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# William Wirt Middle School



## Feasibility Study

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Prince George's County Public Schools  
December 3, 2014

**FINAL DRAFT**

pending Board of Education approval

Grimm+Parker Architects  
Columbia Engineering  
Setty and Associates  
Soltesz Company



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## Design Committee Representatives

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section  
one

executive  
summary

## Purpose

The purpose of this feasibility study is to determine the viability of various options for the conversion of William Wirt Middle School from its current condition to a 1200 seat middle school which has all the spaces required to deliver a state of the art 21st century education. The conversion of William Wirt Middle School must meet the current educational, environmental, safety, and energy efficiency standards of Prince George's County Public Schools and also satisfy community concerns and needs. The study provides an assessment of the existing conditions of the site, and analyzes the value and limitations these conditions impose upon the various approaches to this redevelopment project. The result of the study is a comparison of the relative costs of each of the options and the advantages and disadvantages of each developed by the design team, in consultation with Prince George's County Public Schools, William Wirt Middle School staff and students, and the surrounding community. This report will provide Prince George's County Public School an essential tool to aid them in making a highly informed and confident determination on the best approach to take to address the needs of this middle school and its community.



## Methodology

The study began with a thorough investigation of the existing building and site by a design team of architects and engineers, as well as a review of existing documents and previous building evaluations. The building was analyzed for the existing state of repair of its structure, finishes and various building systems and their potential for reuse, as well as its ability to meet the educational parameters for the proposed school. The design team met with building officials, students and the community to engage them in the process and discuss current issues with the building. The A/E design team then developed several schemes for the site and building that met the scope. Their progression was reviewed with the feasibility study committee throughout the process. The feasibility study committee made comments and suggestions which were incorporated into the schemes as they were developed and refined. Three schemes were finalized for presentation in this report.

G+P worked with Prince George's County Public Schools to adapt their current Middle School Educational Specification to the needs of this school and community for the purpose of this analysis. Excerpts from this document, including an abbreviated Educational Specification and Space Summary are included in Appendix B of this document.

Cost Estimates are included in Section 4 of this report for each scheme. The cost estimates for this report are based upon the current state funding formula adapted to the local conditions and current bidding climate as observed by G+P. We have included a cost per square foot for new construction, modernization and site development as well as a category for exceptional costs. The estimate reflects the requirements of constructing a building that can deliver a state of the art education and function for a minimum life span of 40 years in Prince George's County.



## Overview

The Prince George's County Public Schools system is ranked the 19th largest school district in the country. It has over 125,000 enrolled students and 9,000 teachers at 207 schools and 18,000 staff members.

Prince George's County Public Schools had system-wide facility assessments conducted in 2008 and 2012 which indicate that the county has an aging stock of facilities that currently require \$2.13 billion of renovations and repair and will require an additional \$715 million of funding over the next decade. These assessments indicated that William Wirt Middle School has a 34.45% FCI, which classifies the school as in good condition and would put the school deep in the waiting list for major capital investment. However, serious concerns were voiced by the community, staff and students to the school board that the school is in a more urgent need of major capital investment than has been indicated. It has also been noted that major renovations have not been conducted between now and the 2001 assessment which indicated that William Wirt Middle School had an 63% FCI, which would have classified the building as being towards the lower end of fair condition.

As with many other schools with 50 or more years of service, William Wirt Middle School is not energy efficient or well suited to be adapted to current educational paradigms or technologies. The school is also not well adapted to current security concerns or modern accessibility standards.

Additional concerns that the county must consider are enrollment projections that indicate student populations will be increasing in the next several years. The school system anticipates significant shortfalls in school capacity in the region of the county in which William Wirt Middle School lies. It will be necessary to construct new seats in the area, including both the expansion of existing schools and the construction of new schools. In addition to this, the student population at William Wirt Middle School is over its current State Rated Capacity (SRC) of 850.

By providing key site, building, cost, and scheduling analysis, this report will enable the school board to look at a range of possibilities for addressing the deficiencies that currently exist in the building and provide a long term facility that meets the needs of this community with a modern, state of the art educational environment.

## Existing Conditions

Any major site work would require the school board to make significant investment in the storm water management system and bring the site up to current standards. Current storm water outfalls from the building and the adjacent community are deteriorating local stream beds and are unacceptable by current Maryland Department of the Environment standards.

William Wirt Middle School was constructed in 1963 and has not had major renovations since that time. The existing mechanical systems along with heating, cooling, electrical and plumbing are at the end of their useful lifespan and need replacement. The existing building does not meet current ADA standards. Many of the finishes throughout the building need to be replaced. Of significant concern is the failing skin of the building, which is in need of complete replacement, regardless of whether the building undergoes other major renovations.

Given the need to reorganize spaces within the building, the design team found little of value in the existing building, in terms of items to retain in a major modernization of the school. The only potential reuse was of the major structure of the building: the floor and roof slabs along with the columns.



# executive summary

## Process

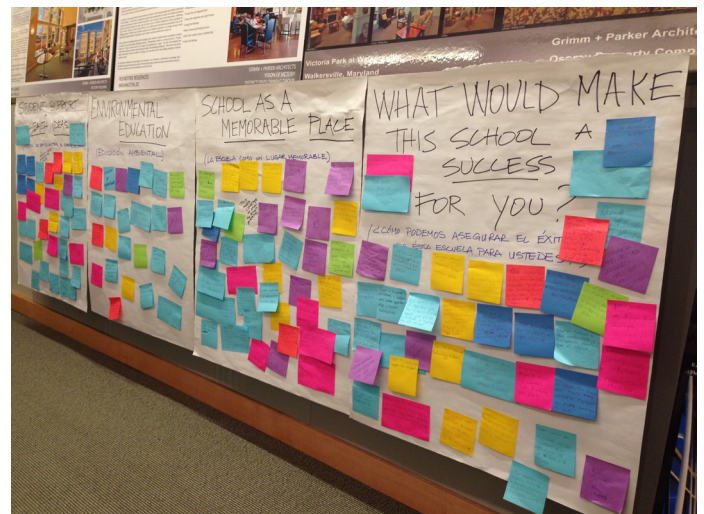
The team conducted an existing conditions assessment reviewing the primary structure, building envelope, secondary systems, mechanical systems, electrical systems, plumbing systems, kitchen and food service systems, energy efficiency, safety, security, technology, site conditions and site utilities.

We met with school officials, students and the community (through the PTSA), and discussed the feasibility process, the existing condition of the school, the educational specifications, and reviewed their vision, aspirations and concerns for the future of William Wirt Middle School.

We then held a series of three Feasibility Committee Meetings during which the design schemes and options for the modernization of the school were reviewed, discussed, then refined, and further reviewed and discussed. At the final meeting a consensus was reached on the recommendation to the school board to be included in the final report. The findings and recommendations of the Feasibility Committee were presented to the community to get their final feedback.

Throughout the process, the results of the meetings and assessments were posted online on a website that allowed the community to view the progress and provide comments.

The final report was then compiled and 20 copies were delivered to the Board of Education for their review and acceptance.



# Design Schemes

The design team examined three approaches to the Modernization of William Wirt Middle School: Maximum Reuse and Addition, Partial Reuse and Addition and Complete Replacement. Each scheme meets the basic requirement of providing a solution that gives the students and community an educationally adequate building that meets the draft Prince George's County Educational Specification for a 1200-student Middle School with a projected forty year useful life span. All three schemes also organize the school based on three small academic teams of four core classes for each of the three grades.

Scheme One and Two will require three and a half years for construction. Scheme Three will require two years of construction and is substantially more economical than Scheme One and Two.

## Scheme One

### Maximum Reuse of the Existing School with Addition

The existing building is demolished to its columns and slabs to allow for the reorganization of the school and to remedy building deficiencies. A major classroom addition with science labs is appended to the existing classroom bar to allow the school to be organized into three teams. Additions are added to the dining room and kitchen and a new administrative area and media center are added. Additionally new locker rooms, a dance room and fitness room are added at the gymnasium.

## Scheme Two

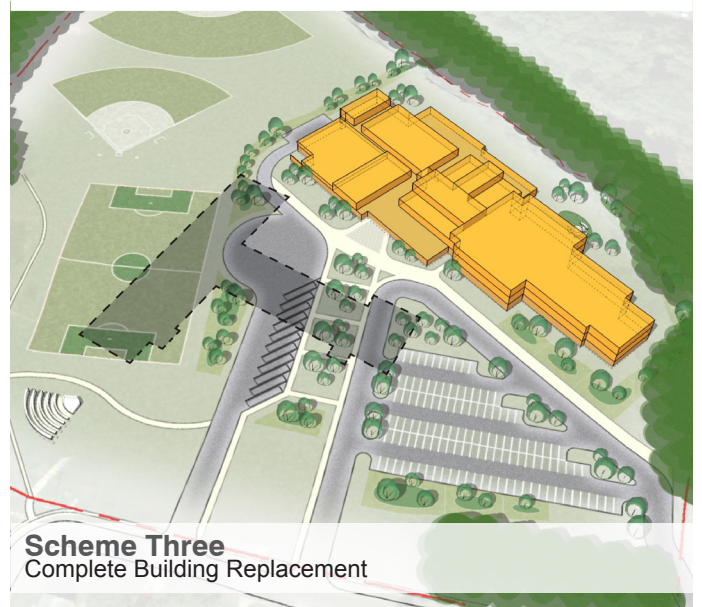
### Partial Reuse of the Existing School with Addition

The existing classroom bar is demolished to its columns and slabs to allow for the reorganization of the school and to remedy building deficiencies. A major classroom addition with science labs is appended to the existing classroom bar to allow the school to be organized into three teams. The existing dining room, music rooms and auditorium are demolished and replaced to allow for the spaces to have the ceiling heights that are appropriate for contemporary schools. A new media center and administration center are added as well as new locker rooms, a dance room and fitness room are added at the gymnasium.

## Scheme Three

### Complete Building Replacement

A new building is built on site directly behind the classroom bar of the existing building. Upon completion of the new building, the existing building will be razed and the site will be developed where it stood.



## Recommendations

After a thorough design and review process conducted with Prince George's County Public Schools, William Wirt Middle School Staff, Community, and the Feasibility Study Committee, the Feasibility Study Committee and Grimm + Parker recommend the Complete Building Replacement option for William Wirt Middle School. This solution provides the most viable educational facility at the most economical cost.

This facility appears to have been diligently maintained through the years, however all of its major systems, including its exterior skin are well past their useful life. As the current building is significantly undersized for the current population of over 1000 students, any scheme involving using the existing building for a maximum of 200 additional students will require significant additions and extensive demolition to meet the Educational Specifications and bring the building appurtenances up to current code, programmatic, and regulatory standards. The need to replace the exterior skin is a major cost and any solution with the existing building will also involve volumetric compromises and increased mechanical costs as ceiling heights in place will only accommodate modern mechanical systems with difficulty and additional cost.

Complete Replacement represents the most successful development of this site toward creating a state of the art facility for the projected student enrollment and the local community.



section  
two

existing  
conditions  
assessment

William Wirt Middle School was designed in 1962 by Ronald S. Senseman, AIA Architect and opened in 1963. The building is situated in the town of Riverdale, MD on the North side of Tuckerman Street at the end of 62nd Place, 63rd Avenue and 63rd Place at 6200 Tuckerman St., Riverdale, MD 20737. The site is adjacent to the Riverdale Hills Neighborhood Park on its West side and is bounded to the North-Northeast by the Brier Ditch waterway. The site also currently contains 9 trailers for classroom instruction.

## Site Assessment

The William Wirt Middle school is an existing school facility located at 6200 Tuckerman Street in Riverdale Park. The existing site area is made up of several parcels bisected by un-built public street rights of way. The site is developed as an existing middle school and includes open recreational fields as well as associated infrastructure such as parking and loading. The rear of the site, (north side) abuts a tributary of the Anacostia River. The site is actually multiple blocks and lots zoned R55.

The current school site is accessed from the adjoining residential neighborhood and has access from Tuckerman Street. There is additional access to the parking lot from 63rd Place. Additionally an un-built right-of-way for Norman Street exists on the west end of the site.

The Prince Georges County Soil Survey (4-67) indicates the Russett-Christiana – Urban Land Complex with slopes of 0 % to 5 % on the majority of the developed portion of the site. The existing school was developed in the early 1960s along with the associated recreational facilities. Because the soils have been disturbed by previous development, it should be assumed that all Environmental Site Design (ESD) devices required for any future redevelopment should include underdrains. These soil types are anticipated to be compacted and poorly drained. A geotechnical study will need to be prepared for the redevelopment of the site and will need to include site investigations for the building proposed, design of site asphaltic, and concrete paving. Subsurface investigations are necessary to determine the feasibility of ESD methods that may be proposed for the site.

The site has some potential environmental concerns including steep slopes, floodplain, wetlands, soils, and tree preservation. These items will need to be evaluated further during the concept design process. Once firmly identified, the final design shall be tailored to avoid and preserve these features as much as possible. Incorporation of sensitive areas into the educational curriculum is a possibility.

## Concept Development

The Prince George's County School Board plans to evaluate its options for the existing William Wirt Middle School and site. The construction is likely to be phased regardless of the final development decision and will take place in at least two phases because PGCPSS does not have access to swing space that can accommodate the school's enrollment. The open space on the site can be used to facilitate phasing of planned improvements on the site whether it is a new school or phased demolition and/or addition. There appears to be room on site to keep the existing school in operation while new work is implemented. This scenario will potentially result in interruption of school operations in a variety of ways including noise, use of the recreational field, and access by buses and cars. Also construction costs can be anticipated to be higher if the school remains open during construction. Access and parking areas will be asphalt paved with concrete curb and gutter. The site design will comply with the American with Disabilities Act (ADA). Walkways will be designed to minimize or eliminate student crossing of vehicle access routes.

## Zoning Requirements

The site is zoned R55 residential single family. Construction of a public school in a R55 zone is a permitted use according to the Prince George's County Code, Subtitle 27. The minimum side yard requirements are as follows:

- Front 25' (minimum of 50 feet to existing or proposed street upon which it fronts).
- Side 17' / 8' (min) \* For each one (1) foot the building exceeds 35 feet in height, the minimum side yard shall be increased by one half foot.
- Rear 20'

Because the site use is a public school it would not be subject to the Prince George's County Landscape Manual. However, the site design will conform to the design requirements of the manual as they relate to the site use and zone. Mandatory review by MNCPPC will be required for this project.

## Utility Availability

The site is located in a developed area; utilities such as electrical power, telephone, natural gas, and cable TV are located in the surrounding road network and are readily available to the site. Soltesz Company, the civil engineering project consultant, has submitted requests to service providers for information regarding their facilities around this site.



# existing conditions assessment

## **Public Water**

Public water currently serves the existing school site. Water service is provided by WSSC. An existing 6" water line exists in Tuckerman Street with a 6" service connection to the building. WSSC will ask that a new connection, if requested, be upsized to an 8" to facilitate future system updates in the neighborhood. The water connection will be a private onsite connection. A public water extension is not anticipated at this time, but this will depend on the final development scenario.

## **Public Sewer**

The existing school drains to an 8" public sewer which exits the site via the north property line roughly in the middle of the site. This line drains to a larger 27" public sewer in the neighboring stream valley. A new grease trap will be required to collect grease from the kitchen of the school before it reaches the main sewer.

## **Site Drainage and Stormwater Management**

The site is subject to the requirements of Prince George's County regarding Stormwater Management (SWM), for both quantity and quality control. The site will be subject to the requirements of new state requirements for SWM. SWM on the site will be accomplished using the new three (3) step process and will begin with the preparation of a SWM concept which will be submitted and approved by Department of Permitting, Inspections and Enforcements (DPIE). To satisfactorily provide SWM for the site PGCPs should anticipate the use of various ESD methods including but not limited to bioretention, microbioretention, pervious paving, green roofs, and rain barrels. Depending on drainage conditions in the area DPIE could request additional 10 or 100 year control in the form of a pond or underground. Although not anticipated at this time, this will need to be evaluated during the design phase.

## **Environmental Issues**

### **Wetlands**

A field inspection will be conducted to determine the presence of non-tidal wetlands. Because the site is developed, it is not anticipated that wetlands will be found on the site. This assumes that the current open areas are used for any proposed improvements without impacting forested steep slopes and floodplain along the north and east of the site.

## **Tree Conservation**

The Prince George's Woodland Conservation Ordinance requires a 20% conservation threshold. Because the site is already developed it is likely that there will be significant impacts to existing forest. This assumes the current developed area is utilized. Forest stand delineation and a Tree Conservation Plans will need to be submitted to MNCPPC, for review and approval. Offsite mitigation is possible depending on the final site proposal. PGCPs should consider options for offsite tree mitigation.

## **Floodplain**

The existing FEMA floodplain lies along the north edge of the site and does not appear to be a significant concern. However, this will ultimately depend on the development proposed. If a floodplain study is required, Prince Georges County Department of the Environment (DER) will prepare a floodplain study as part of a recently introduced county program.

## **Sediment Control**

The site is subject to the new state Erosion and Sediment Control regulations. Of particular interest to PGCPs are the new requirements for stabilization and the use of new standard details. These have been used by storm conservation district (SCD) for a year and should not greatly impact construction. The most restrictive new rule is the "20 acre rule." This rule requires that the contractor not disturb more than 20 acres at one time. The William Wirt site appears to be less than the 20 acres; this will need to be verified since it is made up of so many small parcels. However since the site is cleared and developed it does not appear that this rule, should it apply, would significantly impact the Wirt site.

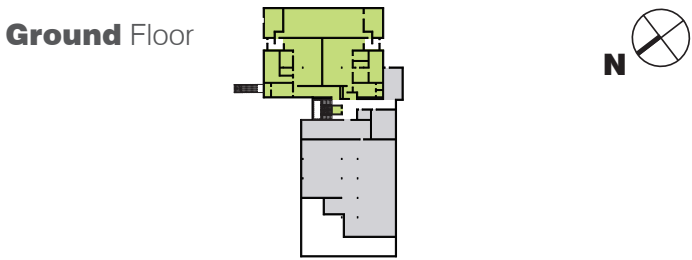
## **Environmental Education**

The plan for construction includes environmental education components for each scheme.

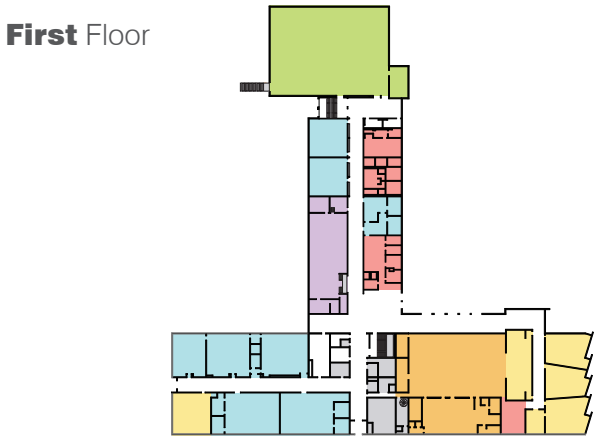


# Building Conditions

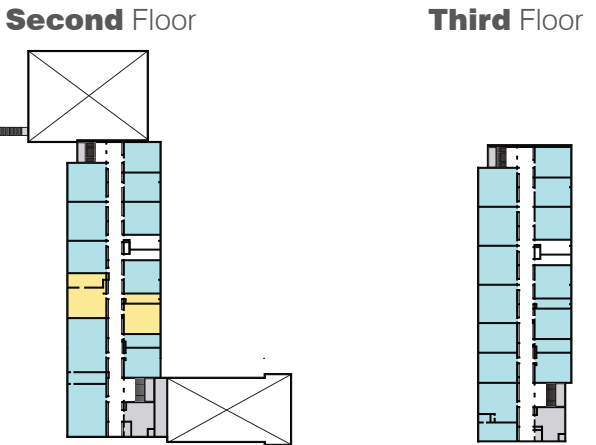
The building comprises 103,178 square feet over four stories, including 7,201 s.f. of crawl space. The building structure is concrete beam with some bearing wall. The building is organized along a three story bar that is oriented from WNW to ESE. On the first floor bar forms a T on it's West side with a bar that contains special and support spaces, with additional support spaces and classrooms in the main bar. The East side of the bar is capped with the gymnasium on the first floor and the locker rooms, dance room and fitness room below the gymnasium.



The **ground floor** of the building is below the gymnasium and extends under a portion of the classroom bar and contains the dance and fitness room and the boys and girls locker rooms and showers, gymnasium storage, laundry room and general storage space. Adjacent to that, the crawl space extends underneath the classroom bar.



On the **main floor** the bar forms a T on its west side with a bar that contains the music spaces, dining hall and kitchen towards the south, with a central circulation core and shop spaces (now used for general classrooms) on a double loaded corridor to the north of the head of the 'T.' with the media center, some classrooms and administrative spaces on a double loaded corridor, on the first floor of the main bar. The main gymnasium is on the main floor capping the east side of the main bar. The main entrance faces the dining hall at the head of the 'T.'



The **second** and **third** floor of the building contain general classrooms along double loaded corridors.

- key
- Administration
  - Food Services
  - Fine Arts
  - Athletics
  - Classrooms
  - Media
  - Building Services

# existing conditions assessment

## Exterior Building Envelope

The exterior walls are concrete masonry unit (CMU) backup with brick exterior solid wall construction or precast concrete panel with single pane aluminum windows. Water damage is in evidence in most rooms with exterior walls throughout the building. The damage ranges from bubbling paint to spalling concrete and plaster. Many of the leaks appear to be active. The lack of cavities within the exterior wall construction will likely lead to continuing difficulties with water infiltration regardless of effected repairs. The extensive water infiltration issues have created a continuing mold problem in the building even with ongoing remediation efforts. Air conditioning is handled throughout the much of the building with window units.

The end walls of the gymnasium showed cracking from the 2012 earthquake, but have been sealed and appear to be stable. The windows throughout the building are single pane aluminum windows, the majority of which have had their panes replaced with lexan. The exterior walls and single pane windows are very energy inefficient and given their lack of insulation or air cavities, would require replacement to make effective improvements.

## Stairways/Entrances

The main entrance to the building is off the bus loop at the dining room corridor. The entrance has steel doors that do not meet current accessibility standards. The sidewalks leading to the entrance are concrete and are in need of repair. There is an alternate entrance near the gymnasium with the same characteristics as the main entrance. Many of the paved pedestrian routes around the building are not fully accessible. The building has two main stairwells, which would not be enough to meet current code requirements. The stairs in the building have vinyl asbestos tile (VAT) flooring, patched with vinyl composition tile (VCT) in places with metal abrasive nosings. The main stairs do not have the required width to meet modern code requirements. The handrails at the stairs also do not meet modern code requirements.

## Roof

The roof is a built-up roof with gravel, and gravel stop edges. The roof was installed approximately 11 years ago and since that time, many spot repairs have been executed. It appears that a complete roof replacement, including the tear-off of insulation down to the roof deck is due.



Cloudy lexan windows, venetian blinds and window mounted AC unit (typical).



Water damage at building exterior wall.



Water damage at building exterior wall.



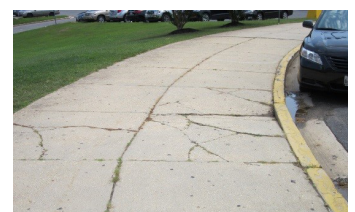
Deteriorating paint and plaster.



Water damage at window base.



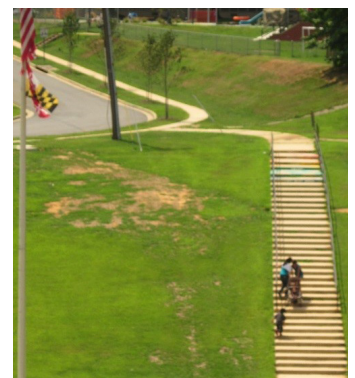
VAT with significant deterioration.



VAT with significant deterioration.



Exterior exit stair at gym.



Some existing site pathways have limited accessibility.

## Circulation

The main classroom corridors appear to be too narrow to accommodate circulation and locker access simultaneously.

## Floor Finishes

The original floors were terrazzo in the entry corridors, vinyl asbestos tile in most other spaces, wood at the gymnasium and stage, ceramic tile at the bathrooms and locker rooms, and concrete or painted concrete at the utility spaces. The gymnasium floor has been replaced within the last five years. There is some water damage to the stage floor. Active leaks were observed creating puddles on the gymnasium floor during the site visit and minor water damage was observed.

On the first floor, the vinyl asbestos tile has largely been replaced with VCT. On the second floor, the vinyl asbestos tile has been replaced piecemeal with VCT. In areas, the vinyl asbestos tile is deteriorating.

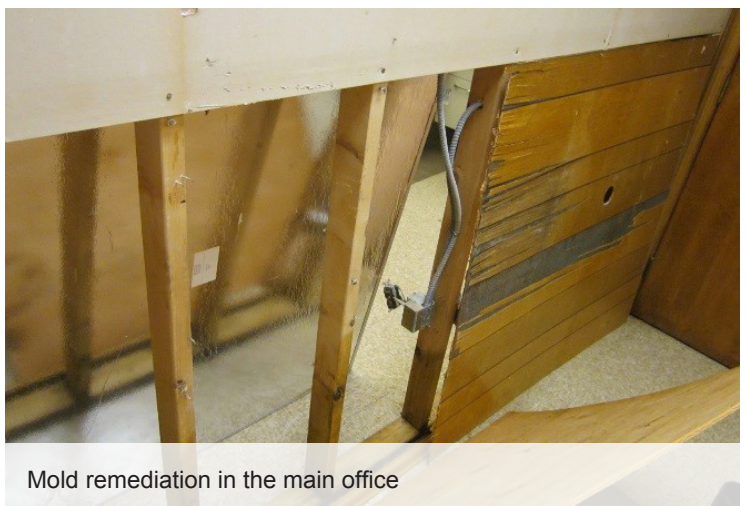
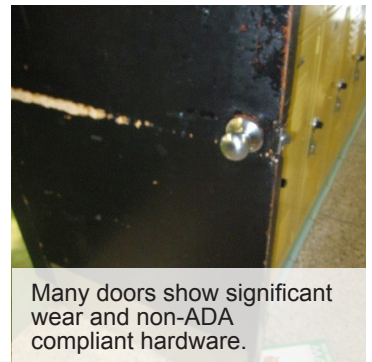
## Interior Doors & Hardware

The typical doors throughout the interior of the building have solid core wooden doors with wooden frames. Most doors within the building have round door knobs. The doors and hardware are largely original to the building and are in poor repair. The door hardware is not ADA compliant. Many of the door configurations are not ADA compliant as the required clearances are not provided.

## Interior Walls

Interior corridor walls and bathrooms are mainly glazed concrete masonry unit (CMU) wainscots below CMU, stair walls are glazed CMU, and the classrooms have CMU walls. There are limited amounts of brick faced partitions in the main corridor. There have been limited additions of CMU and gypsum partitions within the building to meet new needs. It is a possibility that the glazing on some or all of the glazed CMU may contain lead which would create an abatement issue when demolished. An industrial hygienist should be hired to review this issue along with asbestos insulation in the building as part of any major improvement project.

In several areas in the building, black mold has been found. It appears to be the result of the lack of humidity control in the building, combined with the porous exterior envelope.



# existing conditions assessment

## Ceilings

The ceilings are mainly acoustic ceiling tile (ACT) in commonly occupied spaces, gypsum board in bathrooms and exposed concrete ceilings or tectum deck in utility spaces. Ceiling fans were installed in the original building, but are at the end of their serviceable life.

Humidity control throughout the building is poor, which is not good for the suspended ceilings and there is bowing in the ceiling tiles in many spaces in the building.

## Bathrooms

The bathrooms are finished with VCT floors or ceramic tile floors, glazed CMU and CMU walls and gypsum board ceilings. The building's bathrooms have had minor renovations over their lifetime, but none meet current accessibility standards.

## Lockers

The lockers have been recently replaced in the building and are in good condition. However, it should be noted that the narrowness of the corridors along with the overenrollment in the building causes the lockers to be a source of obstruction during classroom changes. As a result, they are only utilized in the morning, at lunchtime and at the end of the day by school policy.

## Renovations

There have been no major renovations of the building, beyond a roof replacement and the locker replacement noted above.

## Casework and Appurtenances

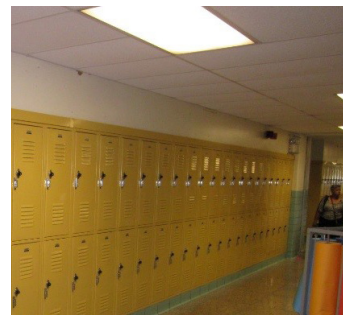
The WWMS casework is original to the building. The casework remains marginally functional; many pieces of the hardware are damaged and the casework has broken shelves, and doors. The casework throughout the building is due for complete replacement.

Venetian blinds on the windows are original to the building. A substantial portion of the blinds are damaged and function poorly.

The water fountains throughout the building are in working order after the water line was replaced last year.



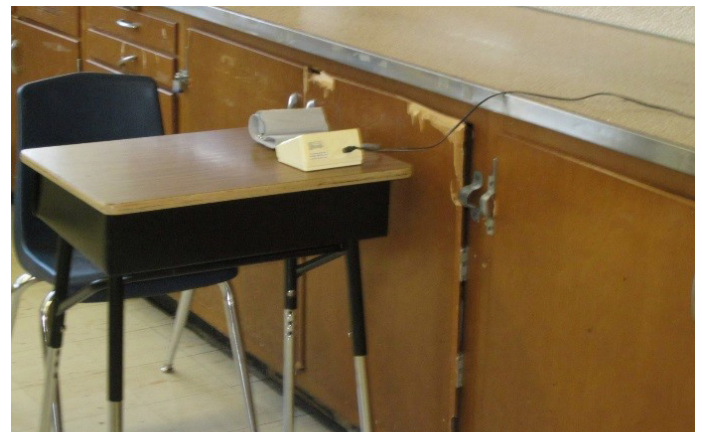
Typical classroom fan - damaged



Lockers obstructing corridor space



Bathrooms do not provide ADA clearances.



Damaged casework



Damaged casework



Damaged window blind

## Classrooms

The classrooms are VCT or VCT, CMU and ACT, except for shop spaces that have been converted into general classrooms. In the converted shop spaces, gypsum board partitions have been added to the existing concrete floor, CMU walls and exposed ceiling finishes.

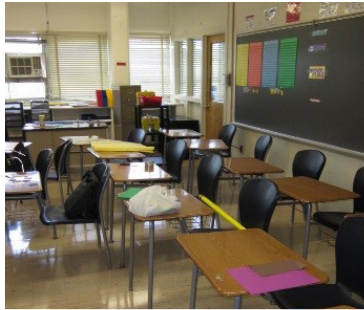
The classroom sizes are small, causing classes to be overcrowded. The finishes in the classrooms are in poor condition.

In the shop spaces, the classroom finishes and casework are inappropriate for their current use. The converted shop spaces also contain appurtenances such as shop sinks that are not appropriate to the spaces' current use as general classrooms. Teachers also reported significant pest infiltration through the compromised building skin.

## Media Center

The media center has VCT floors, CMU walls and ACT ceilings which are bowing from excess humidity.

It is only accessible by stairway or by an exterior route and is severely undersized for the school enrollment. It is not suitable for hosting the functions of a modern middle school media center program.



Undersized classrooms are congested



Science laboratory casework is worn



Entries to the media center are problematic



Media Center is undersized



Media Center is undersized

# existing conditions assessment

## Gym

The gymnasium complex is problematic as the layout provides difficulties for the gym staff to supervise the entire space. The gym is in fair condition as it has recently had a replacement of the strip wood floor. The gym has adequate floor space but does not contain the current PGCPs requirements for bleacher space. The current bleachers are due for replacement.

A dance studio and fitness room are remotely situated below the gymnasium in the basement which has VCT floors, glazed CMU walls and very low tectum ceilings.

The boys' and girls' locker rooms with associated office space, storage rooms and laundry room are located in the basement as well, but cannot simultaneously be supervised with the dance studio and fitness rooms.

The locker rooms have recently had their lockers replaced. The shower areas are currently used as storage spaces. The basement gymnasium spaces are also problematic as accessibility to these spaces are limited to stairways that do not meet current code standards.



Locker rooms have new lockers



Current bleachers are due for replacement.



Dance Room



Dining Room

## Food Services

The dining hall and kitchen are in fair condition, but are undersized for the school population. Additionally, the kitchen has only two serving lines which causes congestion during lunch times. Finishes in these spaces are well maintained but aged. The dining hall is VCT, CMU and ACT. Acoustical ceiling tiles in the dining room show minor humidity damage. The kitchen has quarry tile flooring, glazed CMU walls and a combination of gypsum board and acoustical ceiling tile. The dining room also functions as the school auditorium, but the stage is only accessible by stairs.



Kitchen serving lines

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## Building Accessibility

The age of the William Wirt Middle School building means that accessibility issues were not a primary concern at the time the building was built. No major renovations have occurred in the building, since the enactment of the Americans with Disabilities Act. Therefore few elements have accessible features, and many elements of the building do not conform with ADA requirements, such as:

- Walks and approaches to the building are not ADA compliant and have significant cracking and deterioration.
- The elevator is not ADA compliant.
- The bathrooms do not meet all current accessibility standards. Handicapped door, fixture clearances and turnaround requirements are not provided.
- The stage does not have ADA access and is only accessible by stairway.
- Doors throughout the building do not have ADA-compliant hardware. Many doors also do not have required approach clearances to be ADA compliant. In some instances walls will need to be moved to achieve compliance.
- Many of the spaces within the building are not accessible, including the locker rooms and the media center, which are only accessible by stairway.

## Building Code Analysis

The existing building does not have an automatic sprinkler system except for in the boiler room. Installing a sprinkler system throughout the building 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. Without a sprinkler system, the building exceeds per floor allowable building area restrictions under IBC 2012.

Additional components of the building are not code compliant, including the following:

Most exit stair configurations and railings are not code compliant, including enclosures, landing depth, guardrail height and handrail extensions.

The doors throughout the building have their original hardware. Many of the doors show substantial damage and are due for replacement. The doors have knobs which do not meet current accessibility standards and the closers on many doors do not function properly. Additionally the classroom doors cannot be locked from within the rooms which is a security concern in the case of a school wide lockdown.

# existing conditions assessment

## Program Analysis

Space Requirements	Existing	Ed Spec
Core Academic/Science	35,609	58,775
Media Center	3,469	6,740
Visual Arts	2,480	3,100
Performing Arts	4,650	6,235
PE/Indoor	17,108	16,550
Administration/Health/Guidance	5,229	7,545
Student Dining + Food Service	9,370	10,070
Community Space	-	3,000
Maintenance + Custodial Services	3,239	1,350
Total Net Area	81,154	113,365



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# Structural Analysis

The purpose of this section is to assess the conditions of the existing structural systems.

## Structural Systems

Typical Roof Structure at One Story Section:

- 2 ½" poured in place "perlite" roof system on metal deck or 3" "tectum" roof panels on steel bulb tees spaced at 32 5/8" on center.
- Open-web steel joists spaced between 3'-0" and 4'-0" on center
- Open-web joists supported by steel beams and tube/pipe columns.

Roof Structure at Gymnasium:

- 3" tectum roof panels supported by steel bulb tees spaced at 32-5/8" on center.
- 8" deep roof rafters spaced at +/- 7'-3" on center.
- Tapered steel girders supported by reinforced concrete columns.
- Tapered girders are spaced at 16'-0" on center and clear span the gymnasium.

Roof at Classroom Wing:

- One way concrete joists composed of a 3" concrete slab and 9" deep by 5" concrete stems spaced at 24" on center.
- One way joists span north/south to concrete beams.
- Reinforced concrete beams along the exterior walls and along the corridor walls.
- Reinforced concrete columns along the exterior walls and corridor walls support the beams.

Third and Second Floor Framing:

- One way concrete joists composed of a 4" concrete slab and 12" deep by 5" wide concrete stems spaced at 24" on center.
- One way joists span north/south to concrete beams.
- Reinforced concrete beams along the exterior and along the corridor walls.
- Reinforced concrete columns along the exterior and corridor walls support the beams.

First Floor Framing:

- 5" thick slab on grade with welded wire reinforcing.
- One way concrete joists composed of a 2 ½" concrete slab and 12" deep by 5' wide stems spaced at 24" on center at gym floor and area over the crawl space.
- One way joists span north/south at the gymnasium and east/west at the west end of the 3 story classroom wing.
- Reinforced concrete columns supported by interior and exterior concrete columns.

## Foundation

- Reinforced concrete foundations bear on natural soils.
- Columns and walls are supported on reinforced concrete piers and reinforced concrete footings.
- Exterior walls at the basement and crawl space area are composed of reinforced concrete with a brick veneer.
- Typical exterior foundation walls are composed of masonry and brick.
- The construction documents indicate that the foundation system is designed for an allowable bearing pressure of 6000 psf.

## Miscellaneous

- Exterior walls are either brick and masonry or precast panels.
- Exterior walls are supported from the perimeter concrete beams at the classroom wing.
- Interior walls are typically non bearing.
- Interior masonry walls above the first floor are supported on reinforced concrete beams.

## Mechanical Analysis

The purpose of this section is to assess the conditions of the existing mechanical systems and to evaluate the proposed plan for future use of the existing building with consideration given to the potential re-use of the existing mechanical systems.

### Heating Systems

The main mechanical room has two (2) steam boilers, a condensate receiver, two (2) pumps and a converter. The building is heated by a hot water radiator located along a perimeter wall that receives heat from steam generated by boilers. These gas/oil fired boilers were installed in 2002 to replace three (3) original steam boilers.

Existing condensate receiver is located in a pit in the main mechanical room. Based on visual observation, the condensate receiver is in good condition. Hot water pumps and heat exchanger is located in mezzanine inside the main mechanical room.

Based on visual observation, both existing pumps are in fair condition.

### Existing Boilers Data

Boiler 1

Manufacturer: Hurst  
Serial Number: FB1160.15.1  
Gas Input: 2,240 MBH  
Steam Output: 8,004 Lbs/Hr

Boiler 2

Manufacturer: Hurst  
Serial Number: FB1160.15.1  
Gas Input: 2,240 MBH  
Steam Output: 8,004 Lbs/Hr

### Existing Pumps Data

Pump 1

Manufacturer: Dayton  
Model Number: 2N984K  
Gas Input: 2,240 MBH  
Steam Output: 8,004 Lbs/Hr

Pump 2

Manufacturer: Hurst  
Serial Number: FB1160.15.1  
Gas Input: 2,240 MBH  
Steam Output: 8,004 Lbs/Hr



Existing Boilers



Existing Condensate Receiver/Condensate Pumps



Existing Hot Water Pump



Typical Existing Hot Water Radiator



Existing H&V Unit Serving Gymnasium



Typical Existing Window AC



Existing Roof Top Units

Seven (7) Heating and Ventilating (H&V) units were installed originally; six (6) out of seven (7) of these units were disconnected and abandoned in place. Only H&V unit for gymnasium still connected.

### Cooling Systems

Two (2) roof top units and window AC units are the main source of cooling for the school. There is no central cooling system. Cooling for cafeteria/Multi-purpose room is provided by two (2) roof top units.

### Existing Cooling System Data

Window AC

Manufacturer: Friedrich

Model Number: SL35J30-A

Cooling Capacity: 36,000 Btu/Hr

EER: 9

Refrigerant Type: R-22

Volt/Phase/Hz: 208-230/60/1

Window AC

Manufacturer: Friedrich

Model Number: SL35J30-A

Cooling Capacity: 35,000 Btu/Hr

EER: 8.6

Refrigerant Type: R-22

Volt/Phase/Hz: 208-230/60/1

Window AC

Manufacturer: Fedders

Model Number: A6Y12F2A-E

Cooling Capacity: 12,000 Btu/Hr

EER: 9.8

Refrigerant Type: R-22

Volt/Phase/Hz: 115/60/1

Roof Top Unit

Manufacturer: Carrier

Model Number: 50TM-014---501--

Cooling Capacity: 36,000 Btu/Hr

EER:

Refrigerant Type: R-22

Volt/Phase/Hz: 208-203/60/3

### Ventilation Air

Natural ventilation is used in classrooms, media center, auditorium and offices through window opening. Each classroom is provided with two (2) exhaust grilles which are connected to exhaust fan on the roof. Ventilation air into Cafeteria/Multi-purpose room is supplied by two (2) roof top units.

Ventilation air into the boiler room is provided by louver with motorized damper. Gymnasium ventilation air is provided through louvers located along the perimeter wall as well as heating and ventilating (H&V) unit located in mechanical room below the gymnasium.

### Exhaust System

Roof mounted exhaust fans are used to exhaust the restrooms, classrooms and offices area. Based on visual observation, the exhaust fans are in good condition.

### Controls

Building Automation System (BAS) is not present for the school. Radiators and H&V units are controlled through pneumatic thermostat located in classroom/offices and window AC uses its own self-contained control and thermostat.

Boilers have their own self-contained controller and are also connected to main controller. The boiler main controller is provided by Heat Timer.

Roof top units are controlled by Johnson control located inside main mechanical room.



Operable Window



Roof Mounted Exhaust Fan



Boiler Main Controller



Johnson Control

## Electrical Analysis

### Existing Electrical Systems

The purpose of this section is to assess the conditions of the existing electrical systems and to evaluate the proposed plan for future use of the existing building with consideration given to the potential re-use of the existing electrical systems. The main equipment and systems recommended have been selected based on the various architectural schemes, mechanical system options, energy efficiency, reliability, maintenance, cost, and other critical factors.

### Incoming Utility Service

The building is presently served from an underground electric service that appears to extend from a PEPCO utility pole located at the corner of 62nd Place and Tuckerman Street, down to an underground vault enclosed step-down transformer located on the northwest side of the school building via an underground ductbank. The secondary service feeders from the transformer then enter the main electric room located on the First Floor via an underground concrete encased ductbank and terminate at the Current Transformer (C/T) section of the main switchboard.

### Normal Power Distribution System

The main switchboard is rated at 3000 amps, 208/120 volt, 3 phase, 4 wire and is in good condition. Section 1 of the switchboard comprises the C/T cabinet and Metering space. Section 2 contains the Main Service Disconnect Switch while sections 3 and 4 house the Distribution Section. In addition to the elevator and the two rooftop units, the distribution section feeds various branch panels that are distributed throughout the school.

There are 2 branch panels installed on the Ground Floor, 17 branch panels on the First Floor, 2 on the Second Floor and 2 on the Third Floor of the school. Most of these branch panels are located in the main corridors and mainly feed the local loads such as lighting, receptacles, the bell and clock system, and small mechanical loads like exhaust fans, window A/C units and unit heaters. Certain other panels are located in and are dedicated to serving that particular space. For example, panels 'KL' and 'KP' are located in the kitchen and feed all the kitchen equipment like the kitchen lights, refrigerator, freezer, garbage disposal, dishwasher, oven, food warmer, etc. Panels 'BRL' and 'BRP' are located in the Boiler room and mainly feed the boilers, circulating pump, sump pumps, air compressors and other loads located in the boiler



Underground Vault containing PEPCO Step-Down Transformer



Main Switchboard



Main Service Disconnect Switch



Typical 100A Plug-in Busway



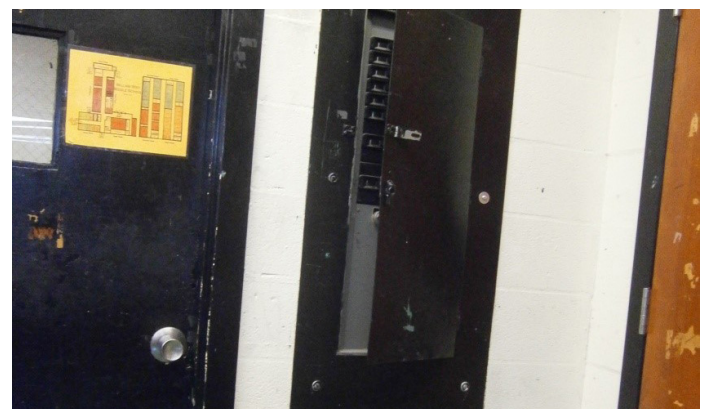
Typical Remote Control Cut-Off Station



Panel 'KP'



Panel 'BRP'



Panel 'P3'

room. Panels 'G' and 'P-6' are located in the Gym and mainly feed the gym lighting, receptacles, scoreboard and the H&V (Heating & Ventilating) unit dedicated to the gym. Three special purpose classrooms (now used for other functions) - the Crafts Shop, Metal Work Shop and Woodwork Shop have dedicated panelboards located within the classrooms themselves which in addition to feeding the typical, local loads, also feed a 100A plug-in busway each. The busways which are all provided with a remote control cut-off station located by the entrance to the classroom, were originally meant to feed equipment such as drills, lathes, grinders, kilns etc and are mostly no longer in use. One of these classrooms currently serves as a computer lab.

A majority of the school's branch panels are in poor to bad condition and are beyond their useful life. Furthermore, most of these panels are recessed mounted in corridor spaces. While not a code violation, it is strongly recommended that the electrical distribution equipment to be installed in dedicated spaces, like electrical rooms and/or closets.

The school is served by a 25Hp hydraulic elevator. The electrical equipment serving the elevator appears to be installed in fair to good condition.

The possibility of the installation of an all new HVAC system, a Fire Pump, Plumbing loads, Lighting loads, Power loads, IT loads etc, resulting from the from the renovation and/or expansion of the school necessitate an electrical service upgrade and it is strongly recommended that the building's electric distribution system be removed and replaced in its entirety.



Emergency Panel 'E' Main Emergency Disconnect switch and FACP



Typical Suspended Classroom Lighting Fixtures



Typical Recessed Classroom Lighting Fixtures



Typical Recessed Corridor Lighting Fixtures



Typical, Newer Motion Sensors



Typical Outdoor Lighting Fixtures



Typical Outdoor Lighting Fixture



Typical Pole Light



Typical Exit fixture

# existing conditions assessment

## Emergency Power Distribution System

The emergency power is provided by tapping the service feeders in the C/T cabinet, ahead of the main service disconnect switch. The tapped feeder serves a 100 amp fused disconnect switch, which feeds the emergency Panel 'E' rated at 100 amp, and the Fire Alarm Control Panel (FACP).

A second emergency tap feeds the program clock and bell coded transmitter unit located in the main electric room.

The school does not have a generator for emergency backup.

## General Interior Lighting System

The interior of the building is typically illuminated with recessed, surface or stem mounted 2'x4' and 1'x4' fluorescent lighting fixtures. These fixtures are equipped with T-8 fluorescent lamps and are in average to fair condition.

The fixtures in classrooms, offices and corridors are generally controlled by toggle switches located in the respective room/area, but most of them are mounted well above the maximum height of 48" above finished floor required by the ADA. It is also clear that motion sensors were added recently in these spaces in order to conserve energy. This is evidenced by surface run conduits installed after initial construction, containing power wires terminating at surface mounted motion sensors.

## General Exterior Lighting System

The exterior of the building is typically illuminated by wall or surface mounted HID lighting fixtures. The fixtures are in average to fair condition and are typically controlled by a time-clock.

The school parking lot and a section of the trailers is illuminated by pole mounted HID lights.

## Emergency Lighting System

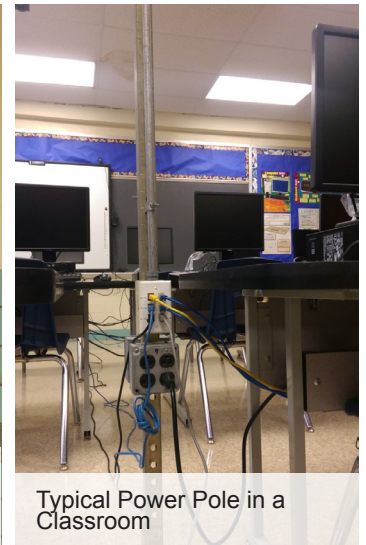
The building is provided with a limited emergency lighting system. A selected number of fixtures are wired to the emergency lighting Panel 'E' in the main electric room. There are also wall mounted emergency battery packs in the multi-occupant spaces like the gym, locker rooms, the auditorium, near stairways and along corridors. Exit fixtures are provided at, or near the exit doors and are equipped with emergency batteries.



Typical Emergency battery pack unit



Typical Low Voltage Equipment Rack in Custodian Closet



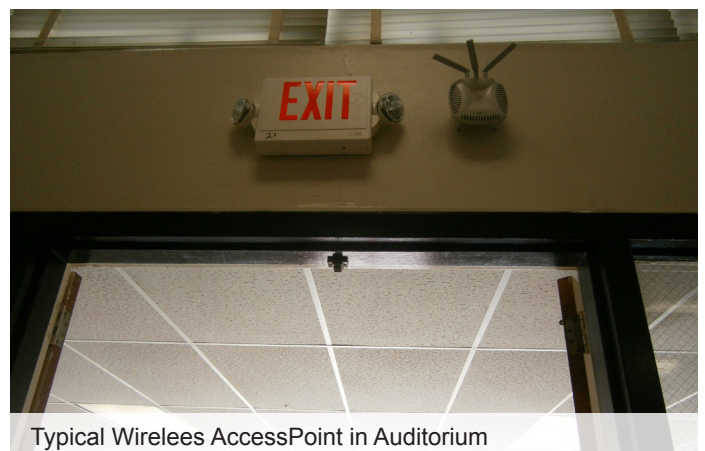
Typical Power Pole in a Classroom



Typical Security Camera in Corridor



Fire Alarm Control Panel



Typical Wireless AccessPoint in Auditorium

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Per the IBC, all paths of egress, including exit discharge doorways shall be provided with at least 1 footcandle average illumination in case of an emergency. Several exit discharge doorways are not equipped with the required emergency light fixtures.

### **Power and Teledata Outlets**

While most of the power outlets appear to be original to the school, there are areas where additional power outlets and all new teledata outlets were added close to existing power outlets. This prompts the assumption that the outlets originally provided were not sufficient for the growing power and telecommunications requirements of the school. This is evidenced by surface run conduits containing power wires terminating at surface mounted receptacle and data boxes and by ceiling to floor power poles installed after initial construction. It also appears as if several of the regular outlets located above counters that house a sink, were replaced with Ground Fault Interrupter (GFI) type receptacles to meet current code requirements. However, there are instances where regular, non-GFI outlets remain. All the outlets appear to be in fair condition.

Some of the school's low-voltage equipment racks are currently located in custodian closets. While it is understandable that this occurred due to space constraint, all high and low voltage equipment will require dedicated spaces.

### **Miscellaneous Systems and Devices**

The school is equipped with a relatively new Telecommunications System with Wireless Access Points (WAPs) provided in most multi-occupant use areas like the auditorium and admin area. The school also has a modern, centrally monitored security system with most egress corridors and doors covered by indoor and outdoor security cameras. Both systems are in fairly good condition.

## **Fire Protection Analysis**

The purpose of this section is to assess the conditions of the existing fire protection system and to evaluate the proposed plan for future use of the existing building with consideration given to the potential re-use of the existing fire protection systems.

### **Fire Suppression System**

The boiler room has a sprinkler system implemented which is connected to the incoming water service. A 3-inch double check valve is installed after the tap to the water supply. The backflow preventer and associated sprinkler system appears in good condition.

See Photo 4-14 for backflow preventer installation serving the sprinkler system. Refer to the fire alarm portion of this report for additional fire protection systems.

### **Fire Alarm System**

The building currently has a central fire alarm system that appears original to the building and does not meet current ADA or code requirements. The system consists of a Fire Alarm Control Panel (FACP), manual pull stations and fire alarm horns but no audio-visual devices. The FACP is manufactured by Ellenco Inc. and is located in the main electrical room. It is recommended that the existing fire alarm system be removed and replaced with a new addressable system in compliance with the current code requirements. See Photos 3-24 and 3-25 for the FACP and related devices.

## Plumbing Analysis

### Existing Plumbing Systems

The purpose of this section is to assess the conditions of the existing plumbing systems and to evaluate the proposed plan for future use of the existing building with consideration given to the potential re-use of the existing plumbing systems. The following plumbing systems that serve the various areas of the building were inspected for usability, condition, required upgrades and/or replacement. The assessment will focus on these items for the Plumbing systems:

- Domestic Water Supply System
- Domestic Hot Water System
- Storm Drainage System
- Sanitary Waste System
- Plumbing Fixtures
- Natural Gas System
- Fire Suppression System

William Wirt Middle School has retained the majority of the original plumbing systems, with a few renovations and updates noted. To ensure proper plumbing system performance and code compliance, modifications will be required for several plumbing systems within the school.

### Domestic Water Supply System

The domestic water supply enters the structure from the west where it turns up through the slab inside the boiler room. As the 4-inch service enters the building, a main shutoff valve serves the entire building domestic supply. Based on fixture counts derived from base building drawings and site visit confirmation, an estimated domestic water load of 239 gallons per minute (GPM) is established.

The school's water supply does not have a main backflow device installed upon entry to the structure. While main water line protection is not a requirement of the International Plumbing Code, it is a requirement of the local water authority. Downstream of the main valve is a tap for a hose bib along the boiler room wall, the pipe then splits off into a 3-inch sprinkler supply, and a line which passes through a filter assembly. The strainer/filter, installed in 2011, has a main shutoff valve on the inlet which then connects back to the 4-inch water supply downstream of a ball valve. Though the isolation valve prior to the filter was not observed to be open or closed, the ball valve on the filter bypass appeared to be open during the survey, at the



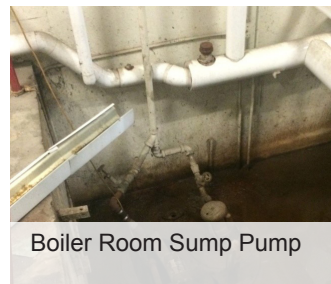
Incoming Water Service



Hot Water Storage Tanks



Exposed Storm Piping



Boiler Room Sump Pump



Third Floor Restroom Urinals



Third Floor Restroom Lavatories



Third Floor Restroom Lavatories



Drinking Fountain



Corroded Trap Leaking



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same time the pressure gauge at the filter was indicating 53 psi. Further investigation of the filter assembly is necessary, as well coordination with the school's staff to discuss use and operation of the filter.

The 3-inch supply to the boiler room sprinkler system is protected by a double check valve assembly.

The system only serves the sprinklers within the mechanical/boiler room without any of the other areas of the building having sprinklers.

The mechanical makeup is supplied through a 1-1/2 inch cold water connection which passes through a Reduced Pressure Zone Assembly (RPZ) with the backflow device discharging to the boiler room floor.

The piping within the mechanical/boiler room is insulated and in fair condition. There have been upgrades and renovations within this area during the building's life span which included the distribution piping.

### **Domestic Hot Water System**

Hot water supplying the school is generated by a boiler located in the first floor boiler room. Along with two vertical storage tanks, the boiler, which is rated for 199 MBH, generates about 138 gallons per hour. This water is stored and circulated within the storage tanks prior to distribution to various plumbing fixtures within the building. The equipment appears to be in good condition without any signs of damage or leaks. The storage temperature was indicated to be just above 110°F. Refer to Valves (TMV) observed at or near the hot water main. The hot water supply piping within the boiler room was in good condition with insulation on all observed piping.

The base building drawings indicate a booster heater utilized for the kitchen dishwasher. While a heater was not observed within the kitchen, the dishwasher was not operational; rather the space was used for storage. The remainder of the kitchen is supplied by the main building hot water supply.

Hot water circulation system is installed in the school. These hot water return lines run parallel to the remote hot water branch lines within the building, and through a pump circulate the water back to the hot water heaters when the temperature within the system drops below a set point.

The building's storm system consists of roof drains collecting rainwater and horizontal piping running through ceiling space prior to penetrating through the wall of the structure where external downspouts drain down to underground storm piping. As there is very little ceiling space in the third floor classrooms, several horizontal storm pipes are either enclosed in a makeshift soffit or run exposed to the exterior wall.

There were several reports by school staff of leaks within the piping and storm drain system, with large quantities of rainwater pouring out of the ceiling during large rain events.

### **Sanitary Waste System**

The building sanitary system has multiple exit points taking the building's sewage out to the city main. The base building drawings show a 6-inch main leaving the building to the north which serves the laundry and nearby fixtures on the ground floor, an additional 5-inch sanitary exits to the north serving the first floor. Two additional building sewer lines draining the western portion of the structure also discharge to the north side of the school. Site utility plans were not available to document the site drainage and sanitary main sizes and locations outside the school.

The waste piping for the school is original with only a few locations observed where accessible piping was replaced with PVC.

The sanitary vent system is generally vertical stacks that go through plumbing chases and terminate at the roof. A few vents through roof penetrations were sized at 2-inches which is not recommended as typically the minimum accepted size is 3-inches. This helps prevent closure due to snow or frost.

The recessed boiler room has a sewage ejector located adjacent to the hot water generator. The duplex sump pump system serves the floor drains within the lower areas that cannot drain through the gravity system. The pumps and basin appear to be original and sized for 25 GPM at 20 feet of head. The 1/3 hp pumps discharge to a mop sink located above through a 1-1/2 inch forced discharge.

# existing conditions assessment

## Plumbing Fixtures

The observed plumbing fixtures in the group restrooms on the third floor were in good condition, and appeared to have been recently installed. Second floor restrooms were locked at time of survey and were not observed. The water closets were floor mounted, bottom outlet, with manual flush valves.

Urinals and lavatories were wall mounted fixtures with manual faucets and flush valves. There were several locations where lavatories and urinals were removed with supply and waste piping capped behind the wall.

Service sinks and classroom sinks all appeared to be original to the school, with majority of the fixtures experiencing problems such as leaks, breaks, or overall non-operational. Science room sinks were disconnected, with only the teacher's station still functional. The solids/clay traps have rusted in majority of the art rooms allowing water to seep down the cabinetry and rot the wooden panels.

Along with the rest of the building, the locker room fixtures were also showing their dated condition. Gang showers were not operational at time of visit, and had noticeable calcium deposits on the stainless steel. The single showers did not have handles to the faucets.

## Natural Gas System

Gas is supplied to the building from the west through a 1-1/2 inch high pressure line provided by Washington Gas. The service line has a capacity of 4,500 MBH with the existing meter only being able to handle 1,010 MBH.

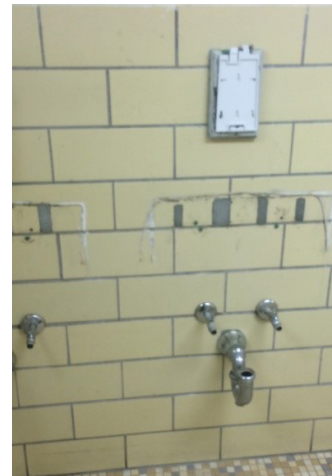
The primary equipment being supplied by the natural gas system is two (2) mechanical boilers and the domestic water heater. There are also gas risers feeding the science labs on the second floor as well as the former metal shop, and classroom kitchen ranges. The mechanical boilers are rated at 2,240 MBH each, and the domestic water heater is rated at 199 MBH. Excluding the smaller fixtures/labs/appliances in the remainder of the school (no longer utilized), the overall peak load for mechanical/domestic hot water use is 4,679 MBH. This load already exceeds the service and gas meter capacity.

## Fire Suppression System

The boiler room has a sprinkler system implemented which is connected to the incoming water service. A 3-inch double check valve is installed after the tap to the water supply. The backflow preventer and associated sprinkler system appears in good condition.



Broken Lab Sink Basin



First Floor Restroom Lavatories Removed



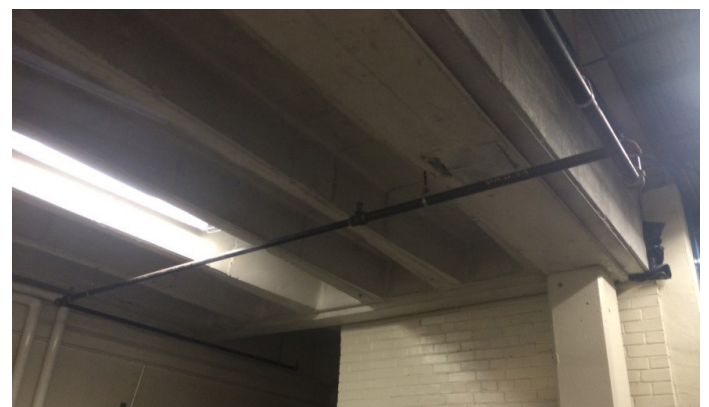
Locker Room Gang Showers



Gas Meter



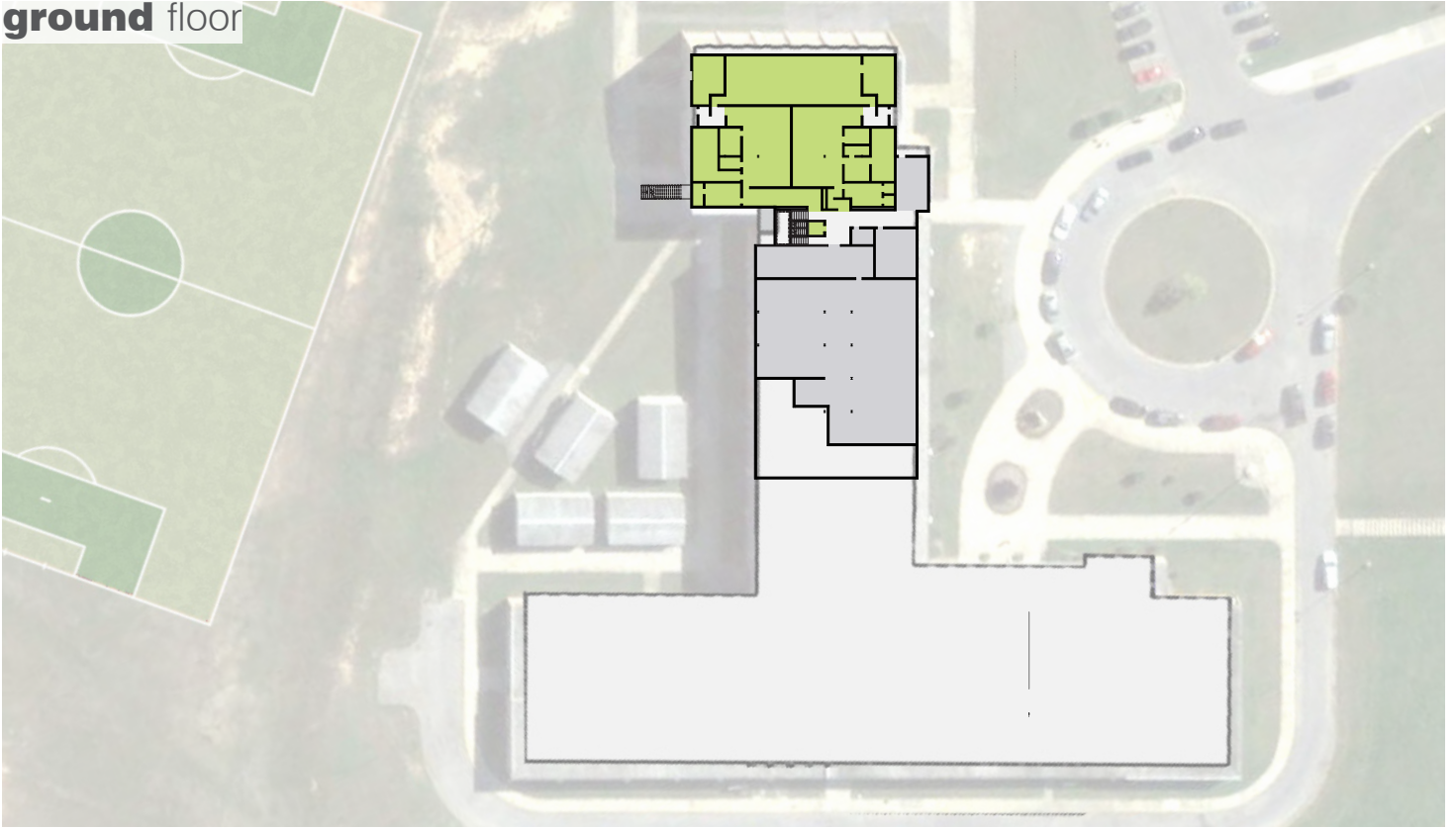
Sprinkler Supply Backflow Device



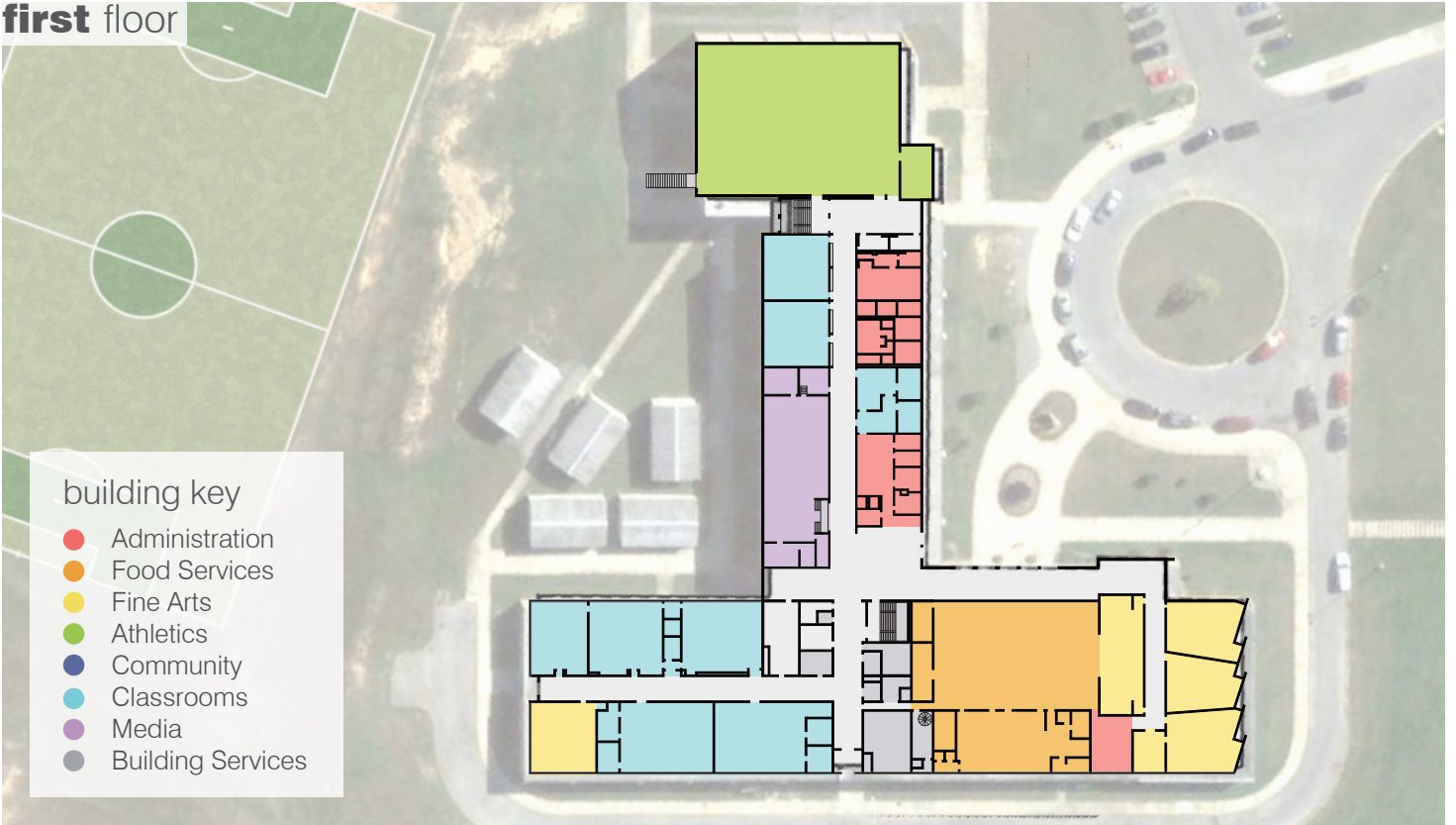
Boiler Room Sprinklers

# Existing Conditions Drawings

**ground** floor



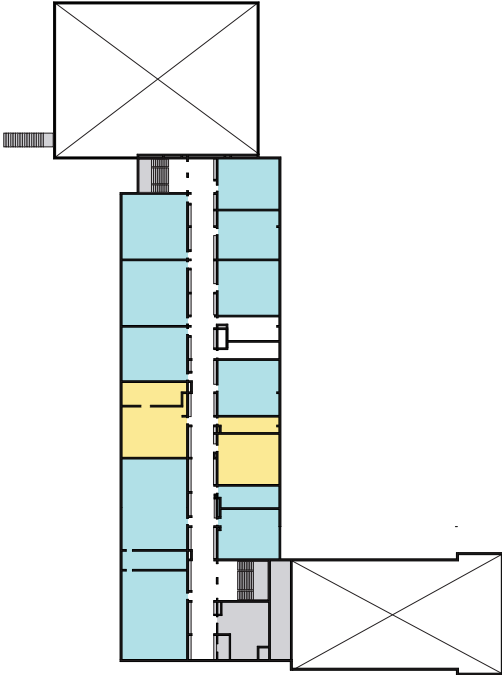
**first** floor



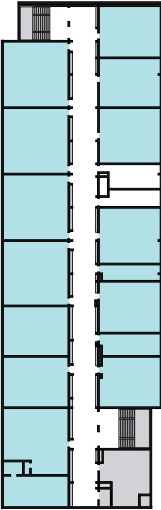
**building key**

- Administration
- Food Services
- Fine Arts
- Athletics
- Community
- Classrooms
- Media
- Building Services

**second** floor



**third** floor





section  
three

concept  
plans

# concept plans

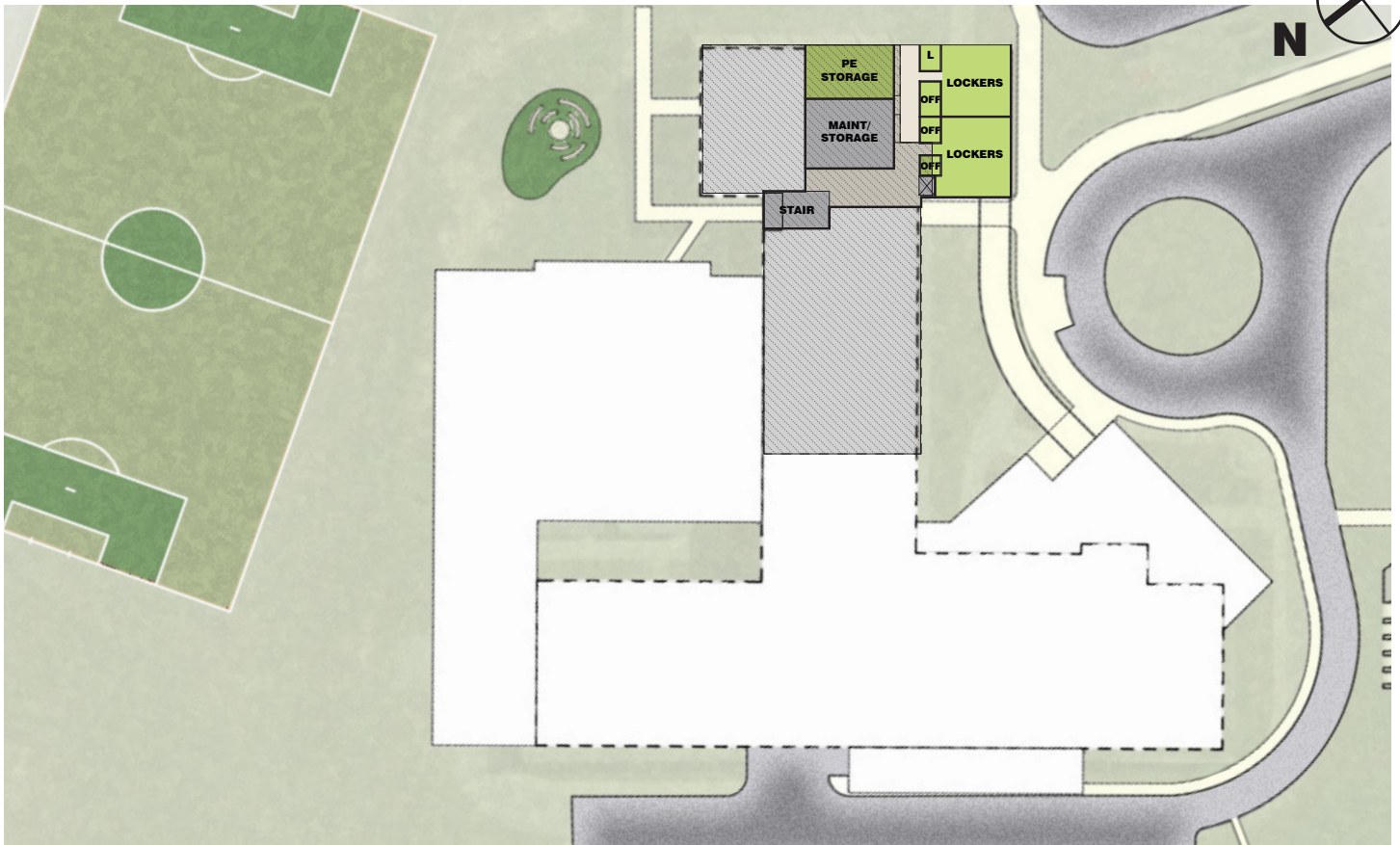
## scheme one maximum re-use



This scheme will use as much of the existing building as the design team believes is feasible. The existing floor slabs and columns will be left intact except in limited locations. All existing finishes will be removed. The building exterior will be replaced. A new addition containing academic clusters will be added to the classroom bar, with a first floor connection to the administration bar that contains the stem labs. New lockers, dance and fitness rooms will be constructed at the gymnasium end and existing locker rooms will be abandoned in place. The crawl space will be sprinklered and sealed in place. Demolition will occur at the main entrance and floors above to facilitate a new lobby, fire stair, main stair and media center. Additional space will be built at the western bar to widen the bar to allow for expansion of the kitchen and cafeteria. Additional space will be built at the end of the administrative bar to allow for the construction of new western and guidance space. Construction will require the removal of virtually all interior walls, the re-skinning of the building, either through the installation of insulation a cavity and new skin to the existing exterior walls or the demolition of the existing exterior walls and the installation of new cavity walls, and the replacement of all interior finishes.

Construction would be phased so that the new classroom pods would be constructed first, for students to occupy when complete, while the other portions of the building would be partially demolished and modernized in up to three additional phases, breaking down to the modernization of the existing classroom bar, the partial demolition and modernization of the existing shop and media center spaces, and the partial demolition and modernization of the cafeteria, administration and kitchen spaces.

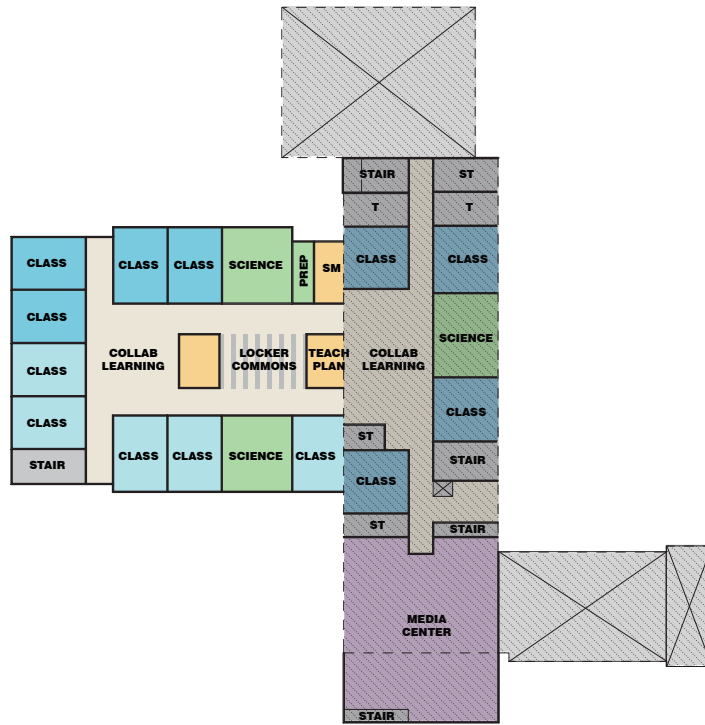
**ground floor**



**first floor**



## second floor



## third floor



### building key

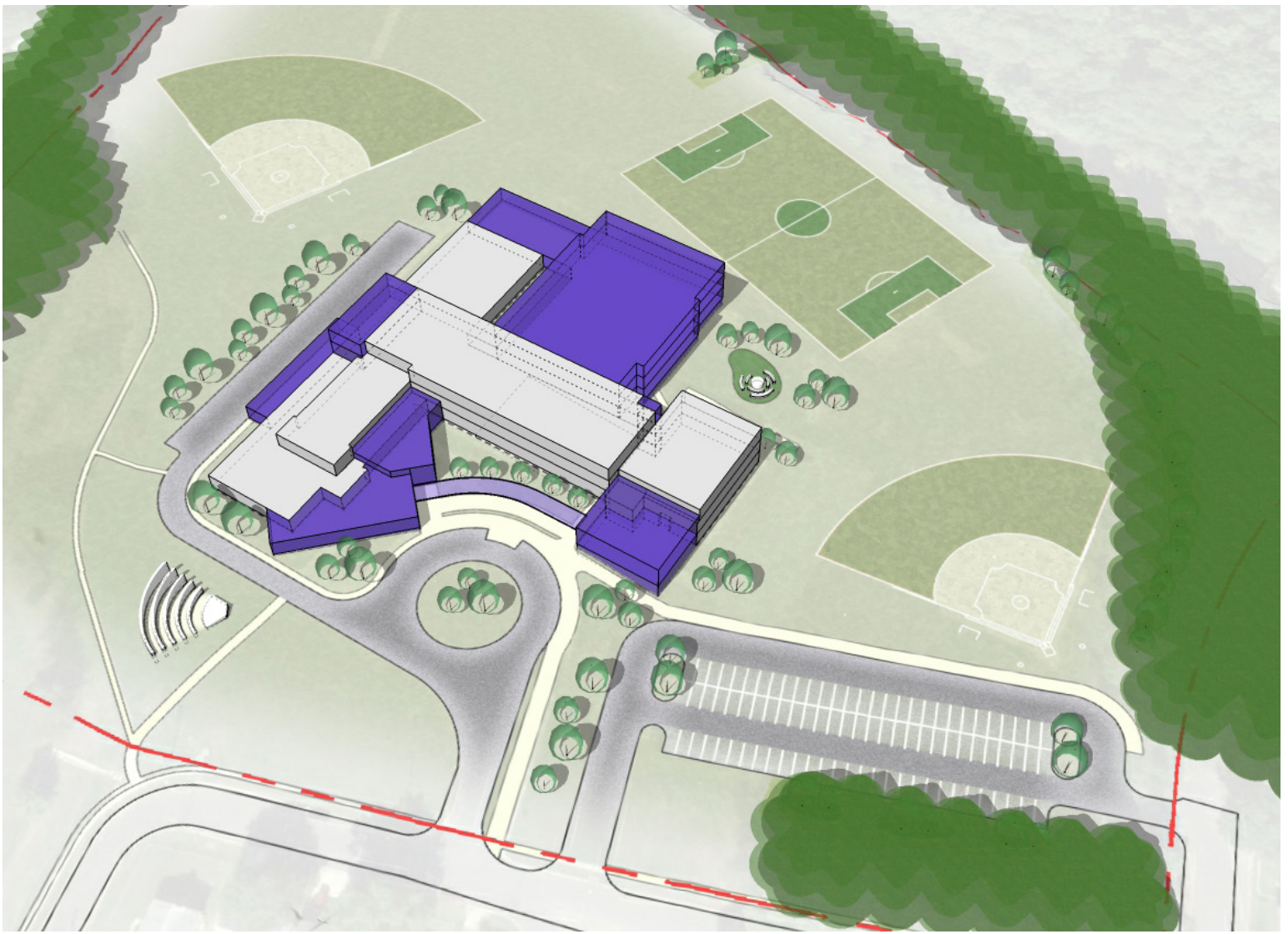
- Administration
- Food Services
- Fine Arts
- Athletics
- Community
- Classrooms
- Science
- Media
- Building Services
- Existing Building

### classroom key

- Team 1
- Team 2
- Team 3







## Pros

- New administration space would give new face to school
- Administration visible to visitors / added entry security
- More space than the current building
- Team adjacency to media center is successful
- Integrated Classroom Wing is successful

## Cons

- Highest Price
- Existing structure limits expanding tight corridors widths
- Supervision of fields is difficult
- Inconvenience to population during occupied renovation
- Students must walk through academic teams to access gym
- Less clear team delineation
- Location of STEM labs less integrated into academic core
- Limited music/stage relationships
- Academic areas low ceiling heights due to low floor to floor heights (11'-4")

# concept plans

## scheme two partial re-use with addition

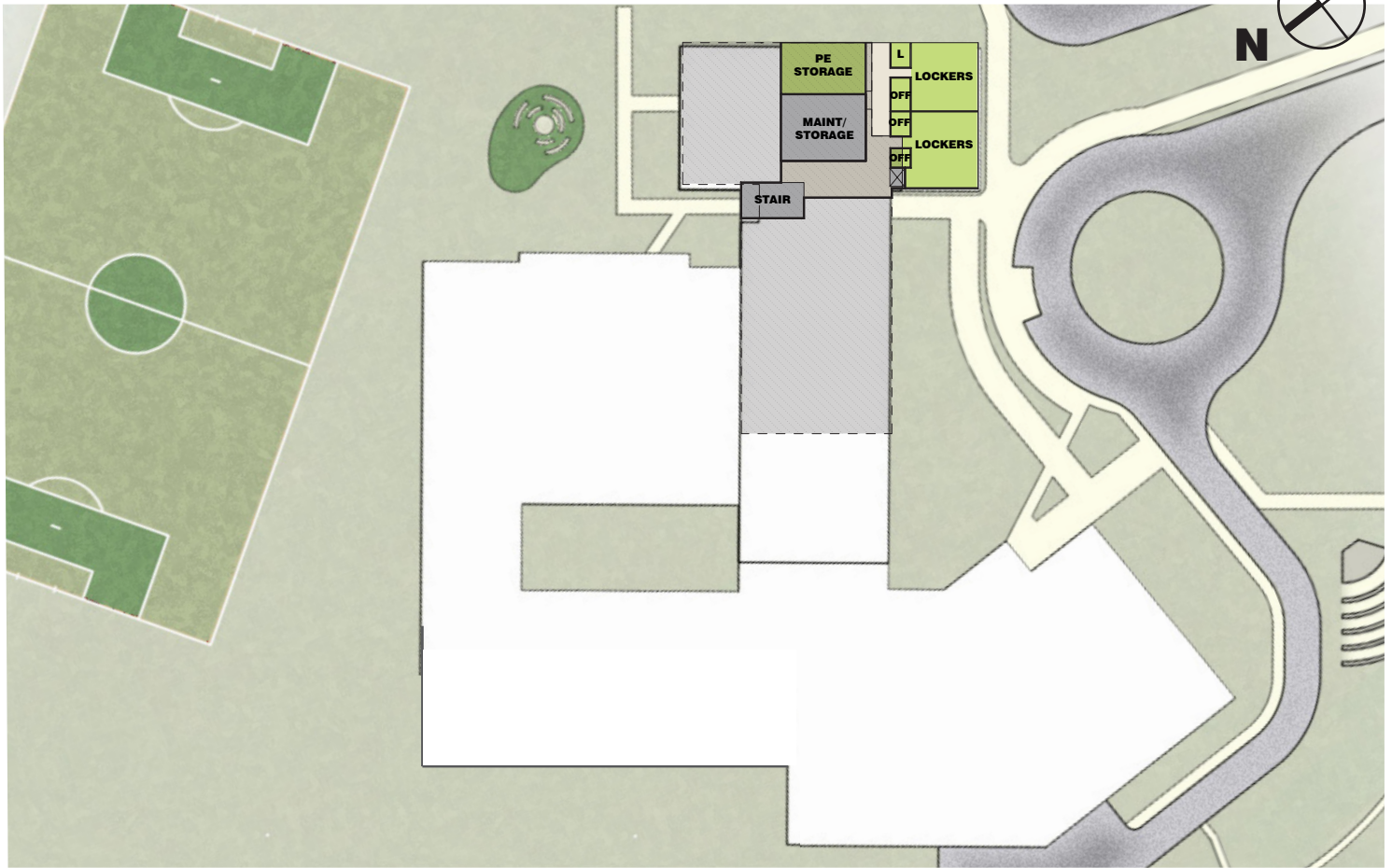


This scheme will leave the classroom bar in place with limited demolition and remove the administrative bar to allow the public spaces to contain the kind of volume found in similar spaces in current new school construction. In the classroom bar, existing floor slabs and columns will be left intact except in limited locations. All existing finishes will be removed. In the classroom bar the building exterior will be replaced. A new addition containing academic clusters will be added to the classroom bar, with a first floor connection to the new administration bar that contains the stem labs, performing and visual arts spaces and new cafeteria, new kitchen, new community space and new administration, health and guidance spaces. New lockers, dance and fitness rooms will be constructed at the gymnasium end and existing locker rooms will be abandoned in place. The crawl space will be sprinklered and sealed in place. Demolition will occur at the main entrance and floors above to facilitate a new lobby, fire stair, main stair and media center. Construction will require the removal of virtually all interior walls, the re-skinning of the building, either through the installation of insulation a cavity and new skin

to the existing exterior walls or the demolition of the existing exterior walls and the installation of new cavity walls, and the replacement of all interior finishes at the portions of the existing building to remain in place.

Construction would be phased so that the new classroom pods would be constructed first, for students to occupy when complete, while the other portions of the building would be partially demolished or completely demolished and modernized in up to three additional phases, breaking down to the modernization of the existing classroom bar, the complete demolition of the existing shop and media center spaces and replacement with new arts spaces, and the complete demolition and replacement of the cafeteria, administration and kitchen spaces along with the construction of the new media center.

# ground floor



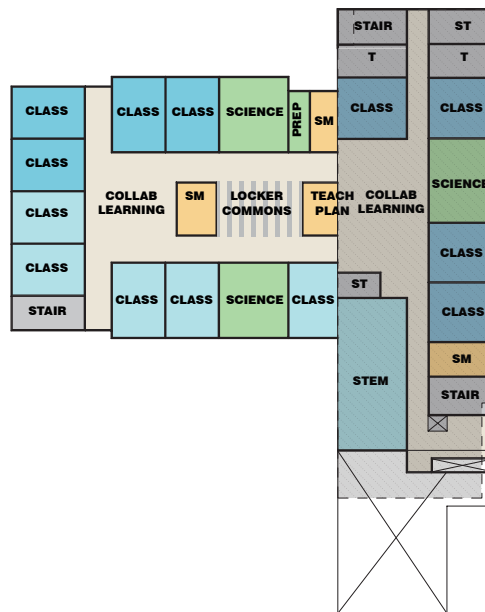
# first floor



## second floor



## third floor



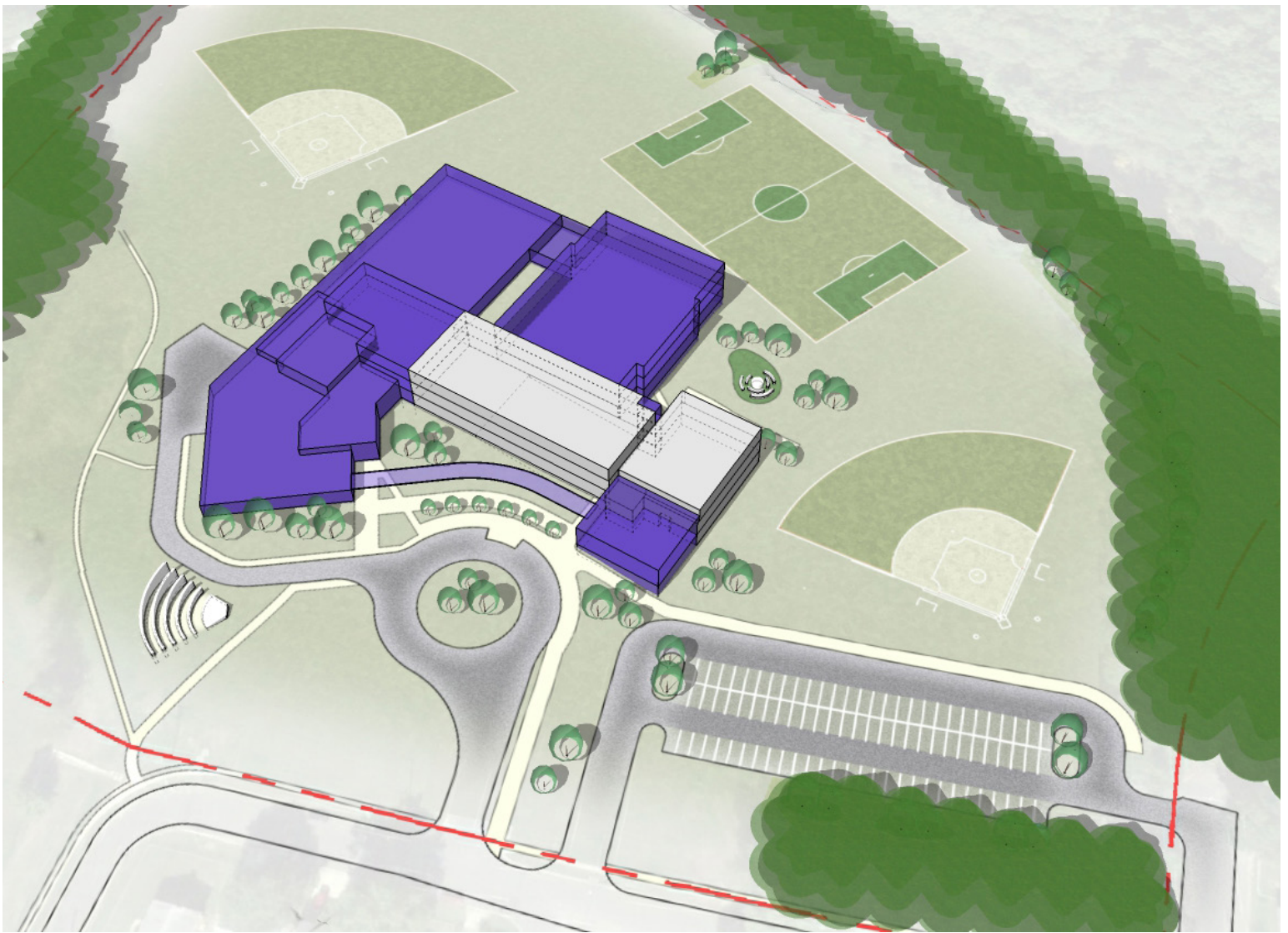
### building key

- Administration
- Food Services
- Fine Arts
- Athletics
- Community
- Classrooms
- Science
- Media
- Building Services
- Existing Building

### classroom key

- Team 1
- Team 2
- Team 3





## Pros

- Higher Price
- New administration space would give new face to school
- Administration visible to visitors
- More space than the current building
- Team adjacency to media center is successful
- Integrated Classroom Wing is successful
- Better proportioned spaces for “Special” spaces than Scheme 1
- Better music/stage relationship than Scheme 1
- STEM better integrated into classrooms
- Roof renovations

## Cons

- Existing structure limits expanding corridors
- Inconvenience to population during occupied renovation
- Students must walk through academic teams to access gym
- Academic areas low ceiling heights due to low floor to floor heights

# concept plans



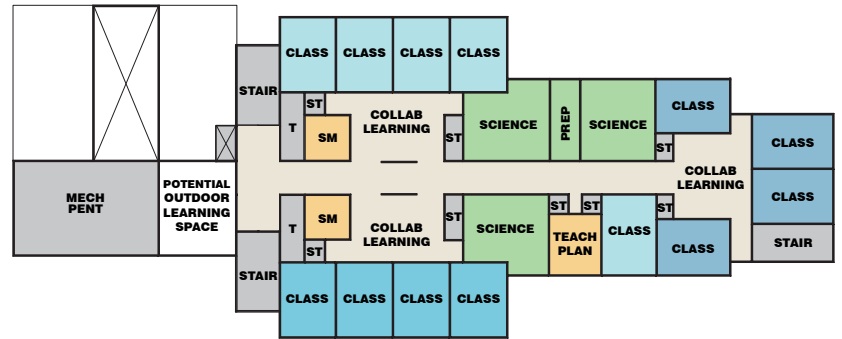
## scheme three replacement

This scheme will involve the complete demolition of the existing building and the construction of a new middle school upon the existing site.

The scheme will involve the grading of the site to accommodate the new building, the construction of the new building over approximately 14-16 months, while the existing school is occupied, and then the transfer of the students to the new building whereupon the existing building will be demolished and the site work will then be completed.



# third floor



## building key

- Administration
- Food Services
- Fine Arts
- Athletics
- Community
- Classrooms
- Science
- Media
- Building Services
- Existing Building

## classroom key

- Team 1
- Team 2
- Team 3







## Pros

- Lower first cost/lowest life cycle cost
- Least disturbance of educational program
- Brand new state of the art school, inside and out
- Smaller overall building, most efficient
- Surveillance of fields is easier
- Gym location and access to fields is successful
- Saves at least one year of disturbance of site and program
- Better ceiling heights for academic spaces / clearances for systems.
- Circulation more functional / wider corridors.
- Better visual supervision of hallways.

## Cons

- Not an urban response to the street.
- Field use limited during construction.

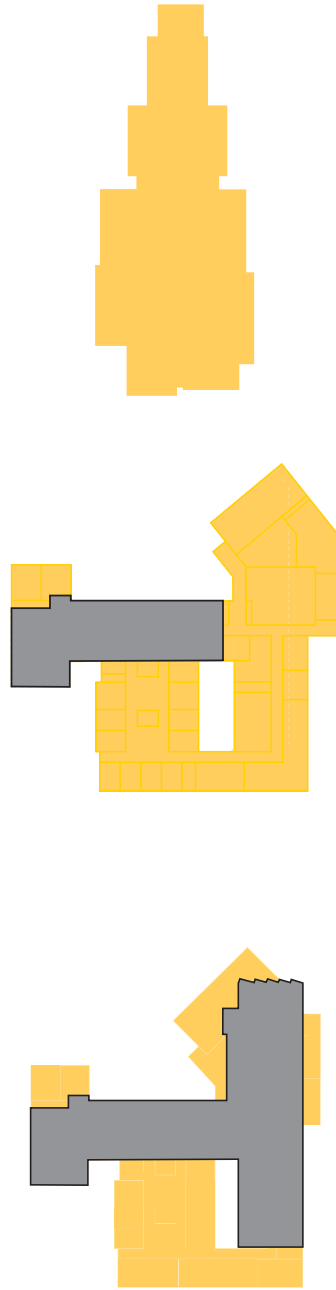




section  
four

cost.  
comparison





**William Wirt Middle School Feasibility Study**  
Cost Estimates

**Scheme 1**  
Modernization and Minimal Addition

**Scheme 2**  
Hybrid Modernization, Demolition and Addition

**Scheme 3**  
Complete Demolition and Replacement

Construction Costs	Scheme 1		Scheme 2		Scheme 3	
	GSF	\$/SF or %	GSF	\$/SF or %	GSF	\$/SF or %
Total Proposed Building	177,310		176,081		167,571	
Selective Building demolition	14,385	\$10	35,814	\$10	0	\$10
Whole Building demolition	0	\$7	0	\$7	106,318	\$7
New Construction	95,718	\$237	115,918	\$237	167,571	\$237
Modernization	81,592	\$234	60,163	\$234	0	\$234
Existing Space Unprogrammed/Shelved	7,201	\$10	7,201	\$10	0	\$10
Unmodified Crawl Space	3,140	\$0	3,140	\$0	-	-
<b>SUBTOTAL Building Costs</b>		<b>\$41,993,554</b>		<b>\$41,980,858</b>		<b>\$40,458,553</b>
Site Development Costs (excluding earthwork)		\$6,718,969		\$6,716,937		\$8,091,711
<b>SUBTOTAL Construction Costs</b>		<b>\$48,712,523</b>		<b>\$48,697,795</b>		<b>\$48,550,264</b>

**Exceptional Costs**

Hazardous Materials Abatement	106,318	\$5	106,318	\$5	106,318	\$5
Escalating Bid Costs	2 yrs escalation	8%	2 yrs escalation	8%	1 yr escalation	4%
Phasing Costs		8%		8%		0.75%
<b>SUBTOTAL Exceptional Costs</b>		<b>\$8,325,594</b>		<b>\$8,323,237</b>		<b>\$2,887,728</b>
<b>TOTAL Construction Costs</b>		<b>\$57,038,116</b>		<b>\$57,021,033</b>		<b>\$51,387,991</b>

**Project Costs**

Construction Contingency		6%		6%		3%
Furniture & Equipment		8%		8%		8%
Misc. Project Costs *		2%		2%		2%
A/E Services		7%		7%		6%
<b>TOTAL Project Costs</b>		<b>\$70,156,883</b>		<b>\$70,135,870</b>		<b>\$61,151,709</b>

Notes: \* Misc. Project Costs include LEED fees and services, commissioning, geotechnical analysis, survey and other similar services not included elsewhere





section  
five

sustainable  
strategies

## A Sustainable Approach

The improvements to William Wirt Middle School that will be made to bring the school in line with Prince George's County Public Schools Educational Specifications and current regulatory standards, will provide an ideal opportunity to institute environmental and energy improvements in the building and on the school campus. Whether the changes at William Wirt Middle School are renovations and additions to the current school, or the replacement of the existing school with a new facility entirely, significant sustainability measures can and should be instituted as a part of the process.

The William Wirt Middle School site is bounded on its Northeast side by the Brier Ditch stream which is currently part of the effort to improve the storm water management practices within the Anacostia Water Shed District. The redevelopment of the William Wirt Middle School site represents an opportunity to reduce the erosion at the edges of the district caused by previous development in the Riverdale area. The Anacostia Watershed Society currently leads the effort to address the issues in this and the surrounding area and the redevelopment of the site is a potential partnership opportunity for Prince George's County and the Society. The Anacostia Watershed Society currently has proposals for this site that should be reviewed prior to proceeding with site development.

Strategies to develop a 'green' building and site will be integrated with efforts to address programmatic and operational deficiencies in the existing facility, inadequate and outdated building systems and technology, the need for an increase to the overall all square footage of the existing building, and the goal of enhancing the building as a center of community activity. Projects of this scope 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. As per the requirements of Prince George's County Public Schools and the Maryland Department of the Environment, a plan will be developed for the modernization of the facility and site that will incorporate many environmental design elements that significantly reduce or eliminate the building's impact on the environment, while also 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 (SWM) plan that reduces discharge rate and quantity of storm water discharge from the existing one and two year, 24 hour design storms. (The design of SWM retrofit on the site may include control of the 100 year storm, this will be determined during the design phase of the project. The design will include Environmental Site Design features as required by the Maryland Department of the Environment. These features will include qualitative and quantitative water remediation.
- Water efficient landscaping or native species.
- Regenerative Step Pool Storm Conveyance or Coastal Plain Outfall System (similar to current proposals from the Anacostia Watershed Society)
- Pervious paving.
- Landscaped shading for at least 50% of the site hardscape through the use of trees and other shade devices.
- Consider using 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

- Provide 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.
- Specifications encourage the use of locally manufactured building materials.
- Specifications encourage 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.
- Specifications encourage the use of certified wood.
- Recycle demolition and construction debris and redirect from landfills to manufacturing process, reuse on site, or at other sites.



- Specifications encourage the use of low-emitting materials to protect indoor air quality for occupants such as low VOC carpet and paint.
- Consider 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.
- Consider the use double glazed “low e” glass and/ or shading devices on windows to enhance the energy efficiency of the building.
- Use operable windows for natural ventilation and individual control, particularly near work stations.
- Building orientation for new construction to maximize natural daylighting and solar control as much as possible.
- Use energy efficient fixtures and consider using 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 and more stringent cutoff to reduce light spill onto neighboring properties.
- Design acoustical performance to reduce background noise levels in classrooms to a 35- 40 DB level.
- 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 low flow toilets, sinks and urinal fixtures to increase water efficiency.
- Provide a dedicated area for the collection, separation, and storage of materials for recycling.
- Consider 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.



## Sustainable 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 out of 69 points (plus 7 pre-requisites) across six categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality, and Innovation & Design Process.

William Wirt Middle School will likely be designed to achieve a LEED for Schools Gold rating for new construction and major renovations based on recent Prince George's County Public School projects.

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 that will affect the cost of the project will include Registration and Certification Review fees, costs for 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.



section  
five

appendices



# appendix A

## **Life Cycle Cost Analysis:**

Scheme 1: Maximum Re-Use

Scheme 2: Partial Re-Use with Addition

Scheme 3: Replacement School

**Proposed Civil Design**

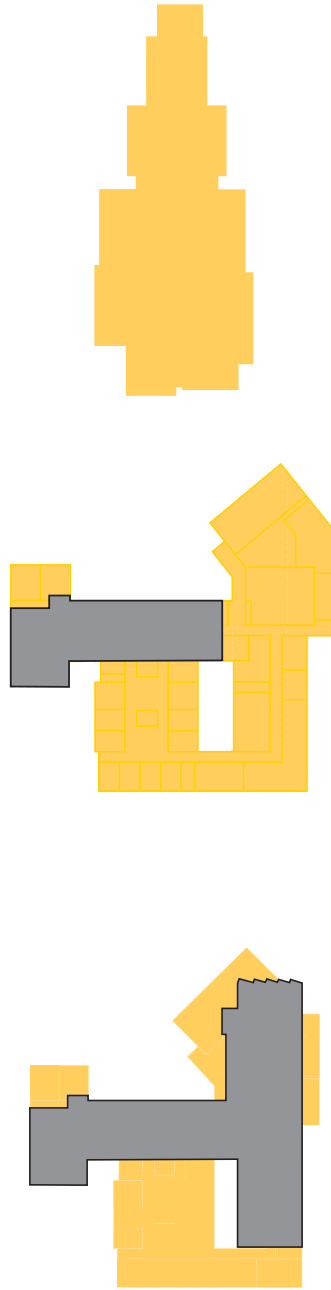
**Proposed Mechanical System**

**Proposed Electrical System**

**Proposed Plumbing System**



# Life Cycle Cost Analysis



## William Wirt Middle School Feasibility Study

### Life Cycle Cost

#### Scheme 1 Modernization and Minimal Addition

#### Scheme 2 Hybrid Modernization, Demolition and Addition

#### Scheme 3 Complete Demolition and Replacement

Maintenance and Operating Costs	Area	Unit Cost	Item Cost	Area	Unit Cost	Item Cost	Area	Unit Cost	Item Cost
Maintenance Costs	177,310	1.48	\$262,419	176,081	1.48	\$260,600	167,571	1.48	\$248,005
Operating Costs	177,310	2.50	\$443,275	176,081	2.50	\$440,203	167,571	2.50	\$418,928
Utility Costs	177,310	2.00	\$354,620	176,081	2.00	\$352,162	167,571	2.00	\$336,142
<b>SUBTOTAL Maintenance + Operational Cost/Year</b>			<b>\$1,060,314</b>			<b>\$1,052,964</b>			<b>\$1,002,075</b>

Net Present Value of Maintenance/Operation Costs (FY 2012 Dollars - based on operating cost escalation rate of 5.5% and 3.5% annual discount rate)

40 years

\$60,873,772

\$60,451,834

\$57,530,195

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# Proposed Civil Design

## **Scheme One and Two**

The following narrative outlines impacts to primary site issues related to both scheme one and scheme two.

### **Site layout**

The site layout and points of access to William Wirt Middle School (WWMS) will remain much as they are today for scheme one and scheme two. Access to the bus drop off and service area will be from Tuckerman Street. The bus loop and service access will be reconstructed and the connection between the cars parking area and the bus loop will be eliminated. The existing parking lot will be rebuilt and will incorporate new car drop off area along the north edge of the parking lot. Primary access to the parking lot will be from 63rd Place, an additional access point will come from Tuckerman Street. This will create separate bus and auto drop off areas for students. Additionally this will allow for the creation of a direct accessible route from the public right of way (Tuckerman Street). Recreational fields will be improved and will remain generally, in their current location in scheme one and two. It is likely that there will be some shift in these facilities to accommodate storm water management on the site. Sidewalks and paths around the building will be reconstructed and will incorporate current accessibility (ADA) requirements; improvements will be made in the access routes and width of sidewalks to accommodate students who will walk to school.

### **Demolition / Phasing**

It is the goal of PGCPSS to keep WWMS open during construction, regardless of the scheme selected. Demolition and reconstruction of the building will have a significant impact on daily activities at WWMS. The contractor selected to complete the work will require room to stage equipment, provide parking for worker and establish a construction office. This will likely impact the recreational facilities on the site and reduce the availability of these fields to students during the construction period. The construction and demolition of the building will occur in phases as will the site work. Reconstruction of parking, service

and loading facilities will be disruptive when they occur but can be completed quickly and could be completed during summer recess to reduce the impact to operations at WWMS.

### **Tree Conservation/ Environmental Impacts**

The site is a developed site; and was developed in the early 1960s the site does not have a current Tree Conservation Plan II or NPDES permits. In Scheme one and two these permits will be required. Since the site does not have an existing TCPII, it is possible that a waiver may be obtained from MNCPPC for the redevelopment work on site. If a waiver is not possible, then a TCPII will be prepared and submitted to MNCPPC environmental section for approval. PGCPSS may need to provide for some offsite tree conservation areas if extensive SWM retrofit takes place on the WWMS site. If PGCPSS agrees to work with PGDPWT on the retrofit, a discussion on how to address tree conservation needs to take place with DPWT. It is anticipated that the environmental impacts will be associated with the SWM retrofit on this site and in the adjoining Briar Run stream valley. PGCPSS will need to consider this as they negotiate with the Prince Georges County and or Anacostia watershed society (AWS) on the retrofit. It is likely that the Wirt SWM retrofit could be made part of Prince George's County pending P3 (public private partnership) effort on SWM retrofit.

### **Erosion and sediment control /NPDES GP14**

Scheme one will require that a sediment and erosion control plan be prepared for the disturbed areas on site. The plan will be based on the current state erosion and sediment control regulations. The most significant change with the current regulation is the limitation on disturbed areas on site to 20 acres maximum. If the disturbed area exceeds 20 acres the plan will need to be phased so no more than 20 acres is disturbed at one time. Additionally an NPDES permit will need to be obtained from MDE for the project.



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### **Site Grading**

The plan to reuse much of the building and to reconstruct parking and loading facilities in essentially their current location will eliminate the need to move a large amount of earth. Because the site is already developed and graded, each scheme will benefit from this existing graded condition. Additionally clearing of existing trees will be limited as well and will be required only to accommodate SWM improvements for the site development and to address SWM retrofit issues that PGCPs has discussed.

### **Full Depth Asphalt Paving**

Existing site asphalt should be removed and replaced with new full depth paving; the existing paving is past its serviceable life. A geotechnical engineer will be part of the final design team and will provide design recommendation for asphalt paving. It is possible that pervious asphalt paving can be used, in part, to satisfy the SWM requirement of ESD to the MEP. This will be determined during the design phase.

### **Site Concrete**

The existing site utilizes concrete for sidewalks, pathways, loading areas, curb and gutter. The site concrete is in general old and past its useful life. It should be assumed that existing site concrete will be removed and replaced. This will also be necessary to ensure that ADA can be met to the greatest extent possible.

### **Water and Sewer**

WSSC is the service provider for water and sewer facilities. The Wirt site is currently served by water and sewer facilities, water comes from Tuckerman Street and sewer discharges to the trunk line in Briar run. It is suggested that the existing building connection on the property and outside the public right of way be replaced during the renovation. WSSC will require an onsite permit for the onsite improvements. There is no reason at this time to expect any public system improvements would be required.

### **Storm Drainage / SWM Onsite**

The existing WWMS site has little onsite storm drainage, in general the Stormwater runs on the surface and in the curb line to three pick up points on the site. The existing storm drain which passes through the site is a public system and collect storm runoff from the surrounding neighborhood. As part of scheme one and two, a private onsite storm drain system will be designed to collect surface runoff and direct it to SWM devices which will provide water quality control on the site. Runoff remaining after treatment will be discharged to a new public outfall, discussed below. The onsite storm drain system will include a number of pickup points and many of these will be designed to discharge directly to a water quality device.

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### **Storm drainage /SWM offsite**

The site is bisected by a large public storm drain which drains the surrounding neighborhood. The storm drain has a drainage area of about 28 acres and discharges water runoff to Briar Run. It was built with no Stormwater management. Over the years there has been extensive erosion in the stream valley as a result. The existing pipe passes through the WWMS site and discharges to Briar Run. The existing outfall to Briar Run is in very poor condition and needs extensive repair. In both scheme one and two the existing pipe alignment could remain as it is, however it should be anticipated that the existing pipe outfall will be relocated and rebuilt to accommodate SWM retrofit efforts and make needed improvements to the existing outfall. PGcps has had some discussion with the Anacostia Watershed Society (AWS) about SWM retrofit in on the Wirt site to improve the existing outfall and to install "coastal Plain outfall" on the site. PGcps will need to evaluate options presented by AWS or Prince Georges County with regard to SWM retrofit on the site. If allowed to go forward on the Wirt site, long term maintenance will be required for the outfall. PGcps will need to enter into a maintenance agreement with the entity that will provide this maintenance or secure funding sources for long term maintenance. The design and permit of this outfall will require environmental impact analysis in Briar Run and will require a MDE wetland permit as well as permission from MNCPPC, the owner of the stream valley. A determination of the exact storm retention requirements will be established during the project design phase.

### **Frontage improvements**

Tuckerman Street and 63rd Place are fully improvement public rights of way, we do not anticipate additional widening of these existing road ways. We do anticipate that Prince Georges County DPWT will require upgrades to the roadways to make any necessary repairs along the school frontage. These improvements may include repair to the road surface, repair or replacement of curb and gutter, repair or replacement of sidewalks and installation of curb ramps, replacement of street trees, replacement of street light poles and fixtures.

### **Recreational facilities /Landscape**

Scheme one and scheme two will include landscape improvements and significant improvements to recreational facilities such as ball fields, soccer fields. It is anticipated that fixed goals and backstops will be replaced and the play surfaces reestablished. PGcps is not required to comply with the county landscape manual.

### **Scheme 3**

#### **Site layout**

The site layout in scheme 3 will be significantly different than the other two schemes and will establish new bus and auto drop off points for WWMS. Access to the bus drop off and service area will be from Tuckerman Street. The auto parking lot will be reconfigured and will incorporate and new car drop off area along the north edge of the parking lot. Primary access to the parking lot will be from 63rd Place and from Tuckerman Street. There will be separate bus and auto drop off areas for students. Recreational fields will be relocated and reestablished and large retaining wall will be required to put the soccer field on grade. Sidewalks and paths around the building will provide pedestrian access around the site and will incorporate current accessibility (ADA) requirements; improvements will be made in the access routes and width of sidewalks to accommodate students who will walk to school.

#### **Demolition / Phasing**

It is the goal of PGcps to keep WWMS open during construction, regardless of the scheme selected. Demolition and reconstruction of the building will have a significant impact on daily activities at WWMS. The contractor selected to complete the work will require room to stage equipment, provide parking for worker and establish a construction office. Scheme 3 will impact the recreational facilities on the site and reduce the availability of these fields to students during the construction period. The construction and demolition of the building will occur in phases as will the site work. Careful considerations to the limits of each phase of construction, in order to ensure the goals of PGcps are safely met.

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### **Tree Conservation/ Environmental Impacts**

The site is a developed site; and was developed in the early 1960s the site does not have a current Tree Conservation Plan II or NPDES permits. In Scheme 3 these permits will be required. Since the site does not have an existing TCPII, it is possible that a waiver may be obtained from MNCPPC for the redevelopment work on site. If a waiver is not possible, then a TCPII will be prepared and submitted to MNCPPC environmental section for approval. PGCPs may need to provide for some offsite tree conservation areas if extensive SWM retrofit takes place on the WWMS site. If PGCPs agrees to work with PGDPWT on the retrofit, a discussion on how to address tree conservation needs to take place with DPWT. It is anticipated that the environmental impacts will be associated with the SWM retrofit on this site and in the adjoining Briar Run stream valley. PGCPs will need to consider this as they negotiate with the Prince Georges County and or Anacostia Watershed Society (AWS) on the retrofit. It is likely that the WWMS SWM retrofit could be made part of Prince George's County pending P3 (public private partnership) effort on SWM retrofit. Scheme 3 may result in a large impact on environmental areas adjoining the site in order to accommodate this SWM retrofit.

### **Erosion and sediment control /NPDES GP14**

scheme 3 requires that a sediment and erosion control plan be prepared for the disturbed areas on site. The plan will be based on the current state erosion and sediment control regulations. The most significant change with the current regulation is the limitation on disturbed areas on site to 20 acres maximum. If the disturbed area exceeds 20 acres the plan will need to be phased so no more than 20 acres is disturbed at one time. Additionally an NPDES permit will need to be obtained from MDE for the project.

### **Site Grading**

Because the site is a redevelopment site much of the extensive earthwork was done decades ago. Scheme 3 will not require extensive earthwork however there will be earthwork necessary to put ball fields to grade and the construction of a retaining wall will be necessary to accommodate a soccer field. Additionally clearing of existing trees will be limited as well and will be required only to accommodate SWM improvements for the site development and to address SWM retrofit issues that PGCPs has discussed.

### **Water and Sewer**

WSSC is the service provider for water and sewer facilities The WWMS site is currently served by water and sewer facilities, water comes from Tuckerman Street and sewer discharges to the trunk line in Briar run. The existing building connection on the property and outside the public right of way will be replaced during the construction of the new building. WSSC will require an onsite permit for the onsite improvements. There is no reason at this time to expect any public system improvements would be required.

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### **Storm drainage / SWM onsite**

The existing WWMS site has little onsite storm drainage, in general the Stormwater runs on the surface and in the curb line to three pick up points on the site. The existing storm drain which passes through the site is a public system and collect storm runoff from the surrounding neighborhood. As part of scheme 3 a private onsite storm drain system will be designed and built to collect surface runoff and direct it to SWM devices which will provide water quality control on the site. Runoff remaining after treatment will be discharged to a new public outfall, discussed below. The onsite storm drain system will include a number of pickup points and many of these will be designed to discharge directly to a water quality device.

### **Storm drainage /SWM offsite**

The WWMS site is bisected by a large public storm drain which drains the surrounding neighborhood. The storm drain has a drainage area of about 28 acres and discharges water runoff to Briar Run. It was built with no stormwater management. Over the years there has been extensive erosion in the stream valley as a result. The existing pipe passes through the WWMS site and discharges to Briar Run. The existing outfall to Briar Run is in very poor condition and needs extensive repair. In scheme three the existing pipe will need to be realigned to avoid the new building. A new pipe outfall will need to accommodate SWM retrofit efforts and make needed improvements to the existing outfall. PGCPs has had some discussion with the Anacostia Watershed Society (AWS) about SWM retrofit in on the Wirt site to improve the existing outfall and to install “coastal Plain outfall” on the site. PGCPs will need to evaluate options presented by AWS or prince Georges County with regard to SWM retrofit on the site. If allowed to go forward on the Wirt site, long term maintenance will be required for the outfall. PGCPs will need to enter into a maintenance agreement with the entity that will provide this maintenance or secure funding sources for long term maintenance. The design and permit of this outfall will require environmental impact in Briar run and will require a MDE wetland permit as well as permission from MNCPPC, the owner of the stream

valley. A determination of the exact storm retention requirements will be established during the project design phase.

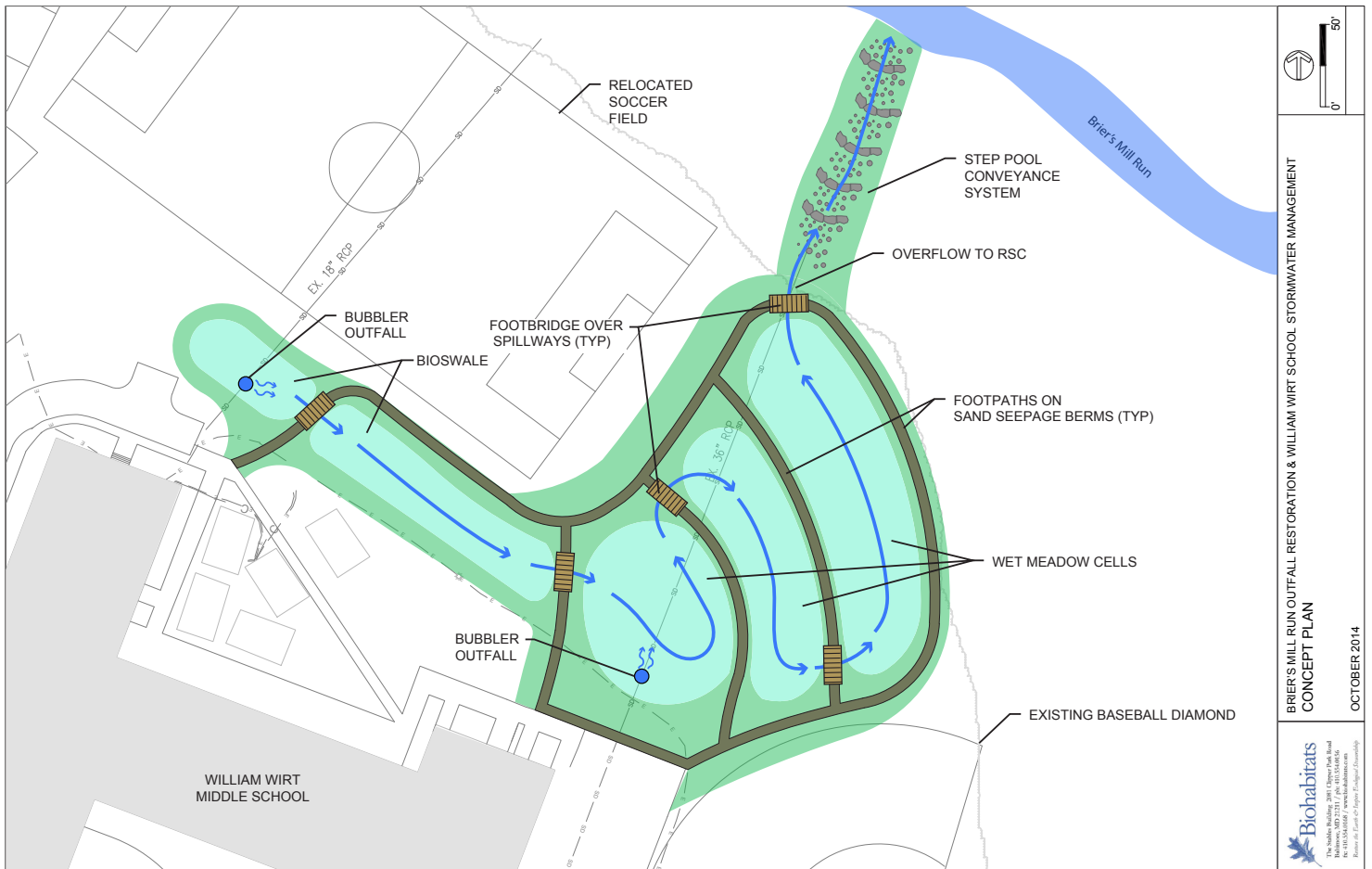
### **Frontage improvements**

Tuckerman Street and 63rd Place are fully improvement public rights of way, we do not anticipate additional widening of these existing road ways. We do anticipate that Prince Georges County DPWT will require upgrades to the roadways to make any necessary repairs along the school frontage. These improvements may include repair to the road surface, repair or replacement of curb and gutter, repair or replacement of sidewalks and installation of curb ramps. Replacement of street trees, replacement of street light poles and fixtures. The inclusion of the impervious area along the frontage in proposed SWM facilities.

### **Recreational facilities /Landscape**

Scheme 3 will include landscape improvements and significant improvements to recreational facilities such as ball fields, soccer fields. It is anticipated that fixed goals and backstops will be replaced and the play surfaces reestablished. PGCPs is not required to comply with the county landscape manual. The construction of recreational fields associated with scheme 3 will include a retaining wall on the west end of the site. The recreational facilities will be all new construction, it is not anticipated that any existing recreational feature will be retained in scheme 3.

## Anacostia Watershed Proposed Concept



The coastal plain outfall and wet meadow cell are contemporary SWM methods to treat existing storm water runoff in an environmentally sensitive way that promote infiltration, the development of wetland and bio habitat and reduces erosion into the receiving stream channel.

See proposed "wet meadow cells" p. 36, 40, 44

# Proposed Mechanical Systems

## Mechanical Overview

The school renovation options and new school option will be designed around the premise of three mechanical system options as follows:

- **Option One:** 4-pipes Fan Coil Unit (FCU) with Dedicated Outside Air System (DOAS) and Roof Top Units.
- **Option Two:** Water Source Heat Pump with Water Cooled DOAS and Water Cooled Roof Top Units
- **Option Three :**Geothermal System.

The proposed system is selected with energy efficiency in mind.

## Codes and Standards

The school heating and cooling system is calculated based on local codes, ASHRAE recommendation and good engineering practices. The codes that are applicable for this renovation or new school will be:

- 2012 International Building Code (IBC).
- 2012 International Mechanical Code (IMC).
- 2012 International Energy Conservation Code (IECC).
- 2013 Washington Suburban Sanitary Commission Code (WSSC).
- 2012 National Fire Protection Association (NFPA).
- American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) standard 90.1 - 2010.
- American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) standard 62.1 - 2010.
- American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) standard 55 - 2004.
- Sheet Metal and Air Conditioning Contractors National Association (SMACNA).

## Design Conditions

The school heating and cooling system will be designed to maintained the following conditions in classrooms, public areas and offices:

Occupied Hours:

Summer: 75°F and 50% Relative Humidity

Winter: 70°F

Noise Criteria 25 - 35 NC (Classrooms)

35 - 40 (Public areas and offices)

Unoccupied Hours:

Summer: 85°F and 50% Relative Humidity

Winter: 55°F

Noise Criteria 25 - 35 NC (Classrooms)

35 - 40 (Public areas and offices)

## Proposed Mechanical System Options

### Option One

#### 4-pipes Fan Coil Unit (FCU) with Dedicated Outside Air System (DOAS) and Roof Top Units.

This option would utilize 4-pipe FCU, DOAS with hot water heating and chilled water cooling, chiller, boilers, and cooling tower.

The school will be cooled and heat by 4- pipe Fan Coil Units (FCU) and ventilation air will be provided by Dedicated Outside Air System (DOAS) located on the roof. Gymnasium, cafeteria and multi-purpose room will be conditioned by Roof Top Units (RTU). Air cooled chiller will be used to provide chilled water to RTUs, DOAS and FCUs. Condensing boiler will be used to provide hot water.

The advantages and disadvantages of this option are listed below:

### Advantages

- Smaller RTU is used only to supply ventilation air required which minimizes the structural impact.
- De-centralized airside equipment.
- Simultaneous heating and cooling.
- Low maintenance required.
- Less risk of entire system being down for maintenance.
- CO2 control with DOAS.

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### **Disadvantages**

- Ceiling space required for ventilation ductwork and exhaust, VAV boxes and FCU.
- Outdoor area for air-cooled chiller.

### **Option Two**

#### **Water Source Heat Pump with Water Cooled DOAS and Water Cooled Roof Top Units.**

The second option will utilize console Water Source Heat pump, water cooled DOAS, water cooled RTU, cooling tower and boiler.

In this option, the school is heat and cooled by Water Source Heat Pump (WSHP), ventilation air will be provided by water cooled DOAS and water cooled RTUs will be provided for gymnasium, cafeteria and multi-purpose room. Cooling tower will provide cooling for the condenser water system and condensing boiler will be used to provide heat into the condenser water loop during heating mode.

The advantages and disadvantages of this option are listed below:

#### **Advantages**

- Low operating cost.
- Energy efficient system.
- Simultaneous heating and cooling.
- Low maintenance required.
- Excellent comfort.
- CO2 control with DOAS.

#### **Disadvantages**

- Heat pumps produce more noise than VAV but can be isolated from the classrooms.
- Higher first cost.
- Outdoor area for cooling tower.

### **Option Three**

#### **Geothermal System**

**The third option would utilize Water Source Heat Pump DOAS and console, closed loop geothermal system.**

This option is similar to previous option. Cooling tower and boiler will not be used in this option. The condenser water loop will utilize a constant temperature of ground to extract or reject heat. The total number, depth and distance of borehole will be determined after soil testing is performed.

The advantages and disadvantages of this option are listed below:

#### **Advantages**

- High energy savings/LEED benefit.
- Smaller RTU is used only to supply ventilation air required which minimizes the structural impact.
- No outdoor equipment that is visible.
- Adequate thermal comfort and control afforded.
- Operational costs are very low year round.
- Requires minimal maintenance.
- Increased system life (heat pumps: 25 years, ground loops: 50 plus years).
- Increased energy efficiency.
- System redundancy.
- Simultaneous heating and cooling is possible.
- CO2 control with DOAS.

#### **Disadvantages**

- Highest first cost.
- Large area needed for geothermal field.
- Heat pumps produce noise but can be isolated from the classrooms.
- Mechanical System Descriptions

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## Mechanical Systems Descriptions

### A. Dedicated Outdoor Air System (DOAS)

A roof mounted Variable Air Volume (VAV) DOAS with energy recovery (enthalpy wheel) will provide ventilation air to classrooms, administrative and support areas, and the main lobby. Supply air shall be ducted vertically from the unit with horizontal distribution ductwork routed in the corridors. DOAS will supply neutral tempered ventilation air to each space through VAV terminal unit. The return/exhaust side of the DOAS shall be used to recover both the ventilation and toilet exhaust air to pre-treat the ventilation air through the DOAS energy recovery wheel. The DOAS shall be sized to accommodate the ventilation air requirements of all the spaces served at maximum occupancy with the capacity to turn down to minimum as dictated by space occupancy or CO2 sensor. The DOAS shall be equipped with MERV 13 filters, cooling and heating coils (either chilled water/hot water or heat pump) and variable frequency drive fan/motor assemblies to provide only the necessary ventilation air as needed.

In the following narrative, several HVAC system components shall be presented and evaluated. The final options that were considered in reference to the architectural scenarios will be a compilation of these components. In any HVAC modernization both airside and water side systems have to be considered individually and then holistically.

### B. Roof Top Unit (RTU)

Roof Top Unit (RTU) shall be located on the roof to handle building envelope loads. RTUs will be used to heat/cool the cafeteria/multi-purpose room and gymnasium. Each room will be provided with two (2) RTUs. The RTU could be chilled water cooling and hot water heating or it could be water cooled heat pump. It should be noted that the RTUs will also be sized to handle ventilation loads for the space its serving.

### C. Fan Coil Unit (FCU)

A fan coil unit (FCU) is a simple device consisting of a dual temperature coil or two coils and a fan to blow air. FCUs can be connected to a 4-pipe or 2-pipe water distribution system. 4-pipe FCUs shall be able to deliver simultaneous heating and cooling, where

as 2-pipe FCUs can deliver cooling or heating only depending on the operating mode that is currently set (Winter/Summer mode). FCUs can be floor mounted, ducted or ceiling mounted. The fan motor does generate noise that if not ducted will transmit into the classroom environment.

### D. Water Source Heat Pump

The water source heat pumps serving the classrooms and offices shall be ducted horizontal type and generally will be located inside the corridor ceiling spaces. They can also be located in a closet in a vertical configuration. It is strongly recommended that heat pump units not be directly installed in the classroom without any sound attenuation. Sound lined supply and return air ductwork from each unit will distribute the air to ceiling mounted air devices in the space. Wall mounted thermostat will control the respected unit. Secondary drain pans will be provided in accordance with code requirements with a drain connected to the unit condensate line. The condensate drains will be routed to mains at the perimeter and connected to the storm risers for disposal.

### E. Chiller

Chillers shall be sized to handle 100% of the calculated peak loads. If two chillers are used, each chiller shall have roughly 70% of peak load redundancy or multiple compressors are recommended to provide system redundancy. As a minimum, ASHRAE guidelines will be followed in selecting chiller performance.

### F. Boiler

Boilers shall be sized based on natural gas input and provide hot water to the building distribution systems. The hot water will generally circulate in the range of 140°F and a maximum Delta T on the return water temperature of 30 to 40°F will be the design goal.

Two condensing boilers were considered for this school. Each of these boilers will be sized to accommodate 60% of the peak heating load.





Figure 2.2.5-1: Typical Outdoor DOAS/RTU



Figure 2.2.5-2: Typical FCU



Figure 2.2.5-3: Typical Water Source Heat Pump



Figure 2.2.5-4: Typical Air Cooled Chiller



Figure 2.2.5-5: Typical Condensing Boiler

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### **G. Cooling Tower**

Cooling towers reject heat from water-cooled systems to the atmosphere. Hot water from the system enters the cooling tower and is distributed over the fill (heat transfer surface). Air is induced or forced through the fill, causing a small portion of the water to evaporate. This evaporation removes heat from the remaining water, which is collected in the cold water basin and returned to the system to absorb more heat.

### **H. Closed Loop Geothermal System**

A ground source geothermal system takes advantage of the constant temperature of the earth as the heat exchange medium instead of the outside air temperature. Ground temperatures a few feet below the earth's surface remain relatively constant year round; and depending on geographical location can range from 45°F to 75°F. Vertical closed loop geothermal systems consist of pipes that carry a heat exchange fluid, such as a glycol solution, into the ground to be heated or cooled.

During the winter, the heat exchange fluid collects heat from the earth, treating the surrounding earth as a heat source. During summer, the earth acts as a heat sink, cooling by pulling heat from the building and leaving it in the ground. The geothermal system is utilized when the temperature difference achieved in the well field exceeds the minimum or maximum design temperatures.

Figure 2.2.5-7 shows a simple flow diagram of a ground source system. In the figure it can be seen that water from the well field is circulated to the vault(s) and then to a series of water-to-water heat pumps. There are many configurations that water-to-water heat pumps can have to effectively heat and condition a building.

In this example, the building load demands heating and cooling simultaneously; therefore, three heat pumps are shown in heating operation and three in cooling. The heat pumps through condensation or evaporation provide the hot or cold water to the building. At this point, the system operates in a similar fashion to a traditional boiler and chiller system.

In a closed loop geothermal application, vertical wells spaced 15 to 20 feet apart are bored in the ground on average 150 to 500 feet deep. Each well consists of a single loop of pipe with a U-bend at the bottom. The remaining open area of the drilled borehole is backfilled or grouted to encase the U-bend assembly.

Each vertical pipe is connected to a horizontal underground pipe that carries fluid in a closed system to and from a well field header system that has multiple valved circuits that are brought into a vault where they are connected to a manifold. The use of a vault proves to be advantageous by creating redundancy in the system. If a problem occurs in one of the boreholes, that row can be isolated through valves. This allows maintenance to take place without shutting down the entire system. A typical vault installation can be seen in Figures 2.2.5-10 and 2.2.5-11.

A typical manifold, as seen in Figure 2.2.5-12, includes butterfly isolation valves, combination balancing/isolation valves and pressure/temperature ports for each circuit.

With this design setup, circuit isolation, pressure testing and flow balancing can be easily performed. Figure 2.2.5-12: Typical Ground Loop Manifold Piping Installation Details

Using geothermal heating and cooling is a very efficient alternative to using traditional boiler and chiller combinations. Minimal maintenance is required for a typical ground source system as well as a reduced dependency on mechanical equipment. Maintenance typically includes system monitoring and leakage checks, along with maintaining proper chemicals and glycol levels based on the type of medium that is chosen. Also, unlike traditional arrangements, the only moving parts are pumps and valves, again reducing the costs on maintenance.



Figure 2.2.5-6: Cooling Tower

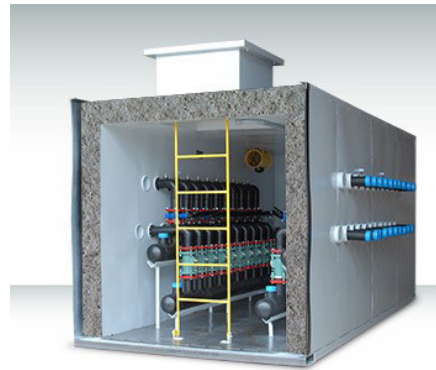


Figure 2.2.5-10: Typical Ground Loop Vault

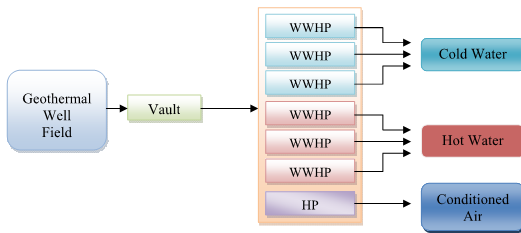


Figure 2.2.5-7: Simple Flow Diagram of a Ground Source System

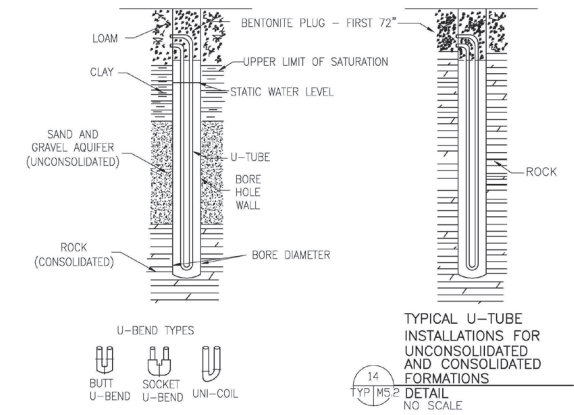


Figure 2.2.5-9: Typical Ground Loop Installation Details

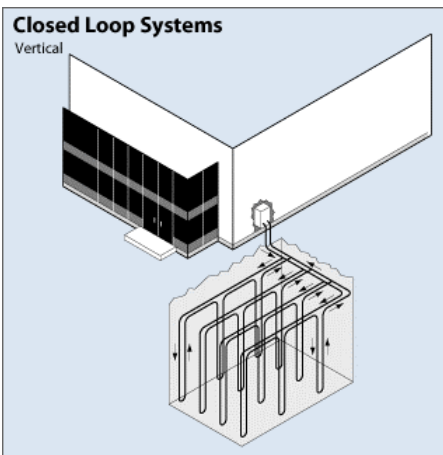


Figure 2.2.5-8: Typical Closed Loop Geothermal System

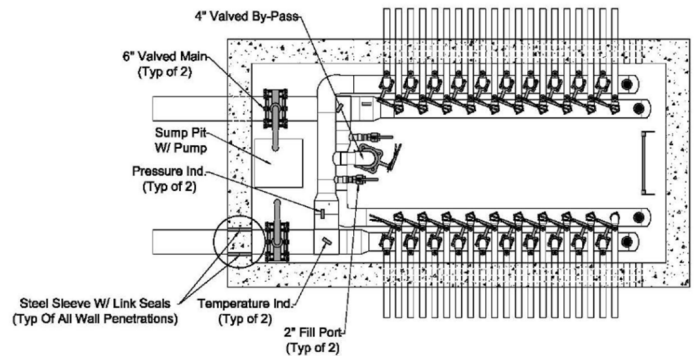


Figure 2.2.5-11: Typical Vault Detail

# Proposed Electrical Systems

## Codes and Standards

- 2012 International Building Code (IBC).
- 2012 International Energy Conservation Code (IECC).
- 2002 NFPA 70, National Electrical Code (NEC)
- ANSI/ASME Elevators and Escalators Safety Code A17.1
- National Electrical Manufacturers Associations (NEMA)
- American National Standards Institute (ANSI)
- Illuminating Engineering Society of North America (IESNA)

## New Power Distribution System

There are currently three architectural schemes proposed for William Wirt Middle School – two schemes provide modernization and extension options and the third presents the option for a complete demolition and replacement of the building. There are also three mechanical system options proposed based on various parameters like energy efficiency, space considerations and cost impact.

Regardless of which option is chosen, and given the age and physical condition of the existing electrical distribution equipment, it is recommended that the entire existing power distribution system be given a complete overhaul. The actual size and configuration of the electrical service and distribution system will depend on the final square footage of the building, the mechanical system chosen, whether or not gas or electricity will be the main source of power for the HVAC and plumbing equipment, etc.

For a typical Middle school, the power density is between 15Watts/SF and 20Watts/SF.

Tables 3-1, 3-2 and 3-3 below provide an estimate of the maximum and minimum electrical utility service required for the three schemes with the assumption that the utility can provide a 480/277V service.

**Table 3-1 Preliminary Load Assumptions - Scheme 1**

Typical Power Density	Total Real Power at 184,511 sf	Total Apparent Power at 184,511 sf	New Electrical Service at 480/277V, 3 phase, 4 wire
15W/ SF (Min)	2,768 kW	3,460 VA	(2) 2,500 Amps
20W/SF (Max)	3,690 kW	4,613 VA	(2) 3,000 Amps

**Table 3-2 Preliminary Load Assumptions - Scheme 2**

Typical Power Density	Total Real Power at 176,081 sf	Total Apparent Power at 176,081 sf	New Electrical Service at 480/277V, 3 phase, 4 wire
15W/ SF (Min)	2,641 kW	3,302 VA	(1) 4,000 Amps
20W/SF (Max)	3,522 kW	4,402 VA	(2) 3,000 Amps

**Table 3-3 Preliminary Load Assumptions - Scheme 3**

Typical Power Density	Total Real Power at 176,081 sf	Total Apparent Power at 176,081 sf	New Electrical Service at 480/277V, 3 phase, 4 wire
15W/ SF (Min)	2,484 kW	3,104 VA	(1) 4,000 Amps
20W/SF (Max)	3,311 kW	4,139 VA	(2) 2,500 Amps

A. A new main Switchboard rated at 208/120 volt (480/277 volt is preferred if available from the utility), 3-phase, 4-wire system with a Surge Protection Devices (SPD) will be provided in the Main Electrical Room. This switchboard will support all the new distribution panelboards, branch panelboards, all major HVAC equipment, the elevator and pumps.

B. The main switchboard will carry a UL label and listing for service entrance equipment. Additionally, the switchboard and all distribution and branch panels will be provided with a minimum of 20% spare capacity for future expansion as per code requirements.

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C. The main switchboard and all distribution and branch panels will also be provided with copper bus bars and fully rated neutral and ground bus bars. The entire system will be grounded in accordance with the current code guidelines.

D. The main switchboard, distribution and branch panels and related equipment will be located in secured spaces so they are protected from physical damage, tampering and unauthorized access.

E. Dedicated branch distribution panels shall be designed to separate the mechanical, lighting and miscellaneous power loads in the building. If desired, sub-metering will be provided for each individual panel for measurement and verification purposes.

F. At least two 277/480 volt (if this voltage is available from the utility) sub-panels will be provided per floor, one dedicated to serving the lighting loads for that floor and the other dedicated to serving the HVAC loads, pumps and miscellaneous loads.

G. Multi-section 120/208 volt sub-panels will be provided per floor to feed convenience receptacles, computer receptacles, IT loads, and small loads like exhaust fans, garbage disposals, etc. If the utility service is rated at 277/480V, these sub-panels will be fed either from a main distribution panel downstream of a single large step down transformer (ex. 300 kVA), or via several, smaller transformers step down transformers (ex. 45 or 75 kVA) located in electrical closets distributed throughout the building.

H. If required by the IT or AV consultants, specified IT and/or AV loads will be fed via a separate K-13 rated, shielded step down transformer, and panels on the secondary side will be provided with an isolated ground and 200% rated ground bus and feeder.

I. All panels will be rated at 100 Amp, 225 Amp or 400 Amp, and will have a copper bus structure and bolt-on breakers.

### **Auxiliary Power**

Convenience duplex receptacles will be provided throughout the school while duplex or double duplex (quad) receptacles will be provided adjacent to all data outlet locations.

A. No more than six convenience duplex receptacles will be connected per circuit.

B. No more than four duplex receptacles meant to serve computer loads will be connected per circuit.

C. One weatherproof, ground fault circuit interrupter (GFCI) type duplex receptacle shall be provided within 25 feet of any rooftop mechanical equipment.

D. Special purpose and heavy-duty equipment such as printers, copiers, microwaves, refrigerators, kilns, motorized room dividers etc shall be provided with a dedicated circuit or per manufacturer's requirements and recommendations.

E. Ceiling mounted receptacles and data outlets will be provided for ceiling mounted projectors.

F. Ground Fault Circuit Interrupter (GFCI) receptacles will be provided in outdoor locations, kitchen spaces, serving areas, toilet rooms, rooms where water is present, and for all abovecounter outlets located near a sink.

G. Corridors shall be provided with duplex receptacles no more than 50'-0" on center and at no more than 20'-0" from the end of a corridor. Receptacles shall also be located near entrances to stairs on the corridor side and not in the stairwell itself.

H. Janitors' Closets, Storage and Utility Rooms shall have at least one general use receptacle.

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Mechanical equipment will be served at either 120 volt, single phase; 208 volt, single phase; 208 volt, three phase; or 480 volt (if available), three phase, depending upon the load requirements. All motors 3/4 HP or higher will be provided with motor controllers and/or disconnect switches. All fans with the fractional HP motors will be wired via motor rated switches with thermal overload protection. All major equipment will be provided with either fused or non-fused safety switches, based on the actual name plate data. All motor controllers/starters will be a minimum NEMA Size 1, unless required otherwise due to environmental conditions. All disconnect switches will be heavy duty, either NEMA Type 1 or 3R, depending on the environment at the installed location. General receptacles will be served at 120 volts, single phase.

All branch circuit wiring will be copper, type THHN, minimum #12 AWG in minimum 3/4-inch conduits. All exterior exposed conduits will be Galvanized Rigid Steel (GRS) and all exterior underground conduits will be PVC Schedule 40, unless required otherwise by the code.

New work on any existing walls shall generally require surface metal raceways and surface mounted outlets. All work on new walls shall be flush mounted.

All kitchen equipment will be wired as per the manufacturer's requirements and recommendations.

### **New Emergency Power Distribution System**

The school is not a high-rise building (less than 4 stories high), and as such, is not required by code to have an emergency generator unless the client wishes it and/or a fire pump is included in the design. All devices requiring emergency back-up in the event of a power failure can be provided with battery back-up, self contained or otherwise.

If an emergency generator is included in the design, it will be sized to serve the emergency and exit lighting, fire alarm, the security system and the fire pump (if any). In the Main Electrical Room, two new fused safety switches will be provided, one for the emergency power distribution system in the building and one for the fire pump (if any). Both switches will be tapped ahead of the main breaker in the switchboard. The switch for the emergency power distribution system will feed the emergency power panel which will in turn serve the building's critical loads. If the utility service is rated at 277/480V, the emergency panel will feed a step down transformer to serve critical loads at 120/208V loads.

### **General Lighting System**

New energy efficient lighting fixtures will be provided throughout the facility. It is recommended that the classrooms be illuminated with new recessed 2'x4' fluorescent lighting fixtures, equipped with electronic ballasts and two or three T-8 fluorescent lamps controlled by dual switches and occupancy sensors. Where the fixtures cannot be recessed in the ceiling, surface or pendant mounted fixtures of similar type and lighting distribution system can be considered. All general offices can be illuminated with recessed 2'x4' fluorescent parabolic luminaires, with 3-inch deep, 18-cell, semispecular louver, equipped with an electronic ballast and two or three T-8 fluorescent lamps.

Multi-purpose rooms, if any, can be illuminated with surface mounted 2'x4' fluorescent lighting fixtures with six 54 watt, T-5 high output lamps and tamper resistant lenses.

For the main corridors, lobbies, vestibules and lounge areas, direct/indirect type suspended lighting fixtures or compact fluorescent type recessed down lighting can be considered. These fixtures will be equipped with the electronic ballasts and two 32 watt, T-8 lamps, or 18 or 26 watt, compact fluorescent lamps. It is highly recommended that special use spaces, such as the multi-purpose rooms, cafeterias, auditoriums, etc., be provided with a combination of special dimmable type of lighting fixtures to address the functional requirements and to create the visual affects necessary for the intended functions, and to

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take full advantage of the natural daylight available in the space. These fixtures can be controlled from the local dimmers or a dimming system.

The lighting in the public restrooms can be illuminated by wall-slot type or fluorescent strips with bare lamps, mounted in a cove. The cove and the strip fixtures would run in a continuous row along the sink and stall side walls. In addition, LED or compact fluorescent down lights can be provided in the vestibule area or near the entrance to the bathrooms, depending on the final space layout.

Lighting in storage rooms, mechanical rooms, electrical rooms, and telecom rooms can be provided with fluorescent strip lighting fixtures with electronic ballast, two T-8 fluorescent lamps and wire guard. The janitors' and similar closet spaces can be illuminated with surface or wall mounted compact fluorescent fixtures. These fixtures will be controlled from local toggle switches in the respective rooms.

It is recommended that the new lighting be designed to provide the following average maintained illumination levels (in foot-candles) at the task levels:

1. Main Lobby 20
2. Elevator Lobby 10
3. Corridors 30
4. Offices 50
5. Gymnasium 50
6. Classrooms/Labs 50
7. Lounge 20
8. Public Toilets 30
9. Storage Rooms 20
10. Mechanical/Electrical Rooms 30
11. Exterior Entry Doorways 10

### **Lighting Controls**

It is recommended that dual technology (Infra-red and Ultrasonic) occupancy/vacancy sensors be used with override switches to control all interior non-emergency lighting in offices and classrooms.

The occupancy/vacancy sensors will consist of wall/ceiling mounted sensor devices that operate in conjunction with relay units. These sensors send signals to the respective relay units in the space

to turn the associated lighting fixtures on and off. In computer classrooms (if any) and conference rooms, luminaries/lamp switching, and toggle switches will be employed. Special task/function areas will be controlled from the dimmer switches/systems.

Occupancy sensors utilizing ultrasonic technology will be considered for all the toilets. Ultrasonic sensors typically detect changes in air pressure produced by occupants in the space and do not need to "see" the occupants for activation.

Areas typically without any obstruction, like corridors will be provided with passive-infrared technology occupancy sensors. These sensors detect heat motion and need to "see" the person moving for activation.

### **Exterior Lighting**

It is recommended that the existing exterior building mounted lighting fixtures be demolished and replaced by new LED fixture types that are fully shielded (full cut-off) to limit/eliminate light pollution. These fixtures will be provided to adequately illuminate all the building entrances/exits and walkways to create a safe and secure environment. All exterior mounted fixtures will be in completely weatherproof enclosures, with minimum -20°F rated ballast and UL label for the exterior/wet location use. Parking lot pole light fixtures shall be provided with either HID lamps or LEDs with type III distribution, and shall be controlled via a contactor and time clock.

### **Emergency Lighting System**

Emergency lighting will be provided in accordance with current codes along all egress paths like public corridors and stairwells, in public spaces like the cafeteria, multi-purpose room, public restrooms, etc. The fixtures designated for emergency lighting will be wired to the nearest emergency panel and shall be provided with battery backup in case a generator is not included in the design.

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Similarly, exit lighting fixtures will also be provided to satisfy code. Exit fixtures will be die-cast aluminum type with LED lamps. These fixtures will be wired to the nearest emergency lighting fixtures from the area or from the nearest emergency panel and shall be provided with an integral battery in case a generator is not included in the design.

### **Fire Alarm System**

A new intelligent fire alarm system of an addressable type will be designed and provided to meet all the latest state, local, and ADA code requirements. The system shall include:

- A. A new Fire Alarm Control Panel (FACP) fed via the new emergency panel.
- B. A new graphic annunciator panel located by the entrance in the main lobby and a digital communicator with a connection to the fire department or monitoring agency as directed by the owner or as required by the fire marshal.
- C. Manual pull stations will be located at all the designated exit doors and in the exit pathways leading to exits out of the building.
- D. Fire alarm audio and visual devices (speakers and strobes) will be located throughout the building/ main corridors, so that no area is without proper coverage. All restrooms, conference rooms, etc., will be provided with visual devices in accordance with ADA requirements
- E. Duct mounted smoke detectors will be provided for all air handlers exceeding 2,000 cfm capacity.
- F. Smoke detectors will be provided in all unoccupied spaces as well as in all electrical, mechanical and telecommunication rooms.
- G. Water flow switches to send an alarm to the FACP when a sprinkler is activated and tamper switches to send a trouble message to the FACP when a valve has been tampered with.
- H. Elevator recall and fire pump and generator monitoring systems.

The fire alarm system circuits will be electrically supervised. A trouble signal would be initiated in the event of an open circuit, a ground fault condition, a wire-to-wire short circuit, or if a device is removed from the system. The system will have a continuous loop in order to provide redundancy to ensure continued system operation in the event of a circuit break.

The FACP will be provided with secondary power via integral mounted batteries, which will provide up to 48 hours of the system operation. Loss of normal AC power, low voltage in the battery system, and/or disconnection of the batteries will initiate a trouble signal at the designated location.

### **Electrical Space Requirements**

The following is a preliminary list of electrical spaces that will be required for the building:

- A. Main Electrical Room shall have 10' L x 16' W minimum clear inside dimensions. This room may be located on the Ground or First Floor level, adjacent to an exterior foundation wall and as close as possible to the new incoming utility feeders. Two means of egress are required. All doors shall swing outwards.
- B. The Emergency Electrical Room (if a generator is provided) shall have 10' L x 8' W minimum clear inside dimensions. This room may be located adjacent to either the Main Electrical Room or to the outdoor generator. If the generator is housed inside the building, the final dimensions of the Emergency Electrical Room will depend on the size of the generator which in turn depends on the size of the Fire Pump and other emergency loads.
- C. Typical Electrical Closets: At least one closet at 8' L x 6' W minimum clear inside dimensions will be required on each floor. Please note that closets should be stacked vertically and as close to the Main Electrical Room as possible.



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# Proposed Plumbing Systems

Due to the condition and extent of the architectural renovations/additions for Schemes 1 and 2, a full gut of the plumbing systems is recommended. The internal substructure of the plumbing systems is the same for all three schemes, with the only difference being the exterior utility coordination necessary for the Scheme 3. For this option, a whole new school is constructed adjacent to the existing structure, which will require coordination with civil engineers and utility purveyors to make sure water, waste, storm, and gas systems are accordingly relocated/extended to serve the new structure.

Schemes 1 and 2 would still require entire new upgrades to all piping systems within the existing structure to accommodate the new architectural layout. Refer to the individual subsystem sections below for an overview of the components involved in each.

## **Domestic Water Supply System**

The supply piping serving Wirt Middle School would completely be demolished back to the incoming service. The new 4-inch domestic service would tie into the existing line outside the structure and run to the new proposed mechanical room. A new backflow device will be installed at the exterior wall where the water service enters the structure. The backflow preventer will be a Reduced Pressure Zone Assembly (RPZA) complying with ASSE 1013. Additional backflow devices will be installed on mechanical makeup water supply lines along with specific kitchen fixtures. Angle stop valves will be provided on all sinks and faucet rough-ins.

All downstream distribution piping will be new and Type L copper. A main loop on the first floor would extend around the new addition and feed vertical risers to the upper floors along with branch lines to remote areas of the school. Shutoff valves will be located at individual riser takeoffs as well as branch lines. This will allow for isolation of branches and risers for maintenance. Insulation will be provided on all domestic water piping.

## **Domestic Hot Water System**

The hot water supply for the building will be generated by two tank type, gas fired, condensing, water heaters along with a storage tank. They will be located in the main mechanical room and sized to meet the building peak hot water demands. Some redundancy will be provided allowing for sufficient hot water in one heater and storage tank, in case of shutdown of the second unit.

Water will be stored at 140°F within the storage tank, which will help prevent bacterial growth such as legionella inside the tanks. A primary mixing valve complying with ASSE 1017 will be implemented at the hot water heaters which will reduce the distribution water temperature to 120°F.

To prevent scalding, a secondary Thermostatic Mixing Valve (TMV) complying with ASSE 1070 will be installed at all ADA fixtures and faucets, with ASSE 1016 compliant mixing valves at showers. A second hot water line will bypass the initial TMV delivering 140°F hot water to kitchen fixtures such as 3-compartment sinks and dishwashers.

A loop around the first floor will be provided in parallel to the cold water supply line with risers feeding the higher floors. The top of the risers and remote branches will have hot water return assemblies which will be balanced and sized to effectively circulate hot water back to the hot water heater. This will help prevent the water from staying stagnant in the hot water supply piping while continuously providing hot water at the remote branches. The circulating pumps will be controlled by timers and aquastats which will be synchronized with the timing and schedule of the school operations.

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### **Storm Drainage System**

The existing structure and new addition will have a new storm system installed with new roof drains and downstream piping. Due to the extent of the renovation, as well as updates to the exterior façade of the structure, internal rain leaders would be recommended rather than the existing system which utilizes downspouts. The courtyard within the new addition will require drainage which will need to pass under the structure to reach the exterior.

The storm drainage system will consist of no-hub cast iron piping in above ground installation with PVC considered for drainage lines below slab. All rain leaders will need to be coordinated with the civil engineer for a connection point outside the structure. Inverts of the storm system will need to be coordinated with all drains that are unable to exit the structure via gravity system requiring a sump pump to discharge up to an elevation that can gravity drain.

The building elevator will require a sump pump with an oil minder system located inside the pit. The discharge line will have to route to daylight.

### **Sanitary Waste System**

The sanitary system will be updated with new infrastructure in the existing school as well as the new additions. As the existing sewage mains exit the structure to the north, the reuse of the exterior sanitary mains will need to be coordinated with the site utility plan and the proposed addition. As with the storm system, any portions of the sanitary waste that cannot gravity drain to the building sewer will require a sewage ejector that pumps up to an acceptable elevation.

The original building drawings indicate several 5-inch mains exiting the building. This pipe size is not regularly used, with typical upsizing to 6-inch mains in today's construction. Where possible, the lines leaving the building will either be 4 or 6-inch, with larger mains needing site utility coordination to determine best tie-in locations.

The new kitchen will require a grease interceptor sized to accommodate all grease laden waste. The interceptor sizing will have to comply with requirements of WSSC. A large concrete volume based interceptor is recommended for a full commercial kitchen which would be located outside the structure as close to the kitchen as possible.

All new art sinks will be provided with clay/solids interceptors which will prevent debris from entering the sanitary system and causing blockages. Science rooms where corrosive chemicals may be used will have acid neutralization cartridges installed on the sinks.

### **Plumbing Fixtures**

All existing plumbing fixtures will be demolished. The new bathroom groups will have commercial grade vitreous china fixtures installed. Water closets will be floor mounted with automatic, sensor operated flush valves, consuming 1.28 gallons per flush (GPF). Urinals will be located in boys' core restrooms and will be wall mounted with automatic, sensor operated flush valves, consuming 0.125 GPF. Lavatories will have sensor activated faucets with a flow rate of 0.5 gallons per minute (GPM). Locker rooms will have commercial showers with thermostatic mixing valves complying with ASSE 1016. Shower heads will be selected with flow rates of no more than 1.8 GPM.

Lavatories and ADA sinks will be provided with insulated pipe covers on exposed piping below the fixtures. All core restrooms will have floor drains with trap primer connections.

### **Natural Gas System**

The existing gas system is currently undersized for the connected load. Depending on the future mechanical, plumbing, lab, and kitchen equipment requiring gas connections, a new gas service and meter may be necessary to meet the building demand. In addition an emergency generator would need either diesel or gas supply.

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High pressure gas is available at the site via a 1-1/2 inch supply, although the service capacity is only 4,500 MBH. A new service upgrade to a larger size may require a long replacement line from the street main. The system load and service upgrades need to be coordinated with Washington Gas.

If the service is sufficient for the proposed systems, only a new gas meter will have to be installed in a convenient location appropriate to the proposed layout. Gas distribution within the building will be run at 2 PSI, with pressure regulators placed at the equipment. If gas is needed for science labs, a push button, emergency shutoff valves will be placed near the teacher's work stations.

### **Fire Suppression System**

The school will require a fire suppression system to be installed with a full sprinkler system implemented throughout the structure. The sprinkler system will be designed in accordance with NFPA 13 and calculated for the most demanding hydraulic area. A flow test of the nearby fire hydrants will be necessary to determine system flow and pressure capacities as well as the potential need for a fire pump. Sprinkler zone valves will be located in the stair case with distribution lines serving each floor branching off on the main landings. Sprinkler zone assemblies will be coordinated and connected to the fire alarm system.

The new 4-inch fire service will need to enter the mechanical room and be protected by a 4-inch Double Check Detector Assembly (DCDA) complying with ASSE 1048.



# appendix B

Education Specification

Program Space Summary

**William Wirt Middle School**

***Abbreviated***  
**Feasibility Study Educational Specification**

**October 2014**

**DRAFT**

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## **Purpose of the Educational Specification**

Educational specifications serve as the link between the educational program and the architect team. The purpose of educational specifications is to clearly describe the various learning activities to be housed in the school, their spatial requirements, appropriate locations within the building or the site, and any special requirements that a designer or a facility planner would need to consider.

The educational specifications should, as thoroughly as possible, describe the facility's anticipated uses and identify the specific physical characteristics that will be required to house and promote the proposed activities. It is important that all educational specifications attempt to:

- Involve educators and community representatives in the definition of educational needs;
- Enable school planners to better understand the purposes of the facility;
- Help the designers to create a building that fits the educational program and needs of the building occupants or users; and,
- Eliminate oversights that are expensive to correct once construction is complete.

A well-prepared educational specification is an integral part in the creation of a building that enhances the learning environment, accommodates learning activities, and provides pleasant surroundings for occupants and visitors. A poorly developed educational specification generally results in a mediocre facility, or one that is marginally functional for education.

This educational specification will provide direction for a feasibility study and is abbreviated to provide only the information necessary for the study. In the future a more complete educational specification will be prepared with the input of the school staff, parents, and community.

## **Background**

As part of the FY15 capital budget process the school board requested a feasibility study be performed for the modernization/addition of William Wirt Middle School. Board members cited continuing concerns about the condition and air quality at the school along with current and projected overcrowding. No additional funding for planning or construction is currently in the Capital Improvement Program.

Concurrent with the study, PGCPs will be conducting a county-wide utilization study and educational adequacy analysis. As part of this process, William Wirt will be ranked with all other PGCPs schools to develop a schedule for a future modernization program.



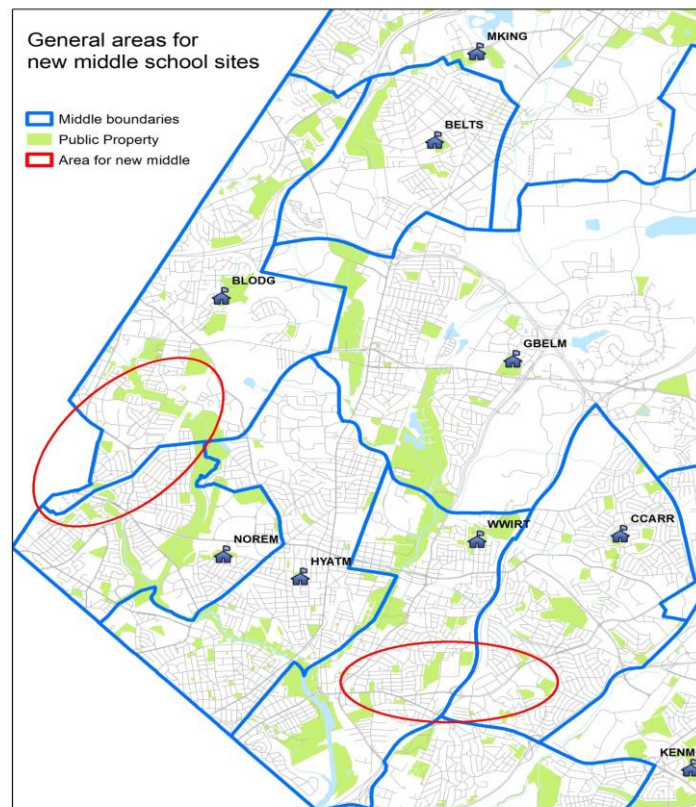
## Demographics

Since the PGCPs Board adopted an educational initiative to transition 6<sup>th</sup> grade students to middle school, the system has been gradually changing to a Grades K-5/6-8 configuration on a 'space available basis.' However, a complete reorganization will not be able to occur for the William Wirt community unless the District builds new middle school capacity. Table 1 shows current and projected enrollment at Wirt and its adjacent schools.

Table 1

Middle School	SRC	2014 Enroll Projection	Space needed	2019 Enrollment w/ reconfiguration	Space needed
Charles Carroll	893	1283	(390)	1605	(712)
Greenbelt	1101	1267	(166)	1454	(353)
Hyattsville	829	888	(59)	1043	(214)
William Wirt	850	1218	(368)	1649	(799)
<b>Total</b>	<b>3673</b>	<b>4656</b>	<b>(983)</b>	<b>5751</b>	<b>(2078)</b>

PGCPS has requested planning funds for two new middle schools to open in 2018 and 2019 - one to provide relief for the William Wirt and Charles Carroll Middle school area and one to provide relief for the Nicolas Orem and Buck Lodge Middle school area. The new middle school will be designed for the district maximum size of 1200 students. (See FY15 Educational Facility Master Plan for further discussion on school size.)



However, even with the opening of a new school, with reorganization for Grades PK-5/6-8, there is still a projected seats deficit in the Wirt community. Therefore, this feasibility study will assume that William Wirt will also be re-designed for a capacity of 1200.

## **Project Scope**

The goal of this feasibility study will be to explore several options for bringing William Wirt Middle School up to current educational standards and to end with a 'like new' building. The architect will consider at a minimum three options:

- 1) a fully modernized existing building;
- 2) a new replacement building; and,
- 3) a combination of new construction and modernization of the existing building.

In evaluating the pros and cons of each option, the architect will identify how each option adequately meets or does not meet the requirements of the educational specification.

The final report will comply with all State of Maryland requirements for this type of study.

## Vision for Middle Schools

Prince Georges County Public Schools (PGCPS) believes that middle grade learners (6-8 grades) are developmentally diverse with unique needs related to their intellectual, physical, emotional/psychological and social development. Meeting the needs of these students for academic achievement, personal development and transitioning from childhood to adolescence is of paramount importance for the success of the individual, the well-being of our communities, and the pre-eminence of our nation. The educational program for the middle grades is of such importance that it warrants the use of extensive resources extending beyond the school into the local, national, and world communities.

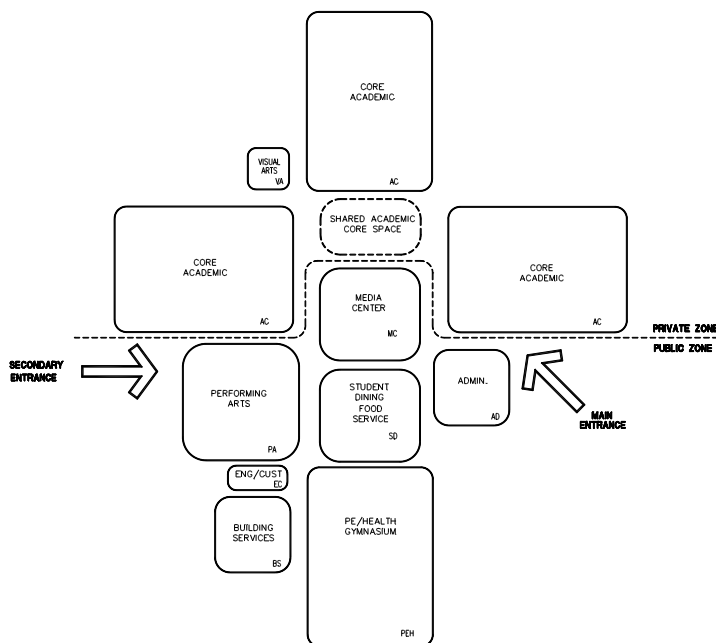
The middle school is a COMMUNITY OF LEARNING, which is characterized by:

- Close, trusting relationships among adults and students, which create a climate for the students' personal growth and intellectual development.
- Collaboration and cooperation among students in learning.
- Extensive use of instructional technology to facilitate learning.
- Feelings of comfort, safety, and orderliness by students and adults in the school environment.
- High expectations of performance and behavior for all involved in supporting the teaching and learning process.
- Opportunities for students to explore and develop interests, knowledge and abilities related to the arts, technology, and family and independent living.
- Parent and community volunteers assisting with and supporting teaching and learning at school.
- Student mastery of the knowledge and skills associated with the various disciplines of the curriculum.
- Student proficiency in the thinking skills and processes associated with critical analysis and creativity.
- Students' and staff members' health and fitness facilitating successful teaching, learning, and personal development.
- Teacher collaboration in making linkages across the curriculum and in meeting unique needs of individuals, and groups of students.

- Teachers and other instructional leaders having the freedom and expertise to adjust instruction as necessary to enhance student learning.
- Teachers and students having access to the resources of the school, local, and world communities in learning activities.

## The Learning Community School

Prince Georges County Public Schools is encouraging all middle schools to create small learning communities comprised of grade level teams. Small communities facilitate a variety of instructional strategies and provide a learning environment which is characterized by flexibility, a sense of community for the students and teachers, and a safe, well-supervised environment. Teachers will have the option and flexibility within a team to create and organize learning environments that work for students and their learning styles.



Academic teams should be located in the quiet areas of the building. Corridors should be short and multi-use, offering opportunities for informal learning and student interaction. Students should be able to interact with a common core of adults for most of their school day.

Electives, the media commons, physical education and dining should be centrally located. Noisier areas should be grouped near the parking and public areas and allow for after-hours access.

Diagram A shows a typical bubble design based on the learning community concept.

It is understood that many projects will be the modernization of an older building and that this clear definition of spaces will be difficult to recreate. The architects can substitute color, patterns and other design solutions to create a sense of place.

Characteristics of the small learning communities would include

- Collaborative Learning Areas (from small alcoves for individual or small groups to larger presentation or listening areas)
- Offices for support staff
- One or more grade level teams with core academics classrooms (Reading/Language Arts, Math, Social Studies, Science)
- Outdoor learning and collaboration areas
- Small group rooms for alternative education needs

William Wirt Middle School *Abbreviated* Draft Educational Specification

- Student storage
- Teacher support rooms and storage
- Bathrooms for students and adults
- Classrooms for students with special needs

Draft

## **General Planning Considerations**

### **Administration/Student Services**

From the parking and walking access areas, all visitors should be able to identify a 'single point of entry' to the school. Immediately upon entry, universal signage and visual cues should guide parents to a spacious, welcoming area with seating and access to the main office staff.

If feasible, visitors should be greeted at a 'welcome center' before proceeding into the rest of the school.

Registration and family services should be located near the main office. The other administrative offices and guidance services may be decentralized to increase security and supervision throughout the campus.

### **Cafeteria**

The cafeteria and serving lines should be well lit with natural and artificial light. The ceiling height should be balanced with the overall volume and treated acoustically. A variety of seating options, including outside seating, is desirable. Electrical outlets for charging mobile devices are also desirable.

This area will be used for student dining, group activities, and community meetings. It is proposed through creative design that this area will effectively house multiple functions.

- A movable wall will allow for multiple functions, and in large schools allow for smaller student groupings at lunchtime.
- At least 2 white boards and electrical outlets for mobile projectors would support 'break-out' discussions
- Wireless access points and wall outlets need to be sufficient to support on-line testing if needed.

### **Community Use**

It is assumed that the community will use the building for recreation, meetings and educational functions. Security during these times is important. The architect will zone the building for flexible after-hours use and note both active and passive security measures.

### **Corridors and Commons Spaces**

The front entry lobby should be welcoming and inviting for students, staff, and visitors. A display monitor should be provided in the lobby and additional display systems should be provided for 2-dimensional and 3-dimensional student work and awards. Finishes should be durable and easy to maintain. Colors, artificial lighting, and natural daylighting should be managed artfully.

Minimize long low-lit hallways lined with classroom doors. Consider informal learning/ collaborative areas for pull-out and views to the outside. Transparency from the classrooms into the hallways will increase supervision and encourage use of the space for learning.

Display Case - A built-in recessed display case with tackable backboard and controlled recessed lights shall be located in the entrance foyer, music area, art area, media center, and at the entrance to each team or grade level area. Provide safety glass.

Water coolers should include reusable bottle fill-up options.

## **Furniture & Equipment**

Classroom activities vary in terms of grouping and orientation; therefore, the furniture should be flexible to accommodate a variety of classroom formats for both individual and group activities. Teachers and students should have storage space for personal belongings, papers, books, supplies, and teaching materials. To the extent possible, movable furnishings will be used, rather than fixed casework, to provide flexibility for future reconfiguration.

Student desks and chairs should encourage rearrangement. Class sizes vary from 20:1 in the core subjects to 28-32:1 in some classrooms. PGCPs requires a larger classroom than has traditionally been designed to support larger classes and flexible arrangements. Alternative seating options will be considered for comfort, mobility, and/or compatibility.

## **Handicapped Accessibility**

The entire facility will be accessible for students, staff, and visitors. This will be accomplished through judicious use of ramping and elevators with sufficient internal clearances for circulation, convenient bus/van loading and unloading, and nearby handicapped parking spaces. All elements of the Americans with Disabilities Act must be complied with, including wayfinding and signage, appropriate use of textures, and universal accessibility of all indoor and outdoor school facilities.

## **Media Center**

School libraries are changing from being quiet book-lined spaces for research and contemplation to multi-media, interactive studios for social collaboration for faculty and students. It is one of the largest most flexible areas in the school, transforming itself from dozens of varied self-directed activities to a large group meeting and presentation space in a matter of minutes.

Often part of school commons, new media centers are more than 50 percent digital and offer both learning areas as well as production areas. The ideal media 'commons' might move from noisy to quiet - through a 'café' and mobile computing environment, to small group study areas, to individual study carrels or an on-line learning room. Visual access and varied seating is important to create a transparent and inviting culture.

On-line and independent learning applications are some of many new learning paths that schools are embracing. Virtual schools and 'blended learning' models are successfully reaching some students who need to learn at their own pace. As part of the media commons, the on-line learning center will have access to a variety of resources and expertise.

## **Site**

(More specifics listed under Safety and Security and Sustainability Considerations)

School sites shall have perimeter security fencing preventing access to walkways and courtyards when facility is not occupied, but allow for public use of exterior athletic facilities. Design exterior doors to prevent unauthorized entry by minimizing key locks and hardware on doors which would not be used for the purpose of entry but are installed for emergency egress.

A flag pole and electronic marquee will be installed in the front of the school.

Consider the entire school grounds as a teaching opportunity with a central space as the 'outdoor learning area or classroom'. An ideal location for garden plots would be to the south of the school.

## **Special Education**

PGCPS offers a continuum of services to students with special needs. To the extent possible students are educated using co-teaching, occasional 'pull-out' focused on intervention or self-contained classroom settings. The number of students and range of teaching options may vary from year to year and all classrooms should be designed to accommodate all students regardless of their disabilities.

Special education facilities will be integrated throughout the school to support the concepts of inclusion and the specialized requirements for the students. Special attention will be given to accessibility of all facilities and an integrated learning program.

Occasionally, a regional program for students with more intensive needs will be located at a neighborhood school.

## **Traffic and Circulation**

The site circulation will be organized for safety and efficiency. This will be accomplished through careful separation of vehicular and pedestrian traffic. Sufficient stacking space will be provided to prevent congestion of busy streets.

The following traffic-related activities occur on the school site:

- A. Approximately, 12-14 school buses will enter and exit the site at the beginning and end of each school day.
- B. Approximately, 117 staff will enter and exit the site daily.
- C. Service and visitor 19 spaces vehicles will enter and exit the site daily.

Proper signage should be included to delineate each area. Signage and bumpers for parking spaces shall be provided by the contractor.



## **Visual Arts and Performing Arts**

The art and music classrooms will be shared by all grade levels for general class and small group instruction. The location and access to these rooms should promote orderly transitions.

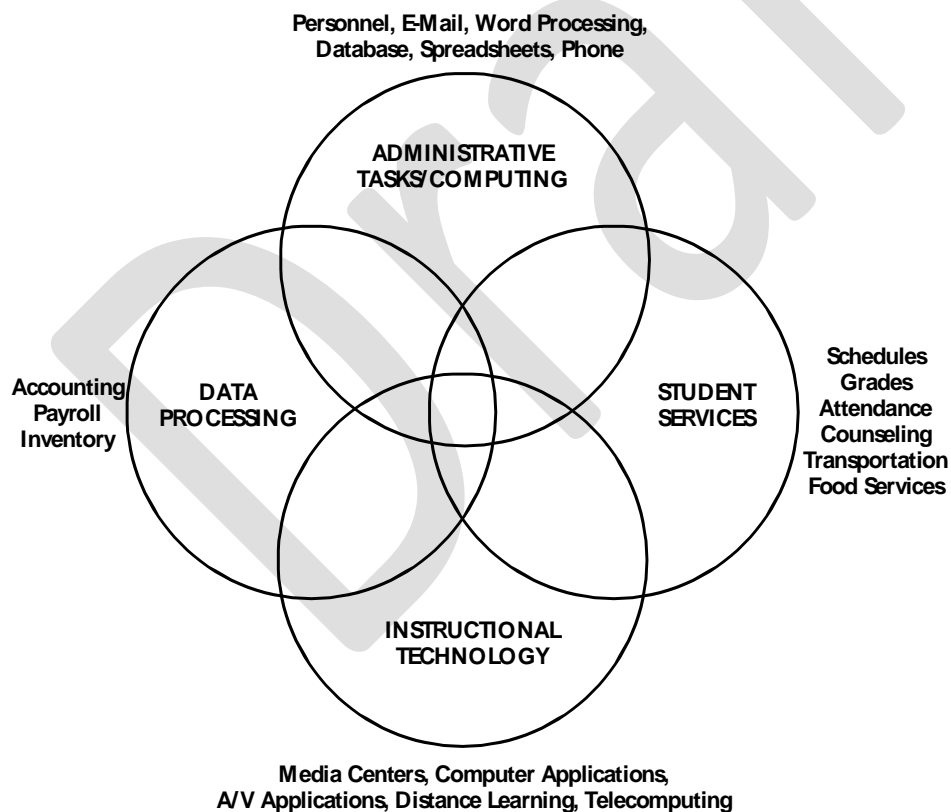
If possible, the music suite will be located near the performance area. Unless a separate auditorium already exists, the performance space seating area for middle school will be co-located with the multi-purpose/dining. This space should be able to seat 50% of the student population for a performance. The architect should consider acoustics, viewing site lines, and the logistical challenges of student performances early in the design process to ensure that these two functions can operate with minimal compromises.

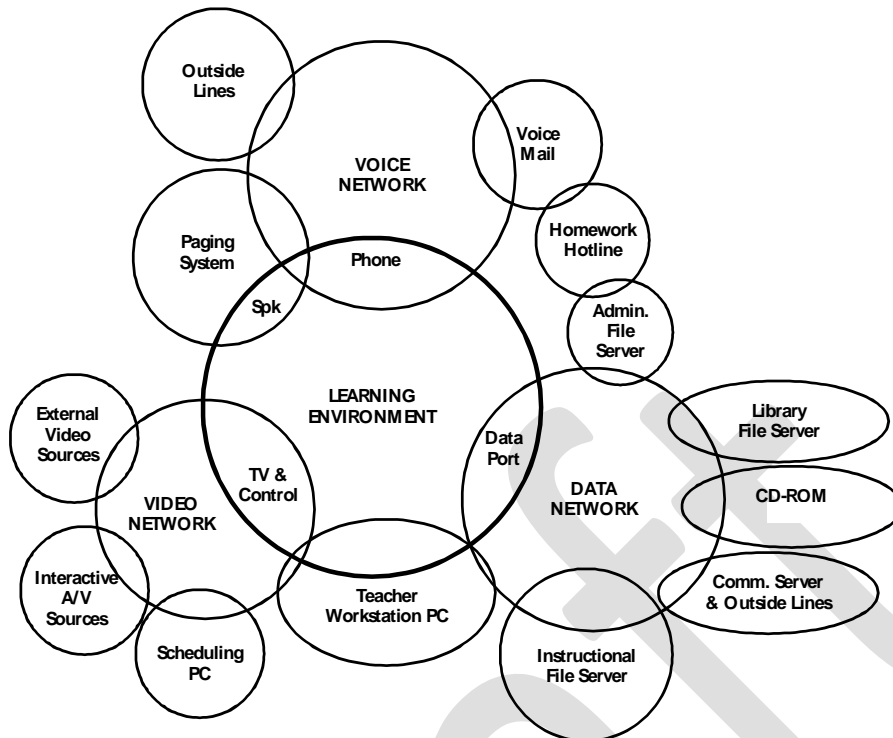
The art classroom should preferably be on the ground floor with an optimal north light orientation. An outside patio and seating area will offer additional work, display, and performance opportunities.

## Educational Technology

The implementation of a voice, data, and video telecommunications system throughout schools is standard across the country. Appropriate and strategically designed and installed technology greatly enhances the teaching and learning of basic skills and positions a school to take advantage of technological developments in the future. All classrooms should be multi-use/multi-purpose with invisible technological support. There should be a seamless web of technology to support the classroom management between administration, teachers, students, and the home. As home and business worlds move into higher levels of technological applications, it is critical for schools to be able to integrate technology into the teaching and learning processes.

Technology has four primary applications within the school environment. These applications have the potential for a positive impact on every aspect of the educational processes found in schools. Diagram C provides a visual of how the four primary applications interface with each other and some examples of educational applications in each area.





A good technology network can support multiple instructional designs:

**Whole Group Instruction (20-30 students)**

This includes the use of interactive boards/walls, LCD displays, video stills, and various forms of computer display techniques. For the near future, laptop computers, tablets and handheld devices will be the tools in the classroom and need to be secured and charged nightly.

**Small Group Instruction (6-8 students)**

This includes areas in the classroom and in shared common spaces where a teacher or another resource person can work with groups of 6-8 students. The technology is essentially the same as whole group instruction technology, the only difference being the size of the groups.

**Individualized Instruction (1-2 students)**

This is primarily a computer-based instruction design where students interact with a computer workstation. As all forms of technology become more and more digitized, it is envisioned that these will become multimedia workstations that integrate voice, video, and data formats.

In the future, it is likely that most end-user devices will be portable. The implications of an all mobile computing environment should be envisioned today to insure that schools are prepared for the wireless and electrical demands of the near future.

**Technology goal in the building:**

Voice: Telephone (IP) and voice communications in every classroom and throughout the entire building as well as to other persons in the school system and external resources including parents and community members.

Data: Data retrieval capabilities in every classroom and throughout the building as well as network capabilities district-wide and to other external databases. (wireless)

Video: Video distribution in every classroom and throughout the building with interactive video capabilities to support whole and small group instruction, distance learning, and providing access to a wide range of internal and external resources. Appropriate school-wide infrastructure is needed.

**All Teaching Stations**

Each learning studio (classroom, lab, resource room, conference room) will be equipped for multimedia presentation. The choice of equipment will be determined one year prior to school opening and will represent the best available teaching and learning tools at that moment.

**Currently:** PGCPs is installing interactive white boards (SMART Boards) mounted just above the center of the writing board.

**Alternatively:** Ceiling mounted digital or LCD short throw projectors and wall mounted screens may be provided in each classroom. Multimedia sources such as PC, document camera, teacher audio assist, video tape decks; DVD and HDTV are connected to it. The teacher can select sources for display on an as-needed basis using remote control.

All playback devices and accessories in classrooms are placed in a lockable A/V cart situated near teacher's desk. All devices are permanently connected to the display panel and the teacher can control the operation by remote control at the desk.

Current standards require the following minimum number of outlets in a typical classroom:

- Four (4) outlets for student use
- Two (2) outlets for wireless network
- One (1) outlet for the intercom system
- One (1) outlet for telephone at the teacher station
- One (1) outlet for control of the classroom projector/interactive board
- Two (2) outlets at the teacher station for a teacher's computing device and accessory
  
- Twenty (20) ampere circuit, or additional as required, to support computers, printer, and typical classroom equipment shall be in each classroom.
- Electrical outlets shall be at six feet (6') on center. In standard classroom they shall be paired with four data outlets around the room, not including the teacher station outlet.

Every classroom will be wired for teacher audio enhancement. Research into this cutting-edge technology suggests that student learning can improve in classrooms where the teacher's voice is amplified and the classroom acoustics are designed to support voice clarity. Teachers in class rooms shall be provided with a directional wireless head worn microphone (Transmitter/Receiver) to ensure adequate audibility and intelligibility. A hand held/desk top microphone is provided for student participation. The mixed sound will be amplified and sent through the speakers (preferably ceiling mounted).

Conference Room Technology – All administrative conference rooms will have on-table computer connections to a video display screen and be internet capable.

Recharging stations - Opportunities to plug in user devices should be intentionally installed in the cafeteria, informal learning alcoves, media center, outdoor learning areas, etc.

### **Communication System**

A two-way voice communication system shall be installed that will provide communication between the administrative area and each teaching station or support area, with a telephone in every room. This same system should have the potential to carry an auditory signal automatically controlled and located in the administrative area. Provision should be made for these signals to reach all teaching and support areas including the outdoor activity area. The public address system shall be integrated with the telephone system with a Call Back (CB) feature from the classrooms and support areas to the main office.

The telephone company will bring fiber cable to the building with wide area network connection. **Currently:** Cable TV with a closed TV system is installed in each instructional area and conference rooms.

**In the future:** Video signals may be carried over IP from any internet able device. When that occurs, cable will still be needed in the gymnasium, auditorium, and main office for emergency broadcasts.

A central wiring closet will house central server, PA system, telephone, television, and technology wiring, with shelves for networking hubs, switch, UPS, file server, etc.

See individual space descriptions for special technology needs.

## **Safety and Security**

PGCPS wants to maintain an inviting and de-institutionalized environment, while simultaneously providing a safe environment for students, staff, and community who use the facility and adjacent support services. The organization of a building will have a major impact on student behavior and safety concerns. Building security can be addressed in an active or a passive manner. Active security is based on security systems; passive security is based on program design, building configuration, and community participation. Schools should be based on passive concepts with applied active concepts where necessary.

### **Building Layout**

- Avoid blind spots, corners, and cubby holes
- Design toilets to balance the need for privacy with the ability to supervise
- Develop spatial relationships that are natural transitions from one location to another
- Locate administrative and teacher preparation with good visual contact of major circulation areas (i.e., corridors, cafeteria, bus drop-off, parking)
- Locate areas likely to have significant community use close to parking and with zoned access

### **Egress and Life Safety**

- Ability to shelter in place with blinds for control of the view into the classroom.
- All doors into classrooms, offices and support areas must have a clear safety glass window with blinds for control of views into the classroom; doors should be able to lock from the inside allowing the ability to shelter in place
- Door bells should be installed at the main and kitchen entrances
- Emergency generator capability, where appropriate, in compliance with MEMA regulations
- Outside lock box for police and fire departments to be provided. Knoxbox system

### **Types of Building Materials**

- Incorporate pitched roofs which inhibit roof entry and are aesthetically pleasing
- Install non-slip floors at point of entry
- Limit size of windows – use multiple smaller windows rather than one large window
- Use durable wall surfaces that are easy to clean so graffiti can be removed

### **Uses of Technology**

- Building-wide all-call designed to be heard throughout the school and on the play fields
- Key systems that track users
- Motion or infra-red detectors, which can also be configured to conserve lighting costs
- Phones in every instructional and support area
- Video cameras both inside and outside of the building

### **Vehicular and Pedestrian Traffic/Landscaping**

- Provide security lighting around building and parking lots with photocell timer with on/off
- Separate student (pedestrian) traffic flow
- Use aesthetically pleasing fencing around perimeter of the building
- Use high trees and low bushes (clear view between three to six feet high) to deter hiding

## **Sustainability Criteria**

### **Energy and Environmental Design**

The sustainable design and green features of the building can be addressed in an active or a passive manner: active interaction is based on digital displays, educational features and curriculum integrated learning about environmental issues; passive interaction is based on the building configuration, green building features, and energy efficient building automation.

#### **Building Layout**

- Avoid excessive window areas in corridors, lobbies, hallways with no gathering opportunities (design for less than 45% of wall area)
- Avoid skylights and use roof monitors with vertical glazing instead
- Concentrate daylight and views to the outside to areas of frequent human interaction (e.g. classrooms, cafeterias, etc.)
- Provide signage to educate users about interior and exterior green building features throughout

#### **Green Curriculum**

- Design interior with sense of buildings orientation to North – East – South - West
- Provide outdoor classroom and student garden areas

#### **Landscaping, Play/Practice Fields, Site, and Lighting**

- Use full cut-off, non-intrusive lighting of all areas (not correctional-type lighting) according to the Light Pollution Credit in LEED-S with no lighting to leave property line or illuminate sky
- Use native high trees and low bushes and ground covers and locate to provide shade to the building and mechanical equipment

#### **Types of Building Materials**

- Design with noise minimization in mind
- Incorporate light colored pitched roofs to prevent heat gain and leakage
- Use durable wall surfaces that are easy to clean

#### **Uses of Technology**

- Daylight sensors and dimming in larger areas (cafeteria, multi-purpose etc.)
- Digital display of the building's energy and water use at entrance and in cafeteria
- Use only vacancy sensors for classrooms, cafeteria, etc. to turn off (not on) lighting
- Website with environmental features of the school

#### **Vehicular and Pedestrian Traffic**

- Provide bicycle lanes to building from all major access directions
- Provide preferred parking for carpooling and fuel efficient vehicles
- Provide sufficient, covered and secure bicycle storage

## Environmental Performance

Scientists who study the "neuroscience of learning" are finding that certain lighting, acoustics, and spatial relationships support or hinder the learning process. Researchers have presented findings that link measurable outcomes such as student attendance, academic performance, faculty retention, and disciplinary actions.

### Acoustics

Research links the importance of maintaining appropriate acoustic conditions for student learning. This relates to noise from external sources and reverberation in the classroom and is linked to academic achievement, behavior, attention, and academic concentration. Classroom design parameters are generally accepted as outlined.

**Goal:** Limiting reverberation and background noise and improving sound isolation.

	DESIGN PARAMETERS	PARAMETER NOTES
1) Reverberation	.6 per second	ANSI S12.60
2) Background Noise	35 dBA	LEED
3) Sound Isolation	STC 50 between Classrooms	

### Environmental / Air Quality

According to the US Center for Disease Control and Prevention, American children miss approximately fourteen million school days each year due to asthma. Controlling environmental factors such as dust, pollen, and carbon monoxide could help prevent more than 65 percent of asthma cases of elementary school-age students according to the American Journal of Respiratory and Critical Care Medicine. The following classroom design parameters should be considered when modernizing a school facility.

(Note: where more recent EPA & ASHRAE parameters must follow recent updates.)

**Goal:** To ensure comfortable rooms, address temperature control, ventilation, and air filtration.

	DESIGN PARAMETERS	PARAMETER NOTES
1) Winter Temperature	68.5 to 75.5 degrees	EPA & ASHRAE 55-04
Summer Temperature	74 to 80 degrees	
2) Humidity	30% to 60% relative humidity	EPA & ASHRAE 55-04
3) Air Changes	6-10 per hour minimum	ASHRAE
4) Outdoor Air Ventilation	10CFM per person minimum	Plus 0.12 per SF of area
5) Air Filtration	MERV 13	LEED



### **Ergonomics**

A 2007 study compared adjustable furniture in schools to traditional fixed furniture. Students using adjustable furniture were found to have higher grades than those in the control group using traditional school furniture. Characteristics of furniture that promote good posture should be considered as well as adjustable desks and chairs to allow students of varying sizes and body types to improve their comfort levels when sitting for long periods of time.

**Goal:** Provide comfortable, mobile, and durable furniture for students and teachers.

Note: All furniture and equipment shall meet the GREEN USGBC LEED requirements for new schools and major renovations.

### **Lighting Quality**

The Heschong Mahone Group found statistical correlations between the amount of daylight in an elementary school classroom and the performance of students on standardized math and reading tests in 1999. Since then, case studies and further research have supported this finding and the educational facility planning community has generally accepted the following classroom design parameters.

**Goal:** Improve natural and artificial lighting in classrooms.

	<b>DESIGN PARAMETERS</b>	<b>PARAMETER NOTES</b>
1) Controlled Natural Lighting (Glazing)	10 - 12% of floor S.F.	LEED & Green Globe
2) Artificial Light	35-50 Foot-candles	IES

## **Outdoor Environmental Classroom**

### **Connection to the Overall School Site**

The outdoor classroom should be clearly defined, but with a possibility for expansion of activities beyond with garden plots nearby. The outdoor classroom should be placed in a well-used and visible part of the school grounds. It should also be a controlled and secure location. The exit from the school should be accessible by all classes, e.g., not through a doorway in a particular classroom. Also consider environmental factors, including noise. For instance, is the school ventilation system or a busy road particularly audible from that location. If there are plans to expand the school in the future, make sure the outdoor classroom is in a place that will remain undisturbed. Also be sure to capitalize on any site features. For instance, create a clear connection to an on-site stream.

### **Required Site Elements:**

- Electrical access
- Exterior water hose hook up
- Point of access for larger vehicles/supplies
- Seating
- Shade, either by a shade structure or by trees
- Tool shed

### **Potential Site Elements:**

- Composting area
- Greenhouse
- Interactive water and energy usage learning station -- this would monitor the school's water and energy usage
- Managed meadow
- Pollinator garden, with space and paths for students to get in and investigate
- Rain garden
- School arboretum
- Sundial (could be in ground, on side of building, incorporated into an awning as an oculus etc)
- Vegetable/community garden plots/raised beds
- WiFi access

### **Accessibility**

The pathway connecting the school, outdoor classroom, and any specifically programmed teaching areas associated with the classroom shall be clearly delineated, constructed of a solid material and should make every attempt to not create any dead ends. All outdoor areas should be fully accessible to students of different mobility. For instance, at least some garden beds should be raised 18"-24" to be easily accessed from a wheelchair (if garden beds are built). Refer to the current ADA standards for minimum design requirements in this capacity. Remember to apply these standards to any student garden areas, or other programmatic spaces associated with the outdoor classroom, as well. These areas will need enough space for work areas to not interfere with space for students to pass.

### **Layout**

Provide a station for the teacher to work from, where he/she can see each student. Seating can be either fixed or flexible, depending on the site, but should easily accommodate up to 35 students. Orientation of the teacher and students should be along a north/south axis, so neither is looking into the sun during instruction times.

**Maintenance:** The outdoor classroom should be designed to be low maintenance and a maintenance plan should be written for each site's outdoor classroom. The school maintenance supervisor or member of the teaching staff should be made aware of any special aspects and confident in his/her ability to care for the space.

**Materials:** The outdoor classroom should be built with natural materials like wood or stone. Limit use of concrete and even then only in high traffic areas, for example the walkway connecting the school and the outdoor classroom. Consider the albedo (reflectivity) of materials used, since glare can hinder the students' ability to focus. Permeable paving of any material is encouraged, including pervious concrete.

**Plants:** When choosing plant material, preference should be given to native shade trees and low maintenance shrubs. Plant material should be chosen based on each specific site conditions. Choose plant species based on how the mature size would fit into the landscape. Also, plants should be chosen with all 4 seasons in mind. The space should be inviting any time the weather is at all agreeable, including during a warm snap in winter. When choosing plant material for the school site, use a variety of species as appropriate. The visual unity of the site is important, but a variety of species is also valuable in terms of biodiversity, sustainability (in case a disease or pest for a particular species arises, then a diversity of species ensures that the whole school grounds isn't decimated) and it also provides the opportunity for a school arboretum.

**Signage:** Interpretive signage should be incorporated into the outdoor classroom, as well as the whole school site, as much as possible. Possible features that could have interpretive signage include, but aren't limited to, native plants that attract beneficial insects, or a managed meadow, or a piece of public art, or a particular feature of the building, or whatever other interesting features get incorporated. Signs could be written in multiple languages.

**Solar aspect/shade:** The teaching area should be shaded, but the nearby areas for potential expansion with garden plots should receive 6-8 hours of sunshine a day. Ultimately an ideal location for garden plots would be to the south of the school with some accommodations made to shade the nearby classroom either with a structure or trees.

**Visibility/Safety:** There should be clearly defined edges to the outdoor classroom and a fence may be preferable, depending on the neighborhood context of the school. Within the space there should be clear lines of sight throughout - no potential hiding spaces. What's going on within the classroom should also be visible from points within the school (windows in nearby classrooms).

## Capacity Calculation

PGCPS has established a minimum and maximum size for middle schools of 600 and 1200 respectively. This educational specification outlines the requirements for a 1200 student school.

Table 1 shows the breakout of classrooms by subject area and the associated State Rated Capacity (SRC). The SRC also assumes that classrooms will be used 85% of the school day. However, in most PGCPS schools, class sizes are typically between 25-32 students, but classrooms are used only 71% of the day because they are not usually shared by other teachers. The resulting capacity is similar.

A 1200 student middle school is designed around 3 teams per grade—each with approximately 135 students. The core classes include reading language arts, math, social studies, and science. It is common to have double periods of language arts and/or math for some students. The number of world language, reading, or other electives varies from school to school and will be identified during the development of a site specific educational specification.

### STATE RATED CAPACITY SUMMARY

	# of Rooms	# Students/ Room	Capacity
Academic Classrooms/Skills Labs (Reading Language Arts 8; Math 10; Social Studies 7; Other 3*; Health 2)	30	25	750
Intensive/Co-teaching Learning Studios (in core subjects)	9	15	135
Dance	1	25	25
ESOL and AVID	5	20	100
PE/Gym	1	50	50
Performing Arts	2	25	50
Science Lab	8	25	200
STEM Lab (Technology Integ.)	2	25	50
Visual Arts	2	25	50
<b>Total</b>	<b>60</b>		<b>1410</b>
<b>Total at 85% (SRC)</b>			<b>1199</b>
<b>Total at 71% (Local)</b>			<b>1001</b>

\* World language, additional language arts or math

**Space Requirements Summary**

Base Required Space	Square Footage
Core Academic/Science	58,775
Administration/Guidance/Health	7,545
Maintenance & Custodial Services	1,350
Media Center	6,740
Performing Arts	6,235
Physical Education/Indoor	16,550
Student Dining & Food Service	10,070
Visual Arts	3,100
Building Support Areas [corridors, bathrooms, storage, stairwells, elevators]	43,140
Construction factor (walls)	12,189
<b>Total</b>	<b>165,694</b>

1199 Students/SF=138 SF per student

**Academic Core Space Requirements**

Space	Design Guideline			Comments
	Qty.	S.F.	Total	
Academic Classroom/Studios	39	875 avg	34,125	Includes co-teaching classrooms
Alternative Education Rooms	2	450	900	ISS/mediation
Collaborative Learning Areas		varies	3,150	Independent and informal learning areas
Outdoor Learning Areas (informal)	3	varies	0	In addition to the outdoor environmental classroom
Science Lab	8	1200	9,600	
Science Prep	3	300	900	1 per grade
Small Group Resource Rooms	6	400	2,400	Pull-out and small group instruction
Speech/OT/PT	1	300	300	
STEM lab/Consumer Science	2	2,200	4,400	
Storage (technology)	3	300	900	1 per floor
Guidance/ Student Services Offices	6	150	900	
Teacher Support Areas	3	400	1,200	1 per grade
<b>Total</b>			<b>58,775</b>	

**Administration Suite Space Requirements**

Space				Comments
	Qty.	S.F.	Total	
Administrative Assistant's Office	1	120	120	
Administrative Workroom	1	200	200	
Business Manager's Office/ vault	1	150	150	
Conference Room	1	300	300	Adj. to principal
Entrance Lobby	1	1,000	1,000	In addition to regular circulation
Mail Room	1	150	150	
Principal's Office	1	230	230	Includes toilet
Security Center/ Office	1	200	200	
Staff Break Room	1	800	800	Includes bathrooms
Storage (General Supplies)	1	250	250	
Text Book Room	1	800	800	2,000 linear ft. shelving
Toilet (adult)	1			See building support space
Waiting Area/Reception	1	600	600	Includes coat closet
<b>Total</b>			<b>4,800</b>	

Note: Administration leadership may be distributed in learning communities.

**Guidance/Student Services Space Requirements**

Space	Suggestions			Comments
	Qty.	S.F.	Total	
Student Services Suite Reception and Work Area	1	300	300	
Conference/Testing Rooms	2	200/ 300	500	
Offices	6	120	720	May be in Academic Core Space
Parent Resource Center	1	300	300	May be in Community Space
Records Storage Rom	1	150	150	May be In Admin. Suite
Toilet	1		0	See building support space
<b>Total</b>			<b>1,970</b>	

**Health Suite Space Requirements**

Space				Comments
	Qty.	S.F.	Total	
Health Suite				
Cots	2	100	200	
Office	1	100	100	
Storage	1	50	50	
Toilet	2	50	100	
Treatment Area	1	125	125	
Waiting Area/Reception	1	200	200	
<b>Total</b>			<b>775</b>	

**Maintenance & Custodial Space Requirements**

Space	Suggestions			Comments
	Qty.	S.F.	Total	
Custodial Office	1	150	150	
Custodial Storage	1	300	300	
Receiving and storage	1	600	600	
Toilet/Shower/Lockers	2	150	300	
<b>Total</b>			<b>1,350</b>	

**Media Center Space Requirements**

Space	Design Guideline			Comments
	Qty.	S.F.	Total	
Library Commons - Independent and on-line learning	1	3,800 1,000	4,800	Computer lab may be semi-open to the media commons
Equipment Storage	1	250	250	
Office	1	150	150	
Staff Development /Conference Rm Instructional Coach's Office	1	750 150	750 150	Corridor access
Telecom Head End Room	1	300	300	
Toilet (staff)	1	40	40	
Workroom	1	300	300	
<b>Total</b>			<b>6,740</b>	

**Performing Arts Space Requirements**

Space	Design Guideline			Comments
	Qty.	S.F.	Total	
Dance/Fitness	1			See P.E. space
Drama Classroom	1	450	450	Stage support
Stage	1	1,200	1,200	
Stage Sound and Light Control Room	1	75	75	(stage)
Storage (Stage)	1	300	300	Piano storage
Toilets w/ changing area	2	150	300	Take from total allowance
<b>General Music</b>				
Choral/ Keyboard/ Guitar Band/Orchestra Room		1,400 1,800	3,200	
Choral Storage	1	200	200	
Instrument Storage	1	350	350	
Practice Rooms	2	80	160	For SmartMusic or similar tool
<b>Total</b>			<b>6,235</b>	

**Physical Education Space Requirements**

Space				Comments
	Qty.	S.F.	Total	
Lobby	1	1,000	1,000	in addition to regular circulation
Gymnasium	1	6,800	6,800	Or 'as is'
Seating	1	2,400	2,400	For ½ the student pop-- 600 audience members
Dance/Fitness	1	3,200	3,200	May be 2 rooms
Dept. Office	3	150	450	
Laundry	1	100	100	
PE Locker Room>Showers	2	850	1,700	Male and female
Storage	3	varies	900	
<b>Total</b>			<b>16,550</b>	

**Site Requirements/Athletics**

Outdoor Educational spaces	Square Footage
400 Meter Track - 200 Meter Straight	
Basketball Courts (2)	
Bleacher Seating (Location and number TBD)	
Bus parking/circulation (may be used as play space during the school day)	
Exterior Grounds Equipment Storage [secure – w/ roll-up door ]	400 SF
Fields for football, soccer, softball, and, if feasible, baseball, lacrosse, and practice	
Gardens and outdoor learning spaces	
Parking ( ___ staff and ___ visitor)	

**Student Dining & Food Service Space Requirements**

Space				Comments
	Qty.	S.F.	Total	
Cafeteria/Commons	1	6,000	6,000	
Chair Storage	1	600	600	
Food service receiving	1	200	200	
Kitchen	1	2,000	2,000	
Office	1	120	120	
Serving Area	1	1,000	1,000	
Toilet/Locker area	1	150	150	
<b>Total</b>			<b>10,070</b>	



**Visual Arts Space Requirements**

Space	Suggestions			Comments
	Qty.	S.F.	Total	
Multi-purpose Studios	2	1,300	2,600	
Kiln Rm.	1	100	100	
Storage	2	200	400	
<b>Total</b>			<b>3,100</b>	

**Other Optional Spaces**

**Community Use**

Community Use spaces	Square Footage
Community Suite	
- Classroom/meeting	800 SF
- Family room	300 SF
- Pantry	300 SF
- Reception	150 SF
Partner office(s) and/or storage	250 SF
Net Total	1,800 SF
<b>Total</b>	<b>2,520 SF</b>

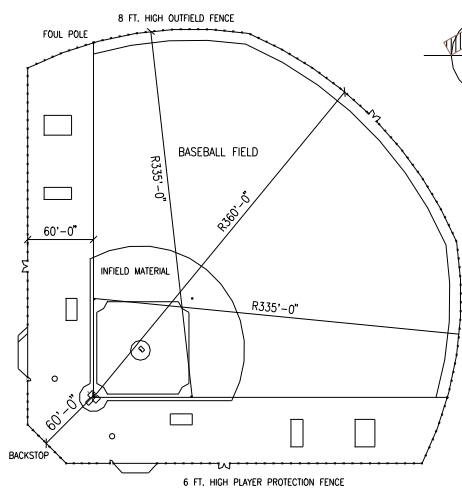
## Physical Education Fields (If feasible)

Provide 6 to 8 lane running track with center soccer/football field; field events; bleacher seating for 400, 2 basketball courts and a softball field. Baseball field is desirable.

Provide grading of fields with 1 percent to 1-1/2 percent slope.

### Baseball Field (If Feasible)

Verify radius required based on program use of field. Estimate of area needed is based on 360 feet radius to center field and 335 feet to right and left outfield. See below Figure.



Provide infield area in compliance with High School Athletic Association guidelines. See adjacent Figure.

Provide a 24-foot high backstop a minimum of 60 feet from home plate.

Provide a player protection fence that is 6-foot high chain link fence offset 60 feet from first and third base lines.

Consider outfield fencing 8-foot high chain link fence with foul poles and top rail protective pad between foul lines for competition fields.

Provide for player benches, set back from side fence line.

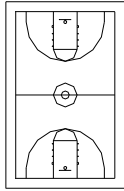
Provide secure storage (under bleachers if provided).

Provide bleacher seating on home and visitor sides for competition fields only.

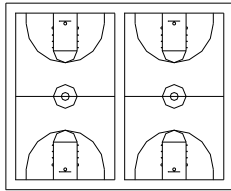
**Basketball**

Provide 50 feet x 84 feet courts with 2 inch wide white striped lines on play pavement.

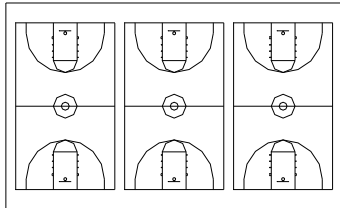
Courts in quantity of 1-2 have 5 feet pavement surrounding and between courts. Courts in quantity of 3 or more have 10 feet pavement beyond ends of court and 5 feet to sides or between courts.



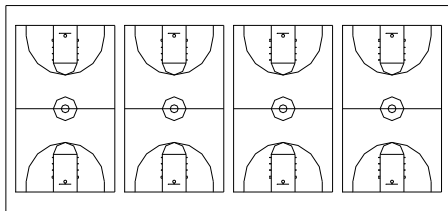
ONE COURT: 5640 S.F.



TWO COURTS: 10,810 S.F.



THREE COURTS: 17,680 S.F.



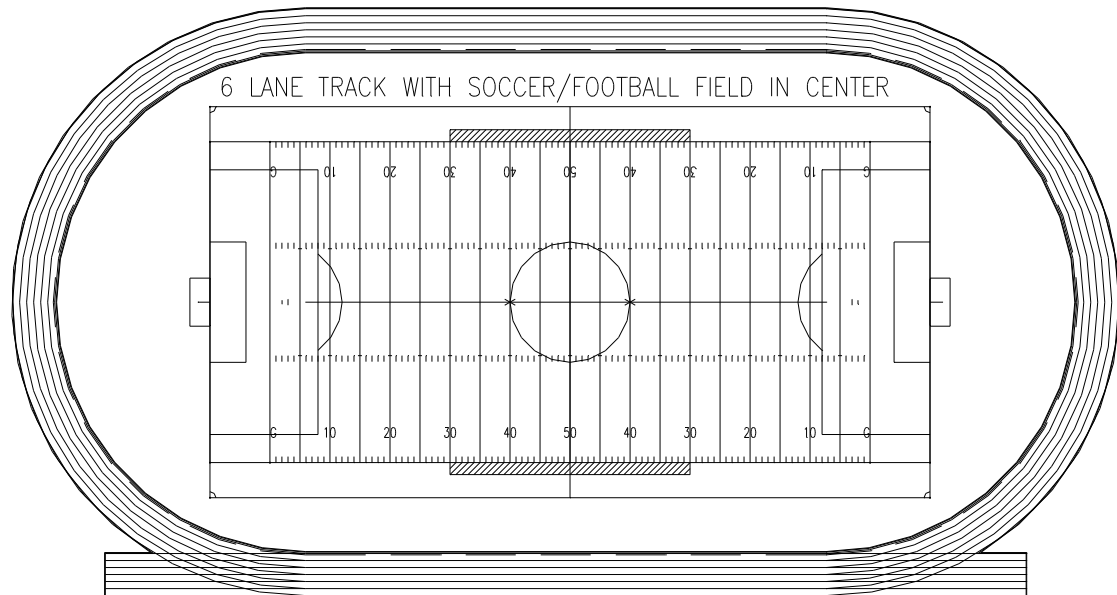
FOUR COURTS: 23,400 S.F.



**Football/Soccer Field W/ Running Track**

Provide 6- or 8-lane, 400-meter running track/football field in accordance with NCAA standards. See below Figure.

Design track radius to allow for a soccer or football field inside the track with player benches.



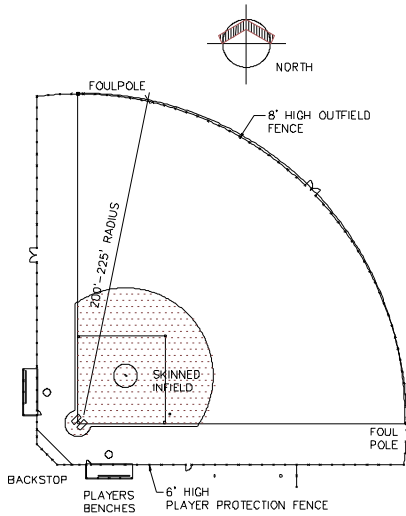
Provide field events that include long/triple jump.

Provide a 4-foot high chain link perimeter fence surrounding track with gates at center field and as needed for maintenance.

Include track equipment storage under bleachers.

## **Softball Field**

Provide softball field radius of 225 feet to 275 feet. See below Figure.



Provide infield area in compliance with the High School Athletic Association guidelines. See adjacent Figure.

Provide a backstop having a 17-foot 6-inch overhang height; and a 10-foot high by 20-foot wide back panel with 10-foot wide side panels. Locate backstop a minimum of 25 feet and a maximum of 30 feet behind home plate.

Provide 6-foot high chain link player protection fence.

Consider 8-foot high chain link outfield fencing, foul poles, and top rail protective pad for competition fields.

Provide player benches, set back from side fence line.

Provide bleacher seating on home and visitor sides for competition fields only. Provide space for future bleachers at practice fields.

Provide secure storage (under bleachers if provided).



# Program Space Summary

## William Wirt Middle School Feasibility Study Area Comparison

### Existing      Ed Spec      Scheme 1      Scheme 2      Scheme 3

Space Requirements	Existing	Ed Spec	Scheme 1	Scheme 2	Scheme 3
Core Academic/Science	35,609	58,775	60,207	61,341	62,625
Media Center	3,469	6,740	6,550	6,850	6,720
Visual Arts	2,480	3,100	3,110	3,300	3,100
Performing Arts	4,650	6,235	6,140	6,254	6,240
PE/Indoor	17,108	16,550	14,613	14,613	16,690
Administration/Health/Guidance	5,229	7,545	7,952	7,574	7,878
Student Dining + Food Service	9,370	10,070	10,070	10,068	10,070
Community Space	-	3,000	2,924	2,960	2,950
Maintenance + Custodial Services	3,239	1,350	1,350	1,350	1,350
<b>Total Net Area</b>	81,154	113,365	112,916	114,310	117,623
Building Support Areas		43,140			
Construction Factor (walls)		12,189			
<b>Total Gross Area</b>	<b>106,318</b>	<b>168,694</b>	<b>177,310</b>	<b>176,081</b>	<b>165,571</b>