors are full of paper and books - items that create a safety hazard

Community spaces, like the gym, were not increased when the 1965 addition was constructed

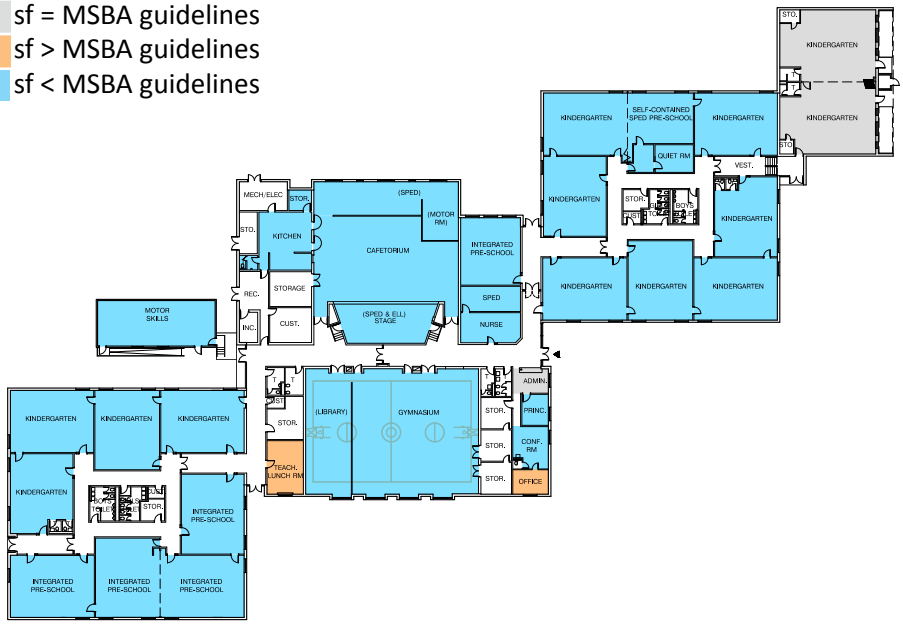
The under-sized media center lacks support spaces

Willett Early Childhood Center

The following diagram is a visual representation of the under-sized spaces within the Willett Early Childhood Center, which are shown in blue. It is apparent that the majority of rooms are inadequate per the guidelines of the Massachusetts School Building Authority (the MSBA).

Willett Early Childhood Center
- 385 students
- 38,500 square feet

sf = MSBA guidelines
sf > MSBA guidelines
sf < MSBA guidelines



first floor

Classrooms are particularly under-sized at Willett, due to the fact that it services pre-kindergarten and kindergarten students only. The curriculum for such an age group is more activity-based, and even though class sizes are smaller, a larger footprint is required. The MSBA recommends 1,200 square feet per classroom, plus the need for toilet rooms and support spaces. If Willett were to continue to operate as an early childhood center, class sizes would have to significantly decrease in order to fit comfortably within the existing classrooms. Shared spaces cannot be used for their intended purposes due to over-crowding.

Existing Space Summary

Over MSBA Guidelines

Under MSBA Guidelines

George F. Willett Center	Existing Conditions			MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**16,364**		**20**	**20,000**	
(List classrooms of different sizes separately)							
Pre-Kindergarten w/ toilet			0	1,200		-	1,100 SF min - 1,300 SF max
Kindergarten w/ toilet	1,055	3	3,165	1,200	4	4,800	1,100 SF min - 1,300 SF max
General Classrooms - Grade PK-K			0	950	16	15,200	900 SF min - 1,000 SF max
Kindergarten	888	10	8,880				
Integrated Pre-School	905	4	3,620				
Integrated Pre-School	699	1	699				
SPECIAL EDUCATION			**3,145**			**4,530**	
(List rooms of different sizes separately)							
Self-Contained SPED			0	950	3	2,850	8% of pop. in self-contained SPED
Self-Contained SPED - toilet			0	60	3	180	
Resource Room			0	500	2	1,000	1/2 size Genl. Clrm.
Small Group Room / Reading			0	500	1	500	1/2 size Genl. Clrm.
Self-Contained Pre-school	595	1	595				
Quiet Room	184	1	184				
Sped & ELL	662	1	662				
Sped Motor Room	512	1	512				
Motor Skills	931	1	931				
Sped	261	1	261				
ART & MUSIC			**0**			**2,575**	
Art Classroom - 25 seats			0	1,000	1	1,000	assumed schedule 2 times / week / student
Art Workroom w/ Storage & kiln			0	150	1	150	
Music Classroom / Large Group - 25-50 seats			0	1,200	1	1,200	assumed schedule 2 times / week / student
Music Practice / Ensemble			0	75	3	225	
HEALTH & PHYSICAL EDUCATION			**3,097**			**6,300**	
Gymnasium	2,763	1	2,763	6,000	1	6,000	6000 SF Min. Size
Gym Storeroom	167	2	334	150	1	150	
Health Instructor's Office w/ Shower & Toilet			0	150	1	150	
MEDIA CENTER			**988**			**2,695**	
Media Center / Reading Room	988	1	988	2,695	1	2,695	
DINING & FOOD SERVICE			**3,962**			**6,687**	
Cafeteria / Dining	2,547	1	2,547	3,375	1	3,375	2 seatings - 15SF per seat
Stage			0	1,000	1	1,000	
Chair / Table / Equipment Storage	253	1	253	350	1	350	
Kitchen	825	1	825	1,750	1	1,750	1600 SF for first 300 + 1 SF/student Add'l
Staff Lunch Room	337	1	337	213	1	213	20 SF/Occupant
MEDICAL			**310**			**510**	
Medical Suite Toilet			0	60	1	60	
Nurses' Office / Waiting Room	310	1	310	250	1	250	
Examination Room / Resting			0	100	2	200	
ADMINISTRATION & GUIDANCE			**818**			**2,315**	
General Office / Waiting Room / Toilet			0	375	1	375	
Teachers' Mail and Time Room			0	100	1	100	
Duplicating Room			0	150	1	150	
Records Room			0	110	1	110	
Principal's Office w/ Conference Area	143	1	143	375	1	375	
Principal's Secretary / Waiting	116	1	116	125	1	125	
Assistant Principal's Office			0	120	0	-	
Supervisory / Spare Office	151	1	151	120	1	120	
Conference Room	242	1	242	250	1	250	
Guidance Office			0	150	2	300	
Guidance Storeroom	166	1	166	35	1	35	
Teachers' Work Room			0	375	1	375	
CUSTODIAL & MAINTENANCE			**497**			**2,050**	
Custodian's Office			0	150	1	150	
Custodian's Workshop			0	375	1	375	
Custodian's Storage			0	375	1	375	
Recycling Room / Trash			0	400	1	400	
Receiving and General Supply	244	1	244	250	1	250	
Storeroom	253	1	253	300	1	300	
Network / Telecom Room			0	200	1	200	
OTHER			**980**			**0**	
Other *(specify)*							
Equipment Room	240	1	240				
Exterior Storage	130	1	130				
Incinerator	96	1	96				
Storage	233	1	233				
Storage	88	2	176				
Custodian	35	3	105				
Total Building Net Floor Area (NFA)			**29,851**			**47,662**	
Proposed Student Capacity / Enrollment			385			**450**	
Total Building Gross Floor Area (GFA)[2]			38,117			**73,125**	
Grossing factor (GFA/NFA)			**1.28**			**1.53**	

According to net and gross square footage recommendations by the MSBA, Willett is under-sized as a whole.

Visual Evidence of Deficiencies

Under-sized classrooms

Insufficient special education space

Dysfunctional library and gymnasium

Over-crowding in every sense; the cafeteria stage is divided up into small group classrooms

Operable walls are not useful and, instead, transmit noise between adjacent classrooms

The trailer is inadequate to comfortably provide educational space, and has become a permanent fixture

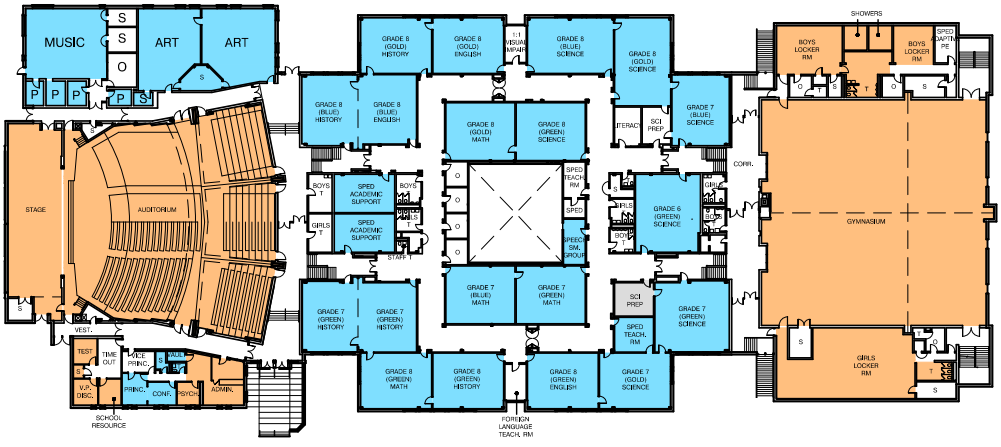
Coakley Middle School

The following diagram is a visual representation of the under-sized spaces within Coakley Middle School, which are shown in blue. It is apparent that the majority of classrooms are inadequate per the guidelines of the Massachusetts School Building Authority (the MSBA).

Coakley Middle School
- 756 students
- 128,100 square feet

sf = MSBA guidelines
sf > MSBA guidelines
sf < MSBA guidelines

second floor



first floor

Core classrooms, excluding science, suffer the most at Coakley Middle School, all falling below the 950 square foot recommendation.

Existing Space Summary

Coakley Middle School	Existing Conditions			MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**30,162**		**48**	**41,260**	
(List classrooms of different sizes separately)							
Pre-Kindergarten w/ toilet			0	1,200		-	1,100 SF min - 1,300 SF max
Kindergarten w/ toilet			0	1,200	0	-	1,100 SF min - 1,300 SF max
General Classrooms - Grades 1-5			0	950	0	-	900 SF min - 1,000 SF max
General Classrooms - Grades 6-8			0	950	34	32,300	
Science Classroom / Lab			0	1,200	7	8,400	1 period / day / student
Prep room			0	80	7	560	
Grade 8 Classrooms	786	8	6,288				
Grade 8 Science Classroom	980	1	980				
Grade 8 Science Classroom	955	1	955				
Grade 8 Science Classroom	791	1	791				
Grade 7 Classrooms	787	10	7,870				
Grade 7 Science Classroom	1,031	1	1,031				
Grade 7 Science Classroom	802	1	802				
Grade 6 Classroom	818	5	4,090				
Grade 6 Classroom	742	1	742				
Grade 6 Classroom	598	1	598				
Grade 6 Science Classroom	1,195	1	1,195				
Grade 6 Science Classroom	991	1	991				
Grade 6 Science Classroom	749	1	749				
Science Prep	263	1	263				
Science Prep	209	1	209				
Language Lab	842	1	842				
Foreign Language	965	1	965				
Foreign Language	801	1	801				
SPECIAL EDUCATION			**5,629**			**9,060**	
(List rooms of different sizes separately)							
Self-Contained SPED - Grades 6-8			0	950	6	5,700	8% of pop. in self-contained SPED
Self-Contained SPED - Grades 1-5			0	950	0	-	8% of pop. in self-contained SPED
Self-Contained SPED - Grades 1-5 toilet			0	60	0	-	
Self-Contained SPED - Grades 6-8 toilet			0	60	6	360	
Resource Room - Grades 6-8			0	500	4	2,000	
Resource Room - Grades 1-5			0	500	0	-	
Small Group Room / Reading	198	1	198	500	2	1,000	1/2 size Genl. Clrm.
Sped P.A.C.S.	1,139	1	1,139				
Sped Behavioral T.A.S.C.	802	1	802				
Sped Pragmatic Learning Center	773	1	773				
Sped Academic Support	456	2	912				
Sped Teachers Room	268	1	268				
Sped Teachers Room	156	1	156				
Literacy - ELL	784	1	784				
Visual Impairment 1:1	154	1	154				
Literacy	202	1	202				
Sped Adaptive PE	158	1	158				
Sped Storage	83	1	83				
ART & MUSIC			**4,091**			**3,800**	
Art Classroom - Grades 1-5			0	1,000	0	-	assumed schedule 2 times / week / student
Art Classroom - Grades 6-8			0	1,200	2	2,400	assumed use - 50% population 2 times / week
Art Classroom	1,040	1	1,040				
Art Classroom	928	1	928				
Art Workroom w/ Storage & kiln			0	150	2	300	
Art Storage	165	1	165				
Art Storage	50	1	50				
Band / Chorus - 100 seats			0	1,500	1	1,500	
Music Classroom / Large Group - 25-50 seats	1,128	1	1,128	1,200	0	-	assumed schedule 2 times / week / student
Music Practice / Ensemble - Grades 1-5			0	75	0	-	
Music Practice / Ensemble - Grades 6-8	86	4	344	200	-2	(400)	
Music Office	192	1	192				
Music Storage	122	2	244				
VOCATIONS & TECHNOLOGY			**3,421**			**6,400**	
Tech Clrm. - (E.G. Drafting, Business)			0	1,200	2	2,400	Assumed use - 25% Population - 5 times/week
Tech Shop - (E.G. Consumer, Wood)			0	2,000	2	4,000	Assumed use - 25% Population - 5 times/week
S.T.E.M. Wood Shop	1,528	1	1,528				
S.T.E.M.	1,176	1	1,176				
Planning Center	349	1	349				
Storage	246	1	246				
Office	122	1	122				
HEALTH & PHYSICAL EDUCATION			**13,815**			**8,400**	
Gymnasium	9,938	1	9,938	6,000	1	6,000	6000 SF Min. Size
Gym Storeroom	132	1	132	150	1	150	
Health Instructor's Office w/ Shower & Toilet			0	250	1	250	
Girls Health Office with Shower	107	1	107				
Boys Health Office with Shower	124	1	124				
Boys Health Office	89	1	89				
Locker Rooms - Boys / Girls w/ Toilets			0	1,000	2	2,000	
Girls Locher Room with Toilets	1,894	1	1,894				
Boys Locker Room with Toilets	1,531	1	1,531				
MEDIA CENTER			**3,210**			**4,727**	
Media Center/Reading Room	3,210	1	3,210	4,727	1	4,727	
DINING & FOOD SERVICE			**10,288**			**10,067**	
Cafeteria / Dining	5,143	1	5,143	5,670	1	5,670	2 seatings - 15SF per seat
Kitchen	2,844	1	2,844	2,056	1	2,056	1600 SF for first 300 + 1 SF/student Add'l
Chair / Table / Equipment Storage			0	452	1	452	200 SF for first 300 + .333 SF/student Add'l
Staff Lunch Room	389	1	389	289	1	289	200 SF for first 400 + .25 SF/student Add'l
Stage	1,912	1	1,912	1,600	1	1,600	
MEDICAL			**567**			**710**	
Medical Suite Toilet	17	2	34	60	1	60	
Nurses' Office / Waiting Room	148	1	148	250	1	250	
Examination Room / Resting	385	1	385	100	4	400	
ADMINISTRATION & GUIDANCE			**3,420**			**3,406**	
Principal's Office w/ Conference Area	159	1	159	375	1	375	
Principal's Secretary / Waiting	468	1	468	125	1	125	
Assistant Principal's Office - AP1	137	1	137	150	1	150	
Assistant Principal's Office - AP2	129	1	129	150	0	-	
General Office / Waiting Room / Toilet	100	1	100	478	1	478	
Conference room	132	1	132	350	1	350	
Teachers' Mail and Time Room			0	100	1	100	
Duplicating Room			0	200	1	200	
Records Room			0	200	1	200	
Supervisory / Spare Office			0	150	1	150	
General Waiting Room			0	100	1	100	
Guidance Office			0	150	4	600	
Guidance Storeroom			0	50	1	50	
Teachers' Work Room	488	1	488	528	1	528	
Resource Room	770	1	770				
School Resource	117	1	117				
Testing	121	1	121				
Timeout	219	1	219				
Foreign Language Teacher Room	152	1	152				
Office	107	4	428				

According to net and gross square footage recommendations by the MSBA, Coakley Middle School is under-sized as a whole.