ACPS

CUMBERLAND AREA SCHOOLS

FEASIBILITY STUDY

JULY 12, 2011

Grimm + Parker Architects

CUMBERLAND AREA SCHOOLS FEASIBILITY STUDY

COMPREHENSIVE FEASIBILITY STUDY OF:
ALLEGANY HIGH SCHOOL
BRADDOCK MIDDLE SCHOOL
WASHINGTON MIDDLE SCHOOL

Board of Education of Allegany County
RFP# 1002
P.O. Box 1724
108 Washington Street
Cumberland, Maryland 21502

DIRECTORY

SCHOOLS

MIDDLE SCHOOL
Washington Middle School
200 Massachusetts Avenue
Cumberland, Maryland 21502
Phone: 301-777-5360

MIDDLE SCHOOL
Braddock Middle School
909 Holland Street
Cumberland, Maryland 21502
Phone: 301-777-7990

HIGH SCHOOL
Allegany High School
616 Sedgwick Street
Cumberland, Maryland 21502
Phone: 301-777-8110

OWNER:
Board of Education of Allegany County
P.O. Box 1724
108 Washington Street
Cumberland, MD 21502
Phone: 301-759-2008

TEAM LIST

ARCHITECT:
Grimm + Parker Architects
11720 Beltsville Drive, Suite 600
Calverton, MD 20705
Phone: 301-595-1000

CIVIL ENGINEER:
SPECS, Inc.
105 S. Centre Street
Cumberland, MD 21502
(301) 777-2510

STRUCTURAL ENGINEER:
Columbia Engineering, Inc.
6210 Old Dobbin Lane
Columbia, MD 21045
(410) 992-9970

MEP ENGINEER:
Gipe Associates, Inc.
849 Fairmount Avenue
Suite 102
Baltimore, Maryland 21286
Phone: 410-832-2420

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SECTION 1 - EXECUTIVE SUMMARY

I – PURPOSE

The purpose of this study is to provide information and recommendations for subsequent decisions of the Board of Education related to the development of a long-range capital improvement plan for the following schools located in the City of Cumberland:

- Allegany High School
- Braddock Middle School
- Washington Middle School

We examined options for the three schools:

- To maintain safe and healthy schools, which enrich the educational experience for all students;
- To provide programs and services in the most cost efficient and effective manner;
- To maximize the utilization of school facilities which includes the regular school day use, after-hours use, and the community use; and
- To provide options for renovation, replacement, adaptive reuse, or a combination of the school facilities.

2 – METHODOLOGY

The study included a comprehensive review of the facilities in relation to enrolment, projected enrolment, educational adequacy and facilities adequacy. The team considered previous reports provided by Allegany County Public Schools as well as performed thorough on site investigations and observations. The design team included a team of experienced school engineers and architects lead by Grimm + Parker Architects. The review focused on the ability of the facilities to conform to the Educational Specifications dated April 6, 2011 which represents the goal of ACPS to provide a comprehensive modern educational experience for all its students and the ability of the facility to provide a safe, comfortable and effective learning environment. The design team met with representatives of ACPS on multiple occasions to review a wide variety of options and to seek input. The options represented in this study were those selected through this process to be the viable options and worthy of this comparative study.

Several assumptions have been made in the program analysis and cost estimates as part of the development of this study. The assumptions are required to develop consistent points of comparison between the different options. The analysis is based on the proposed Educational Specifications and the average costs for the different types of demolition and construction activities proposed. Both the program and the cost estimates will be refined during the schematic design phase of each project as the project proceeds into design.

Included within each cost estimate is a calculation for the proposed state participation value for each project. This number is based on the projected enrollment for each school for the year 2019, the associated state allocated square footage, the state supported cost per square foot for construction and the state participation percentage for Allegany County Public Schools. These numbers are based on the current data available. Since the proposed Education Specifications are geared toward an idle high school and middle school model, the state supported enrolment is below the proposed occupancy included in the Ed Specs. Decisions regarding this discrepancy will be evaluated during the design phase which could potentially affect the total project cost. The number used for state participation value is only a proposed calculation and does not indicate any guarantee that the project will be awarded this funding.

3 – OVERVIEW

The Allegany County Public School system, located in Western Maryland, serve approximately 9,000 students in 22 schools across the county. The City of Cumberland is the county seat for Allegany County and is the focus for this study. Cumberland is the home of four public elementary schools, two middle schools, two high schools and a career education facility. With the exception of the recently renovated Fort Hill High School, this report focuses on the remaining secondary schools in ACPS; Braddock Middle School, Washington Middle School and Allegany High School.

Washington Middle School is located on a 17.5 acre site at 200 North Massachusetts Ave. in the south east section of the City of Cumberland. The back of the site adjoins the adjacent Fort Hill High School site. The school is approximately 98,500 square feet, has a capacity of 765 students and was built in 1965. Washington MS has had minor improvements in recent years but the entire facility is in need of significant improvements to make the building a safe and effective school environment. It is also lacking in adequate program space to meet the requirements of the Education Specifications.

Braddock Middle School is located on a 25 acre site at 909 Holland Street on the north site of the city. The school sits at the edge of the city's neighborhood development to the north and is divided by Franklin Street which runs through the site. The school is approximately 99,000 square feet, has a capacity of 819 students and was built in 1965. Braddock MS has had no significant improvements and the entire facility is in need of significant improvements to make the building a safe and effective school environment. It is also lacking in adequate program space to meet the requirements of the Education Specifications.
HS has had numerous improvements and additions throughout the years. This has created an excessively disjointed and inaccessible facility which is no longer capable of providing an adequate high school educational experience. The size of the building does contain the appropriate amount of program space to meet the Educational Specification requirements but due to the configuration, these spaces cannot be used appropriately to meet the goals of the Ed. Spec. The structure itself is also not a safe and functioning environment for students and renovations to all systems and structures are required.

4 – DESIGN SCHEMES

The study has focused on create multiple options for both schools as are appropriate to the schools and the sites.

Washington Middle School:

Scheme W-1: Renovation

This scheme includes the renovation of the existing school without the additions of any new construction and with a minimum of site work. The scheme focuses on renovation of the major systems of the building that are currently not functioning up to standards are codes.

Scheme W-2a: Modernization and Additions

This scheme involves a comprehensive modernization of the building and all its components as is included in the recommendations portion of the Existing Conditions Assessment. The scheme also includes addition to the building as required to meet the Education Specifications.

Scheme W-2b: Modernization and Additions – Reconfiguration of Auditorium

Allegany High School is located on a 12.5 acre site at 616 Sedgwick Street in the north west section of Cumberland. The school sites on a site on top of a small hill in the center of one of the city's residential districts. The school is 173,892 square feet, has a capacity of 1060 students and the original structure was built in 1932. The building plays a significant role in the history of the City of Cumberland. Allegany

This scheme is the same as Scheme W-2a except that the rear portions of the auditorium are repurposed to create two new classrooms. This decreases the size of the required additional construction.

Scheme W-3: Replacement School

In this scheme, a new school in constructed on the current field location for the existing middle school. The facility is designed to meet all requirements of the Ed. Specs. and is a modern education facility. The existing school building is demolished after completion of the new school.

Braddock Middle School:

Scheme W-1: Renovation

This scheme includes the renovation of the existing school without the additions of any new construction and with a minimum of site work. The scheme focuses on renovation of the major systems of the building that are currently not functioning up to standards are codes.

Scheme W-2a: Modernization and Additions

This scheme involves a comprehensive modernization of the building and all its components as is included in the recommendations portion of the Existing Conditions Assessment. The scheme also includes addition to the building as required to meet the Education Specifications.

Scheme W-2b: Modernization and Additions – Classrooms over Media Center

This scheme is the same as Scheme W-2a except the media center is only a single story space and the area above accessible from the corridor behind the auditorium is built two stories and houses several classrooms. This decreases the size of the required additional construction.

Scheme W-3: Replacement School

In this scheme, a new school in constructed on the current field location for the existing middle school. The facility is designed to meet all requirements of the Ed. Specs. and is a modern education facility. The existing school building is demolished after completion of the new school.

Allegany High School:

Scheme A-1: Renovation

This scheme explores the feasibility of renovating the existing high school building within its current footprint.

Scheme A-2: Replacement School – Existing Track and Field

This scheme constructs a new high school building on the location of the existing track and field area. The scheme maintains the existing road infrastructure but includes the addition of a service road. Since the new building overlaps the existing building, the school would be built in phases to accommodate the students during construction.

Scheme A-3: Replacement School – Existing East Parking Lot

This scheme constructs a new high school building on the existing east parking lot and the east end of the existing school site. The building bridges the existing Tilghman Street. The main academic building is located on the parking lot site and the athletic and arts program are located on the existing high school site. The construction would be phased to allow for continuous operation of the school.

Scheme A-4: Replacement School – Reroute Sedgwick

This scheme explores the opportunities created by connecting the west end of Sedgwick to Niagara Street. This creates a larger portion of contiguous site and changes the traffic patterns to better support the separation of cars and buses. The new school is located so that it can be built in its entirety without demolition of the existing building prior to completion of the new school.

Scheme A-5: Replacement School off Site

In this scheme a new high school will be built on a new site. Since the site has yet to be determined, this is a theoretical exercise. The assumptions used in this exercise represent the most typical circumstances that would apply to a new site in the Cumberland Area.

5 – RECOMMENDATIONS

Washington Middle School:

Since the core building structure for Washington Middle School is not in need of significant repairs and the modifications required to create a building that matches the new Educational Specifications are reasonable, we do not recommend replacement of this building at this time. The design team recommends scheme W-2a or 2b as the most suitable scheme for Washington Middle School. These schemes will create a sound building able to meet the goals of the Ed. Specs. and provide a quality environment for a modern middle school program.

Braddock Middle School:

Similar to WMS, Braddock Middle School is not in need of significant repairs and the modifications required to create a building that matches the new Educational Specifications are reasonable, therefore we do not recommend replacement of this building at this time. The design team recommends scheme B-2a or 2b as the most suitable scheme for Braddock Middle School. These schemes will create a sound building able to meet the goals of the Ed. Specs. and provide a quality environment for a modern middle school program.

Allegany High School:

After a thorough analysis and discussion with ACPS staff, the design team recommends Scheme A-5 as the most suitable scheme for the Allegany High School. This is the only solution that will provide a viable education facility for a state of the art high school program with the supporting site amenities to continuity of the program and safe and secure control of both pedestrian and vehicular circulation. This scheme also preserves the existing historical building on site in the hope that an alternative use can be determined. However, this scheme is contingent on the availability of a suitable site. If a suitable site cannot be obtain, options A-2, 3 and 4 which replace the school on site are all second choice options. Further study will be performed by the design team if replacement on site is selected to determine the best choice out of these three schemes.

Scheme A-5 for Allegany High School also so supports the selection of the appropriate schemes for both Washington and Braddock Middle School. Since the high school will be moved off site, the existing building will be available for temporary housing for both the middle schools as the renovations in those schools take place. The design team recommends phasing the entire process of the work for these three schools to allow this to happen as it will create the least amount of disruption to the students of all three schools. This solution will also be the most economical as it will avoid the additional construction costs created by occupied phased renovation projects and the cost of temporary classrooms.

Detailed analyses of the existing buildings as well as analysis of the schemes are contained in the remaining sections of this study.

SECTION 2 - EXISTING CONDITIONS ASSESSMENT – WASHINGTON MIDDLE SCHOOL

Image 1 - WASHINGTON MIDDLE SCHOOL MAIN ENTRY

I – INTRODUCTION

Washington Middle School was originally constructed in 1965 at approximately 92,500 square feet. An addition of approximately 6,000 square feet was added to infill the courtyard in 2000 and other systemic improvements were accomplished in 1999 and 2004. The total building area is approximately 98,500 square feet. The main level incorporates the cafeteria, auditorium, gym, administration spaces, media center and classrooms. The second floor incorporates additional classrooms and a locker room in the gymnasium area.

Washington Middle School is located on North Massachusetts Avenue in the historic south end of Cumberland Maryland. The school was originally built as South End Junior High School. The school site backs up to Fort Hill High School and is the feeder middle school for that high school. The south end district is the largest district in Cumberland and is a mix of residential neighborhoods, commercial areas and industrial uses. The large residential neighborhood includes the both the Chapel Hill Historic District and the Rolling Mill Historic District.

2 – SITE ASSESSMENT

A. Site Background

The site area is 17.5 acres. Approximately eighty percent of the site is developed. The remaining part is a wooded hillside typical of Western Maryland. The site is graded into three distinct plateaus. The lower plateau includes the parking lots and school building. The middle and upper plateaus each have a ball field. Grade changes between the plateaus are steep.

B. Accessibility

Currently there are two means of access to the site. The main drop off is a one-way loop located off of Kentucky Avenue. The loop serves as primary access to the school. From the loop, access to the two parking lots and delivery area is provided. The pavement condition for the drop off is deteriorating. It should be considered for total replacement. Angled parking is provided along the loop opposite of the school. A partially paved/gravel area east of the building is used for parking. Another parking lot is located west of the building. Access to cafeteria and utility plant is through this parking lot. The loop does double duty as bus and parent drop-off.

The location of the loop has created traffic issues for the surrounding neighborhood. Any increase in usage or traffic should be discussed fully with the City of Cumberland.

The second means of access is a pedestrian entrance from Kent Avenue located northwest of the school building. The route to the building is not ADA accessible. The route is well used by pedestrians and improvements need to be made to incorporate ADA accessibility.

C. Parking

Parking is provided in three areas. Angled parking is located opposite of the main entry. Another paved lot is located to the west of the building. A third parking area, consisting of sporadic asphalt and gravel is located to the east of the school.

These lots include a total of 106 paved and 36 unpaved spaces. There are no clearly indicated, properly configured handicapped parking spaces. The parking areas do not meet ADA standards for the minimum number of accessible spaces. It is recommended that the unpaved parking lot be paved be paved and appropriate accessible spaces be provided.

D. Service

Service access is provided through the western parking lot. Deliveries appear to be in conflict with parking. There is no loading dock.

E. Pedestrian

The school has two defined pedestrian routes mostly consisting of paved sidewalk. One route circles between the access drive and the school. The second route is located from Kent Avenue. Neither route is ADA accessible.

A bike rack was located on site in an unusable state. Bick racks should be provided.

F. Water Supply, Drainage and Sewerage

The site is served by domestic water and sewer supplied by the City of Cumberland. The City reported no issues with either system. Taps for an addition or new building will need to follow City practices.

There is no apparent stormwater management for the site. There is no apparent separate conveyance of stormwater. The City of Cumberland uses the 2010 Maryland Stormwater Management Design Manual. Any renovations done on the site will require compliance with the City's Stormwater Management Ordinance. The designer will be required to follow the Environmental Site Design (ESD) guidelines for redevelopment.

ESD focuses on bringing the site back to what engineers term "Woods in Good Condition". This means that every effort must be made in the design to accommodate alternative non-structural practices before a conventional structure can be employed. These techniques can include green roofs, infiltration, grass swales, and permeable pavements. The architect needs to fully consider this when performing preliminary design for any renovation or construction. Green areas will need to be incorporated into the design to facilitate the implementation of ESD practices.

Potomac Edison provides power for the site. Columbia Gas has gas available, but did not comment on the location or capacity. Verizon supplies telephone. Cable is by Atlantic Broadband. No issues with any of these services were disclosed.

G. Circulation

Circulation on the site is functional but presents some safety issues. The parking along the shared drop off in the loop from Kentucky Avenue is congested. The single vehicular access point to Kentucky Avenue is a real concern for circulation. In the event of an accident, vehicular access (including fire apparatus) would be severely hampered.

Reasonable access among the components of the site is provided. However, most of it does not meet ADA requirements (see Appendix A, Photo 10). None of the athletic or play areas have an accessible route to the school.

H. Environmental Variables

There are no apparent outdoor learning habitats located on the site. Provided there is enough room, Environmentally Sensitive Design can easily be configured to accommodate a wetland learning habit.

I. Pedestrian and Vehicle Circulation

The site mixes pedestrian and vehicle circulation. An attempt needs to be made to separate pedestrian traffic from personal vehicle and bus traffic in order to improve safety.

J. Athletic Fields

The site has two large grass fields. The lower field is a multipurpose field, incorporating discus, shot-put and a ball field. The upper field is a dedicated baseball field. Both fields feature backstops which are aged and in poor condition. The upper field has a set of portable bleachers. The upper field appears to meet NFHS requirements for baseball and is understood to be used by Fort Hill as its home field.

A small paved area enclosed by fencing is located to the rear of the school. This appears to be used for basketball. There is a ramp up to the paved area.

Image 2 - WASHINGTON MIDDLE SCHOOL AERIAL PHOTO

3 – BUILDING CONDITION

A. Exterior Building Envelope

Roof

The existing roof is an exposed membrane roof which is in fair / poor condition and is beyond its warranty coverage. The majority of the roof plane is flat and there is evidence of significant ponding (see Appendix A, Photo 2&3). There are numerous soft spots in the underlying insulation and the majority of the insulation fasteners are telegraphing through the membrane. The existing aluminum coping and gravel stop are in fair condition. Through-wall flashing at low roof to wall transitions is copper and in fair condition, with no evidence of weep provisions. There are no overflow drains or scuppers provided.

Exterior Walls

The building envelope consists of brick with CMU backup. The exterior masonry is generally in good condition, however, overall cleaning and some point up is required(see Appendix A, Photo 4). Most exterior sealants at control joints are in poor condition and should be replaced. There is evidence of cracking in several of the exposed concrete columns in the two story classroom wing (see Appendix A, Photo 5).

Exterior Doors and Windows

All exterior windows are single pane glazing which will not meet current energy standards and should be replaced with thermally broken insulated glass units. The windows also have deteriorating sealant which should be replaced. Several lintels are rusting and should be repaired or replaced (see Appendix A, Photo 6).

B. Interiors

Floor Finishes

Most classrooms have the original 9 "x 9" vinyl asbestos tile (VAT) (see Appendix A, Photo 7), which should be replaced. Corridors are typically terrazzo which is in good condition. In some areas the VAT has been replaced with VCT, which is in good condition. Toilet rooms are typically ceramic tile. The gym wood floor is in good condition. The stage wood floor is in fair condition.

Interior Walls

Most interior walls are painted CMU and are in fair condition. Corridor walls are CMU with a 4’ ceramic tile wainscot. Some tiles are damaged, particularly at the base of wall. Bathrooms are typically glazed ceramic tile and CMU.

Ceilings

Most ceilings in the classroom building are suspended 2'x4' acoustic ceiling tile in metal grid and are in poor condition (see Appendix A, Photo 8). Tiles are damaged or stained and should be replaced. In some spaces the suspended ceilings have been replaced and are in good condition.

Interior Doors and Hardware

Interior doors are typically wood and hollow metal frame. Glass lites in doors are wire glass. The hardware throughout the building is not ADA compliant.

4 – BUILDING CODE ANALYSIS

The building is not fully sprinklered. Installing a sprinkler system is highly recommended for several reasons, including: 1) Safety of the building occupants, 2) protection of property, 3) dramatic reduction in the cost of other fire protection measures needed throughout the building to comply with code.

The area of the building exceeds the allowable area per the IBC code. Even if the building were fully sprinklered, it would not be within the area limitation, and a fire separation wall and doors would be required.

The occupancy loads of some of the larger classrooms like the technology and FACS labs require two means of egress with doors that swing out and have panic hardware, which are not provided.

Existing egress stair guardrail and handrail heights meet current Codes. Three stairs are required to meet the occupancy load of the second floor level of the classroom wing, however, only two are provided. Risers at the gym locker room stairs exceed 7", which is not code compliant. The landing depth at these stairs is also below the code required minimum. Stairs in the classroom wing do not have a fire separation from the corridors and do not comply with current building codes.

Wire glass is provided at sidelights throughout the building. Wire glass is no longer allowed in Educational use buildings per IBC.

5 – BUILDING ACCESSIBILITY

An elevator is provided to provide access to the second floor building level. However, many components of the classroom building are not ADA compliant, including the following:

- ADA access is not provided to the second floor gym locker room.
- ADA access is provided at most exterior entrances, however, at some locations there is a concrete step(see Appendix A, Photo 9).
- Some room entrances do not provide the required door approach clearances.
- Door hardware is not ADA compliant.
- Handicap accessible plumbing fixtures and stalls are not provided at all toilet rooms. In some locations grab bars are provided, but not in the correct configuration to meet current codes. Also, handicap turnaround and fixture clearances are not provided at all toilet rooms.

Image

Image 3 – WASHINGTON MIDDLE SCHOOL FIRST FLOOR PLAN

Image 4 – WASHINGTON MIDDLE SCHOOL SECOND FLOOR PLAN

6 – STRUCTURAL ANALYSIS

A. General Characteristics

Washington Middle School is composed of two sections including an auditorium and gymnasium bar and a classroom, dining room and administration bar. The building was purportedly built in 1965 although no date is provided on the structural drawings. The Washington Middle School is referred to as "South End Junior High School"

The roof deck of the auditorium and gym are composed of gypsum insulating concrete on bulb tee sub-purlins over open web steel joists. The roof deck of the classroom wing is poured in place gypsum over gypsum board forming reinforced with welded wire mesh. The roof over the two elevated connecting links between the classroom and auditorium is a 3" metal deck.

The floor framing at the classrooms is composed of 2½" concrete over corrugated metal deck supported by open web bar joists spanning between steel beams and columns. The floor framing for the control room in the auditorium is poured in place reinforced concrete. The floor framing for the mezzanine level of the gymnasium is composed of 2½" concrete over metal deck supported by open web bar joists spanning between masonry bearing walls. The floor framing for the elevated connecting links between the classrooms and auditorium is 3"concrete over 2" metal deck spanning between steel beams and columns.

The first floors are concrete slab on grade ranging from 4" to 6" thick, reinforced with welded wire mesh. The typical thickness is 5".

The foundations are reinforced concrete spread footings. The footings are continuous at the exterior walls and insolated at the interior columns. The soil bearing capacity is noted as 8,000 psf.

The exterior walls are typically constructed of masonry block with a brick veneer. Wall opening lintels are cast-in-place concrete with steel angles supporting the brick veneer.

The existing roof design snow load is 30 psf. The existing design frost depth is 2'-6". The existing column live load is 70 psf, the corridor, stairs and landings are 100 psf and the storage live load is 125 psf.

B. Visual Inspection

1. There is a gap at the second floor classroom front wall that is covered with an aluminum angle.
2. There is minor cracking of the masonry exterior walls throughout the building. These cracks are due to minor settlement of the foundations.
3. There are cracks in the slab on grade in the boiler room.
4. There are cracks in the grout below the steel columns in the exterior walls.

C. Existing Plan Review

A cursory review of the structural systems shown on the available plans was conducted and we have the following comments:

1. The current code indicates a 40 psf roof snow load. The drawings note a 30 psf roof live load.
2. The current code indicates a 3'-0" frost depth. The drawings indicate a 2'-6" frost depth.
3. Snow drifting on lower roofs does not appear to have been accounted for in the original design.
4. The live load for the classroom floors meets current code requirements.

D. Conclusions

1. The majority of the roof joists are over-stressed under current code live/snow load criteria and/or snow drifting conditions.

2. The long span joists over the gymnasium and auditorium are adequate to support the current roof loads.

3. The concrete beams are slightly over-stressed under current code loads at the addition but are adequate in the original building.

4. The columns and foundations are adequate to support the current code required loads.

7 – MECHANICAL ANALYSIS

A. General

Washington Middle School was originally constructed in 1965 and consists of approximately 92,500 square feet. In 2004 a 6,000 square foot addition was constructed bring the total school square footage to 98,500. The building is located on a level site. The Main Classroom Wing with Media Center and Cafeteria is two-story masonry construction. The First Floor Level is connected to the Gym. Fine Arts, Auditorium, and Shop Rooms Building is located behind the Main Building. The Gym and Auditorium Buildings are also masonry construction. The building is heated and ventilated only (no central air conditioning) except for the 2000 addition which has two (2) rooftop air conditioning units.

B. Existing Conditions

Heating Plan

The building is heated by a central hot water boiler plant located behind the kitchen in the main building. The boiler room has a depressed slab and is approximately a story and a half high. Two (2) fire tube boilers as manufactured by National generate hot water for the heating system. The boilers are coal-fired. A small coal bin is located adjacent to the boilers.

- *Shop Areas*

Coal is dumped into the coal bin from access manholes located at grade. An auger system transfers the coal from the bin to hoppers where coal slowly enters the boiler.

A cyclone separator on the flue gas outlet is the primary ash collector. Three to four 30-gallon drums of ash are typically collected each day. The barrels then have to be hoisted out of the boiler room to be removed from the site. Boiler access doors are also used to shovel ash out of the boilers. Additionally, each boiler is equipped with a soot blower system typically used once a week to help blow the soot out of the boiler.

Two (2) original base-mounted end suction pumps distribute heating water from the boiler room throughout the complex.

Cooling

There is no central cooling for the building except for the 2004 addition which utilizes two packaged rooftop units as manufactured by AAON. The media center which was originally on the exterior wall became an interior wall when the addition occurred. One of the two rooftop units now serves the existing media area while the other rooftop unit serves the addition. There is a limited number of window air conditioning units scattered throughout the school. The main Computer Rooms, MDF Rooms, and IDF Rooms do not have air conditioning, creating extremely hot environments.

Air Distribution Systems

- *Auditorium*

  The Auditorium is served by a heating and ventilating unit hung in a storage room off one side of the stage. The unit barely fits in the space, making maintenance and servicing the unit very difficult. There is no room for pulling coils, replacing fans, nor are there any means of replacing the unit in the future.

  The stage is served by floor-mounted unit ventilators, while the two back sections of the auditorium, physically separated by the control booth, are served by individual heating and ventilating units located above their ceiling fans.

  The two (2) Main Shop Areas are heated only by standard hot water horizontal unit heaters. The Wood Shop has a recirculating dust

collector. The common classroom area is served by a small heating and ventilating air.

- *Classrooms*
  The classrooms are served by floor-mounted vertical heating and ventilating unit ventilators as manufactured by Herman Nelson/AAF. The units have outdoor air louvers located behind the units and through the exterior wall. Relief air is through door grilles, which allows this outdoor air to be transferred to the corridor, where multiple roof fans pulled air through the building to the Second Floor corridor before being exhausted outside. This concept also helped reduce heat build-up on the Upper Level. This section does not comply with current code requirements.

- *Cafeteria*
  The Cafeteria is also served by multiple floor-mounted vertical unit ventilators. Relief air is transferred to the Kitchen, where it is exhausted through the Kitchen hood or dishwasher exhaust system. A make-up air unit is located in the Boiler Room and provides tempered outdoor air directly into the Kitchen back corridor/loading dock. The cold boxes (refrigerator and freezer) are also located in the Kitchen area with their condensing units continuously rejecting heat into the space, creating an even hotter indoor environment.

- *Media Center*
  The Media Center as previously described is served by a packaged rooftop unit (AAON) installed as part of the 2004 addition.

- *Office/Administration Suite*
  The Office/Administration Area has perimeter hot water convectors/finned tube radiation for heating and window air conditioning units for cooling.

- *Gymnasium*
  The Gymnasium is served by two (2) heating and ventilating air handling units. Each of the units is located in a small storage room adjacent to the Boys and Girls Locker Room. These units are also located in a very tight room with limited accessibility for servicing or maintenance and with restricted access for replacing major components or unit replacement. A gravity ventilation system consisting of multiple large wall louvers and roof exhaust fan(s) provide supplemental heat removal during warm days.

- *Locker Rooms*
  Locker rooms, like the Classrooms, are served by floor-mounted vertical heating and ventilating unit ventilators.

- *Corridors, Toilet Rooms, etc.*
  Cabinet unit heaters are typically located at Main Entrance Areas, while convectors and finned tube radiation serve corridors, toilet rooms, storage rooms, etc.

Automatic Temperature Control Systems

All temperature controls are local pneumatic actuation type with limited capabilities. A small tank single compressor unit with air dryer is located in the Main Boiler Room and serves the entire building.

C. Evaluation

With the exception of the two (2) rooftop units installed as part of the 2004 addition, the mechanical systems and equipment are over 45 years old and beyond the anticipated life expectancy according to ASHRAE. The systems are still functional; however, most equipment manufacturers are no longer in business (boiler manufacturer, unit ventilator manufacturer, etc.,) and parts often have to be custom fabricated. The main equipment was installed in such a way that it is difficult to service and maintain; and replacement of major components is not possible without major demolition of walls, etc. The pneumatic control is antiquated and beyond its useful life. The control systems have limited capabilities to conserve energy, and are primarily utilized for occupied/unoccupied control and space temperature control. There are no controls on the coal-fired boilers.

The use of transfer air and large exhaust fans over the Second Floor corridor does not meet current Code requirements.

The coal-fired boilers are not the cleanest burning when compared to current “clean coal” types. It is also very laborious to operate and maintain these types of boilers. It is estimated that 300-400 tons of coal are consumed each year.

D. Recommendations

General
All systems and materials are beyond their useful lives and are recommended to be replaced in their entirety. A 4-pipe central heating and cooling system is recommended.

Heating Plant
It is recommended the heating plant be replaced in its entirety. A hybrid heating plant is recommended, consisting of multiple dual fuel (oil and gas) cast iron non-condensing boilers controlled in modular fashion. Additionally, it is recommended one or two of the boilers within the system be high efficiency gas-fired condensing type. The high efficiency boilers would operate during intermediate weather conditions in the spring and fall when the hot water supply temperature is reset to less than 140 deg F. These boilers can operate at variable flow and +90% efficiency. During winter outdoor conditions, the main non-condensing boilers will run and generate 180 deg F supply water temperature. The condensing boilers can also operate at these temperatures; however, their efficiency is no better than the standard cast iron boilers. Each non-condensing boiler would be equipped with a constant volume circulating pump; while a variable speed drive secondary pump will distribute varying flow throughout the building.

Cooling Plant
It is recommended to install a central chilled water plant to serve the building. A new chilled water system mechanical room will be needed to house the pumps, chillers, and associated specialties. Multiple split air-cooled or water-cooled chillers are recommended. Similar to the heating plant, each chiller would be provided with an associated constant volume pump. The chillers are recommended to be piped in parallel. A variable speed secondary pump will vary chilled water flow distributed throughout the building. A water-cooled magnetic bearing variable speed centrifugal type chiller is recommended. The chillers require vary little maintenance, are extremely quiet, are oil-free (sustainable design), and are the most energy-efficient chiller on the market.

Domestic Water

Air Distribution Systems
The existing equipment cannot be replaced in the same locations based on the lack of accessibility. New mechanical penthouses will be needed to house air handling equipment for assembly areas such as the Gym, Cafeteria, and Auditorium. All new duct systems, sized and insulated for cooling, will be required.

The original building has very limited infrastructure space (i.e., low floor-to-floor heights) since the original building had limited infrastructure needed to support the building. All the unit ventilators sit on the floor within the space. There is no cooling or fire protection system; and the power—IT cabling was minimal.

Unit ventilators are not recommended due to noise, humidity, and air distribution issues. A central all-air heating and cooling system (i.e., variable air volume system) will not be practical without compromising ceiling heights.

A 4-pipe fan-coil system with a dedicated outdoor air system (DOAS) may be the only cost-effective and practical solution.

Automatic Temperature Controls
It is recommended the existing local pneumatic control system be replaced in its entirety with a Web-based open protocol BACNET System using electric/electronic actuation and tied into a Central County Energy Management System (EMS).

Energy Conserving control strategies such as economizer cycles, night setback, demand controlled ventilation, supply air reset, supply water reset, etc., shall be incorporated to meet or exceed ASHRAE 90.1 2007 requirements.

8 – PLUMBING ANALYSIS

A. Existing Conditions

A 4-inch cold water service serves the building. The water service enters the building in the Boiler Room. Two (2) gas-fired hot water heaters

generate domestic hot water which is used in conjunction with a large uninsulated horizontal storage tank to serve the building.

Plumbing Fixtures
The plumbing fixtures appear to be original, are functional, but do not meet the current water conserving requirements.

Natural Gas
A 4-inch low pressure gas line enters the building at the Boiler Room. A large drum meter is located in the Boiler Room. Natural gas serves the domestic hot water heaters, kitchen equipment, and Science Labs.

Sanitary and Vent Piping
It appears most of the sanitary and vent piping is a combination of cast iron sanitary and copper vent piping. The Kitchen has in the floor grease traps and the Art Rooms have clay traps.

Storm Water Piping
The building has roof drains and interior storm water piping, which is cast iron, and original to the building.

B. EVALUATION

Except as necessary for repairs, all plumbing systems, fixtures, and piping are over 45 years old, do not meet current Code requirements for water conservation and accessibility, and are generally beyond their anticipated life expectancies. Insulation is in deteriorating condition. Backflow prevention is also required to protect the potable water supply.

C. RECOMMENDATIONS

Generally, the equipment and systems are recommended to be replaced in their entirety. Domestic hot water systems shall be energy-efficient and comply with ASHRAE 90.1 2007. Domestic hot water temperature limiting devices (ASSE approved devices) are required through the building as well as backflow prevention for the cold water system. Plumbing fixtures shall be replaced with water conserving, accessible types. Piping systems need to be replaced due to their age. Storm water systems need to be provided with independent overflow system and be sized to meet current Code requirements.

It is recommended that the gas service be upgraded to support the increased demand for the heating water system.

9 – FIRE PROTECTION ANALYSIS

A. Existing Conditions

The building for the most part is not equipped with a fire protection system. The 2004 addition and adjacent corridor(s) are protected by a wet pipe sprinkler. Within the boiler room the existing incoming water line was tapped, a 4" backflow preventer was installed and a single zone alarm check valve serves the protected area. It is recommended the water service be upgraded, and a wet pipe sprinkler system protect the entire building.

10 – ELECTRICAL ANALYSIS

A. EXISTING CONDITIONS

Electrical Distribution System
The electric service for Washington Middle School is derived from a utility pad-mount transformer. The main distribution switchboard for the building is rated 3000A, 240V, 3 phase, 3 wire. The switchboard, manufactured by General Electric, is located in the Boiler Room. Physical capacity is limited, and the switchboard bus has been tapped to serve loads added over time.

General Electric panelboards are located throughout the building, typically recessed mounted in corridors to serve local lighting and receptacle loads. Dedicated panelboards are located in the Boiler Room and Kitchen. The switchboard, as well as the majority of the electrical distribution system, is original to the building. Additional panels have been installed to support technology upgrades as well as a building addition in 2004 that included an elevator. Surge suppression devices (SPDs) have been installed at the newer panelboards.

The original distribution equipment has exceeded its anticipated useful life of 25-30 years. The electrical equipment located within the Boiler Room does not have the proper NEMA rated enclosure for the environment. The coal burning boilers generate soot that covers the equipment.

Emergency Distribution System

An "emergency" panel is fed from a circuit breaker ahead of the building main. This panel is located adjacent to the switchboard, inside the office, and serves exit signs and night light circuits. A separate service disconnect ahead of the building main disconnect was recognized by the National Electrical Code (NEC) as an emergency source when the building was constructed, but is not acceptable today for new construction. Dual head battery lighting units have been installed at exit doors, but do not provide emergency lighting throughout the paths of egress.

Lighting

The lighting systems in the building vary in type and condition. Many of the original fixtures are still in use, although linear fluorescent fixtures have been retrofit with 32 watt, T8 fluorescent lamps and electronic ballasts. Incandescent fixtures have largely been re-lamped with compact fluorescent screw-in type bulbs, although some incandescent lamps are still in use in storage rooms.

Classroom spaces utilize the original pendant mounted acrylic wraparound lensed fixtures. The lenses are yellowing, a result of exposure to the UV radiation in the lamps over time. Open louver pendant fixtures are in place in the Wood and Metal Shop, which appear in fair condition. Locker rooms have surface mounted circuline opal lensed fixtures. The gymnasium corridor has the original 12" square lensed recessed fixtures.

The gymnasium has high bay metal halide lighting fixtures that appear in good condition. Corridor and Cafeteria lighting has been replaced with 2'x2' 9-cell parabolic louver fixtures with U-lamps. Recessed 2'x4' lensed fixtures are in the Media Center , Classroom addition and Kitchen, which generally appear in good condition. The original bare incandescent lampholders are in place in the storage area. Fixtures in food storage/serving areas are required to be lensed.

Metal halide flood lights illuminate the Boiler Room, supplemented with compact fluorescent strips. However, these open fixtures are coated in soot. Exterior lighting consists of HID wall packs.

The Auditorium lighting has the original house and stage lights, supplemented with new spotlights on poles in front of the Control Booth. The incandescent bulbs used in the house downlights are scheduled to be discontinued. The incandescent work lights in the backstage area are still in use, with incandescent bulbs. The original theatrical lighting dimming equipment is still in place. House lights are toggle switch controlled, on/off only.

Lighting controls in the building are manual only, via local toggle switches. Classroom fixtures have the row nearest the windows on a separate switch. Exterior lighting is controlled via timeclock.

Fire Alarm System

The fire alarm system is a relatively new Notifier addressable system with voice evacuation. The system consists of manual pull stations at exit doors, smoke detectors at hold open doors, etc. and audio/visual notification devices throughout. Audio notification is via voice messaging throughout the school. The control panel is located in the Faculty Lounge off the main lobby. The graphic annunciator is located in the lobby on the other side of the wall, with a remote alphanumeric display in the main office. A Bosch autodialer reports alarm signal by device to a UL Central Station.

Voice/ Data/ Video System

The county-wide wireless fibernet provides internet service to the school. This system is shared by the County and Allegany County Public Schools. The original incoming telephone service comes into the building in the Boiler Room, adjacent to the electric service. The main point of presence (MPOP) is located in the office next to the emergency panel. The main distribution frame (MDF) is located off the Media Center. From the MDF, six strands of multimode fiber optic cabling serve two intermediate distribution frames (IDFs) each. These are located strategically in the building to maintain Cat 5e horizontal distance requirements. However, their locations were not originally intended for the amount of heat generated by the equipment and cooling is not adequate in those spaces.

Voice and data outlets, as well as ceiling mounted wireless access points (WAPs), are wired back to patch panels in the MDF and IDFs. The voice system is voice over internet protocol (VoIP). Analog voice outlets are terminated on 110 terminal blocks.

Data drops have been installed throughout the building in accordance with the state telecommunications standards for schools. Classrooms are typically equipped with ceiling mounted overhead projectors, although select classrooms have also been equipped with an interactive whiteboard. The school uses streaming video to the classrooms over the network via a Safari video distribution server, although coax cabling for CATV is still in place in the MDF.

An alert messaging system, tied into the county emergency management system, is located in the administration area.

Public Address And Program Bell/Clock System

The original Bogen MCP35A public address and American Time and Signal Master Clock systems are still in operation. The headend PA cabinet and wall mounted clock controller is located in the administration office area. Ceiling mounted speakers are located throughout corridors. Wall mounted speakers with integral microphone, and program clocks are located in each classroom. Call switches are located in classrooms. Voice outlets have been installed in classrooms, but are not part of the pubic address system. Local sound systems are provided in the Auditorium, Gymnasium and Cafeteria.

Security System

Video surveillance cameras are located in corridors throughout the building. The cameras have individual IP addresses and are wired via CAT 5e cabling to the network. Otherwise, there is no intrusion detection or access control system in the building.

B. RECOMMENDATIONS

Electrical Distribution System

The original electrical distribution equipment is recommended to be replaced, as it has well exceeded its anticipated useful life and replacement parts become more difficult and/or costly to obtain. Cascaded surge protection devices are recommended to be installed on the system, at the service entrance and on lighting and appliance panelboards serving computer loads.

In concert with HVAC recommendations to provide a central cooling plant, a service upgrade will be required to accommodate this equipment. A 480/277V, 3 phase, 4 wire system is recommended with K-factor rated dry type transformer(s) to obtain 208/120V service for receptacle and miscellaneous loads.

Emergency Distribution System

An emergency generator is recommended to provide standby power for life safety and optional loads, compliant with current codes. The fire alarm system and emergency lighting is recommended to be connected to the generator. Select fixtures throughout the building (means of egress, as well as exit signs) are recommended to be connected to the emergency source in order to comply with NFPA 101.

Kitchen refrigeration equipment, heating plant equipment and MDF/IDF equipment and associated cooling equipment are typically requested by schools to be provided with generator backup. For use as an emergency shelter, equipment required to support this function are recommended to be connected to the generator in the event of an extended outage. These would include select kitchen equipment, heating equipment, air distribution equipment and supplemental lighting loads. Communications systems (voice, public address) are also recommended to be on the generator backup source.

A minimum of two automatic transfer switches will be required to separate life safety and optional standby loads. Panelboards and dry-type transformers would also be provided to accommodate the load requirements.

Lighting

The fixtures original to the building are recommended to be replaced. The fixtures are generally in fair to poor condition, with the light output impacted by the condition of lenses. New lighting is recommended to be 277V, where applicable. Exterior emergency egress lighting via photocell controlled compact fluorescent cut-off fixtures is also recommended.

Auditorium house lighting is recommended to be replaced, due to the anticipated difficulty in obtaining replacement lamps. Supplemental fluorescent lighting is also recommended if the house area remains in use as instruction space, sub-dividable into three classrooms. Lower efficiency house lighting would be used for performances only. New stage lighting and electronic dimming controls are recommended to replace obsolete systems.

Recommendation for energy savings include automatic shut-off of building lighting systems per the International Energy Conservation Code (IECC). This can be accomplished effectively by installing local occupancy sensors. Alternatively, lighting branch circuits can be routed through a contactor and controlled via the building management system. However, local timed overrides are required for this type of control. Daylight harvesting via photocell control of fixtures in proximity to windows is also recommended for increased energy savings.

Public Address And Program Bell/Clock System

The original systems are recommended to be replaced, as they are over forty years old and replacement parts may be difficult and/or costly to obtain. An integrated telecommunications system is recommended with phone access to the public address system. A GPS wireless clock systems is recommended, with integration with the public address system for class change signaling.

Security System

An access control system with proximity card readers, consistent with the current Allegany County Public School system, is recommended to be installed in the building.

11 – EDUCATIONAL SPECIFICATION ANALYSIS

The existing Washington Middle School was evaluated for its conformance to the educational specifications. There are minor discrepancies in the preferred adjacencies in the building configuration that are not in keeping with the goals of the ed specs, most significantly relating to the classroom layout. Since the configuration of the building does not lend itself well to organizing into teams, it was found that it will not be possible to accomplish the clustered approach emphasized in the ed specs. There are also many notable discrepancies in program spaces, most notably the size of the dining, media center, administration suite and music classrooms are all below the required size. Several classrooms, a computer lab, a fitness room and science labs are missing from the program. Washington Middle School as currently configured is short 14,695 square feet of program space.

WASHINGTON MIDDLE SCHOOL EDUCATION SPECIFICATION COMPARISSON

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Basic Instruction Areas	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces Provided**	**Area Provided**
English										
Classrooms	8	800	6,400		10		7,452		-2	-1,052
Shared Storage	3	100	300		1	497	497		2	-197
Student Project Rooms	8	80	640		0	0	0		8	640
Reading Intervention Room	1	300	300		0	0	0		1	300
Sub Total:				**7,640**				**7,949**		**-309**
Foreign Language										
Classrooms	2	800	1,600		1	739	739		1	861
Storage	1	100	100		0	0	0		1	100
Sub Total:				**1,700**				**739**		**961**
Social Studies										
Classrooms	5	800	4,000		6		4,735		-1	-735
Student Project Rooms	5	80	400		0	0	0		5	400
Shared Storage	3	100	300		0	0	0		3	300
Sub Total:				**4,700**				**4,735**		**-35**
Mathematics										
Classrooms	8	800	6,400		6		4,995		2	1,405
Storage	3	100	300		0	0	0		3	300
Sub Total:				**6,700**				**4,995**		**1,705**

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Basic Instruction Areas (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces Provided**	**Area Provided**
Science										
Classrooms / Labs	6	1,200	7,200		7		5,435		-1	1,765
Prep / Stoarge	3	150	450		2		253		1	197
Greenhouse	1	200	200		0	0	0		1	200
Sub Total:				**7,850**				**5,688**		**2,162**
Special Education										
Teacher Planning	1	400	400				0		1	400
Classroom (SLE)	2	800	1,600		2		1,379		0	221
Conference / IEP Team Room	1	200	200				0		1	200
Itinerant Services Room	1	150	150				0		1	150
OT/PT Storage	1	100	100				0		1	100
Sub Total:				**2,450**				**1,379**		**1,071**
Total Basic Instructional Areas				**31,040**				**25,485**		

Specialized Instruction Areas										
Family Life / Consumer Sciences										
Food Nutrition Lab / Classroom	1	1,200	1,200		1	1,209	1,209		0	-9
Multi-purpose Lab / Classroom	1	1,200	1,200		1	1,230	1,230		0	-30
Storage	2	150	300		3	0	463		-1	-163
Sub Total:				**2,700**				**2,902**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Specialized Instruction Areas (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces Provided**	**Area Provided**
Tech. Ed.										
Manufacturing / Technology	2	1,200	2,400		2		3,103		0	-703
Instructional Classrooms	2	500	1,000		1	705	705		1	295
Storage - General	2	75	150		4		483		-2	-333
Tool Room	2	75	150		2		183		0	-33
Sub Total:				**3,700**				**4,474**		
Art Education										
Art Classroom	2	1,200	2,400		1		2,347		1	53
Storage	2	200	400		1	243	243		1	157
Kiln Area	1	100	100		0	0	0		1	100
Darkroom	0	0	0		1	84	84			
Sub Total:				**2,900**				**2,674**		
Music Education										
Instrumental Music Room	1	1,400	1,400		1	1,431	1,431		0	-31
Practice Rooms	1	50	50				0		1	50
Music Library / Office	1	130	130				0		1	130
Instrument Storage	1	300	300		1	440	440		0	-140
Vocal Music Room	1	1,000	1,000		1	1,010	1,010		0	-10
Multipurpose Music / Piano Lab	1	800	800		0	0	0		1	800
Sub Total:				**3,680**				**2,881**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Specialized Instruction Areas (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces Provided**	**Area Provided**
Computer Lab										
Classroom	1	800	800		0	0	0		1	800
Storage	1	50	50		0	0	0		1	50
Sub Total:				**850**				**0**		
Physical Education										
Gymnasium	1	7,000	7,000		1	6,834	6,834		0	166
Conditioning and Fitness	1	1,300	1,300		0	0	0		1	1,300
Health Education	1	800	800		0	0	0		1	800
Locker Rooms	2	1,300	2,600		2		3,664		0	-1,064
Staff Offices	2	100	200		2		326		0	-126
Indoor Storage	1	300	300		3		300		-2	0
Outdoor Storage	1	100	100		1	154	154		0	-54
Laundry Area	1	50	50		0	0	0		1	50
Sub Total:				**12,350**				**11,278**		
Auditorium										
Seating Area	1	3,000	3,000		1	4,607	4,607		0	-1,607
Stage	1	1,600	1,600		1	1,684	1,684		0	-84
Stage Storage	1	200	200		6		634		-5	-434
Ticket	0	0	0		1	59	59		-1	-59
Dressing	0	0	0		2	110	220		-2	-220
Sub Total:				**4,800**				**7,204**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Specialized Instruction Areas (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces Provided**	**Area Provided**
Media Center										
Main Use Area / Circulation	1	3,200	3,200		1	2,115	2,115		0	1,085
Computer Room	1	600	600		1	879	879		0	-279
Workroom	1	200	200		1	307	307		0	-107
Office	1	100	100		1	419	419		0	-319
Data Room	1	150	150		1	58	58		0	92
TV Studio and Control	1	500	500		0	0	0		1	500
Storage	1	200	200		0	0	0		1	200
Small Group Rooms	2	100	200		0	0	0		2	200
Sub Total:				**5,150**				**3,778**		
Total Specialized Instructional Areas				**36,130**				**35,191**		

Educational Support Services	No. of Spaces	Square Foot per Space	Area Subtotal		Spaces Provided	Area Provided	Area Subtotal		Spaces Provided	Area Provided
Administrative Offices										
General Office / Reception	1	500	500		1	563	563		0	-63
Principals Office	1	150	150		1	163	163		0	-13
Assistant Principals Office	2	130	260		1	145	145		1	115
Conference Room	1	200	200		3		589		-2	-389
Itenerant Office	1	130	130		1	200	200		0	-70
School Improvement Office	1	120	120				0		1	120
Storage	1	200	200		2		162		-1	38
ISS/Academic Village Rm.	1	400	400		1	493	493		0	-93

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Educational Support Services (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces Provided**	**Area Provided**
Administrative Offices (cont.)										
School Store	1	100	100		1	131	131		0	-31
Work Room, Copy Room	1	100	100		1	161	161		0	-61
Staff Toilet	1	50	50		2		37		-1	13
Mail	0	0	0		1	80	80		-1	-80
Sub Total:				**2,210**				**2,724**		
Guidance Suite										
Reception	1	100	100		0	0	0		1	100
Guidance Counselor's Office	2	130	260		0	0	0		2	260
Conference Room	1	200	200		0	0	0		1	200
Work / Records Rm.	1	100	100		1	71	71		0	29
Sub Total:				**660**				**71**		
Health										
Waiting Area	1	150	150		0		0		1	150
Nurse's Office and Private Consultation	1	125	125		0		0		1	125
Rest Areas	2	100	200		2	0	88		0	112
Treatment / Medication Area	1	125	125		1	0	283		0	-158
Exam	1	125	125		0	0	0		1	125
Restrooms	2	50	100		1	19	19		1	81
Storage	1	50	50		0	0	0		1	50
Sub Total:				**875**				**390**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Educational Support Services (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces Provided**	**Area Provided**
Faculty Support										
Faculty Dining	1	300	300		2		334		-1	-34
Team Planning Areas	4	300	1,200		0	0	0		4	1,200
Sub Total:				**1,500**				**334**		
Cafeteria and Food Services										
Cafeteria	1	3,300	3,300		1	3,515	3,515		0	-215
Food Preparation	1	900	900		1	1,271	1,271		0	-371
Serving	1	900	900		0	0	0		1	900
Dishwash	1	300	300		1	160	160		0	140
Receiving	1	100	100				0		1	100
Storage	1	150	150				0		1	150
Dry Food Storage	1	300	300		1	91	91		0	209
Refrigerator Storage	1	150	150		1	58	58		0	92
Frozen Storage	1	150	150		0	0	0		1	150
Non Food Storage	1	80	80		0	0	0		1	80
Personnel Area	1	100	100		1	64	64		0	36
Office	1	100	100		1	51	51		0	49
Can Wash	0	0	0		1	52	52		-1	-52
Sub Total:				**6,530**				**5,262**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Educational Support Services (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces Provided**	**Area Provided**
Custodial and Operations Services										
Custodial Office	1	100	100		0	0	0		1	100
Lavatory, Lockers, Showers	1	150	150				0		1	150
Indoor Storage Area	1	300	300				0		1	300
Utility Closets / Storage	1	200	200		2		91		-1	109
General School Storage	1	200	200		2	0	286		-1	-86
Outdoor Storage	1	200	200		1	334	334		0	-134
Workshop	1	100	100		0	0	0		1	100
Receiving Area	1	100	100		0	0	0		1	100
Sub Total:				**1,350**				**711**		

AREA SUMMARY	ED SPEC	EXISTING BUILDING	DIFFERENCE
NET PROGRAM AREA	**80,295**	**70,168**	**14,695**
Circulation, Toilets, Mechanical, Wall Thickness @ 35%	28,103		
GROSS AREA	**108,398**		
GROSS AREA 70% efficiency	**114,707**		

SECTION 3 - EXISTING CONDITIONS ASSESSMENT – BRADDOCK MIDDLE SCHOOL

Image 5 - BRADDOCK MIDDLE SCHOOL MAIN ENTRANCE

1 – INTRODUCTION

Braddock Middle School was constructed in 1965 and is approximately 99,000 square feet in area. There have been no significant additions or renovations to the original building. The building is configured into three distinct wings – a two story classroom wing, a gym and two story locker room wing, and an auditorium wing, including music and technology labs. The classroom and gym wings are located on the same level, and the auditorium wing is accessed from two bridges connecting to the second level of the classroom building.

Braddock Middle School is located off Holland Street in the north end section of Cumberland Maryland. The school was originally built as North End Junior High School. The school site is located in a residential neighborhood nestled between sloping wooded hills on both side. The back and side of the school side is bordered by steep wooded slopes.

2 – SITE ASSESSMENT

A. Site Background

The site is located along Holland Street in North Cumberland. Franklin Street splits the site 30/70. The site area is 25 acres. Approximately half of the site is developed. The undeveloped portion of the site is a wooded hillside typical of Western Maryland. The site is graded into three distinct plateaus. The lower plateau, situated along the southern part of the site, contains the play fields. The middle plateau has the majority of the school and another playfield. The upper plateau has a parking lot and the remainder of the school. A covered breezeway connects the two parts of the school building.

B. Accessibility

Currently there are three means of access to the site. The main drop off is via Franklin Street. Franklin Street begins at the southern property and continues to approximately midway along Holland Street. Busses and parents share this general access point. The route also serves as a public route. Several vehicles were observed using the street to access the Holland Street neighborhood. The middle plateau has a dedicated service entrance, with access to the coal bin and the cafeteria. The last access is located off of Holland Street.

Franklin Street is currently in a state of disrepair. There are several areas where pavement failure is indicated. Any renovation scenario should consider rebuilding Franklin Street including significant subgrade repair. Pavement cracks with water seepage through those cracks indicate potentially serious issues with groundwater and drainage along this street (see Appendix A, Photo 15).

C. Parking

Parking is provided along Franklin Street and in a parking lot on the upper plateau. The parking along Franklin Street does not meet ADA requirements (see Appendix A, Photo 14). There is no accessible route found from the parking spots (most of which are dedicated to staff) to the main entrance to the school. There is a covered waiting area that includes benches opposite of the parking. The upper lot is not accessible in its current state but could easily be made so. The physical condition of the upper lot is poor (see Appendix A, Photo 16). There are areas where the asphalt has all but disappeared, creating an uneven and dangerous walking surface. In addition, the curb line adjacent to the building has deteriorated to a point where it no longer adequately conveys water or serves as a traffic barrier. Any renovation should consider completely rebuilding and enlarging the lot. The condition of the lot does not appear readily salvageable.

The upper lot has 62 marked spaces. The Franklin Street drop off has an additional 15 spaces. There is a discrepancy of 23 parking spaces between the 77 spaces provided and the 100 spaces called for in the ed spec. The parking areas do not meet ADA standards for the minimum number of accessible spaces. In addition the configuration of the drop-off at Franklin Street poses a safety hazard for pedestrian and vehicles. Pedestrians are required to cross the drop off traffic flow to enter the school.

D. Service

The middle plateau is the service entry. There is a makeshift loading dock for coal deliveries on one side of the paved area. The area is congested with an ash bin. The area also receives deliveries for the cafeteria. Doors from the cafeteria/ kitchen face the loading area.

E. Pedestrian

The school has defined pedestrian routes mostly consisting of paved sidewalk. The lower fields are access by sidewalks, but these are not accessible. Sidewalks are found along Franklin Street and Holland Street. Holland Street sidewalks are in a state of disrepair. These sidewalks provide reasonable connection to the neighborhood pedestrian network. No bike racks or other bike storage accommodations were found on the site.

F. Water Supply, Drainage and Sewerage

The site is served by domestic water and sewer supplied by the City of Cumberland. The City reported no issues with either system. Taps for an addition or new building will need to follow City practices.

There was no apparent stormwater management for the site. Currently, all runoff is directed to a swale located along Holland Street. The conveyance along Holland Street appears to be the main collector for the neighborhood. The City of Cumberland uses the 2010 Maryland Stormwater Management Design Manual. Any renovations done on the site will require compliance with the City's Stormwater Management Ordinance. The designer will be required to follow the Environmental Site Design (ESD) guidelines for redevelopment.

ESD focuses on bringing the site back to what engineers term "Woods in Good Condition". This means that every effort must be made in the design to accommodate alternative non-structural practices before a conventional structure can be employed. These techniques can include green roofs, infiltration, grass swales, and permeable pavements. The architect needs to fully consider this when performing preliminary design for any renovation or construction. Green areas will need to be incorporated into the design to facilitate the implementation of ESD practices. It is also important to note that the review time for projects has increased significantly since the implementation of ESD.

Of particular note is the amount of groundwater seepage that was observed on the site. Any renovation or new construction will need to include underdrains. It is possible that the cut in the North East area of the site exposed a spring. This will need to be addressed in any renovation or replacement scenario.

Potomac Edison provides power for the site. Columbia Gas has gas available, but did not comment on the location or capacity. Verizon supplies telephone. Cable is by Atlantic Broadband. No issues with any of these services were disclosed.

G. Circulation

Circulation on the site is functional but could be improved. Currently, students must cross Franklin Street to access the lower ball fields. It is doubtable if this condition could be improved with a renovation. However, adequate signage and a raised cross walk should be considered in any renovation.

H. Environmental Variables

There are no apparent outdoor learning habitats located on the site. Provided there is enough room, Environmentally Sensitive Design can easily be configured to accommodate a wetland learning habit.

I. Pedestrian and Vehicle Circulation

The site mixes pedestrian and vehicle circulation. An attempt needs to be made to separate pedestrian traffic from personal vehicle and bus traffic. The parking along Franklin requires passengers to discharge directly into the drive lane. If this condition is maintained in any future scenario, it is strongly recommended that the parking be angled so that passenger opening doors would be shielded.

The upper parking lot is too far removed to be useful for any athletic events. Its location to the north presents a rather unique issue for the school. It creates a need for two entrances separated by considerable distance.

J. Athletic Fields

The site has two large grass multipurpose fields. Both fields feature backstops, but lack bleachers. The fields do not meet NFHS requirements for baseball of softball. The lower fields were extremely wet, a condition that was verified with school maintenance personnel to be nearly year-round. Underdrains in these areas, as well as grading to direct surface flow away from the fields need to be included in any renovation. The fields also lack basic amenities such as spectator seating, team seating and water fountains.

There are two separate paved areas located on the lower plateau. These could be configured to accommodate basketball and tennis. They will need resurfacing and proper fencing installed.

Image 6 - BRADDOCK MIDDLE SCHOOL AERIAL PHOTO

3 – BUILDING CONDITION

A. Exterior Building Envelope

Roof
The existing roof is an exposed membrane roof which was installed in 1989 and is in poor condition. The majority of the roof plane is flat and there is therefore evidence of significant ponding (see Appendix A, Photo 17). There are numerous soft spots in the underlying insulation and the majority of the insulation fasteners are telegraphing through the membrane. The existing aluminum coping and gravel stop are in fair condition. Through wall flashing at low roof to wall transitions is copper and in fair condition, with no evidence of weep provisions. There are no overflow drains or scuppers provided.

Exterior Walls
The building envelope consists of brick with CMU backup. The exterior masonry is generally in good condition. Most exterior sealants at control joints are in poor condition and should be replaced. (see Appendix A, Photo18)

Exterior Doors and Windows
All exterior windows are single pane glazing which will not meet current energy standards and should be replaced with thermally broken insulated glass units. The windows also have deteriorating sealant which should be replaced. Several lintels are rusting and should be repaired (see Appendix A, Photo 19).

B. Interiors

Floor Finishes
Most classrooms have the original 9 "x 9" VAT, which should be replaced. Corridors are typically terrazzo which is in good condition. The administration area is VCT and is in good condition. Toilet rooms are typically ceramic tile. The gym wood floor is in good condition. The stage wood floor is in poor condition and should be refinished or replaced.

Interior Walls
Most interior walls are painted CMU and are in satisfactory condition. Corridor walls are CMU with a 4' ceramic tile wainscot. Some tiles are damaged, particularly at the base of wall. Bathrooms are typically glazed ceramic tile and CMU.

Ceilings
Most ceilings in the classroom building are suspended 2'x4' acoustic ceiling tile in metal grid and are in fair condition(see Appendix A, Photo 21), however, in some locations the tiles are damaged or stained and should be replaced. In some spaces the suspended ceilings have been replaced and are in good condition. There are plaster ceilings in some areas including locker rooms, and are damaged and/or have peeling paint in some locations.

Interior Doors and Hardware
Interior doors are typically wood and frames are hollow metal. Glass lites in doors are wire glass. The hardware throughout the building is not ADA compliant.

4 – BUILDING CODE ANALYSIS

The building is not sprinklered. Installing a sprinkler system is highly recommended for several reasons, including: 1) Safety of the building occupants, 2) protection of property, 3) dramatic reduction in the cost of other fire protection measures needed throughout the building to comply with code.

The area of the building exceeds the allowable area per the IBC code. The building can be easily separated into 3 distinct fire zones – classroom building, auditorium and gym. These areas have separate structural systems, however, they are not separated by fire walls and doors. The gym and auditorium areas are within the

allowable area limits, however, the classroom wing exceeds the allowable area. If this area were fully sprinklered, however, it would be within the area limitation.

The occupancy loads of some of the larger classrooms like the technology and FACS labs and require two means of egress with doors that swing out and have panic hardware, which is not provided.

Existing egress stair guardrail and handrail heights meet current Codes. Three stairs are required (and provided) to meet the occupancy load of the second floor level of the classroom wing. Some risers at these stairs exceed 7", which is not code compliant. Stairs are not separated from the corridors, which does not comply with current building codes. The stair to the locker room is 3'-8" wide, which is not code compliant.

Wire glass is provided at sidelights throughout the building. Wire glass is no longer allowed in Educational use buildings per IBC.

5 – BUILDING ACCESSIBILITY

Many components of the building are not ADA compliant, including the following:

- No elevator is provided to access the second floor level of the classroom wing or the girls' locker room in the gym wing. The accessible route in the auditorium wing contains stairs and no lifts are provided.
- ADA access is not provided at all exterior entrances, with one or more concrete steps occurring at some exits(see Appendix A, Photo 22).
- Some room entrances do not provide the required door approach clearances.
- Door hardware is not ADA compliant.
- Handicap accessible plumbing fixtures and stalls are not provided at all toilet rooms. In some locations grab bars are provided, but not in the correct configuration to meet current codes. Also, handicap turnaround and fixture clearances are not provided at all toilet rooms.

Image 7 - BRADDOCK MIDDLE SCHOOL FIRST FLOOR PLAN

Image 8 - BRADDOCK MIDDLE SCHOOL SECOND FLOOR PLAN

6 – STRUCTURAL ANALYSIS

The Braddock Junior High School and Washington Junior High School are composed of three sections including an auditorium, classroom wing and gymnasium. The buildings were purportedly built in 1965 although no date is provided on the structural drawings. The drawings were prepared by J.G. Wilson, Jr. The Braddock Junior High School is referred to as the "North End Junior High School" on the drawings.

A. General Characteristics

At the Braddock Junior High School, the roof deck of the auditorium and gym are composed of gypsum insulating concrete on bulb tee sub-purlins over open web steel joists. The roof deck of the classroom wing is poured in place gypsum over gypsum board forming reinforced with welded wire mesh. The roof over the two elevated connecting links between the classroom and auditorium is a 3" metal deck.

The floor framing at the classrooms is composed of 2½" concrete over corrugated metal deck supported by open web bar joists spanning between steel beams and columns. The floor framing for the control room in the auditorium is poured in place reinforced concrete. The floor framing for the mezzanine level of the gymnasium is composed of 2½" concrete over metal deck supported by open web bar joists spanning between masonry bearing walls. The floor framing for the elevated connecting links between the classrooms and auditorium is 3" concrete over 2" metal deck spanning between steel beams and columns.

The first floors are concrete slab on grade ranging from 4" to 6" thick, reinforced with welded wire mesh. The typical thickness is 5".

The foundations are reinforced concrete spread footings. The footings are continuous at the exterior walls and insolated at the interior columns. The soil bearing capacity is noted as 8,000 psf.

The exterior walls are typically constructed of masonry block with a brick veneer. Wall opening lintels are cast-in-place concrete with steel angles supporting the brick veneer.

The existing roof design snow load is 30 psf. The existing design frost depth is 2'-6". The existing column live load is 70 psf, the corridor, stairs and landings are 100 psf and the storage live load is 125 psf.

B. Visual Inspection

1. The exterior concrete stairs adjacent to the elevated connecting links between the classroom and auditorium wings has severe spalling and cracking at the railing attachments. The underside of the stair slab paint has spalled.
2. The brick has cracked at the steel beam bearing of the connecting link floor beams.
3. The concrete bases at the front canopy support columns have spalled due to corrosion of the pier reinforcing.
4. There is minor cracking of the masonry exterior walls throughout the building. These cracks are due to minor settlement of the foundations.
5. There are raised and loose floor tiles in the girls second floor locker room. This is due to inadequate floor slope and tile application.
6. The end columns of the canopy framing are surrounded by earth.
7. There are cracks in the slab on grade in the boiler room.

C. Existing Plan Review

A cursory review of the structural systems shown on the available plans was conducted and we have the following comments:

1. The current code indicates a 40 psf roof snow load. The drawings note a 30 psf roof live load.

2. The current code indicates a 3'-0" frost depth. The drawings indicate a 2'-6" frost depth.
3. Snow drifting on lower roofs does not appear to have been accounted for in the original design.

4. The live load for the classroom floors meets current code requirements.

D. Conclusions

1. The majority of the roof joists are over-stressed under current code live/snow load criteria and/or snow drifting conditions.

2. The long span joists over the gymnasium and auditorium are adequate to support the current roof loads.

3. The exterior roof girders of the classroom wing are over-stressed under current load criteria.

4. The interior roof girders of the classroom wing at the roof are over-stressed under the original design criteria.

5. In a few locations, the interior floor girders are slightly over-stressed.

6. The columns and foundations are adequate to support the current code required loads.

7 – MECHANICAL ANALYSIS

A. General

Braddock Middle School was originally constructed in 1965 and consists of approximately 99,000 square feet. There have not been any additions or renovations since the building was originally constructed. The building, located on a sloping site, has two primary levels. The Main Classroom Wing with Media Center and Cafeteria is two-story masonry construction. The First Floor Level is connected to the Gym Wing to the South side of the Main Building, while the Fine Arts, Auditorium, and Shop Rooms Building is located behind the Main Building to the East and is connected to the Second Floor by two (2) elevated and enclosed bridges. The Gym and Auditorium Buildings are also masonry construction. The building is heated and ventilated only (no central air conditioning).

B. Existing Conditions:

Heating Plant

The building is heated by a central hot water boiler plant located in the Auditorium Building. The boiler room has a depressed slab and is approximately a story and a half high. Two (2) fire tube boilers as manufactured by Pacific generate hot water for the heating system. The boilers are coal-fired. A large story and a half coal bin is located adjacent to the boilers. Coal is dumped into the coal bin from access manholes located at grade. An auger system transfers the coal from the bin to hoppers where coal slowly enters the boiler.

A cyclone separator on the flue gas outlet is the primary ash collector. Three to four 30-gallon drums of ash are typically collected each day. The barrels then have to be hoisted out of the boiler room to be removed from the site. Boiler access doors are also used to shovel ash out of the boilers. Additionally, each boiler is equipped with a soot blower system typically used once a week to help blow the soot out of the boiler tubes. Although an extremely dirty operation, the boiler room is very clean, considering the daily activities that are needed for boiler operation.

Two (2) original base-mounted end suction pumps distribute heating water from the boiler room, to the Auditorium Building, through the overhead connecting bridge to the Main Building, then over to the Gym Wing. By the time heating water reaches the Gym Wing, the supply water temperature will have cooled by 10 degrees F or more.

Cooling

There is no central cooling for the building. There is a limited number of window air conditioning units scattered throughout the school. The main Computer Rooms, MDF Rooms, and IDF Rooms do not have air conditioning, creating extremely hot environments.

Air Distribution Systems

- *Auditorium*
  The Auditorium is served by a heating and ventilating unit hung in a storage room off one side of the stage. The unit barely fits in the space, making maintenance and servicing the unit very difficult. There is no room for pulling coils, replacing fans, nor is there any means of replacing the unit in the future.

  The stage is served by floor-mounted unit ventilators, while the two back sections of the auditorium, physically separated by the control booth, are served by individual heating and ventilating units. Located above each areas ceiling system.

- *Shop Areas*
  The two (2) Main Shop Areas are heated only by standard hot water horizontal unit heaters. The Wood Shop has a recirculating dust collector. The common classroom area is served by a small heating and ventilating air handling unit.

- *Classrooms*
  The classrooms are served by floor-mounted vertical heating and ventilating unit ventilators as manufactured by Nesbitt. The units have outdoor air louvers located behind the units and through the exterior wall. Relief air was through door grilles, which allowed this outdoor air to be transferred to the corridor, where multiple roof fans pulled air through the building to the Second Floor corridor before being exhausted outside. This concept also helped reduce heat build-up on the Upper Level. At some point, the Fire Marshal required all the door grilles to be blocked off.

- *Cafeteria*
  The Cafeteria is also served by multiple floor-mounted vertical unit ventilators. Relief air is transferred to the Kitchen, where it is exhausted through the Kitchen hood or dishwasher exhaust system. A make-up air unit is located in the Dry Storage Room and provides tempered outdoor air directly into the Kitchen. The unit is not accessible for service or maintenance and cannot be repaired or replaced easily if a major failure occurs. The cold boxes (refrigerator and freezer) are also located in the Kitchen with their condensing units continuously rejecting heat into the Kitchen, creating an even hotter indoor environment.

- *Media Center*
  Similar to the Classrooms, the Media Center is served by multiple floor-mounted vertical heating and ventilating unit ventilators.

- *Office/Administration Suite*
  The Office/Administration Area has perimeter hot water convectors/finned tube radiation for heating and window air conditioning units for cooling.

- *Gymnasium*
  The Gymnasium is served by two (2) heating and ventilating air handling units. Each of the units is located in a small storage room adjacent to the Boys and Girls Locker Room. These units are also located in a very tight room with limited accessibility for servicing or maintenance and with restricted access for replacing major components or unit replacement. A gravity ventilation system consisting of multiple large wall louvers and roof exhaust fan(s) provide supplemental heat removal during warm days.

- *Locker Rooms*
  Locker rooms, like the Classrooms, are served by floor-mounted vertical heating and ventilating unit ventilators.

- *Corridors, Toilet Rooms, etc.*
  Cabinet unit heaters are typically located at Main Entrance Areas, while convectors and finned tube radiation serve corridors, toilet rooms, storage rooms, etc.

Automatic Temperature Control Systems
All temperature controls are local pneumatic actuation type with limited capabilities. A small tank single compressor unit with air dryer is located in the Main Boiler Room and serves the entire building.

C. EVALUATION:

The mechanical systems and equipment are over 45 years old and beyond the anticipated life expectancy according to ASHRAE. The systems are still functional; however, most equipment manufacturers are no longer in business (boiler manufacturer, unit ventilator manufacturer, etc.,) and parts often have to be custom fabricated. The major equipment was installed in such a way that it is difficult to service and maintain; and replacement of major components is not possible without major demolition of walls, etc. The pneumatic control is antiquated and beyond its useful life. The control systems have limited capabilities to conserve energy, and are primarily utilized for occupied/unoccupied control and space temperature control. There are no controls on the coal-fired boilers.

The use of transfer air and large exhaust fans over the Second Floor corridor does not meet current Code requirements.

The coal-fired boilers are not the cleanest burning when compared to current “clean coal” types. It is also very laborious to operate and maintain these types of boilers. It is estimated that 300-400 tons of coal are consumed each year.

D. RECOMMENDATIONS:

General
All systems and materials are beyond their useful lives and are recommended to be replaced in their entirety. A 4-pipe central heating and cooling system is recommended.

Heating Plant
It is recommended the heating plant be replaced in its entirety. A hybrid heating plant is recommended, consisting of multiple dual fuel (oil and gas) cast iron non-condensing boilers controlled in modular fashion. Additionally, it is recommended one or two of the boilers within the system be high efficiency gas-fired condensing type. The high efficiency boilers would operate during intermediate weather conditions in the spring and fall when the hot water supply temperature is reset to less than 140 deg F. These boilers can operate at variable flow and +90% efficiency. During winter outdoor conditions, the main non-condensing boilers will run and generate 180 deg F supply water temperature. The condensing boilers can also operate at these temperatures; however, their efficiency is no better than the standard cast iron boilers. Each non-condensing boiler would be equipped with a constant volume circulating pump; while a variable speed drive secondary pump will distribute varying flow throughout the building.

Cooling Plant
It is recommended to install a central chilled water plant to serve the building. A new chilled water system mechanical room will be needed to house the pumps, chillers, and associated specialties. Multiple split air-cooled or water-cooled chillers are recommended. Similar to the heating plant, each chiller would be provided with an associated constant volume pump. The chillers are recommended to be piped in parallel. A variable speed secondary pump will vary chilled water flow distributed throughout the building. A water-cooled magnetic bearing variable speed centrifugal type chiller is recommended. The chillers require very little maintenance, are extremely quiet, are oil-free (sustainable design), and are the most energy-efficient chiller on the market.

Air Distribution Systems
The existing equipment cannot be replaced in the same locations based on the lack of accessibility. New mechanical penthouses will be needed

The original building has very limited infrastructure space (i.e., low floor-to-floor heights) since the original building had limited infrastructure needed to support the building. All the unit ventilators sit on the floor within the space. There is no cooling or fire protection system; and the power—IT cabling was minimal.

Unit ventilators are not recommended due to noise, humidity, and air distribution issues. A central all-air heating and cooling system (i.e., variable air volume system) will not be practical without compromising ceiling heights.

A 4-pipe fan-coil system with a dedicated outdoor air system (DOAS) may be the only cost-effective and practical solution.

Automatic Temperature Controls
It is recommended the existing local pneumatic control system be replaced in its entirety with a Web-based open protocol BACNET System using electric/electronic actuation and tied into a Central County Energy Management System (EMS).

Energy Conserving control strategies such as economizer cycles, night setback, demand controlled ventilation, supply air reset, supply water reset, etc., shall be incorporated to meet or exceed ASHRAE 90.1 2007 requirements.

8 – PLUMBING ANALYSIS

A. Existing Conditions:

Domestic Water
A 4-inch cold water service serves the building. The water service enters the building in the Boiler Room. Two (2) gas-fired hot water heaters to house air handling equipment for assembly areas such as the Gym, Cafeteria, and Auditorim, as well as common areas like the Media Center. All new duct systems, sized and insulated for cooling, will be required.
generate domestic hot water which is used in conjunction with a large uninsulated horizontal storage tank to serve the building.

Plumbing Fixtures
The plumbing fixtures appear to be original, are functional, but do not meet the current water conserving requirements.

Natural Gas
A 4-inch low pressure gas line enters the building at the Boiler Room. A large drum meter is located in the Boiler Room. Natural gas serves the domestic hot water heaters, kitchen equipment, and Science Labs.

Sanitary and Vent Piping
It appears most of the sanitary and vent piping is a combination of cast iron sanitary and copper vent piping. The Kitchen has in the floor grease traps and the Art Rooms have clay traps.

Storm Water Piping
The building has roof drains and interior storm water piping, which is cast iron, and original to the building.

B. EVALUATION

Except as necessary for repairs, all plumbing systems, fixtures, and piping are over 45 years old, do not meet current Code requirements for water conservation and accessibility, and are generally beyond their anticipated life expectancies. Insulation is in deteriorating condition. Backflow prevention is also required to protect the potable water supply.

C. RECOMMENDATIONS

Generally, the equipment and systems are recommended to be replaced in their entirety. Domestic hot water systems shall be energy-efficient and comply with ASHRAE 90.1 2007. Domestic hot water temperature limiting

devices (ASSE approved devices) are required through the building as well as backflow prevention for the cold water system. Plumbing fixtures shall be replaced with water conserving, accessible types. Piping systems need to be replaced due to their age. Storm water systems need to be provided with independent overflow system and be sized to meet current Code requirements.

The gas service shall be upgraded to support the increased demand for the heating water system.
located. Coal dust covers the equipment. The original distribution equipment has exceeded their anticipated useful life of 25-30 years.

9 – FIRE PROTECTION ANALYSIS

A. Existing Conditions

The building is not equipped with a fire protection system. It is recommended the water service be upgraded, and a wet pipe sprinkler system protect the entire building.

10 – ELECTRICAL ANALYSIS

A. Existing Conditions

Electrical Distribution System

The electric service for Braddock Middle School is derived from a utility pad-mount transformer. The main distribution switchboard for the building is rated 3000A, 208/120V, 3 phase, 4 wire. The switchboard, manufactured by Square D, is located in the Main Electrical Room. Square D panelboards are located throughout the building, typically recessed mounted in corridors to serve local lighting and receptacle loads. Dedicated panelboards are located in the Boiler Room and Kitchen. The switchboard, as well as the majority of the electrical distribution system, is original to the building. Additional panels have been installed to support Technology upgrades as well as a building addition in 2004. Surge suppression devices (SPDs) have been installed at panelboards serving computer loads.

The electrical equipment located within the Boiler Room does not have the proper NEMA rated enclosures for the environment in which they are

Emergency Distribution System

An “emergency” panel is fed from a circuit breaker ahead of the building main. This panel is mounted to the side of the switchboard, and serves night light circuits. A separate service disconnect ahead of the building main disconnect was recognized by the National Electrical Code (NEC) as an emergency source when the building was constructed, but is not acceptable today for new construction. Dual head battery lighting units have been installed at exit doors, but do not provide emergency lighting throughout the paths of egress. In the Kitchen, non-illuminated exit signs are installed.

Lighting

The lighting systems in the building vary in type and condition. Many of the original fixtures are still in use, although linear fluorescent fixtures have been retrofit with 32 watt, T8 fluorescent lamps and electronic ballasts. Incandescent fixtures have largely been re-lamped with compact fluorescent screw-in type bulbs, although some incandescent lamps are still in use in storage rooms.

Classroom spaces utilize the original pendant mounted acrylic wraparound lensed fixtures. The lenses are yellowing, a result of exposure to the UV radiation in the lamps over time. Open louver pendant fixtures are in place in the Wood and Metal Shop, which appear in fair condition. Dropped opal lensed 4’x4’ fixtures are in the Media Center, while Locker rooms have surface mounted circuline opal lensed fixtures. The gymnasium corridor has the original 12” square lensed recessed fixtures.

The gymnasium has high bay metal halide lighting fixtures that appear in good condition. Corridor and Cafeteria lighting has been replaced with 2'x2' 9-cell parabolic louver fixtures with U-lamps. The Kitchen 2'x4'

High pressure sodium lighting is in place in the Main Electrical Room, which is not ideal where "instant on" lighting is required. Metal halide low bay fixtures illuminate the Boiler Room, supplemented with fluorescent strips. However, these open fixtures are coated in soot. Exterior lighting consists of HID wall packs.

The Auditorium lighting has the original house and stage lights, supplemented with new spotlights on poles in front of the Control Booth. The incandescent bulbs used in the house downlights are scheduled to be discontinued. The incandescent work lights in the backstage area are still in use, with incandescent bulbs. The original theatrical lighting dimming equipment is still in place. House lights are toggle switch controlled, on/off only.

Lighting controls in the building are manual only, via local toggle switches. Classroom fixtures have the row nearest the windows on a separate switch. Exterior lighting is controlled via timeclock.

Fire Alarm System

The fire alarm system is a relatively new Simplex 4010 with 4003 voice evacuation panel. The system consists of manual pull stations at exit doors, heat detectors in the Boiler Room, smoke detectors at hold open doors, FACP, etc. and audio/visual notification devices throughout. Audio notification is via voice messaging throughout the school. The control panel is located in the main electric room. The remote alphanumeric display is located in the main office. A Bosch auto-dialer reports alarm signals by device to a UL Central Station. The fire alarm system is equipped with battery backup.

Voice/ Data/ Video System

The county-wide wireless fibernet provides internet service to the school. This system is shared by the County and Allegany County Public Schools. The original incoming telephone service comes into the building in the recessed lensed fixtures appears in good condition, although the original bare incandescent lampholders are in place in the storage area. Fixtures in food storage/serving areas are required to be lensed.
Boiler Room, adjacent to the electric service. The main point of presence (MPOP) is located in the office next to the emergency panel. The main distribution frame (MDF) is located off the Media Center. From the MDF, six strands of multimode fiber optic cabling serve two intermediate distribution frames (IDFs) each. These are located strategically in the building to maintain Cat 5e horizontal distance requirements.

Voice and data outlets, as well as ceiling mounted wireless access points (WAPs), are wired back to patch panels in the MDF and IDFs. The voice system is voice over internet protocol (VoIP). Analog voice outlets are terminated on 110 terminal blocks.

Data drops have been installed throughout the building in accordance with the state telecommunications standards for schools. Classrooms are typically equipped with ceiling mounted overhead projectors. The school uses streaming video to the classrooms over the network via a Safari video distribution server, although coax cabling for CATV is still in place in the MDF.

An alert messaging system, tied into the county emergency management system, is located in the administration area.

Public Address And Program Clock System

The original Bogen MCP35A public address and American Time and Signal Master Clock systems are still in operation. The headend PA cabinet and wall mounted clock controller is located in the administration area. Ceiling mounted speakers are located throughout corridors. Wall mounted speakers with integral microphone, and program clocks are located in each classroom. Call switches are furnished in classrooms as well as phone jacks for communications. Voice outlets have been installed in classrooms, but are not part of the pubic address system. Local sound systems are provided in the Auditorium, Gymnasium and Cafeteria.

Security System
Video surveillance cameras are located in corridors throughout the building. The cameras have individual IP addresses and are wired via CAT 5e cabling to the network. Otherwise, there is no intrusion detection or access control system in the building.

B. RECOMMENDATIONS

A service upgrade will be required to accommodate the proposed HVAC recommendations to provide a central cooling plant. A 480/277V, 3 phase, 4 wire system is recommended with K-factor rated dry type transformer(s) to obtain 208/120V service for receptacle and miscellaneous loads.

Emergency Distribution System
An emergency generator is recommended to provide standby power for life safety and optional loads, compliant with current codes. The fire alarm system and emergency lighting is recommended to be connected to the generator. Select fixtures throughout the building means of egress, as well as exit signs, are recommended to be connected to the emergency source in order to comply with NFPA 101.

Braddock Middle School is currently designated as a Red Cross Shelter. As such, equipment required to support this function are recommended to be connected to the generator in the event of an extended outage. These would include select kitchen equipment, heating equipment, air distribution equipment and supplemental lighting loads. Communications systems (voice, public address) are also recommended to be on the generator backup source.

A minimum of two automatic transfer switches will be required to separate life safety and optional standby loads. More could be provided in order to minimize the generator capacity required. Panelboards and dry-type transformers would also be provided to accommodate the load requirements.

Electrical Distribution System
The original electrical distribution equipment is recommended to be replaced, as it has well exceeded its anticipated useful life and replacement parts become more difficult and/or costly to obtain. Cascaded surge protection devices are recommended to be installed on the system, at the service entrance and on lighting and appliance panelboards serving computer loads.

Lighting
The fixtures original to the building are recommended to be replaced. The fixtures are generally in fair to poor condition, with the light output impacted by the condition of lenses. New lighting is recommended to be 277V, where applicable. Exterior emergency egress lighting via photocell controlled compact fluorescent cut-off fixtures is also recommended.

Auditorium house lighting is recommended to be replaced, due to the anticipated difficulty in obtaining replacement lamps. Supplemental fluorescent lighting is also recommended if the house area remains in use as instruction space, sub-dividable into three classrooms. Lower efficiency house lighting would be used for performances only. New stage lighting and electronic dimming controls are recommended to replace obsolete systems.

Recommendation for energy savings include automatic shut-off of building lighting systems per the International Energy Conservation Code (IECC). This can be accomplished effectively by installing local occupancy sensors. Alternatively, lighting branch circuits can be routed through a contactor and controlled via the building management system. However, local timed overrides are required for this type of control. Daylight harvesting via photocell control of fixtures in proximity to windows is also recommended for increased energy savings.

Public Address And Program Bell/Clock System
The original systems are recommended to be replaced, as they are over forty years old and replacement parts may be difficult and/or costly to obtain. An integrated telecommunications system is recommended with phone access to the public address system. A GPS wireless clock

systems is recommended, with integration with the public address system for class change signaling.

Security System
An access control system with proximity card readers, consistent with the current Allegany County Public School system standard, is recommended to be installed in the building.

An alert messaging system, tied into the county emergency management system, is located in the administration area.

Public Address And Program Bell/Clock System
The original Bogen MCP35A public address and American Time and Signal Master Clock systems are still in operation. The headend PA cabinet and wall mounted clock controller is located in the administration office area. Ceiling mounted speakers are located throughout corridors. Wall mounted speakers with integral microphone, and program clocks are located in each classroom. Call switches are located in classrooms. Voice outlets have been installed in classrooms, but are not part of the pubic address system. Local sound systems are provided in the Auditorium, Gymnasium and Cafeteria.

Security System
Video surveillance cameras are located in corridors throughout the building. The cameras have individual IP addresses and are wired via CAT 5e cabling to the network. Otherwise, there is no intrusion detection or access control system in the building.

11 – EDUCATION SPECIFICATION ANALYSIS

The existing Braddock Middle School was evaluated for its conformance to the educational specifications. The building and programs are very similar to Washington Middle School. There are some minor discrepancies with the adjacency and configuration of the building that are not in keeping with the goals of the ed specs. The most significant nonconformance relates to the classroom layout. Since the configuration of the building does not lend itself well to organizing into teams. It was found that it will not be possible to accomplish the clustered approach emphasized in the ed specs. There were also many notable discrepancies in program spaces. The most notable of these are the size of the dining, media center, administration suite and music classrooms are all below the required size and classrooms, a computer lab, a fitness room and science labs were missing from the program. In total, Braddock Middle School is short 22,406 square feet of program. Braddock MS is a larger school than Washington MS but due to the inefficiencies of the building layout and the widening of the main corridor for display space, this building lacks a greater amount of core program space.

The building layout is not suitable for teaming academically. Multiple level changes, long bridges, and long corridors connecting various areas of the building, make supervision difficult. No science labs are currently provided – and the science classrooms contain only one demonstration table between both rooms. The media center and food services areas are insufficient to meet the current middle school program and there are insufficient planning areas for teachers.

BRADDOCK MIDDLE SCHOOL EDUCATION SPECIFICATION COMPARISSON

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Basic Instructional Areas	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
English										
Classrooms	8	800	6,400		8		5,304		0	1,096
Shared Storage	3	100	300		0	0	0		3	300
Student Project Rooms	8	80	640		0	0	0		8	640
Reading Intervention Room	1	300	300		1		321		0	-21
Sub Total:				**7,640**				**5,625**		**2,015**
Foreign Language										
Classrooms	2	800	1,600		1	739	739		1	861
Storage	1	100	100		0	0	0		1	100
Sub Total:				**1,700**				**739**		**961**
Social Studies										
Classrooms	5	800	4,000		5		3,729		0	271
Student Project Rooms	5	80	400		0	0	0		5	400
Shared Storage	3	100	300		1	147	147		2	153
Sub Total:				**4,700**				**3,876**		**824**
Mathematics										
Classrooms	8	800	6,400		6		4,506		2	1,894
Storage	3	100	300		1		243		2	57
Sub Total:				**6,700**				**4,749**		**1,951**

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Basic Instructional Areas (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Science										
Classrooms / Labs	6	1,200	7,200		6		4,578		0	2,622
Prep / Storage	3	150	450		3		617		0	-167
Greenhouse	1	200	200		0	0	0		1	200
Sub Total:				**7,850**				**5,195**		**2,655**
Special Education										
Teacher Planning	1	400	400				0		1	400
Classroom (SLE)	2	800	1,600		1		740		1	860
Conference / IEP Team Room	1	200	200				0		1	200
Itinerant Services Room	1	150	150				0		1	150
OT/PT Storage	1	100	100				0		1	100
Sub Total:				**2,450**				**740**		
Total Basic Instructional Areas				**31,040**				**20,924**		

Specialized Instructional Areas										
Family Life / Consumer Sciences										
Food Nutrition Lab / Classroom	1	1,200	1,200		1		1,258		0	-58
Multi-purpose Lab / Classroom	1	1,200	1,200		1		1,232		0	-32
Storage	2	150	300		2		484		0	-184
Sub Total:				**2,700**				**2,974**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Specialized Instructional Areas (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Tech. Ed.										
Manufacturing / Technology	2	1,200	2,400		2		3,053		0	-653
Instructional Classrooms	2	500	1,000		2		946		0	54
Storage - General	2	75	150		4		461		-2	-311
Tool Room	2	75	150		2		168		0	-18
Sub Total:				**3,700**				**4,628**		
Art Education										
Art Classroom	2	1,200	2,400		2		2,393		0	7
Storage	2	200	400		1		239		1	161
Kiln Area	1	100	100		0	0	0		1	100
Sub Total:				**2,900**				**2,632**		
Music Education										
Instrumental Music Room	1	1,400	1,400		1	1,451	1,451		0	-51
Practice Rooms	1	50	50						1	50
Music Library / Office	1	130	130						1	130
Instrument Storage	1	300	300		1		440		0	-140
Vocal Music Room	1	1,000	1,000		1	1,006	1,006		0	-6
Multipurpose Music / Piano Lab	1	800	800		0	0	0		1	800
Sub Total:				**3,680**				**2,897**		
Computer Lab										
Classroom	1	800	800		0	0	0		1	800
Storage	1	50	50		0	0	0		1	50
Sub Total:				**850**				**0**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Specialized Instructional Areas (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Physical Education										
Gymnasium	1	7,000	7,000		1	6,915	6,915		0	85
Conditioning and Fitnes	1	1,300	1,300				0		1	1,300
Health Education	1	800	800				0		1	800
Locker Rooms	2	1,300	2,600		2		3,983		0	-1,383
Staff Offices	2	100	200		2		432		0	-232
Indoor Storage	1	300	300		3		201		-2	99
Outdoor Storage	1	100	100		1	269	269		0	-169
Laundry Area	1	50	50				0		1	50
Sub Total:				**12,350**				**11,800**		
Auditorium										
Seating Area	1	3,000	3,000		1	4,704	4,704		0	-1,704
Stage	1	1,600	1,600		1	1,688	1,688		0	-88
Stage Storage	1	200	200		6		586		-5	-386
Ticket	0	0	0		1	35	35		-1	-35
Dressing	0	0	0		2		235		-2	-235
Sub Total:				**4,800**				**7,248**		
Media Center										
Main Use Area / Circulation	1	3,200	3,200		1	2,400	2,400		0	800
Computer Room	1	600	600		0	0	0		1	600
Workroom	1	200	200		1	412	412		0	-212
Office	1	100	100		1	183	183		0	-83
Data Room	1	150	150				0		1	150

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Specialized Instructional Areas (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Media Center (cont.)										
TV Studio and Control	1	500	500		0	0	0		1	500
Storage	1	200	200		2		318		-1	-118
Small Group Rooms	2	100	200				0		2	200
Sub Total:				**5,150**				**3,313**		
Total Specialized Instructional Areas				**36,130**				**35,492**		

Educational Support Services										
Administrative Offices										
General Office / Reception	1	500	500		1	671	671		0	-171
Principals Office	1	150	150		1	193	193		0	-43
Assistant Principals Office	2	130	260		1	131	131		1	129
Conference Room	1	200	200		1	260	260		0	-60
Itenerant Office	1	130	130		2		150		-1	-20
School Improvement Office	1	120	120		1		210		0	-90
Storage	1	200	200		2		227		-1	-27
ISS/Academic Village Rm.	1	400	400				0		1	400
School Store	1	100	100		1	118	118		0	-18
Work Room, Copy Room	1	100	100		1	231	231		0	-131
Staff Toilet	1	50	50		2		37		-1	13
Mail	0	0	0		1	116	116		-1	-116
Sub Total:				**2,210**				**2,344**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Educational Support Services (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Guidance Suite										
Reception	1	100	100		0	0	0		1	100
Guidance Counselor's Office	2	130	260		3	0	430		-1	-170
Conference Room	1	200	200		1	158	158		0	42
Work / Records Rm.	1	100	100		1	66	66		0	34
Sub Total:				**660**				**654**		
Health										
Waiting Area	1	150	150		1		300		0	-150
Nurse's Office and Private Consultation	1	125	125				0		1	125
Rest Areas	2	100	200		2	0	142		0	58
Treatment / Medication Area	1	125	125		0	0	0		1	125
Exam	1	125	125		0	0	0		1	125
Restrooms	2	50	100		1	19	19		1	81
Storage	1	50	50		0	0	0		1	50
Sub Total:				**875**				**461**		
Faculty Support										
Faculty Dining	1	300	300		1	313	313		0	-13
Team Planning Areas	4	300	1,200		2		414		2	786
Sub Total:				**1,500**				**727**		
Cafeteria and Food Services										
Cafeteria	1	3,300	3,300		1	3,211	3,211		0	89
Food Preparation	1	900	900		1	1,160	1,160		0	-260
Serving	1	900	900		0	0	0		1	900
Dishwash	1	300	300		1	196	196		0	104

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Educational Support Services (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Cafeteria and Food Services (cont.)										
Receiving	1	100	100				0		1	100
Storage	1	150	150				0		1	150
Dry Food Storage	1	300	300		1	116	116		0	184
Refrigerator Storage	1	150	150		1	75	75		0	75
Frozen Storage	1	150	150		0	0	0		1	150
Non Food Storage	1	80	80		0	0	0		1	80
Personnel Area	1	100	100		1	71	71		0	29
Office	1	100	100		1	52	52		0	48
Can Wash	0	0	0		1	54	54		-1	-54
Sub Total:				**6,530**				**4,935**		
Custodial and Operations Services										
Custodial Office	1	100	100		0	0	0		1	100
Lavatory, Lockers, Showers	1	150	150		1	108	108		0	42
Indoor Storage Area	1	300	300		1	253	253		0	47
Utility Closets / Storage	1	200	200		3		103		-2	97
General School Storage	1	200	200		2	0	294		-1	-94
Outdoor Storage	1	200	200		0	0	0		1	200
Workshop	1	100	100		0	0	0		1	100
Receiving Area	1	100	100		0	0	0		1	100
Sub Total:				**1,350**				**758**		

AREA SUMMARY	ED SPEC	EXISTING BUILDING	DIFFERENCE
NET PROGRAM AREA	**80,295**	**66,295**	**22,406**
Circulation, Toilets, Mechanical, Wall Thickness @ 35%	28,103		
GROSS AREA	**108,398**		
		#DIV/0!	
GROSS AREA 70% efficiency	**114,707**		

SECTION 4 - EXISTING CONDITIONS ASSESSMENT – ALLEGANY HIGH SCHOOL

Image 9 - ALLEGANY HIGH SCHOOL MAIN ENTRANCE

ALLEGANY HIGH SCHOOL

1 – INTRODUCTION

Allegany High School, the oldest active high school in the state of Maryland, moved to its current location in 1932 on a site called "Camp Hill", formerly a federal army camp during the Civil War. The original building was constructed in 1925 (39,866 sq. ft.). Additions were added in 1933 (65,856 sq. ft.), 1940 (29,375 sq. ft.), 1957 (35,817 sq. ft.), 1982(733s q. ft.), and 1995 (2,268 sq. ft.). A major renovation occurred in 1982, and various other systemic improvements were accomplished in the 90s. The building consists of a basement level (in the auditorium wing), lower level, first floor level, second floor level and third floor level (at center section of original building and at gym wing) for a total of 173,892 square feet.

Allegany High School is located in the west end of Cumberland on the hill top next to the Rose Hill Cemetery. This section of Cumberland is the oldest and first to be developed by the settlers. The adjacent neighborhoods house several of the Allegany County government buildings and are the oldest buildings in Cumberland. AHS has a rich history in the community and provides many residents a sense of identity and connectedness to their community. The school currently houses class pictures from throughout the history of the school and there continues to be an ongoing process of historic documentation for the building.

The architectural detailing on the existing building is quite beautiful and a significant expression of architectural of the time. Efforts should be made regardless of the scheme selected to preserve as much of this detail as possible for reuse of the existing building or for relocation to a new building. If the school moves from this building, any future structure should account for the historic photos currently housed in the school and make all efforts possible to connect the new school to its rich history.

2 – SITE ASSESSMENT

A. Site Background

The site is located along Sedgwick Street in Cumberland. The site area is 12.5 acres inclusive of public right-of-ways. The entire site is developed to its fullest extent. The baseball practice field is located on the north side of Sedgwick Street. The main campus is on the south side of Sedgwick Street. A satellite parking area is located across from Tilghman Street opposite the auditorium.

B. Accessibility

Site accessibility is accomplished primarily through public right-of-way. There is a dedicated parent drop-off along Sedgwick Street at the school's main entrance. It also features some short-term parking and HC spaces.

The school busses are queued on Tilghman Street, with the auditorium being used for a point of access. This same point of access is also used by those parking in the surface lot opposite of Tilghman Street.

A small access road extends between the cemetery and the rear of the school. This provides limited access to the physical plant and cafeteria.

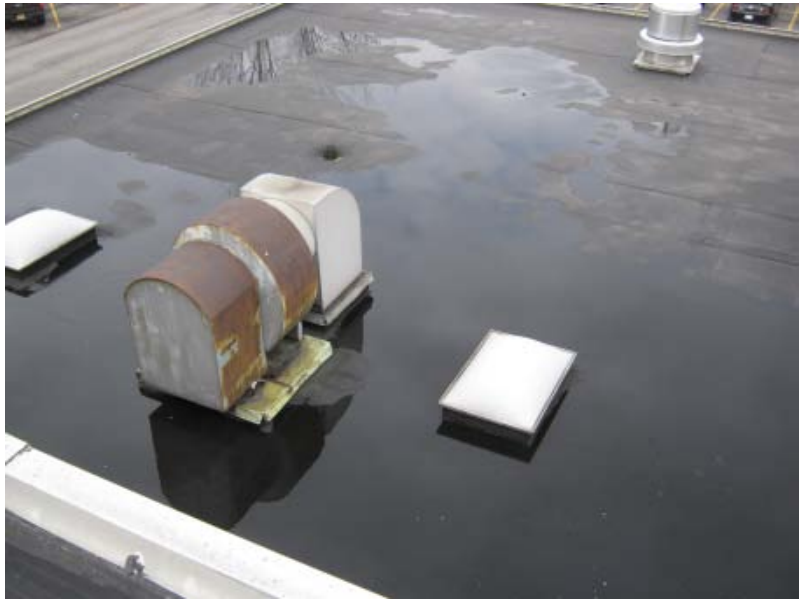
C. Parking

Parking is provided in four areas. The main parking area is a lot along Tilghman Street has a 180 car capacity. There is on- street parking available with an estimated 130 space capacity. These spaces are also shared by the residents on Sedgwick Street. Five short terms spots are found at the main entrance drop off. Another 10-12 spaces are available in the rear service area, which are utilized by staff. The HC spaces at the main Entrance are accessible, but the spaces in the Tilghman Street lot do not meet current ADA standards and are not part of an accessible route to the school.

D. Service

Service access is provided via an alley to the rear of the site. A small barely functional loading dock is adjacent to the access to the cafeteria. Any multi-part or long-wheelbase delivery vehicle would need to back into the loading area from Tilghman Street.

E. Pedestrian



The school has two defined pedestrian routes consisting of paved sidewalk. Pedestrians can approach from the west via Sedgwick or from the east via Tilghman Street. The routes are not fully accessible. The condition of the sidewalk along both streets varies. Isolated repair or total replacement should be anticipated.

No bike racks were found on site.

F. Water Supply, Drainage and Sewerage

The site is served by domestic water and sewer supplied by the City of Cumberland. The City reported no issues with either system. Taps for an addition or new building will need to follow City practices.

The City of Cumberland uses the 2010 Maryland Stormwater Management Design Manual. Any renovations done on the site will require compliance with the City's Stormwater Management Ordinance. The designer will be required to follow the Environmental Site Design (ESD) guidelines for redevelopment. In addition, any increase in impervious are will most like be required to from overbank flood protection, Q10, or equivalent storage. Conveyance from the site would be limited by the downstream structures. The stormwater conveyance is via an undersized combined sewer system. Discussions with City of Cumberland Engineering Department indicated that a means of stable conveyance will need to be installed for any extensive project. Most probable means of conveyance is to a swale that is located northeast of the site. This will need to be evaluated during the design process and repairs made to convey any additional runoff.

ESD focuses on bringing the site back to what engineers term "Woods in Good Condition". This means that every effort must be made in the design to accommodate alternative non-structural practices before a conventional structure can be employed. These techniques can include green roofs, infiltration, grass swales, and permeable pavements. The architect needs to fully consider this when performing preliminary design for any renovation or construction. Green areas will need to be incorporated into the design to facilitate the implementation of ESD practices. It is also important to note that the review time for projects has increased significantly since the implementation of ESD.

Potomac Edison provides power for the site. Columbia Gas has gas available, but did not comment on the location or capacity. Verizon supplies telephone. Cable is by Atlantic Broadband. No issues with any of these services were disclosed.

G. Circulation

Circulation for the site between the school, parking and ball fields are adequate but lack and ADA accessible route. Pedestrians are required to cross Sedgwick and Tilghman Streets. Proper signage and the use of delineated or raised crosswalks can improve pedestrian visibility and safety.

H. Environmental Variables

There are no apparent outdoor learning habitats located on the site. Provided there is enough room, Environmentally Sensitive Design can easily be configured to accommodate a wetland learning habit.

I. Pedestrian and Vehicle Circulation

The site mixes pedestrian and vehicle circulation. An attempt needs to be made to separate pedestrian traffic originating at the parking lot from POV and bus traffic in order to improve safety.

J. Athletic Fields

The site has two grassed athletic fields. The first field, located west of the school, is a combined track and football/soccer practice field(see Appendix A, Photo 28). Neither the field nor the track complies with the published NFHS requirements. They cannot be used for hosting any events. Using this area to practice can also create issues for the athlete. The track, for instance is only 1000' long, nearly 300 feet shy of being a true 400m track.

The other field is a baseball field. It has a backstop and fencing, but lacks accommodations for players and spectators. It also suffers from being on the opposite side of Sedgwick Street, away from the main campus.

There were no paved outside athletic areas found on-site.

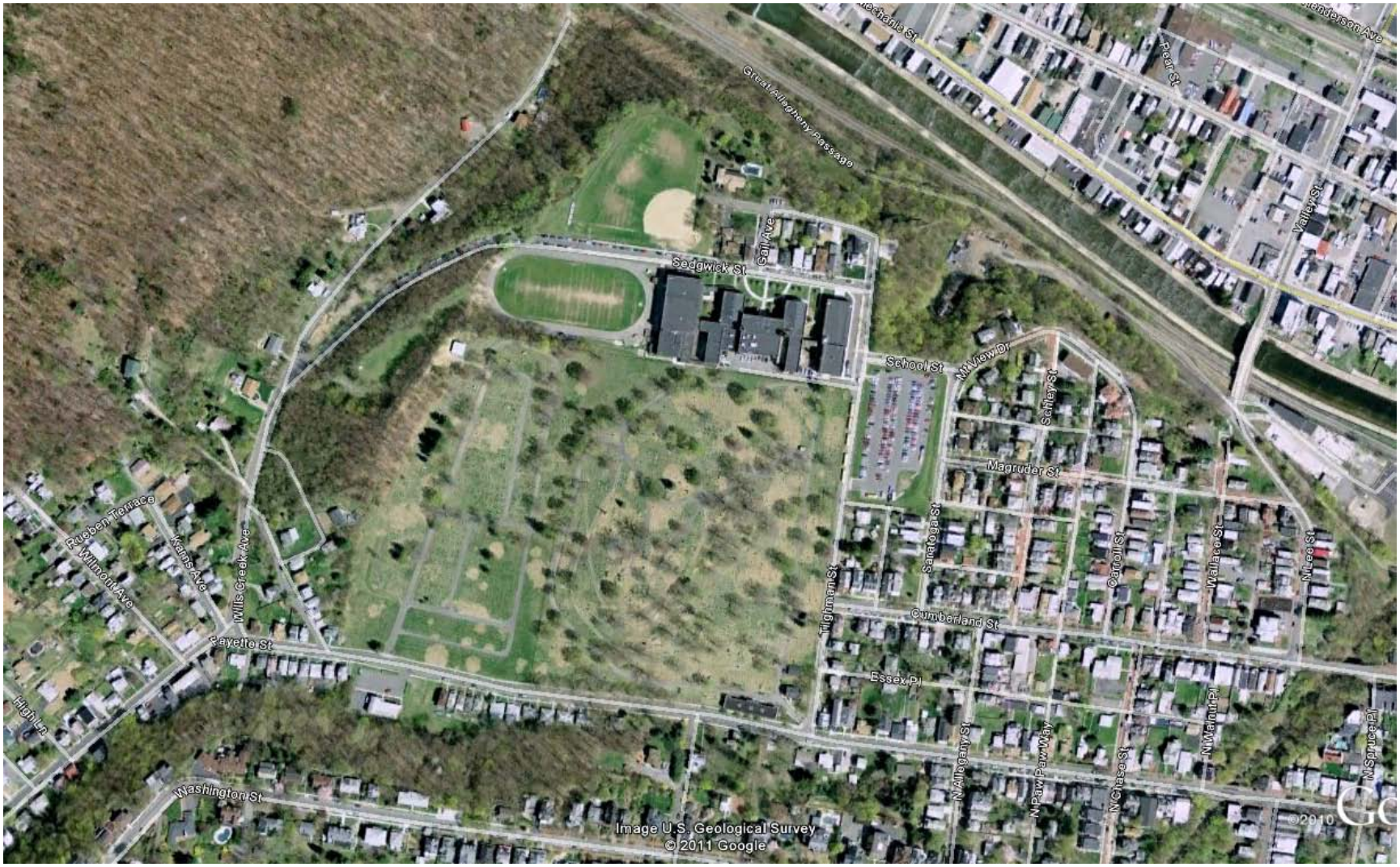


Image 10 - ALLEGANY HIGH SCHOOL AERIAL PHOTO

3 – BUILDING CONDITION

A. Exterior Building Envelope

Roof
The existing roof is an exposed membrane roof and was installed in 1998 and is in generally good / fair condition. The majority of the roof plane has positive slope with good drainage to the roof drains and wall scuppers, however there are no piped overflow drains for the roof drains. There is little evidence of significant ponding (see Appendix A, Photo 27). The existing aluminum coping and gravel stop are in good / fair condition. When the membrane roofing was installed, the flashing membrane was extended up over the back sides of all parapets and up over the horizontal plane of the coping / gravel stops. Roof flashing transitions at walls were performed with termination bars.

Exterior Walls
The building envelope consists of brick with CMU backup. The exterior masonry needs some repair and repointing(see Appendix A, Photos 29-35). Most exterior sealants at control joints are in poor condition and should be replaced. There is significant reconstruction and reinforcing required for the exterior veneer in several locations. There is evidence of cracking in many of the stone units.

Exterior Doors and Windows
All exterior windows are single pane glazing which will not meet current energy standards and should be replaced with thermally broken insulated glass units. The windows also have deteriorating sealant which should be replaced. Several lintels are rusting and should be repaired / replaced (see Appendix A, Photo 35).

B. Existing Interiors

Floor Finishes
Most classrooms are VCT, or carpet tile at areas of wood floor construction. Corridors are typically VCT or terrazzo. Toilet rooms are typically ceramic tile. The floor finishes are generally in fair condition. There are a few rooms which have the original 9 "x 9" VAT which should be replaced.

Interior Walls
Most interior walls are painted CMU and are in satisfactory condition. Some stair walls are glazed brick. Bathrooms are typically glazed ceramic tile. The interior side of some exterior walls is plaster.

Ceilings
Most ceilings in the classroom building are suspended 2'x4' acoustic ceiling tile in metal grid and are in good condition, however, in some locations the tiles are damaged or stained and should be replaced.

Interior Doors and Hardware
Interior doors and frames are typically hollow metal. The hardware throughout the building is not ADA compliant.

4 – BUILDING CODE ANALYSIS

The building is not fully sprinklered. Installing a sprinkler system is highly recommended for several reasons, including: 1) Safety of the building occupants, 2) protection of property, 3) dramatic reduction in the cost of other fire protection measures needed throughout the building to comply with code.

The area of the building exceeds the allowable area per the IBC code. The building is easily separated into 3 distinct fire zones – the classroom building, auditorium and gym. These areas have separate structural systems, however, they are not separated by fire walls and doors. The auditorium area is within the allowable area limits, however, the classroom and gym wing areas exceed the allowable area. If these areas were fully sprinklered, however, they would be within the area limitation.

The occupancy loads of some of the larger spaces and classrooms require two means of egress with doors that swing out and have panic hardware, which is not provided.

Based on the occupancy of the second floor level, the existing stairs do not provide sufficient egress width per code. Also, the landing depth at several stairs is below the code required minimum(see Appendix A, Photos 37-38).

5 – BUILDING ACCESSIBILITY

An elevator is provided in the classroom wing to provide access to the lower, second and third floor building levels. Handicap lifts have also been provided at corridors with stairs. However, many components of the classroom building are not ADA compliant, including the following:

- ADA access is not provided at all exterior entrances, with one or more concrete steps occurring at some exits(see Appendix A, Photo 39-40).
- HC accessible stations are not provided at science labs.
- Some classroom and toilet room entrances do not provide the required door approach clearances.
- Hardware is not ADA compliant.
- Handicap accessible plumbing fixtures and stalls are not provided at all toilet rooms. In some locations grab bars are provided, but not in the correct configuration to meet current codes. Also, handicap turnaround and fixture clearances are not provided at all toilet rooms.

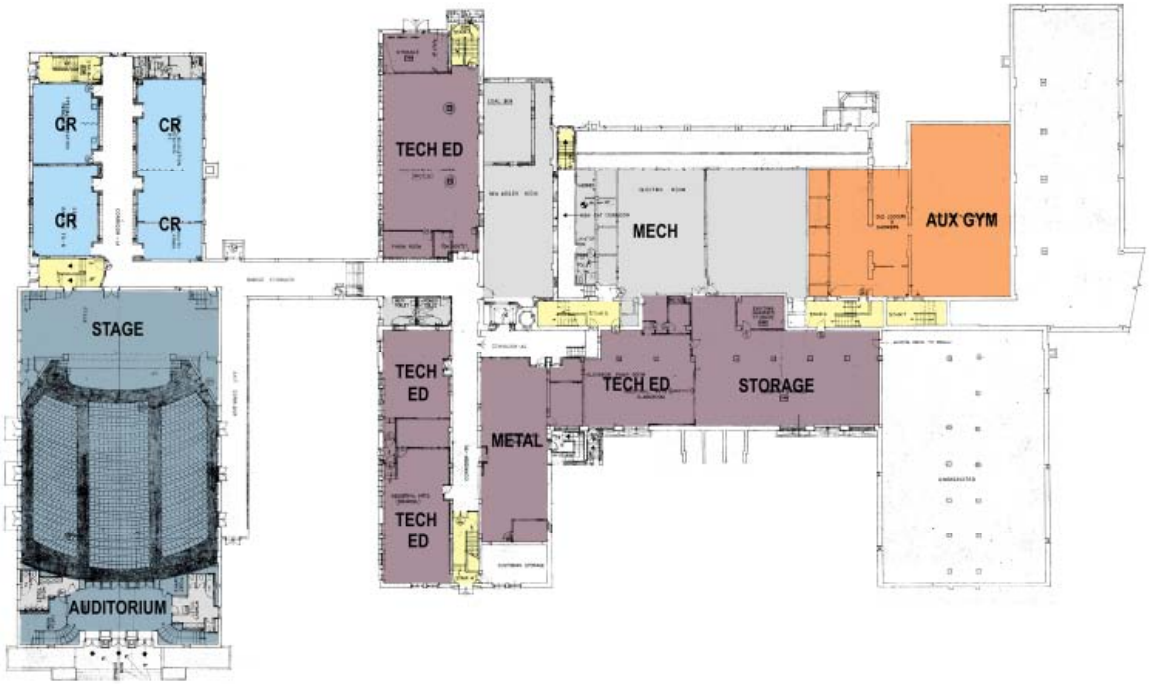


Image 11 - ALLEGANY HIGH SCHOOL AUDITORIUM ENTRANCE FLOOR PLAN

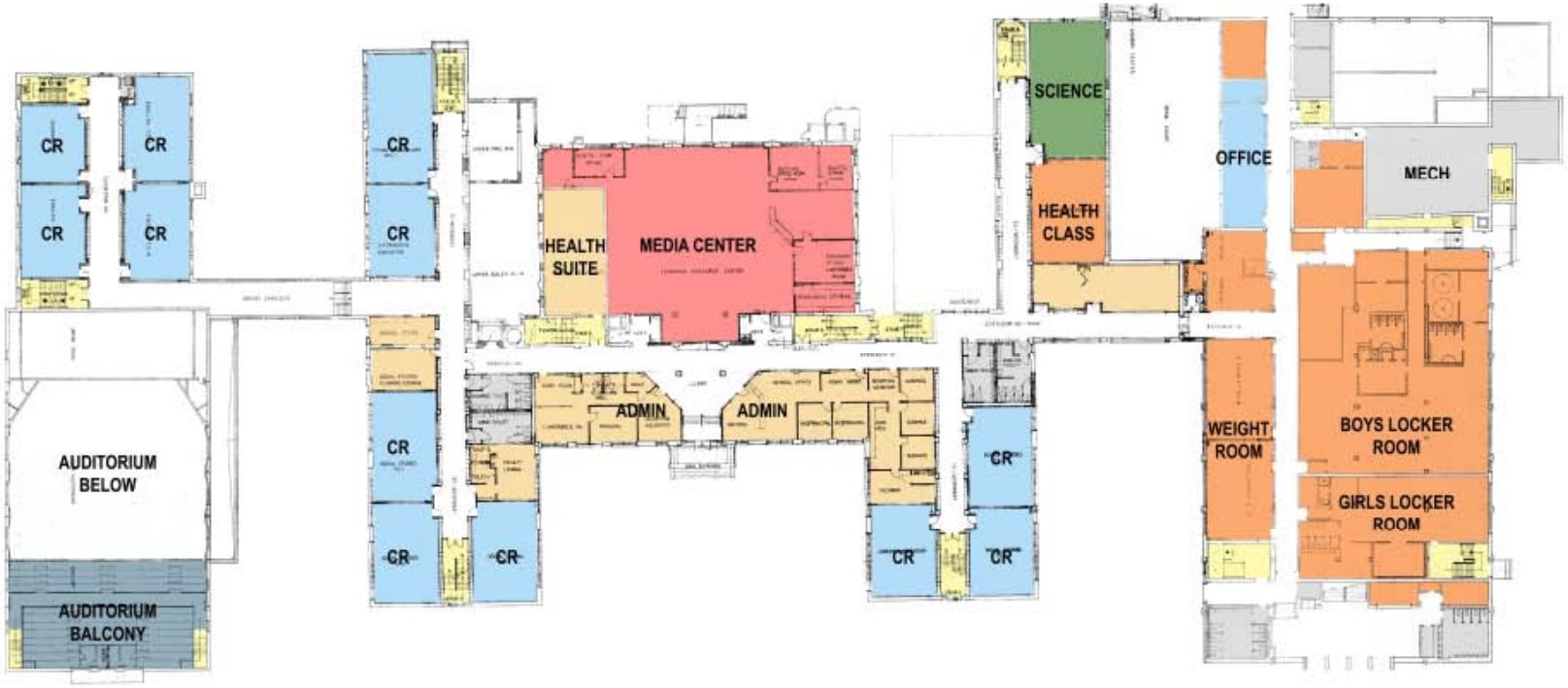


Image 12 - ALLEGANY HIGH SCHOOL MAIN FLOOR PLAN

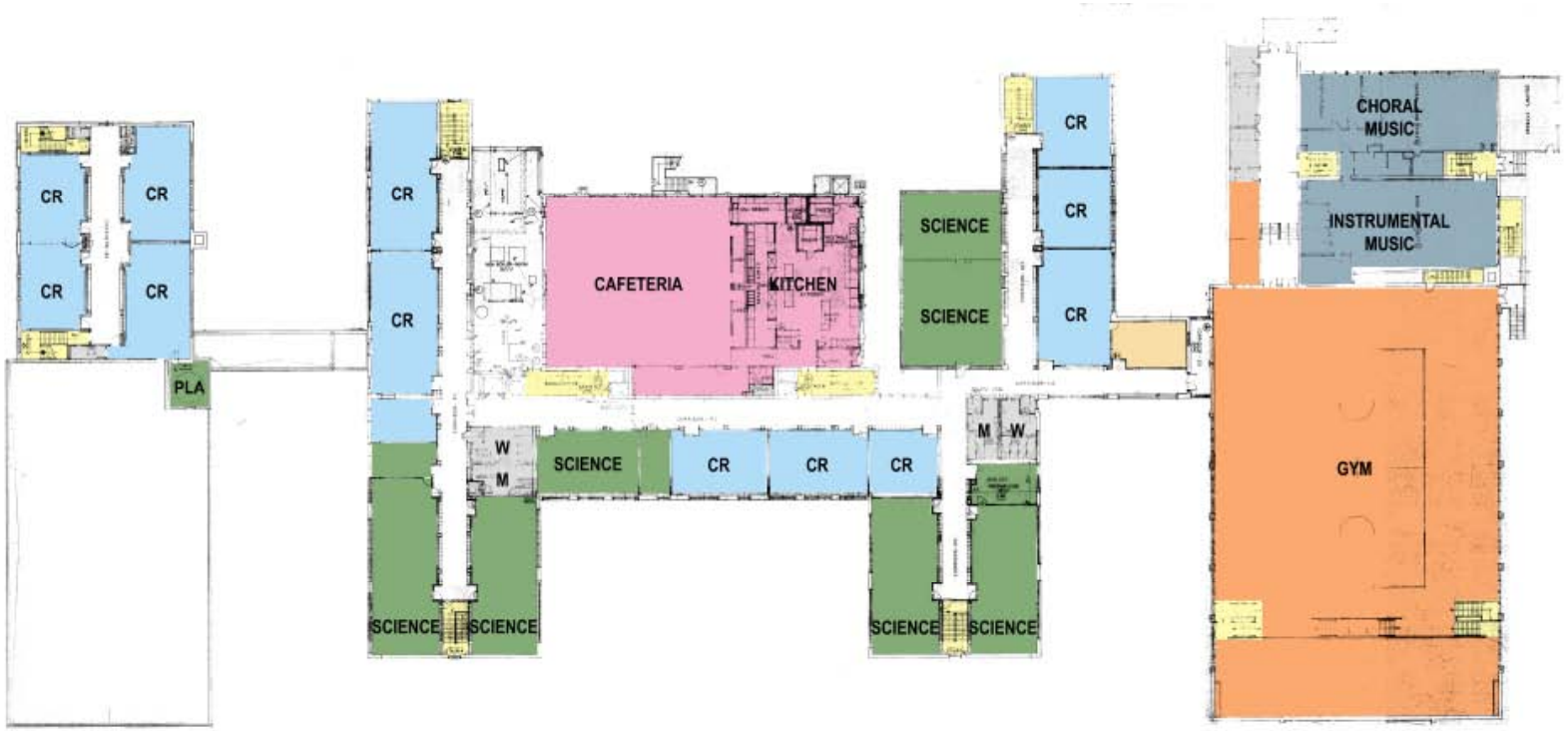


Image 13 - ALLEGANY HIGH SCHOOL SECOND FLOOR PLAN

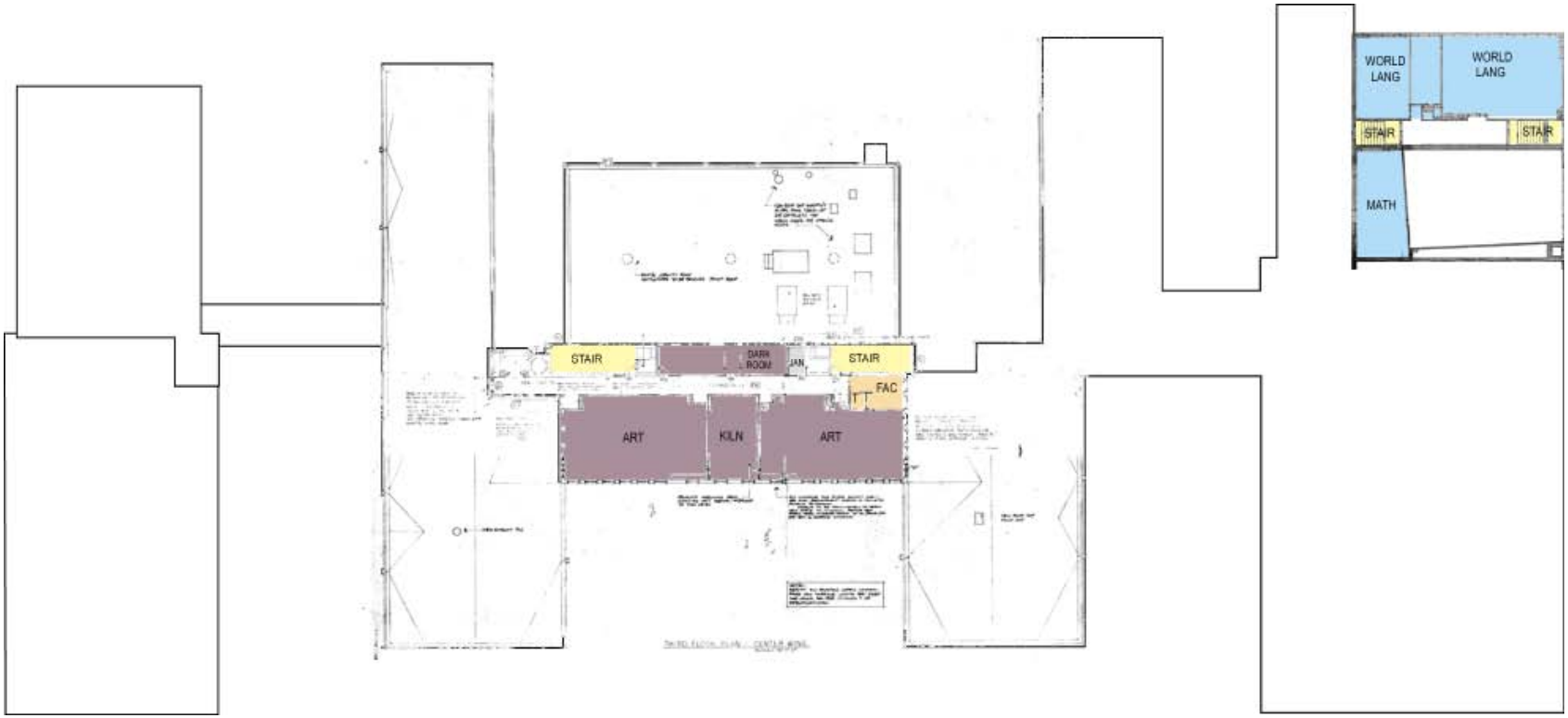


Image 14 - ALLEGANY HIGH SCHOOL THIRD FLOOR PLAN

6 – STRUCTURAL ANALYSIS

The Allegany High School was originally constructed in 1925 with a number of additions occurring in 1933, 1940 and 1957. The gymnasium was constructed last. Original structural drawings have not been reviewed at this time. A majority of the structural elements in the original building are covered with architectural finishes.

A. General Characteristics

The framing for the main building floors is purportedly wood. It appears that the wood framing spans between a combination of brick and stone masonry walls.

The framing for the gymnasium roof is constructed of gypsum plank spanning between bulb tee sub-purlins. The sub-purlins span between open web bar joists that span between steel trusses that span across the gymnasium. The steel trusses bear on brick encased concrete piers. The second floor consists of 2½" concrete slab on metal deck supported by open web steel joists. The steel joists are supported by steel beams, columns and masonry bearing walls. The floor framing of the balcony is constructed of concrete joists spanning between masonry bearing walls. At the main entrance, a cantilevered concrete canopy roof extends from the exterior wall and balcony framing. The main floor framing is composed of concrete joists spanning between concrete beams and columns. The columns are supported on spread footings. The lower level is a concrete slab on grade reinforced with welded wire mesh. The auditorium framing is similar.

Several additions have been added over the years with various combinations of steel and concrete joists, beams and columns, shallow spread footings and deep foundations.

B. Visual Inspection

1. The wood deck at the third floor corridor has some warping. This has affected the VCT flooring. The floor is noisy due to wood squeaking under pedestrian traffic.
2. There is significant cracking at the exterior brick veneer around the gym truss bearing piers.
3. There is stepped and diagonal cracking at the tile veneer of the gym walls.
4. Many of the exterior steel lintels have rusted and laminated.
5. Several glass blocks at the egress corridor exterior wall of the auditorium are broken.
6. The concrete veneer at the east side of the auditorium requires re-grouting.
7. There is cracking at the non-bearing gym wall where the roof truss braces are connected.
8. There are several locations with water stained ceiling tiles.

C. Plan Review

A cursory review of the structural systems shown on the available plans was conducted and we have the following comments:

1. The current code indicates a 40 psf roof snow load. The drawings note a 30 psf roof live load.
2. The current code indicates a 3'-0" frost depth. The drawings indicate a 2'-6" frost depth.
3. Snow drifting on lower roofs does not appear to have been accounted for in the original design.
4. The live load for the classroom floors meets current code requirements.

D. Conclusions

1. The drawings for the 1994 science facility addition over the auxiliary gym at the rear of the main building notes a 35 psf ground snow load.

a. The roof joists are adequate to support the current design loads.

b. The floor joists and columns are adequate to support the current design loads.

2. The roof joists over the gymnasium are slightly over-stressed under the current code live/snow loads. The roof joists over the locker rooms are adequate under the current code loads.

3. The current gymnasium roof trusses have not been analyzed but have performed adequately under the design loads.

4. The structural drawings for the1981 remodeling of the school indicate a roof live load of 30 psf. Current code requirements are for a 40 psf live load.

5. Drawings for the original building have not been reviewed at this time.

7 – MECHANICAL ANALYSIS

A. General

Allegany High School was originally constructed in 1925 and consisted of 39,866 square feet. Subsequently additions occurred in 1933 (65,856 square feet), 1940 (29,375 square feet), 1957 (35,817 square feet), 1982 (733 square feet), and 1995 (2,245 square feet), which brings the current building area to 173,892 square feet. The site gradually slopes and additions did not necessary align with original buildings floor levels. Generally speaking there are four (4) main floor levels, although at different elevations including the lower level, first floor, second floor and third floor. The main entrance, lobby and office are located on the first floor. Unexcavated crawl spaces, sub-basement mechanical spaces, etc. have not been considered as part of the four main floor levels.

An extensive renovation occurred in 1982 and included 135,097 square feet. It included most of the building except for the gym wing which is still served by the steam heating system described later within this report. In 1995 two science rooms were renovated.

B. Existing Conditions

Heating Plant

The building is currently served by two (2) separate and independent heating plans. The gym wing (west end) which serves the gym, locker rooms, weight room, band room, chorus room and coaches room is heated by low pressure steam. Two (2) coal fired, fire tube boilers are located in the gym wing in a depressed floor slab accessible from the first floor level. The mechanical room is approximately a story and half high. The coal bin is open to the main boiler room. Coal is dumped into the coal bin where it is manually transferred by a trolley system to gravity hoppers for each boiler.

A cyclone separator on the flue gas outlet is the primary ash collector while the rest is manually removed from the boilers. Based on the specific coal used for this facility, the remains of the burned coal looks like lava rocks. The ash and coal residue is collected in 30 gallon drums and has to be hoisted out from the lower level boiler room to grade.

The boilers produce low pressure steam which is distributed to heating units serving the gym wing. Condensate is returned to a feed water system which in turn feeds the boilers with makeup water. These boilers are original to the construction of the building and are over fifty (50) years old.

The rest of the building is served by a single coal fired, fire tube hot water boiler. The boiler was installed as part of the 1992 renovation. The boiler was manufactured by CNB. A large story and half coal bin is located within the boiler room. The boiler room has a depressed floor slab so as to create a story and a half high space. The mechanical room is also located off the first floor level at the east end of the main building. An auger system transfers the coal from the coal bin to a gravity hopper where the coal enters the boilers.

A cyclone separator on the flue gas outlet is the primary ash collector. Boiler access doors are also used to shovel ash out of the boilers and into 30 gallon drums. These drums are carried up a long ramp from the boiler room to grade where it is dumped into an exterior ash bin until it can be loaded into a truck and disposed of.

Two (2) original (1982) base mounted end suction constant volume pumps, located in an adjacent but separate mechanical equipment room, circulate heating water throughout the building. The pumps are rated at 600 gpm at 100 foot of head and were manufactured by TACO. At some point the heating system was served by a steam system however, the boiler was converted to hot water and the steam to water converter and condensate receiver/pump have been abandoned.

Cooling Plant

There is no central cooling for the building. The central office suite has minimal cooling provided by packaged through the wall air conditioning (PTAC) units. Minimal cooling is provided throughout the building. Where cooling is provided, residential style window air conditioning units are used, including the room housing the main distribution frame (MDF).

Air Distribution Systems

- *Auditorium*
  The Auditorium is served by two (2) heating and ventilating units located in a sub-basement under the stage. The units were built in place using a small room as a mixing (outdoor air and return air) chamber which is then ducted to a hot water heat coil. The coil is located in a separate room which also contains a floor mounted double inlet housed fan with a ducted outlet to the supply air distribution system located in an unexecuted crawl space under the auditorium floor.

- *Shop Areas*
  The two (2) main shop areas are served by conventional floor mounted heating and ventilating unit ventilators.

- *Classrooms*
  The classrooms are primarily served by floor mounted heating and ventilating unit ventilators. There are minimal horizontal type unit ventilators. The two (2) renovated science rooms are served by individual roof mounted heating and ventilating units.

- *Cafeteria*
  The Cafeteria is served by a rooftop heating and ventilating unit with supplemental perimeter hot water convectors. Ceiling fans are used to help destratify the air. The kitchen has a long double hood arrangement served by two (2) roof mounted exhaust fans and two (2) hot water roof mounted make up air units. The hood is has an ansul fire protection system. Window A/C units provide some cooling in the cafeteria.

- *Media Center*
  The Media Center is heated and ventilated by a roof mounted hot water air handling unit. Window A/C units provide partial cooling. Perimeter hot water convectors provide supplemental heating.

- *Office/Administration Suite*
  The Office Admin suite is served by two separate systems. Perimeter rooms are served by under the window, through the wall packaged air conditioning units with hot water heat coils. The interior spaces are served by a split type system consisting of an indoor air handling unit with hot water coil and remote air cooled condensing unit for cooling.

- *Corridors/Toilet Rooms/Storage Rooms/ Stairwells*
  These areas are served by floor mounted convector or cabinet units heaters as well as ceiling mounted cabinet unit heaters in some areas.

- *Band Room*
  The Band room is served by an indoor heating and ventilating unit using a steam heating coil.

- *Gymnasium*
  The Gymnasium is served by two (2) indoor ceiling hung heating and ventilating units using a steam heating coil. Exposed supply air ductwork is located through the gym roof structural steel system.

- *Locker Rooms*
  Locker rooms, weight rooms, etc. are served by steam type unit ventilators.

Automatic Temperature Control Systems

All controls are local pneumatic activation type with limited and local capabilities.

C. Evaluation

The mechanical systems and equipment with the exception of two (2) science room H & V rooftop units are thirty to fifty years old and beyond their anticipated useful life according to ASHRAE. The systems are still functional, however, most of the equipment manufacturers (boilers, unit ventilators, PTAC's, etc.) are no long in business and parts often have to be custom fabricated. The pneumatic control system is antiquated and beyond its useful life. The control system have limited capability to conserve energy and are primarily used to determine occupied/unoccupied modes of operation and local space temperature control.

The coal fired boilers are not the cleanest burning type of boilers. There is no backup boiler for the heating plant that serves all areas except the gym wing. They are also very laborious to maintain. It is estimated that over 1000 tons of coal are consumed each year.

D. Recommendations

General

All systems and materials are beyond their useful lives and are recommended to be replaced in their entirety. The addition of air conditioning is also recommended. A four (4) pipe heating, air conditioning and ventilation system is recommended.

Heating Plant

It is recommended the heating plant be replaced in its entirety. It is also recommended one (1) central boiler plant with boiler redundancy be provided. A hybrid heating plant is recommended consisting of multiple dual fuel (oil and gas) cast iron non-condensing boilers controlled in modular fashion. Additionally, it is recommended one or two of the boilers within the system be high efficiency gas-fired condensing type. The high efficiency boilers would operate during intermediate weather conditions in the spring and fall when the hot water supply temperature is reset to less than 140 deg F. These boilers can operate at variable flow and +90% efficiency. During winter outdoor conditions, the main non-condensing boilers will run and generate 180 deg F supply water temperature. The condensing boilers can also operate at these temperatures; however, their efficiency is no better than the standard cast iron boilers. Each non-condensing boiler would be equipped with a constant volume circulating pump; while a variable speed drive secondary pump will distribute varying flow throughout the building.

Cooling Plant
It is recommended to install a central chilled water plant to serve the building. A new chilled water system mechanical room will be needed to house the pumps, chillers, and associated specialties. Multiple split air-cooled or water-cooled chillers are recommended. Similar to the heating plant, each chiller would be provided with an associated constant volume pump. The chillers are recommended to be piped in parallel. A variable speed secondary pump will vary chilled water flow distributed throughout the building. A water-cooled magnetic bearing variable speed centrifugal type chiller is recommended. The chillers require very little maintenance, are extremely quiet, are oil-free (sustainable design), and are the most energy-efficient chiller on the market.

Air Distribution Systems
The existing equipment , except for the existing rooftop units, cannot be replaced in the same locations based on the lack of accessibility. New mechanical penthouses will be needed to house air handling equipment for assembly areas such as the Gym, Cafeteria, and Auditorium, as well as common areas like the Media Center. All new duct systems, sized and insulated for cooling, will be required.

Portions of the building have very limited infrastructure space (i.e., low floor-to-floor heights) since the original building had limited infrastructure needed to support the building. The majority of the unit ventilators sit on the floor within the space. There is no cooling and a limited fire protection system; and the power—IT cabling was minimal.

Unit ventilators are not recommended due to noise, humidity, and air distribution issues. A central all-air heating and cooling system (i.e., variable air volume system) will not be practical without compromising ceiling heights.

A 4-pipe fan-coil system with a dedicated outdoor air system (DOAS) may be the only cost-effective and practical solution for classroom areas.

Automatic Temperature Controls

It is recommended the existing local pneumatic control system be replaced in its entirety with a Web-based open protocol BACNET System using electric/electronic actuation and tied into a Central County Energy Management System (EMS).

Energy Conserving control strategies such as economizer cycles, night setback, demand controlled ventilation, supply air reset, supply water reset, etc., shall be incorporated to meet or exceed ASHRAE 90.1 2007 requirements.

8 – PLUMBING ANALYSIS

A. Existing Conditions

Domestic Water – A 4-inch cold water service serves the building. The water service enters the building in the air handling unit room located below the stage in a sub basement area. The combined 4" cold water service also serves a partial fire protection system. Two (2) gas-fired hot water heaters generate domestic hot water which is used in conjunction with associated independent vertical storage tanks to serve the building.

Plumbing Fixtures - The plumbing fixtures appear to be original, are functional, but do not meet the current water conserving requirements.

Natural Gas – A low pressure gas line serves the building. A large drum meter is located outside in front of the building. Natural gas serves the domestic hot water heaters, kitchen equipment, and Science Labs.

Sanitary and Vent Piping – It appears most of the sanitary and vent piping is a combination of cast iron sanitary and copper vent piping. The Kitchen has an outdoor grease trap interceptor and the Art Rooms have clay traps.

Storm Water Piping – The building has roof drains and interior storm water piping, which is cast iron, and original to the building.

B. Evaluation

Except as necessary for repairs, all plumbing systems, fixtures, and piping are over 30-50 years old, do not meet current Code requirements for water conservation and accessibility, and are generally beyond their anticipated life expectancies. Insulation is in deteriorating condition. Backflow prevention is also required to protect the potable water supply.

C. Recommendations

Generally, the equipment and systems are recommended to be replaced in their entirety. Domestic hot water systems shall be energy-efficient and comply with ASHRAE 90.1 2007. Domestic hot water temperature limiting devices (ASSE approved devices) are required through the building as well as backflow prevention for the cold water system. Plumbing fixtures shall be replaced with water conserving, accessible types. Piping systems need to be replaced due to their age. Storm water systems need to be provided with independent overflow systems and be sized to meet current Code requirements if the existing scuppers are not adequate.

The gas service shall be upgraded to support the increased demand for the heating water system.

9 – FIRE PROTECTION ANALYSIS

A. Existing Conditions

The building is only partially equipped with a fire protection system with limited sprinklered areas and standpipes with hose valves located in some stairwells. It is recommended the water service be upgraded, and a wet pipe sprinkler system be used to protect the entire building.

10 – ELECTRICAL ANALYSIS

A. Existing Conditions

Electrical Distribution System

The electric service for Allegany High School is derived from a utility pad-mount transformer. The main distribution switchboard for the building is rated 1600A, 480/277V, 3 phase, 4 wire. The switchboard, manufactured by Federal Pacific, is located in the Main Mechanical/Electrical Room. Federal Pacific panelboards are located throughout the building, typically located in closets containing a 480/277V panel for lighting loads, and a 208/120V panel for receptacle loads served from a local dry type transformer. These closets share duty as Janitors closets, complete with mop sinks adjacent to the electrical equipment.

A 225kVA transformer serves a 208/120V distribution panel located adjacent to the main distribution switchboard. This feeds the wood and metal shop plug-in busway and equipment. A 150kVA transformer in the Basement level serves the Auditorium lighting dimmer cabinets. Dedicated panels are located in the Boiler Room and Kitchen. The switchboard, as well as the majority of the electrical distribution system, was installed in 1982 with the last major building renovation. Additional panels have been installed to support Technology upgrades. Surge suppression devices (SPDs) have been installed at panelboards serving computer loads. In the Gymnasium area, the original panels manufactured by the Cleveland Switch Company are still in use.

Two motor control centers serve mechanical equipment in the building: in the main mechanical/electrical room and on the fourth floor for rooftop equipment. The latter is located in a closet accessible from a stairway and does not have the NEC required working clearance. The electrical equipment located within the Boiler Room is covered in soot.

The majority of the distribution equipment has met the anticipated useful life of 25-30 years. In addition, Federal Pacific equipment is no longer manufactured and replacement parts are not readily available. The distribution equipment in the Gymnasium area has far exceeded its anticipated useful life.

Emergency Distribution System

A 55kW, 480/277V, 3 phase, 4 wire natural gas fired emergency generator is located in the Main Mechanical/Electrical Room and serves the building life safety loads. The generator and automatic transfer switch are manufactured by Onan. The transfer switch was replaced a year ago, and the generator is currently in the process of being removed. A new 100kW diesel generator will be installed outside the building. The larger capacity generator is intended to accommodate the heating water pumps as well as the current emergency loads.

Lighting

The lighting systems in the building vary in type and condition. Many of the original fixtures are still in use, although linear fluorescent fixtures have been retrofit with 32 watt, T8 fluorescent lamps and electronic ballasts. Incandescent fixtures have largely been re-lamped with compact fluorescent screw-in type bulbs, although some incandescent lamps are still in use. Exterior lighting consists of the original building mounted lighting at the main entrances, with HID wall packs added at the Second Floor level.

Classroom spaces utilize 2'x4' recessed lensed fixtures, as do the majority of the corridors. Most date to the 1982 renovation and are in fair to good condition. The Third Floor corridor is an exception, as well as the Kitchen and Cafeteria, with fixtures in poor condition. Parabolic louvered 2'x4' fixtures have been installed in the Adminstration areas and the Media Center, which are in good condition. The Science Rooms on the second floor also utilize parabolic louver fixtures.

The gymnasium has lensed high bay metal halide lighting fixtures that appear in good condition. However, the remaining lighting systems in that portion of the building are in fair to poor condition, consisting of 1'x4' wraparound fixtures in the corridors and Choral Room, with 2'x4' recessed troffers in the Band Room and the original recessed 12" square incandescent fixtures scattered throughout. The Boiler Room serving the Gym utilizes LPS lamps supplemented with fluorescent strip fixtures. Stairways typically have wraparound fluorescent fixtures with discolored lenses.

The Auditorium has the original house and stage lighting systems . Incandescent downlights illuminate both the seating area and the stage for work light. The original theatrical lighting dimming equipment is still in place, with one cabinet backstage, and the other directly below in the Basement.

Lighting controls in the building are manual only, via local toggle switches. Classroom fixtures have the row nearest the windows on a separate switch. Corridor lighting switches are keyed.

Fire Alarm System

The fire alarm system appears to consist of a mix of system components of varying age. Xenon strobe visual notification devices are located in the building, as are older vintage flashing lights that were typical prior to the adoption of the Americans with Disabilities Act. The layout of visual notification devices throughout the building does not comply with current codes.

The fire alarm control panel, located in the Main Mechanical/Electrical Room, is manufactured by EST. Adjacent to this panel is an older zoned system control panel. A new Bosch Fire Control Panel and Ademco Alarm Processing Center report alarm signals to a UL Listed Central Station. A remote alphanumeric type annunciator is located in the Main Lobby.

Voice/ Data/ Video System

The county-wide wireless fibernet provides internet service to the school. This system is shared by the County and Allegany County Public Schools. The telephone, CATV, and fibernet MPOP is located adjacent to the electric service. The main distribution frame (MDF) is located off the Media Center. From the MDF, six strands of multimode fiber optic cabling serve two intermediate distribution frames (IDFs) each. One IDF is located at the rear of the stage in the Auditorium. These are located strategically in the building to maintain Cat 5e horizontal distance requirements. An older telephone terminal board for voice is located in the electric closet opposite the MDF.

Voice and data outlets, as well as ceiling mounted wireless access points (WAPs), are wired back to patch panels in the MDF and IDFs. The voice system is voice over internet protocol (VoIP). Analog voice outlets are terminated on 110 terminal blocks.

Data drops have been installed throughout the building in accordance with the state telecommunications standards for schools. Classrooms are typically equipped with ceiling mounted overhead projectors. CATV outlets (F-connector) are located in each classroom. The CATV distribution system amplifiers and taps are located in the MDF, with trunks to individual F-connectors through the school.

An alert messaging system, tied into the county emergency management system, is located in the administration area.

Public Address And Program Clock System

A Bogen Quantum MulticomIP public address cabinet is located in the administration area. Ceiling mounted speakers are located throughout corridors. Wall mounted speakers with integral microphone, and program clocks are located in each classroom. Call switches are furnished in classrooms as well as phones for communications. Administrative phones have been incorporated that provide paging capability over the system from these locations. A phone is located adjacent to the Bogen cabinet for use with classroom phones.
Local sound systems are provided in the Auditorium and Gymnasium.

The Simplex 2350 Master Clock system control panel is also located in the administration area. Class change signals are sounded over the public address system. Program clocks are typically located in instructional spaces.

Security System

Video surveillance cameras are located in corridors throughout the building. The cameras have individual IP addresses and are wired via CAT 5e cabling to the network. Otherwise, there is no intrusion detection or access control system in the building.

B. Recommendations

Electrical Distribution System

The original electrical distribution equipment is recommended to be replaced, as it has reached or exceeded its anticipated useful life and replacement parts become are difficult and/or costly to obtain. A service upgrade will be required to accommodate the proposed HVAC recommendations to provide a central cooling plant. A 480/277V, 3 phase, 4 wire system is recommended with dry type transformers to obtain 208/120V service for receptacle and miscellaneous loads. Panels serving computer loads will be provided with K-factor rated transformers.

Emergency Distribution System

An emergency generator is recommended to provide standby power for life safety and optional loads, compliant with current codes. It is anticipated that the generator to be installed will not be adequately sized to accommodate the loads desired to have standby power. The fire alarm system and emergency lighting will be connected to the generator. Select fixtures throughout the building means of egress, as well as exit signs, are recommended to be connected to the emergency source in order to comply with NFPA 101.

Kitchen refrigeration equipment, heating plant equipment, MDF and IDF cooling systems are recommended to be connected to the generator, as well as any elevators or lift devices. Additionally, communications systems (voice, public address) are also recommended to be on the backup source. A minimum of two automatic transfer switches will be required to separate life safety and optional standby loads. Panelboards and dry-type transformers would be provided to accommodate the load requirements.

Lighting
The fixtures original to the building are recommended to be replaced, especially inefficient fixtures and those in fair to poor condition. The building lighting system as a whole is not to exceed the lighting power density prescribed by ASHRAE Standard 90.1. New stage lighting and electronic dimming controls are recommended to replace obsolete systems. Fluorescent house lighting would replace incandescent lighting for backstage house lighting. Exterior emergency egress lighting via photocell controlled compact fluorescent cut-off fixtures is also recommended.

Recommendation for energy savings include automatic shut-off of building lighting systems per the International Energy Conservation Code (IECC). This can be accomplished effectively by installing local occupancy sensors. Alternatively, lighting branch circuits can be routed through a contactor and controlled via the building management system. However, local timed overrides are required for this type of control. Daylight harvesting via photocell control of fixtures in proximity to windows is also recommended for increased energy savings.

Public Address And Program Bell/Clock System
The original systems are recommended to be replaced, as they are over forty years old and replacement parts may be difficult and/or costly to obtain. An integrated telecommunications system is recommended with phone access to the public address system. A GPS wireless clock systems is recommended, with integration with the public address system for class change signaling.

Security System
An access control system with proximity card readers, consistent with the current Allegany County Public School system standard, is recommended to be installed in the building.

11 – EDUCATION SPECIFICATION ANALYSIS

The existing Allegany High School was evaluated for its conformance to the educational specifications. The building deviates from the ed spec in several places with its most significant problem being the building configuration. The program is spread out into many sections, which have multiple levels that are not congruent with each other. The building cannot be reconfigured to meet the goals of the ed spec. The building is 6,914 square feet of program over that required by the ed specs but due to the configuration and allocation of this program space, many key program functions are still missing or improperly sized. The most notable difference is in the number of classrooms. The school is missing a computer lab, business classrooms, the family and consumer sciences program and a physics lab. Also notable are the absence of many of the support spaces required for all the programs throughout the school. One notable exception is the athletic program. The total athletic program is 7,000 square feet over the ed spec requirements but even given its size, the configuration makes it difficult to meet the goals of the ed specs.

The physical layout of the building with many level changes does not provide a clear circulation system and many corridors are too narrow. The corridor configuration and the many level changes make supervision difficult. The building layout also makes it difficult to cluster classrooms of various disciplines together. The current configuration of the building and site limitations make it difficult to expand the school any further.

ALLEGANY HIGH SCHOOL EDUCATION SPECIFICATION COMPARISSON

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Basic Instructional Areas	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
English										
Classrooms	6	750	4,500		8		6,027		-2	-1,527
Shared Storage	1	300	300		0	0	0		1	300
Journalism	1	300	300		0	0	0		1	300
Yearbook / Newspaper	1	300	300						1	300
Sub Total:				**5,400**				**6,027**		**-627**
Foreign Language										
Classrooms	3	750	2,250		3		2,522		0	-272
Storage	1	150	150			0	0		1	150
Sub Total:				**2,400**				**2,522**		**-122**
Social Studies										
Classrooms	7	750	5,250		7		5,439		0	-189
Student Project Rooms	1	240	240			0	0		1	240
Shared Storage	1	300	300				0		1	300
Sub Total:				**5,790**				**5,439**		**351**
Mathematics										
Classrooms	5	750	3,750		8		6,081		-3	-2,331
Storage	1	300	300		1	244	244		0	56
Sub Total:				**4,050**				**6,325**		**-2,275**

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Basic Instructional Areas (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Science										
Chemistry Lab	1	1,300	1,300		2		2,121		-1	-821
Storage/Prep	1	100	100						1	100
Biology Lab	2	1,200	2,400		3		3,866		-1	-1,466
Storage/Prep	1	250	250		1	310	310		0	-60
Earth Science Lab	2	1,200	2,400		2		2,040		0	360
Storage/Prep	1	250	250		1	386	386		0	-136
Environmental Science Lab	1	1,200	1,200		1	1,259	1,259		0	-59
Storage/Prep	1	250	250		1	272	272		0	-22
Physics Lab	1	1,300	1,300				0		1	1,300
Student Project Room	3	80	240				0		3	240
Greenhouse	1	300	300			0	0		1	300
Planetarium	0	0	0		1	214	214		-1	
Sub Total:				**9,990**				**10,468**		**-478**
Special Education										
Classroom (SLE)	2	800	1,600		2		1,262		0	338
Small Group Instruction/Planning	1	300	300		1	282	282		0	18
Facilitator's Office	1	120	120				0		1	120
Conference / IEP Team Room	1	200	200				0		1	200
Sub Total:				**2,220**				**1,544**		
Total Basic Instructional Areas				**29,850**				**32,325**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Specialized Instructional Areas	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Family Life / Consumer Sciences										
Food Nutrition Lab / Classroom	1	1,200	1,200						1	1,200
Multi-purpose Lab / Classroom	1	1,200	1,200						1	1,200
Storage	2	150	300						2	300
Sub Total:				**2,700**				**0**		
Tech. Ed.										
Manufacturing / Technology	1	2,500	2,500		1	1,887	1,887		0	613
Machine Lab/Testing	1	2,500	2,500		1	1,022	1,022		0	1,478
Communication Lab	1	2,000	2,000		1	1,157	1,157		0	843
CAD Classroom	1	800	800		0		0		1	800
Storage	3	300	900		4		3,425		-1	-2,525
Metal Shop					1	1,324	1,324			
Small Engine Repair	0	0	0		1	716	716		-1	-716
Sub Total:				**8,700**				**9,531**		
Art Education										
2D Studio/Comp. Graphics	1	1,400	1,400		1	1,345	1,345		0	55
3D Studio/Ceramics	1	1,400	1,400		1	1,265	1,265		0	135
Kiln / Ceramic Storage	1	150	150		1	467	467		0	-317
Storage	1	200	200		1	210	210		0	-10
Darkroom	0	0	0		2	200	400		-2	-400
Sub Total:				**3,150**				**3,687**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Specialized Instructional Areas (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Music Education										
Instrumental Music Room	1	2,000	2,000		1	1,851	1,851		0	149
Instrumental Music Office	1	120	120		1	212	212		0	-92
Practice Rooms	1	60	60		3		337		-2	-277
Music Library	1	200	200				0		1	200
Instrument Storage	1	300	300		1	314	314		0	-14
Percussion Storage	1	300	300		1	225	225		0	75
Band Uniform Storage	1	300	300		1	217	217		0	83
Color Guard Storage	1	100	100				0		1	100
Electronic Equipment Storage	1	100	100				0		1	100
Vocal Music Room	1	1,000	1,000		1	1,097	1,097		0	-97
Vocal Music Office	1	120	120		1	97	97		0	23
Classroom / Piano/Keyboard Rm.	1	650	650		0	0	0		1	650
Sub Total:				**5,250**				**4,350**		
Computer Science										
Classroom	1	1,200	1,200		0	0	0		1	1,200
Shared Storage	1	150	150		0	0	0		1	150
Sub Total:				**1,350**				**0**		
Business Education										
Classrooms	2	1,200	2,400		4		3,362		-2	-962
Shared Storage	1	100	100		0	0	0		1	100
Sub Total:				**2,500**				**3,362**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Specialized Instructional Areas (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Physical Education										
Gymnasium	1	10,000	10,000		1	15,168	15,168		0	-5,168
Auxiliary Gym	1	5,000	5,000		1	2,065	2,065		0	2,935
Cardio/Fitness Room	1	1,300	1,300		1	1,717	1,717		0	-417
Wrestling Room	1	2,500	2,500		0		0		1	2,500
Health/Phys. Ed. Classroom	1	750	750		1		946		0	-196
Locker Rooms	3	750	2,250		3		6,521		0	-4,271
Locker Room	1	1,000	1,000				0		1	1,000
Staff Offices	2	100	200		2		551		0	-351
Training Room / Laundry	1	200	200		2		596		-1	-396
Athletic Director / Referee's Room	1	150	150		1	155	155		0	-5
Coaches Office	1	100	100		1		694		0	-594
PE Storage	1	200	200		8		2,247		-7	-2,047
Team Storage	1	200	200				0		1	200
Exterior Storage	1	200	200				0		1	200
Uniform Storage	1	200	200		1	536	536		0	-336
Concessions	1	150	150		1	143	143		0	7
Sub Total:				**24,400**				**31,339**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Specialized Instructional Areas (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Auditorium										
Seating Area	1	5,000	5,000		1	4,764	4,764		0	236
Stage	1	2,275	2,275		1	2,087	2,087		0	188
Control Booth	1	200	200				0		1	200
Scenic / Prop. Construction Area	1	700	700				0		1	700
Dressing	2	300	600		2		900		0	-300
Ticket	0	0	0		1	57	57		-1	-57
Sub Total:				**8,775**				**7,808**		
Media Center										
Main Use Area / Circulation	1	3,400	3,400		1	3,892	3,892		0	-492
Computer Multi-media Lab	1	700	700				0		1	700
Workroom	1	200	200		2		775		-1	-575
Office	1	100	100				0		1	100
Data Room	1	150	150				0		1	150
TV Studio and Control	1	500	500				0		1	500
Storage	1	200	200		2		398		-1	-198
Small Group Rooms	2	100	200		3		632		-1	-432
Sub Total:				**5,450**				**5,697**		
Total Specialized Instructional Areas				**62,275**				**65,774**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Educational Support Services	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Administrative Offices										
General Office / Reception	1	500	500		2		884		-1	-384
Principals Office	1	150	150		1	206	206		0	-56
Assistant Principals Office	2	130	260		2		304		0	-44
Financial Secretary	1	120	120		1	178	178			
Resource Officer	1	120	120				0		1	120
School Officer	1	120	120				0		1	120
YES Program Room	1	200	200				0		1	200
ISS/Academic Village Rm.	1	400	400		1	346	346		0	54
Photocopy/Workroom	1	150	150		1	187	187		0	-37
Conference Room	1	200	200		1	240	240		0	-40
Storage	1	100	100				0		1	100
Staff Toilet	1	50	50		4		189		-3	-139
Vault	0	0	0		1	57	57		-1	-57
School Store	0	0	0		1	230	230		-1	-230
Sub Total:				**2,370**				**2,821**		
Guidance Suite										
Reception	1	150	150		1	121	121		0	29
Counselor's Office	2	130	260		3		393		-1	-133
PPW Office	1	120	120				0		1	120
Machine / Work Rm.	1	100	100		1	253	253		0	-153
Records	0	0	0		1	221	221		-1	-221
Sub Total:				**630**				**988**		

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Educational Support Services (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Health										
Waiting Area	1	150	150		1		978		0	-828
Nurse's Office and Private Consultation	1	125	125				0		1	125
Rest Areas	2	100	200						2	200
Treatment / Medication Area	1	125	125				0		1	125
Exam	1	125	125				0		1	125
Restrooms	2	50	100				0		2	100
Storage	1	50	50		0	0	0		1	50
Sub Total:				**875**				**978**		
Faculty Support										
Faculty Dining	1	400	400		1	415	415		0	-15
Team Planning Areas	3	300	900		6		2,064		-3	-1,164
Sub Total:				**1,300**				**2,479**		
Cafeteria and Food Services										
Cafeteria	1	3,890	3,890		1	3,854	3,854		0	36
Food Preparation	1	1,050	1,050		1	1,173	1,173		0	-123
Serving	1	1,000	1,000		1	670	670		0	330
Dishwash	1	400	400		1	162	162		0	238
Receiving	1	120	120				0		1	120
Storage	1	200	200		1	61	61		0	139
Dry Food Storage	1	400	400				0		1	400
Refrigerator Storage	1	160	160		1	92	92		0	68
Frozen Storage	1	160	160		1	78	78		0	82

PROGRAM ANALYSIS	ED SPEC REQUIREMENTS				AREA PROVIDED EXISTING SCHOOL				ADDITIONAL AREA REQUIRED	
Educational Support Services (cont.)	**No. of Spaces**	**Square Foot per Space**	**Area Subtotal**		**Spaces Provided**	**Area Provided**	**Area Subtotal**		**Spaces**	**Area**
Cafeteria and Food Services (cont.)										
Non Food Storage	1	80	80				0		1	80
Personnel Area	1	140	140		1	88	88		0	52
Office	1	100	100		1	45	45		0	55
Can Wash	0	0	0		1	49	49		-1	-49
Sub Total:				**7,700**				**6,272**		
Custodial and Operations Services										
Custodial Office	1	150	150		1	183	183		0	-33
Lavatory, Lockers, Showers	1	200	200		1	64	64		0	136
Indoor Storage Area	1	500	500		3		397		-2	103
Utility Closets / Storage	6	75	450		8		428		-2	22
Outdoor Storage	1	600	600		0	0	0		1	600
Workshop	1	150	150		0	0	0		1	150
Receiving Area	1	300	300		0	0	0		1	300
Sub Total:				**2,350**				**1,072**		

AREA SUMMARY	ED SPEC	EXISTING BUILDING	DIFFERENCE
NET PROGRAM AREA	**107,350**	**112,709**	**-6,914**
Circulation, Toilets, Mechanical, Wall Thickness @ 35%	37,573		
GROSS AREA	**144,923**		
		#DIV/0!	
GROSS AREA 70% efficiency	**153,357**		

SECTION 5 – CONCEPT PLANS – WASHINGTON MIDDLE SCHOOL

1 – INTRODUCTION

The goals for this study are to examine options to maintain a safe and healthy school, which enrich the educational experience for all students, to design spaces that will allow programs and services to be delivered in the most cost efficient and effective manner, while maximizing the utilization of the school facilities during regular school days, after hours and community use, and to present options for renovation, replacement, adaptive reuse or combination of the school facilities.

Washington Middle School does not currently meet the Education Specification requirements for a middle school in Allegany County Public School. The building requires the replacement of all mechanical, electrical, HVAC and plumbing systems, the addition of program area, upgrades for life safety and ADA, and the selective replacement of the architectural elements of the building. In this section we considered several strategies to accomplish these tasks, in part or in whole.

2 – SCHEME W-1: RENOVATION

This scheme includes the renovation of the existing school without the addition of any new construction or significant site work. This analysis will focus entirely on the renovation of the major systems of the building currently not functioning up to school system standards, but does not include any architectural upgrades except those required to accomplish the systems renovation. All life safety systems are included in the renovation. This includes:

- Replacement of all HVAC equipment and associated upgrades to distribution systems to comply with current codes for fresh air requirements. This will include the recommended installation of a 4-pipe system and the addition of penthouses to house new equipment.
- Complete replacement of the water distribution systems with provision for required safety features and the inclusion of water conservation features.
- Installation of a full building fire protection system.
- Replacement of the electrical distribution system and all its components. This will include the addition of an emergency generator and associated electrical work.
- Replacement of all original light fixtures.
- Installation of a full building sprinkler system and other required changes to getting the building up to life safety standards.
- Architectural upgrades needed to accomplish the system upgrades described above to include replacement of most ceilings to provide for new lighting and adequate duct clearance, the addition of penthouse spaces as required to install the new mechanical equipment and changes to casework and equipment layouts need to accommodate new equipment

This renovation will not include changes to existing spaces or their configuration and will not meet the Education Specification requirements.

SCHEME W1	ADVANTAGES	DISADVANTAGES
BUILDING	• Needed upgrades will be accomplished to meet current standards for fresh air requirements. • Least expensive option for improving the quality of the education environment.	• Will not meet the education specification requirements. • Will require significant disruption to the school during the renovation. • Will not comply with ADA requirements. • Significant deficiency will still remain in the building as has been detailed in the building assessments. • The building does not match the education philosophy of the ed specs.
PHASED CONSTRUCTION	• The construction could be phased over 18 months with the majority of the most disruptive work being accomplished in the summer.	

CONSTRUCTION COST

Scheme W1 - Limited Renovation **Category**	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Demolition Area	0	$5	$0
Renovated Area	98,500	$145	$14,282,500
New Area (Mechanical Penthouse)	1,000	$180	$180,000
Total Gross Area	98,500		
Building Costs			**$14,462,500**
Site Development			$250,000
Phasing	98,500	$5	$492,500
Portable Classrooms	10		$500,000
Total Construction Costs			**$15,885,000**
Contingency	2.50%		$397,125
Furniture & Equipment	12%		$1,906,200
Project Costs	2%		$317,700
A/E Services	8%		$1,270,800
Total Project Costs			**$19,776,825**
State Participation	93%		$14,773,050
Energy Eff Building Credit	2.00%		$317,700
Total Local Funding			**$5,003,775**

State Supported Funding	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Projected Enrollment (2019)	610		
State Allocated Square Footage	87,615	$207.00	$18,136,305
Site Development (5%)	87,615	$10.35	$906,815
State Allocated Cost			**$19,043,120**
Actual Construction Cost			**$15,885,000**
State Participation	**93%**		**$14,773,050**

3 – SCHEME W-2a AND W-2b: MODERNIZATION AND ADDITIONS

This scheme includes a complete renovation of the existing school and all its components as recommended in the Existing Conditions Assessment portion of this report. This scheme also includes upgrades to the site to improve circulation and the addition of new construction to meet the Educational Specification requirements. This includes:

- Replacement of all systems and equipment listed in Scheme W-1.
- Replacement of the public address and electronic clock system.
- Provision of an access control system.
- Demolition and replacement of the dining room, adjacent service and mechanical areas to increase the size the facilities to meet ed spec requirements.
- Demotion and replacement of the second floor science rooms above the dining room.
- The addition of a fitness room adjacent to the gymnasium.
- Reconfiguration of the music rooms with a small adjacent addition to meet ed spec requirements.
- Internal remodeling of the classrooms previously added in the old courtyard space to create a new media center.
- Remodeling of the old media center and existing administration, guidance and health spaces to create new spaces to meet ed spec requirements.
- Revision of a portion of the old media center to create a computer lab.
- The addition of a new classroom wing that includes new general classroom and new science labs.
- The addition of a new bus loop accessed from Avondale Ave. to separate car traffic and bus traffic.
- The addition of a new parking lot to the east of the school to serve as staff parking.
- Upgrades to the site to provide ADA accessibility include new sidewalks ramps and stairs.
- Upgrades to the front of the building will be provided to modernize the canopy and drop off lane.

- Architectural finishes throughout the school will be upgraded with new ceilings, painting and repair.
- Scheme will provide new doors with accessible hard and insulated thermally broken windows.

The renovation will not include moving walls in areas other than described above so a majority of the rooms will remain in their current size and configuration.

SCHEME W-2a and 2b	ADVANTAGES	DISADVANTAGES
BUILDING	• Program will be updated to provide all the spaces required in the ed specs. • Scheme includes accessibility upgrades. • New bus loop will provide for the separation of car and bus traffic. • Current athletic site facilities will be only slightly impacted by construction.	• Will require significant disruption to the school during the renovation. • The rooms not included in the areas of reconfiguration will remain the same size so many will be less then what is required by the ed specs. • The school as it exists is difficult to organize in a way that matches the teaming goals of the ed specs.
PHASED CONSTRUCTION	• The construction could be phased over 24 months with some of the most disruptive work being accomplished in the summer. • Temporary classrooms will be required throughout the process.	

SCHEME W-2b: RECONFIGURATION OF AUDITORIUM

This scheme difference from Scheme 2a in that the two spaces at the back of the auditorium on either side of the control booth are reconfigured to provide two classroom spaces. This limits the amount of renovation costs for the auditorium and decreases the new construction costs.

CONSTRUCTION COST

Scheme W2a - MODERNIZATION/ADDITION

Category	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Demolition Area	17,156	$5	$85,780
Renovated Area	81,344	$207	$16,838,208
New Area	25,286	$220	$5,562,920
Total Gross Area	106,630		
Building Costs			**$22,486,908**
Site Development			$1,748,133
Phasing	106,630	$5	$533,150
Portable Classrooms	10		$500,000
Total Construction Costs			**$25,268,191**
Contingency	2.50%		$631,705
Furniture & Equipment	12%		$3,032,183
Project Costs	2%		$505,364
A/E Services	8%		$2,021,455
Total Project Costs			**$31,458,898**
State Participation	93%		$17,710,102
Energy Eff Building Credit	2.00%		$505,364
Total Local Funding			**$13,243,432**

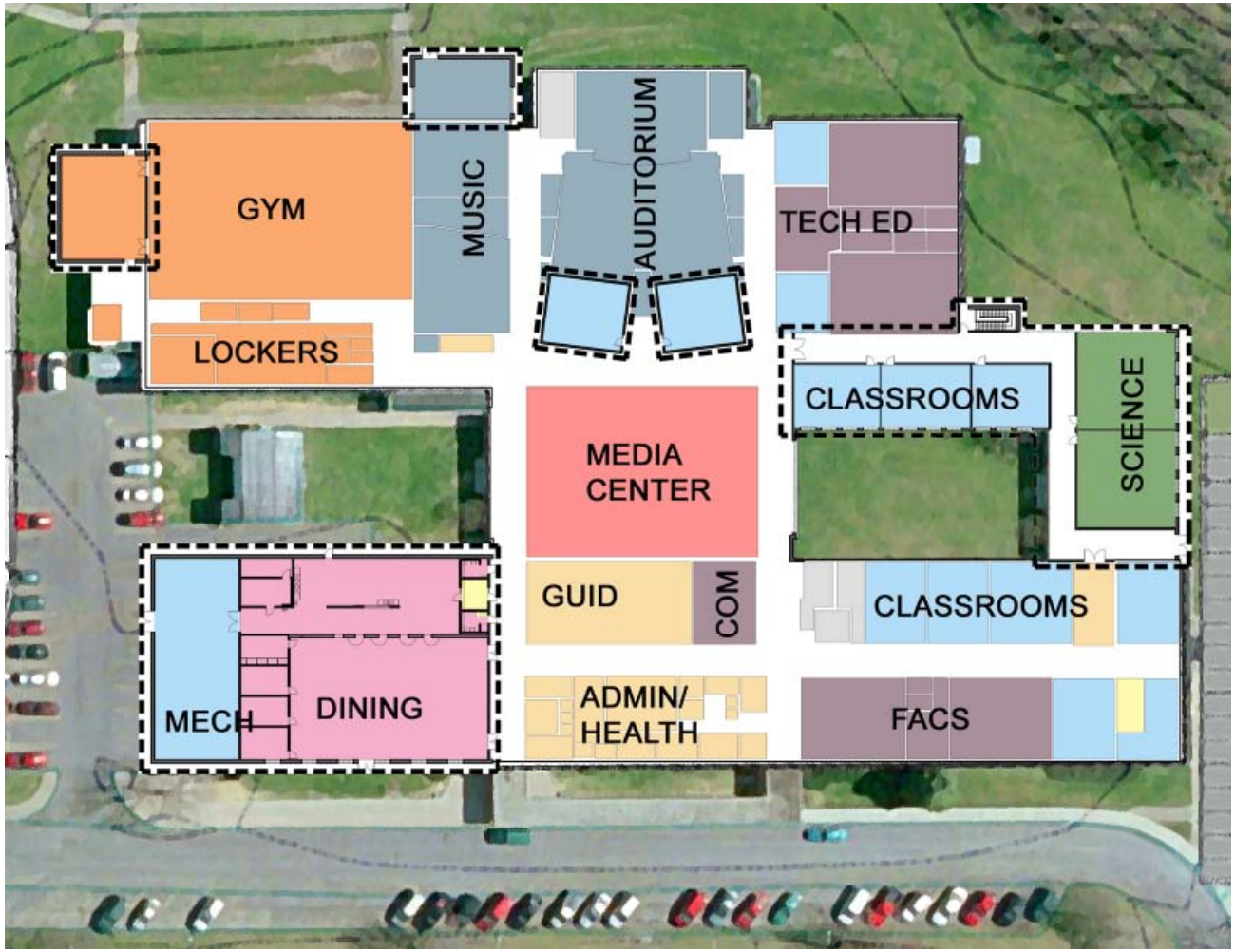
State Supported Funding	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Projected Enrollment (2019)	610		
State Allocated Square Footage	87,615	$207.00	$18,136,305
Site Development (5%)	87,615	$10.35	$906,815
State Allocated Cost			**$19,043,120**
State Participation	**93%**		**$17,710,102**

Scheme W2b - MODERNIZATION/ADDITION (w/ Reconfigured Auditorium)

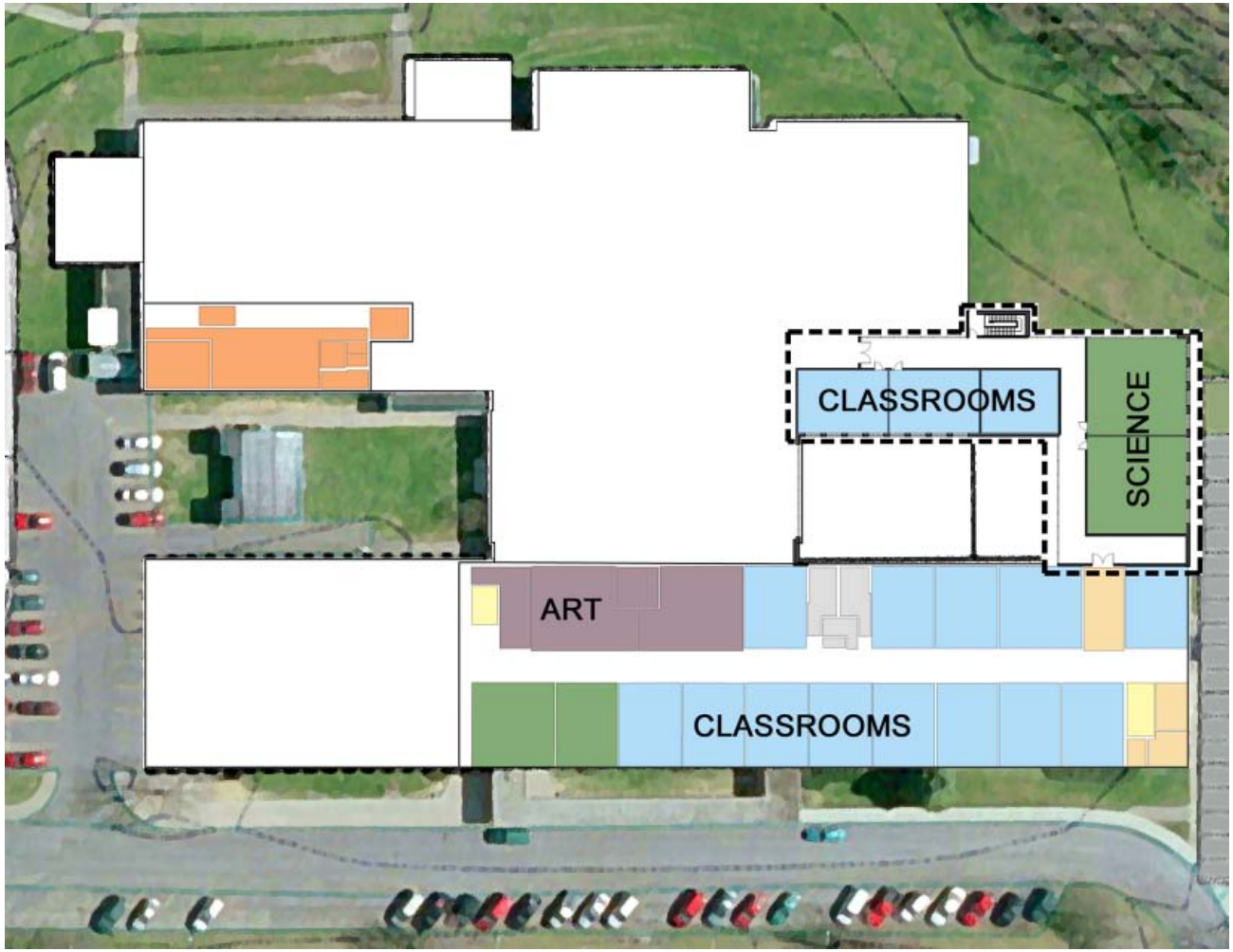
Category	Area (s.f.)/Qty.	Cost ($/s.f.)	Cost
Demolition Area	17,156	$5	$85,780
Renovated Area	81,344	$207	$16,838,208
New Area	22,715	$220	$4,997,300
Total Gross Area	104,059		
Building Costs			**$21,921,288**
Site Development			$1,748,133
Phasing	104,059	$5	$520,295
Portable Classrooms	10		$500,000
Total Construction Costs			**$24,689,716**
Contingency	2.50%		$617,243
Furniture & Equipment	12%		$2,962,766
Project Costs	2%		$493,794
A/E Services	8%		$1,975,177
Total Project Costs			**$30,738,696**
State Participation	93%		$17,710,102
Energy Eff Building Credit	2.00%		$493,794
Total Local Funding			**$12,534,800**

State Supported Funding	Area (s.f.)/Qty.	Cost ($/s.f.)	Cost
Projected Enrollment (2019)	610		
State Allocated Square Footage	87,615	$207.00	$18,136,305
Site Development (5%)	87,615	$10.35	$906,815
State Allocated Cost			**$19,043,120**
State Participation	**93%**		**$17,710,102**

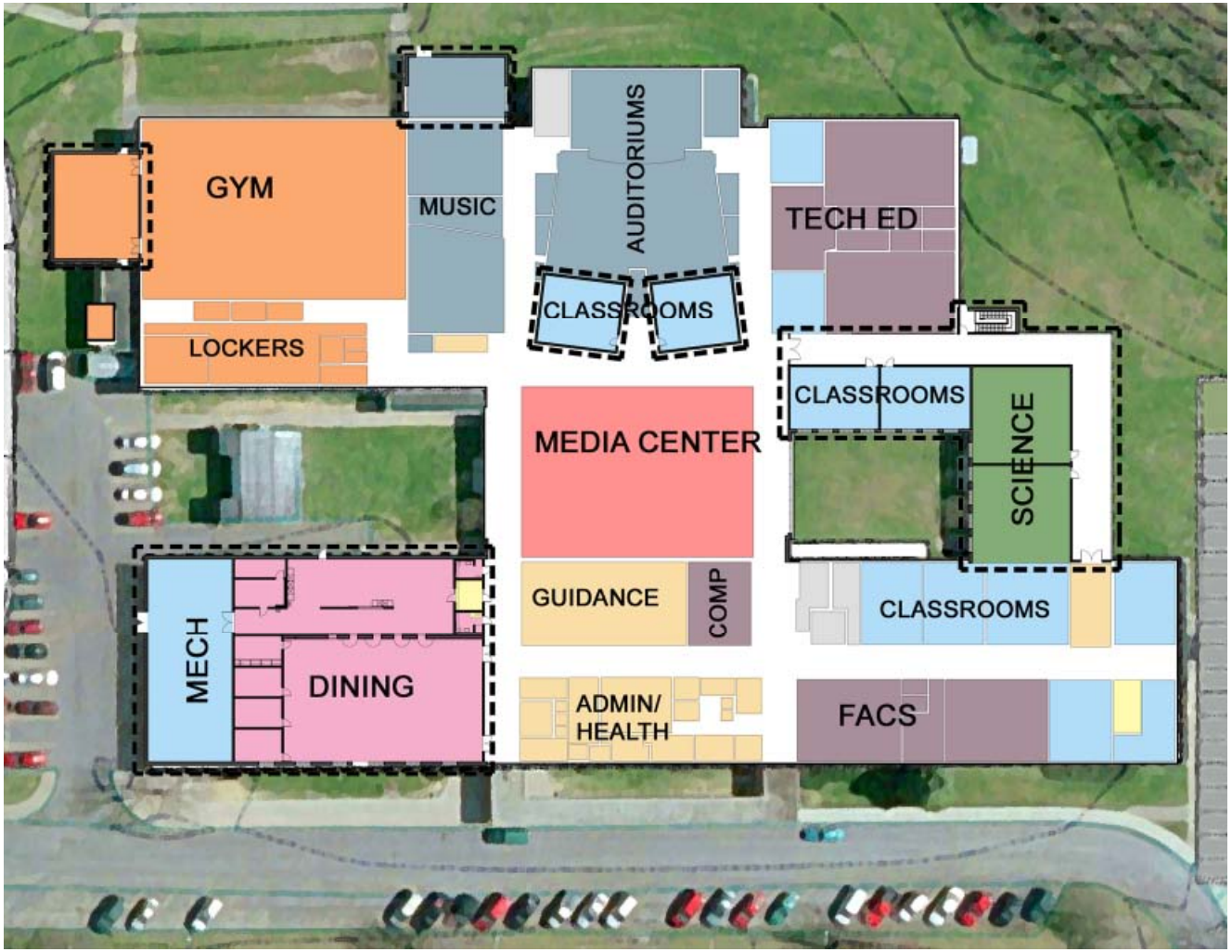
RENOVATION & ADDITION SCHEME W-2a/W-2b – SITE PLAN



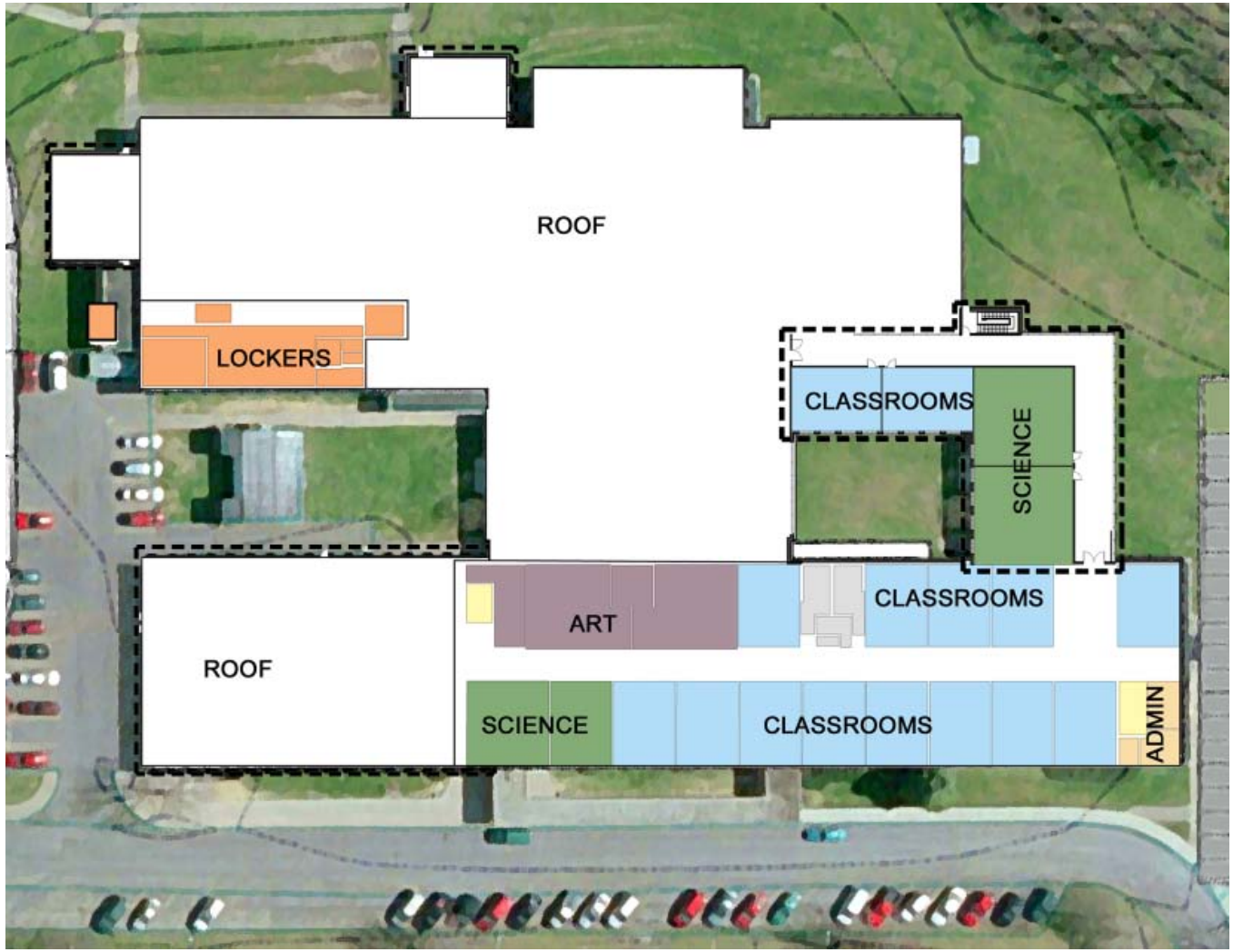
RENOVATION & ADDITION SCHEME W-2a – FIRST FLOOR PLAN



RENOVATION & ADDITION SCHEME W-2a – SECOND FLOOR PLAN



RENOVATION & ADDITION SCHEME W-2b – FIRST FLOOR PLAN



RENOVATION & ADDITION SCHEME W-2b – SECOND FLOOR PLAN

4 – SCHEME W-3: REPLACEMENT SCHOOL

In this scheme a new middle school is constructed in the area of the current baseball field. The new school is built in its entirety while the existing school remains occupied. The school is built to match the Education Specification requirements in every way. Once the new school is built, the students will be moved and the existing school will be demolished. The new school will include new roadways and parking lots to separate car and bus traffic and to serve the new school. These will be built primarily on the existing soccer field. The remaining fields and site amenities will be completed in the final phase after the existing school is leveled.

SCHEME W-3	ADVANTAGES	DISADVANTAGES
BUILDING	• New building will meet all ed spec requirements. • Site will be reconfigured to provide separation of bus and car traffic. • Entire site and all facilities will be upgraded. • There will be no disruption to the students during construction. • There will be no costs for temporary classrooms. • The school can be designed to meet the philosophy of the ed specs.	• Higher cost then other schemes. • The fields will be unavailable for the school for 2 years.
PHASED CONSTRUCTION	• The new school will be built in its entirety, followed by the demolition of the existing school and then the completion of the remaining site work	

CONSTRUCTION COST

Scheme W3 - REPLACEMENT

Category	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Demolition Area	98,500	$5	$492,500
Renovated Area	0	$207	$0
New Area	114,707	$220	$25,235,540
Total Gross Area	114,707		
Building Costs			**$25,728,040**
Site Development			$3,625,774
Total Construction Costs			**$29,353,814**
Contingency	2.50%		$733,845
Furniture & Equipment	12%		$3,522,458
Project Costs	2%		$587,076
A/E Services	8%		$2,348,305
Total Project Costs			**$36,545,498**
State Participation	93%		$18,890,775
Energy Eff Building Credit	2.00%		$587,076
Total Local Funding			**$17,067,647**

State Supported Funding	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Projected Enrollment (2019)	610		
State Allocated Square Footage	87,615	$207.00	$18,136,305
Site Development (5%)	87,615	$24.84	$2,176,357
State Allocated Cost			**$20,312,662**
State Participation	**93%**		**$18,890,775**

FULL REPLACEMENT SCHEME W-3 – SITE PLAN/FIRST FLOOR PLAN

FULL REPLACEMENT SCHEME W-3 – SECOND FLOOR PLAN

SECTION 6 – CONCEPT PLANS - BRADDOCK MIDDLE SCHOOL

1 – INTRODUCTION

The goals for this study are to examine options to maintain a safe and healthy school, which enrich the educational experience for all students. Design spaces that will allow programs and services to be delivered in the most cost efficient and effective manner, while maximizing the utilization of the school facilities during regular school days, after hours and community use. Present options for renovation, replacement, adaptive reuse or combination of the school facilities.

As was described in the previous assessment narratives, Braddock Middle School does not currently meet the Education Specification requirements for a middle school in Allegany County Public School. Several issues exist with the school including needed replacement of all the schools systems, additional program area, life safety and ADA upgrades and selective replacement of some of the buildings architectural elements. We considered several strategies to accomplish these tasks, in part or in whole.

2 – SCHEME B-1: RENOVATION

This scheme includes the renovation of the existing school without the addition of any new construction or site work. This analysis will focus entirely on the renovation to the major systems of the building currently not functioning up to standards for the school system but does not include any architectural upgrades except those required to accomplish the systems renovation. The renovation does included life safety systems required to bring the building up to code. This includes:

- Replacement of all HVAC equipment and associated upgrades to distribution system to comply with current codes for fresh air requirements. This will include the recommended installation of a 4-pipe system and the addition of penthouses to house the new equipment.
- Complete replacement of the water distribution systems with provisions for the required safety feature and the inclusion of water conservation features.
- Provision for a fire protection system to adequately cover the entire building.
- Replacement of the electrical distribution system and all its components. This will include the addition of an emergency generator with associated electrical work.
- Replacement of all original light fixtures.
- Installation of a full building sprinkler system and other required changes to getting the building up to life safety standards.

- Architectural upgrades needed to accomplish the system upgrades described above to include replacement of most ceilings to provide for new lighting and adequate duct clearance, the addition of penthouse spaces as required to install the new mechanical equipment and changes to furniture and equipment layouts need to accommodate new equipment.

This renovation will not include changes to existing spaces or their configuration and will not meet the Education Specification requirements.

SCHEME B-1	ADVANTAGES	DISADVANTAGES
BUILDING	• Needed upgrades will be accomplished to meet current standards for fresh air requirements. • Least expensive option for improving the quality of the education environment.	• Will not meet the education specification requirements. • Will require significant disruption to the school during the renovation. • Will not comply with ADA requirements. • Significant deficiency will still remain in the building as has been detailed in the building assessments.
PHASED CONSTRUCTION	• The construction could be phased over 18 months with the majority of the most disruptive work being accomplished in the summer.	

CONSTRUCTION COST

Scheme B1 - Limited Renovation Category	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Demolition Area	0	$5	$0
Renovated Area	99,000	$145	$14,355,000
New Area (Mechanical Penthouse)	1,000	$180	$180,000
Total Gross Area	99,000		
Building Costs			**$14,535,000**
Site Development			$250,000
Phasing	99,000	$5	$495,000
Portable Classrooms	10		$500,000
Total Construction Costs			**$15,960,000**
Contingency	2.50%		$399,000
Furniture & Equipment	12%		$1,915,200
Project Costs	2%		$319,200
A/E Services	8%		$1,276,800
Total Project Costs			**$19,870,200**
State Participation	93%		$14,842,800
Energy Eff Building Credit	2.00%		$397,404
Total Local Funding			**$4,629,996**

State Supported Funding	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Projected Enrollment (2019)	590		
Square Footage per Student	145		
State Allocated Square Footage	85,550	$207.00	$17,708,850
Site Development (5%)	85,550	$10.35	$885,443
State Allocated Cost			**$18,594,293**
Actual Construction Cost			**$15,960,000**
State Participation	**93%**		**$14,842,800**

3 – SCHEME B-2A/B-2B: MODERNIZATION AND ADDITIONS

This scheme includes a complete renovation of the existing school and all its components as has been recommended in the Existing Conditions Assessment portion of this report. This scheme also includes upgrades to the site to improve drainage and paving and the addition of new construction to meet the Educational Specification requirements. This includes:

- Replacement of all systems and equipment listed in Scheme W-1.
- Replacement of the public address and electronic clock system.
- Provision of an access control system.
- Demolition and replacement of the dining room and adjacent service to size the facilities to meet ed spec requirements.
- Demolition and replacement of the second floor science rooms above the dining room.
- The addition of a fitness room adjacent to the gymnasium.
- Reconfiguration of the music rooms with a small adjacent addition to size them to meet ed spec requirements.
- Addition of a new media center in the courtyard area.
- Remodeling of the old media center and existing administration, guidance and health spaces to create new spaces to meet the ed spec requirements.
- Revision of a portion of the old media center to create a computer lab.
- The addition of a new classroom wing that includes new general classroom and new science labs.
- Upgrades to the site to provide ADA accessibility include new sidewalks ramps and stairs.
- Upgrades to the front of the building will be provided to modernize the canopy and drop off lane.
- Upgrading architectural finishes throughout the school will be upgraded with new ceilings, painting and repair.
- Providing new doors with accessible hard and insulated thermally broken windows.

The renovation will not include moving walls in areas other than described above so a majority of the rooms will remain in their current size and configuration.

SCHEME B-2a and 2b	ADVANTAGES	DISADVANTAGES
BUILDING	• Program will be updated to provide all the spaces required in the ed specs. • Scheme includes accessibility upgrades. • New bus loop will provide for the separation of car and bus traffic. • Current athletic site facilities will be only slightly impacted by construction.	• Will require significant disruption to the school during the renovation. • The rooms not included in the areas of reconfiguration will remain the same size so many will be less then what is required by the ed specs. • The school as it exists is difficult to organize in a way that matches the teaming goals of the ed specs. • Temporary classrooms will be required.
PHASED CONSTRUCTION	• The construction could be phased over 24 months with some of the most disruptive work being accomplished in the summer. • Temporary classrooms will be required throughout the process.	

SCHEME B-2B: CLASSROOMS OVER MEDIA CENTER

This scheme difference from Scheme 2a in that a portion of the addition in the courtyard is two stories. The second story will be on the level of the auditorium and will contain three general classrooms. This will reduce the size of the classroom addition.

CONSTRUCTION COST

Scheme B2a - MODERNIZATION/ADDITION

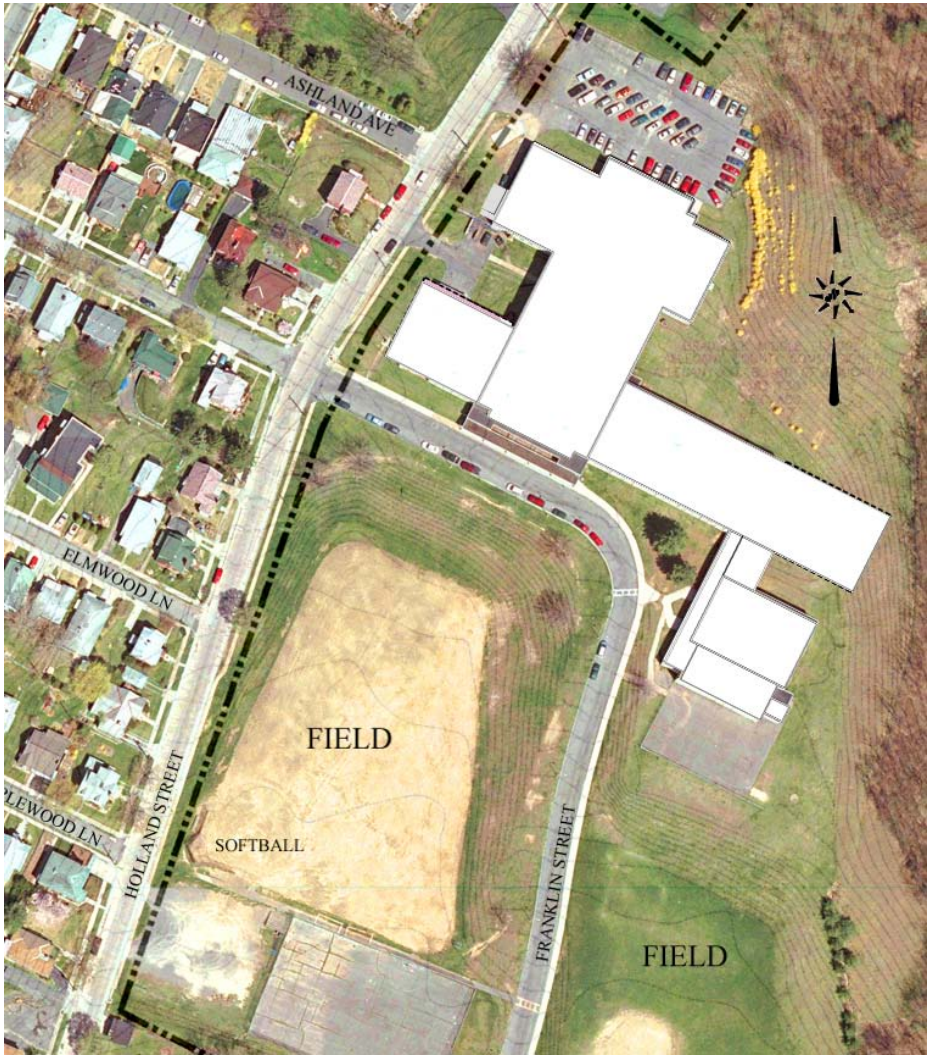
Category	Area (s.f.)/Qty.	Cost ($/s.f.)	Cost
Demolition Area	6,302	$5	$31,510
Renovated Area	92,698	$207	$19,188,486
New Area	30,230	$220	$6,650,600
Total Gross Area	122,928		
Building Costs			**$25,870,596**
Site Development			$1,652,500
Phasing	122,928	$5	$614,640
Portable Classrooms	10		$500,000
Total Construction Costs			**$28,637,736**
Contingency	2.50%		$715,943
Furniture & Equipment	12%		$3,436,528
Project Costs	2%		$572,755
A/E Services	8%		$2,291,019
Total Project Costs			**$35,653,981**
State Participation	93%		$17,292,692
Energy Eff Building Credit	2.00%		$572,755
Total Local Funding			**$17,788,535**

State Supported Funding	Area (s.f.)/Qty.	Cost ($/s.f.)	Cost
Projected Enrollment (2019)	590		
Square Footage per Student	145		
State Allocated Square Footage	85,550	$207.00	$17,708,850
Site Development (5%)	85,550	$10.35	$885,443
State Allocated Cost			**$18,594,293**
State Participation	**93%**		**$17,292,692**

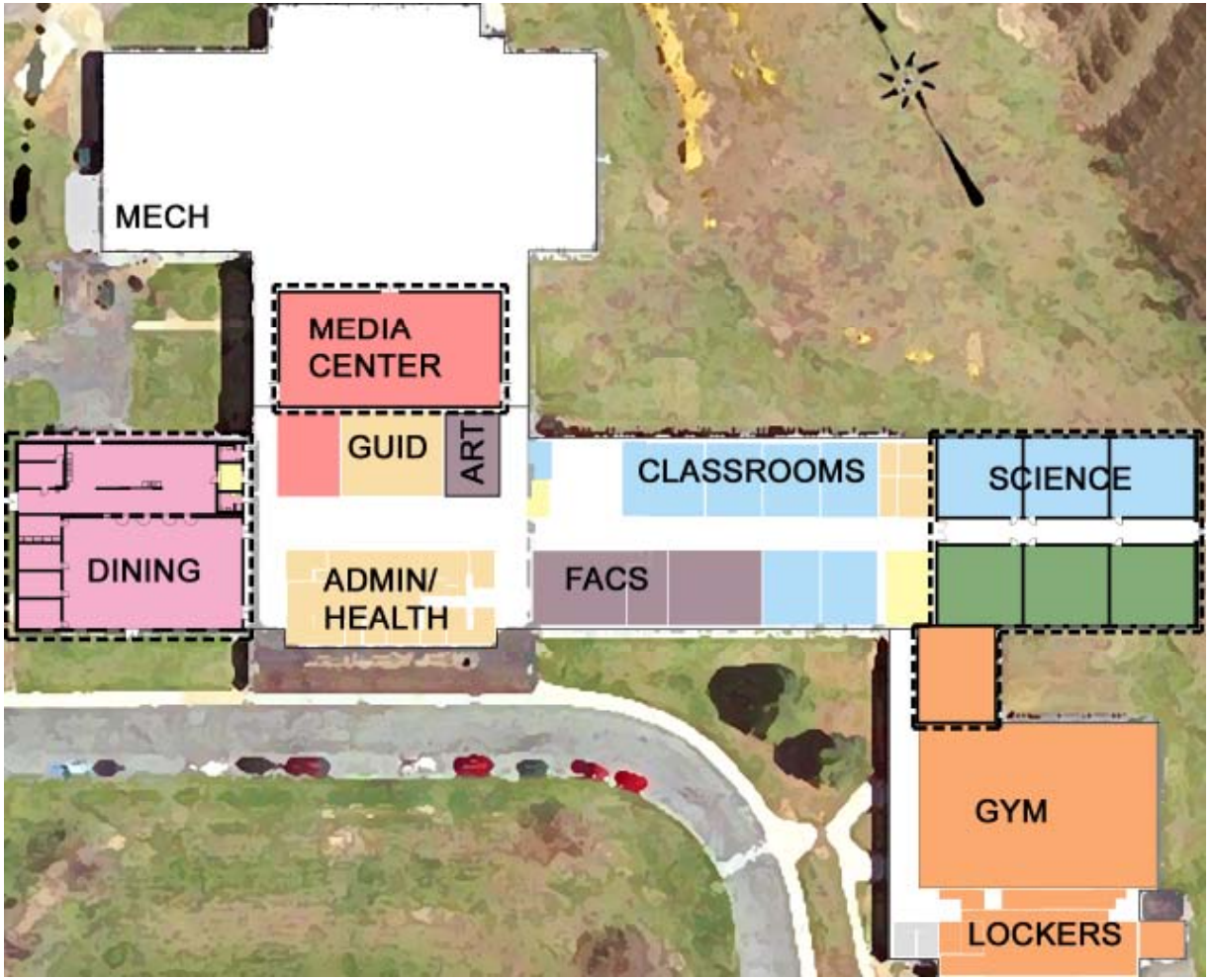
Scheme B2b - MODERNIZATION/ADDITION

Category	Area (s.f.)/Qty.	Cost ($/s.f.)	Cost
Demolition Area	10,302	$5	$51,510
Renovated Area	88,198	$207	$18,256,986
New Area	28,342	$220	$6,235,240
Total Gross Area	116,540		
Building Costs			**$24,543,736**
Site Development			$1,652,500
Phasing	116,540	$5	$582,700
Portable Classrooms	10		$500,000
Total Construction Costs			**$27,278,936**
Contingency	2.50%		$681,973
Furniture & Equipment	12%		$3,273,472
Project Costs	2%		$545,579
A/E Services	8%		$2,182,315
Total Project Costs			**$33,962,275**
State Participation	93%		$17,292,692
Energy Eff Building Credit	2.00%		$545,579
Total Local Funding			**$16,124,005**

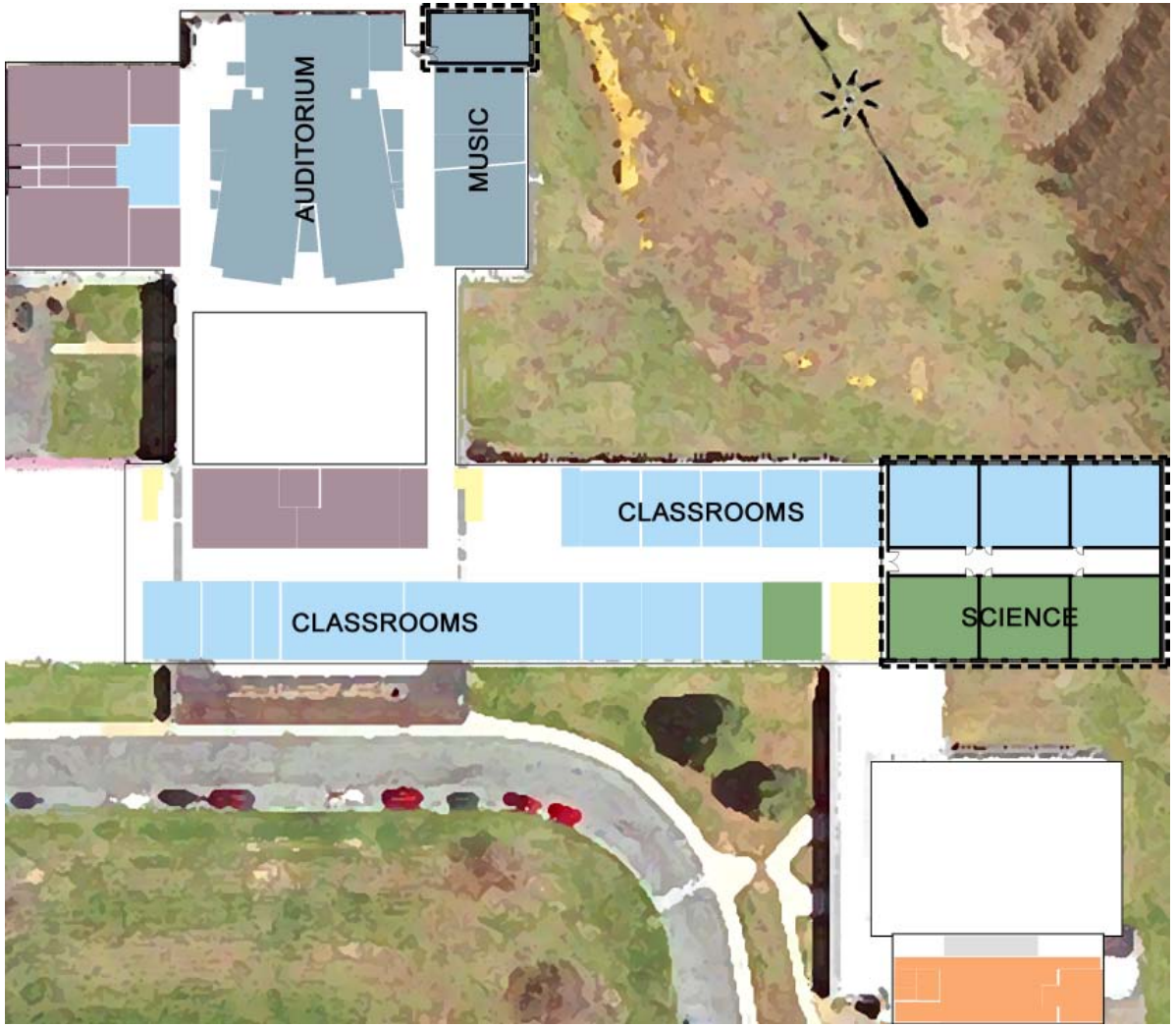
State Supported Funding	Area (s.f.)/Qty.	Cost ($/s.f.)	Cost
Projected Enrollment (2019)	590		
Square Footage per Student	145		
State Allocated Square Footage	85,550	$207.00	$17,708,850
Site Development (5%)	85,550	$10.35	$885,443
State Allocated Cost			**$18,594,293**
State Participation	**93%**		**$17,292,692**



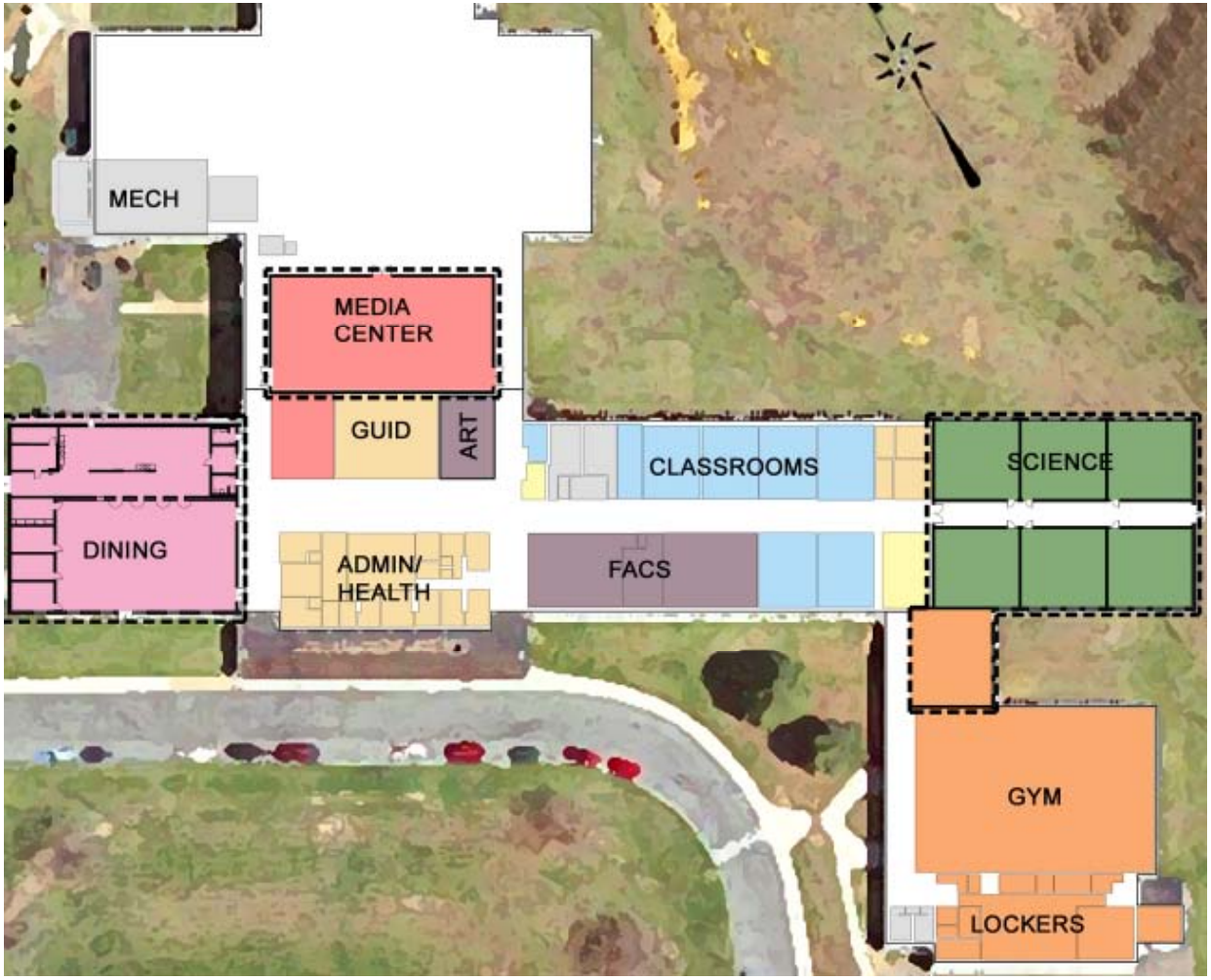
RENOVATION & ADDITION SCHEME B-2a/B-2b – SITE PLAN



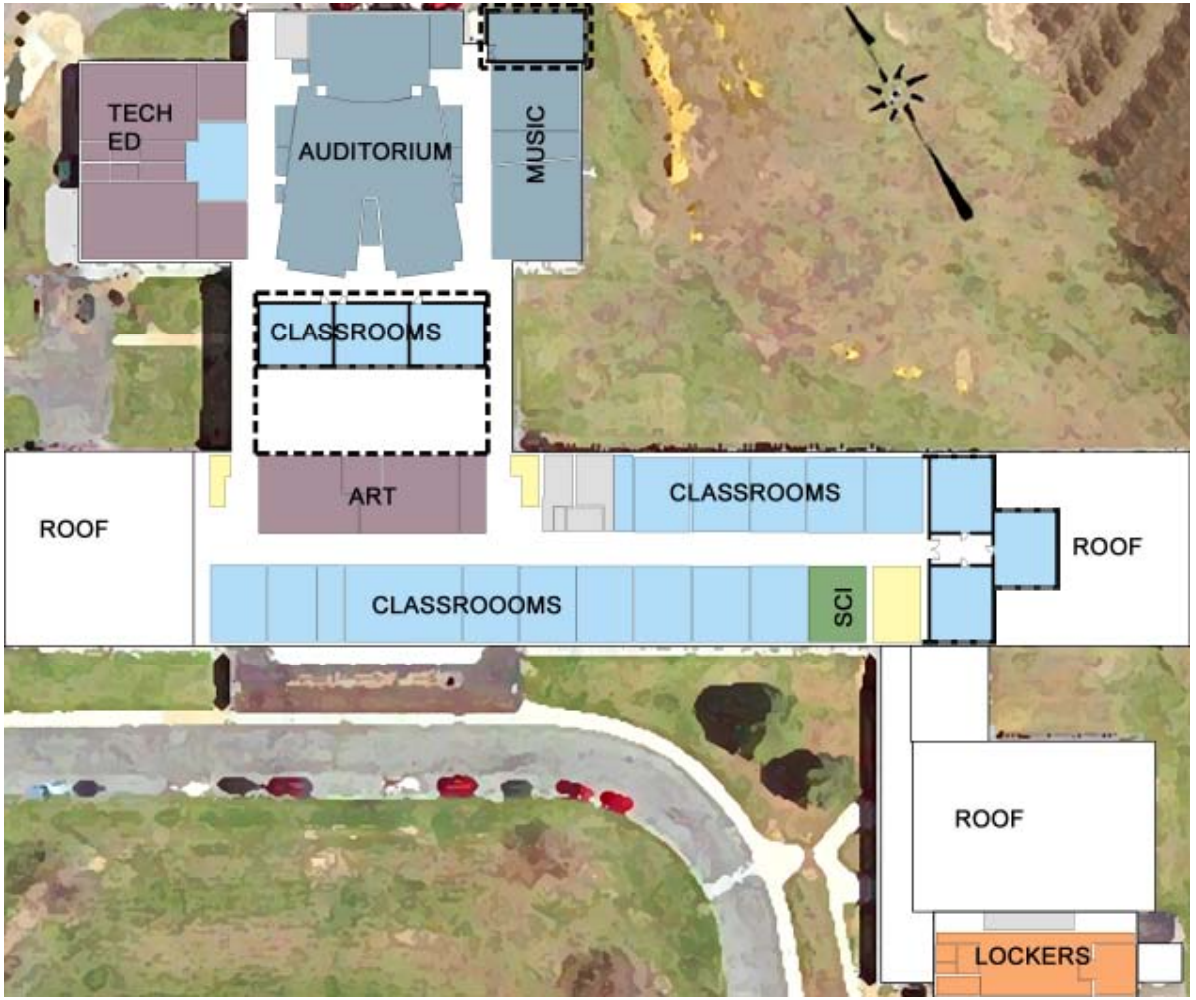
RENOVATION & ADDITION SCHEME B-2a - 1ST FLOOR PLAN



RENOVATION & ADDITION SCHEME B-2a - 1ST FLOOR PLAN



RENOVATION & ADDITION SCHEME B-2b – FIRST FLOOR PLAN



RENOVATION & ADDITION SCHEME B-2b – SECOND FLOOR PLAN

SCHEME B-3: NEW SCHOOL

In this scheme a new middle school is constructed in the area of the current practice field. The new school is built in its entirety while the existing school remains occupied. The school will be designed to have entry on both floors to match the existing grade of the site. The school is built to match the Education Specification requirements in every way. Once the new school is built, the students will be moved and the existing school will be demolished. The new school will include new roadways and parking lots to separate car and bus traffic and to serve the new school. The fields and site amenities will be completed in the final phase after the existing school is leveled.

SCHEME B-3	ADVANTAGES	DISADVANTAGES
BUILDING	• New building will meet all ed spec requirements. • Site will be reconfigured to provide separation of bus and car traffic. • Entire site and all facilities will be upgraded. • There will be no disruption to the students during construction. • There will be no costs for temporary classrooms. • The school can be designed to meet the philosophy of the ed specs.	• Higher cost then other schemes. • The fields will be unavailable for the school for 2 years.
PHASED CONSTRUCTION	• The new school will be built in its entirety, followed by the demolition of the existing school and then the completion of the remaining site work	

CONSTRUCTION COST

Scheme B3 - REPLACEMENT

Category	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Demolition Area	99,000	$5	$495,000
Renovated Area	0	$207	$0
New Area	114,707	$220	$25,235,540
Total Gross Area	114,707		
Building Costs			**$25,730,540**
Site Development			$4,493,222
Total Construction Costs			**$30,223,762**
Contingency	2.50%		$755,594
Furniture & Equipment	12%		$3,626,851
Project Costs	2%		$604,475
A/E Services	8%		$2,417,901
Total Project Costs			**$37,628,584**
State Participation	93%		$18,445,538
Energy Eff Building Credit	2.00%		$604,475
Total Local Funding			**$18,578,570**

State Supported Funding	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Projected Enrollment (2019)	590		
Square Footage per Student	145		
State Allocated Square Footage	85,550	$207.00	$17,708,850
Site Development (12%)	85,550	$24.84	$2,125,062
State Allocated Cost			**$19,833,912**
State Participation	**93%**		**$18,445,538**

NEW REPLACEMENT SCHEME B-3 – SITE PLAN/LOWER FLOOR PLAN

NEW REPLACEMENT SCHEME B-3 – UPPER FLOOR PLAN

SECTION 7 – CONCEPT PLANS – ALLEGANY HIGH SCHOOL

ALLEGANY HIGH SCHOOL

The goals for this study are to examine options to maintain a safe and healthy school, which enrich the educational experience for all students. Design spaces that will allow programs and services to be delivered in the most cost efficient and effective manner, while maximizing the utilization of the school facilities during regular school days, after hours and community use. Present options for renovation, replacement on site, replacement off site or combination of the school facilities.

As described in the building assessment portion of this report, Allegany High School was designed to meet the needs of high school students at its current location since 1932. The last major addition was completed in 1957 and the last major renovation was in 1982. The educational adjacencies requirements for high schools have changed since 1957 and according to Allegany County Public Schools 2001 comprehensive school facilities utilization study the current building "needs major improvement" and is in poor physical condition. The report goes on to indicate Allegany County Public Schools should "explore the possibilities of acquiring a new site and construct a replacement school or in the current location make the necessary improvements and acquire adjacent properties to enlarge the site. Due to the condition of the building and the configuration of the spaces, extensive renovation and upgrading of building systems would be necessary to meet all the needs of the school system and goals as stated in the educational specifications and achieve the requirements of the current building and energy codes. Scheme A-1 explores the renovation of the existing high school without addressing the need to achieve all the requirements of the educational specification. Additionally, we have evaluated three replacement school schemes on the existing site and a theoretical replacement scheme on a new site yet to be identified. We have also investigated the possibility of a new combined middle and high school on a new site yet to be determined.

There were many schemes discussed and explored in the process of determining which schemes would be useful to present in this evaluation. They included discussions involving retaining and modernizing portions of the school while demolition and/or replacing portions in an attempt to develop a scheme that will accomplish the program and adjacency goals of the Educational Specification. These schemes were found to fall too far short in the educational requirements and to create a complexity to the project that would be cost prohibited. Because of this, these modernization and addition schemes have not been developed to include in this analysis. There were also discussions regarding the possibility of attaining adjacent property, as was suggested in the report mentioned above. Since there is no adjacent property that isn't either currently in use or very steeply sloped, it was not useful to include that option as part of this study.

1 – SCHEME A-1: RENOVATION OF EXISTING HIGH SCHOOL

Scheme A1 will explore the feasibility of renovating the existing high school building within its current footprint with minimal demolition and addition. It does not address all programmatic items required to bring the school into compliance with the Educational Specifications.

The building is 6,914 square feet of program over that required by the ed specs but due to the configuration and allocation of this program space, many key program functions are still missing or improperly sized. The most notable difference is in the number of classrooms. The school is missing a computer lab, business classrooms, the family and consumer sciences program and a physics lab. Also notable are the absence of many of the support spaces required for all the programs throughout the school. One notable exception is the athletic program. The total athletic program is 7,000 square feet over the ed spec requirements but even given its size, the configuration makes it difficult to meet the goals of the ed specs.

SCHEME A-1	ADVANTAGES	DISADVANTAGES
BUILDING/ SITE	• Would continue to use the existing building as the high school. • Possible to use the current football practice field as the location of the geothermal wells.	• Current building configuration has significant shortfalls in educational adjacencies. • Long travel distances between classrooms including level changes. • Could not use existing structure if building were to be used and reconfigured to meet the requirements of the educational specifications. • Students will have to be moved to temporary facilities or off site while building is being renovated. • Would not be able to create an efficient layout with easily supervised classroom corridors without major reconfiguration of building. • A minimum of three elevators would need to be included in this scheme to meet ADA requirements for circulation to all educational spaces. • Would not be able to address the traffic issue on Sedgwick Street. • Excessively expensive due to current building conditions.
PHASED CONSTRUCTION	• If all the students are able to move off site the building renovation will not have to be phased.	• If students are not able to move off campus, the current site limitations and ensuring separation of construction and educational functions, phased construction would take three to four years to complete the project.

CONSTRUCTION COST

Scheme A1 - Limited Renovation

Category	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Demolition Area	20,000	$5	$100,000
Renovated Area	154,000	$207	$31,878,000
New Area	20,000	$220	$4,400,000
Total Gross Area	174,000		
Total Building Costs			**$36,378,000**
Site Development			$3,786,182
Phasing	174,000	$5	$870,000
Hazard Materials			$1,000,000
ADA Compliance			$500,000
Historic Preservation			$1,200,000
Portable Classrooms	20		$1,000,000
Total Construction Costs			**$44,734,182**
Contingency	2.50%		$1,118,355
Furniture & Equipment	12%		$5,368,102
Project Costs	2%		$894,684
A/E Services	8%		$3,578,735
Total Project Costs			**$55,694,057**
State Participation	93%		$24,215,833
Energy Eff Building Credit	2.00%		$894,684
Total Local Funding			**$30,583,540**

State Supported Funding	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Projected Enrollment (2019)	730		
Sq. ft. / Student	160		
State Allocated Square Footage	116,800		
Community Use	3,000		
Total Area	119,800	$207.00	$24,798,600
Site Development (5%)	119,800	$10.35	$1,239,930
State Allocated Cost			**$26,038,530**
State Participation	**93%**		**$24,215,833**

RENOVATION SCHEME A-1 -SITE

2 – SCHEME A-2: NEW REPLACEMENT (BUILT ON EXISTING TRACK AND FIELD)

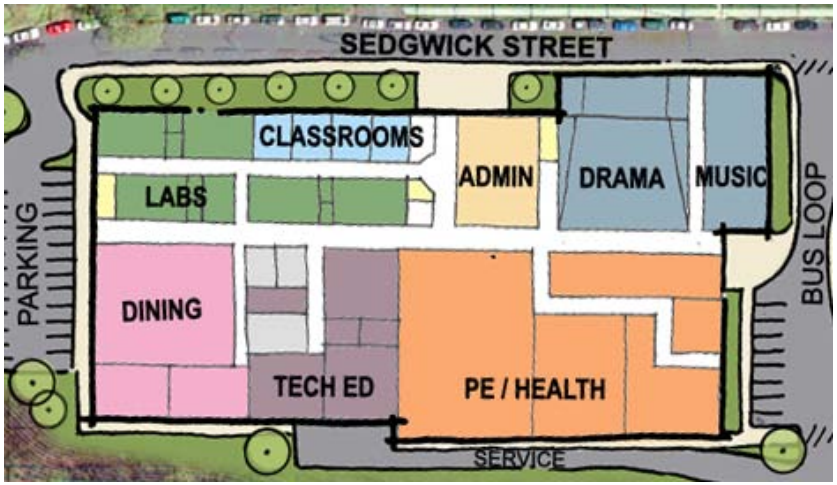
Scheme A2 is the construction of a new high school building on the existing track and football field. This scheme has been developed within the current site limits of Sedgwick Street to the north and the current service road between the site and the cemetery to the south. The compact floor plan was developed with the larger volume, high noise spaces separated from the quieter classroom and teaching spaces by a natural light filled "main street" corridor.

Scheme A2 was developed to create a more efficient layout of all required curriculum spaces called for in the Educational Specification for Allegany High School dated April 2011. Prime site development considerations were the separation of vehicular traffic from pedestrian traffic, separate car and bus loop drop offs and reduce the school traffic load on Sedgwick Street at the beginning and end of the school day.

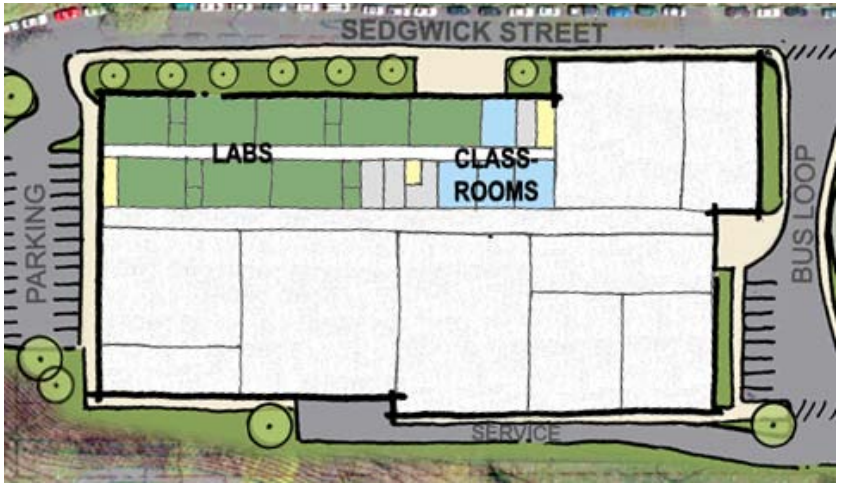
Building design objectives were to reduce the amount of exterior skin while maintaining natural day light to as many educational and office spaces as possible, separate the noisy spaces from the quieter educational spaces create a controlled but welcoming entry to the building, ensure after hours activities access to drama, music and gymnasium spaces while securing the remainder of the building.

SCHEME A-2	ADVANTAGES	DISADVANTAGES
BUILDING/ SITE	• Construction can occur while the existing building is occupied. • Less expensive construction cost, no incurred cost for temporary classrooms. • Efficient layout with easily supervised classroom corridors. • Gym and drama spaces have separate after hours entry controlling access to the remainder of the building. • Vehicle site entry and bus loop separation reducing traffic on Sedgwick Street at the beginning and end of the school day. • Separate loading and delivery area from other vehicle traffic at rear of site.	• Increased student travel distance from parking lot to building entry. • Loss of track and field areas during construction. • Limited staff and visitor parking adjacent to the building. • Would have to phase in the construction of geothermal wells and coordinate it with the demolition of the existing building.
PHASED CONSTRUCTION	• Build new gymnasium, tech ed., and dinning wing first than demo existing gym building to finish construction of the remainder of the building.	

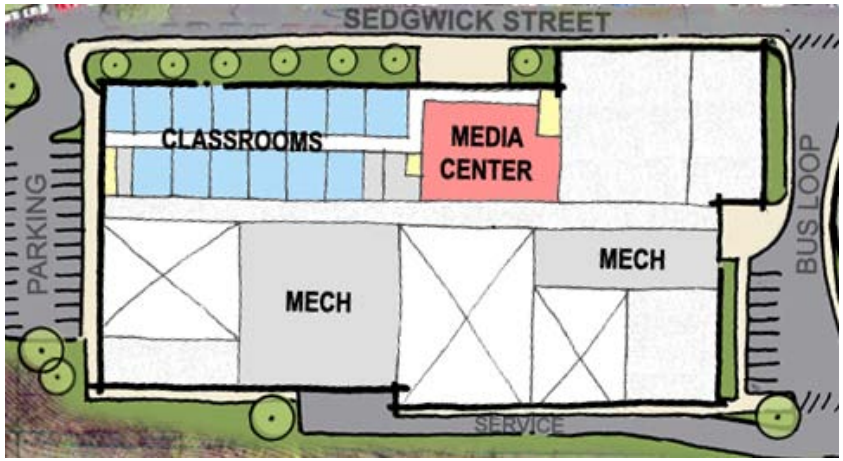
NEW REPLACEMENT SCHEME A-2 – SITE PLAN



NEW REPLACEMENT SCHEME A-2 – FIRST FLOOR PLAN



NEW REPLACEMENT SCHEME A-2 – THIRD FLOOR PLAN



NEW REPLACEMENT SCHEME A-2 – SECOND FLOOR PLAN

NEW REPLACEMENT SCHEME A-2 – PHASING STRATEGY

Phase One
- Build new high school except the music wing and construct new parking lot. – 24 months

Phase Two
– Hazardous materials removal /Demolition of existing high school building – 4 to 6 months

Phase Three
- Finish construction of the music wing and construct the practice football field, bus loop – 4 to 6 months.

CONSTRUCTION COST

Scheme A2 - REPLACEMENT (Exiting Fields)

Category	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Demolition Area	174,000	$5	$870,000
Renovated Area	0	$207	$0
New Area	153,357	$220	$33,738,540
Total Gross Area	153,357		
Total Building Costs			**$34,608,540**
Site Development			$3,786,182
Phasing	153,357	$5	$766,785
Total Construction Costs			**$39,161,507**
Contingency	2.50%		$979,038
Furniture & Equipment	12%		$4,699,381
Project Costs	2%		$783,230
A/E Services	8%		$3,132,921
Total Project Costs			**$48,756,076**
State Participation	93%		$25,830,222
Energy Eff Building Credit	2.00%		$783,230
Total Local Funding			**$22,142,624**

Supported Funding	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
:ted Enrollment (2019)	730		
/ Student	160		
Allocated Square ge	16,800		
ıunity Use	3,000		
Area	19,800	$207.00	$24,798,600
)evelopment (12%)	19,800	$24.84	$2,975,832
Allocated Cost			**$27,774,432**
Participation	**93%**		**$25,830,222**

3 – SCHEME A-3: NEW REPLACEMENT (BUILT ON EXISTING EAST PARKING LOT)

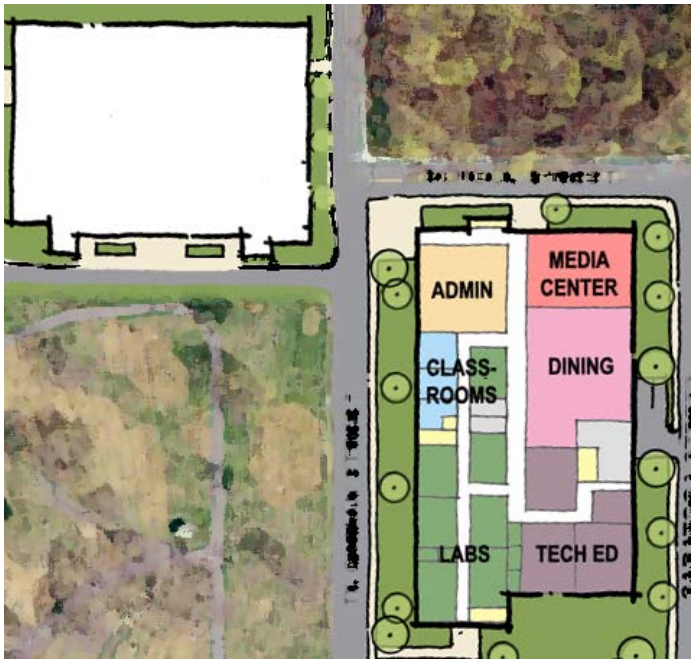
Scheme A3 is the construction of a new high school building on the existing southeast parking lot adjacent to the existing high school building. This scheme has been developed using both the parking lot site, for the classroom academic building and a portion of the existing building site housing the drama, music and gymnasium functions. The compact academic building floor plan has a similar development as Scheme A2, with the larger volume, high noise spaces separated from the quieter classroom and teaching spaces by a natural light filled "main street" corridor.

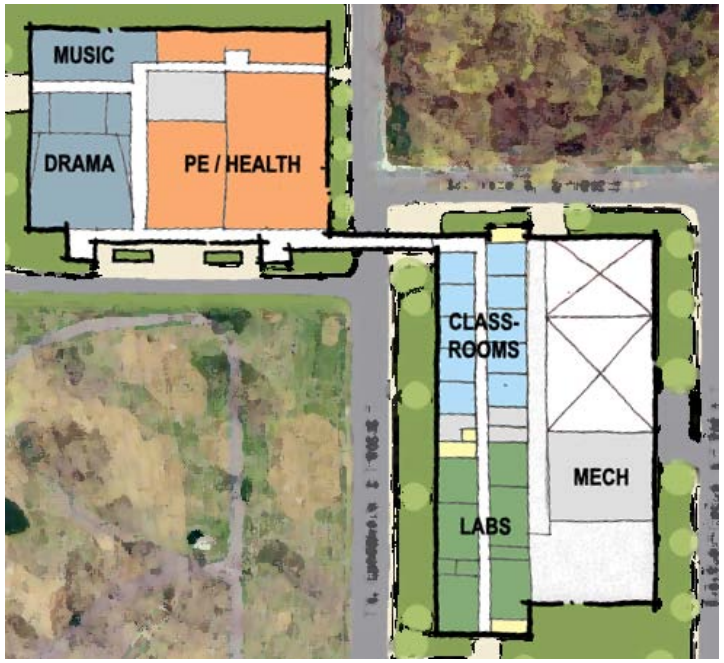
Scheme A3 was developed to create a campus plan for the high school. Prime site development considerations were the separation of vehicular traffic from pedestrian traffic, separate car and bus loop drop offs to address the need for additional bus loop space off of Sedgwick Street. Relocation of the parking area between the drama/music/gymnasium building and the existing stadium create the flexibility for the use of the parking lot for both school and after school activities.

Building design objectives were to create the opportunity for natural day light to as many educational and office spaces as possible, separate the noisy spaces from the quieter educational spaces, create a controlled but welcoming entry to both buildings as well as providing a covered elevated walk way bridge over Tilghman Street for safe transition from one building to the other, and to ensure afterhours access to drama, music and gymnasium spaces while securing the academic building.

SCHEME A-3	ADVANTAGES	DISADVANTAGES
BUILDING/ SITE	• Construction can occur while the existing building is occupied. • Less expensive construction cost, no incurred cost for temporary classrooms. • Once the new construction is complete the existing high school can be used as a temporary middle school during the middle school renovations. • Efficient layout with easily supervised classroom corridors. • Vehicle site entry and bus loop separation reducing traffic on Sedgwick Street at the beginning and end of the school day. • All classrooms are oriented in the ideal north – south direction for proper day lighting and reduced heat gain. • Gym and drama spaces are in a separate building, this allows for after hours use of these spaces while controlling access to the remainder of the building.	• Increased student travel distance from parking lot to building entry. • Loss of parking lot during construction. • Construction sequencing and potential locations for the geothermal well fields would make it difficult to install them in the scheme. We will look at this in more detail during the design phase.
PHASED CONSTRUCTION	• Phase One -Construction of the new schools academic spaces. Phase Two - demolish the existing eastern classroom wings to construct the new drama and gymnasium spaces. Additional phases would be develop to accommodate the use of the existing high school as the temporary middle school.	

NEW REPLACEMENT SCHEME A-3 – SITE PLAN





NEW REPLACEMENT SCHEME A-3 – FIRST FLOOR PLAN & SECOND FLOOR PLAN

NEW REPLACEMENT SCHEME A-3 – THIRD FLOOR PLAN

NEW REPLACEMENT SCHEME A-3 – PHASING STRATEGY

Phase One
- Build the new section of the high school building on the parking lot. – 20 months

Phase Two
– Hazardous materials removal /Demolition of existing high school building – 4 to 6 months

Phase Three
-Build the separate performing arts and gymnasium building, the bus loop and the parking lot – 20 months.

CONSTRUCTION COST

Scheme A3 - REPLACEMENT (Exiting Parking Lot)

Category	Area (s.f.)/Qty.	Cost ($/s.f.)	Cost
Demolition Area	174,000	$5	$870,000
Renovated Area	0	$207	$0
New Area	153,357	$220	$33,738,540
Total Gross Area	153,357		
Total Building Costs			**$34,608,540**
Site Development			$2,223,548
Pedestrian Bridge	1800	220	$396,000
Phasing	153,357	$5	$766,785
Total Construction Costs			**$37,994,873**
Contingency	2.50%		$949,872
Furniture & Equipment	12%		$4,559,385
Project Costs	2%		$759,897
A/E Services	8%		$3,039,590
Total Project Costs			**$47,303,617**
State Participation	93%		$25,830,222
Energy Eff Building Credit	2.00%		$759,897
Total Local Funding			**$20,713,498**

State Supported Funding	Area (s.f.)/Qty.	Cost ($/s.f.)	Cost
Projected Enrollment (2019)	730		
Sq. ft. / Student	160		
State Allocated Square Footage	116,800		
Community Use	3,000		
Total Area	119,800	$207.00	$24,798,600
Site Development (12%)	119,800	$24.84	$2,975,832
State Allocated Cost			**$27,774,432**
State Participation	**93%**		**$25,830,222**

4 – SCHEME A-4: NEW REPLACEMENT (CLOSING SEDGWICK STREET)

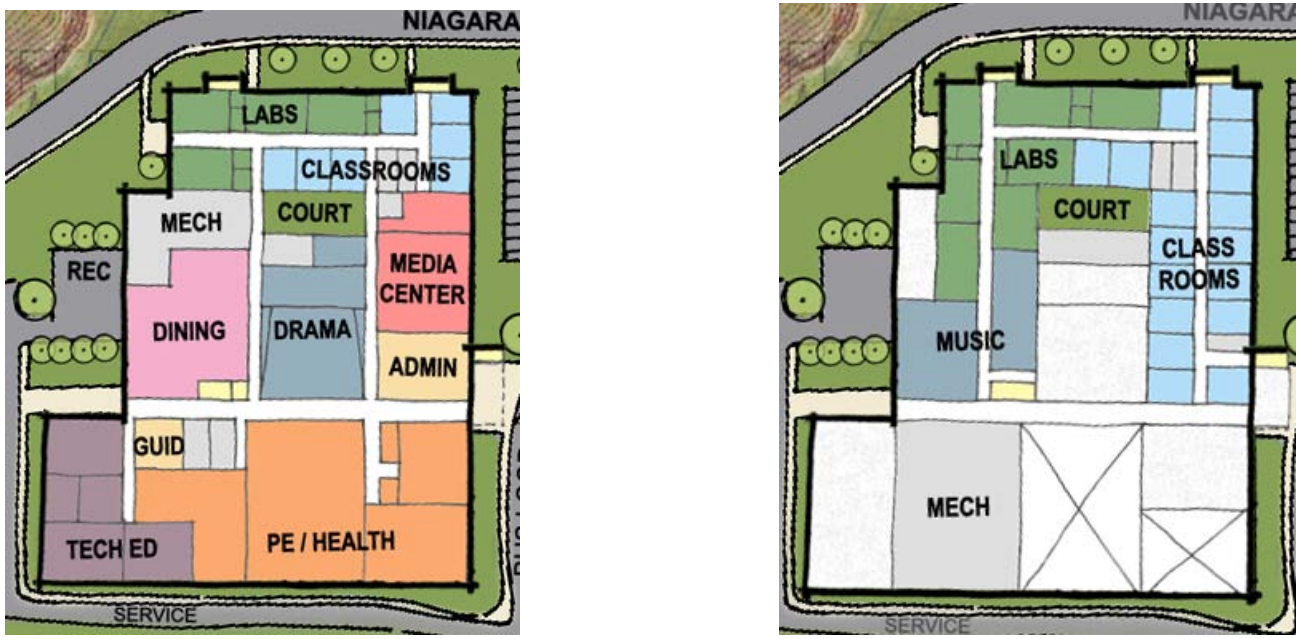
Scheme A4 explores the opportunity to create a very efficient floor plan for the high school as a two story building. Closing Sedgwick Street allows the new high school building to be constructed in the middle of the site providing a total separation of bus loop and vehicular traffic. This proposed scheme is designed to be constructed on the track and football field close to the existing high school a section of the site make wider by the closing of Sedgwick Street.

Scheme A4 was developed around a main street corridor that runs east to west, allowing controlled access to the building from both sides, (the parking lot/parent drop off side and the bus loop side) while meeting the requirements of the Educational Specification for Allegany High School. Prime site development considerations were the separation of vehicular traffic from pedestrian traffic, separate car and bus loop drop offs and reduce the school traffic load from blocking neighborhood streets at the beginning and end of the school day.

Building design objectives were to reduce the amount of exterior skin while maintaining natural day light to as many educational and office spaces designed around an interior courtyard. Similar to the other high school schemes we separate the noisy spaces from the quieter educational spaces, created controlled entry points to the building at either end of main street and to ensure after hours activities access to drama, music and gymnasium spaces, while securing the remainder of the building.

SCHEME A-4	ADVANTAGES	DISADVANTAGES
BUILDING/ SITE	• Construction can occur while the existing building is occupied. • Closing Sedgwick will allow for a larger building foot print. • Less expensive construction cost, no incurred cost for temporary classrooms. • Efficient layout with easily supervised classroom corridors. • Vehicle site entry and bus loop separation reducing traffic at the beginning and end of the school day. • Gym and drama spaces have separate after hours entry controlling access to the remainder of the building. • Construction staging area self contained.	• Loss of a practice field • Increased student travel distance from parking lot to building entry. • Loss of track and field areas during construction. • Construction sequencing would make it difficult to install geothermal wells. We will look at this in more detail during the design phase.
PHASED CONSTRUCTION	• Phase Two -Build new gymnasium and tech ed. spaces, than demo existing gym building to finish construction of the remainder of the building.	• Phase One -Close and reroute traffic from Sedgwick Street to Niagara Street

NEW REPLACEMENT SCHEME A-4 – SITE PLAN



NEW REPLACEMENT SCHEME A-4 – FIRST FLOOR PLAN & SECOND FLOOR PLAN

NEW REPLACEMENT SCHEME A-4 – PHASING STRATEGY

Phase One
- Build the new section of the high school gym and tech ed spaces. – 14 months.

Phase One or Two
– Reroute traffic and close Sedgwick Street.

Phase Two
-Demolition of old school gymnasium building including hazardous material removal of this section – 5 months.
(Students use the new gymnasium spaces while existing gym is being demolished)

Phase Three
– Build the remaining section of the new school building including both the East and West side parking lots. – 20 months.

Phase Four
– Hazardous materials removal /Demolition of remaining existing high school building and construct new practice field–6 to 8 months.

CONSTRUCTION COST

Scheme A4 - REPLACEMENT (Reroute Sedgwick)

Category	Area (s.f.)/Qty.	Cost ($/s.f.)	Cost
Demolition Area	174,000	$5	$870,000
Renovated Area	0	$207	$0
New Area	151,500	$220	$33,330,000
Total Gross Area	151,500		
Total Building Costs			**$34,200,000**
Site Development			$3,887,589
Reroute Sedgewick			$1,000,000
Total Construction Costs			**$39,087,589**
Contingency	2.50%		$977,190
Furniture & Equipment	12%		$4,690,511
Project Costs	2%		$781,752
A/E Services	8%		$3,127,007
Total Project Costs			**$48,664,048**
State Participation	93%		$25,830,222
Energy Eff Building Credit	2.00%		$781,752
Total Local Funding			**$22,052,075**

State Supported Funding	Area (s.f.)/Qty.	Cost ($/s.f.)	Cost
Projected Enrollment (2019)	730		
Sq. ft. / Student	160		
State Allocated Square Footage	116,800		
Community Use	3,000		
Total Area	119,800	$207.00	$24,798,600
Site Development (12%)	119,800	$24.84	$2,975,832
State Allocated Cost			**$27,774,432**
State Participation	**93%**		**$25,830,222**

5 - SCHEME A-5: NEW REPLACEMENT (SCHOOL ON A NEW SITE)

In this scheme a new high school will be built on a new site. Since this site has yet to be determined, this is a theoretical exercise. The assumptions used in this exercise represent the most typical circumstances that would apply to a new site in the Cumberland area. The new school is built in its entirety while the existing school remains occupied. The new school will contain all the goals and program included in the Educational Specifications.

SCHEME A-5	ADVANTAGES	DISADVANTAGES
BUILDING	• New building will meet all ed spec requirements. • There will be no disruption to the students during construction. • There will be no costs for temporary classrooms. • The school can be designed to meet the philosophy of the ed specs. • The existing high school building is available for an alternative use including temporarily housing the middle schools while their renovations occur. • More flexibility to design geothermal well fields to work with the building design.	• Higher cost then other schemes. • The site is not yet determined so the values used in this analysis are estimates. • There are limited potential sites available in the City of Cumberland. • If a new use is not determined for the existing high school, the building will continue to require costs for maintenance.
PHASED CONSTRUCTION	• The new school will be built in its entirety on at new site. The existing site will remain unaltered.	

COST ESTIMATE

Scheme A5 - REPLACEMENT OFF SITE

Category	Area (s.f.)/Qty.	Cost ($/s.f.)	Cost
Demolition Area	0	$5	$0
Renovated Area	0	$207	$0
New Area	151,500	$220	$33,330,000
Total Gross Area	151,500		
Total Building Costs			**$33,330,000**
Site Development	151,500	$24.84	$3,763,260
Site Acquisition			$2,000,000
Total Construction Costs			**$39,093,260**
Contingency	2.50%		$977,332
Furniture & Equipment	12%		$4,691,191
Project Costs	2%		$781,865
A/E Services	8%		$3,127,461
Total Project Costs			**$48,671,109**
State Participation	93%		$25,830,222
Energy Eff Building Credit	2.00%		$781,865
Total Local Funding			**$22,059,022**

State Supported Funding	Area (s.f.)/Qty.	Cost ($/s.f.)	Cost
Projected Enrollment (2019)	730		
Sq. ft. / Student	160		
State Allocated Square Footage	116,800		
Community Use	3,000		
Total Area	119,800	$207.00	$24,798,600
Site Development (12%)	119,800	$24.84	$2,975,832
State Allocated Cost			**$27,774,432**
State Participation	**93%**		**$25,830,222**

6 – SCHEME A-6: NEW REPLACEMENT (COMBINED HIGHSCHOOL AND MIDDLE SCHOOL ON A NEW SITE)

In this scheme a new combined high school and middle school will be built on a new site. Since this site has yet to be determined, this is a theoretical exercise. The assumptions used in this exercise represent the most typical circumstances that would apply to a new site in the Cumberland area. The new school is built in its entirety while the existing schools remains occupied. The new school will contain all the goals and facilities included in the Educational Specifications.

SCHEME A6	ADVANTAGES	DISADVANTAGES
BUILDING	• New building will meet all ed spec requirements for both the MS and HS. • There will be no disruption to the students during construction. • There will be no costs for temporary classrooms. • The school can be designed to meet the philosophy of the ed specs. • The existing high school and middle school buildings are available for an alternative use including temporarily housing a middle school while their renovations occur. • Combining the two programs allows them to share construction and reduce overall cost.	• Higher cost then other schemes. • The site is not yet determined so the values used in this analysis are estimates. • There are limited potential sites available in the City of Cumberland. • If a new use is not determined for the existing high school, the building will continue to require costs for maintenance.
PHASED CONSTRUCTION	• The new school will be built in its entirety on at new site. The existing sites will remain unaltered.	

COST ESTIMATE

Scheme A6 - COMBINED HS/MS

Category	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
Total High School	133,960	$220	$29,471,200
Total Middle School	99,000	$220	$21,780,000
Shared Area	17,540	$220	$3,858,800
Total Gross Area	250,500		
Total Building Costs			**$55,110,000**
Site Development	250,500	$24.84	$6,222,420
Site Acquisition			$2,000,000
Total Construction Costs			**$63,332,420**
Contingency	2.50%		$1,583,311
Furniture & Equipment	12%		$7,599,890
Project Costs	2%		$1,266,648
A/E Services	8%		$5,066,594
Total Project Costs			**$78,848,863**
State Participation	93%		$43,651,998
Energy Eff Building Credit	2.00%		$1,266,648
Total Local Funding			**$33,930,217**

State Supported Funding	**Area (s.f.)/Qty.**	**Cost ($/s.f.)**	**Cost**
HIGH SCHOOL			
Projected Enrollment (2019)	730		
Sq. ft. / Student	160		
State Allocated Square Footage	116,800		
Community Use	3,000		
Total Area	119,800	$207.00	$24,798,600
Site Development (12%)	119,800	$24.84	$2,975,832
State Allocated Cost			$27,774,432
State Participation	**93%**		**$25,830,222**
MIDDLE SCHOOL			
Projected Enrollment (2019)	590		
Sq. ft. / Student	145		
State Allocated Square Footage	85,550	$200	$17,110,000
Site Development (12%)	85,550	$24	$2,053,200
State Allocated Cost			$19,163,200
State Participation	**93%**		**$17,821,776**
Total State Participation			**$43,651,998**

SECTION 8 - MECHANICAL 35 YEAR ENERGY COST ANALYSIS

Annual energy costs were developed utilizing computer modeling for the schemes. The annual operating cost was then multiplied by 35 years to provide a simple cost analysis for a 35 year life span. High efficiency energy systems were used for all new construction and a geothermal system was analyzed for schemes that have the site space to accommodate the system.

1 - WASHINGTON MIDDLE SCHOOL

Annual energy costs were developed utilizing computer modeling for the four (4) proposed building schemes (1, 2A, 2B, & 3) for the Allegany Public Schools – Washington Middle School Feasibility Study. The annual operating cost was then multiplied by 35 years to provide a simple cost analysis for a 35 year life span. Two types of HVAC systems were analyzed for all six building schemes. A 4-pipe fan coil unit system coupled with dedicated outdoor air units (DOAS), and a geothermal heat pump system coupled with geothermal dedicated outdoor air units.

The existing building and associated building envelope will be less efficient as compared to a new building. Therefore, the mechanical systems will be less efficient since these existing physical-condition limitations will increase energy consumption by mechanical equipment, thus lowering the energy efficiency of the renovation/addition options when compared to the new building scheme.

The following are summaries of the 35-year energy cost based on today's electric/fuel rates. The 35-year cost is a simple cost and does not reflect inflation of the fuel sources.

The simulated 4-pipe fan coil unit system use chilled and heating water to condition each space and energy recovery units to supply ventilation air to the building. A more detailed breakdown of the modeled system may be found in the Mechanical Analysis Recommendations Narrative section in the feasibility study.

FOUR-PIPE FAN COIL UNIT SYSTEM				
Option	**Estimated Installation Cost**	**Estimated Maintenance and Service Cost**	**Estimated Annual Operating Cost**	**35-Year Energy Cost**
SCHEME 1 (98,500 S.F.)	$3,743,000	$157,600	$130,738	$4,575,830
SCHEME 2A (106,630 S.F.)	$4,051,940	$170,608	$121,026	$4,235,910
SCHEME 2B (104,059 S.F.)	$3,954,242	$166,494	$118,859	$4,160,065
SCHEME 3 (114,707 S.F.)	$4,014,745	$183,531	$122,559	$4,289,565

The simulated geothermal heat pump system rejects or extracts heat to/from a geothermal water loop to condition each space and water cooled energy recovery units to supply ventilation air to the building. A more detailed breakdown of the modeled system may be found in the Mechanical Analysis Recommendations Narrative section in the feasibility study.

GEOTHERMAL HEAT PUMP SYSTEM				
Option	**Estimated Installation Cost**	**Estimated Maintenance and Service Cost**	**Estimated Annual Operating Cost**	**35-Year Energy Cost**
SCHEME 1 (98,500 S.F.)	$4,013,000	$82,100	$126,992	$4,444,720
SCHEME 2A (106,630 S.F.)	$4,461,940	$87,300	$117,890	$4,126,150
SCHEME 2B (104,059 S.F.)	$4,434,242	$85,700	$115,740	$4,050,900
SCHEME 3 (114,707 S.F.)	$4,514,745	$96,200	$119,726	$4,190,410

The actual utility costs for the existing building systems were obtained for 5 (five) consecutive years (2004 – 2009). The average annual operating cost for this time period was $89,884. As expected this value is lower than the 2011 value indicated above, as energy rates have increased and occupancy numbers and schedules were estimated based on the current enrollment and usage.

In summary, the projected life-cycle costs are less for the new building options than for the renovation/addition options. There will be less value per dollars spent in terms of projected life-cycle costs for the renovation / addition options than for the new building option.

2 - BRADDOCK MIDDLE SCHOOL

Annual energy costs were developed utilizing computer modeling for the four (4) proposed building schemes (1, 2A, 2B, & 3) for the Allegany Public Schools – Braddock Middle School Feasibility Study. The annual operating cost was then multiplied by 35 years to provide a simple cost analysis for a 35 year life span. Two types of HVAC systems were analyzed for all six building schemes. A 4-pipe fan coil unit system coupled with dedicated outdoor air units (DOAS), and a geothermal heat pump system coupled with geothermal dedicated outdoor air units.

The existing building and associated building envelope will be less efficient as compared to a new building. Therefore, the mechanical systems will be less efficient since these existing physical-condition limitations will increase energy consumption by mechanical equipment, thus lowering the energy efficiency of the renovation/addition options when compared to the new building scheme.

The following are summaries of the 35-year energy cost based on today's electric/fuel rates. The 35-year cost is a simple cost and does not reflect inflation of the fuel sources.

The simulated 4-pipe fan coil unit system use chilled and heating water to condition each space and energy recovery units to supply ventilation air to the building. A more detailed breakdown of the modeled system may be found in the Mechanical Analysis Recommendations Narrative section in the feasibility study.

FOUR-PIPE FAN COIL UNIT SYSTEM				
Option	**Estimated Installation Cost**	**Estimated Maintenance and Service Cost**	**Estimated Annual Operating Cost**	**35-Year Energy Cost**
SCHEME 1 (99,000 S.F.)	$3,762,000	$158,400	$131,142	$4,589,970
SCHEME 2A (122,925 S.F.)	$4,671,150	$196,680	$134,835	$4,719,225
SCHEME 2B (117,040 S.F.)	$4,447,520	$187,264	$129,812	$4,543,420
SCHEME 3 (114,707 S.F.)	$4,014,745	$183,531	$122,559	$4,289,565

The simulated geothermal heat pump system rejects or extracts heat to/from a geothermal water loop to condition each space and water cooled energy recovery units to supply ventilation air to the building. A more detailed breakdown of the modeled system may be found in the Mechanical Analysis Recommendations Narrative section in the feasibility study.

GEOTHERMAL HEAT PUMP SYSTEM				
Option	**Estimated Installation Cost**	**Estimated Maintenance and Service Cost**	**Estimated Annual Operating Cost**	**35-Year Energy Cost**
SCHEME 1 (99,000 S.F.)	$4,112,000	$81,000	$127,392	$4,458,720
SCHEME 2A (122,925 S.F.)	$5,100,150	$101,650	$131,588	$4,605,580
SCHEME 2B (117,040 S.F.)	$4,887,520	$98,735	$126,604	$4,431,140
SCHEME 3 (114,707 S.F.)	$4,414,745	$91,788	$119,726	$4,190,410

The actual utility costs for the existing building systems were obtained for 5 (five) consecutive years (2004 – 2009). The average annual operating cost for this time period was $95,157. As expected this value is lower than the 2011 value indicated above, as energy rates have increased and occupancy numbers and schedules were estimated based on the current enrollment and usage.

In summary, the projected life-cycle costs are less for the new building options than for the renovation/addition options. There will be less value per dollars spent in terms of projected life-cycle costs for the renovation / addition options than for the new building option.

3 - ALLEGANY HIGH SCHOOL

Annual energy costs were developed utilizing computer modeling for the six (6) proposed building schemes (A1, A2, A3, A4, A5, & A6) for the Allegany Public Schools – Allegany High School Feasibility Study. The annual operating cost was then multiplied by 35 years to provide a simple cost analysis for a 35 year life span. Two types of HVAC systems were analyzed for all six building schemes. A 4-pipe fan coil unit system coupled with dedicated outdoor air units (DOAS), and a geothermal heat pump system coupled with geothermal dedicated outdoor air units.

The existing building and associated building envelope will be less efficient as compared to a new building. Therefore, the mechanical systems will be less efficient since these existing physical-condition limitations will increase energy consumption by mechanical equipment, thus lowering the energy efficiency of the renovation/addition options when compared to the new building scheme.

The following are summaries of the 35-year energy cost based on today's electric/fuel rates. The 35-year cost is a simple cost and does not reflect inflation of the fuel sources.

The simulated 4-pipe fan coil unit system use chilled and heating water to condition each space and energy recovery units to supply ventilation air to the building. A more detailed breakdown of the modeled system may be found in the Mechanical Analysis Recommendations Narrative section in the feasibility study.

FOUR-PIPE FAN COIL UNIT SYSTEM				
Option	**Estimated Installation Cost**	**Estimated Maintenance and Service Cost**	**Estimated Annual Operating Cost**	**35-Year Energy Cost**
SCHEME A1 (173,892 S.F.)	$6,120,750	$278,080	$201,969	$7,068,915
SCHEME A2 (153,450 S.F.)	$5,370,750	$245,520	$176,353	$6,172,355
SCHEME A3 (153,360 S.F.)	$5,367,600	$245,376	$178,450	$6,245,750
SCHEME A4 (151,500 S.F.)	$5,302,500	$242,400	$170,579	$5,970,265

SCHEME A5 (151,500 S.F.)	$5,302,500	$242,400	$170,579	$5,970,265
SCHEME A6 (232,900 S.F.)	$8,151,500	$372,640	$257,352	$9,007,320

The simulated geothermal heat pump system rejects or extracts heat to/from a geothermal water loop to condition each space and water cooled energy recovery units to supply ventilation air to the building. A more detailed breakdown of the modeled system may be found in the Mechanical Analysis Recommendations Narrative section in the feasibility study.

GEOTHERMAL HEAT PUMP SYSTEM				
Option	**Estimated Installation Cost**	**Estimated Maintenance and Service Cost**	**Estimated Annual Operating Cost**	**35-Year Energy Cost**
SCHEME A1 (173,892 S.F.)	$6,780,750	$148,080	$195,138	$6,829,830
SCHEME A2 (153,450 S.F.)	$5,900,750	$125,520	$170,225	$5,957,875
SCHEME A3 (153,360 S.F.)	$5,867,600	$125,376	$167,369	$5,857,915
SCHEME A4 (151,500 S.F.)	$5,832,500	$124,400	$164,942	$5,772,970
SCHEME A5 (151,500 S.F.)	$5,832,500	$124,400	$164,942	$5,772,970
SCHEME A6 (232,900 S.F.)	$8,961,500	$188,640	$249,316	$8,726,060

The actual utility costs for the existing building systems were obtained for 5 (five) consecutive years (2004 – 2009). The average annual operating cost for this time period was $142,335. As expected this value is lower than the 2011 value indicated above, as energy rates have increased and occupancy numbers and schedules were estimated based on the current enrollment and usage.

In summary, the projected life-cycle costs are less for the new building options of equal of lesser square footage than for the renovation/addition options. There will be less value per dollars spent in terms of projected life-cycle costs for the renovation / addition options than for the new building option.

SECTION 9 – COST COMPARISON

WASHINGTON MIDDLE SCHOOL

SCOPE	**W1** - Limited Renovation	**W2a** - Modern./ Addition	**W2b**- Modern/Add/Aud area classess	**W3**- Replacement
Area Break Down (sf)				
Area of Demolition	-	17,156	17,156	98,500
Area of Renovation	98,500	81,344	81,344	-
Area of New Construction	-	25,286	22,715	114,707
TOTAL AREA	98,500	106,630	104,059	114,707
TOTAL CONSTRUCTION COST	$15,885,000	$25,268,191	$24,689,716	$29,353,814
TOTAL PROJECT COSTS	$19,776,825	$31,458,898	$30,738,696	$36,545,498
TOTAL LOCAL	$5,003,775	$13,243,432	$12,534,800	$17,067,647
35 YEAR LIFE CYCLE COST	$4,575,830	$4,235,910	$4,160,065	$4,190,410
Duration (in months)	16	24	24	18

BRADDOCK MIDDLE SCHOOL

SCOPE	**B1** - Limited Renovation	**B2a** - Modern/ Addition	**B2b**-Modern/ Addition/ CR over Media	**B3**- Replacement
Area Break Down (sf)				
Area of Demolition	-	6,302	10,302	99,000
Area of Renovation	99,000	92,698	88,198	-
Area of New Construction	-	30,230	28,342	114,707
TOTAL AREA	99,000	122,928	116,540	114,707
TOTAL CONSTRUCTION COST	$15,960,000	$28,637,736	$27,278,936	$30,223,762
TOTAL PROJECT COSTS	$19,870,200	$35,653,981	$33,962,275	$37,628,584
TOTAL LOCAL	$4,629,996	$17,788,535	$16,124,005	$18,578,570
35 YEAR LIFE CYCLE COST	$4,589,970	$4,719,225	$4,543,420	$4,190,410
Duration (in months)	16	24	24	18

ALLEGANY HIGH SCHOOL

SCOPE	**A1** - Renovate Existing	**A2** - Replacement on the Existing Field	**A3**- Replacement on the Parking Lot	**A4**- Replacement - Reroute Sedgwick	**A5**- Replacement - Off Site	**A6**- Replacement - HS/MS Combination
Area Break Down (sf)						
Area of Demolition	20,000	174,000	174,000	174,000	0	0
Area of Renovation	154,000	0	0	0	0	0
Area fo New Construction	20,000	153,357	153,357	151,500	151,500	250,500
TOTAL AREA	174,000	153,357	153,357	151,500	151,500	250,500
TOTAL CONSTRUCTION COST	$44,734,182	$39,161,507	$37,994,873	$39,087,589	$39,093,260	$63,332,420
TOTAL PROJECT COSTS	$55,694,057	$48,756,076	$47,303,617	$48,664,048	$48,671,109	$78,848,863
TOTAL LOCAL	$30,583,540	$22,142,624	$20,713,498	$22,052,075	$22,059,022	$33,930,217
35 YEAR LIFE CYCLE COST	$7,068,915	$6,172,355	$5,857,915	$5,970,265	$5,772,970	$8,726,060
Duration (in months)	24	32-36	44-46	45-47	24	24

SECTION 10 – SUSTAINABLE DESIGN STRATEGIES

The design of these projects will consider several strategies to achieve a "green building" with a LEED Silver rating. The middle school projects, involving substantial renovation and additions, offer significant opportunities for achieving LEED ((Leadership in Energy and Environmental Design) Certification Credits, through design, commissioning, and construction practices. A plan will be developed for the modernization and/or construction of the projects that will incorporate many environmental design elements that significantly reduce or eliminate the building's impact on the environment, while providing an inviting, friendly, and comfortable place for faculty, staff student and community users of the facility. These sustainable design features, systems, and materials may include the following:

SITE

- An erosion control plan during construction to prevent storm water runoff and wind erosion.
- A storm water management plan that reduces discharge rate and quantity of storm water discharge
- Water efficient landscaping or native species.
- Pervious paving.
- Landscaped shading for at least 50% of the site hardscape through the use of trees and other shade devices.
- A rainwater harvesting system for landscape irrigation and/or use graywater to flush toilets.
- Reserved parking for carpools and for fuel efficient and low-emitting cars.
- Provide Bike racks.

BUILDING

- Low flow toilets, sinks and urinal fixtures to increase water efficiency.
- Involve a building commissioner throughout the design and construction process to verify building systems and involve a construction cost estimator to maximize use of "Green" systems.
- The use of locally manufactured building materials.
- The use of high-recycled content materials including: steel, carpet, acoustical ceiling panels, drywall, and concrete.

- Consideration for replacing large quantities of portland cement with either fly ash or ground granulated blast furnace slag (ggbfs) in concrete in site-cast concrete. Both fly ash and ggbfs are by-products of steel production. Utilization of slag cement or fly ash in concrete lessens the burden on landfills, reduces emissions, and ultimately conserves energy.
- The use of Forest Conservation certified wood.
- Maintenance of existing interior and exterior walls, slabs, and roof deck where possible.
- Recycling of demolition and construction debris and redirect from landfills to manufacturing process, reuse on site, or at other sites.
- The use of low-emitting materials to protect indoor air quality for occupants such as low VOC carpet and paint.
- The use of green roofs to help optimize energy efficiency, reducing stormwater generated and improving the microclimate by reducing the heat island effect.
- The use of large windows in new construction and where possible in existing construction to provide views of the outdoors while also allowing for natural daylighting and winter solar heating.
- The use double glazed “low e” glass and/or shading devices on windows to enhance the energy efficiency of the building.
- The use of operable windows for natural ventilation and individual control, particularly near work stations.
- Building orientation for new construction to maximize natural daylighting and solar control.
- Use energy efficient fixtures and multiple switching daylight controls.
- Maximize daylighting opportunities for building occupants.
- Minimize light pollution from the building and site by specifying exterior and site lighting with lower foot-candle output, more stringent cutoff to reduce light spill onto neighboring properties.
- The use of LED lighting.
- Reductions background noise levels in classrooms to a 35- 40 DB level through high performance acoustical design.
- On new construction, use approved roofing assembly with a highly reflective top coat with an R value of 20 or greater to reduce heat island effect.

- On new construction, design exterior walls to have an R- value of 19 or greater.
- Use vegetated roofs areas.
- Design building as an integral part of the community by providing for its use for non school functions and events.
- Reduce potable water demand by specifying low water use showers, dishwashers, ice machines and clothes washers.
- Provide a dedicated area for the collection, separation, and storage of materials for recycling.
- Use of onsite renewable energy sources e.g. geothermal or solar.
- Use of an Energy Management System (EMS) to monitor and efficiently control the major building systems and their energy consumption.
- Monitoring and control of temperature throughout the building with the use of sensors.
- Storage for chemical products, such as cleaning, printing, and copying supplies, is contained in isolated or ventilated rooms.

CONCLUSION

LEED (Leadership in Energy and Environmental Design) Green Building Rating System® is one method of tracking and measuring the "greenness" of a building. LEED is a national rating system and accreditation tool for developing high-performance, sustainable buildings. Buildings are awarded points and achieve different levels of certification based on project procedures and design elements. There are four levels of LEED certification: certification, silver, gold, and platinum. The level achieved is based on the total number earned across seven categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality, Regional Priority and Innovation & Design Process.

To achieve LEED Certification, the school will have to supplement the already sustainable design features listed above with additional tactics to meet the qualifications for more points,

These tactics include (but are not limited to) the following:

- Encourage staff and students to ride bikes to work by providing secure bike storage and showers/changing rooms in the building.
- Encourage staff and visitors to carpool and vanpool by reserving prime parking spots with additional striping and signage.
- Encourage staff and students to use public transportation to reduce the number of required parking spaces.

- Purchase electricity from green-certified sources that guarantee that at least a fraction of it is derived from non-polluting renewable technologies.

- Use energy-efficient fluorescent T5 and compact-fluorescent lamps in the school's lighting design. Advantages of using T5 lighting over the standard T8 lighting include better lighting due to a higher color-rendering index and better light distribution. T5 lamps are approximately 40% smaller than T8 lamps and this smaller diameter tube lends itself to lower profile and sleeker fixtures. T5 lighting has twice as many lumens per bulb as its T8 counterpart, which results in fewer fixtures needed and a savings on installation and maintenance. The T5 bulb also has a coating that stops glass and phosphorus from absorbing mercury. This coating keeps light levels close to its initial output.

- Extend contract with commissioning team to include additional commissioning reviews in early design phases.

- Incorporate design strategies to meet LEED requirements minimum daylight factor for regularly-occupied spaces. Commission a simulation from a Daylighting Consultant to determine best geometries and locations for daylighting devices. Strategies may include introducing light from above via skylights, light tubes, clerestory windows and/or roof monitors and controlling that light with light shelves, louvers and/or shades. Designing overhead daylight devices and cost of the simulations could make it cost prohibitive to meet the LEED requirements for introducing and controlling sunlight in new additions

The Green strategies identified above and others that may be considered during the design process will need to be evaluated for their energy savings and cost effectiveness.

Additional costs to the project include retaining a commissioning team that does not include individuals directly responsible for project design or construction management to implement commissioning procedures as outlined to meet LEED requirements. Further supplemental costs include Registration and Certification Review fees, retaining a LEED consultant to complete the requisite documentation for project registration and certification, and most significantly, direct costs to be borne by the contractor will affect the cost of the project.

APPENDIX A - EXISTING CONDITIONS PHOTOS

Photo 1- WMS Entrance

Photo 3 WMS - Roof-condition fair with ponding

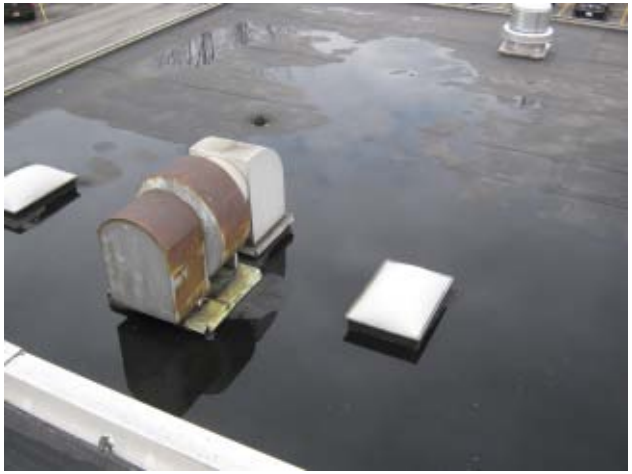


Photo 2- WMS - Roof-condition, fair with ponding

Photo 4 WMS - Masonry – efflorescing, point up required

Photo 5 WMS - Column cracking

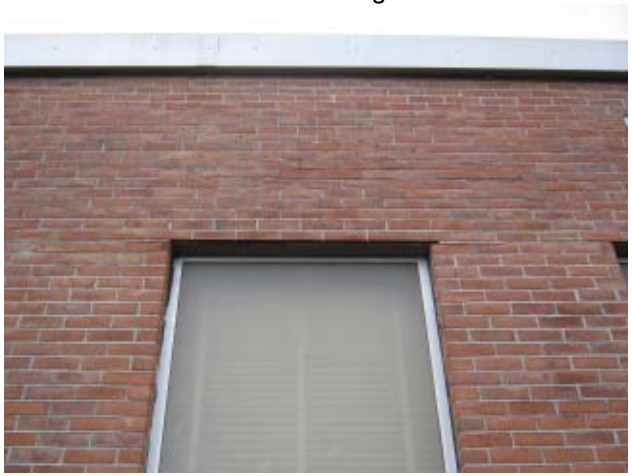


Photo 6 WMS - Exterior windows single glazed – rusting lintels

Photo 7 WMS – Vinyl Asbestos Tile

Photo 8 WMS - Ceilings poor condition

Photo 9 WMS - Non ADA compliant entrance.

Photo 10 WMS - Non-ADA compliant pathway to playground.

Photo 11 BMS - Entrance

Photo 12 BMS - Courtyard.

Photo 13 – BMS - Non-ADA compliant at Stair

Photo 14 BMS - Non-ADA accessible parking - Franklin Street

Photo 15 BMS - Water seepage on Franklin street

Photo 16 BMS - Upper lot condition is poor

Photo 17 BMS - Roof, fair condition with ponding

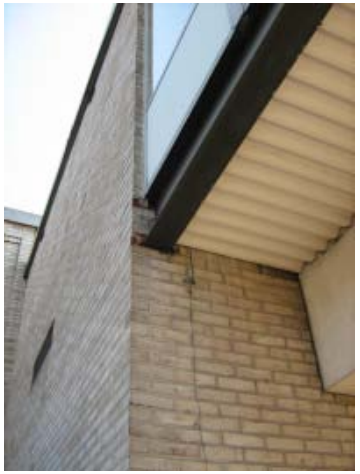


Photo 18 BMS - Masonry – point up required

Photo 19 BMS - Exterior rusting lintels

Photo 20 BMS – Vinyl Asbestos Tile

Photo 21 BMS - Ceilings fair condition

Photo 22 BMS - Non ADA compliant entrance, wire glass lites

Photo 23 AHS - Previous main entrance altered to window opening.

Photo 24 AHS – Courtyard facing cemetery.

Photo 25 AHS – alternate entrance.

Photo 26 AHS - Significant architectural detailing

Photo 27 AHS - Roof - fair condition, ponding.

Photo 28 AHS – Existing play fields are under-sized

Photo 29 – AHS masonry needs repair / repointing.

Photo 30 AHS - masonry settlement cracking.

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Photo 31 AHS - masonry cracking from settlement.

Photo 32 AHS - Damaged masonry at canopy.

Photo 33 AHS - masonry requiring minor repair

Photo 34 AHS - Masonry – point up required

Photo 35 AHS - Exterior rusting lintels

Photo 36 AHS – Non-code compliant stair, high risers

Photo 37 AHS - Non-ADA compliant stair.

Photo 38 AHS - Non-ADA compliant Stair

Photo 39 AHS – Non-ADA compliant entrance

Photo 40 AHS – Non-accessible entrance

Photo 41 Non-accessible stair