SCOPE STUDY REPORT
for
Harford County Board of Education
HOMESTEAD WAKEFIELD ELEMENTARY SCHOOL
OCTOBER 2009

U.S. GREEN BUILDING COUNCIL MEMBER

HARFORD COUNTY PUBLIC SCHOOLS Serving Youth

FREDERICK WARD ASSOCIATES

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Scope Study Design Team

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Introduction:

Homestead Wakefield Elementary School in Bel Air, MD consists of three (3) separate structures. The entire campus consists of approximately 115,458 square feet.

The Wakefield school building was constructed in 1958 and consists of approximately 58,245 square feet. Renovations and additions to the media center were constructed in the mid 1990s. Over the past year there has been a roughly $5 million construction project ongoing to upgrade various mechanical systems, restrooms, lighting, and portions of the curtainwall/exterior envelope. There is a new chiller contained in an exterior area adjacent to the cafeteria as well.

In 1966, the Homestead building was constructed, which consists of approximately 52,628 square feet. Renovations and additions to the media center were constructed in the mid 1990s.

A remote kindergarten building was constructed near the Wakefield building in 1968 and consists of approximately 4,585 square feet.

One of the biggest operational challenges with the Homestead Wakefield Elementary School (HWES) is that it is spread out over three buildings, two of which (Wakefield and the Kindergarten building) are on a plateau that is forty (40') feet higher than the finished floor of the existing Homestead School. Additionally, Wakefield is a few hundred yards laterally from Homestead and teachers and students are forced to traverse a gravel path from one school to the other. In inclement weather this can be challenging, and to complicate matters further, the path is not currently handicap-accessible.

The combined student population of the two schools is approximately 900 students (+/-) spread out over three buildings. Investigating the feasibility of having the entire school population under one roof while modernizing the facility was one major goal of this scope study. In commencing that investigation the first thing FWA did was to investigate the existing conditions at Homestead-Wakefield, including site issues (brought in for reference from FWA's Bel Air Campus Master Plan Final report), architectural issues (building envelope, ADA compliance, adequacy of program space, energy efficiency, and sustainability), structural issues (conditions

of masonry, load-bearing walls, columns, canopies, and roof structure), mechanical and plumbing issues (fixtures, condition of pipes, HVAC equipment, controls), electrical issues (building lighting, power, panelboards, site lighting, data/telecom (IT), Audio-Visual Equipment, Fire Alarm system, Security System, and emergency power), and Food Service issues (cooking equipment, prep and serving equipment, kitchen finish assessment, and health department violations).

This final scope study report consists of an overview of the existing school buildings on the Homestead Wakefield Campus, a potential renovate-in-place scenario for each building, and two options for renovation and expansion of the Wakefield School building. To support these key elements, a site analysis plan of the Bel Air Campus, Floor Plans of the existing schools, and Floor plans of the three (3) options are included; as well as schematic 3-D massing models of each option. Also included are cost models to compare potential costs with program spreadsheets for each option.

1.0 Site Development Conditions:

1.1 PROPERTY DESCRIPTION

The Homestead / Wakefield Elementary Schools are located at the southern end of the campus. Homestead Elementary School is addressed at 900 South Main Street and is a single-story brick building. Wakefield Elementary School is also identified by the same address and is also a single-story brick building with a smaller building which houses the kindergarten classrooms.

Both schools combined have a state-rated capacity of 907 students. One temporary classroom is located on the north side of the main Homestead Elementary School building and six others are located on the west side of the Wakefield Elementary School main building.

Wakefield Elementary School.

Homestead Elementary School.

The Homestead Elementary School building is closest to the Bel Air Middle School. Students are dropped off by parents and buses in a looped access drive on the north side of the building. There are various other ingress/egress points around the building including service on the east side. There are 49 marked spaces with additional parking along the existing access road from cross campus drive and loop in front of the building.

Wakefield Elementary School is primarily accessed on the east side of the building where parents and buses drop off students via a looped driveway. The parking lot has recently been improved to accommodate 78 spaces. There are other ingress/egress points around the building including the service access on the north side.

Both elementary schools are accessed from Maryland Route 924 at the MacPhail Road intersection. This is considered the main access point with a 27 foot paved driveway from Route

924 opposite East MacPhail Road. Another access point is also from Route 924 at Idlewild Street. This entrance (a 39-foot paved public right-of-way) is shared with the Bel Air Middle School. Connecting these entrances is a 27 foot wide paved drive that runs north and south between the Middle School and the Elementary Schools. As a result of the construction of the new Bel Air High School and its athletic fields, the vehicle circulation no longer continues to connect with Kenmore Avenue.

Pedestrian traffic originates from homes located in close proximity to campus with sidewalks leading to the kindergarten building and play areas as well as between Homestead Elementary School and Wakefield Elementary School. One playground, a hard surface play area, and one small baseball / multi-purpose play field are located behind and adjacent to both schools.

Zoning Requirements

The campus is located in the Town of Bel Air and is zoned R-3 (High Density Residential). The bulk requirements for a school use within this district are as follows:

- Minimum Lot Area 15,000 square feet
- Minimum Lot Width 100 feet
- Front Yard Setback 30 feet
- Side Yard Setback 20 feet
- Rear Yard Setback 40 feet
- Maximum Height 40 feet

A Special Exception is required for a school use within the R3 district. This applies to changes to existing uses or new schools. Development must adhere to performance standards outlined in Section 8.04 B 3 (Institutional Uses) of the Town of Bel Air Zoning Code. These requirements include the following:

1. The subject property shall have frontage on and direct vehicular access to an existing street with sufficient capacity to accommodate any traffic generated by the proposed use.
2. All trash and refuse should be stored in a self-enclosed storage area.

3. The site should be of sufficient size to accommodate the use without adversely affecting adjacent land uses.
4. The location of the subject property shall be suitable for the type and scope of the development proposed, taking into account such factors as the existing urbanization of the neighborhood, traffic, the character of surrounding properties and the neighborhood in general.
5. A Lighting Plan shall be submitted to the Director of Public Works for review and approval. When adjacent to an 'R' district, lights shall be shielded to minimize glare on any adjoining residential uses.
6. Proposed development adjoining historic structures or sites shall be compatible in color, size, material, and mass with said historic properties.
7. The proposed development shall be designed to provide a transition near the periphery of the site, either with open space areas and landscaping, or by designing the buildings near the periphery to be harmonious in density and type with the surrounding neighborhood.
8. The applicant should provide a written explanation of the character of the facility, the program's policies, goals and means to accomplish these goals, characteristics of the service population, number of residents served, operating methods and procedures, and any other aspects pertinent to the facility's program and how the facility will serve the neighborhood.
9. The reviewing agency/body may require a parking impact study if deemed necessary to assure the adequacy of the proposed number of parking spaces.

In addition, a school use must adhere to requirements outlined in Section 8.04 B 3 (xv) (Schools, Colleges and Universities). These requirements are outlined below.

1. If the school offers general academic instruction below the college level, an outdoor play area shall be required which shall meet minimum state requirements for such outdoor play area. The area shall be located at least twenty-five feet from any adjoining lot.
2. The Board of Appeals may specify the maximum number of students to be enrolled.

The development process in the Town of Bel Air for a Special Exception use first requires a Concept Meeting. At this meeting, a sketch plan is reviewed by representatives of various Town agencies and informal comments are given regarding the design. Following this meeting a formal submission of a Site Plan, Architectural Elevations, Sign Elevations and a Landscape/Lighting Plan to the Board of Appeals is made for review of the proposed use. The Board of Appeals will review the Site Plan and grant approval with conditions (if any) for the use. Following approval by the Board, the Planning Commission will review the materials for approval of the Site and Landscape/Lighting Plans. This process should take approximately three to four months.

2.0 SITE ENVIRONMENTAL CONSIDERATIONS:

2.1 Soils

The project area is underlain with the Aldino silt loam (AdB), Aldino very stony silt loam (AsB), Chester silt loam (CcB2, CcC2), Neshaminy silt loam (NeB2), and the Watchung silt loam (WaA) soil types. According to the National Technical Committee on Hydric Soils (NTCHS), the Watchung silt loam is known as a hydric soil, and the Aldino soil types are listed as potentially containing small inclusions of soils noted as hydric in depressions, low areas, drainage ways and seepage areas. In addition, the AdB mapping unit is listed as being potentially erodible due to a combination of high K value and moderate slopes. Specific soil engineering constraints should be evaluated prior to construction by conducting a geotechnical investigation.

2.2 Topography / Wetlands / Vegetation

The topography of the project area varies from relatively flat areas in the sports-fields and playgrounds to steeply sloped forested areas. The elevations within the project area range from 317 to 378 feet above sea level. High-points occur at the eastern property line near East MacPhail Road and at the southern-most property corner adjacent to the Wakefield Meadows subdivision. The site is currently sports fields, open grass areas, parking lots, existing school buildings and forested areas. The forested areas contain the majority of the steep slopes found on-site.

This school site was investigated for the presence of non-tidal wetlands and waters of the United States. There is an intermittent stream/ ephemeral channel at the northern most corner of the project area carrying storm flow from the adjacent properties to the on-site storm drain system. This system is then discharged into an existing on-site perennial stream along the western project boundary, which then connects off-site to the main branch of Plumtree Run. In addition, an ephemeral channel carries storm-flow from the area surrounding the basketball court behind Homestead Elementary to the onsite perennial stream. According to FEMA FIRM map 24025C0163D, there is no 100-year floodplain within the project area. However, on FEMA FIRM 24025C0164D, there is an area of 'Zone A' 100-year floodplain on-site. The floodplain area is located along the stream in the northeastern corner of the project area.

Steep Slopes.

Frederick Ward Associates has inspected the property for specimen trees and forested areas. The school site contains 65 State specimen (>30" diameter at breast height (DBH)) trees, an additional 158 Town trees (individual trees over 10" DBH) and 7.03 ac± of forested area. There are five areas of forest on-site, please see the Site Analysis for forest locations.

Forest Area 1 contains mature trees with the majority of trees having a DBH of 24" or greater. The canopy species found in this forested area include Tulip Poplar, Northern Red Oak, Black Oak, White Oak, American Beech, Hickory spp., Green Ash, Red Maple, and Black Locust. There is an open understory containing seedlings of the above mentioned canopy species, Virginia Creeper, Poison Ivy, Honeysuckle, Multiflora Rose and Christmas Fern.

Forest Area 2 is similar to Area 1, but canopy species White Oak, American Beech, Red Maple, Hickory spp. and Green Ash. The understory consists mainly of grass due to the high amount of foot traffic this area receives as it is adjacent to multiple playground areas.

Forest Area 3 contains smaller diameter trees and has a thick, overgrown understory. Canopy species include Green Ash, Red Maple, Tulip Poplar, Black Walnut, Black Locust, and Black Cherry. The understory includes Greenbrier, Wild Grape, Multiflora Rose, and Honeysuckle.

Specimen Trees.

Forest Area 4 contains both large and small diameter trees with areas of moderately thick understory. American Beech, Tulip Poplar, and Red Maple dominate the canopy species, with additional species including Black Locust, Black Cherry, Musclewood, and Black Walnut. The understory is comprised of Poison Ivy, Wild Grape, Multiflora Rose, May Apple, Arrowwood, Spicebush, and Jack-in-the-Pulpit.

Forest Area 5 contains a large amount of mature trees with diameters of 20" or greater and the understory contains several worn trails. American Beech and Tulip Poplar dominate the canopy species, with additional species including American Elm, Hickory spp., Flowering Dogwood, Black Cherry and Red Maple. The understory contains Multiflora Rose, Poison Ivy, Arrowwood, Staghorn Sumac, and Wild Grape.

Significant landscaping has taken place within the proposed project area and throughout the property. Trees found in these landscaped areas included Red Maple, Pin Oak, Ornamental Cherry, Flowering Dogwood, White Pine, Tulip Poplar, White Oak and Red Oak. See the accompanying Site Analysis for detailed size/species and location information.

2.3 Rare, Threatened or Endangered Species

Frederick Ward Associates has contacted the Maryland Department of Natural Resources Natural Heritage Program and the U.S. Fish & Wildlife Service for information regarding the existence of any rare, threatened or endangered species for the subject property and nearby

vicinity. The Maryland Natural Heritage Program responded on July 21, 2008, "there are no State or Federal records for rare, threatened or endangered species within the boundaries of the project site as delineated." Based on this information along with several field visits and site investigations conducted by Frederick Ward Associates, we are of the opinion that no State or Federally listed plants or animals present.

2.4 Landscape and Forest Issues

A ten-foot landscape strip is required between parking areas and road right-of-way. This strip must contain an average of one shade tree and ten shrubs every forty feet. This requirement can vary depending on grade difference, berming, fences and existing vegetation. The same requirement is applied to perimeter buffering between more intensive and less intensive land uses. In this case, buffering existing residential areas will be required. All service areas must be screened by a buffer strip of at least five feet in width. Eight percent of the interior of all parking areas must be landscaped. Shade trees are preferred in these areas when dealing with large expanses of asphalt.

New development in environmentally sensitive areas (properties which contain wetlands or floodplain, are near a stream or have large wooded areas) in the Town of Bel Air will be required to prepare an Environmental Impact Assessment Report. This report should address identification, protection, impact mitigation, and enhancement of environmental resources of the project site. Given the scale of the potential development, a report will be required as part of the Site Plan submission.

The project is subject to the requirements of the Town of Bel Air Forest Conservation Ordinance (529). According to Article VII, Section I-701, this project has an afforestation threshold of 15%, which requires 9.15 acres of forest. This project will need to provide 2.12 acres of afforestation. In addition, there will be some forest and specimen trees removed as part of this overall project. The amount of clearing varies from 2.5 to 4 acres depending on the development option; this means a possibility of 7 to 10 acres of forest planting with the construction of the two schools.

3.0 CIVIL ENGINEERING CONSIDERATIONS:

3.1 Utilities

Water services for both schools are provided by the Maryland American Water Company. There is an existing 16 inch water main in South Main Street that is owned by Harford County as well as a 4 inch water main that extends west from the MacPhail/Rt. 942 intersection east of MacPhail Road that provides water services to the Bel Air Senior Center. There are interconnections at the common property line between the Town of Bel Air and Harford County to provide back-up service between the two providers. An 8 inch water main extends west from the Route 924/MacPhail Road intersection that is the Maryland American Water Company owned line that provides water and fire service to the Bel Air Schools. Two fire hydrants are located near Wakefield Elementary School as well as two fire hydrants are located on the southeast and southwest sides of Homestead Elementary School.

Sanitary sewer service is provided via an existing 8" terracotta sewer main that runs in an existing 50 foot sanitary sewer easement between Bel Air Middle School and Homestead Elementary School. Adjacent to this sanitary sewer easement, there is an existing 30-inch to 36-inch RCP storm drain that picks up the wetlands along the north property line and discharges at the southern wetland area. The existing on-site storm drain system, inlets, manholes, etc. connect to this existing main storm drainage system.

Utilities.

There are existing overhead electric lines, utility poles and gas main located on-site. Dependent upon the various layouts options, existing utilities may need to be relocated or upgraded.

3.2 Storm Water Management

Storm Water management was not required when the schools were built. Facility expansions and upgrades have not been comprehensive enough to require quantity management. Because of new regulations adopted by the

State of Maryland in 2009 they will be in effect for any development without permits prior to May 4, 2010. Any major renovations will require quantity and quality management which will need to meet these new regulations.

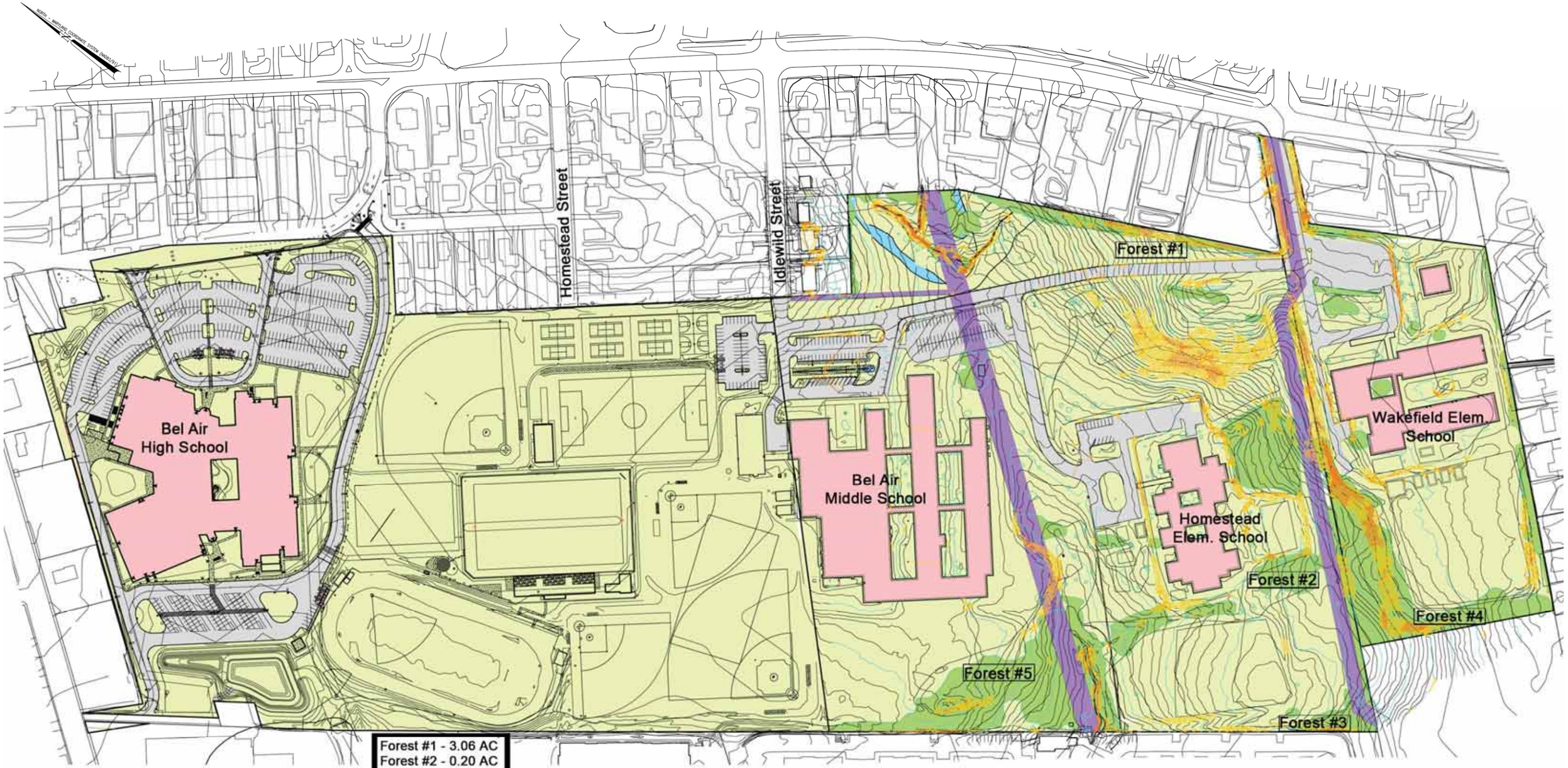
Storm water management (SWM) will be provided on site to comply with the "Storm Water Management Ct 0f 2007" (Act), which establishes a new procedure for SWM approval within the State of Maryland and all of its jurisdictions. The Act is in the process of development and Codes are being drafted by the Town and County for implementation in 2010. Its ramifications at this time are not fully known. However, given the guidelines set forth in the new "MDE Design Manual Supplement" accompanying the Act, SWM will be provided to mirror natural hydrology to the maximum extent practicable.

Necessary components of the SWM design will include the following:

- Water quality control (WQV to minimize pollutants in SWM runoff. This will require treatment for all new impervious surfaces and 50% of all existing impervious surfaces within the limits of the project.
- Groundwater recharge volume to closely match natural hydrologic conditions
- Channel Protection volume storage to protect downstream channel degradation and erosion
- Potentially manage ten year peak discharge to pre-developed conditions. This criteria is not required by the State but may be required by the local review authority.
- Provide safe conveyance of the 100 year storm water runoff

Two possible quantitative/qualitative SWM facilities are proposed in option three: one near the loading area/service entrance of the John Archer School, and one near the parking area south of the John Archer School. As final design progresses, the type and quantity of SWM facilities will be determined. In addition, bio-swales, micro bio-retention areas and vegetative green roof areas are proposed to mitigate pollutants close to the origin of its flow path. Median areas will be depressed within parking lots where feasible to collect and filter runoff. Bio-retention areas near the HWES Day Care area and within the Archer drop off circle are viable and should be pursued.

An existing storm drain system runs through the center of the site and will require relocation or maintenance and repair. It is essential that this system be videoed for maintenance issues to determine whether it is viable to remain in place, and analyzed for adequate capacity. This system is located between the Bel Air Middle School and the new John Archer School. The system runs within a 50 foot wide drainage and utility easement.



Forest #1	3.06 AC
Forest #2	0.20 AC
Forest #3	0.19 AC
Forest #4	1.58 AC
Forest #5	2.00 AC
Total:	7.03 AC

100' 0 100' 200' 300'
SCALE: 1"= 100'

Site Analysis

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5.0 Existing Facilities Evaluation:

5.1 Architecture

Wakefield Elementary-advantages to renovating it:

-Recent exterior envelope improvements
-Recent restroom improvements
-Recent HVAC Improvements
-Additional Electrical capacity available
-Abundant daylight
-Media Center Addition (1996)
-Partial Asbestos Remediation
-Building orientation on the site
-Structure is in good shape & well maintained

Wakefield Elementary-deficiencies (why it needs to be renovated):

-Parking
-H.C. Accessibility
-HVAC Systems
-Security
-Classroom Design Styles
-Asbestos potential
- Inefficient Use of Kitchen
- Lack of Site Amenities
- Exposed Cable Trays
- Lack of Storage space
- Lack of Tack Space on walls
- Lack of sprinkler system
- Student Safety and Site circulation
- Special Ed in Hallways
- Does not meet current Energy Efficiency standards
- Portable Classrooms
- Lack of Music Rooms

Portable classrooms at rear of building

Homestead Elementary-advantages to renovating it:

-Media Center Addition (1998)

-Structure is in decent shape

-Proximity to adjacent campus

-Flatter site is easier to develop

-Better circulation pattern

Homestead Elementary-deficiencies (why it needs to be renovated):

-Parking
-H.C. Accessibility
-HVAC Systems
-Security
-Classroom Design Styles
-Asbestos potential
- Lighting
- Lack of Site Amenities
- Exposed Cable Trays
- Inefficient use of Kitchen
-Numerous roof leaks
-Insufficient landscaping
-Exterior appearance is undesirable
- Lack of Storage space
- Lack of Tack Space on walls
- Lack of sprinkler system
- Student Safety and Site circulation
- Special Ed in Hallways
- Does not meet current Energy Efficiency standards
- Portable Classrooms
- Lack of Music Rooms
- Inadequate gym
- Canopies drain poorly and are falling apart
- Poor Site drainage
- Lack of proper Site lighting

Lack of Storage space

EXISTING FLOOR PLAN
NTS

EXISTING HOMESTEAD ELEMENTARY

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EXISTING FLOOR PLAN
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EXISTING WAKEFIELD ELEMENTARY

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09/16/2009

5.2 Structural evaluation:

General Information:

Property Name: Homestead-Wakefield Elementary School
Field Inspector: Kevin M. Merriman, P.E.
Date of Inspection: January 21, 2009

Third Party Responsibility:

This review is limited solely to the review of existing conditions of the property which are the subject of this report and which are visible to the naked eye without the moving or removing of impediments to such visibility including, but not necessarily limited to soils, landscaping, finish materials or structural materials. The Client acknowledges that CEI is not the architect or engineer of record and does not assume the liability thereof.

Report:

Project Scope:

An observation was performed of the exterior perimeter and selected interior spaces of the existing school buildings. The purpose of this observation was to assess the structural condition of the existing buildings, note visible areas of structural deterioration, and recommendations for future expansion/additions.

Homestead Elementary School – Structure Description:

The original building is a single-level school built circa 1966. The primary construction consists of Tectum decking over steel roof joists and beams supported by masonry bearing walls and steel columns. The interior consists of masonry walls, bearing and non-bearing, which delineate classrooms, offices, bathrooms, a multi-purpose room, and a cafeteria. The building is clad with brick veneer and precast concrete.

Existing Tectum Decking & Steel Joist system

Renovations and additions to the media center were constructed in the mid 1990s. The primary construction consists of metal decking over steel joists supported from masonry bearing walls.

Observations:

CEI observed the exterior perimeter from the ground and a random sampling of the interior spaces. The following is a summary of our observations:

Interior:

The interior masonry walls and slab-on-grade appeared to be in good structural condition, with no significant cracking observed. Evidence of roof leaks was observed in several locations. The roof joists and decking that could be observed appeared in good condition.

Exterior:

The exterior brick veneer and precast fascia generally appeared to be in good condition. Several of the plywood soffit panels at the recessed entries have experienced some deterioration due to exposure to the elements.

The brick veneers at the screen walls around the emergency generator were observed to have diagonal cracking with some loss of mortar. This appeared to be the result of foundation settlement and/or thermal expansion.

Screen Wall @ Generator

Existing Exterior

Wakefield Elementary School – Structure Description:

The original building is a single-level school built circa 1958. The primary construction appears to consist of poured gypsum decking over steel roof joists and beams supported by interior masonry bearing walls and exterior steel columns. The interior consists of masonry walls, bearing and non-bearing, which delineate classrooms, offices, bathrooms, a gymnasium, and cafeteria. The building is clad with curtain wall and brick veneer.

Renovations and additions to the media center were constructed in the mid 1990s. The primary construction consists of metal decking over steel joists supported from steel beams and columns. The curtainwall system was replaced in 2009.

Observations:

CEI observed the exterior perimeter from the ground and a random sampling of the interior spaces. The following is a summary of our observations:

Interior:

The interior masonry walls and slab-on-grade are in good structural condition, with no significant cracking observed. Evidence of roof leaks was observed in several locations. The roof joists and decking that could be observed appeared in good condition.

Exterior:

The exterior brick veneer and curtainwall (recently replaced) generally appeared to be in good condition. The brick veneer at the loading dock area was observed to have diagonal cracking with some loss of mortar. This appeared to be the result of foundation settlement and/or thermal expansion.

Existing Exterior Curtainwall

Generally, the plywood soffit panels around the perimeter and at the recessed entries have experienced varying degrees of deterioration due to exposure to the elements. The exposed steel decking and tube framing at the multi-purpose room exit canopies were observed to have significant corrosion due to exposure to the elements.

The exposed steel tube framing at the bus canopy was observed to have some corrosion due to exposure to the elements.

Soffit Damage

Cracking at Loading Dock

Conclusions:

The overall structural condition of both buildings appeared to be adequate. It is our opinion that the deficiencies noted above do not pose a structural threat at this time, but should be repaired as part of an ongoing maintenance program.

Recommendations for Future Modifications/Expansions:

Option #1

This option includes a two story expansion of the existing Wakefield Elementary School towards the northwest. We envision the framing of the addition to be similar to systems used for the existing building.

The expansion roof structure would be metal decking over steel joists supported from a combination of masonry bearing walls and steel beams/columns. The new gymnasium roof would consist of deep long-span joists, spanning to exterior masonry bearing walls. The upper floor framing will generally consist of concrete and form deck over steel joists supported from masonry bearing walls. Due to vibration concerns, we recommend the gymnasium floor framing to be a composite steel beam and girder system, supported from exterior masonry bearing walls and a grid of interior steel columns.

Based on a review of the existing structural documents, it is our opinion that the existing exterior walls could be used for supporting portions of the new roof framing. The proposed expansion framing can be arranged so as to minimally affect the existing framing. Some reinforcement of existing columns and foundations will be required.

We anticipate the foundation system to be on shallow spread footings. A reinforced masonry retaining wall will be required for the lower level that is partially below grade.

Option #2A & 2B

These options include a single story expansion to both existing schools. We envision the framing of the additions to be similar to systems used for the existing buildings.

The expanded roof structures would be metal decking over steel joists supported from a combination of masonry bearing walls and steel beams/columns. The new gymnasium roof in both options would consist of deep long-span joists, spanning to exterior masonry bearing walls.

Based on a review of the existing structural documents, it is our opinion that the existing exterior walls in both schools could be used for supporting portions of the new roof framing. The proposed expansion framing can be arranged so as to minimally affect the existing framing. Some reinforcement of existing columns and foundations will be required.

We anticipate the foundation system to be on shallow spread footings.

Option #3

This option includes a two story expansion of the existing Wakefield Elementary School towards the northeast, and a gymnasium expansion off the existing cafeteria. We envision the framing of the additions to be similar to systems used for the existing building.

The expanded roof structure would be metal decking over steel joists supported from a combination of masonry bearing walls and steel beams/columns. The new gymnasium roof would consist of deep long-span joists, spanning to exterior masonry bearing walls. The upper floor framing will generally consist of concrete and form deck over steel joists supported from masonry bearing walls.

Based on a review of the existing structural documents, it is our opinion that the existing exterior walls could be used for supporting portions of the new roof framing. The proposed expansion framing can be arranged so as to minimally affect the existing framing. Some reinforcement of existing columns and foundations will be required.

We anticipate the foundation system to be on shallow spread footings. Due to the drop in grade along the northwest, several site retaining walls are anticipated in the vicinity of the gymnasium expansion.

5.3 Food Services/Kitchen Evaluation:

Objective:

This report is to evaluate existing kitchens to determine equipment needs and code violations.

Homestead Elementary School

Equipment Assessment:

(2) Bev-Air Milk Coolers – these units are in good condition and meet code. 5 – 7 year life expectancy

(2) True Glass Door Merchandisers – these units are in good condition and meet code. 5-7 year life expectancy

Custom Serving Counter - This unit is in good condition and meets code. All hot wells & cold pans are drop-in style and can be replaced. The sneeze guards are all per code. Life expectancy 7-10 years
Ice Cream cabinet – this unit is in good condition and meets code. 5-7 year life expectancy

(2) Continental freezers – unit are in good condition and meet code. Life expectancy 5-7 years

(2) Hand sinks – units meet code.

Continental refrigerator – unit is in good condition and meets code. Life expectancy 5-7 years

Prep sink – unit has galvanized base. Remove rust, prime, and paint.

Exhaust hood – unit does not meet code. Recommend replacement.

Blodgett double deck convection oven – unit is in good condition. Life expectancy 3-5 years

Accutemp Steamer – unit is in very good condition. Life expectancy 5-7 years

Three-compartment sink – unit does not meet code, as there is only one drain board. Recommend replacement.

Gladco Trash Compactor – unit is operational.

Soiled Dish table – unit is in fair condition and meets code. Remove rust, prime, and paint.

Dish machine – Unit is in fair condition. Life expectancy 2-4 years

Booster heater – unit is in fair condition. Life expectancy 2-4 years

Clean dish table – unit is in good condition.

Kitchen Finish Assessment:

All walls, floors, and ceilings meet current health codes.

There are adequate floor sinks and floor drains.

Serving Line

Kitchen

<u>Wakefield Elementary School</u>

Equipment Assessment:

(2) Continental Milk Coolers – these units are in good condition and meet code. 5 – 7 year life expectancy

Custom Serving Counter - This unit is old and does not meet code. The cold pan is not NSF 7 and sneeze guards are missing and / or out of code. The work board is a non-NSF wood. The base is galvanized and in poor shape. Recommend replacement.

Fogel Ice Cream cabinet – this unit is in good condition and meets code. 5-7 year life expectancy

(2) Back counters – these units are stainless steel w/ sliding doors and are in good condition.

Walk-in cooler / freezer assembly – units are in good condition and meet code. Cooler temperature needs to be adjusted as it is running high. 7-10 year Life expectancy

Continental freezer – unit is in good condition and meets code. Temperature is running high and needs adjustment. Life expectancy 3-5 years

Two-compartment prep sink – unit has galvanized base & residential faucet. Recommend replacing faucet with NSF approved unit & remove rust, priming and repainting base.

Worktable w/ pot rack – unit base and pot rack are galvanized steel. Remove rust, prime, and paint.

Exhaust hood – unit does not meet code as it has exposed fasteners and threads. Recommend replacement.

Blodgett deck oven – unit is old but in fair condition. It was not in operation at time of survey. Life expectancy 2-4 years

Blodgett double deck convection oven – unit is in good condition. Recommend replacing bullet feet as some are bent due to concrete curb installation. Life expectancy 3-5 years

Accutemp Steamer – unit is in very good condition. Life expectancy 5-7 years

Work table w/ galvanized base - unit base is galvanized steel. Remove rust, prime, and paint.

Three compartment sink – unit does not meet code as the sink bowls are 20" x 20". Unit must have 20" x 28" bowl compartments to hold a full size sheet pan, which the school is currently utilizing. Recommend replacement.

14'-0" Worktable w/ galvanized base - unit base is galvanized steel. Remove rust, prime, and paint.

Soiled Dish table – unit is in good condition and meets code. Recommend replacement of residential faucet.

Power Unloader – This is in good condition. Life expectancy 3-5 years

Dish machine – Unit is in fair condition. Life expectancy 3-5 years

Booster heater – unit is in good condition. Life expectancy 3-5 years

Clean dish table – unit is in good condition.

Kitchen Finish Assessment:

All walls, floors, and ceilings meet current health codes.

There are adequate floor sinks and floor drains.

Other Concerns:

There is currently only one hand sink in entire kitchen. This does not meet current code as a hand sink is required every 20'-0" from any point of service.

Serving Line

Kitchen

5.4 Mechanical Evaluation

GENERAL:

The Homestead/Wakefield campus is made up of three (3) buildings. The Wakefield building was constructed in 1958 and consists of approximately 58,245 square feet. In 1966, the Homestead building was constructed, which consists of approximately 52,628 square feet. A remote kindergarten building was constructed near the Wakefield building in 1968 and consists of approximately 4,585 square feet. The entire campus consists of approximately 115,458 square feet.

Wakefield Building:

The building is single-story, except for a basement mechanical equipment room. The building has a crawlspace/pipe tunnel(s) located under the main corridor. It also has two (2) typical double loaded corridor classroom wings, which are parallel to each other. The media center was renovated in 1996, which included three (3) split DX type air conditioning units.

Homestead Building:

The building is single-story, except for a basement mechanical equipment room. The building has a crawlspace/pipe tunnel(s) located under the main corridors. It has multiple symmetrical classroom pods. In 1998, a media center renovation/addition was constructed.

EXISTING MECHANICAL SYSTEMS:

A. EXISTING HEATING PLANT:

Homestead Building:

The heating water plant system is made up of two (2) small packaged type boilers that are original to the facility. The boilers are hot water type utilizing No. 2 fuel oil as the energy source. The boilers are 3-pass type as manufactured by Kewanee. The boilers have a total capacity as follows:

Boiler No. 1: Model M-205 – 2050 MBH
Boiler No. 2: Model M-095 – 950 MBH

Wakefield Building:

The heating water plant system is made up of two (2) existing equally sized Scotch Marine boilers (Model CB-100 - 3348 MBH) that were installed in 1988. The boilers are hot water type utilizing No. 2 fuel oil as the energy source. The boilers are 4-pass type as manufactured by Cleaver Brooks.

The remote kindergarten building includes an existing gas-fired/split direct expansion multi-zone rooftop unit.

EXISTING CONDITIONS / EVALUATIONS:

A. GENERAL:

Homestead Building:

The cooling water plant system consists of a 230 ton cooling tower located within a small mechanical courtyard. Two (2) equally sized indoor water cooled chillers are located in the

basement mechanical room. The existing chillers utilize R-22 refrigerant. The existing heating plant is original to the facility. Majority of the building is served by systems and equipment originally installed at the time of construction in 1966. The systems and equipment are well-maintained; however, they are 42 years old and well beyond their average life expectancies. In addition the building has limited ceiling space.

Wakefield Building:

A four-pipe (heating and chilled water) distribution system has been installed for this facility. The heating water plant system is made up of the existing heating water generation equipment. The existing heating water generation equipment is well-maintained; however, it is beyond its average life expectancy. The cooling water plant system is made up of one (1) 170 ton air-cooled chiller coupled with a flat-plate heat exchanger to separate the glycol system from the building clear water system. The new chiller utilizes R-410A refrigerant. It is located behind the Gym/Stage area and is adjacent to the paved drive, which serves the boiler room and kitchen. Variable flow/variable speed pumps serve the building distribution system for the heating and chilled water. New pumps and heat exchanger are located in the existing boiler room.

B. EXISTING HVAC SYSTEM:

Homestead Building:

Multiple 4-pipe, multi-zone, overhead distribution air handling units serve the classrooms. Each air handling unit is located in a dedicated mechanical equipment room, among each pod of classrooms. The existing units are original to their construction phase and are in fair to poor condition. Ducted return air from each room collects and runs through the crawlspace and up to its associated air handling unit.

The Gymnasium is served by two (2) 4-pipe, constant volume indoor air handling units located above the stage supported by structure above.

The Stage is served by two (2) 4-pipe, floor-mounted fan coil units.

The Cafeteria/Kitchen area is served by a 4-pipe, multi-zone, overhead air distribution air handling unit. The AHU is located in a dedicated mechanical equipment room adjacent to the cafeteria. The AHU also serves a portion of the building's entrance lobby area. Perimeter hot water baseboard radiation is present to offset window/wall heat and infiltration losses. The AHU and baseboard radiation is up fed from the crawlspace/pipe tunnel below.

The Office/Administration area is served by two (2) 4-pipe, single zone, overhead air distribution air handling units. Minor hot water baseboard radiation is present to offset window/wall heat and infiltration losses to the exposed walls of the courtyard.

The Media Center is served by single zone rooftop unit that utilizes multiple duct-mounted heat coils. Adjacent classrooms that were renovated in 1998 were provided with an overhead air distribution system connected to existing multi-zone air handling units. The Media Center computer lab is served by a split DX fan coil unit and associated outdoor condensing unit.

Perimeter hot water baseboard radiation is present along exterior corridor walls to offset window/wall heat and infiltration losses. The existing pedestal-mounted baseboard radiation is up-fed from the crawlspace/pipe tunnel below.

The original heating water pipes, with distribution mains reside in a pipe tunnel/crawl space, and are 42 years old. The condition of these pipes is unknown and is largely dependent upon water chemistry and water treatment history. The pipe tunnel, even though accessible, would not be recommended for installing new piping systems unless absolutely necessary, due to lack of overhead ceiling space.

Wakefield Building:

Unit Ventilator System: A four-pipe heating/chilled water overhead distribution system serves new heating terminal units and unit ventilators for the classroom wings. The overhead distribution system utilizes metal pipe enclosures in each room to conceal run-out piping down to the individual unit ventilators. Included with the new unit ventilator system, all perimeter casework has been replaced.

The Gymnasium is served by a new single-zone constant volume packaged rooftop unit.

The Office/Administration area is served by a new variable air volume packaged rooftop unit.

Perimeter hot water baseboard radiation has been replaced in the office/administration suite and along exterior corridor walls to offset window/wall heat and infiltration losses.

The original heating water pipes located in the crawlspace/pipe tunnel were capped and abandoned in place. The pipe tunnel, even though accessible, would not be recommended for installing new piping systems unless absolutely necessary.

C. AUTOMATIC TEMPERATURE CONTROLS:

Homestead Building:

The building, for the most part, is locally controlled through a pneumatic automatic temperature control system.

Wakefield Building:

The building has been upgraded to a Johnson Controls Web-Based Automation System and is tied into the County Energy Management System. All controls are electric/electronic actuation.

D. PLUMBING:

Homestead Building:

The original domestic cold water and hot water plumbing pipes, with distribution mains, reside in a pipe tunnel/crawl space, and are 42 years old. The condition of these pipes is unknown and is largely dependent upon water chemistry and water treatment history. The pipe tunnel, even though accessible, would not be recommended for installing new plumbing systems unless absolutely necessary, due to lack of overhead ceiling space. The domestic hot water generation and incoming water are original to the building. A public 4" water supply serves the building.

Wakefield Building:

Gang toilet rooms and public restrooms were upgraded to ADA compliance, new plumbing systems (CW, HW, HWR, SAN & Vent) associated with the toilet rooms were installed in 2008. The systems were tied into the existing mains. The original domestic cold water and hot water plumbing pipes are active and most still reside in the pipe tunnel/crawl space. The complete condition of these pipes is unknown and is largely dependent upon water chemistry and water treatment history. The domestic hot water generation equipment was installed in 2008 and tied into existing mains. The domestic incoming water is original to the building. A public 4" water supply serves the building.

RECOMMENDATIONS / ALTERNATIVES:

A. GENERAL:

Homestead Building:

A new four-pipe (heating and chilled water) distribution system is proposed for this facility. It is recommended not to reuse the existing heating water generation equipment. Generation equipment shall include two (2) Scotch Marine type boilers sized for 2/3 of the total capacity or four (4) equally sized cast iron boilers. A 175 ton (based on 275ft²/ton) air-cooled chiller coupled with a flat plate heat exchanger, to separate the glycol system from the building clear water system, is the proposed cooling system. This also allows variable flow/variable speed pumps to be used on the building distribution system for chilled water. New boilers, pumps and/or heat exchangers will be located in the existing mechanical equipment room. If the building is expanded, major additions to the heating and chilled water plants would be necessary largely dependent on square footage (i.e. multiple chillers, larger boilers, larger pumps, larger heating/chilled water piping).

The existing cooling tower enclosure located outside the Cafeteria will need to be modified to house the new air cooled chiller. If the existing enclosure is not utilized, as a minimum, the chiller shall have a chain link fence (8'-0" high) enclosure.

Wakefield Building:

If the building is expanded, the 170 ton air-cooled chiller that was installed in 2008 has additional capacity to serve 5-6 new classrooms (based on 3-3½ tons per room). It is

recommended not to reuse the existing heating water generation equipment. Generation equipment shall include two (2) Scotch Marine type boilers sized for 2/3 of the total capacity. Four (4) equally sized cast iron boilers are not recommended due to lack of floor space in the existing mechanical equipment room. If the building is expanded more than 5-6 classrooms, major additions to the heating and chilled water plants would be necessary (i.e. multiple chillers, larger boilers, larger pumps, larger heating/chilled water piping).

B. HVAC SYSTEM:

Homestead Building:

A four-pipe heating water/chilled water overhead distribution system shall serve new heating terminal units. New lower ceiling systems to accommodate the piping systems will be required.

Packaged rooftop units shall be utilized for the Gymnasium & Office/Administration suite.

Wakefield Building:

A four-pipe heating water/chilled water overhead distribution system shall serve new heating terminal units and/or unit ventilators. Valved and capped connections that were installed in 2008 shall extend to the new addition. The heating/chilled water pumps have additional capacity to serve 5-6 new classrooms.

C. AUTOMATIC TEMPERATURE CONTROL:

Homestead Building:

The existing building currently utilizes a local pneumatic control system with minimal direct digital control through the Energy Management System. It is recommended that the building be provided with an upgraded Johnson Web-Based Automation System and be tied into the County Energy Management System. It is recommended that the system have full direct digital controls, including space terminal unit controls, which is consistent with the County Standard. All controls shall be electric/electronic actuation. All control and monitoring points shall be consistent with the County's current Standards and shall be reviewed with the Facilities Management Department during Design.

Automatic Temperature Controls shall be capable of operating per the sequence of operation, including when the Energy Management System is manually overridden.

The Basic Design Criteria is as follows:

1. Cooling Mode:
   Outdoor Temperature: 95° F DB, 78° F WB
   Indoor Temperature: 75° F DB, 65% RH or less

2. Heating Mode:
   Outdoor Temperature: 10° F DB
   Indoor Temperature: 70° F DB

3. Chilled Water System (at 95° F Ambient):
   44° F Supply Water Temperature
   54° F Return Water Temperature

4. Heating Water System (at 10° F Ambient):
   180° F Supply Water Temperature
   160° F Return Water Temperature

5. Ventilation Rates (ASHRAE Standard 62.1-2007):
   15 CFM per person minimum - Classrooms
   20 CFM per person minimum - All other areas

Central Heating Plant: The building central heating system shall be energized to operate whenever outside air temperatures are 65° F or less.

Through sequencing software the boilers and associated boiler circulating water pump shall be staged in lead-lag fashion to maintain system supply water set point. Boiler lead-lag control shall be rotated through the sequencing software.

The heating water temperature supply shall be reset (linear type) based on outside air temperature. Boiler return water shall be maintained at 140° F minimum.

Central Chilled Water Plant: The building central chilled water system shall be energized to operate whenever outside air temperatures are 50° F or above. When activated, the chiller and its associated chilled water pump shall be energized.

The chiller shall be controlled through its internal control panel to maintain discharge evaporator water temperatures.

Terminal Variable Air Volume Room Units will be controlled by room temperature sensors (direct digitally controlled). The room temperature sensors will modulate the quantity of supply air (from the air handling unit) and return air (from the ceiling plenum) via a modulating damper in the supply air duct. When additional heat is required, the room thermostat shall modulate the terminal room unit's heating coil valve.

For Constant Volume Air Handling Units, a room temperature sensor will modulate the associated air handling units' cooling coil valve and outside air economizer controls to provide the necessary cooling. When heating is required, the room thermostat first modulates the unit's hot water preheat coil valve. If additional heat is required, the thermostat shall modulate the unit's heating coil valve in series with the preheat coil valve.

For Variable Air Volume Air Handling Units, a supply duct temperature sensor sensing the discharge air temperature shall modulate preheat coil valve or chilled water valve in conjunction with air economizer control to maintain constant supply air temperature.

Duct static pressure sensors strategically located downstream in the supply duct shall vary supply air fan speed to maintain its set-point.
The return air fan speed will vary so as to maintain a constant volumetric difference between supply and return air; i.e., fan tracking. A constant volume outside air injection fan will energize during occupied modes of operation.

All air handling units will be provided with safety features such as low limit control, freeze stat, supply and return air smoke detectors, and high static pressure sensors (for variable air volume units only). All air handling units will be provided with energy conservation features such as economizer cycles, night setback, and morning warm-up cycles of operation.

Supply air discharge air temperature set-points will be reset based on the space within the zone requiring the greatest cooling.

Unit Ventilators will be face and bypass control with end cycle valves for 4-pipe systems. The units will utilize ASHRAE Cycle II Sequence of Operations, controlled by space temperature sensors through the Building DDC System.

Wakefield Building:
No upgrades are necessary. If the building is expanded, new electric/electronic actuation control system shall be tied into the existing, upgraded EMS.

D. GEOTHERMAL:

For all options geothermal is a preferred design. With the mandatory LEED requirements for all schools in Maryland, geothermal is great way to obtain credits and cost effectively heat/cool the building. When life cycle design is performed during the schematic phase of a project it is typically see that geothermal comes out as the lowest cost per year and shortest payback. The only 'downfall' is the initial first cost for testing, drilling, and the equipment. Geothermal would likely be combined with partial conventional heating/cooling considering the recent HVAC upgrades.

A typical geothermal field design is based on (sq footage / 275sq ft/ton - typical cooling load of elementary school) then divide that by 1.5 tons per bole hole and that gives you the number of bole holes needed. The bore holes are on average spaced 20'-0" on center. For instance a 65,000 sq ft building / 275 sq ft/ton = 236.6 tons / 1.5 tons per bore hole = ~158 bole holes resulting in a 40,000 s.f. (200'X 200') open area for geothermal. With the amount of open space for playfields, there is ample room to handle the well field required for this project. On Option 3, for instance, it would be underneath the soccer and baseball fields at the South end of the site.

PLUMBING:

General:

The existing under-slab sanitary mains shall be reused. The new Addition(s) will tie into the existing sanitary system. New piping systems (cold water, hot water and hot water circulating) will be extended from the existing system to serve the Addition(s). New plumbing systems will be installed in strict accord with all applicable codes and regulations, including ADA.

The plumbing systems will consist of, but not be limited to:

Domestic Cold Water
Domestic Hot Water with Recirculation
Sanitary Drainage and Vent
Storm Water Collection

All plumbing fixtures will be included and shall be good commercial grade of institutional quality. Water closets and urinals shall be flush valve, water-conserving type. Faucets for lavatories will be the self-metering types. Handicapped fixtures will comply with ADA requirements. Mounting heights for all fixtures will be coordinated with the Owner.
Water Service: The existing water service, which extends into the building, shall be replaced in its entirety to accommodate the sprinkler flow demands. A new 6" service is recommended. The water piping shall be sized per the requirements of the American Society of Plumbing Engineers and the International Plumbing Code.

Hot and cold water will be extended to and serve the fixtures and equipment as required. All domestic water piping shall be copper Type L with wrought copper fittings and lead free 95-5 solder. All water piping shall be insulated with the exception of non-handicapped final branch run-outs for connection to fixtures/equipment.

Backflow preventers and vacuum breakers will be provided to prevent back siphonage and contamination of the potable water system.

Freeze proof wall hydrants will be located every 150 feet along the building's perimeter.

Sanitary Drainage: The existing sanitary drainage system will be utilized in part. The new Sanitary Drainage System serving the new plumbing fixtures will be tied into the existing system. The Sanitary Drainage System will be sized per the requirements of the American Society of Plumbing Engineers and the International Plumbing Code.

Storm Water Drainage: The existing storm water collection system at the Renovation/ Addition Area will be modified as required and will serve the Addition(s). A new storm water drain line will be brought to a point 5'-0" from the building exterior wall (under another Division). At this point, and under this Division, connection will be made to the drainage line and same will be extended into the building for distribution. The Storm Water Collection System and Overflow System will be designed and sized per the requirements of the American Society of Plumbing Engineers and the International Plumbing Code.

Fire Protection/Sprinkler System: A backflow preventer will be provided to prevent backflow into the potable water system if a combined water service is provided for domestic and fire protection needs. The sprinkler system shall serve the Addition with capacity for future extension to serve the existing building.

5.5 Electrical Evaluation

GENERAL:

The original building was constructed in 1958 and consists of approximately 58,245 square feet. In 1968, a remote kindergarten building was constructed, which consists of approximately 4,585 square feet. The building is a single-story, except for a basement mechanical equipment room and pipe tunnels located under the main corridor. The building has two (2) typical double-loaded corridor classroom wings located parallel to each other. The Media Center was renovated in 1996, which included split type air conditioning units.

An HVAC system upgrade/replacement is currently under construction for the Wakefield building. The lighting systems are being replaced in concert with the ceilings in order to facilitate this work.

EXISTING ELECTRICAL SYSTEMS – WAKEFIELD BUILDING:

A. Electrical Distribution

The electric service is 3000A, 208/120 volt, 3-phase, 4-wire via an exterior pad-mounted transformer and interior meter and C/T cabinet. The service has been upgraded to accommodate the HVAC renovation. The main switchboard, as well as panel boards for motor and lighting loads, is new. The existing panel boards in the building serving other loads are back fed from the new service. These panels account for approximately half the electrical distribution equipment in the building. They are original to the building and are typically located recessed mounted in corridor walls.

Portable classrooms on site are served independently from the building via a dedicated BGE service.

B. Interior Lighting

The majority of the building interior lighting was replaced with the HVAC upgrade. The new fixtures utilize 32 watt T8 lamps and electronic ballasts. The gymnasium and stage lighting, as well as the kitchen area lighting, has not been replaced.

C. Exterior Lighting

There is minimal exterior building-mounted lighting outside of the canopy lighting. Parking lot lighting appears to have been added after the building was constructed and consists of a few poles with several metal halide floodlights mounted to each.

D. Fire Alarm System

The Simplex fire alarm system is fully addressable and ADA compliant. The system is new, having been replaced concurrently with the HVAC renovation project.

E. Telecommunications System

The existing Rauland Public Address System located in the main office includes a radio/tape player. Classrooms are typically equipped with the original wall-mounted speaker. Call activation is via the local room telephone handsets. There are minimal public address speakers throughout the corridors.

The Data System consists of a main wiring room (MDF) in the Media Center connected by 62.5 micron multimode fiber optic cables to multiple sub-wiring closets (IDFs) located strategically in the building. Cat 5e horizontal copper wiring is then distributed from these locations to individual outlets.

25-pair trunk cables interconnect the IDFs to the MDF for telephone service, which is distributed from 110 terminal blocks to individual outlets.

The video system was originally an MATV system, which is abandoned. CATV is currently distributed from each outlet directly back to the IDF locations with RG6 cable. There is no media retrieval system in the building. DVD/VCRs are located on portable carts with TVs.

F. Emergency Power

Emergency egress lighting within the building is typically provided via individual battery ballasts self-contained within selected fixtures.

G. Security System

The security system is a Radionics D9112 intrusion detection system, consisting of door contact switches, motion sensors and glass break sensors located throughout the building. A keypad for arming/disarming the system is located in the main lobby, while the control panel is located in a work area off a nearby classroom.

EXISTING ELECTRICAL SYSTEMS – HOMESTEAD BUILDING:

A. Electrical Distribution

The electric service is 1000A, 480/277 volt, 3-phase, 4-wire via an exterior pad-mounted transformer and interior meter and C/T cabinet. The utility transformer is located within a brick enclosure adjacent to the building cooling tower. The original Westinghouse switchboard and panel boards are still in use, although several new panel boards have been added throughout the building for a kiln, computer receptacles and a feed for modular classrooms.

B. Interior Lighting

The building interior fluorescent lighting has been either replaced or retrofitted with 32 watt T8 lamps and electronic ballasts. The classroom lighting fixtures appear to be the original, eggcrate louver-recessed troffers, which are in poor condition. The corridor fixtures are surface-mounted, with prismatic lenses and appear to be newer than the classroom fixtures. Incandescent downlights are still utilized around the perimeter of the main lobby.

C. Exterior Lighting

There is minimal exterior building-mounted lighting outside of the canopy lighting. Parking lot lighting appears to have been added after the building was constructed and consists of a few poles with several metal halide floodlights mounted to each.

D. Fire Alarm System

The Simplex fire alarm system appears to be original to the building. The zoned enunciator panel is located adjacent to the system control panel in the Principal's office.

E. Telecommunications System

The existing Dukane Public Address System located in the main office includes a Rauland radio/tape player. Classrooms are typically equipped with the original wall-mounted speaker. Call activation is via the local room telephone handsets. There are minimal public address speakers throughout the corridors. The Simplex master clock controller is located in the Principal's Office.

The Data System consists of a main wiring room (MDF) in the Administration area connected by 62.5 micron multimode fiber optic cables to a sub-wiring closet (IDF). Cat 5 horizontal copper wiring is then distributed from these locations to individual outlets.

The telephone service MPOP and Toshiba switch is located in the Mechanical Room adjacent to the electrical equipment. A 25-pair trunk cable interconnects the IDF to the MDF for telephone service, which is distributed from 110 terminal blocks to individual outlets.
The video system is currently distributed from the TV Studio off the Media Center. Classrooms are equipped with high/low video outlets.

F. Emergency Power

Emergency power consists of a panel for lighting with the source tapped ahead of the building main disconnect. This was code compliant at the time of construction, but has not been recognized as an acceptable standby source by the NEC for many years. Wall-mounted dual head emergency battery units have been added throughout the building.

G. Security System

The security system is a Radionics D9112 intrusion detection system, consisting of door contact switches, motion sensors and glass break sensors located throughout the building. A keypad for arming/disarming the system is located in the main lobby, while the control panel is located in the IDF room.

A CCTV monitor is located in the Main Administration Office, with CCTV equipment in the MDF rack.

RECOMMENDATIONS – WAKEFIELD BUILDING:

A. Electrical Distribution

The electrical service is adequately sized to accommodate a building renovation. The original electrical distribution equipment currently in use is recommended to be replaced due to the age of the equipment.

The electrical distribution system will remain 208/120 volt, three phase, four wire from the main switchboard to panel boards throughout the building. Receptacle panel boards will be replaced. Separate panel boards with 200% rated neutral busses and transient voltage surge suppression will be provided for non-linear computer loads. Computer panel boards will be served by dry type K-13 rated transformers.

Double duplex receptacles will be provided for all computers and selected equipment at all work stations, teaching stations, Office and Administration Area workstations/desks. A separate neutral conductor shall be installed for each computer circuit in order to reduce the effects of harmonics caused by non-linear loads.

Typical classrooms/instructional areas will have a minimum of five computer receptacles (one [1] teacher and four [4] student) on three 20-ampere circuits. In addition, general receptacles will be provided on one to two circuits per classroom. Computer Labs, and other specialized instructional areas will be provided with computer and general receptacles per student station as required.

B. Interior Lighting

Lighting will be required to meet adopted energy codes for lighting power density as well as controllability. In general, lighting systems that utilize linear fluorescent lamps with electronic ballasts are recommended, similar to what is currently installed. The recently replaced lighting systems are recommended to be reused to the fullest extent possible. Supplemental lighting controls will be required to incorporate full automatic shutoff of building lighting systems. This can be accomplished via local motion detectors or via contactors controlled via the building EMCS system with timed, local override.

C. Exterior Lighting

The existing building and parking area lighting is recommended to be replaced. Pulse-start metal halide lamps will be required for new installations in 2009 with standard metal halide lamps being phased out. New lighting is recommended utilizing pulse-start metal halide lamps, designed to meet the adopted energy codes. Additionally, site lighting would be designed to meet cut-off requirements of the LEED rating system.

Compact fluorescent lighting is also recommended at egress doors, connected to an emergency standby source per code and controlled via photocell. The following are the target illumination levels for exterior lighting.

LIGHTING TASK	TARGET ILLUMINATION LEVELS (Foot Candles)
Exterior: Pedestrian Walkway	0.6
Exterior: General Parking	0.6
Exterior: Vehicle Lanes	1.0

D. Fire Alarm System

The fire alarm system is recommended to be reused to the fullest extent possible. Minor modifications and some additional devices may be required, and existing devices may need to be reconfigured to suit the architectural layout.

E. Telecommunications System

Telecommunications systems, except the Public Address system, may be reused where possible, although the existing IDF locations are in closets off classrooms and are not independently air-conditioned. These spaces are very tight on space as they were not originally intended for the current application. Additional IDF locations may be required to accommodate any increase in

the number of drops that may be required to meet current State of Maryland and Harford County Public School Standards.

A public address system capable of integration with the other voice systems in the school will be provided. Public Address Speakers will be located in hallways, kitchen, boiler room, general office area, bus loading area, and large group activity areas. All Classrooms shall have voice handsets and speakers. Paging and intercom functions in the Administration Offices, other offices, the Health Suite, and other selected areas shall be via a telephone-style handset.

Provisions for streaming video system will be provided. In addition, the streaming video system will contain video recording/playback equipment (such as VCR and DVD players) in a central location. This central equipment rack will be wired such that video equipment may be accessed via the computer network system from the instructional areas.

F. Emergency Power

An emergency generator is typically provided for life safety loads, as well as for telecommunications equipment and associated HVAC equipment. The existing battery units can be reused for egress lighting. The addition of a generator for optional standby loads will be determined by HCPS.

G. Security System

The security system control panel and devices may be reused if feasible. New wiring may be required to suit new space configurations.

RECOMMENDATIONS – HOMESTEAD BUILDING:

A. Electrical Distribution

The original electrical distribution equipment is well past its expected useful life and is recommended to be replaced. The newer panel boards for computer and receptacles loads, TVSS devices, etc., are recommended to be reused where feasible.

The electrical distribution system will be 480/277 volt, three phase, four wire from the main switchboard to panel boards throughout the building. The main switchboard will contain molded case, electronic-trip circuit breakers and Owner-metering equipment, as well as ground fault protection on the main circuit breaker and transient voltage surge suppression. Dry type transformers will be provided to supply 208/120 volt, three phase, four wire service to panel boards throughout the building. Panel boards and transformers will be installed locally throughout the building to minimize voltage drop on branch circuits. General lighting and mechanical equipment will be served at 480/277 volts and receptacles and office equipment will be served at 208/120 volts.

Additional panel boards with 200% rated neutral busses and transient voltage surge suppression will be provided for non-linear computer loads as required. Computer panel boards will be served by dry type K-13 rated transformers.
Double duplex receptacles will be provided for all computers and selected equipment at all work stations, teaching stations, Office and Administration Area workstations/desks. A separate neutral conductor shall be installed for each computer circuit in order to reduce the effects of harmonics caused by non-linear loads.

Typical classrooms/instructional areas will have a minimum of five computer receptacles (one [1] teacher and four [4] student) on three 20-ampere circuits. In addition, general receptacles will be provided on one to two circuits per classroom. Science Rooms, Computer Labs, and other specialized instructional areas will be provided with computer and general receptacles per student station as required.

Motor control centers, equipped primarily with combination type magnetic motor starters, will be provided in Mechanical Rooms to serve mechanical equipment. Individual motor starters in appropriate enclosures will be provided to serve remote mechanical equipment. Power factor correction capacitors will be provided for motors to maintain a minimum power factor of 90%.

B. Interior Lighting

Lighting will be required to meet adopted energy codes for lighting power density as well as controllability. In general, lighting systems that utilize linear fluorescent lamps with electronic ballasts are recommended. Lighting controls will be required to incorporate full automatic shutoff of building lighting systems. This can be accomplished via local motion detectors or via contactors controlled via the building EMCS system with timed, local override.

Illumination levels and design will be as recommended by the Illuminating Engineering Society of North America and ASHRAE 90 Standards. The major Lighting Design Criteria will include the following:

LIGHTING TASK	TARGET ILLUMINATION LEVELS (Foot Candles)
Classrooms	60.0
Gymnasium	50.0
Science Laboratories	75.0
Music Rooms	75.0
Media Center	50.0
Offices/Administration Areas	50.0
Teacher Lounges	20.0
Work Rooms	50.0
Toilet Rooms	20.0
Exterior: Pedestrian Walkway	0.6
Exterior: General Parking	0.6
Exterior: Vehicle Lanes	1.0

C. Exterior Lighting

The existing building and parking area lighting is recommended to be replaced. Pulse-start metal halide lamps will be required for new installations in 2009 with standard metal halide lamps being phased out. New lighting is recommended utilizing pulse-start metal halide lamps, designed to meet the adopted energy codes. Additionally, site lighting would be designed to meet cut-off requirements of the LEED rating system.

Compact fluorescent lighting is also recommended at egress doors, connected to an emergency standby source per code and controlled via photocell.

D. Fire Alarm System

The fire alarm system is recommended to be replaced. A complete state-of-the-art, addressable Fire Alarm System with a graphic enunciator panel at the main entrance will be provided. An autodialer will be provided for communication of alarm to the local monitoring agency. Interconnection to the Security System will also be provided.

The entire Fire Alarm System will be designed in accordance with the State of Maryland Fire Code, IBC, and NFPA. All audible, visible, and initiating devices will be designed to meet all ADA requirements.

E. Telecommunications System

Telecommunications systems are recommended to be replaced throughout to current State of Maryland and Harford County Public Schools standards. A public address system capable of integration with the other voice systems in the school will be provided. Public Address Speakers will be located in hallways, kitchen, boiler room, general office area, bus loading area, and large group activity areas. All Classrooms shall have voice handsets and speakers. Paging and intercom functions in the Administration Offices, other offices, the Health Suite, and other selected areas shall be via a telephone-style handset.

Individual public address systems will be provided for the Cafeteria and Gymnasium.

The System shall be star-wired and consist of Category 6, or better, cabling for both telephone and public address.

Telephone outlets and cables will be provided in the following areas:

- Two (2) outlets at each Office and Administration Area work station/desk.
- One (1) outlet will be provided in all Classrooms, the Media Center, and other selected areas.

The Data Network will be star-wired 100 Base-T and consist of Category 6 cabling. The System will provide all components for a complete operable LAN. It will provide access to the System WAN and internet access through T-1 access to a County Server Site. A multi-strand composite fiber optic backbone will be used to link the main MDF, located in the Media Center, with the IDF rooms. The Project will include an allowance for all switches. Strategically located telecommunication hubs (IDF Rooms) will limit cabling lengths to 250 linear feet.

Data cable outlets and associated cables will be provided in the following areas:

- Three (3) outlets at each student computer work station.
- Two (2) outlets at each teaching station.
- Two (2) outlets at each office and administration area work station/desk.
- Other selected areas.

Each classroom will be wired for four (4) data ports for Student Areas and one (1) Data Port at the Teacher's Workstation. The Computer Laboratory will have one (1) data port per student station and two (2) data ports at each teaching station.

The existing video system is recommended to be reused where feasible. Provisions for streaming video system will be provided. In addition, the streaming video system will contain video recording/playback equipment (such as VCR and DVD players) in a central location. This central equipment rack will be wired such that video equipment may be accessed via the computer network system from the instructional areas.

F. Emergency Power

An emergency generator is typically provided for life safety loads, as well as for telecommunications equipment and associated HVAC equipment. A packaged diesel engine generator set and automatic transfer switch is recommended. The generator will supply power to panel boards at 480/277 Volt, 3 phase, four wire. Dry type transformers and panel boards will be provided for 208/120 Volt loads as required.

G. Security System

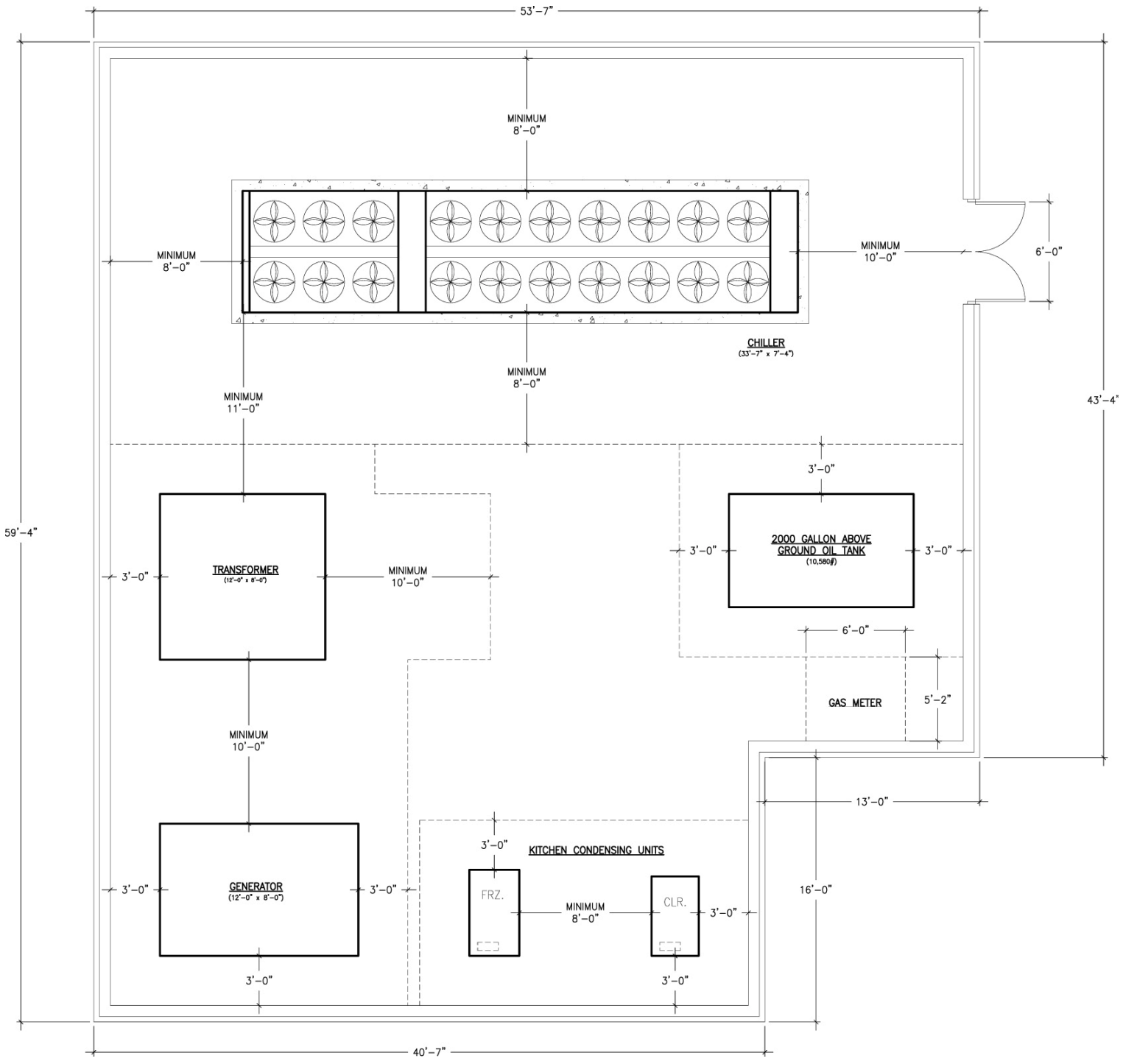
The security system control panel and devices may be reused if feasible. New wiring may be required to accommodate any new space configuration.

GENERAL ELECTRICAL SYSTEM STANDARDS:

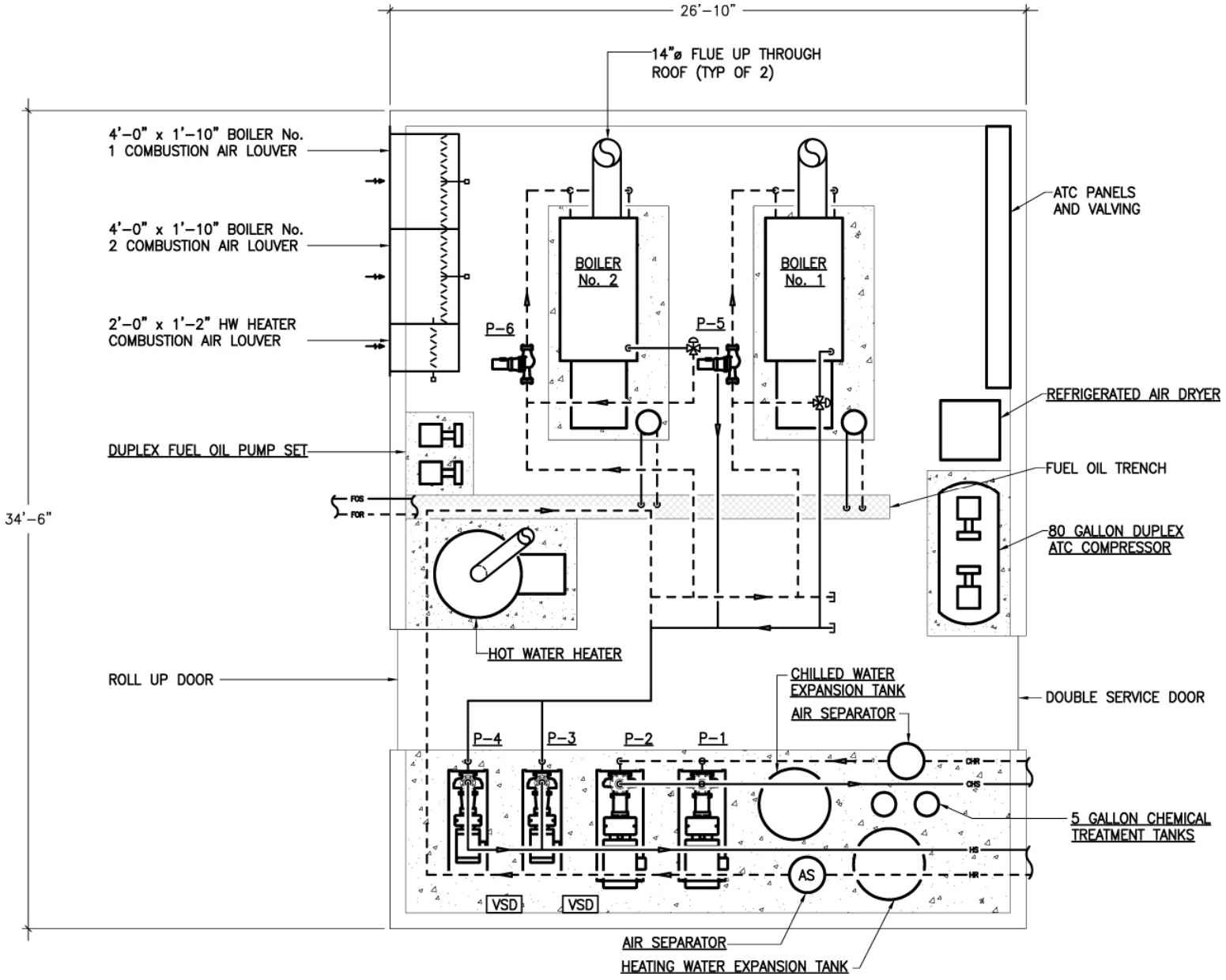
All systems and components will be designed in accordance with the following:

- Harford County Board of Education - Educational Specifications.
- All applicable national, state, and local requirements.
- Maryland State Interagency Committee for Public School Construction Standards.
- Americans with Disabilities Act (ADA) Requirements.
- American National Standards Institute (ANSI).
- Institute of Electrical & Electronic Engineers (IEEE).
- National Electrical Code (NEC).
- National Electrical Manufacturer's Association (NEMA).
- National Electrical Safety Code (NESC).
- National Fire Protection Association (NFPA).
- Underwriters Laboratories (UL).
- International Building Code (IBC).

- Illuminating Engineering Society (IES).
- American Society of Testing and Materials (ASTM).
- American Society of Mechanical Engineers (ASME).
- Maryland Public School Standards for Telecommunications Distribution Systems
- Maryland State Department of Education Science Facilities Design Guidelines
- Maryland State Department of Education Technology Education Facility Guidelines



Typical Chiller Courtyard



Typical Boiler Room

6.0 Concept Plans:

Overview:

Upon review of the conditions of the existing buildings and site amenities, coupled with an evaluation of the project spatial needs, it is suggested that a renovation and expansion (option 1 & 3) is feasible. A scenario where the existing buildings were renovated to meet the new programmatic needs was looked into as well (option 2A &2B). The enclosed conceptual floor plans, program summaries and cost estimates illustrate the possible solutions.

6.1 Option #1 – Expand Wakefield to West

The option 1 plan includes the complete demolition of the existing Homestead building (52,628 s.f.) and the partial demolition of the existing Wakefield administration wing and kitchen/serving area of the cafeteria, equaling approximately 2,100 SF of selective demolition & 11,833 SF of complete demolition. The areas being demolished represent portions of the building that are spatially and programmatically in the worst configuration.

There will be an addition of approximately 112,674 square feet which includes a new cafeteria, gymnasium, administration wing, music area, library, building services and additional classrooms. The addition will be two (2) stories; with the first floor (upper level) remaining at the existing finish floor height and the new lower level will be designed using the slope of the existing grade.

The first floor will consist of a new front entry and canopy facing north. The orientation of the new entrance will serve as a strong visible element from MacPhail Road leading visitors in the correct direction. Off of the new entry will be a main corridor with the new administration wing and health suite flanking either side. To the south of the new entry, where the original cafeteria/kitchen was, specialty classrooms such as reading, math, and enrichment have been added. To the west of the new entry a completely new cafeteria and loading area will be added. Immediately adjacent to the cafeteria to the southwest will be the new gymnasium, music and art spaces. Finally to the east of the new entry/health suite, a new daycare, early intervention and resource classrooms have been added.

The recently updated media center and existing courtyard will remain. The existing northern classroom wing will be renovated to allow for new ADA toilet rooms but the number of classrooms in the wing will remain the same. This wing will house pre-kindergarten through first grade. The existing southern classroom wing will remain but partial demolition will take place to open up the once downsized classrooms (by removing the existing specialty classrooms) to create more useable classroom space. This wing will house first and second grade. From there a new corridor will be created to connect the ends of the larger existing classroom wings. At the center of this corridor, two (2) new flex classrooms will be added. This space creates a new enclosed, and thus safer, courtyard between the classroom wings that can be use for such elements as a play space, a learning tool like an environmental interpretive area (with signs for bird species, a rain garden, and nomenclature of native plants) or a vegetable garden. This new courtyard space will also be easier to maintain by still allowing access for landscape crews.

The new lower level addition will take shape at the southwest of the new entry and just underneath the new administration, cafeteria and gymnasium addition. Access from the first floor to the lower level will be via the new entry corridor stairwell/ elevator core. On the lower level there will be a new intermediate library and computer room. The classrooms will run southwest along the exposed perimeter of the lower level. These classrooms will range from 3rd grade through to 5th grade and also include flex classrooms. This new classroom wing will allow for two (2) new interior common areas. Along the portion of the addition that is dug into the hillside, building services such as mechanical spaces and IT spaces (that do not need natural light) will be added.

One additional element that was considered to maximize the use of the renovation is a vegetative green roof (or “Living Roof”). The green roof could be an excellent teaching tool and also would assist in earning multiple LEED Credits. It has many sustainable benefits such as reducing heat gain to the building, reducing the heat island effect on the site, increasing insulation value of the roof (thus being able to potentially downsize the HVAC system), Stormwater management benefits, lengthening the lifespan of the roof membrane (3 to 6 times as much) and it is aesthetically-pleasing as well. Access can be made to this roof from the gymnasium or from the play yards.

Two new play yards have been added and fenced to maximize safety for the younger children. One yard will be for the day care and another will be for the early intervention and pre-k classrooms. A new courtyard will be added where the original cafeteria's southern-most exterior wall was located. This allows for natural light to penetrate into the new specialty classrooms as well as the art rooms.

Overall the building will be receiving a new exterior envelope with the exception of the areas that were recently updated last year with new curtainwall systems. This will not only make for a healthier and more efficient building but will offer a new public face to the community. The corridors have all been configured in a way to allow for maximum safety during school as well as for after school activities. Signage, ease of circulation, and adequate site lighting will all contribute to making the after-schools, Parks & rec., and other activities easier to coordinate.

Regarding construction, the classroom wings at Wakefield would not have much work done in them. However, the entire administrative and teaching staff would have to be relocated.
We therefore anticipate that the students from Wakefield would be relocated to Homestead and would have classes in the school and in portable classrooms adjacent to the school while construction is ongoing at Wakefield.

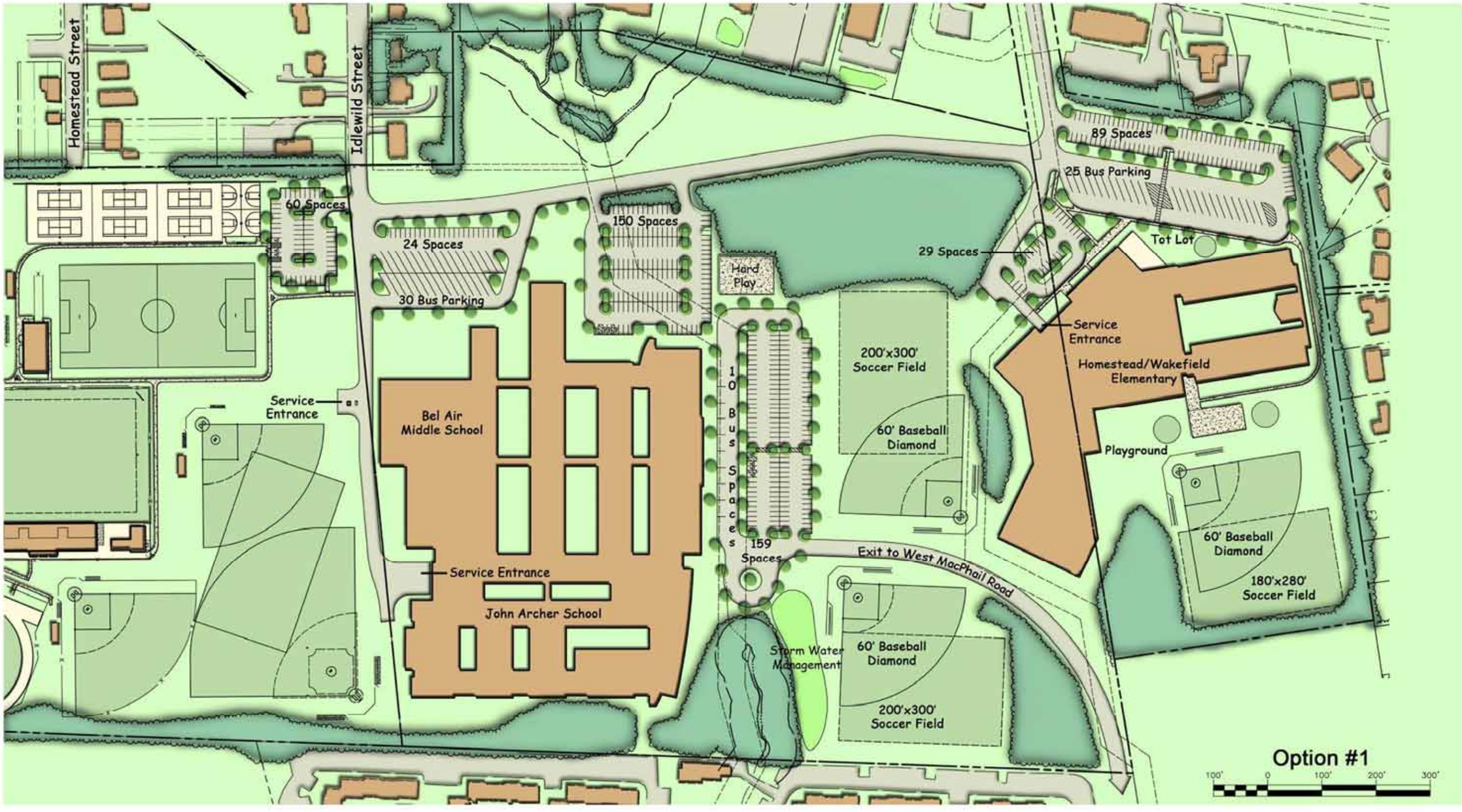
Advantages:

- Sustainable design was factored in many elements of the building creating the potential for a healthier more cost-effective building
- New building entrance/orientation allows for a better presence on campus.
- Day care, early intervention, and specialty classrooms are at front of school for ease of access.

Disadvantages:

- This option maximizes grading and increases cost of construction
- The phasing required for construction will have to be monitored closely as not to interrupt the academic environment.
- Loading dock and service entrance location is not ideal.

In summary, this option would provide a revitalized 163,671 square foot facility, capable of serving a student body of 1,167 students.



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WAKEFIELD ELEMENTARY-OPTION 1 EXPAND TO THE NORTHEAST & WEST

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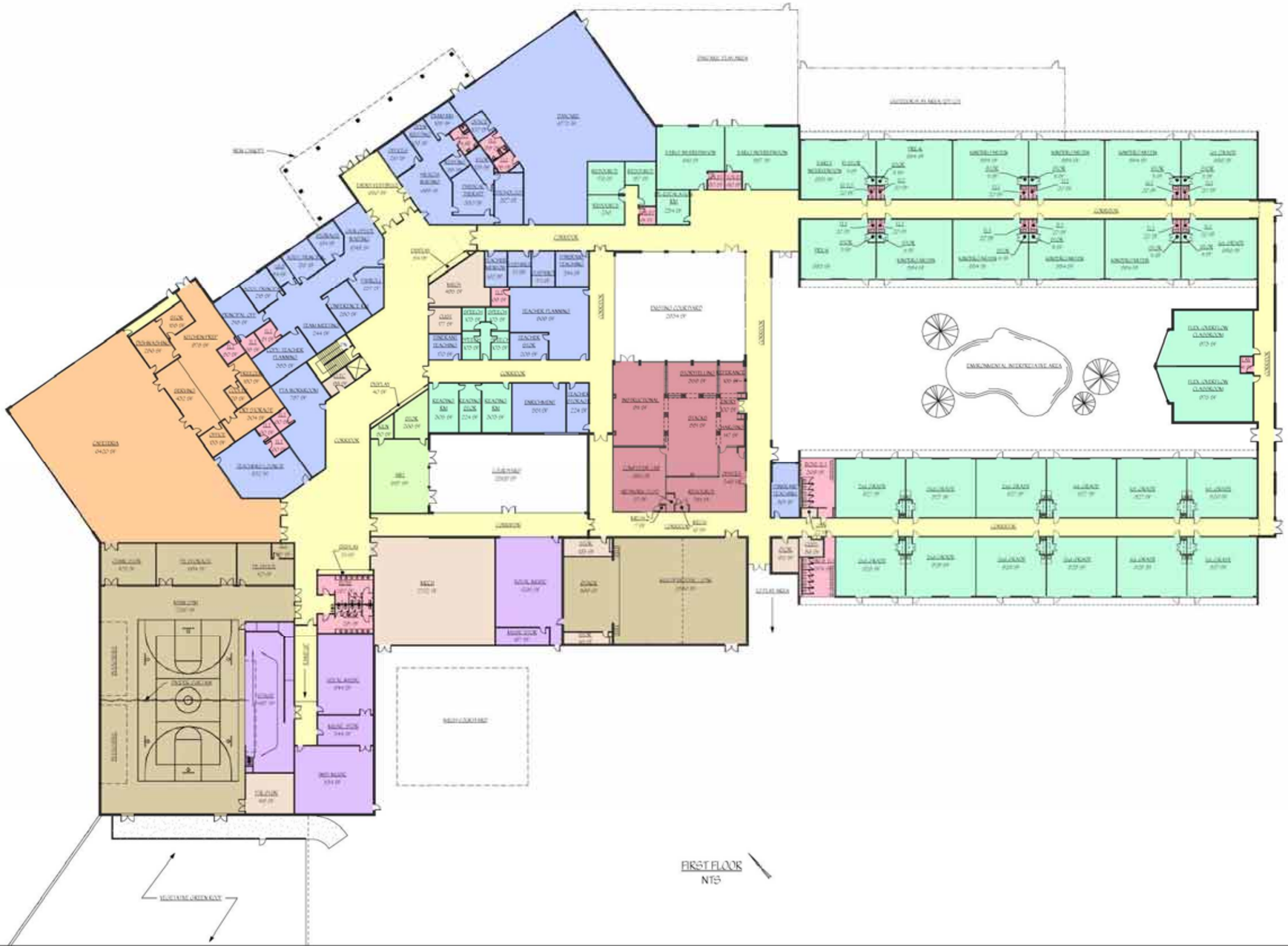

FIRST FLOOR
NTS

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WAKEFIELD ELEMENTARY-OPTION 1 EXPAND TO THE NORTHEAST & WEST

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Program Analysis: Option 1

Department	Quantity	SqFt (avg)	Total SqFt
General Office			
Waiting-First Floor	1	1,048	1,048
Admin Lower Level	1	290	290
Principal Office/TLT	1	386	386
Assistant Principal office	2	218	436
Office - Lower Level	1	125	125
Admin Storage	1	194	194
Payroll Office	1	237	237
Admin Toilet Room	2	81	162
Admin Toilet - Lower Level	1	48	48
Copier/Supply Room	1	383	383
Conference Room	1	280	280
ISS - First Floor	1	84	84
ISS- Lower Level	1	84	84
Admin Storage- Lower Level	1	48	48
Team Meeting	1	244	244
		General Office Total:	4,049
Administration			
Instructional Facilitator	1	171	171
Guidance Office	2	171	342
Teacher Mentor Office	1	162	162
Itinerant Teaching/Diagnostic	3	238	715
		Administration Total:	1,390
Health Suite			
Waiting	1	700	700
Resting Room	1	88	88
Open Resting	1	129	129
Toilet Room	1	94	94
Exam Room	1	168	168
Office	1	210	210
		Health Suite Total:	1,389

Department	Quantity	SqFt(avg)	Total SqFt
Team Planning/Lounge			
Teacher Planning-First Floor	1	969	969
" " toilet room-First Floor	1	69	69
Teacher Planning-Lower Level	1	846	846
" " toilet room-Lower Level	2	60	120
Teachers Lounge	1	832	832
Teachers Lounge- Toilets	2	60	120
volunteer/PTA Workroom	1	787	787
volunteer/PTA workroom- Toilet Rooms	1	60	60
		Team Planning Total:	3,803
Media Center			
Stacks(primary & secondary)	1	881	881
Story Telling	1	359	359
TV Studio	1	460	460
Computer Lab	1	695	695
Resource Room	1	315	315
Reference	1	165	165
Entry/Charging	1	247	247
Librarian Offices	1	346	346
Instructional	1	911	911
Media-Lower Level	1	5,100	5,100
Media- Computer Room	1	750	750
		Media Center Total:	10,229
Athletics			
Maintenance Storage	1	380	380
New gymnasium	1	7,290	7,290
ext/int P&R storage	1	418	418
PE storage	1	694	694
Chair storage	1	475	475
PE Office	1	421	421
PE Office Tlt	1	65	65
		Athletics Total:	9,743

Department		Quantity	SqFt(avg)	Total SqFt
Daycare				
	Daycare	1	4,772	4,772
	Office	1	100	100
	Toilet w/ Shower	1	98	98
	Toilet	1	65	65
			Daycare Total:	5,035
Child Find/ Specialty				
	Reading Room	2	305	610
	Reading Storage	1	224	224
	School Enrichment	1	551	551
	De-Escalation Rooms	1	234	234
	Early Intervention	3	862	2,586
	EI Toilets	3	47	141
	Teacher Storage	3	328	984
	Resource	6	217	1,302
	Resource Tlt	1	61	61
	Psychology Office	1	307	307
	Physical Therapy	1	330	330
	Speech Therapy	4	103	412
	Psych. & Phys. Therapy Storage	1	125	125
			Child Find/Specialty Total:	7,867
Art				
	Classroom- First Floor	1	897	897
	Classroom- Lower Level	1	929	929
	Storage - Lower Level	1	150	150
	Storage - First Floor	1	266	266
	Kiln - First Floor	1	80	80
	Kiln - Lower Level	1	95	95
			Art Total:	2,417
Multipurpose				
	Stage - New	1	1,497	1,497
	Stage/ storage- existing to remain	1	1,179	1,179
	Multipurpose/Gym- existing to remain	1	2,830	2,830
			Multipurpose Total:	5,506
Music				
	Vocal	2	1,105	2,210
	Instrument	1	1,134	1,134
	Music Storage	2	271	542
			Music Total:	3,886

Department		Quantity	SqFt(avg)	Total SqFt
Food Services				
	Kitchen	1	978	978
	Dishwashing	1	286	286
	Serving Area	1	432	432
	Dry Storage	1	304	304
	Cooler	1	79	79
	Freezer	1	190	190
	Kitchen Storage	1	158	158
	Cafeteria	1	6,420	6,420
	Office	1	133	133
	Toilet Room	1	80	80
			Food Service Total:	9,060
Building Services				
	Custodial	4	181	724
	Student Gang Toilets	8	303	2,424
	Network Room - 1st Floor	1	27	27
	Mech / Elec Rooms	7	1,363	9,541
	Facilities Office	1	547	547
	Additional Storage	5	400	2,000
			Building Services Total:	15,263
General Classrooms				
	Pre-K	2	884	1,768
	Pre-K TLT	2	20	40
	Kindergarten	7	884	6,188
	Kindergarten TLT	7	20	140
	Primary 1-2	14	836	11,704
	Primary 3-5	23	840	19,320
	Flex / Overflow Classrooms	4	1,021	4,084
	Common Areas	2	2,051	4,102
			General Classroom Total:	47,346

Department		Quantity	SqFt(avg)	Total SqFt
Circulation				
	Vestibule	1	650	650
	Corridors- First Floor	1	19,177	19,177
	Corridors- Lower Level	1	10,729	10,729
			Circulation Total:	30,556

Program Space:	111,720
Gross Bldg SQFT:	163,672
Efficiency:	0.68
State Rated Capacity:	1,167
Total SqFt / Student:	140

Option 1 Conclusion:

Option 1 addresses the program concerns in a footprint that uses the slope of the site as buildable area. With the classroom requirements and the combining of the two schools into one, the state-rated capacity grew larger than necessary, but does provide for expanded capacity for the attendance area. This scheme borrows from some of the successful strategies utilized in the Red Pump, Deerfield, and Youth's Benefit School designs and incorporates them in conjunction with the new and existing program areas for Homestead Wakefield.

Utilizing the slope for buildable area will require substantial excavation and site work, which would increase the cost of construction. This option also has a large building footprint, and is relatively spread out to allow for sufficient play areas at the upper level plateau. Having a two-story portion of the building on the West side does create a better axial relationship to the future John Archer School, as the lower level classrooms would be at approximately the same grade. However, when designing the new construction into the hillside, there ends up being less potential daylight than in the other schemes, the foundation will require thicker walls (more sub-grade walls) as there will also be additional retaining walls required.

In summary, this option is the largest, most costly scenario, with the largest footprint and sitework costs of any of the Three Options.

Cost Estimate:

POTENTIAL COST MODEL (In 2009 Dollars)

OPTION 1 - RENOVATION AND MODERNIZATION OF WAKEFIELD ELEMENTARY SCHOOL

Approximately 2 year construction duration

Existing Building	**Area (SF)**	**Cost (SF)**	**Subtotal**
Selective Demolition	2,100	$8.00	$16,800.00
Complete Demolition	11,833	$5.00	$59,165.00
Renovation	3,300	$100.00	$330,000.00
New Roof (existing building)	51,000	$15.00	$765,000.00
ALT: Sedum Mat on Existing Building Roof	51000	$5.00	$255,000.00
Asbestos Abatement			$125,000.00
Additions (New Construction)			
Upper Level	58,732	$170.00	$9,984,440.00
Lower Level	53,942	$170.00	$9,170,140.00
ALT: Extensive Vegetative Roof on New Addition	112,674	$8.00	$901,392.00
Full Demolition			
Removal of Homestead School	52,628	$5.00	$263,140.00
Removal of Kindergarten Building	4,585	$5.00	$22,925.00
Site Work and Temporary Construction			
Geo-Thermal Wells			$500,000.00
Sitework	163,671	$10.00	$1,636,710.00
Relocatables (450 students, 1 per 30)	15	$50,000.00	$750,000.00
Phasing/Temporary Construction			$500,000.00
TOTAL BASE (For 1,167 Student Capacity)			**$24,123,320.00**
TOTAL ALT			**$1,156,392.00**
TOTAL			**$25,279,712.00**

6.2 Option #2a – Renovate Wakefield in Place

Option 2a includes a partial renovation and expansion of the existing Wakefield building. Partial demolition equaling 5,730 square feet of the existing Wakefield administration wing and 7,985 square feet of complete demolition will be required. The addition will include a new entry, new administration wing and new gymnasium. In the areas targeted for partial demolition as much of the existing structure will remain as long as it is deemed structurally sound. The areas being demolished represent areas of the building that are spatially and programmatically in the worse configuration and allow for the best possible new design.

The new entry will be located in approximately 60'-0" +/- to the north of the existing entry way. Directly off of the new entry to the west will be a new health suite and to the east will be the new administration offices. A new wider entry corridor will extend off of the new entry and connect to the existing main corridors. Directly adjacent to the new administration offices will be the new gymnasium and vocal music room. This gymnasium addition will run off of the existing corridor and grow to the north parallel to the new entry. This addition will allow for a new "face" of the building.

The cafeteria and kitchen will be renovated for maximum daylighting and more efficient programming. The existing kitchen will be demolished and relocated to the south wall of the existing cafeteria. This will allow for a more updated kitchen, a new loading area as well as the addition of a larger more convenient teachers lounge in the cafeteria. The old gymnasium will be renovated into specialty classrooms. The stage will be demolished and new classrooms and common area will be added. The existing media center and courtyard will remain as- is with the exception of minor finish changes and updates.

The northern most classroom wing will remain w/ the exception of the toilet room upgrade to be ADA compliant. This wing will house grades pre-kindergarten through first grade. The existing southern most classroom wing will remain but partial demolition will take place to open up the once downsized classrooms (the removal of the existing specialty rooms) to create more useable classrooms. This wing will house first and second grade. From there a new corridor will be created to connect the ends of the classroom wings. At the center of this corridor a new art

room and teacher planning will be added. This will create a new enclosed safer courtyard between the classroom wings that can be use for such elements as a play space or learning tool like an environmental interpretive area.

In this scheme the building will be receiving a partial new exterior envelope that includes the entry canopy, new gym, and administration areas. This will not only make for a healthier & more efficient building but will offer a new public face to the community. Regarding security, the corridors have all been configured in a way to allow for maximum safety during school as well as for after school activities. Regarding construction, the classroom wings at Wakefield would not have much work done in them. However, the entire administrative and teaching staff would have to be relocated and the cafeteria and other support areas will not be accessible. We therefore anticipate that the students from Wakefield would be relocated to Homestead and would have classes in the school and in portable classrooms adjacent to the school while construction is ongoing at Wakefield. Construction Phasing Options: Phase I: Renovate existing gym interior, construct new classrooms at SE end of new courtyard, construct connecting corridor; Phase II: Construct/upgrade Cafeteria; Phase III: Demo existing Admin., construct new admin. & health suites. Relocate Admin. & Health Program areas to existing gym temporarily. Phase IV: Construct new Gym. These options might allow partial occupancy of the WF building during construction, particularly if the students and staff are uninterrupted in their studies.
In summary, this option would provide a revitalized 74,279 square foot facility, capable of serving a student body of 520 students.

Advantages:

- Has the smallest footprint and is a very compact scheme (though still only housing half of the HWES student population)
- Keeps existing chiller in place at exterior courtyard

Disadvantages:

- Still leaves HWES as a two-building elementary schools separated by a forty (40') ft. vertical elevation change and 100+ yards of horizontal distance
- Places mass of new Gym at front of building
- Wakefield would have no direct access to Day Care, as it would be at the Homestead school

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WAKEFIELD ELEMENTARY - OPTION 2 RENOVATE IN PLACE

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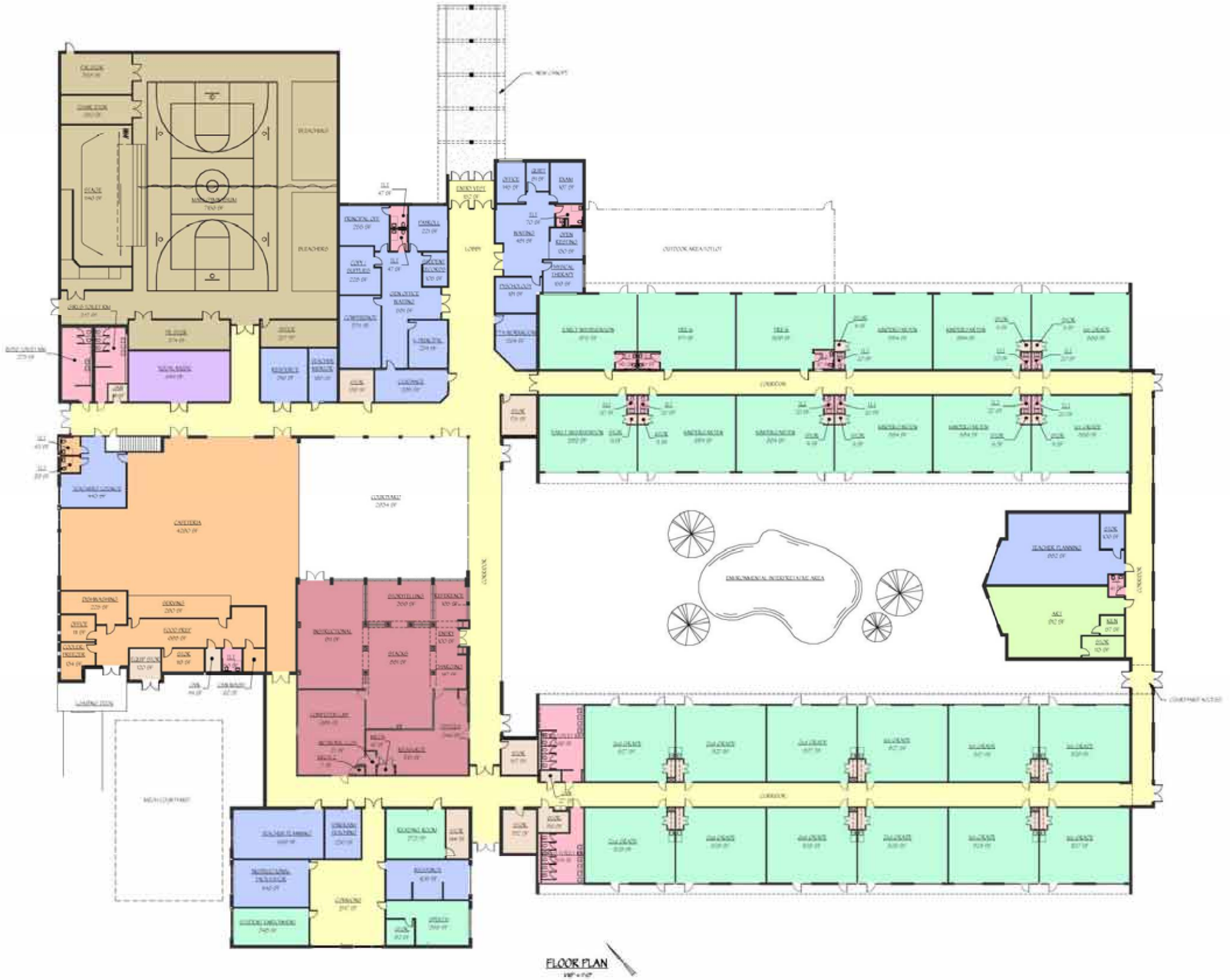

WAKEFIELD ELEMENTARY - OPTION 2A RENOVATE WAKEFIELD IN PLACE

FREDERICK WARD ASSOCIATES
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Program Analysis: Option 2a

Department	Quantity	SqFt(avg)	Total SqFt
General Office			
Waiting	1	581	581
Principal office/TLT	1	302	302
Assistant Principal Office	1	234	234
Payroll	1	221	221
Admin TLT	1	47	47
Copier/ Supply Room	1	228	228
Conference Room	1	375	375
Student Records	1	105	105
		General Office Total:	2,093
Administration			
Instructional Facilitator	1	446	446
Guidance	1	295	295
Teacher Mentor Office	1	190	190
Itinerant Teaching/ Diagnostic	1	230	230
		Administration Total:	1,161
Health Suite			
Health- Waiting	1	481	481
Health- Exam Room	1	167	167
Health - Open resting	1	130	130
Health - Toilet Room	1	70	70
Health - Quiet Room	1	81	81
Health - Office	1	145	145
		Health Suite Total:	1,074
Team Planning			
Teacher Planning	2	776	1,551
Teacher Planning Storage	1	106	106
Teacher Planning TLT	1	41	41
Teachers Lounge	1	443	443
Teachers Lounge- Toilets	2	41	82
Volunteer/PTA Workroom	2	264	528
		Team Planning Total:	2,751

Department		Quantity	SqFt(avg)	Total SqFt
Media Center				
	Stacks	1	881	881
	Story Telling	1	359	359
	Computer lab	1	695	695
	Resource Room	1	315	315
	Reference	1	165	165
	Entry/Charging	1	247	247
	Librarian Offices	1	346	346
	Instructional	1	911	911
			Media Center Total:	3,919
Athletics				
	New Gymnasium	1	7,156	7,156
	Ext/int P&R Storage	1	358	358
	PE storage	1	374	374
	Chair storage	1	250	250
	PE Office	1	257	257
			Athletics Total:	8,395
Child find/ specialty				
	Reading Room	1	375	375
	Reading Storage	1	144	144
	School Enrichment	1	348	348
	Early Intervention	2	877	1,753
	Early Int. TLT	2	65	65
	Resource	2	361	721
	Psychology Office	1	191	191
	Physical Therapy	1	159	159
	Speech Therapy	1	358	358
	Speech Therapy Storage	1	92	92
			Child Find/Specialty Total:	4,206
Art				
	Classroom	1	912	912
	Art Storage	1	113	113
	Kiln	1	57	57
			Art Total:	1,082
Multipurpose				
	Stage/ storage	1	1,146	1,146
			Multipurpose Total:	1,146

Department		Quantity	SqFt(avg)	Total SqFt
Music				
	Vocal	1	644	644
			Music Total:	644
Food Services				
	Kitchen	1	698	698
	Dishwashing	1	225	225
	Serving Area	1	290	290
	Dry Storage	1	119	119
	Cooler/Freezer	1	134	134
	kitchen cleaning storage	1	152	152
	Cafeteria	1	4,290	4,290
	Office	1	111	111
	TLT	1	56	56
	Can Wash	1	62	62
			Food Service Total:	6,137
Building Services				
	Jan closets	3	37	112
	Outdoor Maint/grounds Equip	1	120	120
	Boys Gang Toilets	2	321	642
	Girls Gang Toilets	2	276	551
	Main Storage	5	148	739
	Server Room	1	27	27
			Building Services Total:	2,191
General Classrooms				
	Pre-K	2	870	1,739
	Pre-K TLT	2	46	92
	Kindergarten	6	884	5,304
	Kindergarten TLT	6	20	120
	Kindergarten Storage	6	11	66
	Primary 1-2	14	836	11,700
	Primary 1-2 TLT	2	20	40
	Commons	1	947	947
			General Classroom Total:	20,008

Department		Quantity	SqFt(avg)	Total SqFt
Circulation				
	Vestibule	1	152	152
	Corridors	1	11,285	11,285
			Circulation Total:	11,437

Program Space:	52,616
Gross Bldg SQFT:	74,279
Efficiency:	0.71
State Rated Capacity:	520
Total SqFt / Student:	142

Program Conclusion:

This scheme was investigated at the request of HCPS to satisfy requirements by the State of Maryland to look at renovate-in-place scenarios. It is a part of the combination that is the least desirable of the three proposed scenarios, as it essentially addresses the current school scheme by upgrading each building separately. It does not solve the issues of: having the elementary school population spread out between two separate buildings, circulation between the two buildings and having the day care at one facility but not the other.

The recent work that took place (HVAC, Lighting, and Exterior envelope upgrades) remains virtually untouched in this scheme, and the chiller that was installed is also spared. However, Option 3 also has similar features of keeping the $5million of recent work intact, but has none of this Option's disadvantages.

With a cost estimate of $9,794,176.00 (including Green Roof Alternate), this scenario represents 54% of the overall Option 2 cost of $18,354,394, which includes both Homestead & Wakefield being renovated in place. This number makes it the least expensive option of the three, but as stated above, the least desirable for the students, educators, and the community.

Cost Estimate:

POTENTIAL COST MODEL (In 2009 Dollars)

OPTION 2a - RENOVATION IN-PLACE & MODERNIZATION OF WAKEFIELD ELEMENTARY SCHOOL

Approximately 1.5 year construction duration

Existing Building	**Area (SF)**	**Cost (SF)**	**Subtotal**
Selective Demolition	5,730	$8.00	$45,840.00
Complete Demolition	7,985	$5.00	$39,925.00
Renovation	5,630	$100.00	$563,000.00
New Roof (Existing Building)	42,547	$15.00	$638,205.00
ALT: Sedum Mat on Existing Building Roof	42,597	$5.00	$212,985.00
Asbestos Abatement			$125,000.00
Additions			
First Floor	31,732	$170.00	$5,394,440.00
ALT: Extensive Vegetative Roof on New Addition	31,732	$8.00	$253,856.00
Full Demolition			
Removal of Kindergarten Building	4,585	$5.00	$22,925.00
Site Work and Temporary Construction			
Sitework (in acres)	7.60	$200,000.00	$1,520,000.00
Storm Water management (in acres)	7.60	$30,000.00	$228,000.00
Relocatables (150 students, 1 per 30)	5	$50,000.00	$250,000.00
Phasing/Temporary Construction			$500,000.00
TOTAL BASE(For 520 Student Capacity)			**$9,327,335.00**
TOTAL ALT			**$466,841.00**
TOTAL			**$9,794,176.00**

6.3 Option #2b – Renovate Homestead in Place

Option 2b includes a partial renovation and expansion of the existing Homestead building. A majority of the work will be a new addition of approximately 25,286 square feet. The demolition scope for this option includes 6,200 square feet of selective demolition and 3,430 square feet of complete demolition. The main addition of approximately 22,600 +/- square feet will include a new entry, new administration wing, cafeteria expansion, new gymnasium and daycare. A smaller but necessary addition of approximately 2,686 +/- square feet will include additional classrooms. Along with the two additions there will be re-allocation/renovation of spaces. This will allow for ease of program and spatial relationships.

The main addition will consist of demolishing and relocating the existing entry 56'-0" +/- to the northwest of the original entry. There will be an addition of a new daycare to the south of the existing cafeteria. The addition of a new health suite will be added to the east of the new entry corridor. Immediately adjacent to the health suite a new gymnasium and music wing will be added. To the west of the new entry corridor new administration offices will be added. This will require partial demolition of four (4) existing classrooms which will be relocated to the west of the existing gymnasium. By relocating some classrooms and adding an expansion Homestead will have a newer more prominent entry and façade as well as offer more program flexibility.

There will be minor renovations/program re-allocations to existing spaces inside the building. For instance, the existing administration office/ health suite will be partially demolished and renovated to house a teachers' lounge and resource rooms. The existing specialty classroom cluster between the two existing courtyards will be renovated to accommodate these classrooms more efficiently as well as a flex classroom and PTA workroom. With the addition of a new gym/music wing the existing gym and music area will be renovated to house two (2) new flex classrooms, a new courtyard and an art room. Lastly, the two small classrooms adjacent to the teacher preparation will be renovated to house one early intervention classroom. By re-locating and renovating existing spaces it is possible to minimize the building footprint while maximizing the building use.

As with any renovation there is often expansion required. With Homestead Wakefield Elementary's growing student body and academic program changes the need for additional spaces is imminent. One such space that needs to be expanded is the existing cafeteria /kitchen. This area will be expanded to the east allowing for a larger cafeteria and updated kitchen. With the increasing number of students this expansion is necessary to accommodate the required number of lunch seatings.

A good majority of the building will remain the same with the exception of minor updates and finish changes. For instance, the media center, computer lab and teacher preparation were recently updated in 1998. These spaces will remain the same unless minor updates are required. Four of the five existing classroom wings will also remain as-is. By keeping as much of the building as possible, the cost can be decreased. However, it also can lead to having less than desirable spatial relationships and adjacencies.

Regarding construction phasing, we anticipate that the students from Homestead would be relocated to Wakefield and would have classes in the school and in portable classrooms adjacent to the school while construction is ongoing at Homestead. There is simply too much new work and renovation work to keep Homestead fully operational during the construction phase. Construction Phasing Options: Phase I- Construct daycare & classrooms at SE end of building; Phase II- Complete interior renovation work; Phase III- Construct new Gym & Cafeteria; Phase IV- Construct new Admin. & Health suites and relocate those program areas to Gym temporarily. This phasing might allow the possibility of partially-occupying the building in advance of completion of all construction. In summary, this option would provide a revitalized 73,329 square foot facility, capable of serving a student body of 562 students.

Advantages:

- Has the smallest footprint of the three options. (but still only houses roughly half the HWES Student population)
- Would have the lowest cost of the three options.

Disadvantages:

- Still leaves HWES as a two-building elementary school separated by a forty (40') ft. vertical elevation change and 100+ yards of horizontal distance.
- Plenum/Ceiling space is limited and infrastructure would need major updates.

FLOOR PLAN
NTS

HOMESTEAD ELEMENTARY- OPTION 2B RENOVATE HOMESTEAD IN PLACE

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Program Analysis: Option 2b

Department	Quantity	SqFt (avg)	Total SqFt
General Office			
Waiting	1	598	598
Principal office/TLT	1	269	269
Assistant Principal Office	1	220	220
Payroll	1	230	230
Admin TLT	1	39	39
Conference Room	1	260	260
Student Records	1	99	99
ISS	1	104	104
		General Office Total:	1,819
Administration			
Instructional Facilitator	1	144	144
Instructional Facilitator Storage	1	575	575
Guidance	1	228	228
Teacher Mentor Office	1	147	147
Itinerant Teaching/diagnostic	1	262	262
De-Escalation	1	172	172
		Administration Total:	1,528
Health Suite			
Waiting	1	437	437
Exam Room	1	177	177
Open resting	1	288	288
Toilet Room	1	51	51
Quiet Room	1	80	80
Office	1	145	145
		Health Suite Total:	7,872
Team Planning			
Teacher Planning	2	463	926
Teachers Lounge	1	568	568
Teachers Lounge- Toilets	2	45	90
Volunteer/PTA Workroom	1	393	393
Volunteer/PTA Workroom TLT	1	40	40
		Team Planning Total:	2,017
Media Center			
Stacks	1	1,161	1,161
Story Telling	1	313	313
Computer Lab	1	733	733
Reference	1	493	493
TV Studio	1	502	502
Instructional	1	754	754
		Media Center Total:	3,956

Department		Quantity	SqFt(avg)	Total SqFt
Athletics				
	New Gymnasium	1	6,712	6,712
	Ext/int P&R Storage	1	305	305
	PE Storage	1	768	768
	Chair Storage	1	189	189
	PE Office	1	180	180
	PE Office TLT	1	53	53
			Athletics Total:	8,207
Child Find/ Specialty				
	Reading Room	1	261	261
	Reading Storage	1	74	74
	Math	1	258	258
	School Enrichment	1	267	267
	Early Intervention	1	721	721
	Resource	3	169	508
	Resource Vestibule	1	83	83
	Resource TLT	1	45	45
	Psychology Office	1	189	189
	Physical Therapy	1	208	208
	Speech Therapy	1	227	227
	Speech Therapy Storage	1	20	20
			Child Find/Specialty Total:	2,861
Art				
	Classroom	1	737	737
	Art Storage	1	116	116
	Kiln	1	67	67
			Art Total:	920
Daycare				
	Waiting	1	429	429
	Waiting TLT	1	41	41
	Daycare	1	1,785	1,785
	Daycare TLT	1	98	98
	Office	1	126	126
	Storage	1	72	72
	Custodian	1	138	138
			Daycare Total:	2,689
Multipurpose				
	Stage/ Storage	1	1,235	1,235
			Multipurpose Total:	1,235

Department		Quantity	SqFt(avg)	Total SqFt
Music				
	Vocal	1	523	523
	Instrumental	1	411	411
	Instrumental Storage	1	95	95
			Music Total:	1,029
Food Services				
	Kitchen	1	762	762
	Dishwashing	1	228	228
	Dry Storage	1	105	105
	Cooler/Freezer	1	101	101
	Cafeteria	1	4,334	4,334
	Office	1	132	132
	TLT	1	37	37
	Can Wash	1	60	60
			Food Service Total:	5,759
Building Services				
	Jan closets	1	38	38
	Boys Gang Toilets	3	198	595
	Girls Gang Toilets	3	198	594
	Boys Toilet Room	1	88	88
	Girls Toilet Room	1	69	69
	Main Storage	1	203	203
	Mech Rooms	6	114	682
	Incinerator	1	253	253
	Boiler	1	1,514	1,514
			Building Services Total:	4,036
General Classrooms				
	3rd Grade	7	728	5,093
	4th Grade	7	726	5,080
	5th Grade	7	726	5,083
	Flex Classroom	3	625	1,876
			General Classroom Total:	17,132
Circulation				
	Vestibule	1	219	219
	Corridors	1	12,573	12,573
			Circulation Space:	12,792

Program Space:	57,024
Gross Bldg SQFT:	73,329
Efficiency:	0.77
State Rated Capacity:	562
Total SqFt / Student:	131

Program Conclusion:

The Homestead building is the smaller of the two schools and appears to be in worse shape than Wakefield. It also lacks the natural daylighting potential that Wakefield has. However, with 25,286 s.f. of new construction proposed, Homestead would be able to support a state-rated capacity of 562 students.

This scheme was investigated at the request of HCPS to satisfy requirements by the State of Maryland to look at renovate-in-place scenarios. It is a part of the combination that is the least desirable of the three proposed scenarios, as it essentially addresses the current school scheme by upgrading each building separately. It does not solve the issues of: having the elementary school population spread out between two separate buildings, circulation between the two buildings and having the day care at one facility but not the other.

With a cost estimate $8,560,218 (including the Green Roof)**,** this scenario represents 47% of the overall Option 2 cost of $18,354,394. The combined total includes the Wakefield and Homestead schools being renovated in place. This number makes it the least expensive option of the three, but as stated above, the least desirable for the students, educators, and the community.

Cost Estimate:

POTENTIAL COST MODEL (In 2009 Dollars)

OPTION 2b - RENOVATION IN-PLACE & MODERNIZATION OF HOMESTEAD ELEMENTARY SCHOOL

Approximately 1.5 year construction duration

Existing Building	**Area (SF)**	**Cost (SF)**	**Subtotal**
Selective Demolition	6,200	$8.00	$49,600.00
Complete Demolition	3430	$5.00	$17,150.00
Renovation	6200	$100.00	$620,000.00
New Roof (Existing Building)	52,628	$15.00	$789,420.00
ALT: Sedum Mat on Existing Building Roof	52,628	$5.00	$263,140.00
Asbestos Abatement			$75,000.00
Additions			
First Floor	25286	$170.00	$4,298,620.00
ALT: Extensive Vegetative Roof on New Addition	25286	$8.00	$202,288.00
Site Work and Temporary Construction			
Sitework (in acres)	6.50	$200,000.00	$1,300,000.00
Storm Water Management (in acres)	6.50	$30,000.00	$195,000.00
Relocatables (150 students, 1 per 30)	5	$50,000.00	$250,000.00
Phasing/Temporary Construction			$500,000.00
TOTAL BASE (For 562 Student Capacity)			**$8,094,790.00**
TOTAL ALT			**$465,428.00**
TOTAL			**$8,560,218.00**

6.4 Option #3 – Expand Wakefield to Northeast & West (Preferred Option)

The option 3 (preferred option) includes the complete demolition of the existing Homestead building and the partial demolition, expansion and renovation of the existing Wakefield Building. Partial demolition will occur in the existing administration wing, kitchen/serving area of the cafeteria, and gymnasium. The approximate partial demolition equals 9,200 +/- square feet. In the areas targeted for partial demolition as much of the existing structure will remain as long as it is deemed structurally sound. The areas being demolished represent areas of the building that are spatially and programmatically in the worse configuration.

The bulk of the project will consist of 99,356 square feet of new construction. One portion of the addition will consist of a new two story classroom wing to the northeast of the existing entry. This new wing will be angled toward the north to allow for better daylighting as well as better frontage from MacPhail Road. The lower level of this classroom wing will house three (3) Early Intervention classrooms, classrooms for grades pre-kindergarten through kindergarten (with toilet rooms in each room), as well as two common areas, itinerant teaching, teacher planning, a resource room and building services. The upper level of this classroom wing will house classrooms for grades fourth through fifth, two common areas as well as teacher planning, one teachers lounge, secondary administration offices, a resource room, enrichment/itinerant classrooms, ample storage rooms, two gang toilet rooms (one male one female) and building services. This second story is accessed through either the new main stairwell/elevator core near the new front entry or via a secondary stair at the end of the classroom wing. The older children's classrooms were located on the second story for safety concerns of the younger children not being able to traverse the steps as easily. The shape and scale of the new classroom wing is meant to mimic that of the existing classroom wings but function more efficiently while maintaining a similarity to the existing footprint.

In addition to the new classroom wing, other additions have been added to maximize program space and allow for the most efficient elementary school possible. In this option the existing entry will be demolished and relocated approximately 70'-0" to the west of the original entry.

The existing administration wing will be partially demolished and a new administration area will be built to the west of the new entry. This new administration area will also house a new PTA workroom and some specialty classrooms. To the east of the new entry a new health suite and the remaining specialty classroom area will be built. This will allow a majority of the school's specialty classes as well as administration needs to be located in one centralized area. The orientation and location of the new classroom wing, administration offices, health suite and daycare areas will create a new, more prominent entry as well as add more program flexibility. This new façade will give a new modern "face" to the Homestead-Wakefield Elementary School, thus creating one cohesive unit for the community.

Directly adjacent to the new administration offices will be a new daycare suite which can be accessed either from the main corridor or from the exterior of the building allowing Bel Air Campus staff to drop off and pick up their (daycare-age) children with ease. To the southwest of the existing cafeteria a new gymnasium and music wing will be added. The new gym will be large enough to be divided for multiple functions, can seat 300+ for a concert or presentation, and has ample chair and PE storage as well as Parks/Rec. storage (with outside access). The vocal and instrumental music rooms will be much larger than the current HWES music rooms, and have easy access to the stage. Adjacent to the new gymnasium will be the addition of a large boiler/mechanical room which will allow for the necessary mechanical upgrades required to bring all the building services up to date. Other additions are located in the exterior space between the existing classroom wings which add another vocal room, a teacher's lounge, and two new art rooms. These new "endcaps" to the existing wings allow some excellent points to be considered: safety/security, as the courtyard space is now closed off, ease of maintenance (no blowing debris/trash), circulation corridors that connect the two previously distant wings, and room for an environmental interpretative area that can encourage native plants and habitat for small birds. It could be a great place to create a rain garden and also have educational signage that explains bioswales or other storm water management strategies to the students.

Expansion to other areas of the school was deemed necessary for proper functionality due to the combination of the Homestead and Wakefield Schools. The existing kitchen will be demolished and a new kitchen built to the southwest of the existing cafeteria. Essentially, the entire cafeteria area will be expanded to the southwest to create a space large enough to

accommodate the increase in student body created by combining the two existing schools. With the combination of the two schools a new media center is necessary, and the existing gymnasium will be demolished to allow for a new intermediate media center as well as primary and intermediate (tiered) computer labs.

Much of the building will remain relatively unchanged; the existing media center will remain untouched with the exception of minor changes and finish upgrades. The classroom wings will only have minimal changes, such as converting previously subdivided classroom spaces back into larger classroom areas. The only major change in the northern most classroom wing will be an upgrade of the existing in classroom toilet rooms to be ADA compliant. Otherwise this wing will remain as is with the exception of finish upgrades. This northern wing will house grades first and second as well as two resource rooms. The existing southern most classroom wing will have partial demolition to open up the once downsized classrooms (the removal of the existing specialty rooms) to create more useable classrooms. This wing will house second grade through fourth grade. From there a new corridor addition will be created to connect the ends of the classroom wings. At the center of this corridor two new art rooms will be added. This will create a new enclosed safer courtyard between the classroom wings that can be use for such elements as a play space or learning tool like an environmental interpretive area.

Regarding construction, the existing classroom wings at Wakefield would not have much work done in them. However, the entire administrative and teaching staff would have to be relocated and the cafeteria and other support areas will not be accessible. We therefore anticipate that the students from Wakefield would be relocated to Homestead and would have classes in the school and in portable classrooms adjacent to the school while construction is ongoing at Wakefield. If properly phased, however, it would be possible to turn over a large portion of Wakefield back to the School district while some work is being finished. Possible phasing could be as follows:

- Phase I- Construct new (2) story classroom wing, demo other portions of building
- Phase II- Construct new Admin. And Health suites
- Phase III- Construct new Cafeteria
- Phase IV- Construct new Gymnasium and Music Wing

In summary, this option would provide a revitalized 138,940 square foot facility, capable of serving a student body of 1,029 students.

Advantages:

- **Has a compact footprint. Would minimize sitework (cut and fill) for the building pad.**
- **Slope used for parking area instead of building addition- loading area is readily accessible.**
- **Provides numerous opportunities for daylight harvesting, passive solar, vegetative green roofs, and other sustainable strategies.**
- **Contains the entire program spaces desired and is closest to the requested state rated capacity.**
- **Is less expensive than Option 1 while providing a totally new exterior look for the building.**
- **Retains and reuses the majority of the curtainwall/ exterior envelope, plumbing, and HVAC improvements that were recently completed (2009).**

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WAKEFIELD ELEMENTARY - OPTION 3 EXPAND WAKEFIELD TO NORTHEAST

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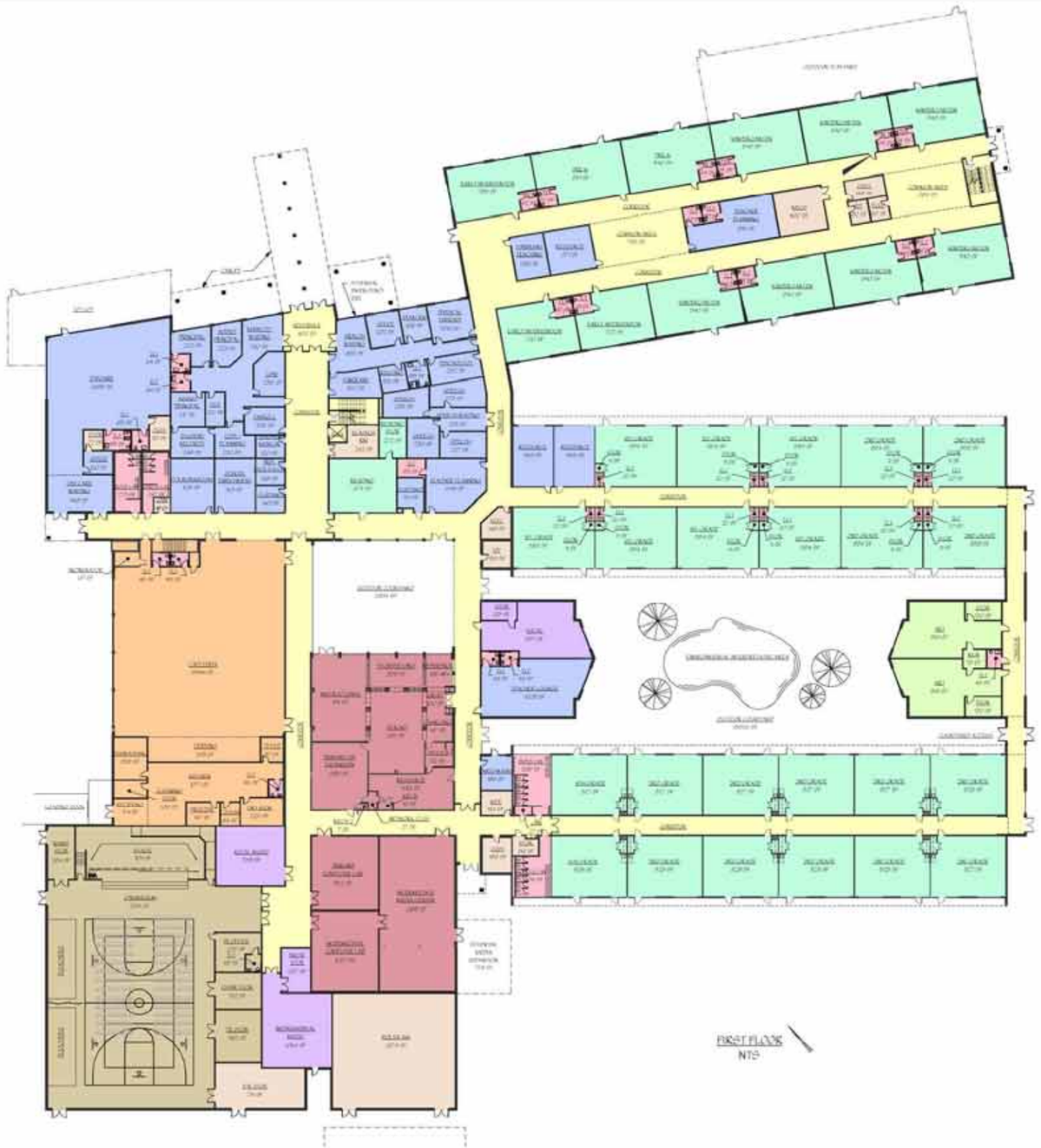

WAKEFIELD ELEMENTARY - OPTION 3 EXPAND WAKEFIELD TO NORTHEAST

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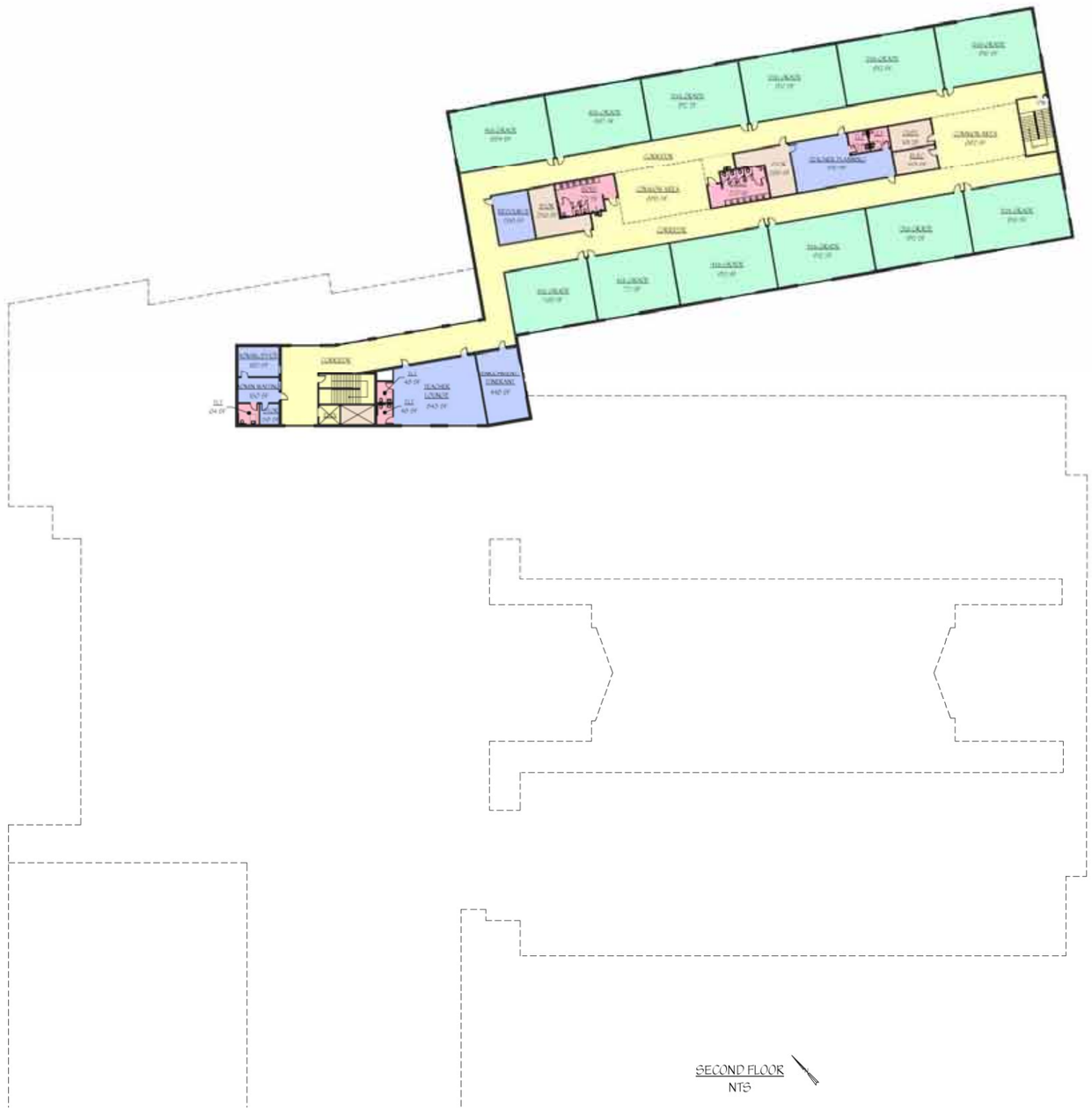

SECOND FLOOR
NTS

WAKEFIELD ELEMENTARY - OPTION 3 EXPAND WAKEFIELD TO NORTHEAST

FREDERICK WARD ASSOCIATES
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900 South Main St
Bel Air MD, 21014

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Program Analysis: Option 3

Department	Quantity	SqFt(avg)	Total SqFt
General Office			
Waiting - First Floor	1	780	780
Principal office/TLT	1	286	286
Assistant Principal office	2	217	434
Student Records	1	249	249
Payroll Office	1	205	205
Admin Toilet - First Floor	1	64	64
Copier/Supply Room	1	232	232
Conference Room	1	238	238
ISS	1	122	122
Second Floor- Office	1	190	190
Second Floor- Storage	1	59	59
Second Floor- Waiting	1	150	150
Second Floor- Admin Toilet	1	64	64
		General Office Total:	3,073
Administration			
Instructional Facilitator	1	139	139
Guidance Office	2	145	290
Teacher Mentor Office	1	120	120
Itinerant Teaching/Diagnostic	2	259	518
		Administration Total:	1,067
Health Suite			
Waiting	1	662	662
Resting Room	1	125	125
Toilet Room	1	99	99
Exam Room	1	166	166
Office	1	202	202
		Health Suite Total:	1,254

Department	Quantity	SqFt(avg)	Total SqFt
Team Planning/Lounge			
Teacher Planning-Pre K-K	1	615	615
" " toilet room-Pre K-K	2	60	120
Teacher Planning-Primary	1	548	548
" " toilet room-Primary	1	93	93
Teacher Planning- Intermediate	1	615	615
" " toilet room-Intermediate	2	60	120
Teachers Lounge-First Floor	1	1,028	1,028
Teachers Lounge-First Floor- Toilet Room	2	46	92
Teachers Lounge-Second Floor	1	843	843
Teachers Lounge-Second Floor- Toilet Room	2	48	96
Volunteer/PTA Workroom	1	429	429
		Team Planning Total:	4,599
Media Center			
Primary Media- Stacks	1	881	881
Primary Media- Story Telling	1	359	359
Primary Media- Computer lab	1	695	695
Primary Media- Resource Room	1	315	315
Primary Media- Reference	1	165	165
Primary Media- Entry/Charging	1	247	247
Primary Media- Librarian Offices	1	346	346
Primary Media- Instructional	1	911	911
Intermediate Media- Overall	1	2,970	2,970
Intermediate Media- Computer Lab	1	938	938
		Media Center Total:	7,827
Athletics			
Maintenance Storage	1	264	264
gymnasium	1	7,631	7,631
ext/int P&R storage	1	714	714
PE storage	1	462	462
Chair storage	1	312	312
PE Office	1	278	278
PE Office-Toilet	1	49	49
		Athletics Total:	9,710

Department		Quantity	SqFt(avg)	Total SqFt
Daycare				
	Daycare-Open Area	1	2,598	2,598
	Daycare-Waiting	1	443	443
	Daycare-Office	1	120	120
	Daycare- Toilet w/ Shower	1	99	99
	Daycare- Toilet	1	63	63
	Daycare storage/Cust.	1	203	203
			Daycare Total:	3,526
Child Find / Specialty				
	Reading Room	1	674	674
	Reading Room Storage	1	202	202
	Enrichment	3	349	1,047
	Early Intervention	3	733	2,199
	Early Intervention Toilets	3	60	180
	Teacher Storage	2	256	512
	Psychology Office	1	252	252
	Physical Therapy	1	306	306
	Speech Therapy	4	244	976
	Speech therapy Waiting	1	213	213
	Resource	4	388	1,552
			Child Find/Specialty Total:	8,113
Art				
	Art Classroom	2	861	1,722
	Art Storage	2	130	260
	Art- Kiln	1	78	78
	Art Toilet Room	1	48	48
			Art Total:	2,108
Multipurpose				
	Stage	1	1,131	1,131
			Multipurpose Total:	1,131
Music				
	Vocal	2	823	1,646
	Vocal Storage	1	128	128
	Instrument	1	1,054	1,054
	Storage	1	237	237
			Music Total:	3,065

Department	Quantity	SqFt(avg)	Total SqFt
Food Services			
Kitchen	1	1,069	1,069
Dishwashing	1	259	259
Dry Storage	1	216	216
Kitchen Cleaning Storage	1	105	105
Cooler	1	80	80
Freezer	1	140	140
Office	1	97	97
Kitchen Staff Toilet Room	1	45	45
Receiving	1	166	166
Food Serving Area	1	513	513
Cafeteria	1	5,944	5,944
Cafeteria Toilet Room	2	45	90
		Food Service Total:	8,724
Building Services			
Student Gang Toilets- First Floor	4	298	1,192
Student Gang Toilets- Second Floor	2	271	542
Custodial	4	135	540
Elevator Machine Room	1	242	242
Network Server Room	1	27	27
MDF/IDF	2	139	278
Mechanical / Electrical Rooms	7	462	3,234
Storage	3	203	609
		Building Services Total:	6,664
General Classrooms			
Pre-K	2	846	1,692
Pre-K-toilets	2	63	126
Kindergarten	7	840	5,880
Kindergarten-toilets	7	64	448
1st Grade	7	884	6,188
1st Grade- Toilets	7	20	140
2nd Grade	7	861	6,027
2nd Grade- Toilets	4	20	80
3rd grade	7	828	5,796
4th Grade	7	842	5,894
5th Grade	7	913	6,391
Common Areas	4	715	2,860
		General Classroom Total:	41,522

Department		Quantity	SqFt(avg)	Total SqFt
Corridors				
	Vestibule	1	400	400
	Corridors- First Floor	1	19,000	19,000
	Corridors- Second Floor	1	9,760	9,760
			Circulation Space:	29,160

Total Program Space:	95,719
Gross Bldg SQFT:	138,940
Efficiency:	69%
State Rated Capacity	1,029
Total SqFt/Student:	135

Program Conclusion:

This scheme became the preferred scheme during the scope study analysis, due to the logic of using the slope of the site for parking, having an appealing massing model, and the spatial arrangements and adjacencies that were possible in the floor plan. It also leads itself to numerous sustainable design possibilities, and is in between the costs of Option 1 and Option 2.

The recent work that took place (HVAC, Lighting, and Exterior envelope upgrades) remains virtually untouched in this scheme, and was a contributing factor as to why Wakefield is being chosen to be renovated over Homestead. The efficiency ratio of 69% can very likely be improved upon during design development, as the goal would be to reach at least 75% for the final design.

With a cost estimate of $23,877,548, this scenario is between the cost of Options 1 and 2, and seeks a middle ground between footprint size, cost, and overall square footage. Option 3 is simply the most desirable design for the students of Homestead Wakefield, the educators and staff, and the community in and around Bel Air that it serves.

Code Analysis:

A code analysis was performed for the preferred Option 3 only. This project shall comply w/ the 2006 International Building Code (IBC), the 2006 NFPA, 2002 Maryland Accessibility Code/ADA and all other applicable codes.

Use group:	Educational Group "E"
Construction Type:	IIB Non combustible
Fire Resistive Rating Requirements for Building Elements:	Structural Frame = 0 hrs Bearing Walls = 0 hrs Non Bearing Walls Exterior = 0 hrs Non Bearing Walls Interiors = 0 hrs Floor Construction = 0 hrs Roof Construction = 0 hrs
Fire Resistive Rating Requirements for Exterior Walls:	Group "E" type IIB construction = No rating required where fire separation distance is ≥ 10'-0"
Automatic Sprinkler Systems:	__X__ Reqired; _X__ provided
Maximum Height & Area:	Allowable Height = 2 stories Allowable Area = 14,500 SF/ Area Actual Height = 2 stories Actual Area = 113,936 SF Lower Level + 25,004 SF Upper Level 138,940 SF Total
Area Modification:	Aa = {14,500 + (14,500 x 2)} = 43,500 + Frontage Increase
Minimum # of Exists:	3 Required @ Lower Level 3 Provided @ Lower Level 2 Required @ Upper Level 2 Provided @ Upper Level
Exist Access Travel Distance:	250'-0" Max w/ Sprinkler System
Common Path of Travel:	75'-0" Max

Cost Estimate:

POTENTIAL COST MODEL (In 2009 Dollars)

OPTION 3 - RENOVATION AND MODERNIZATION OF WAKEFIELD ELEMENTARY SCHOOL

Approximately 2 year construction duration

Existing Building	**Area (SF)**	**Cost (SF)**	**Subtotal**
Selective Demolition	2,100	$8.00	$16,800.00
Complete Demolition	12500	$5.00	$62,500.00
Renovation	5630	$60.00	$337,800.00
New Roof (Existing Building)	42,547	$15.00	$638,205.00
ALT: Sedum Mat on Existing Building Roof	42,547	$5.00	$212,735.00
Asbestos Abatement			$125,000.00
Additions (New Construction)			
First Floor	74352	$170.00	$12,639,840.00
Second Floor	25004	$170.00	$4,250,680.00
ALT: Vegetative Roof on New Addition	99356	$8.00	$794,848.00
Full Demolition			
Removal of Homestead School	48,043	$5.00	$240,215.00
Removal of Kindergarten Building	4,585	$5.00	$22,925.00
Site Work and Temporary Construction			
Geo-Thermal Wells			$500,000.00
Sitework (in acres)	12	$200,000.00	$2,426,000.00
Storm Water Management (in acres)	12	$30,000.00	$360,000.00
Relocatables (450 students, 1 per 30)	15	$50,000.00	$750,000.00
Phasing/Temporary Construction			$500,000.00
TOTAL BASE (For 1,029 Student Capacity)			**$22,869,965.00**
TOTAL ALT			**$1,007,583.00**
TOTAL			**$23,877,548.00**

7.0 Additional Points to Consider: LEED Rating system

The LEED for Schools Ratings system was utilized as a reference since it is a consideration of the Maryland Green Schools initiative. With the USGBC's recent roll out of the LEED V3 (LEED 2009) system, below is a breakout of the credit categories and some of the strategies that will be used to achieve a LEED SILVER rating for the new School building.

Sustainable Sites (11 Points of 24)

After meeting the prerequisites, a point could be achieved for the site selection itself (Previously developed site) and another for community connectivity. On the Preliminary project checklist, Alternative Transportation could be worth three points, as the school has access to public transportation, parking could be provided for alternative fuel (hybrid or flex fuel) vehicles, and bicycle storage and changing rooms (for faculty/staff) could be provided. With the forthcoming MDE Stormwater Management Regulations on the horizon, we would design with ESD (Environmental Site Design) strategies and meet two points for Stormwater Design-Quality and Quantity control. Other easily achievable points in this category that we would anticipate on achieving are: Light Pollution Reduction (with appropriate cut-off fixtures and pole lights), Site Master Plan, and Joint Use of Facilities (since the HWES School will be used by the community, Boy Scouts, Parks & Rec. etc.).

Lastly, to achieve the Heat Island Effect-Roof credit, and for other sustainability reasons, vegetative green roofs would also be utilized at some level. We have proposed vegetative roofs for all three Options, though only Options 1 and 3 show a green roof on the model. The new construction areas would have an "extensive" vegetative roof composed of a variety of sedum plants, and that roof system would weigh approximately 28 pounds per s.f. The existing roof areas would utilize a pre-grown sedum mat, which only 14 pounds per s.f. and would not require any changes to the existing roof structure. FWA broke out the cost for the Green roofs (AKA "Living Roof") as an alternate on the cost estimate to make it clear that there is an additional cost. However, at an additional $8.00/ s.f. for the vegetative roof and $5.00/s.f. for the sedum mat, the benefits are enormous: Lower HVAC system sizing and cost, higher thermal insulation value at roof, longer lifespan of the roof membrane, decreased heat island effect, provides habitat for various species, encourages community buy-in for sustainability, is aesthetically-pleasing, and is an excellent educational tool.

Water Efficiency (6 Points of 11)

By specifying native plants and by reducing water use for landscaping by 50% we can achieve two points. The other four points can be achieved by a 40% water use reduction due to specifying low flow and water-efficient plumbing fixtures.

Energy & Atmosphere (8 points of 33)

For this preliminary analysis, which is pre-energy modeling, we have assumed four points can be achieved for optimizing energy performance. If on-site renewable energy is desirable, two points (or more) could be achieved using Photovoltaic panels on the roof of the gym. We have also selected one point for enhanced refrigerant management and one point for Green Power (purchasing portion of energy from renewable sources).

Materials & Resources (9 points of 13)

Since a large portion of the existing Wakefield School is remaining, and because there may be materials from Homestead or Wakefield that can be reused, we can get three points and another point for construction waste management. During construction, all efforts will be made to sort construction materials for recycling and reuse, instead of sending those materials to a landfill. The design team will specify recycled content in the materials such as sheetrock, carpet, and acoustical ceilings, which will help us to achieve two more points. Cradle to Cradle products, those which meet criteria for their whole life cycle (manufacturing to recycling or re-purposing) would take precedence when feasible. With the single-stream recycling program that HCPS has initiated, having a new school that utilizes recycled content materials would be a positive tie-in to that accomplishment. Regional materials (extracted, harvested, and processed within 500 mile radius of the site) will comprise a large portion of the building, which adds on two more points. The intent of the credit is to lower the fuel usage to transport those materials and therefore the carbon footprint. Ultimately the goal would be to help reduce factors which affect climate change, but also to encourage use of local and regional products when possible. Lastly, we will specify FSC-certified wood products, which come from a Sustainably-managed forest (one point).

Indoor Environmental Quality (16 of 19 points)

Because people spend so much time indoors and because air quality, temperature, daylighting, and lighting are so important to mental and physical health, we will strive to achieve virtually all of the IEQ points for this project. A points is available for increased ventilation (having operable windows), and two points can be achieved with a thorough Construction Indoor Air Quality management plan (which helps to mitigate dust and dirt in ducts and in the building remaining from construction). We will specify low-emitting materials (with low VOC) for two additional points and get another point for controlling indoor chemical and pollutant sources. Controlling Thermal comfort and lighting will be important for well-being and also to coordinate with the white boards and other electronic media and computers in the new school (four points).

With numerous studies having been done showing improved test results for students educated in buildings with abundant natural lighting, all of the options studied would include daylight and views for 90% of occupied spaces. Daylight harvesting, a strategy where natural light is encouraged and actually determines the amount of artificial lights that are used, would be prevalent throughout the buildings. Dimmers, occupancy sensors, and photocells would be used in conjunction with shading devices, light shelves, and indirect lighting to maximize lighting while minimizing energy use. We plan to achieve all four points available for Daylight & views. Enhancing the acoustical performance of the classrooms and other spaces will achieve a point as it is extremely desirable to have quiet, acoustically-efficient spaces in a learning environment. Sound transmission through walls and from floor-to-floor will be given special care. Finally, mold prevention will be paramount by lessening the potential for condensation and by designing for mold prevention (one point).

Innovation and Design Process (3 of 6 points)

We will be able to achieve the LEED AP credit and intend to pursue the School as a Teaching Tool Credit, helping HCPS to write a curriculum for the students that uses the LEED School to teach sustainability in the classroom. With the environmental interpretative area we have designed, the vegetative Green Roof, or the light shelves that will be noticeable, sustainable features of the new Green School will abound for teaching opportunities. As the children move on from HWES, they can progress to middle school as “Sustainability Natives” and take that knowledge with them for the future.

8.0 Conclusions:

The charge of this scope study was to narrow the focus for the Harford County Public School system's goal to modernize the Homestead Wakefield elementary School (HWES). All three of the options discussed in the preceding study present viable alternatives for the modernization of HWES. Option One is a scheme that modernizes and enlarges the Wakefield Building using the sloped hillside as area to place a two-story portion of the School. Option Two has two parts, A, and B, which are both renovation-in-place schemes for the Wakefield (A) and Homestead (B) buildings. Option Three, the preferred option, is a modernization and renovation of the Wakefield building, with a new two-story classroom wing at the front of the building. The Wakefield school is preferred for renovation work, as it is in better shape than Homestead, and recently underwent $5 million worth of HVAC, Lighting, and Exterior envelope renovations.

The program concerns in Option One are addressed in a building footprint that was designed using the steep slope of the site as buildable area for a new two-story wing. It is the largest of the three options and also the most costly. The design for Option One allows a thorough modernization of the Wakefield School, use of various sustainable strategies, and easily provides all of the required program spaces. The compromises that were made on this option are the large footprint, difficulty in providing natural daylight to all of the spaces, and the location of the loading/service area.

Option Two is a two-part option that investigated the options of renovating both of the existing schools in place. Referring to the cost model provided, this scenario would be the least expensive, because it has the smallest area of new construction. However, it leaves both schools as separate buildings, with much of the same site scenarios that are problematic presently. It does update both school's gyms, music wings, administrative/ health suites and the overall exterior look of the buildings. Additionally, with these Options, Homestead gets a new day care addition.

With a different methodology used to deal with the sloping hillside of the upper part of the site, Option 3 has the main parking lot and service entrance located on the slope, instead of utilizing it for the building. This approach would minimize grading and fill, and disturbs less trees than Option One also. Basically, Wakefield is expanded on the upper plateau where it currently sits,

and the new Two-story classroom wing takes over the space where the kindergarten building was located. This is a very compact option considering the amount of square footage that is being added. It has numerous sustainable strategies incorporated, has abundant natural daylight, has an efficient building envelope (from a construction and energy use point of view), and is the clearly the best overall site scheme when circulation, orientation, and the relationship to the John Archer school and the entire Bel Air Campus design is considered.

Our project team, in agreement with the HWES Scope Study committee, recommend Option Three as the preferred scheme to modernize the Homestead Wakefield Elementary School. We believe that renovating and modernizing Wakefield as shown in Option Three is in the best interests of the students and staff, as well as parents and other members of the community. This option allows for more room for the John Archer School, an access road to John Archer, outdoor play areas and ball fields for both schools, and preserves the environment to the greatest extent. Additionally, it is less expensive than Option One, but more ambitious than Option Two, which does little to improve the two-building condition at HWES.

It is our suggestion that the next steps for this process be the adoption of this recommendation and the inclusion of the students, faculty, staff, and community in the development of the Educational Specification for the new Homestead Wakefield Elementary School. Concurrently, the need will exist for a detailed justification to the State IAC for replacement of this school. Following the acceptance of an approved Ed Spec. and the appropriation of planning and design funding, the schematic design of this new facility will usher in a new era at Homestead Wakefield Elementary School.