Introduced 1/2/18
Public Hearing 1/16/18
Council Action 2/5/18
Executive Action 2/8/18
Effective Date 2/8/18

County Council of Howard County, Maryland

2018 Legislative Session

Legislative Day No. 1

Transfer of Appropriation Ordinance No. 2 Fiscal Year 2018

Introduced by: The Chairperson at the request of the County Executive

AN ACT transferring $750,000 from Capital Project E1031, Wilde Lake Middle School Replacement, to Capital Project E1043, Talbott Springs Elementary School Renovation, in the Fiscal Year 2018 Capital Budget.

Introduced and read first time January 2, 2018. Ordered posted and hearing scheduled.

By order Jessica Feldmark
Jessica Feldmark, Administrator

Having been posted and notice of time & place of hearing & title of Bill having been published according to Charter, the Bill was read for a second time at a public hearing on January 16, 2018.

By order Jessica Feldmark
Jessica Feldmark, Administrator

This Bill was read the third time on February 5, 2018 and Passed ✓, Passed with amendments _____, Failed _____.

By order Jessica Feldmark
Jessica Feldmark, Administrator

Sealed with the County Seal and presented to the County Executive for approval this 7th day of February, 2018 at 4:30 a.m./p.m.

By order Jessica Feldmark
Jessica Feldmark, Administrator

Approved/Vetoed by the County Executive Feb 8, 2018

Allan H. Kittleman, County Executive

NOTE: [[text in brackets]] indicates deletions from existing law; TEXT IN SMALL CAPITALS indicates additions to existing law; ~~Strike-out~~ indicates material deleted by amendment; Underlining indicates material added by amendment.

WHEREAS, the Board of Education would like to transfer funds from E1031, Wilde Lake Middle School Replacement, a capital project that is in its final phase of completion to E1043, Talbott Springs Elementary School Renovation, a project that is in need of additional planning and design funds; and

WHEREAS, in order to meet the desired occupancy date of the new Talbott Springs Elementary School of August 2021, this transfer is needed earlier than Fiscal Year 2019 funds can be available; and

WHEREAS, Section 609(b) of the Howard County Charter authorizes and empowers the Howard County Council to make such transfers; and

WHEREAS, the Board of Education has indicated that the funds are available for transfer from the respective projects.

Section 1. Be It Enacted *by the County Council of Howard County, Maryland, that, subject to the provisions of Maryland law, the Howard County Charter, and the Howard County Code relating to the budgetary and fiscal procedures, the amount hereafter specified is hereby approved, appropriated, and authorized to be disbursed for the general County purposes specified and in sums itemized for the fiscal year beginning July 1, 2017 and ending June 30, 2018, as hereinafter indicated:*

Donor Project:

E1031	**Wilde Lake Middle School Replacement**		
	Appropriation Fiscal 2018 before transfer	$44,777,000	
	Less amount transferred to E1043	$750,000	(B)
	Appropriation Fiscal 2018 after transfer	$44,027,000	

Recipient Project:

E1043	**Talbott Springs Elem School Renovation**		
	Appropriation Fiscal 2018 before transfer	$1,000,000	
	Plus amount transferred from E1031	$750,000	(B)

Appropriation Fiscal 2018 after transfer $1,750,000

Section 2. And Be It Further Enacted *by the County Council of Howard County, Maryland that this Transfer of Appropriation Ordinance shall be effective upon its enactment.*

BY THE COUNCIL

This Bill, having been approved by the Executive and returned to the Council, stands enacted on February 8, 2018.

Jessica Feldmark

Jessica Feldmark, Administrator to the County Council

BY THE COUNCIL

This Bill, having been passed by the yeas and nays of two-thirds of the members of the Council notwithstanding the objections of the Executive, stands enacted on _____, 2018.

_____

Jessica Feldmark, Administrator to the County Council

BY THE COUNCIL

This Bill, having received neither the approval nor the disapproval of the Executive within ten days of its presentation, stands enacted on _____, 2018.

_____

Jessica Feldmark, Administrator to the County Council

BY THE COUNCIL

This Bill, not having been considered on final reading within the time required by Charter, stands failed for want of consideration on _____, 2018.

_____

Jessica Feldmark, Administrator to the County Council

BY THE COUNCIL

This Bill, having been disapproved by the Executive and having failed on passage upon consideration by the Council stands failed on _____, 2018.

_____

Jessica Feldmark, Administrator to the County Council

BY THE COUNCIL

This Bill, the withdrawal of which received a vote of two-thirds (2/3) of the members of the Council, is withdrawn from further consideration on _____, 2018.

_____

Jessica Feldmark, Administrator to the County Council

CM DRS TA02-FY18
JF
PS

Howard County Public School System

HOWARD COUNTY COUNCIL
RECEIVED
2018 JAN 12 PM 1:40

Mary Kay Sigaty
Chairperson
Howard County Council
George Howard Building
3430 Court House Drive
Ellicott City, Maryland 21043

January 8, 2018

Dear Chairperson Sigaty:

The Board of Education requests that the County Council authorize a capital budget transfer. This transfer moves a total of $750,000 between two projects. The transfer is summarized below:

Donor Projects		
E-1031 – Wilde Lake MS	($750,000)	County Bond Funding
Recipient Projects		
E-1043 – Talbott Springs ES	$750,000	Planning & Design

Thank you for your attention to this matter.

Sincerely,

Michael J. Martirano, Ed.D.
Interim Superintendent

Copies: Allan H. Kittleman, County Executive
County Council Members
County Council Administrator
Board of Education Members

J. Sager
J. Feldmark
B. Kidwell

K. Turner-Little
A. Brown Dennis
B. Gist

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Childs, JF, file

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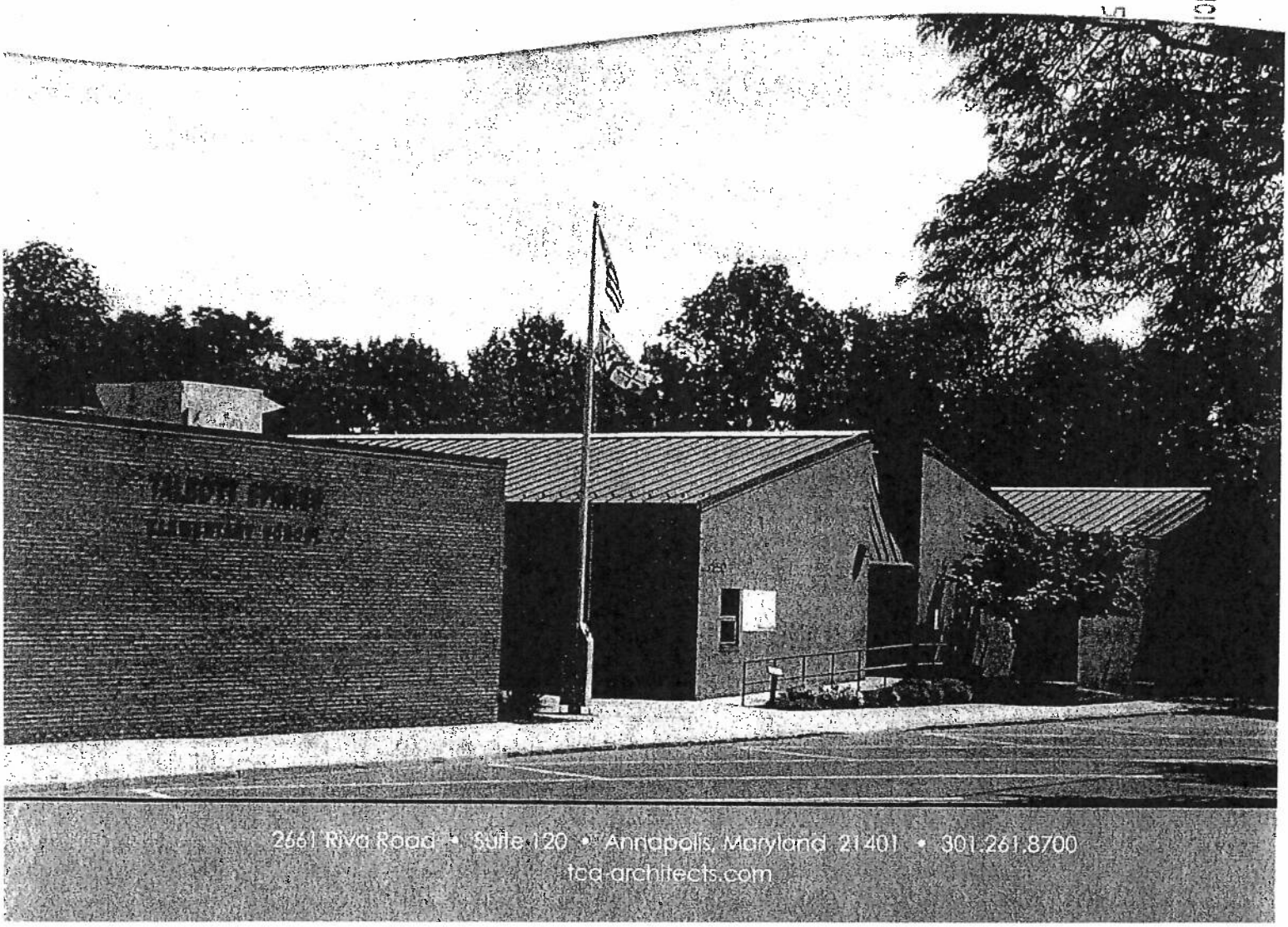
Specializing in the design of educational facilities

Feasibility Study

Talbott Springs Elementary School

Howard County Public School System
Board of Education

17 August 2017



2661 Riva Road • Suite 120 • Annapolis, Maryland 21401 • 301.261.8700
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Feasibility Study

for

Talbott Springs Elementary School

FOR THE BOARD OF EDUCATION OF HOWARD COUNTY:

Chairman	Cynthia L. Vaillancourt
Vice Chairman	Bess Altwerger, Ed. D.
Members	Kirsten Coombs Christina Delmont-Small Mavis Ellis Sandra H. French Ananta Hejeebu Anna Selbrede (Student)
Interim Superintendent of Schools	Dr. Michael J. Martirano.
Executive Director Capital Planning and Operations	Bruce Gist
Director School Construction	Scott W. Washington

tca|architects

17 August 2017

Table of Contents

Design Team

ARCHITECT	TCA Architects, LLC	Annapolis, MD
CIVIL ENGINEER	Fisher, Collins & Carter, Inc.	Ellicott City, MD
STRUCTURAL ENGINEER	Morabito Consultants	Glencoe, MD
MECHANICAL / ELECTRICAL / PLUMBING ENGINEERS	James Posey and Associates	Baltimore, MD
TELECOMMUNICATIONS CONSULTANT	Educational Systems Planning	Annapolis, MD
FOOD SERVICE CONSULTANT	Nyikos Associates, Inc.	Gaithersburg, MD
CONSTRUCTION MANAGER	MBP	Columbia, MD

Project Introduction

PROJECT SUMMARY

Current Student Population:	478 Students
Existing Building Square Footage:	54,089 GSF *
* does not include the ten existing portable classrooms	
Existing Building Height:	One Story
Construction Classification:	Type 2B
Use Group:	Educational

CONSTRUCTION BUDGET

Current Construction Budget:	$ 21,350,000
** excludes A/E design fees, CM fees, related costs, FF&E and project contingency	

PROJECT SCHEDULE

Selection of Feasibility Study Scheme:		August	2017
Design Notice-to-Proceed:		September	2017
Completed Schematic Design Phase:		December	2017
Completed Design Development Phase:		April	2018
Completed Construction Documents:		September	2018
Permits Received:		November	2018
Out for Bids:		November	2018
Bid Opening:		December	2018
Start Construction:		November	2018
Substantial Completion:	Scheme 1	August	2020
(for site and building)	Scheme 2	June	2021
	Scheme 3 *	June	2021
* New School will be Occupied for Scheme 3:		December	2020

Project Background

The existing Talbott Springs Elementary School is a one-story building that opened in 1973 and was 46,186 sf. In 2000, a 6,374 sf addition was constructed to provide a separate gymnasium and an art room. In 2008 a 1,529 sf kindergarten addition was constructed which increased the school to its current size of 54,089 sf (not including the ten portable classrooms currently on site). In 2013, the open space plan was renovated to partition off teaching spaces with low partition walls, but no doors. Additional construction has been done over the years to further partition the existing building.

The school currently has 478 students.

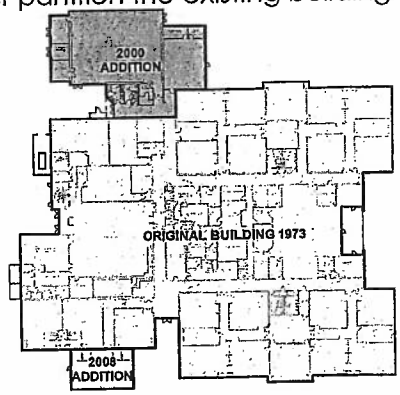
This feasibility study illustrates three schemes:

Scheme 1 - Light Renovations to Existing School

Scheme 2 - Major Renovations and Additions to Existing School

Scheme 3 - New Replacement School

Note: Scheme 2 and Scheme 3 will accommodate an increased student capacity for Talbott Springs Elementary School.



Methodology

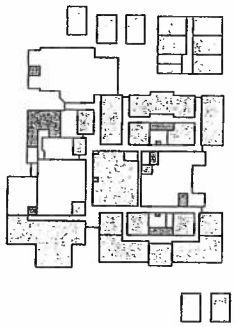
The existing school has been evaluated by the design team to determine the existing condition of the facility and to understand operational concerns of the school staff. The goal of Scheme 1 is to improve the existing facility using the HCPSS "Guidelines Manual for Renovations and Modernizations of Existing Schools". The goal of Scheme 2 is to improve the existing facility as shown in Scheme 1 as well as providing a new addition which will provide the existing school with all the educational spaces listed in the 2010 educational specifications for elementary schools, though modified for the smaller 500 student capacity of Talbott Springs Elementary School. Scheme 3 illustrates a new replacement school, which is a modified version of Elementary School No.42 to respond to the smaller 500 student capacity of Talbott Springs Elementary School. Under this direction, all existing teaching stations remain in the renovated areas for Scheme 1 and Scheme 2 will meet the minimum size of 660 square feet with a goal of providing 750 square feet at each teaching station for Grades 1-5 and minimum size of 750 square feet for Kindergarten classrooms. All new construction shown in Scheme 2 will provide teaching stations which will comply with the current elementary school educational specifications. All spaces in the replacement school will meet the current elementary school educational specifications. The information presented in this report is based on the following:

- Analysis of the existing Talbott Springs Elementary School. The design team conducted a thorough visual evaluation of the existing building.
- Review of existing construction documents for the original building and the 2000 and 2008 additions as provided by the HCPSS.
- Analysis of existing site features including, but not limited to, the utilities, site access, playfields and the Columbia Association's non-credited open space requirements.
- Development of one renovation scheme which requires the existing portable classrooms to remain on site, one renovation and addition scheme that meets the current elementary school program, and one scheme showing the feasibility of a constructing a new building which would be a modified version of the two-story prototype elementary school.

Overview of Schemes

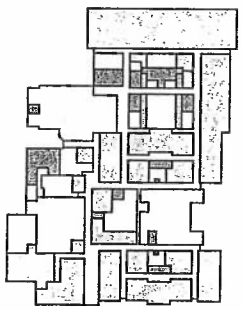
Scheme 1 - Light Renovations to Existing School

Area of Existing Building	**54,089 gsf**
Construction Duration (occupied)	**± 18 months**
LEED certification level	**'Certified'**
Building Cost	**$ 8,338,957**
Site Cost	$ 51,985
Demolition Cost	$ 112,862
Phased Construction Cost	$ 275,479
Total Construction Cost	**$ 8,779,283**



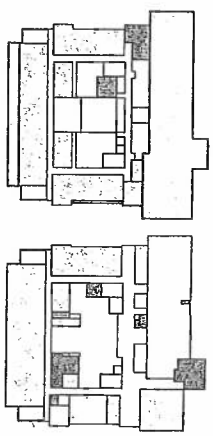
Scheme 2 - Major Renovations and Additions to Existing School

Area of Existing Building	54,089 gsf
Area of New Addition	± 33,581 gsf
Total Area	**± 87,670,gsf**
Construction Duration (occupied)	**± 27 months**
LEED certification level	**'Certified'**
Building Cost	**$22,253,869**
Site Cost	$ 606,675
Demolition Cost	$ 331,969
Phased Construction Cost	$ 459,131
Total Construction Cost	**$23,651,644**



Scheme 3 - New Replacement School

Area of First Floor	57,425 gsf
Area of Second Floor	33,786 gsf
Total Area	**91,211 gsf**
Construction Duration	**± 27 months**
LEED certification level	**'Silver'**
Building Cost	**$23,820,203**
Site Cost	$ 2,497,177
Demolition Cost	$ 607,864
Phased Construction Cost	$ 202,621
Total Construction Cost	**$27,127,865**



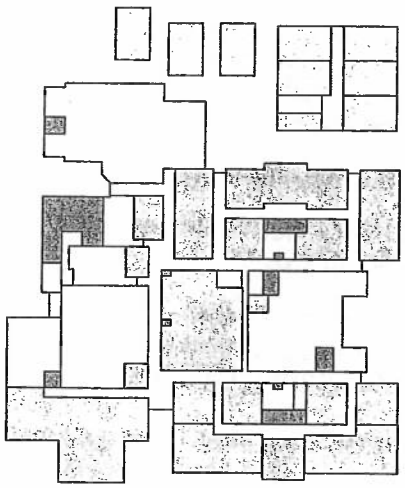
Design Goals

- Ensure that the building is fully accessible and meets the 2010 Americans with Disabilities Act (ADA) guidelines.
- Provide new looped corridors for better accessibility.
- Increase the amount of natural daylighting and exterior views in occupied spaces.
- Investigate the feasibility of renovating the existing building to meet the needs of the latest HCPSS elementary school educational program, life safety code and building codes in comparison to constructing the HCPSS elementary school prototype design as a new replacement school.
- Improve security of the school by providing a controlled main entrance with a new vestibule that provides direct access to the main office.
- Provide stormwater management facilities for all new construction on site.
- Minimize impact to school operations during construction by maintaining existing building infrastructure, thereby minimizing costs.
- Improve vehicular circulation on-site by separating the bus drop-off/pick-up area from the car drop-off/pick - up area.
- Ensure the safety and comfort of all students, faculty, school staff and visitors.
- 'Green School' construction improvements will be designed to conserve energy, water and materials, thus reducing negative impacts on human health and the environment. It is a goal for this project to achieve a Leadership in Energy and Environmental Design (LEED) certification by the United States Green Building Council.

Scheme 1
Light Renovations to Existing School

Total Area of Renovation	**54,089 gsf**
Construction Duration (occupied)	**± 18 months**
LEED certification level	**'Certified'**
Building Cost	**$ 8,338,957**
Site Cost	$ 51,985
Demolition Cost	$ 112,862
Phased Construction Cost	$ 275,479
Total Construction Cost	**$ 8,779,283**

Note: Phased Construction Costs include both the cost of providing additional portable classrooms and the cost of temporary construction.



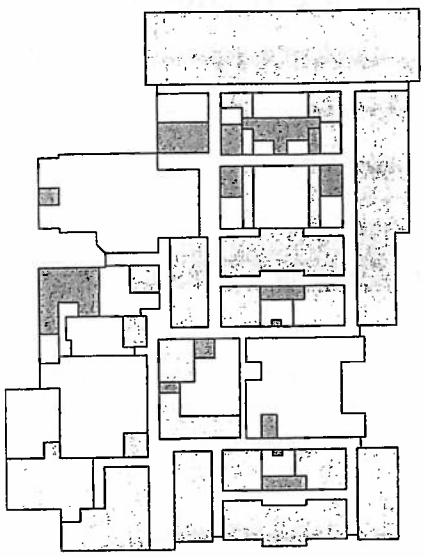
Scheme 1 Design Attributes:

- Majority of full height walls will remain.
- Minimal amount of existing partial height drywall partitions will be extended to become full height walls. Classrooms will become fully enclosed and will receive new finishes, cabinetry, doors, data, electrical and mechanical systems to meet current HCPSS design standards.
- Many of the existing classroom locations will not allow for windows and views to the outside. Solartubes will provide natural daylight where feasible with the existing roof structure. This scheme will not be able to meet the requirements of the LEED credit for views.
- Existing building circulation will be improved by creating looped circulation in each of the instructional wings.
- Existing kitchen will be renovated to meet current HCPSS standards for food service.
- Mechanical, electrical and data systems will be upgraded.
- Ten existing portable classrooms will remain at the end of this project to accommodate the current student capacity.
- An estimated five additional portable classrooms will need to be moved onto this site temporarily to accommodate the students during the phased occupied construction of the existing school.
- School will not have access to the paved play area for duration of construction (±18 months) due to the additional portable classrooms.
- The following spaces from the current HCPSS elementary school program do not exist in the existing building and will not be provided at the end of this project: testing area, restrooms within the kindergarten classrooms, gifted and talented classrooms, technology resource room, media production room, mini-auditorium, ensemble room, special education classroom and resource rooms, second teaching station for physical education.
- Site amenities will remain the same as the existing conditions after construction.
- Construction project will be designed to receive USGBC certification at LEED 'Certified' level.

Scheme 2
Major Renovations and Additions to Existing School

Area of Light Renovation	10,000 gsf
Area of Light Renovation	44,089 gsf
Area of New Addition	± 33,581 gsf
Total Area	**± 87,670,gsf**
Construction Duration (occupied)	**± 27 months**
LEED certification level	**'Certified'**
Building Cost	**$22,253,869**
Site Cost	$ 606,675
Demolition Cost	$ 331,969
Phased Construction Cost	$ 459,131
Total Construction Cost	**$23,651,644**

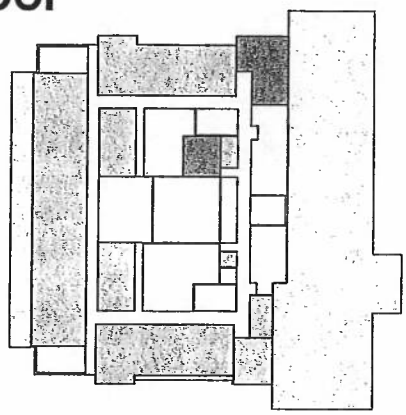
Note: Phased Construction Costs include both the cost of relocating the existing portable classrooms and the cost of temporary construction.

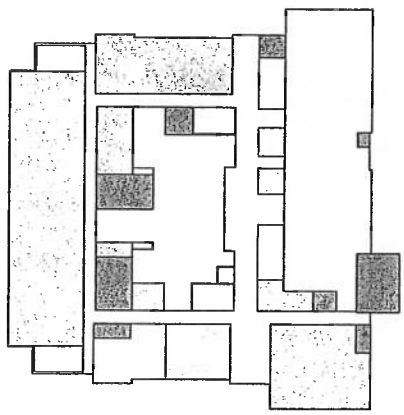


Scheme 2 Design Attributes:

- Existing partial height drywall partitions will be removed along with many of the existing masonry construction. Classrooms will become fully enclosed and will receive new finishes, cabinetry, doors, data, electrical and mechanical systems to meet current HCPSS design standards.
- Many of the classrooms will have windows or views to the outside. Solatubes will be provided for natural daylight where feasible with the roof structure. This scheme will not be able to meet the requirements of the LEED credit for views.
- Existing building circulation will be improved by creating looped circulation in each of the instructional wings.
- A new administrative suite will be located in a small addition in front of the school to provide a new security vestibule and better supervision of the main entrance.
- Early Childhood classrooms, mini-auditorium, auxiliary gym, special education room and additional classrooms will be located in the newly constructed addition.
- 40% of the classrooms will be located within the existing building, therefore these classrooms will meet the HCPSS "Guidelines Manual for Renovations and Modernizations of Existing Schools" but will be undersized in comparison to the classrooms in Scheme 3 which will be designed to meet the current HCPSS elementary school program for square footage.
- A new addition will be constructed to accommodate the new kitchen which will meet current HCPSS standards for food service.
- Mechanical, electrical and data systems will be upgraded for the entire building.
- Eight of the existing portable classrooms will be required to be relocated on site to make room for the construction of the new addition. These portable classrooms will be removed from the site at the completion of the project.
- School will not have access to most of the play fields for duration of construction (±27 months) due to the relocated portables and the contractor's staging area.
- Site amenities will remain the same as the existing conditions after construction.
- Construction project will be designed to receive USGBC certification at LEED 'Certified' level.

Scheme 3
New Replacement School





Area of First Floor	57,425 gsf
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Total Area	**91,211 gsf**
Construction Duration	**± 27 months**
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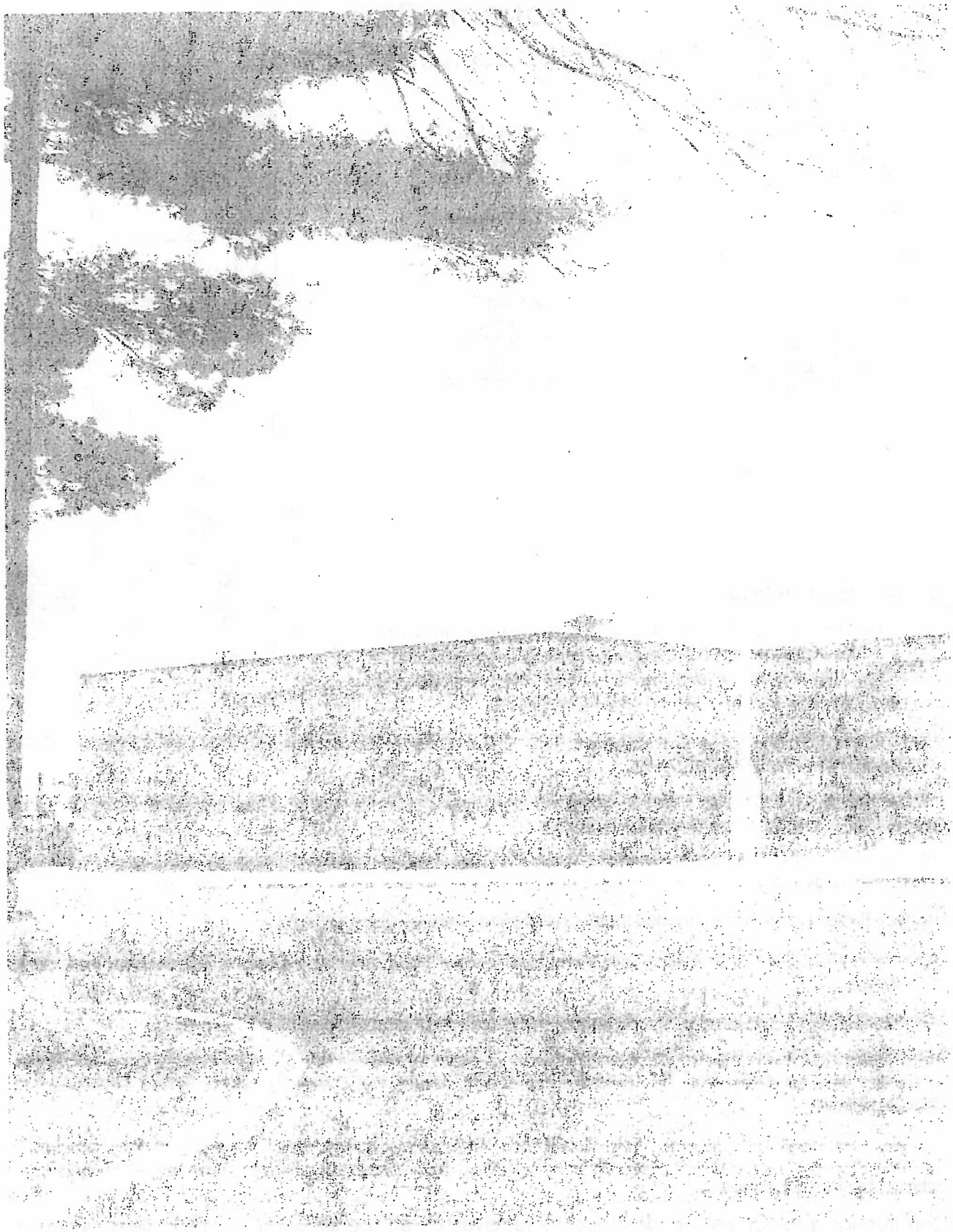
Building Cost	**$23,820,203**
Site Cost	$ 2,497,177
Demolition Cost	$ 607,864
Phased Construction Cost	$ 202,621
Total Construction Cost	**$27,127,865**

Note:
* Based on Bid-Day Construction Cost from Elementary School No.42.

Scheme 3 Design Attributes:

- This scheme allows the existing school to run as it does today while construction of the new school is underway. In addition, all of the students and staff will be able to occupy the new school earlier than Scheme 2.
- New school illustrated is a smaller version of the current Elementary School No. 42 design, which will accommodate 500 students.
- This scheme will provide natural daylight and views to more of the occupied spaces and earn more LEED credits than the other schemes.
- New construction will allow for the school to have highly efficient building envelope which will reduce energy costs.
- Highly efficient mechanical, electrical and data systems will be utilized.
- Floor plan includes Recreation and Parks spaces per the prototype design, which is not included in Scheme 1.
- School will not have access to playfields for duration of construction (± 27 months).
- Site design for this scheme will allow students to enter building directly from parent drop-off without crossing the bus-loop and to access playfields directly from gymnasium without crossing the service drive.
- Project will need a variance from Columbia Association to provide the appropriate amount of paving for all the vehicular circulation on site. The process of obtaining such a variance is estimated to take a year.
- Construction project will be designed to receive USGBC certification at LEED 'Silver' level as required by the State of Maryland for new construction projects.



Feasibility Study Recommendation

After a review of all schemes, the staff recommends **Scheme 3**, thus constructing a new high performance, elementary school building alongside the existing Talbott Springs Elementary School which will be demolished upon completion of the new school.

Benefits of Scheme 3 Include the following:

- Scheme 3 allows the occupants of Talbott Springs ES to work, teach and learn, in a newly constructed building where all spaces will be constructed for their intended use. No spaces will be repurposed as in the renovation schemes.
- There will be virtually no disruption to the students educational spaces of Talbott Springs Elementary School during construction of Scheme 3. Renovation schemes require teaching and learning to be located within the same building as construction for anywhere between 18-27 months. New construction for Scheme 3 building will be on the other side of the school site.
- Scheme 3 provides more natural daylighting and exterior views in occupied spaces than either of the renovation schemes.
- Scheme 3 provides the most efficient corridor circulation pattern throughout the building, compared to the renovation schemes.
- Scheme 3 completely separates the bus drop-off/pick-up area from the car drop-off/pick - up area. Students will not cross a vehicular driveway as they enter/exit the school from the car drop-off/pick-up area as they would in the other schemes.
- Scheme 3 provides an energy efficient building envelope built in the most cost effective manner. Insulation for Scheme 3 will be integral to the new building envelope design in comparison to adding a new layer of insulation to the 44 year old building envelope for the areas of renovation.
- The state of the art, highly energy efficient building provided by Scheme 3 will provide both a superior building envelope (walls, doors, windows and roof) with a higher thermal resistance and an enhanced lighting design which minimizes energy consumption by careful light fixture selection and automated controls with dimming capabilities and occupancy sensors
- Scheme 3 results in lower operating costs over the life of the school compared to the renovation schemes.
- Scheme 3 allows the high performance school building to be used as a teaching tool to educate students, educators and community members about the benefits of energy efficiencies.
- Scheme 3 will achieve a 'Silver' level of LEED certification compared to the renovation/ addition schemes which would likely achieve a 'Certified' level.

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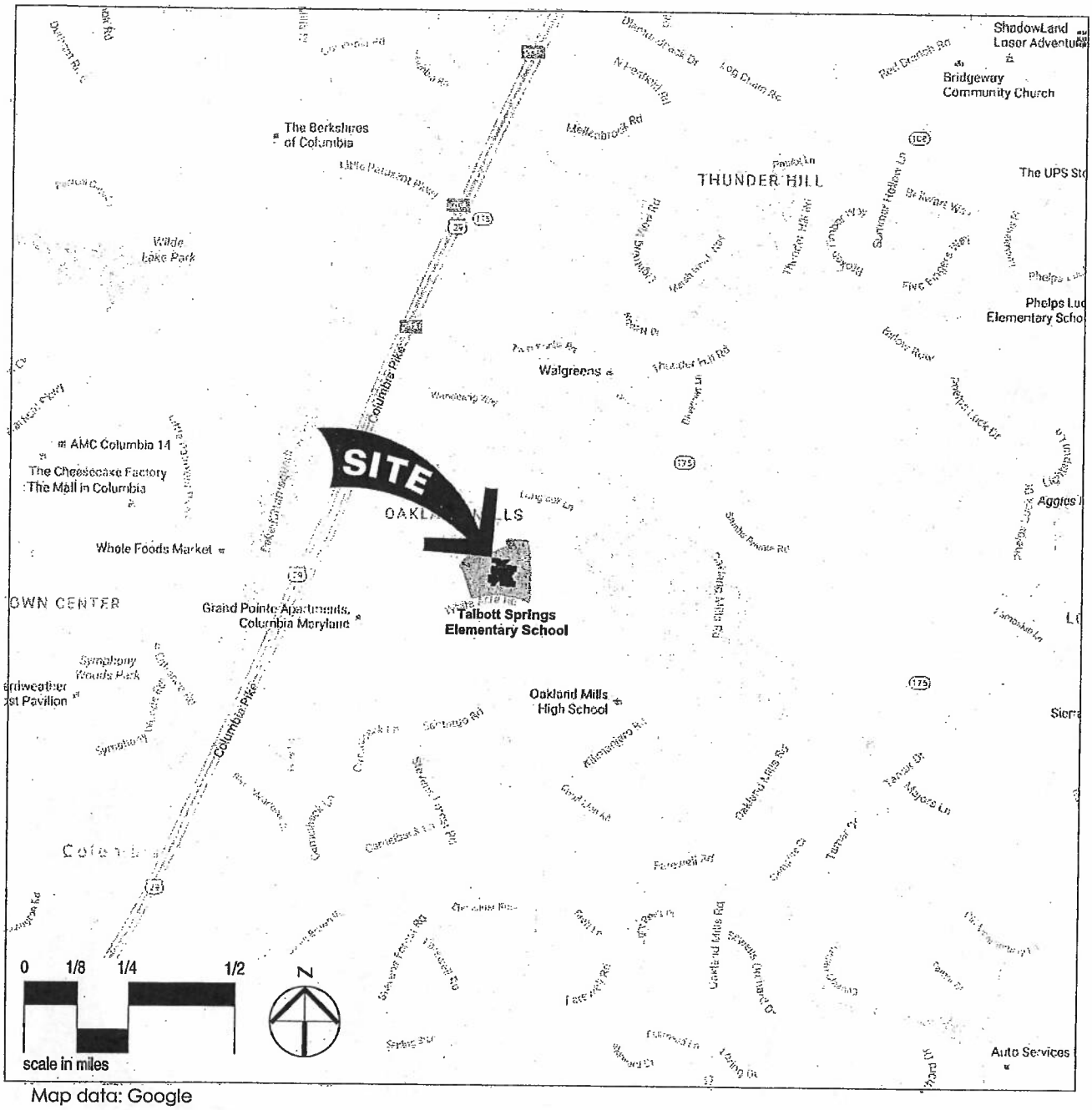
Existing Conditions

Talbott Springs Elementary School

Vicinity Map



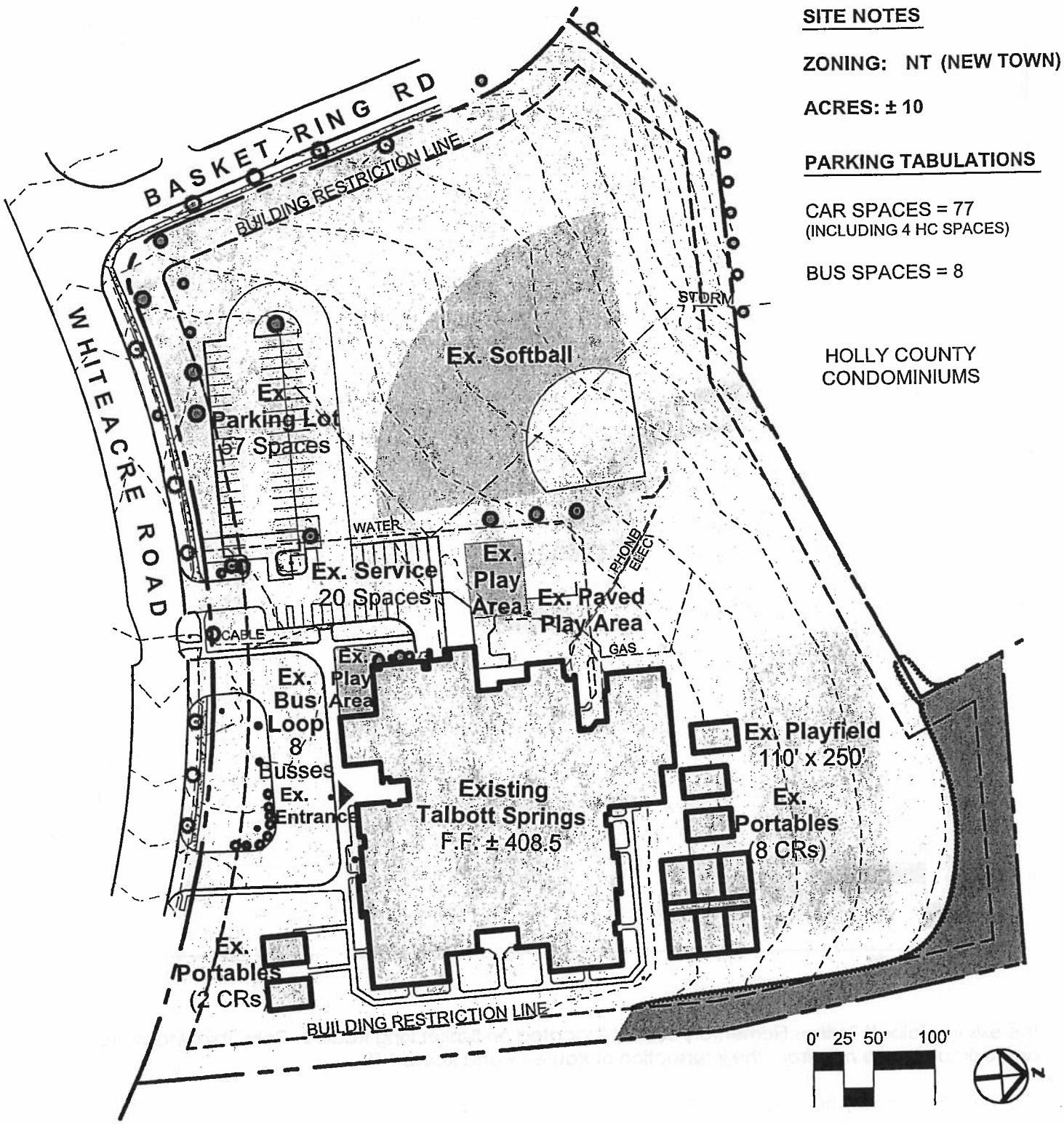
Map data: Google

The existing Talbott Springs Elementary School is located on Basket Ring Road in Columbia, Maryland approximately one mile from the intersection of Route 29 and Route 175.

This site was originally developed for the school in 1973 on a ten acre site.

Public water, sewer and natural gas serve the site.

Existing Site Plan



SITE NOTES

ZONING: NT (NEW TOWN)

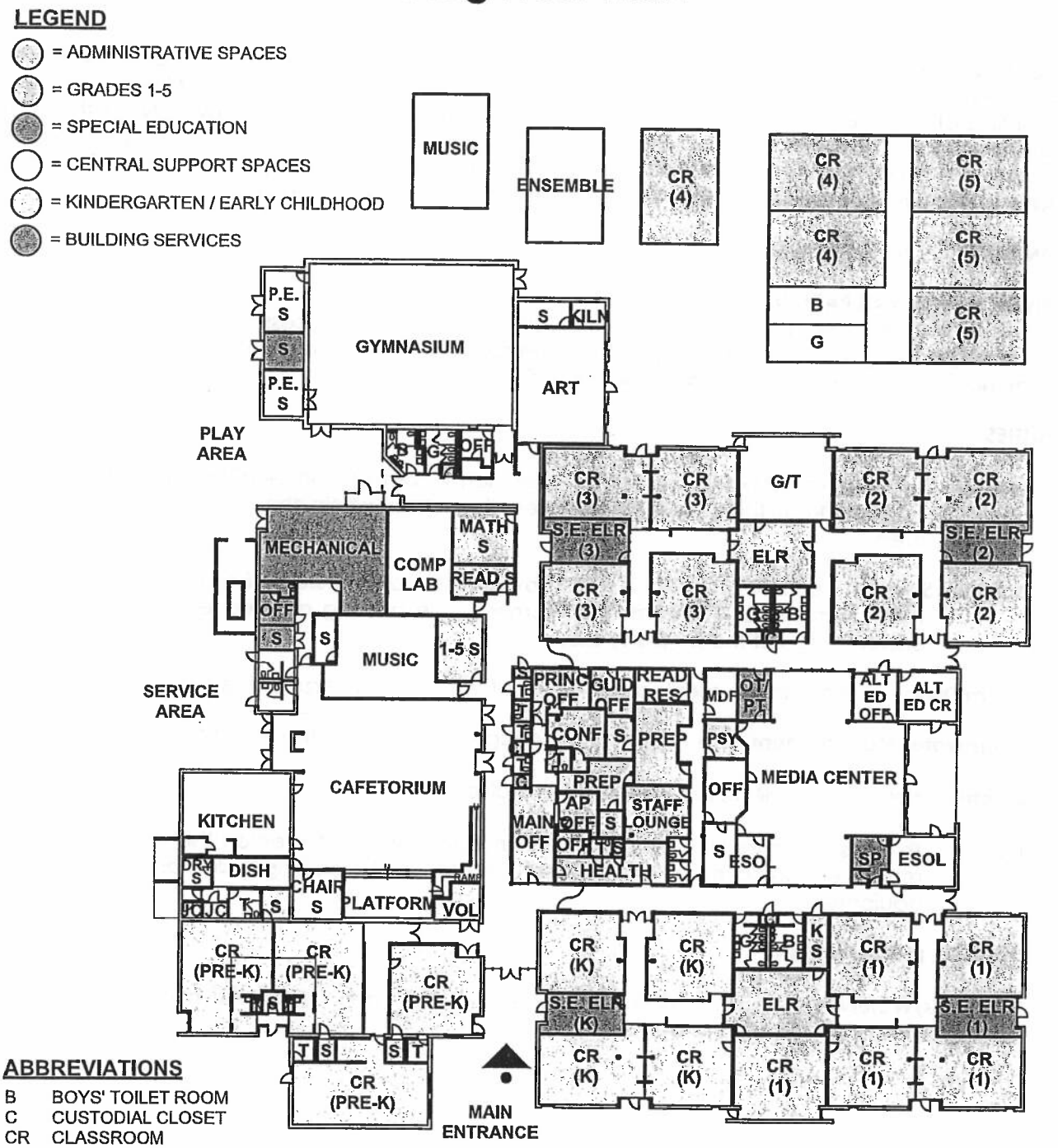
ACRES: ± 10

PARKING TABULATIONS

CAR SPACES = 77
(INCLUDING 4 HC SPACES)

BUS SPACES = 8

Existing Floor Plan



Existing Site Assessment

Talbott Springs Elementary School is located at the northeast corner of Whiteacre Road and Basket Ring Road. The school site is recorded as Lot 216 in the Village of Oakland Mills in Columbia consisting of 10 acres of land. The existing zoning for the school site is New Town (NT) with public water and public sewer service. The existing bus loop accommodates eight school buses with its access at Whiteacre Road. The existing parking lot accommodates 77 parking spaces including four handicap parking spaces along with its access being at Whiteacre Road.

ZONING NT (New Town)

DRIVES, WALKS AND PARKING

The existing bus loop accommodates eight school buses with its access at Whiteacre Road. The existing parking lot accommodates 77 parking spaces including four handicap parking spaces along with its access being at Whiteacre Road.

UTILITIES

Water - The existing school is served by a six-inch incoming combination fire/water service, supplied from the County and enters the school within the main mechanical room area.

Sanitary Sewer - The existing school is served by a public sewer system. Existing sanitary lines exit the building near the north east corner of the building and leave the site along the eastern edge of the property line.

Storm Drain - Existing stormwater leaves the site at the northern edge of the property line.

Stormwater Management - No stormwater management exists on the site at this time.

Electric - New service will be required for the addition.

Gas - The existing school is served by a BGE natural gas line that enters the school within the main mechanical room. This gas service supplies the existing boilers and water heater equipment.

ADDITIONAL INFORMATION

Wetlands/Waterways - An environmental survey has not been performed at this time, but no existing wetlands are known to be on the site.

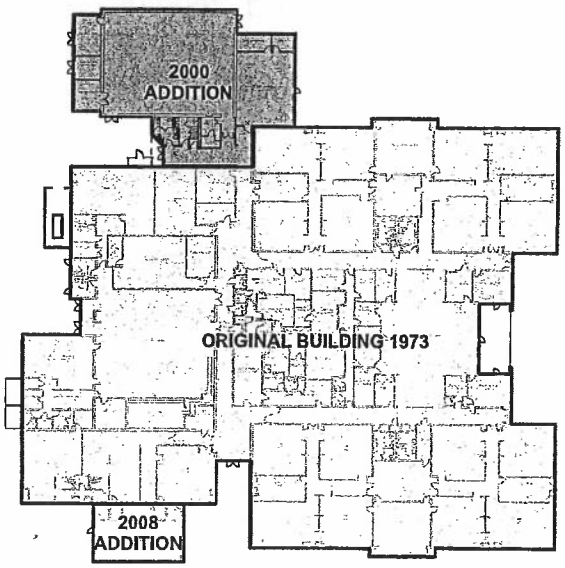
Existing Building Assessment

Talbott Springs Elementary School opened in 1973. An addition consisting of a gymnasium and art classroom was constructed in 2000, and a Kindergarten Classroom was added in 2008. The roof was replaced in 2006. The open classroom pods and the central core of the building received limited renovations in 2013 that included replacing the existing light fixtures, renovating the four toilet rooms to be ADA compliant, and constructing a limited amount of low partition walls. See diagram below for locations of past additions. The current total gross square footage of the school is 54,089 square feet.

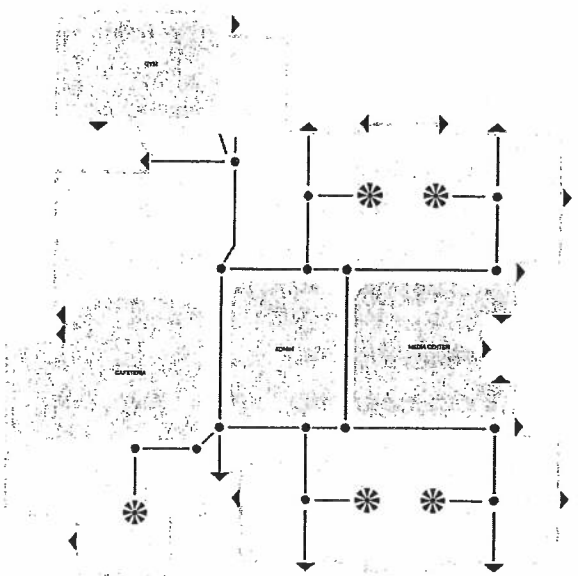
The original design was an open classroom concept, consisting of four pods with four classrooms in each pod. The existing building has all rooms on the ground level. There are two pods on the south end of the building and two pods on the north end of the school. Both pairs of pods are divided by a shared classroom space and a resource room. The media center is located in the core of the building between the north and south pods. Due to the open classroom concept, the only thing that separates the corridors from the classrooms in each pod are low partition walls. Sound travels from the corridor to the classrooms and from classroom to classroom, which is not ideal during instruction. Each pod has at least one classroom that is not located on an exterior wall, and therefore, lacks natural daylight and views to the outside.

The student population has increased over time and currently there are ten portable classrooms on site that house eight classrooms, a music classroom and an ensemble room.

BUILDING HISTORY DIAGRAM



CIRCULATION DIAGRAM



LEGEND

- LEVEL CIRCULATION PATH
- CORRIDOR INTERSECTION
- EXIT FROM BUILDING
- DEAD END

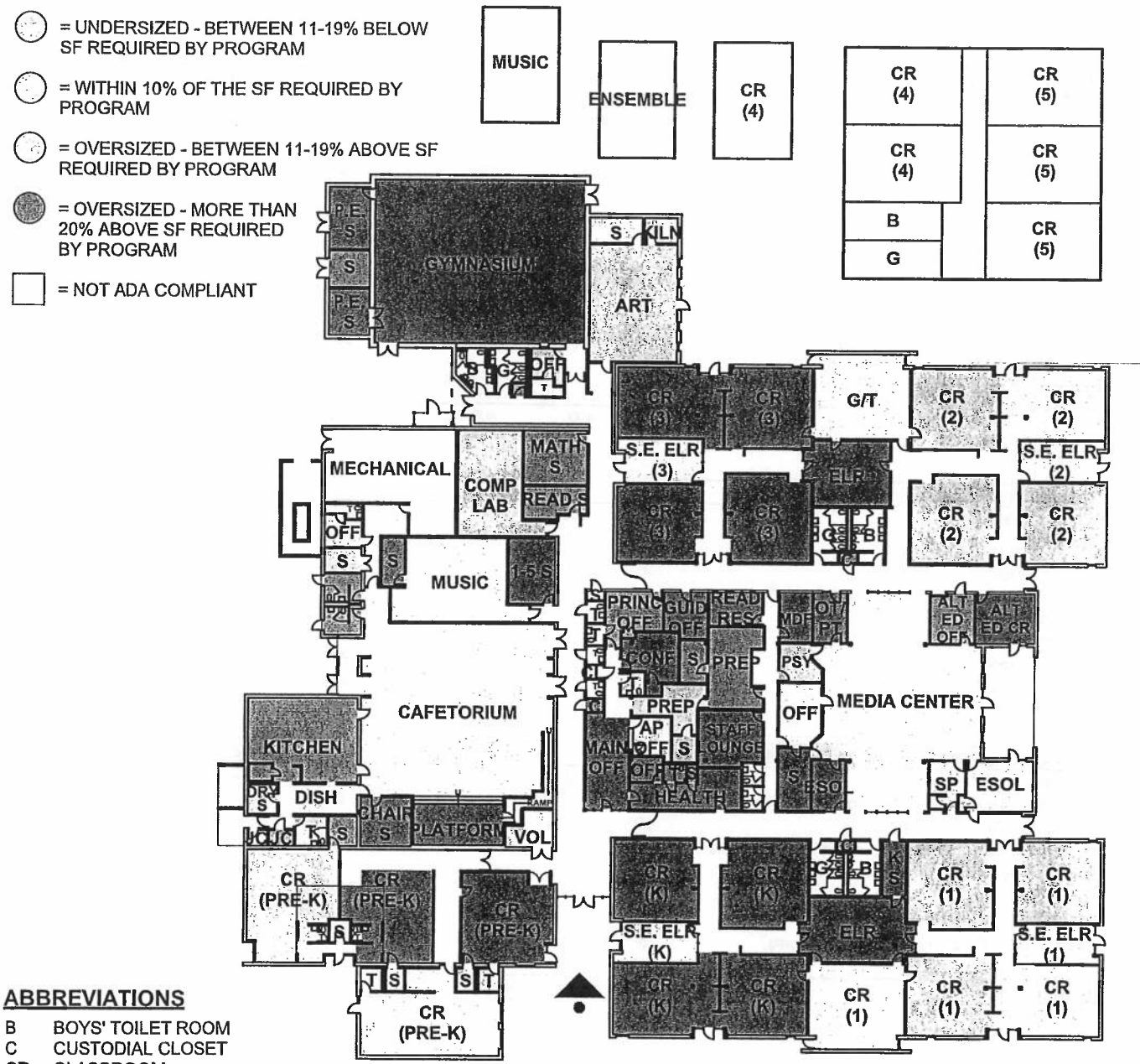
The analysis of existing room size diagram on the following page indicates spaces which are oversized or undersized in comparison to the 2010 HCPSS elementary school educational program which has been modified for a 500 student capacity school, in addition to spaces which are not ADA compliant. The following observations are based on this diagram:

- 88% of the Classrooms for grades 1-5 in the building are undersized in comparison to the current HCPSS Elementary School Educational Specifications.
- 50% of the classrooms are less than 680 square feet n comparison to the renovation goal of 750 sf.
- All of the fourth and fifth grade students are currently housed in portable classrooms.
- 3 out of the 4 Pre-K classrooms are undersized. One of the classrooms is not used as teaching space, since it is in an open area where students must walk through to access another classroom.
- The health suite does not meet Maryland's current COMAR regulations and is undersized.
- The existing school is not fully handicap accessible. Many of the single-use restrooms do not comply with the 2010 ADA guidelines.
- The existing general music room is appropriately sized; however, there is no ensemble room and the music storage is greatly undersized.
- The art classroom is undersized.
- Many of the administrative spaces are greatly undersized, including: the main office, staff lounge, and conference room. Also, there is currently no secure testing preparation office and Storage room in the current school.
- The existing school does not have all of the special education spaces listed in the current HCPSS Elementary School Educational Specifications.
- The gymnasium is greatly undersized and there is currently not enough storage space for physical education.
- The media center is located at the central core of the building and is appropriately sized; however, the school is lacking the technology resource room and media production/ video area, which are required by the current HCPSS Elementary School Educational Specifications.
- The telecommunication room (a.k.a. MDF room) is greatly undersized.
- The computer lab is also undersized and is not adjacent to the media center.
- The kitchen does not have an enclosed kitchen office.

Analysis of Existing Room Sizes

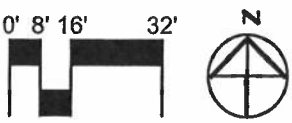
LEGEND

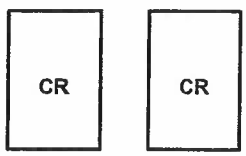
- = UNDERSIZED - MORE THAN 20% BELOW SF REQUIRED BY PROGRAM
- = UNDERSIZED - BETWEEN 11-19% BELOW SF REQUIRED BY PROGRAM
- = WITHIN 10% OF THE SF REQUIRED BY PROGRAM
- = OVERSIZED - BETWEEN 11-19% ABOVE SF REQUIRED BY PROGRAM
- = OVERSIZED - MORE THAN 20% ABOVE SF REQUIRED BY PROGRAM
- = NOT ADA COMPLIANT



ABBREVIATIONS

B	BOYS' TOILET ROOM
C	CUSTODIAL CLOSET
CR	CLASSROOM
E	ELECTRICAL CLOSET
G	GIRLS' TOILET ROOM
SP	SPEECH
S	STORAGE ROOM
T	TOILET ROOM
MDF	MAIN DISTRIBUTION FRAME ROOM





Existing Building Space Analysis

	2010 Ed. Spec. Modified for 500 Student Capacity			Existing Talbott Springs Elementary School			Program / existing differential	
	Area(s)	SF	Total Net	Area(s)	SF	Total Net	Area	%
Administration			**2,900**			**2,384**	**-516**	**-18%**
Secretarial/Reception (incl. closet)	1	500	500	1	387	387	-113	-23%
Principal's Office (incl. closet)	1	200	200	1	253	253	53	27%
Principal's Lavatory	1	50	50	1	35	35	-15	-30%
Asst. Principal's Office (incl. closet)	1	150	150	1	148	148	-2	-1%
Secure Testing Preparation Office & Storage Room	1	150	150	0	0	0	-150	-100%
Conference Rm.	1	400	400	1	260	260	-140	-35%
Parent Volunteer Room (incl. storage)	1	150	150	1	142	142	-8	-5%
Work Preparation Room (Incl. storage)	1	400	400	1	488	488	88	22%
Satelite Work Room (incl. storage)	1	250	250	1	286	286	36	14%
Staff Lounge	1	600	600	1	332	332	-268	-45%
Adult Lavatory (including storage)	1	50	50	1	53	53	3	6%
Alternative Education			**550**			**485**	**-65**	**-12%**
Classroom (Observation)	1	400	400	1	283	283	-117	-29%
Office (Reading)	1	150	150	1	202	202	52	35%
Cafetorium / Kitchen			**5,060**			**5,076**	**16**	**0%**
Student Dining	1	3,000	3,000	1	3,155	3,155	155	5%
Platform	1	800	800	1	352	352	-448	-56%
Chair Storage	1	300	300	1	235	235	-65	-22%
Kitchen and Serving (incl. refrig. & freezer)	1	500	500	1	887	887	387	77%
Dishwashing Area	1	200	200	1	184	184	-16	-8%
Dry Storage	1	100	100	1	83	83	-17	-17%
Locker/Lavatory	1	80	80	1	90	90	10	13%
Janitor's Closet	1	40	40	2	45	90	50	125%
Kitchen Office	1	40	40	0	0	0	-40	-100%
Classrooms Grades 1-5 & Resource Rooms			**20,775**			**10,826**	**-9,949**	**-48%**
Grades 1-2 Classrooms *	8	800	6,400	9	688	6,192	-208	-3%
Grades 1-2 Lavatories (classroom access)	8	50	400	0	0	0	-400	-100%
Grades 3-5 Classrooms *	12	850	10,200	4	674	2,696	-7,504	-74%
(Grades 3-5 lavatories are located in the hallway and included in the gross square footage)								
Resource Rooms	6	400	2,400	2	558	1,116	-1,284	-54%
Grades 1-5 Storage Rooms	5	200	1,000	2	153	306	-694	-69%
Math (1) and Reading (2) Storage Rooms	3	125	375	2	258	516	141	38%
Kindergarten			**4,560**			**3,438**	**-1,122**	**-25%**
Kindergarten Classrooms *	4	1,040	4,160	4	830	3,320	-840	-20%
Kindergarten Lavatories (classroom access)	4	50	200	0	0	0	-200	-100%
Kindergarten Storage Rooms	5	40	200	1	118	118	-82	-41%
Computer Room			**850**			**693**	**-157**	**-18%**
Computer Room	1	850	850	1	693	693	-157	-18%
Custodial			**490**			**451**	**-39**	**-8%**
Storage Rooms	2	120	240	5	31	155	-85	-35%
Office/Storage Room (incl. storage)	1	150	150	1	151	151	1	1%
Ventilated Storage	1	100	100	1	145	145	45	45%

*Renovation goal for Kindergarten Classrooms is 880 SF.
*Renovation goal for Classrooms grades 1-5 is 750 SF.

Existing Building Space Analysis

	2010 Ed. Spec. Modified for 500 Student Capacity			Existing Talbott Springs Elementary School			Program / existing differential	
	Area(s)	SF	Total Net	Area(s)	SF	Total Net	Area	%
ESOL			**700**			**481**	**-219**	**-31%**
Primary Extended Learning Room (ESOL 1)	1	350	350	1	327	327	-23	-7%
Intermediate Extended Learning Room (ESOL 2)	1	350	350	1	154	154	-196	-56%
Gifted & Talented			**800**			**744**	**-56**	**-7%**
G/T Resource Room	1	750	750	1	744	744	-6	-1%
Storage Room	1	50	50	0	0	0	-50	-100%
Guidance			**250**			**183**	**-67**	**-27%**
Guidance Reception/Office/Counseling	1	250	250	1	183	183	-67	-27%
Health Suite			**760**			**388**	**-372**	**-49%**
Waiting Room	1	100	100	1	85	85	-15	-15%
Treatment/Medication	1	120	120	1	85	85	-35	-29%
Rest Area	1	200	200	1	85	85	-115	-58%
Office/Consult/Exam	1	100	100	1	78	78	-22	-22%
Examination/Isolation	1	100	100	0	0	0	-100	-100%
Student Lavatory (ADA) w/ hydraulic lift and	1	100	100	1	38	38	-62	-62%
Storage Room	1	40	40	1	17	17	-23	-58%
Library / Media Center			**5,175**			**3,166**	**-2,009**	**-39%**
Main Reading Room	1	2,800	2,800	1	2,568	2,568	-232	-8%
Technology Resource Room (incl. storage)	1	800	800	0	0	0	-800	-100%
Office/Work Space	1	240	240	1	248	248	8	3%
Media Production/Video Area	1	500	500	0	0	0	-500	-100%
Storage Room	1	335	335	1	195	195	-140	-42%
MDF	1	500	500	1	155	155	-345	-69%
Mini Auditorium			**1,500**			**0**	**-1,500**	**-100%**
Mini Auditorium	1	1,500	1,500	0	0	0	-1,500	-100%
Music			**2,000**			**999**	**-1,001**	**-50%**
General Music Room	1	950	950	1	896	896	-54	-6%
Ensemble Room	1	800	800	0	0	0	-800	-100%
Storage Room	1	250	250	1	103	103	-147	-59%
Physical Education			**5,320**			**4,057**	**-1,263**	**-24%**
Gymnasium	1	4,500	4,500	1	3,282	3,282	-1,218	-27%
Storage Room	1	560	560	2	215	430	-130	-23%
Office (incl. lavatory)	1	160	160	1	141	141	-19	-12%
Outdoor-Access Restrooms (2)	2	50	100	2	102	204	104	104%
Psychological Services			**150**			**132**	**-18**	**-12%**
Psychological Services Area	1	150	150	1	132	132	-18	-12%
Reading Resource			**450**			**186**	**-264**	**-59%**
Reading Resource Room	1	400	400	1	186	186	-214	-54%
Storage Room	1	50	50	0	0	0	-50	-100%
Special Education K-5			**2,200**			**1,268**	**-932**	**-42%**
Classroom	1	600	600	0	0	0	-600	-100%
Student Lavatory (ADA) w/ hydraulic lift & changing table	1	100	100	0	0	0	-100	-100%
S.E. Resource Rooms	5	300	1,500	4	317	1,268	-232	-15%

Existing Building Space Analysis

	2010 Ed. Spec. Modified for 500 Student Capacity			Existing Talbott Springs Elementary School			Program / existing differential	
	Area(s)	SF	Total Net	Area(s)	SF	Total Net	Area	%
Speech/Language Therapy			160			153	-7	-4%
Speech Language Therapy Room	1	160	160	1	153	153	-7	-4%
Special Education K-5 Occupational			814			155	-659	-81%
OT/PT Therapy Room	1	750	750	1	155	155	-595	-79%
Storage Room	1	64	64	0	0	0	-64	-100%
Visual Art			1,400			1,216	-184	-13%
Studio	1	1,200	1,200	1	1,002	1,002	-198	-17%
Kiln & Storage Room	1	200	200	2	107	214	14	7%
Subtotal Net Sq. Ft.			56,864			36,481	-20,383	-36%
Early Childhood Area (Pre-K)			4,520			3,644	-876	-19%
Preschool/Pre-K Classrooms	4	1,040	4,160	4	830	3,320	-840	-20%
Preschool/Pre-K Lavatories	4	50	200	4	30	120	-80	-40%
Storage Rooms	4	40	160	4	51	204	44	28%
Recreation & Parks			2,000			0	-2,000	-100%
Activity Room	1	1,800	1,800	0	0	0	-1,800	-100%
Storage/ Toilet	1	200	200	0	0	0	-200	-100%

Space Analysis Summary

	2010 Ed. Spec. Modified for 500 Student Capacity	Existing Talbott Springs Elementary School	Program / existing differential	
	S.F.	S.F.	Area	%
Total Net Sq.Ft.	63,384	40,125	-23,259	-37%
Gross Area Factor (Walls, Circulation, Toilets, Mech./ Elec. Rooms, Data Closets, etc.)	24,042	13,964	-10,078	-42%
Efficiency = Net / Gross	73%	74%		
Gross Area Total	87,426	54,089	-33,337	-38%

Existing Building Enclosure Assessment

SCOPE OF INVESTIGATIONS

This building enclosure assessment presents the findings of a building exterior visual condition survey of existing Talbott Springs Elementary School. Exterior features are assessed along with recommended short-term repairs, major distress or failure and recommendation (if any) for further invasive studies, if required.

The school was originally constructed in 1973 and is approximately 44 years old. Additions and renovations were completed in 2000, 2006, 2008, and 2013.

The exterior features of the structure include brick veneers, standing seam Mansard type perimeter roofing, hollow metal-framed windows and aluminum storefronts. Concrete sidewalks and asphalt pavements were found adjacent to many portions of the structure.

The envelope components were found to be in good overall condition with only minor maintenance or repairs required at this time. There was no evidence of structure settlement or mortar joint reinforcing failure.

The exterior brick veneers and mortar systems were generally found to be in good overall condition with only isolated issues related to minor joint cracking, mortar erosion and only a few locations of minor joint reinforcement corrosion. The identified issues are not considered to affect the integrity of the structure and do not require any action at this time.

Steel lintels, exposed structural steel, exposed decking, window frames, and exterior doors were found to be in good condition with no short term repairs required.

Some soffit and sidewalk locations were missing caulk at the brick interface, which should be replaced to prevent water and insect infiltration.

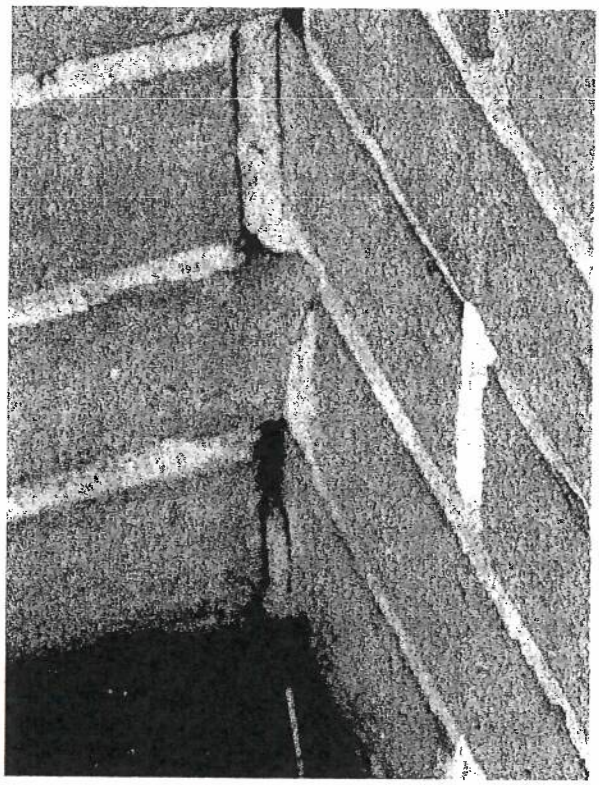


Figure 1 - Brick- Missing Mortar

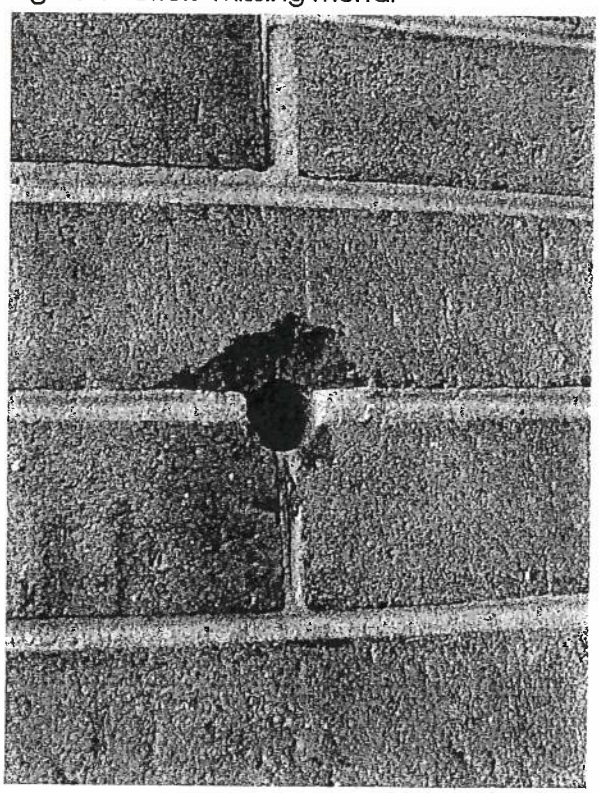


Figure 2 - Brick - Holes

PROPERTY CONDITION
In general, the structure appeared to be in ***good condition*** for a structure of this age and type of construction. Improvements and renovations have occurred since the initial construction of the property, and the exterior of the building seems to have been properly maintained. During the performance of this survey, TCA identified several minor items associated with the project site that merit prompt attention and/or repair, which are discussed herein.

MASONRY - BRICK
The primary exterior finish is clay brick masonry. The brick was found to be in good overall condition with some signs of cracking or spalling. See Figures 1 and 2. The north-facing walls of the building have considerable amount of algae growth where the sloping metal roofing overhangs existing doorways. See Figures 3 and 4.

JOINT MORTAR
Mortar joints were typically tight and well tooled with little evidence of joint failure. Few joints are missing mortar. See Figure 1.

MASONRY WEEPS AND FLASHING
The masonry weep holes were found to be in-place at regular intervals on the Gym addition and the Kindergarten addition. No blockage or damage was noted. Weep holes were difficult to identify on the original building.

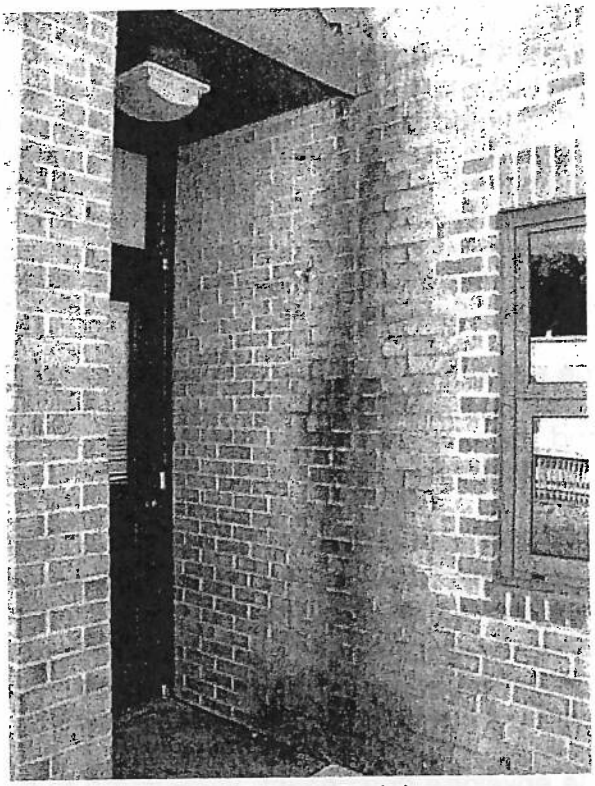


Figure 3 - Exterior - Algae Staining

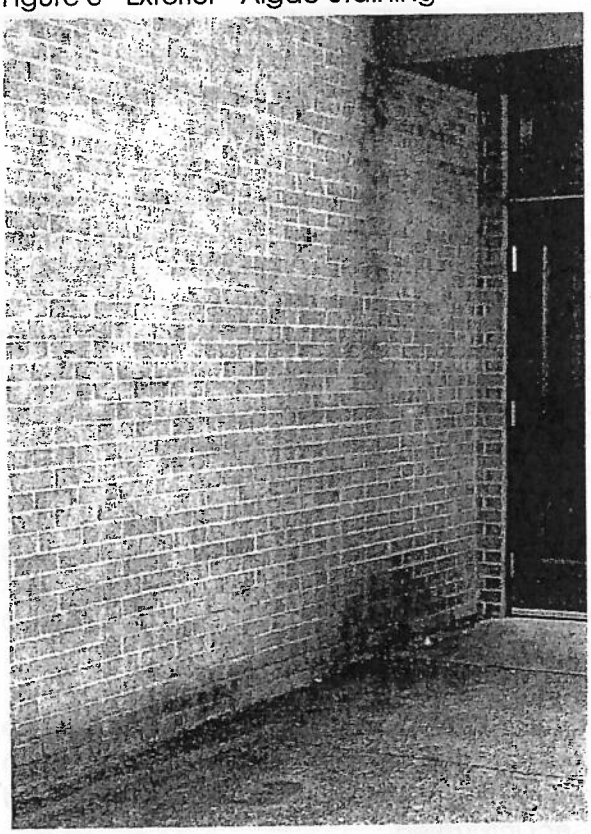


Figure 4 - Exterior - Algae Staining

WINDOW AND DOOR FRAMES

Many of the Window and Door Frames are from the original construction. They should be replaced with new thermally broken hollow metal frames or aluminum storefront systems. See Figure 6.

JOINT REINFORCEMENT

Joint reinforcement corrosion is not a visible issue at this structure.

CAULKING

Several areas were identified where caulking was missing or eroding. These areas were primarily at the intersection of horizontal concrete sidewalk and the vertical brick walls. Missing caulk should be replaced to ensure that water and/or insects do not penetrate the building or subgrade which could lead to future damage. See Figure 5. In addition, the caulking between door/window frames and the masonry is eroding and should be removed and replaced. See Figure 6.

STEEL LINTELS

The steel lintels over openings appear to be in fair condition with evidence of loss of coating. All should be addressed during any renovation work. Bearing length appears to be sufficient.

SETTLEMENT

There was no evidence of structural settlement other than minor cracking of concrete pads adjacent to several areas of the structure. The settlement of the slabs has not progressed to the point where repairs are merited.

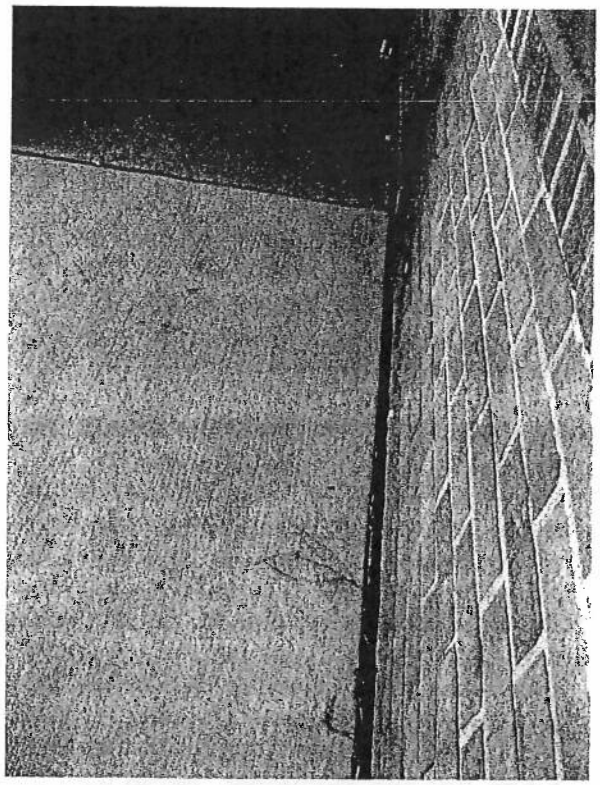


Figure 5 - Missing Caulk Joint

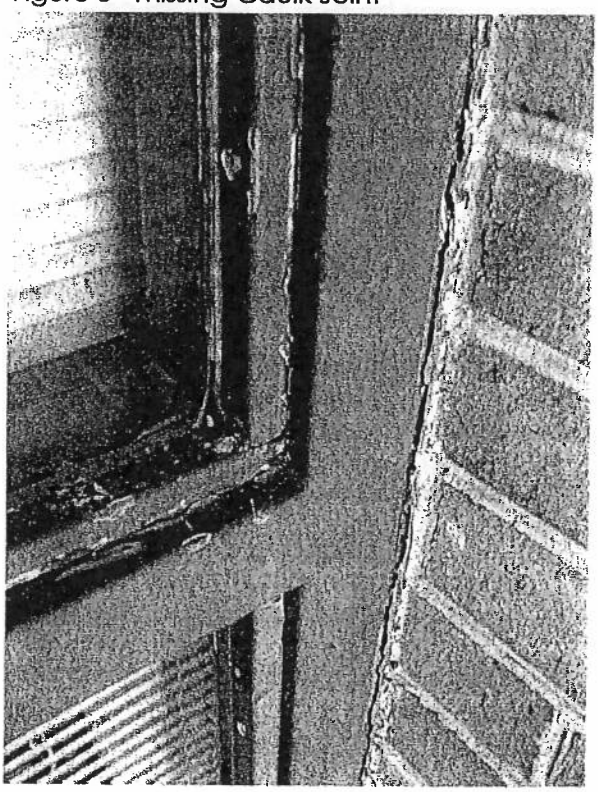


Figure 6 - Chipped Paint and Eroding Caulk

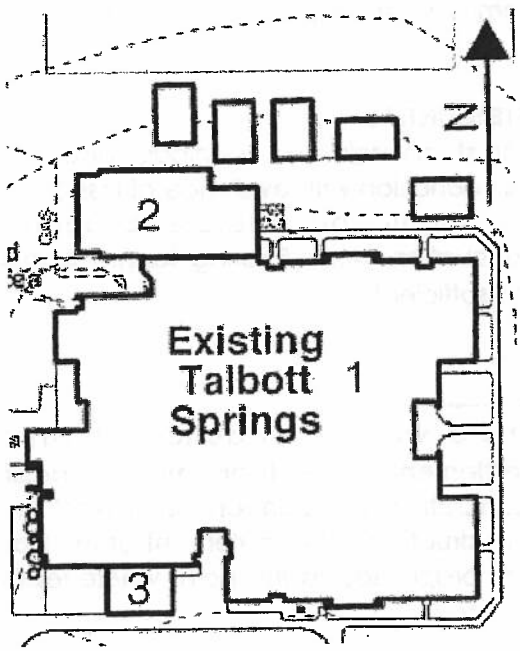
Existing Structural System Assessment

Talbott Springs Elementary School was originally constructed in 1973 as a one-story structure with several small mezzanines located above the interior corridors, cafetorium, and library that were used for support of mechanical equipment. A one-story gymnasium addition was added at the northeast corner of the building in 2000 and a kindergarten addition was added at the southeast corner of the structure in 2008. Information on the structural aspects of the building is based on the available existing drawings and a field visit to the school. The roof structure for the most part consists of metal roof deck supported by steel bar joists that are supported by interior and exterior bearing walls, steel beams, and columns at the media center. At the cafetorium, the roof structure consists of a gypsum roof on bulb tees that are supported by long span joists. The mechanical mezzanine structure consists of a 5 ½" concrete slab on metal deck that is supported by steel beams and columns. Some interior modifications were completed recently to the bathrooms and floor finishes in 2013.

Based on a site visit on September 12, 2016 and the review of the available existing drawings, the following was noted and observed:

A. The original roof over the cafetorium consists of a bulb tee poured gypsum deck on form board. The underside of this roof system is currently exposed. This type of structural roof system is no longer being used. This roof system is very difficult to modify in any way. Repairing existing holes and adding new holes to the roof is problematic as additional exposed structural reinforcement will be required. Sections of the roof that may need to be replaced due to water infiltration or deterioration would have to be replaced with a different structural roof system as well. This new structural system would also affect the visible appearance of the underside of the roof. New roof top units, if required, would also result in structural modifications as well. Given the extent of any future possible renovation, along with the actual condition of the bulb tee roof structure in this area, *it may be best to seriously consider the removal of the deck and the installation of a new acoustical metal deck.*

B. The exterior walls of the building consist of unreinforced six inch block wall, with a two inch cavity and four inch brick. The exterior of the building walls appears to be in relatively good shape. From an energy standpoint, this wall construction would not meet today's code as additional cavity for air space and insulation would be required. Also, the structural design of the existing walls do not meet today's code since it is lacking the vertical reinforcing that would be required to resist the lateral loads. Vertical reinforcing would be required to these existing walls if new windows and/or doors are added or if larger windows are to be added to the existing walls as part of a renovation or addition. As such, any modifications to the exterior masonry wall will require vertical structural reinforcement. Installation of vertical rebar to the existing masonry block walls of this building will prove to be time consuming and expensive.



1. Original Building 1973
2. Gym Addition 2000
3. Kindergarten Addition 2008

C. The roof is relatively flat with sloping areas located above the mechanical mezzanines accordingly. Structural modifications to the roof structure will be required if new mechanical units will be placed on the existing roof. Also, units that are longer than fifteen feet will create snow drifting loads on the existing roof that must be considered. Installing additional structural reinforcement to existing steel bar joists and adding steel beams to the existing roof structure could prove to be time consuming and costly.

D. As previously stated, a large portion of the existing roof structure is supported by interior masonry bearing walls. These existing bearing walls reduce the flexibility to renovate the building. As such, it may be necessary as a part of the renovation to remove some of these bearing walls. The removal of these bearing walls will require temporary shoring of the roof structure and the installation of steel beams, columns and footings accordingly. The extent of this modification could be significant depending on the extent of the renovation.

E. There are multiple challenges in renovating an existing building. The structural components of the building for the most part are concealed by architectural finishes. Unknown and unforeseen conditions will occur during the renovations. Once these conditions are resolved by the design team, increased time and costs will be incurred by the contractor which will be passed on to the Owner. Working in an existing building is usually a slow and difficult process. It will be difficult to move and erect steel in the required locations due to the inability of a crane to be utilized. As previously stated, temporary shoring may need to be installed which would restrict the available work space as well. This type of work can prove to be labor intensive, slow and ultimately costly.

F. Renovating an existing building can prove to be costly if the existing lateral system of the building becomes compromised. If the lateral system of the building becomes compromised by more than 10%, it will be necessary to reevaluate the entire lateral system of the building. Removing large portions of the interior and exterior wall system of this building will affect the lateral system of the building. Modification of an existing lateral system of the building or creating a new lateral system for this building will result in substantially increased construction costs.

Existing Mechanical System Assessment

The existing modular air handling units located within the rooftop penthouse areas serve various spaces throughout the original Talbott Springs Elementary School and date back to the school's original construction in 1973. These units are served by the buildings dual temperature piping system to provide seasonal heating and cooling. The existing water-cooled chiller and companion cooling tower were replaced in 2011. The following is a detailed description of the existing mechanical systems serving the school.

HEATING SYSTEMS

Two eight-section cast iron sectional boilers produce heating water that serves mechanical equipment throughout the school through an existing two-pipe chilled/heating water distribution system. These boilers are approximately 15-20 years old, appear to be in good to fair operating condition, and have approximately five-ten years of service life remaining. Manufactured by Weil-McLain (Model 888), each boiler has an output rating of 1,987 MBH and is equipped with a gas-fired Power Flame burner (Model WCR2-G-20A). Both boilers are functioning adequately to satisfy the existing school, with available standby capacity in the event of a single boiler failure. Each boiler is connected to a common metal flue stack through a dedicated metal flue extending from each boiler. The existing combustion air intake arrangement appears to be of adequate size; however, the louver location/configuration does not meet current CSD-1 code used by the State of Maryland which requires both high and low combustion air inlet locations.

During the heating season, the chilled/heating water piping system supplies heating water to the following mechanical equipment:

- Air-handling units located within the penthouse areas.
- Heating and ventilating (H&V) unit.
- Kitchen air-handling unit.
- Duct-mounted heating coil associated with the art room air-conditioning unit.
- Miscellaneous heating equipment (unit heaters, convectors, etc.) throughout the school.

Two base-mounted end suction chilled/heating water distribution pumps provide distribution of either heating water or chilled water throughout the building depending on the season. These pumps are provided with variable frequency drive (VFD) controllers, allowing for a reduction in pump energy during periods of reduced heating water demand. The existing pumps were replaced in 2011 and appeared to be in good working condition.

COOLING SYSTEMS

A single magnetic bearing type water-cooled chiller (McQuay, Model E2212BE2-B) provides chilled water to the two-pipe chilled/heating water distribution system serving the existing air handling units located throughout the school. A single cooling tower (B.A.C. Series PT2, Model PT2-0709A-3J1) located at grade and positioned adjacent to the mechanical room provides for the heat rejection for the chiller. Both the chiller and cooling tower were replaced in 2011 and appeared to be in good condition.

During the cooling season, the chilled/heating water piping system supplies chilled water to the air-handling units located within the penthouse areas, as well as the art classroom localized air-conditioning unit.

The existing chillers are served by the same base-mounted end suction chilled/heating water pumps described within the heating system section of this narrative. A single base-mounted end suction type condenser water pump provides distribution of condenser water between the existing chiller and cooling tower. This pump was installed in 2011 and appears to be in good condition.

The mechanical room is currently equipped with an existing refrigerant monitoring system and refrigerant exhaust system.

HVAC SYSTEMS

The existing mechanical systems consist of equipment installed at various times since the building's original construction. A description of the existing systems along with their age is included below.

- Classroom pods / cafetorium / special purpose (AHU-1 thru 4, 8, & 9): Single-zone type air-handling units located within the rooftop penthouse areas provide space conditioning and ventilation airflow for the classrooms served. These air-handling units were installed around 1973 and are provided with remote return fans, external face and bypass dampers, and chilled/heating water coils. These units are in fair working condition and have reached the end of their useful service life.

- Media center / administrative areas / kindergarten / music (AHU-5 thru 7): Multi-zone air-handling units located within the rooftop penthouse areas provide space conditioning and ventilation airflow for the classrooms served. These air-handling units were installed around 1973 and are provided with remote return fans and chilled/heating water coils. These units are in fair working condition and have reached the end of their useful service life.

- Gymnasium: A single-zone rooftop H&V unit provides heating and ventilation airflow for the gymnasium through a hydronic heating coil. Installed in 2000, this unit appeared to be in good to fair working condition with approximately five years of service life remaining.

- Art room: A single-zone rooftop air-conditioning unit with remote hydronic duct-mounted heating coil provides space conditioning and ventilation airflow for the art classroom. Installed in 2000, this unit appeared to be in good to fair working condition with approximately five years of service life remaining.

- Kitchen: A single-zone air-handling unit located within a rooftop penthouse provides heating and ventilation airflow for the Kitchen area. The unit is provided with a hydronic heating coil connected to the two-pipe chilled/heating water distribution system. Installed in 2011, this unit is in good working condition and has approximately fifteen years of service life remaining.

In 2015, a series of system improvements were performed to air-handling units AHU-1 through AHU-9. A summary of these system improvements are described below:

- Air-Handling Units AHU-1, 2, 3, 4, 8, and 9: VFDs were added to the supply and return fans serving these air-handling units. Fan motors were also replaced with invertor duty type motors, which are compatible with the VFDs. Electric duct-mounted heating coils and outdoor airflow monitoring stations were also added to these units. It appears that these modifications were made to improve controllability of these systems.

- Air-Handling Units AHU-5, 6, and 7: Dedicated outdoor air system units were installed at the roof and ducted to the outdoor air intake louvers serving these three air-handling units. It appears that these modifications were made to improve controllability and operating efficiency of these systems.

EXISTING CHILLED/HEATING WATER PIPING SYSTEMS

A majority of the building's existing two-pipe chilled/heating water distribution piping (with the exception of the boiler room area) dates back to the school's 1973 construction and is over 40+ years in age. Select building piping sections, along with the boiler room piping, were replaced as part of the 2000 building renovation and the 2011 Chiller/Cooling Tower replacement projects. This piping should be replaced as required to support the scope of any planned building renovations.

EXISTING DUCTWORK DISTRIBUTION SYSTEMS

A majority of the existing ductwork distribution serving the existing classroom pods is located within the penthouse areas. Supply airflow is ducted to sidewall supply registers from within the penthouse areas. Return airflow is ducted from the space directly into the penthouses through return fans. Outdoor air is ducted from intake louvers at the penthouse walls to the return air ductwork, where it mixes prior to entering the associated air-handling unit served.

A portion of the building's existing ductwork was replaced as part of the 2000 renovation/addition project.

A majority of the existing ductwork dates back to the school's 1973 construction and is over 40+ years in age. This ductwork should be replaced as required to support the scope of any planned building renovations.

CONTROL SYSTEM

The existing school is currently provided with a combination of pneumatic and direct digital controls (DDC). The existing pneumatic control system components should be replaced and DDC controls provided throughout the entire school as part of any planned building renovations.

Existing Plumbing System Assessment

SITE UTILITIES

- Incoming Water Service: The existing school is served by a six-inch incoming combination fire/ water service, supplied from the County, and enters the school within the main mechanical room area.
- Sanitary: The existing school is served by a public sewer system.
- Gas Service: The existing school is served by a BGE natural gas line that enters the school within the main mechanical room. This gas services supplies the existing boilers and water heater equipment.

PLUMBING SYSTEMS

A three-inch domestic water service (discussed above) provides both potable water as well as make-up water for the cooling tower and the chilled/heating water distribution system.

A gas-fired water heater and associated storage tank provides domestic hot water for the building. Manufactured by PVI (Maxim Model 54 p 125A-MXG), this equipment has a gas input rating of 540 MBH. The water heater appears to have been installed in 2009, with approximately 10 years of service life remaining.

A thermostatic mixing valve tempers the domestic hot water before it is distributed throughout the school.

Existing Fire Protection System Assessment

FIRE SUPPRESSION SYSTEM

The building is currently provided with sprinkler coverage throughout. A six-inch fire line extends from the incoming water service and is provided with a six-inch double-check type backflow preventer. This fire line serves multiple zone valve assemblies located throughout the school.

FIRE ALARM SYSTEM

The existing fire alarm control panels are located in the building services office. The first fire alarm control panel is by Notifier. The second fire alarm control panel is by Edwards Systems Technology (EST). It appears that the fire alarm control panels do not have voice evacuation capability. Fire alarm devices include manual pull stations at exterior egress doors, smoke detectors at locations of magnetic door holders, and wall mounted audible and visual notification devices. It appears that the audible devices are horns and not speakers. There is a fire alarm annunciator panel and keypad in the main lobby.

Existing Electrical System Assessment

The 46,186 square foot elementary school was originally built in 1973. In 2000, there was a major renovation at the school that included a 6,374 square foot addition. In 2008, a 1,529 square foot kindergarten addition was built. The electrical equipment at the school appears to be in fair to good working condition. The following is a description of the existing electrical service, power distribution including generator power, lighting, and fire alarm systems at Talbott Springs Elementary School.

ELECTRICAL SERVICE

There is a BGE pad mounted utility transformer (BGE 40052) located on the west side of the school in an outdoor enclosure adjacent to the cooling tower. The location of the primary feeders serving this utility transformer needs to be confirmed. Secondary service electrical feeders run in underground conduit from the secondary of the utility transformer to the current transformer (CT) cabinet of the existing main switchboard located in the main mechanical room (boiler room). The BGE meter (KZD119051088SG009) is located adjacent to the main switchboard.

The school sign in front of the school has a separate BGE electrical service with a BGE meter (ING159438880SG002) located adjacent to the school sign.

POWER DISTRIBUTION

The main switchboard in the main mechanical room was installed in 2000. The main switchboard is a two-section switchboard by Square D Company, Type QED Power Style Switchboard, rated at 277/480 volts, 3–phase, 4-wire, 1600 ampere bus, with 1600 ampere main circuit breaker (PowerPact Type RK, model RKF36160U44A). From right to left, the first section has the main circuit breaker on top and utility CT cabinet on the bottom. The second section is a distribution section with distribution circuit breakers serving Portables #189 and #188 (100A), Panel HC (200A), Panel HR (225A), EASi meter (20A), ATS-1 (80A), Panel MDLP (400A), ATS-2 (30A), 2016 Modular Building (300A), Booster Heater (70A), 2011 Portable (70A), Panel HG (100A), Chiller (225A), Punch P-3 (25A), Pump P-2 (40A), and Panel HA (225A). The switchboard has space for seven additional 250-ampere frame circuit breakers. Infrared scanning of the main switchboard was performed in June 2013.

Other electrical equipment in the main mechanical room includes Panel HC, 225-kVA transformer, Panel MDLP, Panel LC, Panel EM, Panel HR, variable frequency drives (VFD's) for Pump P-1 and Pump P-2, and combination starters for Pump P-3, EF-1, CP-1 and CP-2. The room adjacent to the main mechanical room has the cooling tower VFD, ATS-1, Panel E480, 15-kVA transformer, Panel E120, ATS-2, 30-kVA transformer, and 60A disconnect for Panel EM.

There are electrical panelboards (Panel HA, Panel LA, Panel LB) located in electrical closets in the school. There are recessed panelboards (Panel HG and Panel LG) in the corridor adjacent to the gym, (Panel LK) in the kitchen, (Panel LD) in the corridor of the main office area, and in a storage room of the 2008 kindergarten addition. Electrical equipment in the main mechanical room is by Square D, except VFD's are by ABB and Panel HR (installed in 2015) is by General Electric. Panelboards located throughout the school are by Square D, except the panelboards in the 2008 kindergarten addition are by General Electric.

GENERATOR POWER

There is a 100-kW natural-gas outdoor generator in weatherproof enclosure by Kohler Power Systems near the gymnasium entrance. This generator serves standby panelboards (Panel E480 and Panel E120) via ATS-1 and life safety panelboard (Panel EM) via ATS-2. Panel E480 serves boilers. Panel E120 serves selected mechanical equipment. Panel EM serves egress lighting, exit lights, security panels, and the intercom / public address system cabinet. The generator remote annunciator is located in the building services office.

LIGHTING

Fluorescent lighting is primarily used within the school. Corridors have 2'x4' volumetric type fluorescent luminaires (lighting fixtures). Open classroom areas utilize stem suspended direct-indirect linear fluorescent luminaries. The main office area, art room, music room, and 2008 kindergarten addition use 2'x4' recessed fluorescent troffer luminaires with prismatic lenses and linear fluorescent lamps. One kindergarten classroom has surface mounted luminaires with wraparound prismatic lenses and linear fluorescent lamps. The media center uses both 2'x4' volumetric type fluorescent luminaires and surface mounted fluorescent luminaires with wraparound prismatic lenses. The gymnasium has chain suspended linear fluorescent luminaires with wire guards and four lamps in each luminaire. The cafetorium uses both 2'x4' fluorescent troffer luminaires on the low portion and the same luminaires as the gymnasium on the high portion. The kitchen has both 1'x4' recessed fluorescent troffer luminaires and surface enclosed and gasketed fluorescent luminaires. The main mechanical room uses chain suspended industrial type luminaires. Exit signs have red lettering.

Lighting controls in instructional areas consist of line-voltage toggle switches at entrance locations. Occupancy sensors are used in corridors, open classroom areas, media center, and the 2008 kindergarten addition.

The building exterior has metal halide wall packs with wall packs at the back of the gymnasium having cutoff louvers. Exterior canopy soffits have surface square luminaires with white finish using compact fluorescent lamps. Bus loop and parking lot lighting consists of LED pole mounted luminaires with bronze finish on bronze light poles. Exterior lighting is connected via lighting contactor located in the main mechanical room.

Existing IT System Assessment

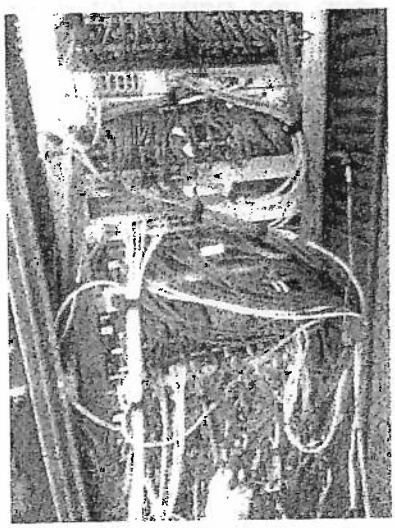
IT/AV/Security systems site assessment was conducted by Educational Systems Planning at the Talbott Springs Elementary School building September 12, 2016 as part of this Feasibility Study. The voice, video and data communications infrastructure is of the vintage of the Technology in Maryland Schools (TIMS) installed in the1990's. The communications infrastructure is designed with a single telecommunication room: The Technology Equipment Room (TER; another term is MDF).

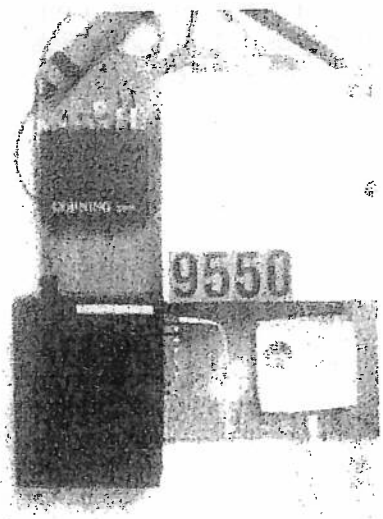
The school is a single floor building with a considerable number of interior classroom and learning spaces with no daylight and the circulation patterns are such that there are a significant number of dead-end corridors. It is anticipated that either a significant interior renovation re-configuration of spaces to allow natural lighting and better circulation or a new replacement building will be recommended. In either case, a new communications infrastructure for voice, video, data and security systems would be required.

TELECOM SPACES

The TER/MDF is in an existing room between the office and the media center. The TER/MDF is adequately sized and is approximately nine feet by eighteen feet, well air-conditioned, well-designed, and secure although shared with media center carts with televisions. The TER/MDF consists of:

- A floor-mounted equipment cabinet containing head-end equipment for the coax video distribution equipment.
- A floor-mounted equipment cabinet containing data patch panels and switch equipment.
    - 6 48 port patch panels
    - 10 24 port 3 COM 10/100 switches
- A floor-mounted equipment cabinet containing servers and other equipment.
- A wall board data service entrance and other equipment.





DATA NETWORK

The existing data network was installed under the TIMS program of 1998/99, and consists of category 5E UTP cabling in the horizontal and fiber optic backbone cabling. Switches provide 10/100 to the desktop and Gigabit Ethernet in the backbone. The TER/MDF has 48-port Three Com switches. TER/MDF equipment seems to be in good working condition. Hallways and classrooms have recessed ceilings with the cable installation generally above the ceiling.

Most classrooms have two-four data drops at the teaching station with a quad data outlet or multiple drops in the rear of the classroom for student workstations as per the previous MSDE standards. Classrooms have been fitted with wireless access points that are used for laptops from laptop carts.

TELEPHONE SYSTEM

The telephone network enters the building in room S1, and contains a Meridian phone system. School personnel report that the system is operational. Fax lines and an emergency plain old telephone service (POTS) line have been extended to the office area. Some are unused at this time. The cable plant consists of category 5E horizontal cabling and multi-pair UTP for backbone.

SECURITY SYSTEM

The security system at the school consists of motion sensors and 16 video surveillance security cameras. Security cameras are located outside and inside the building. The cameras are located in the hallways and are spaced so that they have to cover a long range. The cameras are enclosed in smoked domes and hang from the ceiling for protection. A ceiling hung display monitors in the main office area to display images from the video surveillance camera. An entry door video AIPHONE is also used to buzz-in visitors to the main office from the exterior.

INTERCOM SYSTEM

The Rauland MCX300 public address system (PA) is a phone oriented system supplemented with speakers. The PA is located in the main school office and is reportedly in good working condition.

CLASSROOM AUDIO-VISUAL

Most classrooms and other instructional spaces have a typical technology in Maryland schools (TIMS) "high-low" A/V cable harness consisting of an S-video and RCA style audio connection from a faceplate at 18 inches to a location near a wall-hung television. However, most projection is accomplished via a short-throw projector mounted over a whiteboard.

VIDEO DISTRIBUTION SYSTEM

A coaxial "Tap and drop" distribution system is currently in place in all sections of the building. Amps have been located in telecom spaces. The head-end equipment is located in an open floor cabinet in the media center work area.

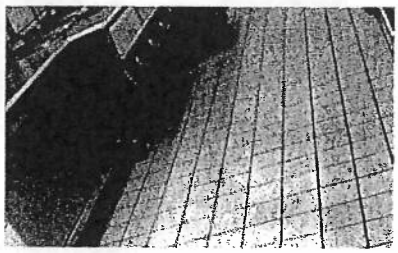
A new IP digital video distribution system should be designed to operate over the data IP network which meets HCPSS's current standards for video streaming. The system shall allow for local content and channel insertion intended for redistribution throughout the facility as well as streaming live and stored content.

DEFICIENCIES

- TER/MDF equipment in media center work area is not enclosed in a separate conditioned room.
- Category 5e cable for hard-wired outlets and wireless access points should be updated to Category 6 and Category 6A respectively.
- Coax video distribution should be upgraded to digital video over IP.
- Classroom AV should be upgraded to more recent HCPSS standards.

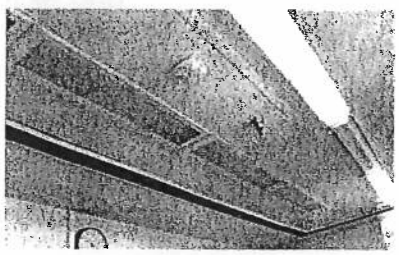
Existing Kitchen Assessment

Talbott Springs Elementary School has had a few addition projects since it opened its doors in 1973 as an open pod design. The grades are Pre-K thru 5th with a current enrollment of 478 students. HCPSS would like to create a feasibility study to compare a systemic renovation project to a brand new replacement school which would be built on the same site, while the current school is occupied, similar to the Wilde Lake Middle School project. The majority of the equipment is original to the 1970's building. Much of the equipment, although well-maintained, is old, outdated, inefficient, non-compliant with current codes and has seen its useful life.



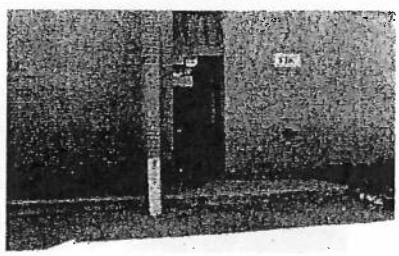
EXISTING CONDITIONS:

Floors: Kitchen and serving areas are thick-set quarry tile with coved base. Although old most tiles appear in sound condition. Due to smooth surface, tiles can be very slippery when wet or laden with grease.



Walls: Painted drywall to the finished ceiling and coved floor appear in good condition.

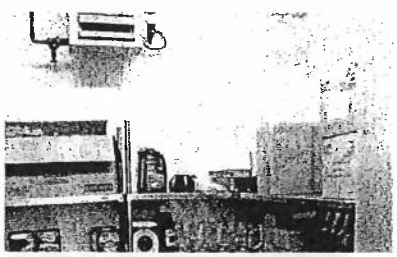
Ceilings: Exposed 10'-0" ceiling height throughout kitchen, dry storage, and serving area appear in good condition.



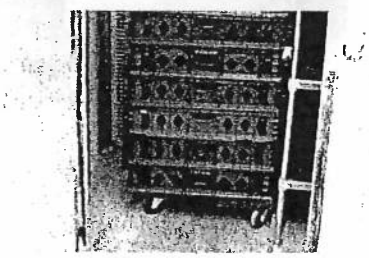
Lighting: Light level throughout space is within code standards.

AREAS

Receiving: A single 3'-0" door with screen. Door is not wide enough to accept palletized merchandise for deliveries.

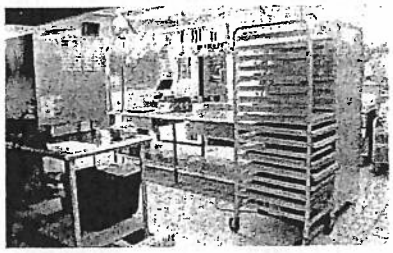


Dry Storage: Product stored on shelving units surrounding perimeter of room. Walls are painted block. Ceilings are acoustic ceiling tiles. Floor is VCT tile. Poor light level. Principal stated that they are in need of more dry storage.

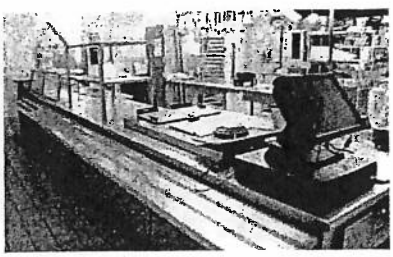
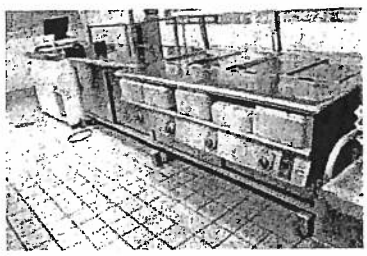


Walk-in Freezer: Walk-in Freezer is no longer used due to age and condition. Not adequately sized for new food regulations. Light levels are poor. Unit used for container storage only.

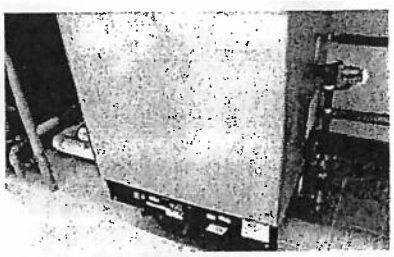
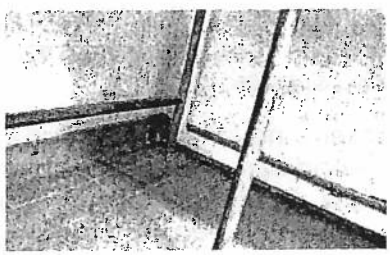
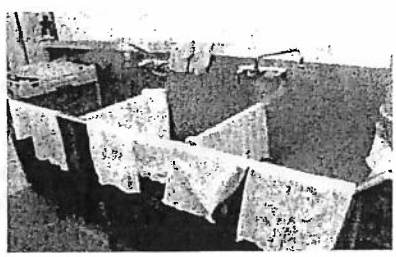
Kitchen: Ventilation appears good. Current cooking equipment is either obsolete or constantly breaking down, or lacks parts. Additional cooking equipment is needed to properly prepare current menu items. Gas, water and drain lines around cooking area are rusting, unsanitary, and it is difficult to properly keep area clean.


Serving: Serving area consists of a single straight-lined "institutional looking" cafetorium counter, original to the building with provisions for a hot food area, is uninviting and extremely plain resulting in an unpleasant dining experience. There is no cold food serving area. Hand washing sinks are porcelain and do not meet current health code. Additional hand sinks will need to be placed in the space. The only pass-thru hot cabinet is rusted and has lived its useful life. There are three milk coolers. Two of them appear to be in fair working condition and the other is completely rusted out in the bottom of the unit. The ice cream freezer on the serving line is used to store frozen food. The working conditions of appliances on the serving line are in constant need of repair.


Dishwashing: Dishmachine appears original to the building. There is a booster heater and a disposer attached to the dishmachine. There is quite a bit of corrosion and rust accumulated on the equipment. The soiled and clean dishtables are stainless steel with galvanized legs which are rusty. Area contains three-compartment pot washing.

Janitor Closet: There is sufficient space to adequately store cleaning supplies.

EQUIPMENT

Exhaust Hood:

Galvanized metal interior with aluminum mesh filters. Both are in violation of current health code. Insufficient light levels. Unit is oversized for cooking equipment that is used in the kitchen.

Fire Protection System:

Hood is a Type II hood for heat and steam capture only.
No Ansul fire protection required.

Current Cooking Equipment:

1.) One Steamer (fair condition) Seals are broken.

2.) One Double-Deck Convection Oven (one unit is newer than the other). Both work currently but due to age may have a short working life remaining.

Refrigeration:

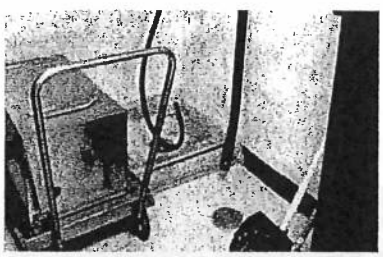
There is one two door reach-in refrigerator and one three door reach-in refrigerator. Both units are old and will need to be replaced. The seals are broken and dirty/moldy. Refrigeration is not properly maintained. Both units should be replaced and are filled to capacity so may consider installing a walk-in refrigerator or a second three door refrigerator. The reach-in freezer is new and is also filled to capacity.

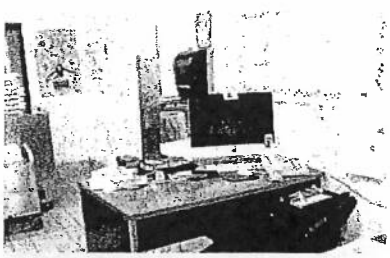
Worktables, Prep Sinks, Pot Sinks:

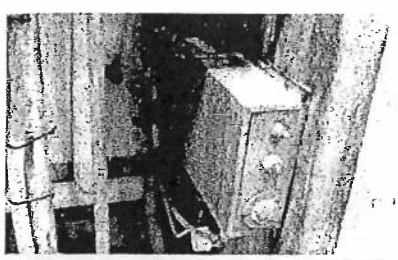
Original to building. Stainless tops, galvanized bases badly scratched and rusting. Painted finishes require high maintenance.

CONCLUSIONS:

The kitchen is old, tired, stuffy, labor-intensive, presenting an uncomfortable working environment. The majority of the equipment has either seen its useful life or is in violation of current health codes. Replace all outdated inefficient equipment with new energy saving appliances according to current HCPSS menu. Select bright, colorful, attractive finishes to promote friendly inviting atmosphere. With the anticipated increase of students, a second serving line should be set in place, walk-in cooler and a walk-in freezer should be added. Schools are now serving breakfast to the students and dry storage will need to be increased. The total square footage of the existing foodservice area(s) will need to be increased to 1,800 square feet to comply with current State recommendations.







tca|architects

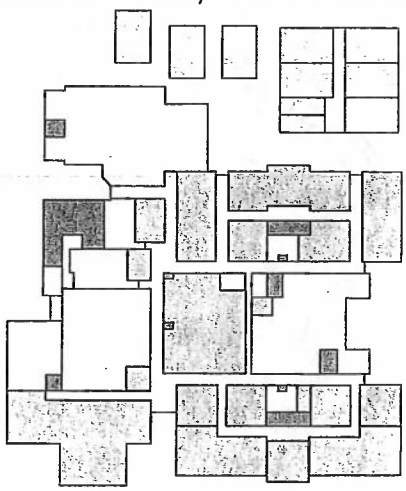
Scheme 1

Talbott Springs Elementary School

Summary of Scheme 1
Light Renovations to Existing School

Scheme 1 explores the possibility of reusing as many of the existing teaching stations as will meet the minimum requirements as established by the HCPSS Guidelines for Renovation and Modernization of Existing Buildings. Thus, many of the existing windowless classrooms will remain in their current location, but will receive new finishes, cabinetry, mechanical, data and electrical systems as well as skylights in ceiling to provide natural daylight.

Total Area of Renovation	**54,089 gsf**
Construction Duration (occupied)	**± 18 months**
LEED certification level	**'Certified'**
Building Cost	**$ 8,338,957**
Site Cost	$ 51,985
Demolition Cost	$ 112,862
Phased Construction Cost	$ 275,479
Total Construction Cost	**$ 8,779,283**

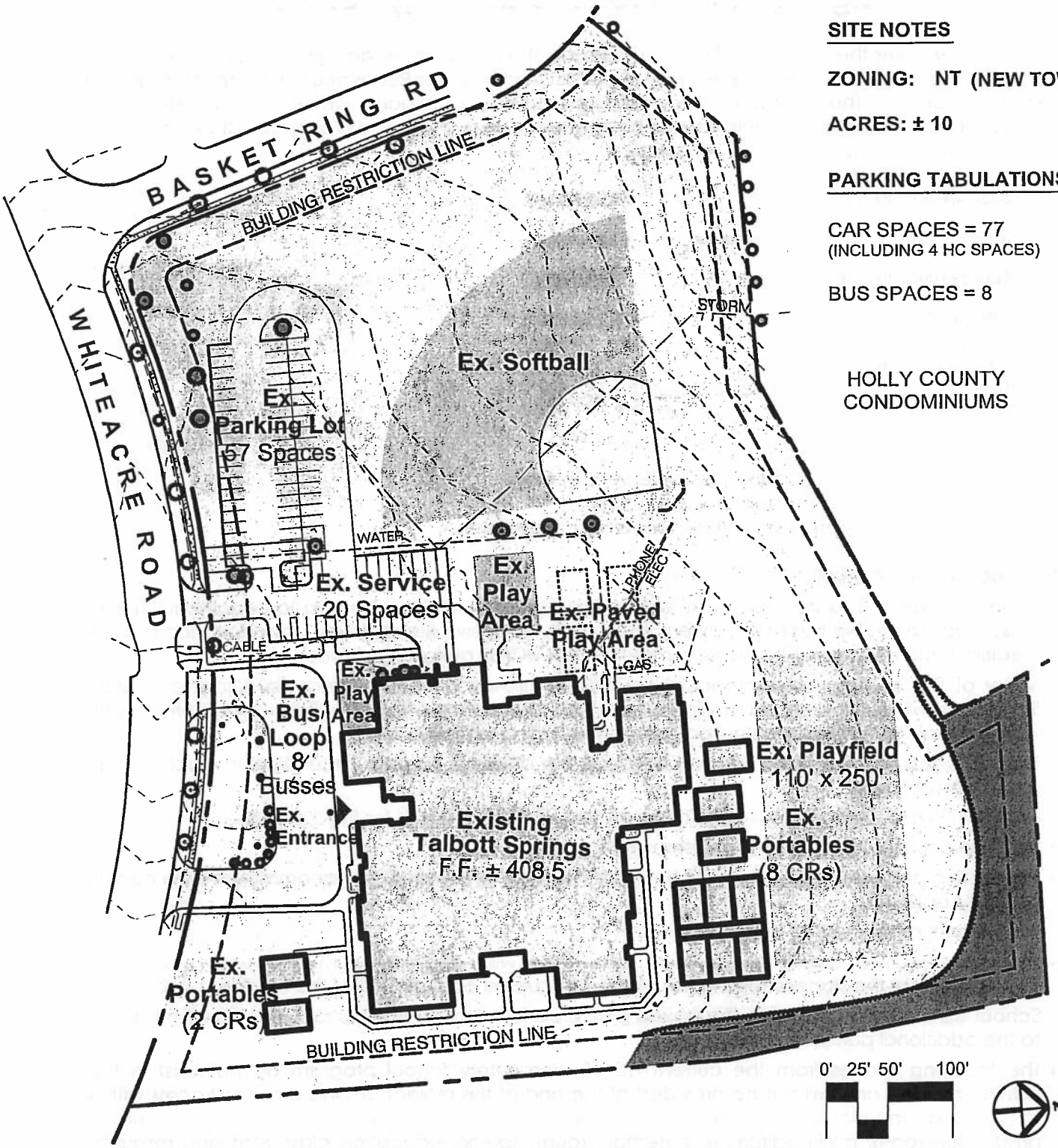


Note: Phased Construction Costs include both the cost of providing additional portable classrooms and the cost of temporary construction.

Scheme 1 Design Attributes:

- Minimal amount of existing partial height drywall partitions will be extended to become full height walls. Classrooms will become fully enclosed and will receive new finishes, cabinetry, doors, data, electrical and mechanical systems to meet current HCPSS design standards.
- Many of the existing classroom locations will not allow for windows and views to the outside. Solartubes will provide natural daylight where feasible with the existing roof structure. This scheme will not be able to meet the requirements of the LEED credit for views.
- Existing building circulation will be improved by creating looped circulation in each of the instructional wings.
- Existing kitchen will be renovated to meet current HCPSS standards for food service.
- Mechanical, electrical and data systems will be upgraded.
- Ten existing portable classrooms will remain at the end of this project to accommodate the current student capacity.
  - Majority of full height walls will remain.
- An estimated five additional portable classrooms will need to be moved onto this site to accommodate the students during the phased occupied construction of the existing school.
- School will not have access to the paved play area for duration of construction (±18 months) due to the additional portable classrooms.
- The following spaces from the current HCPSS elementary school program do not exist in the existing building and will not be provided at the end of this project: testing area, restrooms within the kindergarten classrooms, gifted and talented classrooms, technology resource room, media production room, mini-auditorium, ensemble room, special education classroom and resource rooms, second teaching station for physical education.
- Site amenities will remain the same as the existing conditions after construction.
- Construction project will be designed to receive USGBC certification at LEED 'Certified' level.

Site Plan



SITE NOTES

ZONING: NT (NEW TOWN)

ACRES: ± 10

PARKING TABULATIONS

CAR SPACES = 77
(INCLUDING 4 HC SPACES)

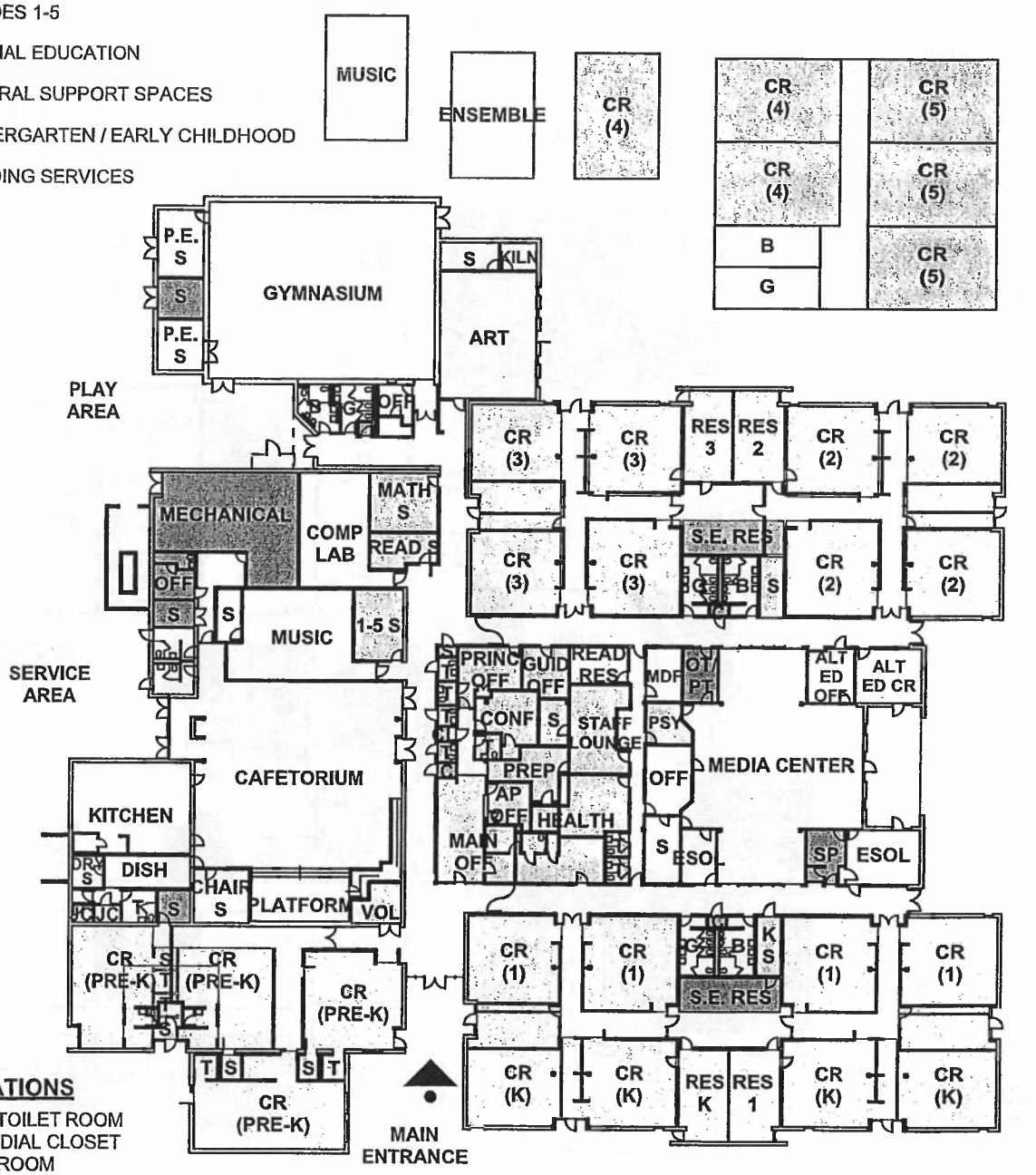
BUS SPACES = 8

NOTE: ALL SITE ELEMENTS TO REMAIN IN THIS SCHEME

Floor Plan

LEGEND

- = ADMINISTRATIVE SPACES
- = GRADES 1-5
- = SPECIAL EDUCATION
- = CENTRAL SUPPORT SPACES
- = KINDERGARTEN / EARLY CHILDHOOD
- = BUILDING SERVICES



ABBREVIATIONS

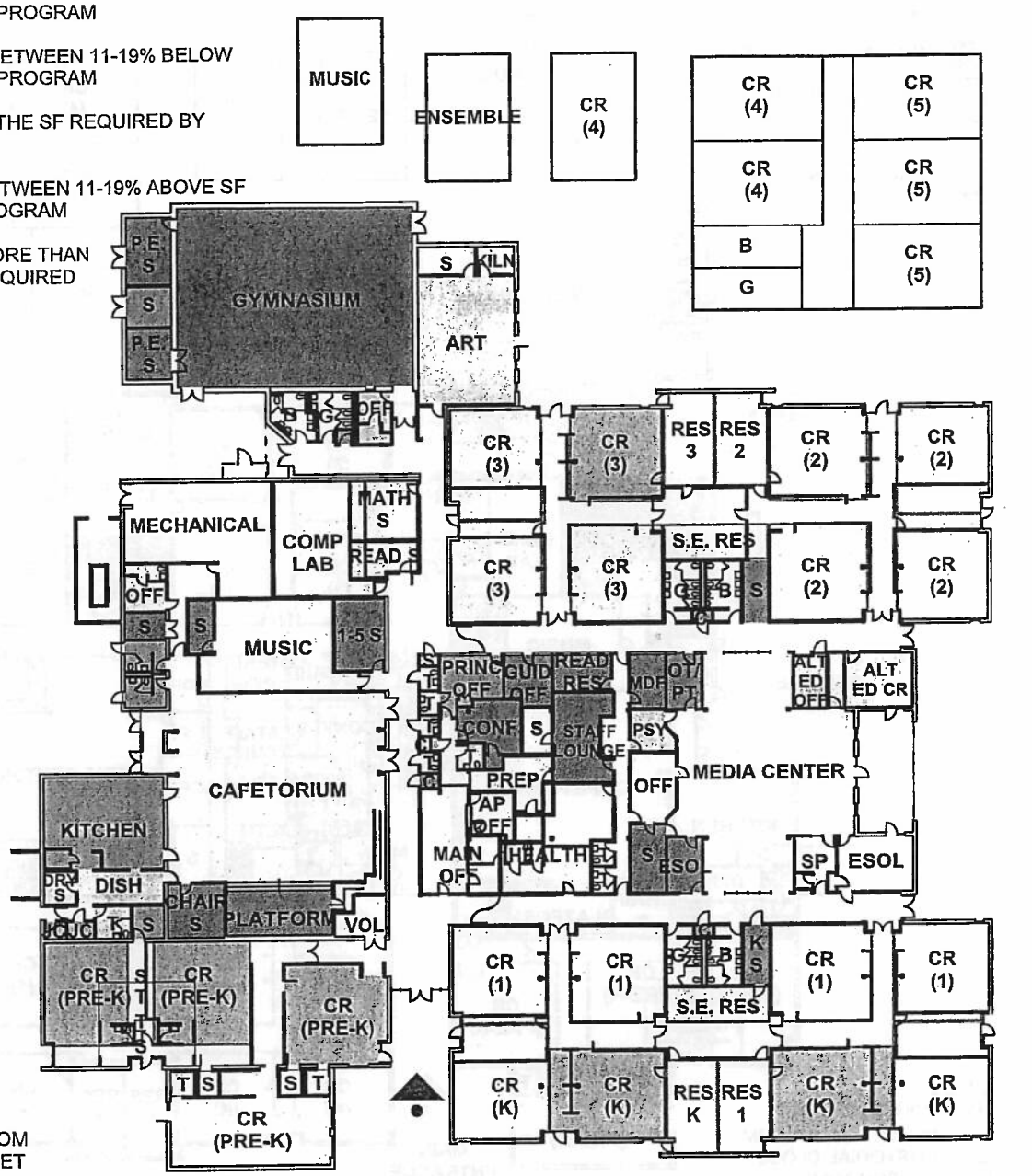
B	BOYS' TOILET ROOM
C	CUSTODIAL CLOSET
CR	CLASSROOM
E	ELECTRICAL CLOSET
G	GIRLS' TOILET ROOM
SP	SPEECH
S	STORAGE ROOM
T	TOILET ROOM
MDF	MAIN DISTRIBUTION FRAME ROOM

Existing Building = 54,089 gsf

Analysis of Scheme 1 Room Sizes

LEGEND

- = UNDERSIZED - MORE THAN 20% BELOW SF REQUIRED BY PROGRAM
- = UNDERSIZED - BETWEEN 11-19% BELOW SF REQUIRED BY PROGRAM
- = WITHIN 10% OF THE SF REQUIRED BY PROGRAM
- = OVERSIZED - BETWEEN 11-19% ABOVE SF REQUIRED BY PROGRAM
- = OVERSIZED - MORE THAN 20% ABOVE SF REQUIRED BY PROGRAM



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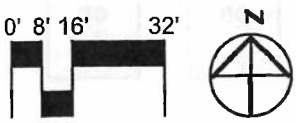

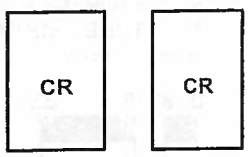

Scheme 1 Space Analysis

	2010 Ed. Spec. Modified for 500 Student Capacity			Scheme 1 Talbott Springs Elementary School			Program / existing differential	
	Area(s)	SF	Total Net	Area(s)	SF	Total Net	Area	%
Administration			**2,900**			**2,193**	**-707**	**-24%**
Secretarial/Reception (incl. closet)	1	500	500	1	552	552	52	10%
Principal's Office (incl. closet)	1	200	200	1	253	253	53	27%
Principal's Lavatory	1	50	50	1	35	35	-15	-30%
Asst. Principal's Office (incl. closet)	1	150	150	1	152	152	2	1%
Secure Testing Preparation Office & Storage Room	1	150	150	0	0	0	-150	-100%
Conference Rm.	1	400	400	1	260	260	-140	-35%
Parent Volunteer Room (incl. storage)	1	150	150	1	142	142	-8	-5%
Work Preparation Room (incl. storage)	1	400	400	1	366	366	-34	-9%
Satelite Work Room (incl. storage)	1	250	250	0	0	0	-250	-100%
Staff Lounge	1	600	600	1	380	380	-220	-37%
Adult Lavatory (including storage)	1	50	50	1	53	53	3	6%
Alternative Education			**550**			**482**	**-68**	**-12%**
Classroom (Observation)	1	400	400	1	349	349	-51	-13%
Office (Reading)	1	150	150	1	133	133	-17	-11%
Cafetorium / Kitchen			**5,060**			**5,118**	**58**	**1%**
Student Dining	1	3,000	3,000	1	3,155	3,155	155	5%
Platform	1	800	800	1	352	352	-448	-56%
Chair Storage	1	300	300	1	235	235	-65	-22%
Kitchen and Serving (incl. refrig. & freezer)	1	500	500	1	887	887	387	77%
Dishwashing Area	1	200	200	1	226	226	26	13%
Dry Storage	1	100	100	1	83	83	-17	-17%
Locker/Lavatory	1	80	80	1	90	90	10	13%
Janitor's Closet	1	40	40	2	45	90	50	125%
Kitchen Office	1	40	40	0	0	0	-40	-100%
Classrooms Grades 1-5 & Resource Rooms			**20,775**			**11,011**	**-9,764**	**-47%**
Grades 1-2 Classrooms *	8	800	6,400	8	728	5,824	-576	-9%
Grades 1-2 Lavatories (classroom access)	8	50	400	0	0	0	-400	-100%
Grades 3-5 Classrooms *	12	850	10,200	4	726	2,904	-7,296	-72%
(Grades 3-5 lavatories are located in the hallway and included in the gross square footage)								
Resource Rooms	6	400	2,400	4	366	1,464	-936	-39%
Grades 1-5 Storage Rooms	5	200	1,000	3	143	429	-571	-57%
Math (1) and Reading (2) Storage Rooms	3	125	375	2	195	390	15	4%
Kindergarten			**4,560**			**3,438**	**-1,122**	**-25%**
Kindergarten Classrooms *	4	1,040	4,160	4	830	3,320	-840	-20%
Kindergarten Lavatories (classroom access)	4	50	200	0	0	0	-200	-100%
Kindergarten Storage Rooms	5	40	200	1	118	118	-82	-41%
Computer Room			**850**			**820**	**-30**	**-4%**
Computer Room	1	850	850	1	820	820	-30	-4%
Custodial			**490**			**451**	**-39**	**-8%**
Storage Rooms	2	120	240	5	31	155	-85	-35%
Office/Storage Room (incl. storage)	1	150	150	1	151	151	1	1%
Ventilated Storage	1	100	100	1	145	145	45	45%

*Renovation goal for Kindergarten Classrooms is 880 SF.
*Renovation goal for Classrooms grades 1-5 is 750 SF.

Scheme 1 Space Analysis

	2010 Ed. Spec. Modified for 500 Student Capacity			Scheme 1 Talbott Springs Elementary School			Program / existing differential	
	Area(s)	SF	Total Net	Area(s)	SF	Total Net	Area	%
ESOL			700			481	-219	-31%
Primary Extended Learning Room (ESOL 1)	1	350	350	1	327	327	-23	-7%
Intermediate Extended Learning Room (ESOL 2)	1	350	350	1	154	154	-196	-56%
Gifted & Talented			800			0	-800	-100%
G/T Resource Room	1	750	750	0	0	0	-750	-100%
Storage Room	1	50	50	0	0	0	-50	-100%
Guidance			250			183	-67	-27%
Guidance Reception/Office/Counseling	1	250	250	1	183	183	-67	-27%
Health Suite			760			719	-41	-5%
Waiting Room	1	100	100	1	95	95	-5	-5%
Treatment/Medication	1	120	120	1	115	115	-5	-4%
Rest Area	1	200	200	1	186	186	-14	-7%
Office/Consult/Exam	1	100	100	1	95	95	-5	-5%
Examination/Isolation	1	100	100	1	95	95	-5	-5%
Student Lavatory (ADA) w/ hydraulic lift and	1	100	100	1	95	95	-5	-5%
Storage Room	1	40	40	1	38	38	-2	-5%
Library / Media Center			5,175			3,166	-2,009	-39%
Main Reading Room	1	2,800	2,800	1	2,568	2,568	-232	-8%
Technology Resource Room (incl. storage)	1	800	800	0	0	0	-800	-100%
Office/Work Space	1	240	240	1	248	248	8	3%
Media Production/Video Area	1	500	500	0	0	0	-500	-100%
Storage Room	1	335	335	1	195	195	-140	-42%
MDF	1	500	500	1	155	155	-345	-69%
Mini Auditorium			1,500			0	-1,500	-100%
Mini Auditorium	1	1,500	1,500	0	0	0	-1,500	-100%
Music			2,000			999	-1,001	-50%
General Music Room	1	950	950	1	896	896	-54	-6%
Ensemble Room	1	800	800	0	0	0	-800	-100%
Storage Room	1	250	250	1	103	103	-147	-59%
Physical Education			5,320			4,057	-1,263	-24%
Gymnasium	1	4,500	4,500	1	3,282	3,282	-1,218	-27%
Storage Room	1	560	560	2	215	430	-130	-23%
Office (incl. lavatory)	1	160	160	1	141	141	-19	-12%
Outdoor-Access Restrooms (2)	2	50	100	2	102	204	104	104%
Psychological Services			150			132	-18	-12%
Psychological Services Area	1	150	150	1	132	132	-18	-12%
Reading Resource			450			186	-264	-59%
Reading Resource Room	1	400	400	1	186	186	-214	-54%
Storage Room	1	50	50	0	0	0	-50	-100%
Special Education K-5			2,200			564	-1,636	-74%
Classroom	1	600	600	0	0	0	-600	-100%
Student Lavatory (ADA) w/ hydraulic lift & changing table	1	100	100	0	0	0	-100	-100%
S.E. Resource Rooms	5	300	1,500	2	282	564	-936	-62%

Scheme 1 Space Analysis

	2010 Ed. Spec. Modified for 500 Student Capacity			Scheme 1 Talbott Springs Elementary School			Program / existing differential	
	Area(s)	SF	Total Net	Area(s)	SF	Total Net	Area	%
Speech/Language Therapy			160			153	-7	-4%
Speech Language Therapy Room	1	160	160	1	153	153	-7	-4%
Special Education K-5 Occupational			814			155	-659	-81%
OT/PT Therapy Room	1	750	750	1	155	155	-595	-79%
Storage Room	1	64	64	0	0	0	-64	-100%
Visual Art			1,400			1,216	-184	-13%
Studio	1	1,200	1,200	1	1,002	1,002	-198	-17%
Kiln & Storage Room	1	200	200	2	107	214	14	7%
Subtotal Net Sq. Ft.			56,864			35,524	-21,340	-38%
Early Childhood Area (Pre-K)			4,520			3,584	-936	-21%
Preschool/Pre-K Classrooms	4	1,040	4,160	4	797	3,188	-972	-23%
Preschool/Pre-K Lavatories	4	50	200	4	48	192	-8	-4%
Storage Rooms	4	40	160	4	51	204	44	28%
Recreation & Parks			2,000			0	-2,000	-100%
Activity Room	1	1,800	1,800	0	0	0	-1,800	-100%
Storage/ Toilet	1	200	200	0	0	0	-200	-100%

Space Analysis Summary

	2010 Ed. Spec. Modified for 500 Student Capacity	Scheme 1 Talbott Springs Elementary School	Program / existing differential	
	S.F.	S.F.	Area	%
Total Net Sq.Ft.	63,384	39,108	-24,276	-38%
Gross Area Factor (Walls, Circulation, Toilets, Mech./ Elec. Rooms, Data Closets, etc.)	24,042	14,981	-9,061	-38%
Efficiency = Net / Gross	73%	72%		
Gross Area Total	87,426	54,089	-33,337	-38%

Civil Design Narrative

Scheme 1 consists of a design solution that would focus only on the building. All existing site elements would remain as is. Any areas on the site that are disturbed by portable classrooms or contractor staging or contractor access roads during construction will be replaced in kind.

DRIVES, WALKS AND PARKING

The existing bus loop accommodates eight school buses with its access at Whiteacre Road. The existing parking lot accommodates 77 parking spaces including four handicap parking spaces along with its access being at Whiteacre Road.

UTILITIES

Refer to page 18 for description of existing utilities on site, which will remain in this scheme.

ADDITIONAL INFORMATION

Landscape Plan - No landscaping would be added for this scheme.

Grading Permit - A grading permit would not be required for this scheme.

Columbia Association - Meetings will not be required with the Village of Oakland Mills if the site is not affected by the scope of work for this scheme.

Architectural Design Narrative

Scheme 1 retains all existing spaces that are currently up to code and meets the minimum requirement of 660 square feet to be considered a teaching station as dictated by the HCPSS "Guidelines Manual for Renovations and Modernizations of Existing Schools". Of the three schemes, this one presents the least impact to the existing Talbott Springs Elementary School building, however it does not address the school's capacity needs.

The floor plan illustrates most spaces remaining intact and receiving cosmetic upgrades, new finishes (flooring, painting, ceiling, etc) and new cabinetry (if applicable) along with new mechanical, electrical and telecommunication systems.

Most Classroom spaces will remain in their current locations and configurations, but existing partial height walls will be removed and replaced with full-heights walls and new hollow metal doors at the entrance.

All areas will become handicap accessible. This will require most of the single-use toilet rooms to be renovated to increase their size for proper clearances, new plumbing fixtures and toilet accessories.

The administrative area and health suite will receive more extensive renovations to increase the size of the spaces by taking space currently used as a staff lounge and staff workrooms. This scheme will not allow for a security vestibule.

Circulation within the school will be improved by connecting existing corridors which will provide a circulation loop within each of the existing instructional wings.

The organization of various school departments will be improved; however, some departments will still be fragmented due to space and structural constraints (i.e. music will remain in existing portable classrooms which are remote from the existing platform).

A preliminary LEED analysis shows that the building in Scheme 1 can achieve a LEED "Certified" level under the latest version of "LEED 4.0" as published by the United States Green Building Council (USGBC). See page 61.

Construction of Scheme 1 will be completed in phases since the school will need to remain occupied during the ±18 months.

Structural Design Narrative

This design will consist of a full systemic renovation to the existing building to bring it up to the current code. All portables would remain. No structural modification is planned under this scheme.

Mechanical Design Narrative

The proposed mechanical system will consist of maintaining the existing high efficiency chiller / cooling tower arrangement and replacing the existing cast iron sectional boilers with high efficiency gas-fired condensing type boilers. The existing two-pipe chilled/heating water system will be replaced with a four-pipe chilled water and heating water distribution system throughout the school.

The existing air-handling units dating back to the original construction in 1973 have reached the end of their useful service life. The 2015 improvements described previously were improvements to the existing air-handling unit systems and will no longer be useful for the replacement systems described below.

HEATING AND COOLING SYSTEMS

The existing boilers will be replaced by two or three equally sized high efficiency gas-fired condensing type boilers and will occupy the same space as the existing boilers. A pair of heating water distribution pumps will circulate heating water throughout the school during the heating season. Variable frequency drives will be provided for the heating water pumps to vary flow based on the systems differential pressure. A maximum heating water supply temperature of 140 degrees F will be utilized, with this supply water temperature being reset based on the outdoor air temperature. The heating water system will provide hot water to the dedicated outdoor air system units, fan coil units, unit heaters, convectors, and baseboard radiation throughout the building.

The existing mechanical room does not have adequate available space to accommodate the new heating water pumps, expansion tank, and water treatment systems. These components will require an additional 180 square feet of floor space. At this time, it is assumed that this space can be taken from the adjacent computer lab.

The existing high efficiency chiller and associated cooling tower will remain as currently installed to serve the school. The existing dual temperature and condensing water pumps will also remain to circulate chilled water and condenser water during the cooling season. A variable primary chilled water arrangement will be utilized where chilled water is piped from the chillers to a pair of chilled water distribution pumps where it is then circulated throughout the building. The chilled water system will provide chilled water to the dedicated outdoor air system units, air-handling units, and fan coil units.

The chilled water and heating water pumping systems will be provided with N+1 redundancy, such that the operation of the school can be maintained in the event of a single pump failure. New (and existing) pumping systems will be base-mounted end-suction type pumps, arranged in a lead/lag configuration. Variable frequency drives will be provided for reduced energy consumption during periods of reduced system demand.

The existing refrigerant monitoring and purge exhaust systems will remain. The existing combustion air louver will be partially blanked off and will be utilized for the refrigerant purge and room ventilation systems.

The existing two-pipe chilled/heating water piping distribution system will be replaced throughout the entire school with a four-pipe chilled water system. This type of system provides the ability to have independent heating and cooling year-round, while delivering a high level of energy efficiency. The existing mechanical room piping will be reconfigured and the existing distribution piping will be replaced throughout the school.

Water expansion, air removal, and chemical treatment systems will be provided for the new chilled water and heating water piping systems.

HVAC SYSTEMS

Classroom Areas

Classroom areas throughout the school will be provided with four-pipe vertical fan coil units for space conditioning. These units will be located within the penthouses areas, with supply and return air ductwork extending from these units to the classroom served.

A series of dedicated outdoor air system (DOAS) units complete with plate heat exchangers, enthalpy wheels, chilled water cooling coils, and hot water heating coils will provide code required ventilation air to the classroom area served. These units will be located in either the penthouses or exposed on the roof depending on available space within the penthouses. Airflow supplied from these units will be dehumidified, conditioned, and delivered at a room neutral temperature either to each space or to each fan coil unit depending on the DOAS unit location. Exhaust airflow from classrooms, restrooms, and storage rooms will be routed through each DOAS unit's plate heat exchanger and enthalpy wheel for pre-conditioning of outdoor air. Minimum ventilation airflow rates will be as required by ASHRAE Standard 62 and the International Mechanical Code.

Administrative Areas

The administrative areas (including the guidance and health suite areas) will be provided with space conditioning through a variable refrigerant flow (VRF) system. This system will be complete with heat recovery type air-cooled compressors. The use of ceiling cassette type VRF terminal units is anticipated, promoting good access for filter replacement.

A single dedicated outdoor air system with an enthalpy wheel, direct expansion (DX) cooling coil, hot gas reheat coil, and hot water heating coil will be provided for delivering conditioned ventilation airflow to the administrative areas. Airflow supplied from this unit will be dehumidified, conditioned, and delivered directly to each space at a room neutral temperature. Exhaust airflow from offices, conference rooms, restrooms, and storage room areas will be routed through the dedicated outdoor air unit's DOAS unit's plate heat exchanger and enthalpy wheel for pre-conditioning of outdoor air.

Main Reading Area

A single-zone rooftop air-handling unit will be provided for space conditioning and ventilation within the main reading area of the media center. This rooftop air-handling unit will be provided with a chilled water cooling coil, hot water preheat and heating coils, and airside economizer operation. Supply and return air fans will be equipped with variable frequency drives for reducing airflow quantities during periods of reduced cooling demand. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy.

Gymnasium Area
A single-zone heating-only rooftop air-handling unit will be provided for space conditioning and ventilation within the gymnasium area. This rooftop unit will be provided with a hot water heating coil and airside economizer operation. Supply and return air fans will be equipped with variable frequency drives for airflow balancing purposes. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy.

In addition to the rooftop air-handling unit, a "summer ventilation" system will also be provided, consisting of multiple exhaust fans and companion outdoor air intakes for increased room air-change rates during the summer months.

Cafetorium, Platform, and Serving Lines
Similar to the main reading area, a single-zone rooftop air-handling unit will be provided for space conditioning and ventilation within the cafetorium, platform, and serving Lines. This rooftop air-handling unit will be provided with a chilled water cooling coil, hot water preheat and heating coils, and airside economizer operation. Supply and return air fans will be equipped with variable frequency drives for reducing airflow quantities during periods of reduced cooling demand. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy. Excess outdoor air quantities will be transferred to the adjacent kitchen area for exhaust hood make-up.

Kitchen Area
The existing heating and ventilation air-handling unit serving the kitchen will remain.

Controls System
The existing controls system consists of a combination of pneumatic and DDC type controls. The new building automation system will consist of only DDC components throughout the entire school. Damper and valve components will be provided with electric or electronic actuation. DDC control components will be utilized for all fan coil units and dedicated outdoor air systems. All control system components will be interfaced with the central HCPSS energy management control system for remote monitoring and energy management routines.

Plumbing Design Narrative

STORM WATER PIPING SYSTEM

Existing storm water drainage, including roof drains, overflow drains, and above-grade storm water piping systems are original and will be replaced. Above- and below-grade piping will be constructed from cast-iron material, with no-hub piping connections provided only for above-grade piping components. Below-grade piping will remain to the extent possible.

SANITARY AND VENT PIPING SYSTEM

Sanitary waste and vent piping systems will be modified to align with the revised architectural floor plan arrangement. Similar to the storm water piping, above- and below-grade sanitary and vent piping will be constructed from cast-iron, with no-hub piping connections provided only for above-grade piping components. Below-grade piping will remain to the extent possible. Vent piping will terminate at the roof level, with a minimum 25-foot separation provided between vent piping terminations and any outdoor air intake locations. Existing vent piping within 25-feet of any new outdoor air intakes will be relocated. New sanitary piping systems will connect to existing sanitary piping to the extent possible.

DOMESTIC WATER PIPING SYSTEM

The existing six-inch combination fire/water service entering the building within the main mechanical room area will remain. A new domestic water service, complete with basket strainer and dual reduced pressure zone backflow preventers will separate the domestic water and fire services prior to distributing water throughout the school. The existing domestic water piping will be replaced throughout, with new piping distributed from the main mechanical room area to plumbing fixtures and equipment located throughout the school.

The existing gas-fired water heaters will remain to provide domestic hot water for the school. Both 140-degrees F (for the kitchen area only) and 110-degrees F domestic hot water is distributed throughout the school, with each piping loop complete with a dedicated hot water circulation pump and expansion tank. The existing distribution system will be modified as required to accommodate any new plumbing fixtures.

PLUMBING FIXTURES

Classroom sinks will be replaced along with any casework improvements. Other plumbing fixtures that are required to be upgraded to meet ADA requirements will also be replaced.

NATURAL GAS PIPING SYSTEM

The existing gas service will be evaluated to determine if it needs to be upgraded. Gas piping will serve the emergency generator, boilers, and domestic water heaters.

Fire Protection Design Narrative

FIRE SUPPRESSION SYSTEM

Replacement of existing branch sprinkler piping and associated sprinkler heads is anticipated for areas where ductwork modifications are required, which is anticipated to be a majority of the existing school. Sprinkler mains will be modified to the extent necessary to accommodate new ductwork. Since the school is currently provided with sprinkler coverage without a fire pump, the use of a fire pump is not anticipated. However, this available municipal water pressure will be further evaluated based on the results of a new fire flow test during the design phase. All work will be specified to conform to standards of the National Fire Protection Association (NFPA) and will include requirements for performance verification through hydraulic calculations.

FIRE ALARM SYSTEM

A new fire alarm system with voice evacuation will replace the existing fire alarm system in its entirety. This will include a new fire alarm control panel with voice evacuation and new addressable fire alarm devices such as manual pull stations, smoke detectors, duct smoke detectors with remote test stations, and audible and visual notification devices (combination speaker/strobes and strobes).

Electrical Design Narrative

The electrical systems include power, lighting, lighting controls, and fire alarm systems. The existing power system will be utilized to serve new HVAC equipment. Fluorescent lighting will be replaced with LED lighting in spaces that do not currently meet the lighting power density (LPD) requirements of the 2015 International Energy Conservation Code (IECC). New lighting controls will be added throughout in order to meet the energy code requirements of the 2015 IECC. The fire alarm system will be upgraded to have voice evacuation capability to meet requirements of the 2015 International Building Code.

ELECTRICAL SERVICE

The existing BGE electrical service will remain and be reused.

POWER DISTRIBUTION

The existing 277/480-volt, 1600-ampere main switchboard will be utilized to serve new mechanical DOAS rooftop units. The main circuit breaker may need to be changed from an 80 percent rated circuit breaker to a 100 percent rated circuit breaker, depending on the additional mechanical loads required for the systemic renovation.

There are seven spaces in the distribution section of the main switchboard for installation of 250-ampere frame circuit breakers. Circuit breakers can be added in the main switchboard to serve new DOAS rooftop units and new panelboards for power connections to new fan coil units. A 120/208-volt panelboard will be added to serve a new VRF system in the main office area.

EMERGENCY PUBLIC SHELTER REQUIREMENT

The Maryland Emergency Management Agency (MEMA) may designate Talbott Springs Elementary School as an emergency public shelter. It is anticipated that Howard County Public School System will request a waiver for this requirement.

GENERATOR POWER DISTRIBUTION

The existing generator power system will remain and be reused.

LIGHTING

In spaces where existing fluorescent lighting does not meet the LPD requirements of the 2015 IECC, fluorescent lighting luminaires will be replaced with equivalent LED lighting luminaires.

The building exterior lighting will be replaced with LED full-cutoff dark sky compliant luminaires. The existing LED pole lights will remain and be reused.

LIGHTING CONTROLS

New lighting controls will be provided throughout in order to meet the requirements of the 2015 IECC. Lighting control system will be by Eaton/Cooper (Greengate series), WattStopper (Digital Lighting Management DLM series), or Acuity Brands (Blue Box / MicroPanel series). No other lighting controls manufacturers will be specified.

Where existing fluorescent lighting will remain, existing circuiting may need to be reconfigured in order to meet 2015 IECC requirements for spaces that require light reduction in which the lighting load in a space is reduced by 50 percent with a reasonably uniform illumination pattern.

Stand-alone lighting relay room controllers will be utilized. Networked systems will not be acceptable. Low-voltage lighting control stations (switches) will be used to manually control lighting in spaces. Ceiling-mounted occupancy sensors will be used throughout the school. Daylight sensors (for daylight harvesting) will only be used where required per 2015 IECC in rooms where there is more than 150 watts of general lighting within sidelight or toplight daylight zones. The existing lighting contactor in the main mechanical room will remain to control existing exterior lighting.

Telecommunications Design Narrative

TELECOMMUNICATION ROOMS

Existing Telecommunications Room (aka MDF) will remain, but because the currently installed cabling system is located in occupied spaces and storage rooms, the cabling in place will most likely need to be removed and replaced with Category 6 cabling. Fiber optic backbone cabling should also be installed, connecting all telecom spaces back to the main telecom equipment room.

STRUCTURED CABLING SYSTEM (DATA AND TELEPHONE)

Any renovations of the school that includes new systemic system upgrades will require the replacement of the communications infrastructure systems. Wireless connectivity via Category 6A cabling will need to be available throughout the building to allow for higher throughput rates.

TELEPHONE SYSTEM

The new telephones will meet the latest HCPSS standards. Voicemail servers will be incorporated into the design to allow for a more unified communications platform. Telephone handsets will also be provided in offices and classrooms. The school will also need to maintain a minimum number of separate incoming analog telephone lines for fax, fire and security connections throughout the facility.

SECURITY SYSTEM

Architectural changes necessitate the installation of new security equipment that will be current to HCPSS standards and include warranted equipment. The security systems shall include video surveillance (CCTV), intrusion detection, access control and entry door video intercom systems.

CCTV equipment shall include UTC Interlogix servers, network video recorders, digital video recorders and control software located in the new TER/MDF. Associated CCTV cameras shall be located strategically throughout the facility to monitor entry/egress, public spaces and sensitive areas. Camera infrastructure shall be Cat 6 UTP cables and dedicated switching/distribution equipment.

The intrusion detection system shall consist of a DSC main panel with associated motion detection and perimeter door contacts sensors. Two and four conductor cable shall be used to connected panels and sensors to monitor various zones of the facility. The system shall be locally and remotely monitored and accessed. The system shall also interact with the AMAG door access control system. The access control system shall include strategically placed card readers on exterior and interior doors to control the access to the facility. In addition, an AIPHONE entry door video intercom system shall be installed on main points of entry to the facility. These locations shall communicate with the main office and security office with two-way audio and visual communications. The system shall allow momentary lock release to allow a visitor to enter the facility.

CLASSROOM AUDIO-VISUAL

All existing televisions and chalkboards in classrooms and labs should be removed.

Each classroom will be equipped with a wall mounted short-throw LCD projector and projection board flanked by two marker boards per HCPSS Standards, if not already provided. All audio-visual connections will be located at the teacher's standard wardrobe cabinet and at the teacher's desk. A sound enhancement system with ceiling mounted speakers will be installed in all instructional areas to equalize sound levels. Each classroom should have data drop provided at each teacher's desk for computer connections along with at least two student drops and wireless capabilities. Additional data cables may be needed for other equipment within each space. The outlet configurations will be in accordance with the latest HCPSS standards.

VIDEO DISTRIBUTION SYSTEM

A new IP digital video distribution system will be designed to operate over the data IP network which meets the HCPSS's current standards for video streaming. The system will allow for local content and channel insertion intended for redistribution throughout the facility as well as streaming live and stored content.

Kitchen Design Narrative

FIINISHES

Floors: Existing smooth surface quarry tile will be replaced by new quarry tile with a slip resistant abrasive grain finish.

Walls: Existing painted drywall will be covered with new glazed tile for easy cleaning.

Ceilings: Existing exposed ceilings in dry storage, and serving areas will be replaced with new fire retardant ceiling panels.

Lighting: Existing light fixtures will be replaced with new LED light fixtures.

AREAS

Receiving: The existing single 3'-0" door with screen will be replaced with a 4'-0" wide door and screen door.

Dry Storage: Existing finishes will be replaced with quarry tile and fire retardant ceiling planes.

Walk-in Freezer: Existing walk-in Freezer will be replaced.

Kitchen: Existing cooking equipment will be replaced. Existing gas, water and drain lines around cooking area will be replaced. Existing refrigerators will be replaced along with worktables.

Serving: Serving area will be reconfigured to provide more serving options.

Existing hand washing sinks will be replaced to meet current health code. Additional hand sinks will also be provided.

The existing pass-thru hot cabinet will be replaced. New energy-saving appliances will be provided.

Dishwashing: Existing dishwashing elements will need to be replaced.

Two new serving lines, new hood and double stack convection oven and steamer and replacement of existing walk-In box.

Sustainable 'Green' Design Goals

For scheme 1, the renovated school and additions should achieve a 'Certified' level from the LEED (Leadership in Energy and Environmental Design) rating system, making this facility a 'Green' school.

Simply stated, a 'Green' school is a building designed to conserve energy, water, and materials, thus reducing negative impacts on human health and the environment. A 'Green' learning environment provides natural daylight, enhanced classroom acoustics, improved indoor air quality, thermal comfort, and opportunities to integrate green features into the school's curriculum.

This project will be required to use the new LEED 4.0 rating system for schools. An 'in progress' LEED scorecard is shown below which summarizes the credits most likely obtainable at this time. As the project continues to evolve, new credits may be possible while others may become increasingly difficult to engineer or too costly to provide. At this time we have identified 45 likely credits (with an additional '33 possible credits') allowing for the loss of some and still complying with the goal of a LEED 'Certified' Building.

LEED Scorecard

tca | architects — LEED for SCHOOLS (v4)

Scheme 1 - Talbott Springs Elementary School
Howard County Public School System
November 2016

Credit — Integrative Process

LT Location & Transportation — Possible Points: 15

	Credit	LEED for Neighborhood Development Location (15 credits)
1	Credit	Sensitive Land Protection
	Credit	High Priority Site (2 credits)
2	Credit	Surrounding Density and Diverse Uses (5 credits)
4	Credit	Access to Quality Transit (4 credits)
1	Credit	Bicycle Facilites
1	Credit	Reduced Parking Footprint
1	Credit	Green Vehicles

3 7 Total Location & Transportation Credits

SS Sustainable Sites — Possible Points: 12

R	Prereq	Construction Activity Pollution Prevention
R	Prereq	Environmental Site Assessment
1	Credit	Site Assessment
1	Credit	Site Development - Protect or Restore Habitat (2 credits)
1	Credit	Open Space
	Credit	Rainwater Management (4 credits)
1	Credit	Heat Island Reduction (2 credits)
	Credit	Light Pollution Reduction
	Credit	Site Master Plan
1	Credit	Joint use of Facilities

5 0 Total Sustainable Sites Credits

WE Water Efficiency — Possible Points: 12

R	Prereq	Outdoor Water Use Reduction
R	Prereq	Indoor Water Use Reduction
R	Prereq	Building-level Water Metering
2	Credit	Outdoor Water Use Reduction (2 credits)
3 4	Credit	Indoor Water Use Reduction (7 credits)
2	Credit	Cooling Tower Water Use (2 credits)
1	Credit	Water Metering

5 7 Total Water Efficiency Credits

EA Energy and Atmosphere — Possible Points: 31

R	Prereq	Fundamental Commissioning and Verification
R	Prereq	Minimum Energy Performance
R	Prereq	Building-Level Energy Metering
R	Prereq	Fundamental Refrigerant Management
6	Credit	Enhanced Commisioning (6 credits)
4 4	Credit	Optimize Energy Performance (16 credits)
1	Credit	Advanced Energy Metering
	Credit	Demand Response (2 credits)
	Credit	Renewable Energy Production (3 credits)
1	Credit	Enhanced Refrigerant Management
	Credit	Green Power and Carbon Offsets (2 credits)

10 6 Total Energy and Atmosphere Credits

MR Materials and Resources — Possible Points: 13

R	Prereq	Storage & Collection of Recyclables
R	Prereq	Construction and Demolition Waste Management Planning
1 1	Credit	Building Life-Cycle Impact Reduction (5 credits)
1 1	Credit	Building Product - Environmental Declarations (2 credits)
1 1	Credit	Building Product - Raw Materials (2 credits)
2	Credit	Building Product - Material Ingredients (2 credits)
2	Credit	Construction and Demolition Waste Management (2 credits)

7 3 Total Materials and Resources Credits

EQ Indoor Environment Quality — Possible Points: 16

R	Prereq	Minimum IAQ Performance
R	Prereq	Environmental Tobacco Smoke (ETS) Control
R	Prereq	Minimum Acoustical Performance
2	Credit	Enhanced IAQ Strategies (2 credits)
3	Credit	Low-Emitting Materials (3 credits)
1	Credit	Construction IAQ Management Plan
1 1	Credit	IAQ Assessment (2 credits)
1	Credit	Thermal Comfort
1 1	Credit	Interior Lighting (2 credits)
1 1	Credit	Daylight (3 credits)
1	Credit	Quality Views
1	Credit	Acoustic Performance

10 5 Total Indoor Environment Quality Credits

IN Innovation — Possible Points: 6

4 1	Credit	Innovation (5 credits)
1	Credit	LEED Accredited Professional

5 1 Total Innovation Credits

RP Regional Priority — Possible Points: 4

4	Credit	Regional Priority (4 credits)

0 4 Total Regional Priority Credits

45 Total Credits (33 'Maybe' Credits) Possible Points: 110

Key to Possibility of Earning Credit: R = Required # = Yes # = Maybe X = No

Project Credit Totals: Certified 40–49 Silver 50–59 Gold 60–79 Platinum 80+

Detailed Cost Estimate of Scheme 1

IAC/PSCP FORM 302.4

COST ESTIMATE SUMMARY

LEA: Howard County Public School System
PROJECT TITLE: Talbott Springs Elementary School
DATE: 4/6/2017
PSC NO.

Cost Estimate for: Feasibility Studies Scheme 1 [ ] Design Development [ ] Construction Document

Planned Bid Date
Design Capacity: 500 Students
Existing Wall Perimeter

Building Gross Area
New/Add S.F.
Renovation 54,089 S.F.
Total 54,089 S.F.

Acres of Site
Developed
Undeveloped
Total

General Building Description (number of stories, type of construction, etc.): One story, structural steel framed (except at masonry load bearing walls around gymnasium and cafeteria), with concrete slab on grade, composite steel framed slab at mezzanines and open web steel joists at roof.

C.S.I DIV	CATEGORY	ESTIMATED COST OF NEW CONSTRUCTION	ESTIMATED COST OF RENOVATION	TOTAL COST
00 00 00	PROCUREMENT & CONTRACTING REQUIREMENTS	$0	$0	$0
01 00 00	GENERAL REQUIREMENTS	$0	$1,059,115	$1,059,115
02 00 00	EXISTING CONDITIONS	$0	$112,862	$112,862
03 00 00	CONCRETE	$0	$8,680	$8,680
04 00 00	MASONRY	$0	$239,687	$239,687
05 00 00	METALS	$0	$0	$0
06 00 00	WOOD, PLASTICS & COMPOSITES	$0	$0	$0
07 00 00	THERMAL & MOISTURE PROTECTION	$0	$125,916	$125,916
08 00 00	OPENINGS	$0	$351,962	$351,962
09 00 00	FINISHES	$0	$1,017,685	$1,017,685
10 00 00	SPECIALTIES	$0	$76,161	$76,161
11 00 00	EQUIPMENT	$0	$494,862	$494,862
12 00 00	FURNISHINGS	$0	$296,739	$296,739
13 00 00	SPECIAL CONSTRUCTION	$0	$250,916	$250,916
14 00 00	CONVEYING EQUIPMENT	$0	$0	$0
21 00 00	FIRE SUPPRESSION	$0	$192,297	$192,297
22 00 00	PLUMBING	$0	$352,463	$352,463
23 00 00	HVAC	$0	$3,213,506	$3,213,506
25 00 00	INTEGRATED AUTOMATION	$0	$0	$0
26 00 00	ELECTRICAL	$0	$623,977	$623,977
27 00 00	COMMUNICATIONS	$0	$39,274	$39,274
28 00 00	ELECTRONIC SAFETY & SECURITIES	$0	$269,217	$269,217
31 00 00	EARTHWORK	$0	$19,246	$19,246
32 00 00	EXTERIOR IMPROVEMENTS	$0	$34,717	$34,717
33 00 00	UTILITIES	$0	$0	$0
34 00 00	TRANSPORTATION	$0	$0	$0
35 00 00	WATERWAY & MARINE CONSTRUCTION	$0	$0	$0
40 00 00	PROCESS INTEGRATED	$0	$0	$0
41 00 00	MATERIAL PROCESSING & HANDLING EQUIPMENT	$0	$0	$0
42 00 00	PROCESS HEATING, COOLING & DRYING EQUIP.	$0	$0	$0
43 00 00	PROCESS GAS LIQUID & HANDLING & PURIFICATION & STORAGE EQUIPMENT	$0	$0	$0
44 00 00	POLLUTION & WASTE CONTROL EQUIPMENT	$0	$0	$0
45 00 00	INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT	$0	$0	$0
46 00 00	WATER & WASTE WATER EQUIPMENT	$0	$0	$0
48 00 00	ELECTRICAL POWER GENERATION	$0	$0	$0
	TOTAL	$0	$8,779,283	$8,779,283

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Scheme 2

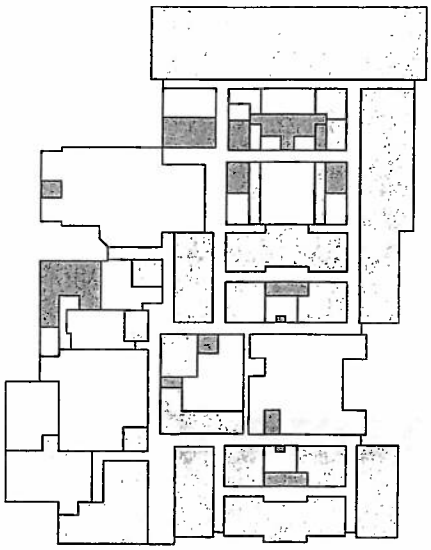
Talbott Springs Elementary School

Summary of Scheme 2
Major Renovations and Additions to Existing School

Scheme 2 provides all spaces from the 2010 HCPSS Elementary School Educational Specifications within the school building.

Area of Light Renovation	10,000 gsf
Area of Light Renovation	44,089 gsf
Area of New Addition	± 33,581 gsf
Total Area	**± 87,670,gsf**
Construction Duration (occupied)	**± 27 months**
LEED certification level	**'Certified'**
Building Cost	**$22,253,869**
Site Cost	$ 606,675
Demolition Cost	$ 331,969
Phased Construction Cost	$ 459,131
Total Construction Cost	**$23,651,644**

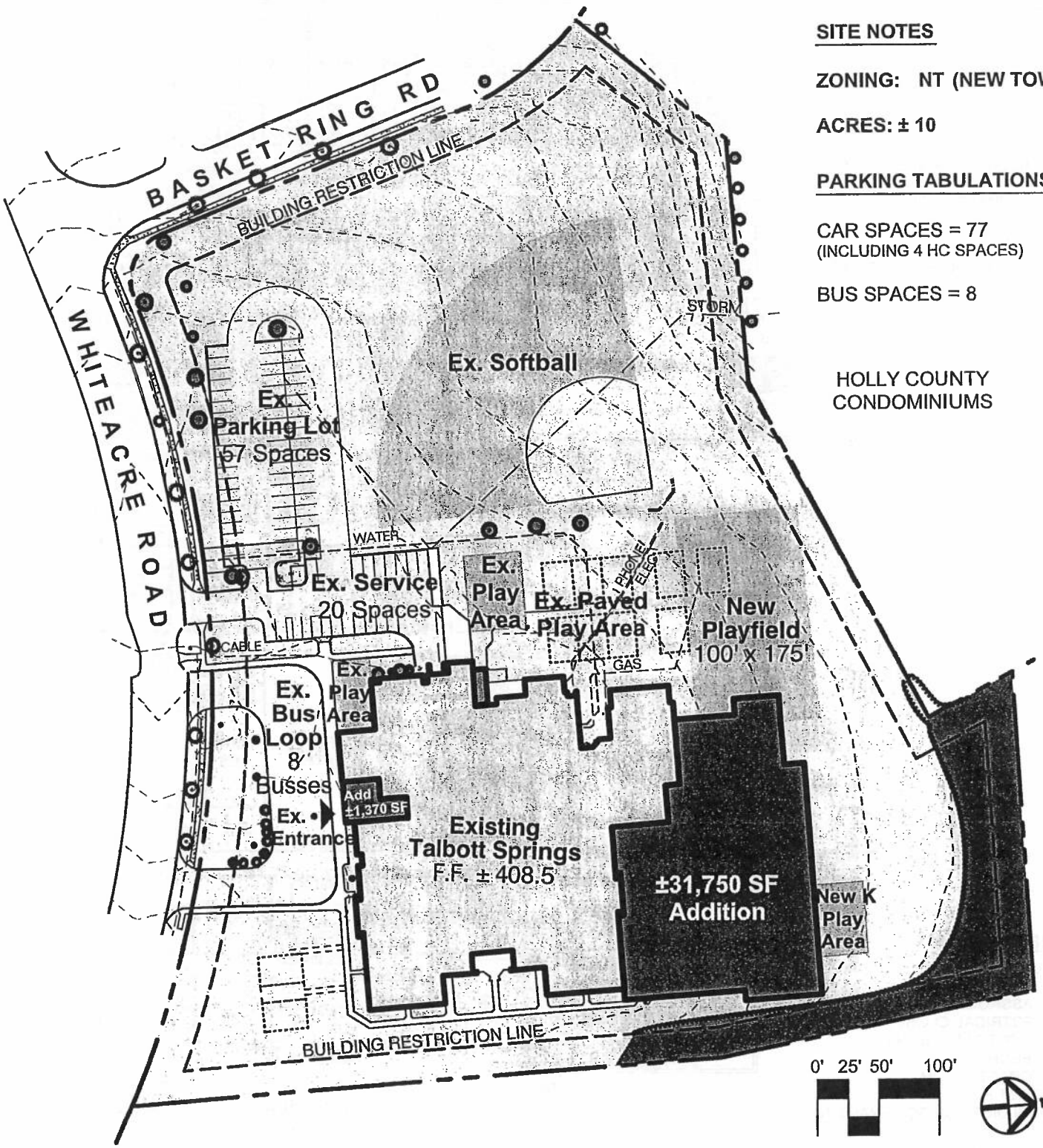
Note: Phased Construction Costs include both the cost of relocating the existing portable classrooms and the cost of temporary construction.



Scheme 2 Design Attributes:

- Existing partial height drywall partitions will be removed along with many of the existing masonry construction. Classrooms will become fully enclosed and will receive new finishes, cabinetry, doors, data, electrical and mechanical systems to meet current HCPSS design standards.
- Many of the classrooms will have windows or views to the outside. Solatubes will be provided for natural daylight where feasible with the roof structure. This scheme will not be able to meet the requirements of the LEED credit for views.
- Existing building circulation will be improved by creating looped circulation in each of the instructional wings.
- A new administrative suite will be located in a small addition in front of the school to provide a new security vestibule and better supervision of the main entrance.
- Early Childhood classrooms, mini-auditorium, auxiliary gym, special education room and additional classrooms will be located in the newly constructed addition.
- 40% of the classrooms will be located within the existing building, therefore these classrooms will meet the HCPSS "Guidelines Manual for Renovations and Modernizations of Existing Schools" but will be undersized in comparison to the classrooms in Scheme 3 which will be designed to meet the current HCPSS elementary school program for square footage.
- A new addition will be constructed to accommodate the new kitchen which will meet current HCPSS standards for food service.
- Mechanical, electrical and data systems will be upgraded for the entire building.
- Eight of the existing portable classrooms will be required to be relocated on site to make room for the construction of the new addition. These portable classrooms will be removed from the site at the completion of the project.
- School will not have access to most of the play fields for duration of construction (±27 months) due to the relocated portables and the contractor's staging area.
- Site amenities will remain the same as the existing conditions after construction.
- Construction project will be designed to receive USGBC certification at LEED 'Certified' level.

Site Plan



SITE NOTES

ZONING: NT (NEW TOWN)

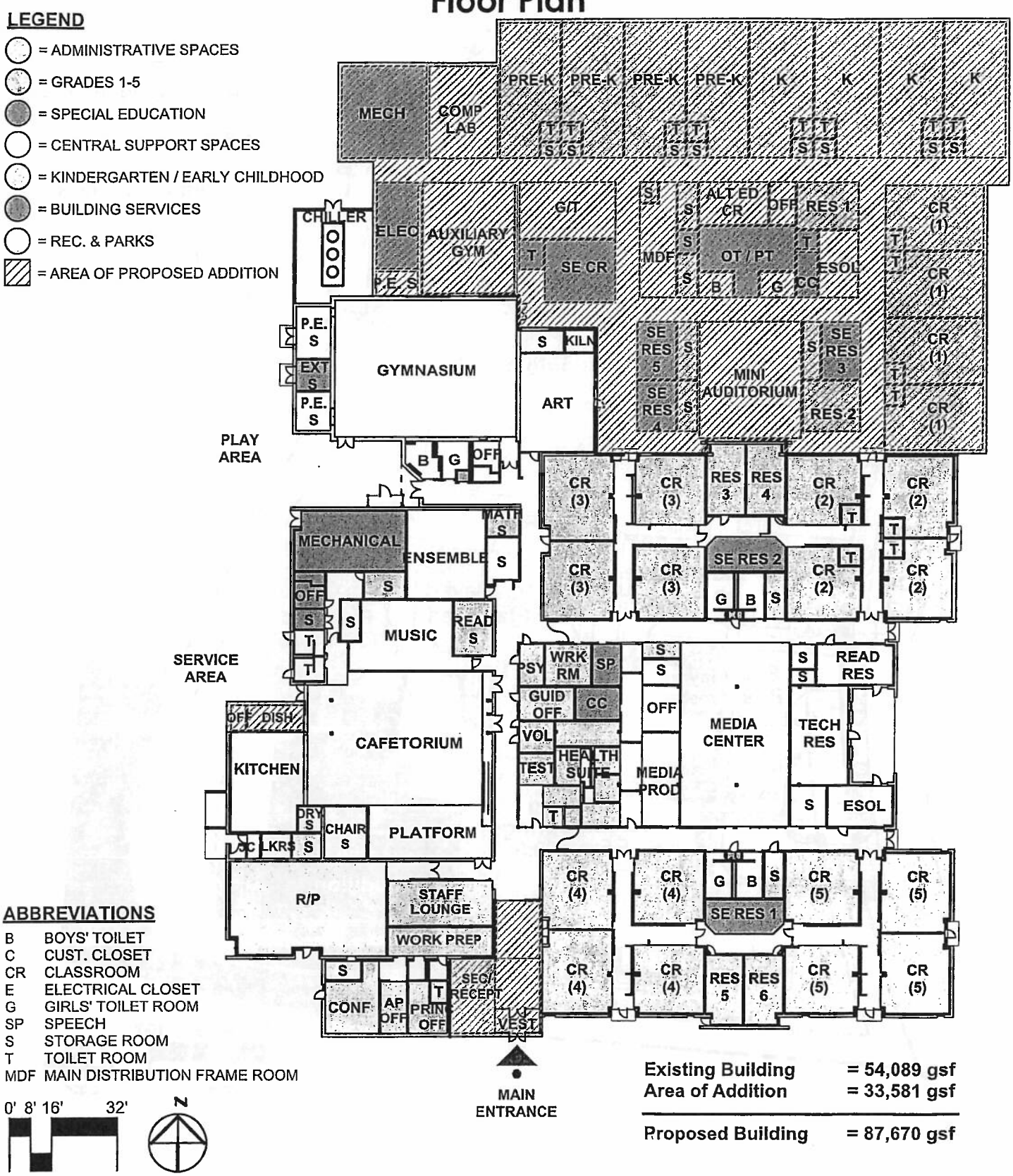
ACRES: ± 10

PARKING TABULATIONS

CAR SPACES = 77
(INCLUDING 4 HC SPACES)

BUS SPACES = 8

Floor Plan

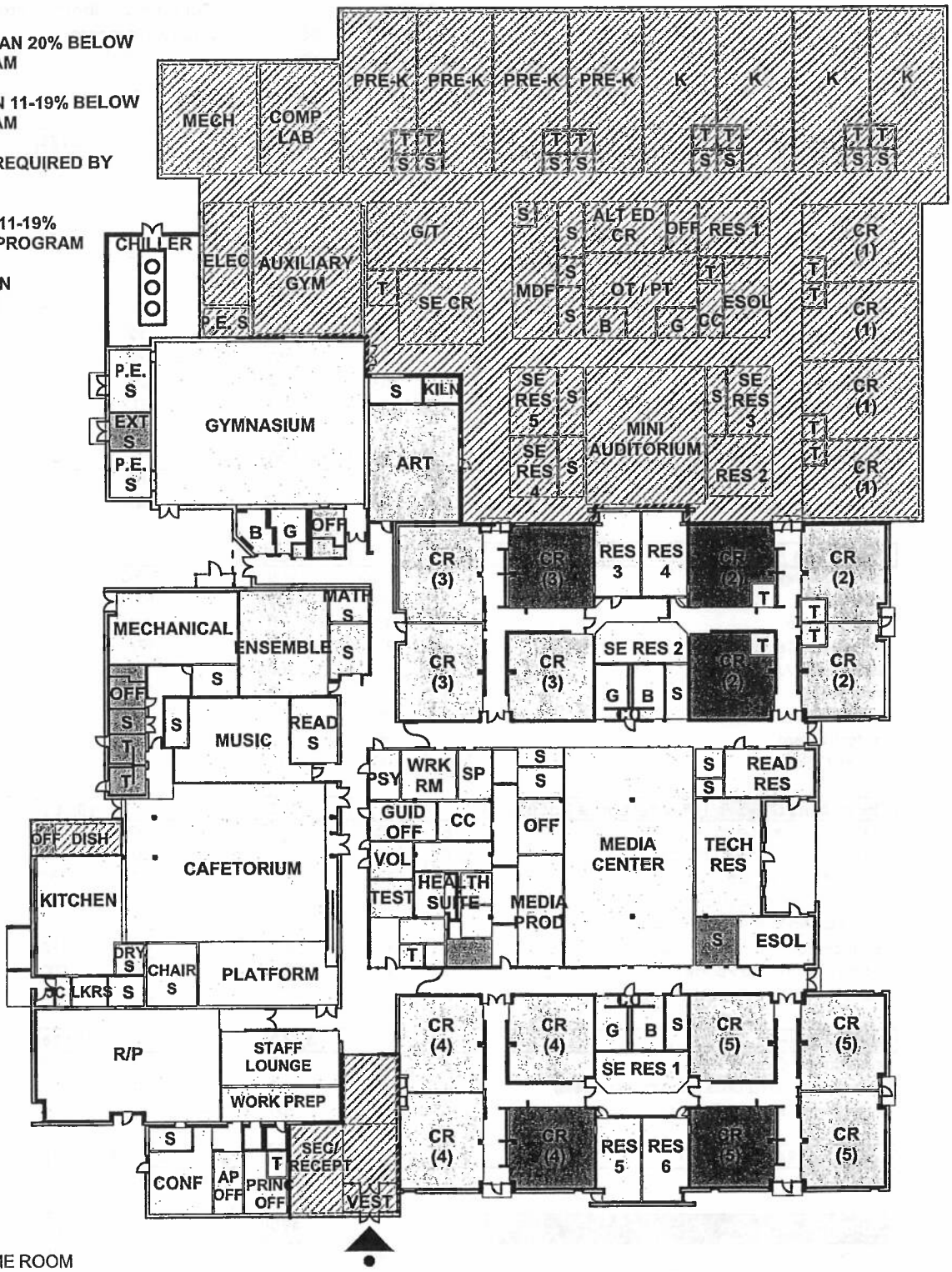


Existing Building	= 54,089 gsf
Area of Addition	= 33,581 gsf
Proposed Building	= 87,670 gsf

Analysis of Scheme 2 Room Sizes

LEGEND

- = UNDERSIZED - MORE THAN 20% BELOW SF REQUIRED BY PROGRAM
- = UNDERSIZED - BETWEEN 11-19% BELOW SF REQUIRED BY PROGRAM
- = WITHIN 10% OF THE SF REQUIRED BY PROGRAM
- = OVERSIZED - BETWEEN 11-19% ABOVE SF REQUIRED BY PROGRAM
- = OVERSIZED - MORE THAN 20% ABOVE SF REQUIRED BY PROGRAM
- = AREA OF PROPOSED ADDITION



ABBREVIATIONS

B	BOYS' TOILET
C	CUST. CLOSET
CR	CLASSROOM
E	ELECTRICAL CLOSET
G	GIRLS' TOILET ROOM
SP	SPEECH
S	STORAGE ROOM
T	TOILET ROOM
MDF	MAIN DISTRIBUTION FRAME ROOM

0' 8' 16' 32'

N

Scheme 2 Space Analysis

	2010 Ed. Spec. Modified for 500 Student Capacity			Scheme 2 Talbott Springs Elementary School			Program / existing differential	
	Area(s)	SF	Total Net	Area(s)	SF	Total Net	Area	%
Administration			**2,900**			**2,936**	**36**	**1%**
Secretarial/Reception (incl. closet)	1	500	500	1	457	457	-43	-9%
Principal's Office (incl. closet)	1	200	200	1	201	201	1	0%
Principal's Lavatory	1	50	50	1	48	48	-2	-4%
Asst. Principal's Office (incl. closet)	1	150	150	1	174	174	24	16%
Secure Testing Preparation Office & Storage Room	1	150	150	1	152	152	2	1%
Conference Rm.	1	400	400	1	426	426	26	6%
Parent Volunteer Room (incl. storage)	1	150	150	1	152	152	2	1%
Work Preparation Room (incl. storage)	1	400	400	1	392	392	-8	-2%
Satelite Work Room (incl. storage)	1	250	250	1	262	262	12	5%
Staff Lounge	1	600	600	1	621	621	21	3%
Adult Lavatory (including storage)	1	50	50	1	51	51	1	2%
Alternative Education			**550**			**551**	**1**	**0%**
Classroom (Observation)	1	400	400	1	404	404	4	1%
Office (Reading)	1	150	150	1	147	147	-3	-2%
Cafetorium / Kitchen			**5,530**			**5,581**	**51**	**1%**
Student Dining	1	3,000	3,000	1	3,000	3,000		0%
Platform	1	800	800	1	831	831	31	4%
Chair Storage	1	300	300	1	301	301	1	0%
Kitchen and Serving (incl. refrig. & freezer)	1	970	970	1	976	976	6	1%
Dishwashing Area	1	200	200	1	198	198	-2	-1%
Dry Storage	1	100	100	1	101	101	1	1%
Locker/Lavatory	1	80	80	1	81	81	1	1%
Janitor's Closet	1	40	40	1	43	43	3	8%
Kitchen Office	1	40	40	1	50	50	10	25%
Classrooms Grades 1-5 & Resource Rooms			**20,775**			**18,302**	**-2,473**	**-12%**
Grades 1-2 Classrooms	8	800	6,400	8	727*	5,815	-585	-9%
Grades 1-2 Lavatories (classroom access)	8	50	400	8	50	400	0	0%
Grades 3-5 Classrooms	12	850	10,200	12	707*	8,482	-1,718	-17%
(Grades 3-5 lavatories are located in the hallway and included in the gross square footage)								
Resource Rooms	6	400	2,400	6	366	2,195	-205	-9%
Grades 1-5 Storage Rooms	5	200	1,000	8	125	1,000	0	0%
Math (1) and Reading (2) Storage Rooms	3	125	375	2	205	410	35	9%
Kindergarten			**4,560**			**4,524**	**-36**	**-1%**
Kindergarten Classrooms	4	1,040	4,160	4	1,031	4,124	-36	-1%
Kindergarten Lavatories (classroom access)	4	50	200	4	50	200	0	0%
Kindergarten Storage Rooms	5	40	200	4	50	200	0	0%
Computer Room			**850**			**851**	**1**	**0%**
Computer Room	1	850	850	1	851	851	1	0%
Custodial			**490**			**621**	**131**	**27%**
Storage Rooms	2	120	240	4	62	249	9	4%
Office/Storage Room (incl. storage)	1	150	150	2	114	227	77	51%
Ventilated Storage	1	100	100	1	145	145	45	45%

*Renovation goal for Classrooms grades 1-5 is 750 SF.

Scheme 2 Space Analysis

	2010 Ed. Spec. Modified for 500 Student Capacity			Scheme 2 Talbott Springs Elementary School			Program / existing differential	
	Area(s)	SF	Total Net	Area(s)	SF	Total Net	Area	%
ESOL			**700**			**683**	**-17**	**-2%**
Primary Extended Learning Room (ESOL 1)	1	350	350	1	342	342	-8	-2%
Intermediate Extended Learning Room (ESOL 2)	1	350	350	1	341	341	-9	-3%
Gifted & Talented			**800**			**802**	**2**	**0%**
G/T Resource Room	1	750	750	1	751	751	1	0%
Storage Room	1	50	50	1	51	51	1	2%
Guidance			**250**			**250**	**0**	**0%**
Guidance Reception/Office/Counseling	1	250	250	1	250	250	0	0%
Health Suite			**760**			**797**	**37**	**5%**
Waiting Room	1	100	100	1	121	121	21	21%
Treatment/Medication	1	120	120	1	128	128	8	7%
Rest Area	1	200	200	1	215	215	15	8%
Office/Consult/Exam	1	100	100	1	94	94	-6	-6%
Examination/Isolation	1	100	100	1	94	94	-6	-6%
Student Lavatory (ADA) w/ hydraulic lift and	1	100	100	1	105	105	5	5%
Storage Room	1	40	40	1	40	40	0	0%
Library / Media Center			**5,175**			**5,132**	**-43**	**-1%**
Main Reading Room	1	2,800	2,800	1	2,736	2,736	-64	-2%
Technology Resource Room (incl. storage)	1	800	800	1	742	742	-58	-7%
Office/Work Space	1	240	240	1	241	241	1	0%
Media Production/Video Area	1	500	500	1	480	480	-20	-4%
Storage Room	1	335	335	3	135	406	71	21%
MDF	1	500	500	1	527	527	27	5%
Mini Auditorium			**1,500**			**1,603**	**103**	**7%**
Mini Auditorium	1	1,500	1,500	1	1603	1,603	103	7%
Music			**2,000**			**2,094**	**94**	**5%**
General Music Room	1	950	950	1	896	896	-54	-6%
Ensemble Room	1	800	800	1	904	904	104	13%
Storage Room	1	250	250	2	147	294	44	18%
Physical Education			**5,320**			**5,542**	**222**	**4%**
Gymnasium	1	4,500	4,500	2	2,328	4,655	155	3%
Storage Room	1	560	560	3	185	556	-4.01	-1%
Office (incl. lavatory)	1	160	160	1	141	141	-19	-12%
Outdoor-Access Restrooms (2)	2	50	100	2	95	190	90	90%
Psychological Services			**150**			**142**	**-8**	**-5%**
Psychological Services Area	1	150	150	1	142	142	-8	-5%
Reading Resource			**450**			**449**	**-1**	**0%**
Reading Resource Room	1	400	400	1	401	401	1	0%
Storage Room	1	50	50	1	48	48	48	-4%
Special Education K-5			**2,200**			**2,278**	**78**	**4%**
Classroom	1	600	600	1	601	601	1	0%
Student Lavatory w/ hydraulic changing table	1	100	100	1	101	101	1	1%
S.E. Resource Rooms	5	300	1,500	5	315	1,576	76	5%

Scheme 2 Space Analysis

	2010 Ed. Spec. Modified for 500 Student Capacity			Scheme 2 Talbott Springs Elementary School			Program / existing differential	
	Area(s)	SF	Total Net	Area(s)	SF	Total Net	Area	%
Speech/Language Therapy			**160**			**161**	**1**	**1%**
Speech Language Therapy Room	1	160	160	1	161	161	1	1%
Special Education K-5 Occupational			**814**			**792**	**-22**	**-3%**
OT/PT Therapy Room	1	750	750	1	728	728	-22	-3%
Storage Room	1	64	64	1	64	64		0%
Visual Art			**1,400**			**1,215**	**-185**	**-13%**
Studio	1	1,200	1,200	1	1,002	1,002	-198	-17%
Kiln & Storage Room	1	200	200	2	107	213	13	6%
Subtotal Net Sq. Ft.			**57,334**			**55,306**	**-2,028**	**-4%**
Early Childhood Area (Pre-K)			**4,520**			**4,528**	**8**	**0%**
Preschool/Pre-K Classrooms	4	1,040	4,160	4	1,040	4,160		0%
Preschool/Pre-K Lavatories	4	50	200	4	50	200	0	0%
Storage Rooms	4	40	160	4	42	168	8	5%
Recreation & Parks			**2,000**			**2,137**	**137**	**7%**
Activity Room	1	1,800	1,800	1	1,943	1,943	143	8%
Storage/ Toilet	1	200	200	2	97	194	-6	-3%

Space Analysis Summary

	2010 Ed. Spec. Modified for 500 Student Capacity	Scheme 2 Talbott Springs Elementary School	Program / existing differential	
	S.F.	S.F.	Area	%
Total Net Sq.Ft.	**63,854**	**61,971**	**-1,883**	**-3%**
Gross Area Factor (Walls, Circulation, Group Toilets, Mech./ Elec. Rooms, Data Closets, etc.)	**27,363**	**25,699**	**-1,664**	**-6%**
Efficiency = Net / Gross	**70%**	**71%**		
Gross Area Total	**91,217**	**87,670**	**-3,547**	**-4%**

Civil Design Narrative

GENERAL

Scheme 2 proposes building a large addition of approximately 31,750 square feet at the north end of the existing building, a small addition near at the main entrance of approximately 1,370 square feet and a small addition near the kitchen which would be approximately 460 square feet. The proposed addition will require the relocation of eight existing portable classrooms and extending the sanitary connection to their new location.

DRIVES, WALKS AND PARKING

The existing bus loop accommodates eight school buses with its access at Whiteacre Road. The existing parking lot accommodates 77 parking spaces including four handicap parking spaces along with its access being at Whiteacre Road.

UTILITIES

Water - The existing school is served by a six-inch incoming combination fire/water service, supplied from the County and enters the school within the main mechanical room area. This water service will need to be replaced with an eight-inch water line. An additional fire hydrant will be required to be installed adjacent to the proposed building addition along with the construction of a new emergency access fire lane adjacent to the proposed addition.

Sanitary Sewer - The existing school is served by a public sewer system. Existing sanitary lines exit the building near the north east corner of the building and leaves the site along the eastern edge of the property line.

Storm Drain - Storm water management and water quality utilizing a bio-retention facility will be required for the proposed building addition impervious area. Soil borings will be required for the design of the bio-retention facility.

Storm Water Management - Storm water management and water quality utilizing a bio-retention facility will be required for the proposed building addition impervious area. Soil borings will be required for the design of the bio-retention facility.

Electric - New service will be required for the addition.

Gas - The existing school is served by a BGE natural gas line that enters the school within the main mechanical room. This gas service supplies the existing boilers and water heater equipment.

ADDITIONAL INFORMATION

Landscape Plan - Proposed planting will consist only of what is necessary to vegetatively stabilize the disturbed areas of the site. Plantings will be necessary for the stormwater management facility in order to meet requirements of the 2000 Maryland Stormwater Design Manual and the 2008 update. Taking this into consideration, additional landscape material proposed for the school site as part of the addition will be kept to a minimum in order to accommodate the school's desire to minimize maintenance.

Grading Permit - Since there will be more than 5,000 square feet of disturbance, a grading permit will be required

Columbia Association - A series of meetings will be required with the Village of Oakland Mills to review the Site Plan. In addition, a public hearing will be required with the Planning Board for approval of the Site Plan. The planning Board hearing is required for any Site Plan disturbing over 5,000 square feet of area. The County will also require the Planning Board Notice to be sent to the County Council members along with the Columbia Association and the Howard Hughes Corporation.

Architectural Design Narrative

Scheme 2 will fully renovate the existing building to provide improved adjacencies between departments and improved circulation rooms and will increase the size of the building to accommodate all of the spaces in the current HCPSS Elementary School Educational Specifications. The additions will add approximately 33,580 square feet to the existing school, which will address the capacity needs.

The existing Pre-K and kindergarten classrooms at the front of the school will have major renovations to accommodate the administrative suite and Rec and Parks program.

The new addition at the front of the school will be approximately 1,370 square feet and will provide a security vestibule which will force all visitors to the building into the main office to check in with staff before entering the school. Moving the administrative suite to the very front of the building will improve supervision of the main entrance and bus loop.

The health suite will also move closer to the lobby at the main entrance and will allow this program to expand to meet COMAR requirements.

The new large addition in the back of the school will be approximately 31,750 square feet and will house the early childhood and kindergarten classroom along with some general classrooms, providing each with natural daylight and views. A new auxiliary gym, mini-auditorium, special education spaces, resource rooms, support spaces will also be included in this addition. New mechanical room, electrical and TER/MDF rooms will need to be built in the addition to support the new systems in the new construction area during the phased-occupied construction.

A small addition will be constructed off the kitchen approximately 460 square feet to accommodate all of the kitchen support spaces.

All spaces in the addition will meet the HCPSS elementary school educational program requirements for square footage.

The existing circulation pattern of the school will be improved by connecting existing corridors in the two existing instructional wings. New addition will provide more looped circulations.

After construction is complete, all portables will be removed from the site with this scheme.

A preliminary LEED analysis shows that the building in Scheme 2 should achieve a "LEED Certified" level under the latest version of "LEED for Schools" as published by the United States Green Building Council (USGBC). See page 80.

Construction of Scheme 2 will be done in multiple phases since the school will need to remain occupied during the ± 27 months.

Therefore, portable classrooms will need to be brought on site during construction. Also, the eight existing portable classrooms behind the school would need to be relocated before construction of the new addition can begin.

Structural Design Narrative

This design will consist of a full systemic renovation to the existing building along with the additions which will increase the size of the school by approximately 33,580 square feet. Interior walls must be reconfigured to make all existing spaces meet current design specifications. Interior bearing walls and columns may have to be removed as well which will necessitate modification to the existing structural roof system. New steel columns, footings, and beams will be required to serve as support for the existing structural roof system.

The new addition will be conventionally framed with structural steel columns, steel wide flange girders, and open web steel joists that will support a metal roof deck. The foundations will consist of conventional spread footings. The first floor will be reinforced concrete slab on grade over vapor barrier over porous fill. The exterior wall will be composed of brick veneer, cavity, insulation, and CMU block that will be reinforced and filled solid with grout.

New additions located adjacent to the existing building must be carefully evaluated from a structural perspective. If the new addition is taller than the existing structure, snow drift loads will be imposed on the existing structure. This additional load will require reinforcing of the existing roof structure. As previously stated, installing additional structural reinforcement to the existing steel bar joists and adding steel beams to the roof structure could prove to be time consuming and costly. Also, footings for the new addition will be necessary to be installed adjacent to the existing building. These new footings may be in close proximity to the existing footings thus resulting in the new footing to be combined with the existing footings accordingly. Combined footings with dowels bars tying the new footing to the existing footing may be required. Finally, we believe it is best to isolate the new addition from the existing addition to eliminate the requirement to upgrade the existing building due to the current seismic loads. Expansion joints between the new building and the existing building will be warranted.

As previously stated, new masonry walls of the building will be structurally reinforced with the proper cavity insulation to meet the current energy code. They will also have the proper moisture barrier to prevent water and mold entering the building. The existing walls as we stated previously do not meet these criteria. If the existing building is to be renovated with a new addition, the final construction will have walls of different structural, energy and waterproofing capabilities.

Mechanical Design Narrative

GENERAL

Refer to the description for Scheme 1 on page 52. Exceptions are noted below.

HEATING AND COOLING SYSTEMS

Refer to the description for Scheme 1 on page 52. Exceptions are noted below.

Since there will be a large addition to the school under this scheme, the existing chilled water infrastructure, including the chiller, cooling tower, chilled and condenser water pumps, refrigerant monitoring system, and condenser water piping systems will need replaced. The new chiller and cooling tower systems will be approximately 250-tons in capacity, supporting the increased cooling requirements of the expanded school.

The overall size and capacity of the new heating water infrastructure, including boilers and heating water pumps, will be increased beyond Scheme 1 to accommodate the increased heating requirements of the expanded school.

HVAC SYSTEMS

Refer to the description for Scheme 1 on page 53. Exceptions are noted below.

Kitchen Area
Replacement of the existing kitchen hood heating and ventilation unit is anticipated under Scheme 2.

Building Addition Classroom Areas
Classroom areas in the addition will be provided with four-pipe horizontal fan coil units for space conditioning. These units will be located above the classroom ceilings with supply and return air ductwork extending from these units to supply and return registers. Low filter return registers will be utilized for improved serviceability.

The DOAS unit for the addition will be located on the roof.

Mini Auditorium and Auxiliary Gymnasium Areas
A pair of single-zone rooftop air-handling units will be provided for space conditioning and ventilation within the mini-auditorium and auxiliary gymnasium areas. These rooftop air-handling units will be provided with a chilled water cooling coil, hot water preheat and heating coils, and airside economizer operation. Supply and return air fans will be equipped with variable frequency drives for reducing airflow quantities during periods of reduced cooling demand. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy.

Rec and Park Activity Rooms
Space conditioning and ventilation for the Rec and Park activity room areas will be extended from the VRF system and dedicated outdoor air unit serving the administrative suite. The use of above-ceiling ducted type VRF terminal units is anticipated for these areas due to the overall size of each room.

CONTROL SYSTEM

Refer to the description for Scheme 1 on page 54.

Plumbing Design Narrative

Refer to the description for Scheme 1 on page 55. Exceptions are noted below.

STORMWATER PIPING SYSTEMS

New storm water piping components, including roof drains, overflow drains, and above-grade storm water piping systems will be provided throughout. Similar to the above-grade piping systems, under slab storm water piping will be replaced throughout the entire existing school.

SANITARY AND VENT PIPING SYSTEMS

Above-grade sanitary and vent piping systems will be replaced throughout as required for accommodating the revised architectural floor plan and associated plumbing fixture locations. Similar to the above-grade piping systems, under slab sanitary piping will be replaced throughout the entire existing school.

DOMESTIC WATER PIPING SYSTEM

The existing six-inch combination fire/water service will be evaluated. Sprinkler zones will be modified.

The existing gas-fired water heater will be evaluated, however, it is anticipated that the existing water heater, associated circulation pump, and expansion tank will need replaced to accommodate the increased domestic hot water requirements of the expanded school.

PLUMBING FIXTURES

Institutional grade plumbing fixtures will be provided throughout the school. These fixtures will include floor-mounted water closets utilizing 1.6 gallon per flush valves, pint flush (0.125 gallon per flush) wall-hung urinals, and wall-hung lavatories with self-closing hot and cold water faucets that supply 0.35 gallons per minute. All plumbing fixtures will comply with the Americans with Disabilities Act (ADA).

Fire Protection Design Narrative

FIRE SUPPRESSION

A new zone valve assembly will be required to support any planned building addition.

FIRE ALARM

A new fire alarm system with voice evacuation will replace the existing fire alarm system in its entirety. This will include a new fire alarm control panel with voice evacuation and new addressable fire alarm devices such as manual pull stations, smoke detectors at magnetic door holders, duct smoke detectors with remote test stations, and audible and visual notification devices (combination speaker/strobes and strobes). A new fire alarm annunciator panel will be provided at the main entrance showing the proposed addition.

Electrical Design Narrative

The electrical systems include power, lighting, lighting controls, and fire alarm systems. A new electrical service will be provided in the proposed addition and back-feed the existing power system of the existing school. The proposed addition will have LED lighting. Fluorescent lighting will be replaced in the existing school with LED lighting in spaces that do not currently meet the lighting power density (LPD) requirements of the 2015 International Energy Conservation Code (IECC). New lighting controls will be provided throughout in order to meet the energy code requirements of the 2015 IECC. The fire alarm system will be upgraded to have voice evacuation capability to meet requirements of the 2015 International Building Code.

ELECTRICAL SERVICE

The existing BGE electrical service will be removed and replaced with a new BGE electrical service. The existing BGE pad-mounted transformer, secondary service electrical feeders, and meter will be removed. The underground primary electrical service feeders will run to a new outdoor BGE pad-mounted transformer to be located adjacent to the new main electrical room.

POWER DISTRIBUTION

The new main electrical room will be located in the proposed addition and will consist of a new main switchboard, panelboards, and transformers. The new main switchboard will be a 2000-ampere, 277/480-volt, three-phase, four-wire, with a CT section, two main sections, and a distribution section with molded-case branch circuit breakers. The first main section will be connected to BGE utility power and will have a 2000-ampere electronic-trip main circuit breaker. The second main section will be connected to an outdoor generator quick-connect switchboard (for connections to a temporary portable generator) and have a 1600-ampere electronic-trip main circuit breaker. The main circuit breakers will be key-interlocked such that only one main circuit breaker is in the "closed" position at a time.

The existing 277/480-volt 1600-ampere switchboard in the main mechanical room (boiler room) of the existing school will remain and be reused. The new main switchboard will back-feed the existing switchboard.

The new main switchboard will be utilized to serve new mechanical DOAS rooftop units and new panelboards in the existing school for power connections to new fan coil units. A 120/208-volt panelboard will be added to serve a new variable refrigerant flow (VRF) system in the main office area.

EMERGENCY PUBLIC SHELTER REQUIREMENT

The Maryland Emergency Management Agency (MEMA) may designate Talbott Springs Elementary School as an emergency public shelter. Electrical equipment for the MEMA emergency public shelter will include an outdoor 1600-ampere generator quick-connect switchboard (equal to Square D QED-2) with both multiple cam-lock connectors per phase and lug connections (in order to connect to a temporary portable generator). The gymnasium, cafetorium, kitchen, and associated spaces will be designated by MEMA to be used as an emergency public shelter with the electrical loads, as well as mechanical loads, required to support these spaces.

GENERATOR POWER DISTRIBUTION

The existing generator power system will remain and be reused. Existing Panel EM will be utilized to serve emergency egress lighting in the proposed addition.

LIGHTING

Luminaires (lighting fixtures) in the proposed addition will utilize LED light sources and have a correlated color temperature of 4000K-4100K. LED luminaires in classrooms, instructional spaces, support spaces, storage rooms, and rooms with lay-in ceilings will be recessed 2'x2' troffer-type lensed luminaires. Group toilet rooms and individual toilet rooms will utilize vandal resistant recessed LED luminaires with prismatic lenses. Recessed LED downlights will be used in interior areas that cannot accommodate larger luminaires. Industrial-type LED luminaires will be used in support spaces with open ceilings.

In spaces of the existing school where existing fluorescent lighting does not meet the lighting power density (LPD) requirements of the 2015 International Energy Conservation Code (IECC), fluorescent lighting luminaires will be replaced with equivalent LED lighting luminaires.

The proposed addition will have exterior building mounted full-cutoff dark-sky compliant LED luminaires. Recessed LED downlights will be used in exterior canopies and soffits. The building exterior lighting of the existing school will be replaced with LED full-cutoff dark sky compliant luminaires. The existing LED pole lights at the bus loop and parking lot will remain and be reused.

LIGHTING CONTROLS

New lighting controls will be provided in the proposed addition and throughout the existing school in order to meet the requirements of the 2015 IECC. Lighting control system will be by Eaton/Cooper (Greengate series), WattStopper (Digital Lighting Management DLM series), or Acuity Brands (Blue Box / MicroPanel series). No other lighting controls manufacturers will be specified.

Where existing fluorescent lighting will remain in the existing school, existing circuiting may need to be reconfigured in order to meet 2015 IECC requirements for spaces that require light reduction in which the lighting load in a space is reduced by 50 percent with a reasonably uniform illumination pattern.

Stand-alone lighting relay room controllers will be utilized. Networked systems will not be acceptable. Low-voltage lighting control stations (switches) will be used to manually control lighting in spaces. Ceiling-mounted occupancy sensors will be used throughout the school. Daylight sensors (for daylight harvesting) will only be used where required per 2015 IECC in rooms where there is more than 150 watts of general lighting within sidelight or toplight daylight zones. The existing lighting contactor in the main mechanical room will remain to control existing exterior lighting.

Telecommunications Design Narrative

DATA NETWORK

Scheme 2 requires new communications infrastructure and technology systems, telecommunications rooms will need to be upgraded to standard sized (eight feet by ten feet) Telecommunication Room should be provided for every 70,000 square feet of floor space. These rooms should contain good environmental conditioning including air conditioning, emergency power-protected circuits, and good lighting. The TER/MDF should be better sized for a more technology rich school and located near the media center. Often times these rooms are greater than 250 sq. ft.

The data network shall be an implementation of 10/100/1000 Mbit Ethernet over Category 6 copper UTP cable and Gigabit Ethernet over multimode fiber, complying with the Institute of Electrical Engineers' (IEEE) 802.3 standards for Ethernet. Backbone cabling between the telecommunications equipment room (TER/MDF "head end") and all telecom rooms (IDF) shall be a hybrid single-mode/ multimode fiber optic cable (6/12 strands). Multimode Fiber shall be a minimum OM3 type fiber while Single-mode Fiber shall be reserved for Distributed Antenna Systems (DAS) applications or future use as needed. All horizontal cabling shall be terminated in Category 6A rack-mounted patch panels in the telecom rooms, and in communication network outlets (CNO's) at the workstation. The data infrastructure will support the implementation of a wireless LAN system and potential convergence of voice and video onto the data distribution network.

Refer to description for Scheme 1 page 58 for additional detail.

TELEPHONE SYSTEM

The school will contain the Category 6A cable described above for voice distribution in offices and classrooms. The infrastructure will support the analog, digital and IP telephone services. The school should also maintain a minimum number of separate incoming analog telephone lines for elevator, fax, fire and security connections throughout the facility.

Refer to description for Scheme 1 page 58 for additional detail.

INTERCOM AND MASTER CLOCK SYSTEM

The intercommunication system shall utilize a copper cable infrastructure to distribute multiple, simultaneous conversations on separate channels throughout the facility through telephones, call-in switches and loudspeaker assemblies. A programmable master clock with correction of secondary clocks shall also be included as part of the overall system. In addition, the system must be scalable to meet the user's future expansion needs and be programmable from a computer terminal located at the facility.

CLASSROOM AUDIO-VISUAL

The instructor's station in each classroom will have cable harness assembly that will allow the teacher's computer to display to a video monitor, wall mounted LCD projector or electronic whiteboard. Sound Reinforcement will be included in each instructional space as part of the A/V systems.

Refer to description for Scheme 1 page 59 for additional detail.

VIDEO DISTRIBUTION SYSTEM

The IP data network shall be used for IP video streaming. The IP video streaming head end will consist of a distribution cabinet holding rack mounted video distribution equipment and be located in the Main Telecom Room.

Refer to description for Scheme 1 page 59 for additional detail.

SECURITY SYSTEM

New Closed Circuit Television shall provide visual surveillance and recording of the school, internally and externally, 24 hours per day. A possible implementation would include IP based cameras that are connected to the data network through switching equipment in Telecom Rooms. Cameras will survey the corridors, specific rooms and portions of the perimeter of the facility. Digital video recordings will be transmitted from each camera location and stored for no less than 30 days. The CCTV will be connected to an emergency backup system that will keep the system operational in a power outage.

Refer to description for Scheme 1 page 59 for additional detail.

ACCESS CONTROL AND INTRUSION DETECTION DESCRIPTION

The new Access Control and Intrusion Detection system shall allow/prevent access, track movement throughout the facility and provide an alarm signal on and offsite in the event of an unauthorized entry. The systems shall be integrated and will be controllable on and offsite to allow for efficient system management. The system shall consist of motion detectors, door and window contacts, card readers, door controllers, power supplies and intelligent software all connected to alarm panels throughout the facility.

AUXILIARY SOUND SYSTEMS DESCRIPTION

Specific spaces within the facility shall have local auxiliary sound systems that allow for sound amplification and reproduction. These spaces include gymnasiums, cafetorium, music rooms and mini-auditorium.

Kitchen Design Narrative

FIINISHES

Floors: Existing smooth surface quarry tile will be replaced by new quarry tile with a slip resistant abrasive grain finish.

Walls: Existing painted drywall will be covered with new glazed tile for easy cleaning.

Ceilings: Existing exposed ceilings in dry storage, and serving areas will be replaced with new fire retardant ceiling panels.

Lighting: Existing light fixtures will be replaced with new LED light fixtures.

AREAS

Receiving: The existing single 3'-0" door with screen will be replaced with a 4'-0" wide door and screen door.

Dry Storage: Existing finishes will be replaced with quarry tile and fire retardant ceiling planes.

Walk-in Freezer: Existing walk-in Freezer will be replaced.

Kitchen: Existing cooking equipment will be replaced. Existing gas, water and drain lines around cooking area will be replaced. Existing refrigerators will be replaced along with worktables.

Serving: Serving area will be reconfigured to provide more serving options.

Existing hand washing sinks will be replaced to meet current health code. Additional hand sinks will also be provided.

The existing pass-thru hot cabinet will be replaced. New energy-saving appliances will be provided.

Dishwashing: Existing dishwashing elements will need to be replaced.

Sustainable 'Green' Design Goals

For scheme 2, the renovated school and additions should achieve a 'Certified' level from the LEED (Leadership in Energy and Environmental Design) rating system, making this facility a 'Green' school.

Simply stated, a 'Green' school is a building designed to conserve energy, water, and materials, thus reducing negative impacts on human health and the environment. A 'Green' learning environment provides natural daylight, enhanced classroom acoustics, improved indoor air quality, thermal comfort, and opportunities to integrate green features into the school's curriculum.

This project will be required to use the new LEED 4.0 rating system for schools. An 'in progress' LEED scorecard is shown below which summarizes the credits most likely obtainable at this time. As the project continues to evolve, new credits may be possible while others may become increasingly difficult to engineer or too costly to provide. At this time we have identified 50 likely credits (with an additional '34 possible credits') allowing for the loss of some and still complying with the goal of a LEED 'Certified' Building.

LEED Scorecard

tca | architects — LEED for SCHOOLS (v4)

Scheme 2 - Talbott Springs Elementary School
Howard County Public School System
November 2016

Credit Integrative Process

LT Location & Transportation — Possible Points: 15

Y	Credit	LEED for Neighborhood Development Location (16 credits)
1	Credit	Sensitive Land Protection
N	Credit	High Priority Site (2 credits)
2	Credit	Surrounding Density and Diverse Uses (5 credits)
4	Credit	Access to Quality Transit (4 credits)
1	Credit	Bicycle Facilites
1	Credit	Reduced Parking Footprint
1	Credit	Green Vehicles

3 7 Total Location & Transportation Credits

SS Sustainable Sites — Possible Points: 12

Y	Prereq	Construction Activity Pollution Prevention
Y	Prereq	Environmental Site Assessment
1	Credit	Site Assessment
1	Credit	Site Development - Protect or Restore Habitat (2 credits)
1	Credit	Open Space
3	Credit	Rainwater Management (3 credits)
1	Credit	Heat Island Reduction (2 credits)
1	Credit	Light Pollution Reduction
N	Credit	Site Master Plan
1	Credit	Joint use of Facilities

8 1 Total Sustainable Sites Credits

WE Water Efficiency — Possible Points: 12

Y	Prereq	Outdoor Water Use Reduction
Y	Prereq	Indoor Water Use Reduction
Y	Prereq	Building-level Water Metering
2	Credit	Outdoor Water Use Reduction (2 credits)
4	Credit	Indoor Water Use Reduction (7 credits)
2	Credit	Cooling Tower Water Use (2 credits)
1	Credit	Water Metering

5 7 Total Water Efficiency Credits

EA Energy and Atmosphere — Possible Points: 31

Y	Prereq	Fundamental Commissioning and Verification
Y	Prereq	Minimum Energy Performance
Y	Prereq	Building-Level Energy Metering
Y	Prereq	Fundamental Refrigerant Management
6	Credit	Enhanced Commisioning (6 credits)
4	Credit	Optimize Energy Performance (16 credits)
1	Credit	Advanced Energy Metering
N	Credit	Demand Response (2 credits)
N	Credit	Renewable Energy Production (3 credits)
1	Credit	Enhanced Refrigerant Management
N	Credit	Green Power and Carbon Offsets (2 credits)

12 6 Total Energy and Atmosphere Credits

MR Materials and Resources — Possible Points: 13

Y	Prereq	Storage & Collection of Recyclables
Y	Prereq	Construction and Demolition Waste Management Planning
1	Credit	Building Life-Cycle Impact Reduction (5 credits)
1	Credit	Building Product - Environmental Declarations (2 credits)
1	Credit	Building Product - Raw Materials (2 credits)
2	Credit	Building Product - Material Ingredients (2 credits)
2	Credit	Construction and Demolition Waste Management (2 credits)

7 3 Total Materials and Resources Credits

EQ Indoor Environment Quality — Possible Points: 16

Y	Prereq	Minimum IAQ Performance
Y	Prereq	Environmental Tobacco Smoke (ETS) Control
Y	Prereq	Minimum Acoustical Performance
2	Credit	Enhanced IAQ Strategies (2 credits)
3	Credit	Low-Emitting Materials (3 credits)
1	Credit	Construction IAQ Management Plan
1	Credit	IAQ Assessment (2 credits)
1	Credit	Thermal Comfort
1	Credit	Interior Lighting (2 credits)
1	Credit	Daylight (3 credits)
1	Credit	Quality Views
1	Credit	Acoustic Performance

10 5 Total Indoor Environment Quality Credits

IN Innovation — Possible Points: 6

1	Credit	Innovation (5 credits)
1	Credit	LEED Accredited Professional

5 1 Total Innovation Credits

RP Regional Priority — Possible Points: 4

4	Credit	Regional Priority (4 credits)

0 4 Total Regional Priority Credits

50 Total Credits (34 'Maybe' Credits) Possible Points: 110

Key to Possibility of Earning Credit: R = Required # = Yes # = Maybe X = No

Project Credit Totals: Certified 40–49 Silver 50–59 Gold 60–79 Platinum 80+

Detailed Cost Estimate of Scheme 2

IAC/PSCP FORM 302.4

COST ESTIMATE SUMMARY

LEA: Howard County Public School System DATE: 4/6/2017

PROJECT TITLE: Talbott Springs Elementary School PSC NO.

Cost Estimate for: Feasibility Studies [ ] Design Development [ ] Construction Document

Scheme 2

Planned Bid Date

Design Capacity 500 Students

Existing Wall Perimeter

Building Gross Area

New/Add 33,581 S.F.

Renovation 54,089 S.F.

Total 87,670 S.F.

Acres of Site

Developed

Undeveloped

Total

General Building Description (number of stories, type of construction, etc.): One story, structural steel framed (except at masonry load bearing walls around gymnasium and cafeteria), with concrete slab on grade, composite steel framed slab at mezzanines and open web steel joists at roof.

C.S.I DIV	CATEGORY	ESTIMATED COST OF NEW CONSTRUCTION	ESTIMATED COST OF RENOVATION	TOTAL COST
00 00 00	PROCUREMENT & CONTRACTING REQUIREMENTS	$0	$0	$0
01 00 00	GENERAL REQUIREMENTS	$966,769	$1,210,639	$2,177,408
02 00 00	EXISTING CONDITIONS	$0	$124,569	$124,569
03 00 00	CONCRETE	$1,308,489	$8,769	$1,317,258
04 00 00	MASONRY	$689,154	$301,111	$990,266
05 00 00	METALS	$0	$667,568	$667,568
06 00 00	WOOD, PLASTICS & COMPOSITES	$71,794	$0	$71,794
07 00 00	THERMAL & MOISTURE PROTECTION	$467,056	$624,378	$1,091,434
08 00 00	OPENINGS	$473,848	$597,563	$1,071,411
09 00 00	FINISHES	$939,914	$1,786,180	$2,726,094
10 00 00	SPECIALTIES	$218,448	$88,651	$307,099
11 00 00	EQUIPMENT	$57,593	$499,980	$557,573
12 00 00	FURNISHINGS	$370,977	$356,963	$727,940
13 00 00	SPECIAL CONSTRUCTION	$0	$464,770	$464,770
14 00 00	CONVEYING EQUIPMENT	$0	$0	$0
21 00 00	FIRE SUPPRESSION	$147,090	$226,904	$373,994
22 00 00	PLUMBING	$158,323	$694,123	$852,446
23 00 00	HVAC	$2,065,766	$4,330,487	$6,396,253
25 00 00	INTEGRATED AUTOMATION	$0	$0	$0
26 00 00	ELECTRICAL	$990,624	$1,081,746	$2,072,370
27 00 00	COMMUNICATIONS	$312,640	$56,388	$369,028
28 00 00	ELECTRONIC SAFETY & SECURITIES	$337,251	$311,619	$648,870
31 00 00	EARTHWORK	$29,880	$110,778	$140,658
32 00 00	EXTERIOR IMPROVEMENTS	$0	$207,894	$207,894
33 00 00	UTILITIES	$0	$294,947	$294,947
34 00 00	TRANSPORTATION	$0	$0	$0
35 00 00	WATERWAY & MARINE CONSTRUCTION	$0	$0	$0
40 00 00	PROCESS INTEGRATED	$0	$0	$0
41 00 00	MATERIAL PROCESSING & HANDLING EQUIPMENT	$0	$0	$0
42 00 00	PROCESS HEATING, COOLING & DRYING EQUIP.	$0	$0	$0
43 00 00	PROCESS GAS LIQUID & HANDLING & PURIFICATION & STORAGE EQUIPMENT	$0	$0	$0
44 00 00	POLLUTION & WASTE CONTROL EQUIPMENT	$0	$0	$0
45 00 00	INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT	$0	$0	$0
46 00 00	WATER & WASTE WATER EQUIPMENT	$0	$0	$0
48 00 00	ELECTRICAL POWER GENERATION	$0	$0	$0
	TOTAL	$9,605,615	$14,046,029	$23,651,644

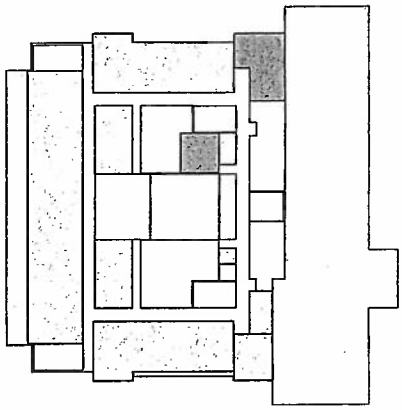
tca|architects

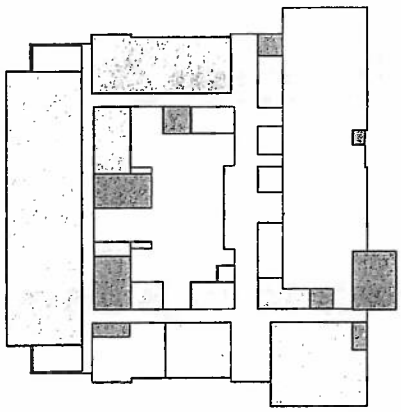
Scheme 3

Talbott Springs Elementary School

Summary of Scheme 3
New Replacement School

Scheme 3 illustrates a new replacement school alongside the existing school. The new school building will be based on the HCPSS prototype elementary school design used at Elementary School No. 42, but modified to accommodate the smaller 500 student capacity needed in this community.





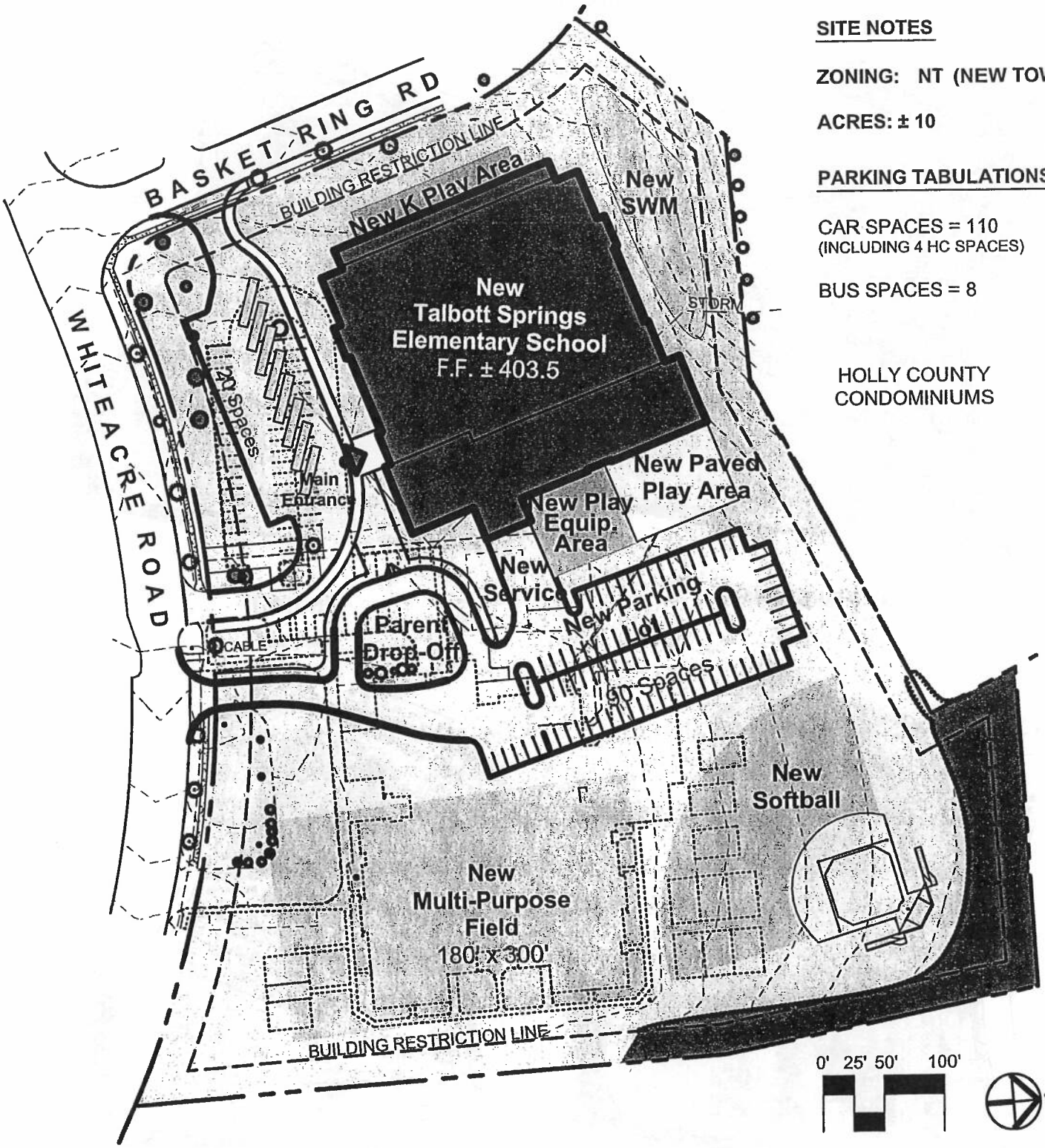
Area of First Floor	57,425 gsf
Area of Second Floor	33,786 gsf
Total Area	**91,211 gsf**
Construction Duration	**± 27 months**
LEED certification level	**'Silver'**
Building Cost	**$23,820,203**
Site Cost	$ 2,497,177
Demolition Cost	$ 607,864
Phased Construction Cost	$ 202,621
Total Construction Cost	**$27,127,865**

Note:
* Based on Bid-Day Construction Cost from Elementary School No.42.

Scheme 3 Design Attributes:

- This scheme allows the existing school to run as it does today while construction of the new school is underway. In addition, all of the students and staff will be able to occupy the new school earlier than Scheme 2.
- New school illustrated is a smaller version of the current Elementary School No. 42 design, which will accommodate 500 students.
- This scheme will provide natural daylight and views to more of the occupied spaces and earn more LEED credits than the other schemes.
- New construction will allow for the school to have highly efficient building envelope which will reduce energy costs.
- Highly efficient mechanical, electrical and data systems will be utilized.
- Floor plan includes Recreation and Parks spaces per the prototype design, which is not included in Scheme 1.
- School will not have access to playfields for duration of construction (± 27 months).
- Site design for this scheme will allow students to enter building directly from parent drop-off without crossing the bus-loop and to access playfields directly from gymnasium without crossing the service drive.
- Project will need a variance from Columbia Association to provide the appropriate amount of paving for all the vehicular circulation on site. The process of obtaining such a variance is estimated to take a year.
- Construction project will be designed to receive USGBC certification at LEED 'Silver' level as required by the State of Maryland for new construction projects.

Site Plan



SITE NOTES

ZONING: NT (NEW TOWN)

ACRES: ± 10

PARKING TABULATIONS

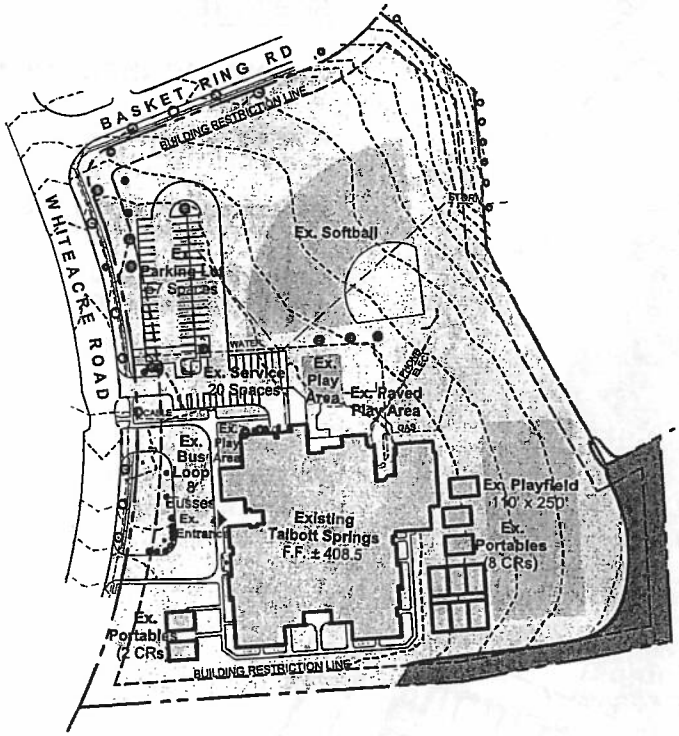
CAR SPACES = 110
(INCLUDING 4 HC SPACES)

BUS SPACES = 8

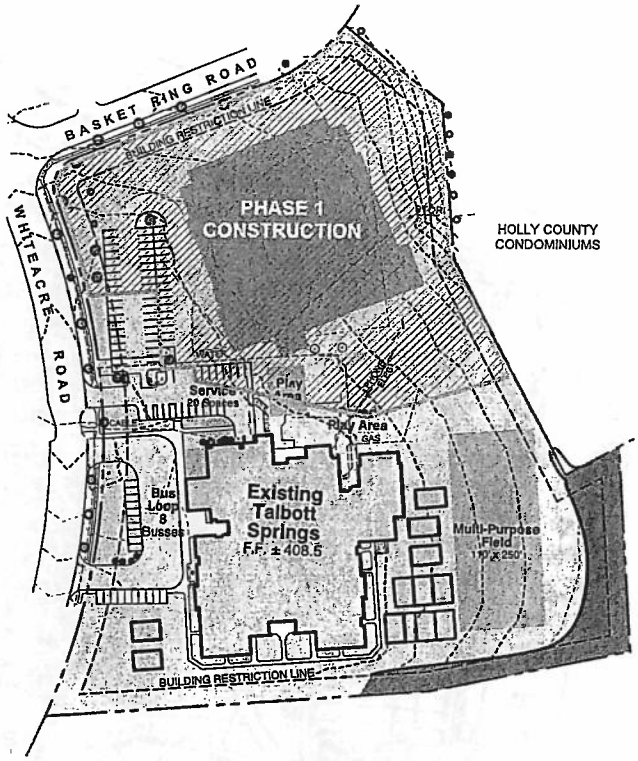
HOLLY COUNTY CONDOMINIUMS

Conceptual Site Phasing Diagrams

(27 month duration)

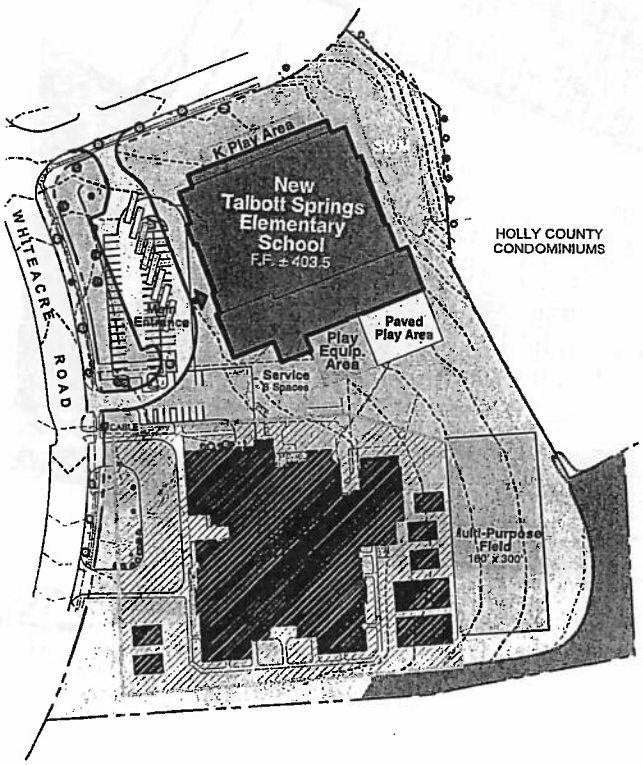


Existing Site Plan

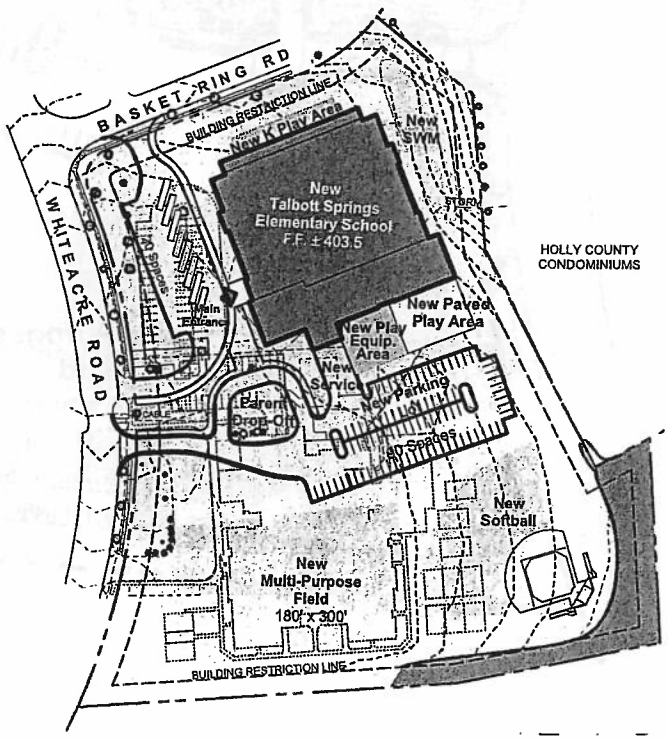


Phase 1

Site Plan



Phase 2

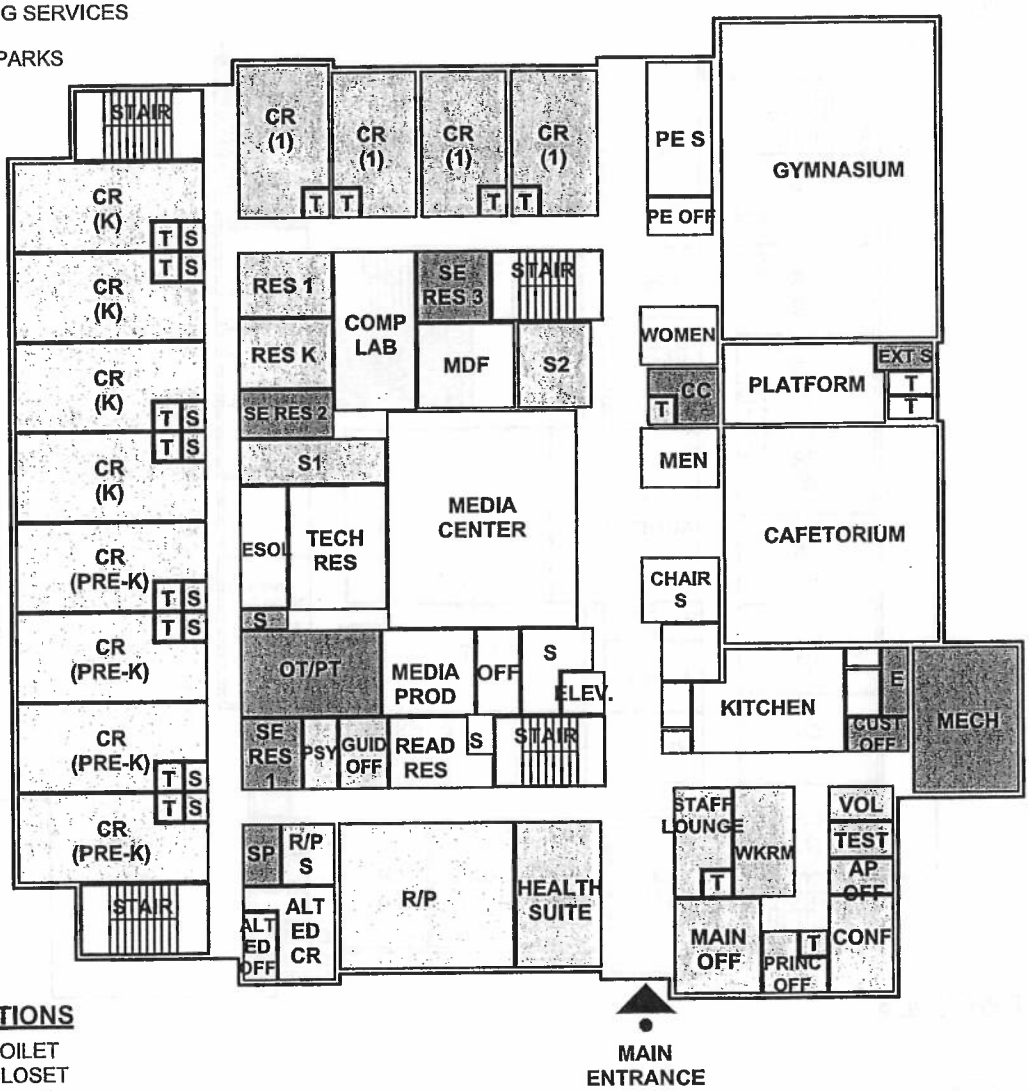


Proposed Site Plan

First Floor Plan

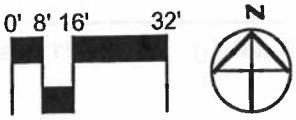
LEGEND

= ADMINISTRATIVE SPACES
= GRADES 1-5
= SPECIAL EDUCATION
= CENTRAL SUPPORT SPACES
= KINDERGARTEN / EARLY CHILDHOOD
= BUILDING SERVICES
= REC. & PARKS



ABBREVIATIONS

B	BOYS' TOILET
C	CUST. CLOSET
CR	CLASSROOM
E	ELECTRICAL CLOSET
G	GIRLS' TOILET ROOM
SP	SPEECH
S	STORAGE ROOM
T	TOILET ROOM
MDF	MAIN DISTRIBUTION FRAME ROOM

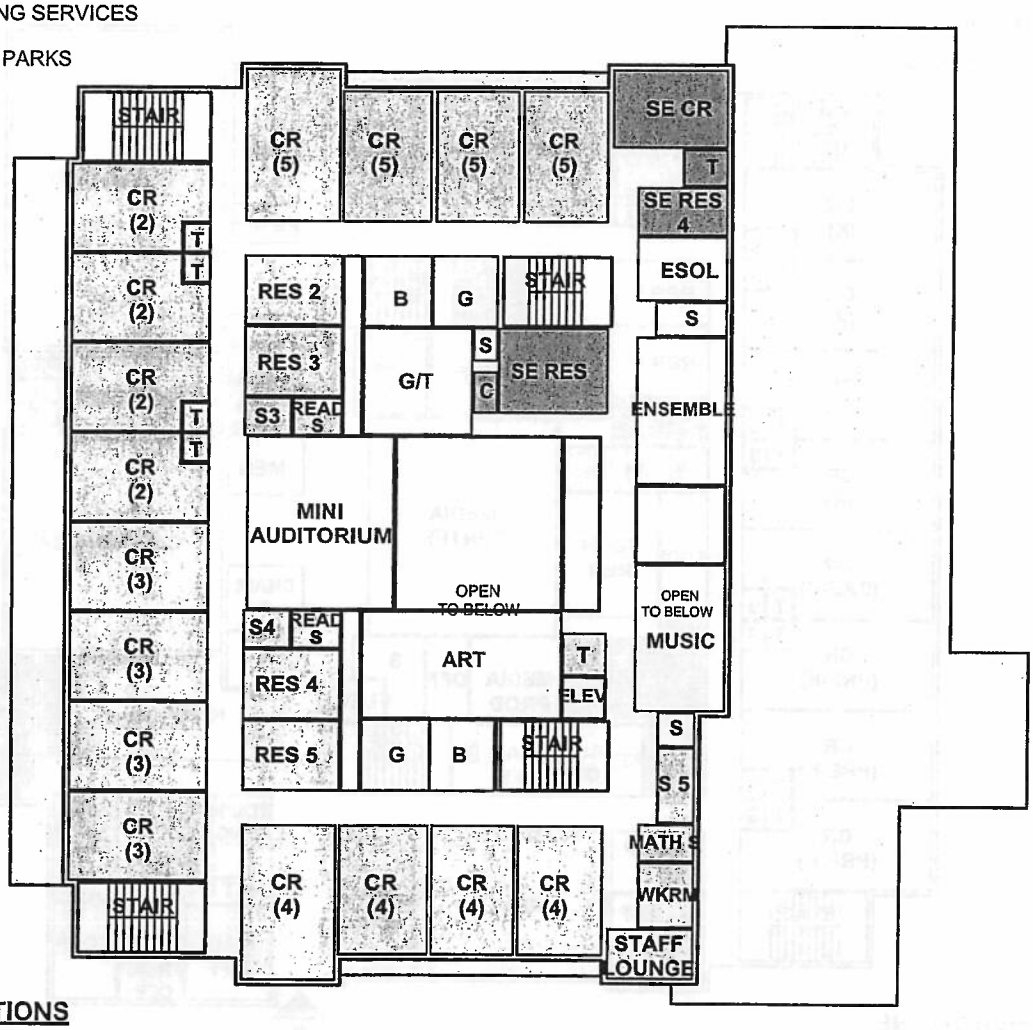


First Floor	**= 57,425 gsf**
Second Floor	**= 33,786 gsf**
Proposed Building	**= 91,211 gsf**

Second Floor Plan

LEGEND

- = ADMINISTRATIVE SPACES
- = GRADES 1-5
- = SPECIAL EDUCATION
- = CENTRAL SUPPORT SPACES
- = KINDERGARTEN / EARLY CHILDHOOD
- = BUILDING SERVICES
- = REC. & PARKS



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MDF	MAIN DISTRIBUTION FRAME ROOM

0' 8' 16' 32'

N

First Floor	= 57,425 gsf
Second Floor	= 33,786 gsf
Proposed Building	= 91,211 gsf

Scheme 3 Space Analysis

	2010 Ed. Spec. Modified for 500 Student Capacity			Scheme 3 Talbott Springs Elementary School		
	Area(s)	SF	Total Net	Area(s)	SF	Total Net
Administration			**2,900**			**3,022**
Secretarial/Reception (incl. closet)	1	500	500	1	535	535
Principal's Office (incl. closet)	1	200	200	1	216	216
Principal's Lavatory	1	50	50	1	47	47
Asst. Principal's Office (incl. closet)	1	150	150	1	151	151
Secure Testing Preparation Office & Storage Room	1	150	150	1	151	151
Conference Rm.	1	400	400	1	420	420
Parent Volunteer Room (incl. storage)	1	150	150	1	144	144
Work Preparation Room (incl. storage)	1	400	400	1	414	414
Satelite Work Room (incl. storage)	1	250	250	1	240	240
Staff Lounge	1	600	600	2	328	656
Adult Lavatory (including storage)	1	50	50	1	48	48
Alternative Education			**550**			**559**
Classroom (Observation)	1	400	400	1	410	410
Office (Reading)	1	150	150	1	149	149
Cafetorium / Kitchen			**5,530**			**5,623**
Student Dining	1	3,000	3,000	1	2,992	2,992
Platform	1	800	800	1	846	846
Chair Storage	1	300	300	1	324	324
Kitchen and Serving (incl. refrig. & freezer)	1	970	970	1	977	977
Dishwashing Area	1	200	200	1	211	211
Dry Storage	1	100	100	1	106	106
Locker/Lavatory	1	80	80	1	84	84
Janitor's Closet	1	40	40	1	41	41
Kitchen Office	1	40	40	1	42	42
Classrooms Grades 1-5 & Resource Rooms			**20,775**			**20,572**
Grades 1-2 Classrooms *	8	800	6,400	8	784	6,272
Grades 1-2 Lavatories (classroom access)	8	50	400	8	50	400
Grades 3-5 Classrooms *	12	850	10,200	12	804	9,648
(Grades 3-5 lavatories are located in the hallway and included in the gross square footage)						
Resource Rooms	6	400	2,400	6	436	2,616
Grades 1-5 Storage Rooms	5	200	1,000	5	254	1,270
Math (1) and Reading (2) Storage Rooms	3	125	375	3	122	366
Kindergarten			**4,560**			**4,524**
Kindergarten Classrooms *	4	1,040	4,160	4	1,038	4,152
Kindergarten Lavatories (classroom access)	4	50	200	4	50	200
Kindergarten Storage Rooms	5	40	200	4	43	172
Computer Room			**850**			**875**
Computer Room	1	850	850	1	875	875
Custodial			**490**			**507**
Storage Rooms	2	120	240	2	132	264
Office/Storage Room (incl. storage)	1	150	150	1	141	141
Ventilated Storage	1	100	100	1	102	102

Scheme 3 Space Analysis

	2010 Ed. Spec. Modified for 500 Student Capacity			Scheme 3 Talbott Springs Elementary School		
	Area(s)	SF	Total Net	Area(s)	SF	Total Net
ESOL			**700**			**764**
Primary Extended Learning Room (ESOL 1)	1	350	350	1	386	386
Intermediate Extended Learning Room (ESOL 2)	1	350	350	1	378	378
Gifted & Talented			**800**			**820**
G/T Resource Room	1	750	750	1	768	768
Storage Room	1	50	50	1	52	52
Guidance			**250**			**235**
Guidance Reception/Office/Counseling	1	250	250	1	235	235
Health Suite			**760**			**758**
Waiting Room	1	100	100	1	102	102
Treatment/Medication	1	120	120	1	130	130
Rest Area	1	200	200	1	187	187
Office/Consult/Exam	1	100	100	1	95	95
Examination/Isolation	1	100	100	1	100	100
Student Lavatory (ADA) w/ hydraulic lift and	1	100	100	1	106	106
Storage Room	1	40	40	1	38	38
Library / Media Center			**5,175**			**5,183**
Main Reading Room	1	2,800	2,800	1	2,730	2,730
Technology Resource Room (incl. storage)	1	800	800	1	819	819
Office/Work Space	1	240	240	1	244	244
Media Production/Video Area	1	500	500	1	536	536
Storage Room	1	335	335	1	310	310
MDF	1	500	500	1	544	544
Mini Auditorium			**1,500**			**1,631**
Mini Auditorium	1	1,500	1,500	1	1,631	1,631
Music			**2,000**			**1,992**
General Music Room	1	950	950	1	874	874
Ensemble Room	1	800	800	1	874	874
Storage Room	1	250	250	2	122	244
Physical Education			**5,320**			**5,375**
Gymnasium	1	4,500	4,500	1	4,555	4,555
Storage Room	1	560	560	1	561	561
Office (incl. lavatory)	1	160	160	1	157	157
Outdoor-Access Restrooms (2)	2	50	100	2	51	102
Psychological Services			**150**			**165**
Psychological Services Area	1	150	150	1	165	165
Reading Resource			**450**			**484**
Reading Resource Room	1	400	400	1	430	430
Storage Room	1	50	50	1	54	54
Special Education K-5			**2,200**			**2,593**
Classroom	1	600	600	1	648	648
Student Lavatory w/ hydraulic changing table	1	100	100	1	105	105
S.E. Resource Rooms	5	300	1,500	5	368	1,840

Scheme 3 Space Analysis

	2010 Ed. Spec. Modified for 500 Student Capacity			Scheme 3 Talbott Springs Elementary School		
	Area(s)	SF	Total Net	Area(s)	SF	Total Net
Speech/Language Therapy			**160**			**150**
Speech Language Therapy Room	1	160	160	1	150	150
Special Education K-5 Occupational			**814**			**871**
OT/PT Therapy Room	1	750	750	1	811	811
Storage Room	1	64	64	1	60	60
Visual Art			**1,400**			**1,440**
Studio	1	1,200	1,200	1	1,240	1,240
Kiln & Storage Room	1	200	200	1	200	200
Subtotal Net Sq. Ft.			**57,334**			**58,143**
Early Childhood Area (Pre-K)			**4,520**			**4,524**
Preschool/Pre-K Classrooms	4	1,040	4,160	4	1,038	4,152
Preschool/Pre-K Lavatories	4	50	200	4	50	200
Storage Rooms	4	40	160	4	43	172
Recreation & Parks			**2,000**			**1,918**
Activity Room	1	1,800	1,800	1	1,703	1,703
Storage/ Toilet	1	200	200	1	215	215

Space Analysis Summary

	2010 Ed. Spec. Modified for 500 Student Capacity	Scheme 3 Talbott Springs Elementary School
	S.F.	S.F.
Total Net Sq.Ft.	**63,854**	**64,585**
Gross Area Factor (Walls, Circulation, Toilets, Mech./ Elec. Rooms, Data Closets, etc.)	**27,363**	**26,626**
Efficiency = Net / Gross	**70%**	**71%**
Gross Area Total	**91,217**	**91,211**

Civil Design Narrative

Scheme 3 proposes building a new elementary school adjacent to the existing school. This allows the staff and students of Talbott Springs Elementary School to be fully separated from the construction activities as the new building is being built.

DRIVES, WALKS AND PARKING

The new bus loop will accommodate eight school buses with its entrance off Whiteacre Road and the exit on Basket Ring Road. The new parking lot accommodates 90 parking spaces including four handicap parking spaces while an additional 20 parking spaces will be provided in the bus loop for visitors and staff. Therefore, providing a total of 110 parking spaces on site.

UTILITIES

Water - New water service will be provided to the school.

Sanitary Sewer - New school will be served by a public sewer system. New sanitary connections will be made from the new school.

Storm Drain - Storm water management and water quality utilizing a bio-retention facility will be required for the proposed building. Soil borings will be required for the design of the bio-retention facility.

Storm Water Management - New bioretention areas will need to be constructed to accommodate the treatment of the water for the new building and new impervious paving.

Electric - New service will be required for the new school.

Gas - The new school will be served by a new BGE natural gas line.

ADDITIONAL INFORMATION

Landscape Plan - Proposed planting will consist only of what is necessary to vegetatively stabilize the disturbed areas of the site. Plantings will be necessary for the stormwater management facility in order to meet requirements of the 2000 Maryland Stormwater Design Manual and the 2008 update. Taking this into consideration, additional landscape material proposed for the school site as part of the new building will be kept to a minimum in order to accommodate the school's desire to minimize maintenance.

Grading Permit - Since there will be more than 5,000 square feet of disturbance, a grading permit will be required.

Columbia Association - A series of meetings will be required with the Village of Oakland Mills to review the Site Plan. A new elementary school will require an Environmental Concept Plan showing proposed storm water management devices for the impervious areas. A community meeting will be required as per Howard County Regulations prior to submission of an Environmental Concept Plan. Upon approval of the Environmental Concept Plan a Site Development Plan will be required for County processing. The total process is approximately one year from the original submission of the Environmental Concept Plan. Due to the school site being in the Village of Oakland Mills there are recorded requirements in a Final Development Plan one of which is non-credited open space. The school site has a non-credited open space of 1.00 ac. which is area associated with drive aisles for parking, bus loops and associated roadways that service the parking areas. Any increase of the 1.00 ac. non-credited open space area based on the new elementary school site plan would result in rerecording and amending the Final Development Plan criteria documents. Amending the Final Development Plan criteria will require a meeting with the Howard Hughes Corporation at an early stage in the process. This Final Development Plan process is approximately one year.

PHASING

Phase 1 of the project will require the construction of the new school at the west end of the property due to the existing elementary school having to remain operational during construction. The workable area required for construction of the new school will require the removal of a portion of the existing parking lot and existing paved play area. The existing bus loop will remain. Approximately 20 parking spaces can be added adjacent to the existing paving in the bus loop area. A new public water main and new fire hydrants will be required to provide fire protection service to the new school.

Phase 2 of the project will require the construction of a temporary road adjacent to the new school for buses to egress the site to Basket Ring Road along with a temporary parking lot. The existing school will be demolished along with removal of the existing portable classrooms and existing utilities. A temporary paved play area will be installed at the west end of the existing multi-purpose field. During this phase of construction the area for recreational activities will be limited for student use.

Phase 3 will be the removal of the temporary roads and parking lot. A permanent bus loop, parent drop-off area, parking lot and utilities will then be installed adjacent to the new school. A paved play area, softball field and a multi-purpose field will be installed along the east side of the property.

Architectural Design Narrative

Scheme 3 assumes that the existing Talbott Springs Elementary School (TSES) building will be demolished and replaced with a new building based on one of the HCPSS elementary school prototype designs. The prototype is a two-story building, modified from the high performance Elementary School No. 42 design to accommodate the smaller capacity of the TSES community.

The design has a first floor area of 57,425 square feet and a second floor area of 33,786 for a total of 91,211 gross square feet. The school will have a capacity of 500 students.

The prototype plan features major support spaces including the administrative suite, health suite, gymnasium, cafetorium and media center that are centrally located near the intersection of two major circulation spines running north/south and east/west. The north/south corridor connects on both ends to vertical circulation stairwells and elevator, effectively maximizing building circulation efficiency. New construction will allow for all the latest HCPSS technology specifications to be fully integrated into the design.

The prototype floor plan includes Department of Recreation and Parks spaces, which are not currently provided at TSES; in addition, there will be four pre-kindergarten classrooms.

State legislation mandates that a newly constructed building must achieve a 'Silver' rating under the latest version of LEED for Schools as published by the United States Green Building Council (USGBC).

Since the new building will be constructed while the existing TSES is occupied, the school will lose access to most of the playfields and will need to use the blacktop and the courtyard outside of the media center for their outdoor activities.

Upon completion of the new school building, the existing building will be demolished and replaced with a new car parking lot and parent drop-off area. This will allow bus and vehicular traffic to be separated providing pedestrian safety. New playfields will be constructed where the existing school and portable classrooms are currently located.

Structural Design Narrative

The new building will be two story steel frame structure. The foundations will consist of conventional spread footings. The first floor will be a reinforced concrete slab on grade over vapor barrier over porous fill. The second floor will be framed with steel columns, wide flange girders and steel filler beams that will serve to support a composite metal deck and reinforced concrete slab. The roof will be framed with corresponding steel columns, steel wide flange girders and open web steel joists that will support a metal roof deck. The exterior wall will be composed of brick veneer, cavity, insulation and CMU block that will be reinforced and filled solid with grout.

As previously stated, new masonry walls of the building will be structurally reinforced with the proper cavity insulation to meet the current energy code. They will also have the proper moisture barrier to prevent water and mold entering the building.

Mechanical System Narrative

HEATING AND COOLING SYSTEMS

A four-pipe chilled water and heating water system is anticipated for Talbott Springs Elementary School. This type of mechanical system provides the ability to have independent heating or cooling year-round, while delivering an extremely high level of overall building energy efficiency.

A single high-efficiency air-cooled chiller will be located within an equipment service yard area that is positioned adjacent to the main mechanical room. This equipment will generate chilled water for the school's four-pipe distribution system. A variable primary chilled water arrangement will be utilized. Chilled water will be piped from the chiller to a pair of chilled water distribution pumps, located within the mechanical room, and circulated throughout the school.

Production of heating water for the school's four-pipe distribution system will be accomplished by three gas-fired condensing type boilers, located within the main mechanical room. A pair of heating water distribution pumps, located in the mechanical room, will circulate heating water throughout the school. A maximum heating water supply temperature of 140 degrees F will be utilized, with this supply water temperature reset based on outdoor air temperature.

All chilled water and heating water pumping systems will be provided with N+1 redundancy, such that the operation of the school can be maintained in the event of a single pump failure. Pumping systems will utilize base-mounted end-suction type pumps, arranged in a lead/lag configuration. Variable frequency drives will be provided for reduced energy consumption during periods of reduced system demand. In addition to distribution pumps, other heating water and chilled water infrastructure components, including air separators, expansion tanks, and a chilled water buffer tank will be located within the main mechanical room.

HVAC Systems

Classroom Areas

Classroom areas throughout the school will be provided with four-pipe horizontal fan coil units for space conditioning. Fan coil units will be positioned above the classroom ceilings, with supply and return air ductwork extending from these units to the classroom served. The use of filter return grilles (rather than filters within the fan coil units) will be provided, minimizing above ceiling maintenance requirements.

A series of rooftop dedicated outdoor air systems with enthalpy wheel energy recovery devices, chilled water cooling coils, and hot water heating coils will be provided for delivering conditioned ventilation airflow to the classroom areas served. Airflow supplied from these units will be dehumidified, conditioned, and delivered to each fan coil unit's return air ductwork. Exhaust airflow from classrooms, restrooms, and storage room areas will be routed through each dedicated outdoor air unit's enthalpy wheel for pre-conditioning of outdoor air.

Administrative Suite and Administrative Support Areas

The administrative suite and administrative support areas (including the guidance and health suite areas) will be provided with space conditioning through a variable refrigerant flow (VRF) system. This system will be complete with heat recovery type air-cooled compressors. The use of ceiling cassette type VRF terminal units is anticipated, promoting good access for filter replacement.

A single rooftop dedicated outdoor air system with enthalpy wheel energy recovery device, direct expansion (DX) cooling coil, and hot water heating coil will be provided for delivering conditioned ventilation airflow to the administrative area. Airflow supplied from this unit will be dehumidified, conditioned, and delivered directly to each space at a room neutral temperature. Exhaust airflow from offices, conference rooms, restrooms, and storage room areas will be routed through the dedicated outdoor air unit's enthalpy wheel for pre-conditioning of outdoor air.

Rec and Park Activity Rooms

Space conditioning and ventilation for the Rec and Park activity room areas will be extended from the VRF system and dedicated outdoor air unit serving the administrative area. The use of above-ceiling ducted type VRF terminal units is anticipated for these areas due to the overall size of each room.

Media Center

A single-zone rooftop air-handling unit will be provided for space conditioning and ventilation within the media center area. This rooftop unit will be provided with chilled water cooling coil, hot water preheat and heating coils, and airside economizer operation. Supply and return air fans will be equipped with variable frequency drives for reducing airflow quantities during periods of reduced cooling demand. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy.

Mini Auditorium

A single-zone rooftop air-handling unit will be provided for space conditioning and ventilation within the mini auditorium area. This rooftop unit will be provided with chilled water cooling coil, hot water preheat and heating coils, and airside economizer operation. Supply and return air fans will be equipped with variable frequency drives for reducing airflow quantities during periods of reduced cooling demand. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy.

Gymnasium

A single-zone heating-only rooftop air-handling unit will be provided for space conditioning and ventilation within the gymnasium area. This rooftop unit will be provided with a hot water heating coil and airside economizer operation. Supply and return air fans will be equipped with variable frequency drives for airflow balancing purposes. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy.

In addition to the rooftop air-handling unit, a "summer ventilation" system will also be provided, consisting of multiple exhaust fans and companion outdoor air intakes for increased room air-change rates during the summer months.

Cafetorium, Platform, and Serving Line

Similar to the media center area, the cafetorium, platform, and stage areas will be provided with a single-zone rooftop air-handling unit for space conditioning and ventilation. This rooftop unit will be provided with chilled water cooling coil, hot water preheat and heating coils, and airside economizer operation. Supply and return air fans will be equipped with variable frequency drives for reducing airflow quantities during periods of reduced cooling demand. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy. Excess outdoor air quantities will be transferred to the adjacent kitchen area for exhaust hood make-up.

Kitchen

Space conditioning for the kitchen area will be accomplished primarily through transfer airflow from the adjacent serving line and cafetorium areas. The use of a Type II kitchen hood is anticipated, reducing the hood's exhaust airflow requirements and overall energy usage of the kitchen area.

Stairwell Areas

Space conditioning for the stairwell areas will be accomplished through a series of heating-only cabinet unit heaters.

CONTROL SYSTEM

A building automation system consisting of DDC components will be provided for the school. Damper and valve components will be provided with electric or electronic actuation. DDC control components will be utilized for all fan coil units and dedicated outdoor air systems. All control system components will be interfaced with the central HCPSS energy management control system for remote monitoring and energy management routines.

Plumbing Design Narrative

STORMWATER PIPING SYSTEMS

Storm water drainage, including roof drains, overflow drains, and storm water piping systems will be provided for the school. Above- and below-grade piping will be constructed from cast-iron, with no-hub piping connections provided only for above-grade piping components. All storm water piping systems will exit the building at various locations and coordinate with available site piping connections provided for the school.

SANITARY AND VENT PIPING SYSTEMS

Sanitary waste and vent piping systems are provided for supporting plumbing fixtures within the school. Similar to the storm water piping, above- and below-grade sanitary and vent piping will be constructed from cast-iron, with no-hub piping connections provided only for above-grade piping components. Vent piping will terminate at the roof level, with a minimum 25-foot separation provided between vent piping terminations and any outdoor air intake locations. Sanitary piping systems will exit the building at various locations and coordinate with available site piping connections provided for the school.

The following special sanitary and vent piping systems are anticipated:

- Equipment and sinks that may discharge grease into the sanitary system from the kitchen will be piped to an underground concrete grease interceptor. The discharge from this interceptor will be connected to site sanitary piping system.
- Sinks within the art classrooms will be provided with solids interceptors, collecting debris and preventing it from entering into the site sanitary piping system.

DOMESTIC WATER PIPING SYSTEM

A combination fire/water service will enter the building within the main mechanical room area. This service will be capable of supporting both the fire and water service demands of the new school. A new domestic water service, complete with basket strainer and dual reduced pressure zone backflow preventers will separate the domestic water and fire services prior to distributing water throughout the school. Domestic water piping will be distributed from this mechanical room area to plumbing fixtures and equipment located throughout the school.

A pair of gas-fired condensing type water heaters will be provided for generating domestic hot water for the school. Both 140-degrees F (for the kitchen area only) and 110-degrees F domestic hot water will be distributed throughout the school, with each piping loop complete with a dedicated hot water circulation pump and expansion tank.

PLUMBING FIXTURES

Institutional grade plumbing fixtures will be provided throughout the school. These fixtures will include floor-mounted water closets utilizing 1.6 gallon per flush valves, pint flush (0.125 gallon per flush) wall-hung urinals, and wall-hung lavatories with self-closing hot and cold water faucets that supply 0.35 gallons per minute. All plumbing fixtures will comply with the Americans with Disabilities Act (ADA).

NATURAL GAS PIPING SYSTEMS

A natural gas service will be provided by BGE for the school. The gas service meter and pressure reducing station will be located within an equipment service yard area, located adjacent to the main mechanical room. Gas piping will serve the emergency generator, boilers, and domestic water heaters.

Fire Protection Design Narrative

FIRE SUPPRESSION SYSTEM

The entire building will be fully sprinklered. The building will be separated into several zones that will match the fire alarm pull zones for the building. Since the existing school is currently provided with sprinkler coverage without a fire pump, the use of a fire pump is not anticipated. However, this available municipal water pressure will be further evaluated based on the results of a new fire flow test during the design phase. All work will be specified to conform to standards of the National Fire Protection Association (NFPA) and will include requirements for performance verification through hydraulic calculations.

FIRE ALARM SYSTEM

The proposed replacement school will have a new fire alarm system, which will consist of a fire alarm control panel with voice evacuation, fire alarm annunciator panel in the main lobby, manual pull stations, smoke detectors at magnetic door holders, duct smoke detectors with remote test stations, and audible and visual notification devices (combination speaker/strobes and strobes).

Electrical Design Narrative

The electrical systems include power, lighting and lighting controls.

ELECTRICAL SERVICE

A new BGE electrical service is required for the proposed replacement school. A new outdoor BGE pad-mounted transformer will be located adjacent to the new main electrical room of the proposed replacement school.

POWER DISTRIBUTION

The new main electrical room will consist of a main switchboard, panelboards, and transformers. A separate electrical room will be provided for generator-connected equipment. Generator-connected equipment will consist of enclosed switches, automatic transfer switches, transformers, and panelboards. Panelboard and transformers will also be located in electrical closets throughout the school.

The main switchboard will be a 2000-ampere, 277/480-volt, three-phase, four-wire, with a CT section, two main sections, and distribution sections with molded-case branch circuit breakers. The first main section will be connected to BGE utility power and will have a 2000-ampere electronic-trip main circuit breaker. The second main section will be connected to an outdoor generator quick-connect switchboard (for connections to a temporary portable generator) and have a 1600-ampere electronic-trip main circuit breaker. The main circuit breakers will be key-interlocked such that only one main circuit breaker is in the "closed" position at a time.

EMERGENCY PUBLIC SHELTER REQUIREMENT

The Maryland Emergency Management Agency (MEMA) may designate Talbott Springs Elementary School as an emergency public shelter. Electrical equipment for the MEMA emergency public shelter will include an outdoor 1600-ampere generator quick-connect switchboard (equal to Square D QED-2) with both multiple cam-lock connectors per phase and lug connections (in order to connect to a temporary portable generator). The gymnasium, cafetorium, kitchen, and associated spaces will be designated by MEMA to be used as an emergency public shelter with the electrical loads, as well as mechanical loads, required to support these spaces.

GENERATOR POWER DISTRIBUTION

A 150-kW 277/480-volt outdoor natural gas generator in a weatherproof sound-attenuated enclosure will be installed in the service yard of the proposed replacement school, adjacent to the BGE utility transformer. The basis-of-design generator manufacturer will be Cummins Power Systems. The generator will connect to two automatic transformer switches for "life safety" loads and "standby" loads, respectively.

LIGHTING

Fluorescent lighting will not be used. Luminaires (lighting fixtures) will utilize LED light sources and have a correlated color temperature of 4000K-4100K. Building lighting will generally consist of recessed 2'x2' troffer-type lensed luminaires (lighting fixtures). Building lighting will also include high-bay LED luminaires in the gymnasium, a combination of LED pendants and LED downlights in the media center and cafetorium, recessed LED downlights in selected areas, vandal-resistant LED luminaires in group toilet rooms, gasketed LED luminaires with smooth lenses (for easier cleaning) in the kitchen, industrial-type LED luminaires for support spaces with open ceilings, LED exit signs with red lettering, exterior perimeter building-mounted full-cutoff LED luminaires, and exterior pole-mounted full-cutoff LED luminaires at the bus loop, drop off, and parking lot(s). The finish of exterior luminaires will be selected by the Architect.

LIGHTING CONTROLS

Lighting controls system will be by Eaton/Cooper (Greengate series), WattStopper (Digital Lighting Management DLM series), or Acuity Brands (Blue Box / MicroPanel series). No other lighting controls manufacturers will be specified.

Stand-alone lighting relay room controllers will be utilized. Networked systems will not be acceptable. Low-voltage lighting control stations (switches) will be used to manually control lighting in spaces. Ceiling-mounted occupancy sensors will be used throughout the school. Daylight sensors (for daylight harvesting) will only be used where required per 2015 IECC in rooms where there is more than 150 watts of general lighting within sidelight or toplight daylight zones. A lighting contactor connected to the building automation system (BAS) will be used to control exterior lighting.

Daylight harvesting shall be utilized where significant energy savings can be achieved from the vertical glazing or operable skylights, typically in classrooms and selected office spaces. Additional control strategies for specific spaces are listed below.

Classroom lighting shall be controlled by the following devices and programming settings:

1. Manual Control: Teachers shall have access to manual controls in two zones; the row of lights along the teaching wall, and the remaining lights in the room. Both zones shall be provided with low voltage switches to access dimming setpoints at 0 percent, 50 percent, or 100 percent.
2. Automatic Control: Lights must be turned on manually upon entering the room. Ceiling-mounted 360-degree dual-technology occupancy sensors shall turn off lights within the room after 15 minutes of inactivity. Occupancy sensors shall only be responsible for turning lights off.
3. Daylight Harvesting: Each classroom will have two zones of daylight harvesting; the row closest to the windows and the next row farther away. Each zone shall dim independently based on an output signal from the ceiling mounted photocell.

Office lighting shall be controlled by the following devices and programming settings:

1. Manual and Automatic Controls (small offices): A dual-relay line voltage wall station occupancy sensor. The sensor shall be manual on by selecting one or both of the "on" buttons, providing flexibility of lighting at 0 percent, 50 percent, and 100 percent relative light output. Sensor shall be factory set to turn off lighting after 15 minutes.
2. Manual and Automatic Controls (larger offices): A corner-mount occupancy sensor shall be provided, typically in the corner adjacent to the latch side of the door (the occupancy sensor should not be able to see out the door if the door is propped open). This occupancy sensor shall be set to turn off lighting after 15 minutes. Two manual toggle switches shall be provided at the door for control of the lighting at 0 percent, 50 percent, and 100 percent relative light output.

Gymnasium lighting shall be controlled by the following devices and programming settings:

1. Manual Control: Line voltage key switches shall be provided at the entry doors to the gymnasiums for control of all of the lighting within each room.
2. Automatic Control: Mechanical contactors connected to the building security system shall be provided to satisfy the automatic control requirements for these spaces.
3. Daylight Harvesting: The gymnasium will have four zones of daylight harvesting.

Media center lighting shall be controlled by the following devices and programming settings:

1. Manual Control: Manual switches shall be provided to control the lighting in three zones. For the lights surrounding each projection screen, additional low voltage override switches shall be provided on the face of the adjacent column to allow for these lights to be independently turned off during the use of the projection screen.
2. Automatic Control: Mechanical contactors connected to the building security system shall be provided on the line side of the switches to automatically shut off the lighting in case the lighting within the space was left on after hours.
3. Daylight Harvesting: The media center will have three zones of daylight harvesting.

Restroom lighting shall be controlled by the following devices and programming settings:

1. Manual Control: None in group restrooms. Manual override switch within wall station occupancy sensor for private toilet rooms.
2. Automatic Control: Group restrooms shall have ceiling mounted occupancy sensors that will automatically turn lighting on upon entry and automatically turn off after being unoccupied for 15 minutes. Private restrooms shall have wall station occupancy sensors which shall be programmed to require a manual initiation to turn lighting on, but shall automatically turn off after being unoccupied for 15 minutes.

Storage room lighting shall be controlled by the following devices and programming settings:

1. Manual and Automatic Control: Small closets and storage rooms shall have a single wall station occupancy sensor, programmed to require manual activation to turn the lights on and shall automatically turn lights off after 15 minutes. Larger spaces shall have ceiling mounted occupancy sensors without manual override devices. Lighting shall turn on and off automatically.

Mechanical, electrical and telecom room lighting shall be controlled by the following devices and programming settings:

1. Manual Control: Line voltage toggle switches are provided at each entrance to the space. Automatic controls shall not be provided for these spaces due to concerns for safety during maintenance.

Exterior lighting shall be controlled by the following devices and programming settings:

1. Automatic Control: Lighting shall be controlled by a signal from the building automation system through mechanical contactors. Contactors shall be equipment with Hand-Off-Automatic control pushbuttons to allow manual override.

Telecommunications Design Narrative

DATA NETWORK

The data network shall be an implementation of 10/100/1000 Mbit Ethernet over Category 6 copper UTP cable and Gigabit Ethernet over multimode fiber, complying with the Institute of Electrical Engineers' (IEEE) 802.3 standards for Ethernet. Backbone cabling between the telecommunications equipment room (TER/MDF "head end") and all telecom rooms (IDF's) shall be a hybrid single-mode/multimode fiber optic cable (6/12 strands). Multimode Fiber shall be a minimum OM3 type fiber while Singlemode Fiber shall be reserved for Distributed Antenna Systems (DAS) applications or future use as needed.

All horizontal cabling shall be terminated in Category 6A rack-mounted patch panels in the telecom rooms, and in communication network outlets (CNO's) at the workstation. The data infrastructure will support the implementation of a wireless local area network (LAN) system and potential convergence of voice and video onto the data distribution network. Horizontal voice and data cables shall not exceed 90 meters in length. Data Electronics (routers, switches, servers, etc.,) shall be employed and utilize the data network infrastructure. Intermediate TR's will be managed through stackable switches sharing a gigabit uplink to the chassis switch located in the TER/MDF. Each terminated data outlet shall be cross-connected to an active switch port.

Data outlets intended for wireless use shall be cross-connected to inline powered switch ports or power inverting equipment. These outlets shall be mounted above the drop ceiling in a low voltage jack and faceplate or have a male RJ-45 termination. Each wireless drop shall include two cables and may utilize Cat 6a to provide 10 Gb Ethernet out to 95 meters. In either scenario, the ceiling grid must be tagged and a fifteen foot service loop must be allocated. The school district has currently standardized on Aruba as their wireless solution.

The HCPSS receives service to the building from Howard County Government Fiber as well as Verizon and Comcast currently. The specific services delivered to the building will be refined with the owner throughout design based on their latest arrangements. Pathways will be provided to accommodate services as needed with spares for future use.

VOICE DISTRIBUTION INFRASTRUCTURE DESCRIPTION

The voice cable plant will consist of Category 6A UTP cables extended from TR's to the workstation. These cables will terminated in Category 6 patch panels and will be cross-connected to either rack mounted Cat 6A patch panels or 100-pair Category 5e rack mounted 110 blocks. Multipair Cat 5e cables shall be installed for analog backbone connectivity and interconnect intermediate telecom rooms with the TER/MDF (head end). Cat 5e backbone cables shall be terminated in wall-mounted 110-blocks at the TER/MDF and connected to various analog services where required. The infrastructure will support analog, digital and IP based services.

TELEPHONE SYSTEM

The school will contain the Category 6A cable described above for voice distribution in offices and classrooms. The infrastructure will support the analog, digital and IP telephone services.Voicemail servers shall be incorporated into the design to allow for a more unified communications platform. Telephone handsets will also be provided in offices and classrooms. Handsets will be located appropriately during the design phase of the project. The school should also maintain a minimum number of separate incoming analog telephone lines for elevator, fax, fire and security connections throughout the facility.

INTERCOM AND MASTER CLOCK SYSTEM

The intercommunication system shall utilize a copper cable infrastructure to distribute multiple, simultaneous conversations on separate channels throughout the facility through telephones, call-in switches and loudspeaker assemblies. A programmable master clock with correction of secondary clocks shall also be included as part of the overall system. In addition, the system must be scalable to meet the user's future expansion needs and be programmable from a computer terminal located at the facility.

The HCPSS is currently reviewing Intercom and Clock system types and architectures. The final decisions made by the HCPSS shall be incorporated into the design documents when available.

CLASSROOM AUDIO-VISUAL

The instructor's station in each classroom will have cable harness assembly that will allow the teacher's computer to display to a video monitor, wall mounted LCD projector or electronic whiteboard. The A/V harness shall include HDMI, USB, VGA and 3.5 MM audio at a minimum and be connected to various devices around the room. HCPSS currently uses Epson Brighlink 695 wall mounted interactive projectors with Epson Pixie controllers.

Sound Reinforcement will be included in each instructional space as part of the AV systems. The system includes two or four ceiling mounted speakers that can also be integrated with other classroom equipment such as the LCD projector, DVD player or television tuner to amplify sound from those sources as well. The system has the ability to act as a mixer to switch audio sources and control volume levels on multiple inputs. Sound levels are equalized throughout the space so students hear at proper volume and clarity levels.

VIDEO DISTRIBUTION SYSTEM

Comcast cable service will be brought to the building. Comcast shall provide three Digital Transport Adaptors (DTAs) to convert encrypted digital signals to de-encrypted analog signals. A small coaxial cable plant will be installed to strategic locations for immediate viewing without the need for a set-top box.

The IP data network shall be used for IP video streaming. The IP video streaming head end will consist of a distribution cabinet holding rack mounted video distribution equipment and be located in the Main Telecom Room. The system will allow for content to be streamed over the data network and viewed through a computer or through a display using a video decoder. The head end will receive signals from external and internal sources and establish channels to display images on demand.

SECURITY SYSTEM

Closed Circuit Television shall provide visual surveillance and recording of the school, internally and externally, 24 hours per day. Currently, the HCPSS utilizes Pelco cameras connected via coaxial cable to GE DVRs strategically located within facilities. At a minimum, the CCTV system will utilize analog cameras connected to DVRs via RG-6 coaxial cable. A possible implementation would include IP based cameras that are connected to the data network through switching equipment in IDFs.

Each IP camera location shall have a Cat6 UTP cable, identical to other data infrastructure at the facility, terminated with a 15 service loop and an 18/2 AWG wire that follows the same path (for possible future transition to a PTZ camera.). Analog cameras shall have an RG-6 coaxial cable with Male F Connector and 15 foot service loop at each camera location. Exterior pole mounted cameras shall receive an RG-6, RG-11 or fiber for signal transmission along with associated power conductors.

Cameras will survey the corridors, specific rooms and portions of the perimeter of the facility. Digital video recordings will be transmitted from each camera location and stored for no less than 30 days. The CCTV will be connected to an emergency backup system that will keep the system operational in a power outage.

All external cameras shall be PTZ type cameras and cameras facing access doors will have an auto focus iris to allow for the change in lighting conditions. Cameras will record digital pictures in color whenever light conditions permit and only revert to black and white where low light conditions will not permit accurate color images. Interior fixed cameras should generally be considered over PTZ type cameras due to cost and operator issues.

The location of the system cameras, NVRs, DVRs, power supplies and associated control software/ hardware will be located during design phase of the project. The system will be capable of reviewing images based upon time and location inquiries.

ACCESS CONTROL AND INTRUSION DETECTION DESCRIPTION

The access control and intrusion detection system shall allow/prevent access, track movement throughout the facility and provide an alarm signal on and offsite in the event of an unauthorized entry. The systems shall be integrated and will be controllable on and offsite to allow for efficient system management. Bosch shall be used for the Intrusion System and AMAG shall be used for the access control system.

The system shall consist of motion detectors, door and window contacts, card readers, door controllers, power supplies and intelligent software all connected to alarm panels throughout the facility. (Electric locking devices and door hardware shall be provided by others.)

Cabling for this system will be installed in dedicated pathways with panels located in telecommunications rooms and storage rooms. All entrances will be equipped with handicapped reachable speakers, intercom, and video camera entry systems. Entrance areas will be fitted with cable for future installation of metal detectors.

AUXILIARY SOUND SYSTEMS DESCRIPTION

Specific spaces within the facility shall have local auxiliary sound systems that allow for sound amplification and reproduction. These spaces include gymnasiums, cafetorium, music rooms and mini-auditorium. The spaces shall have a combination of hardwired and wireless microphone inputs, output speakers and system control.

A typical auxiliary sound system shall include rack or cabinet mounted electronics consisting of pre-amplifiers, mixers, program sources, equalizers, amplifiers, wireless microphone inputs, assistive listening stations and storage space for microphones. Each system should be connected to the facilities intercom system and fire alarm control panel to allow for system override in the event of an important or emergency announcement.

Kitchen Design Narrative

FIINISHES

Floors:	New kitchen will be provided with quarry tile with a slip resistant abrasive grain finish.
Walls:	New kitchen walls will be constructed of glazed masonry units..
Ceilings:	Ceiling will be provided with new fire retardant ceiling panels.
Lighting:	New LED light fixtures will be provided throughout kitchen.

AREAS

New kitchen will meet all the current HCPSS and Maryland food service standards with two serving lines and 1800 sf of program space.

Energy Statement

Energy conservation is an important goal for the HCPSS elementary school prototype design. Many energy saving techniques are incorporated into the building to achieve energy efficiency and compliance with LEED energy requirements. These techniques include the following:

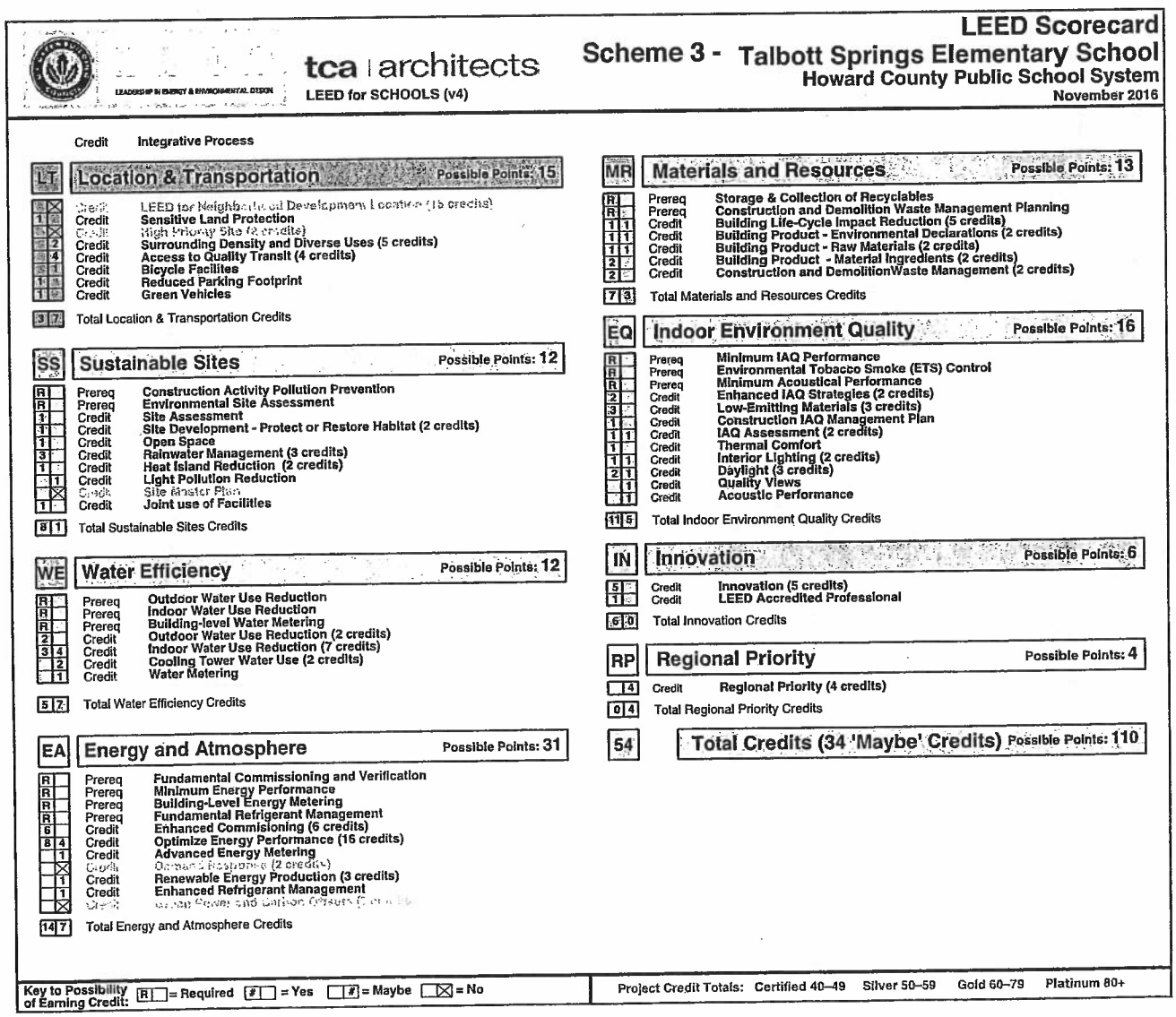
- Mechanical systems will exceed the energy efficiency requirements mandated by ASHRAE standard 90.1.
- Energy recovery will be used to pre-condition outdoor ventilation air where appropriate and permitted per IMC.
- Mechanical systems (pumps and fans) will include variable frequency drives to allow systems to operate at lower capacities when building loads are reduced. Premium efficiency motors will be specified for all fans and pumps and all non-variable frequency drive motors over ten horsepower will be power-factor corrected to 90 percent minimum.
- Air-handling unit systems will incorporate dry-bulb economizer control allowing the use of "free cooling" when outdoor air temperature and humidity conditions permit. Systems will include MERV 13 filtration to improve indoor air quality.
- Mechanical systems will be designed to maximize indoor air quality by effectively mixing and delivering fresh air to building occupants. Air-handling unit systems will include airflow monitoring stations on outdoor air connections to assure the delivery of outdoor air.
- Designated areas will include carbon dioxide monitoring to reset the quantity of outdoor air required during periods of reduced occupancy.
- Environmentally friendly refrigerants will be specified for mechanical equipment to meet ozone depletion and global warming thresholds.
- Mechanical systems will be designed to allow occupants to control temperature within their zone and will meet the requirements of ASHRAE Standard 55.
- Building commissioning will be provided to assure that systems operate as designed.
- The HVAC system will be controlled by the latest generation of computerized energy management equipment.
- The HVAC system is divided into many occupancy zones for efficient year-round and after-hours use.
- Specifications will exclude materials that lead to poor indoor air quality.
- Low-flow fixtures will be specified to reduce overall building water usage. Specific strategies will include two-position flush valves for water closets, high efficiency type urinals, low-flow aerators and low-flow shower heads.

Sustainable 'Green' Design Goals

For Scheme 3, the new school should achieve a 'Silver' level from the LEED (Leadership in Energy and Environmental Design) rating system, making this facility a 'Green' school.

Simply stated, a 'Green' school is a building designed to conserve energy, water, and materials, thus reducing negative impacts on human health and the environment. A 'Green' learning environment provides natural daylight, enhanced classroom acoustics, improved indoor air quality, thermal comfort, and opportunities to integrate green features into the school's curriculum.

This project will be required to use the new LEED 4.0 rating system for schools. An 'in progress' LEED scorecard is shown below which summarizes the credits most likely obtainable at this time. As the project continues to evolve, new credits may be possible while others may become increasingly difficult to engineer or too costly to provide. At this time we have identified 54 likely credits (with an additional '34 possible credits') allowing for the loss of some and still complying with the goal of a LEED 'Silver' Building.



LEED Scorecard
Scheme 3 - Talbott Springs Elementary School
Howard County Public School System
November 2016

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LEED for SCHOOLS (v4)

Credit Integrative Process

LT Location & Transportation Possible Points: 15

Credit	LEED for Neighborhood Development Location (15 credits)
1	Credit	Sensitive Land Protection
Credit	High Priority Site (2 credits)
2	Credit	Surrounding Density and Diverse Uses (5 credits)
4	Credit	Access to Quality Transit (4 credits)
1	Credit	Bicycle Facilities
1	Credit	Reduced Parking Footprint
1	Credit	Green Vehicles

3 7 Total Location & Transportation Credits

SS Sustainable Sites Possible Points: 12

R	Prereq	Construction Activity Pollution Prevention
R	Prereq	Environmental Site Assessment
1	Credit	Site Assessment
1	Credit	Site Development - Protect or Restore Habitat (2 credits)
1	Credit	Open Space
3	Credit	Rainwater Management (3 credits)
1	Credit	Heat Island Reduction (2 credits)
1	Credit	Light Pollution Reduction
Credit	Site Master Plan
1	Credit	Joint use of Facilities

8 1 Total Sustainable Sites Credits

WE Water Efficiency Possible Points: 12

R	Prereq	Outdoor Water Use Reduction
R	Prereq	Indoor Water Use Reduction
R	Prereq	Building-level Water Metering
2	Credit	Outdoor Water Use Reduction (2 credits)
3 4	Credit	Indoor Water Use Reduction (7 credits)
2	Credit	Cooling Tower Water Use (2 credits)
1	Credit	Water Metering

5 7 Total Water Efficiency Credits

EA Energy and Atmosphere Possible Points: 31

R	Prereq	Fundamental Commissioning and Verification
R	Prereq	Minimum Energy Performance
R	Prereq	Building-Level Energy Metering
R	Prereq	Fundamental Refrigerant Management
6	Credit	Enhanced Commisioning (6 credits)
8 4	Credit	Optimize Energy Performance (16 credits)
1	Credit	Advanced Energy Metering
Credit	Demand Response (2 credits)
1	Credit	Renewable Energy Production (3 credits)
1	Credit	Enhanced Refrigerant Management
Credit	Green Power and Carbon Offsets (2 credits)

14 7 Total Energy and Atmosphere Credits

MR Materials and Resources Possible Points: 13

R	Prereq	Storage & Collection of Recyclables
R	Prereq	Construction and Demolition Waste Management Planning
1 1	Credit	Building Life-Cycle Impact Reduction (5 credits)
1 1	Credit	Building Product - Environmental Declarations (2 credits)
1 1	Credit	Building Product - Raw Materials (2 credits)
2	Credit	Building Product - Material Ingredients (2 credits)
2	Credit	Construction and DemolitionWaste Management (2 credits)

7 3 Total Materials and Resources Credits

EQ Indoor Environment Quality Possible Points: 16

R	Prereq	Minimum IAQ Performance
R	Prereq	Environmental Tobacco Smoke (ETS) Control
R	Prereq	Minimum Acoustical Performance
2	Credit	Enhanced IAQ Strategies (2 credits)
3	Credit	Low-Emitting Materials (3 credits)
1	Credit	Construction IAQ Management Plan
1 1	Credit	IAQ Assessment (2 credits)
1	Credit	Thermal Comfort
1 1	Credit	Interior Lighting (2 credits)
2 1	Credit	Daylight (3 credits)
1	Credit	Quality Views
1	Credit	Acoustic Performance

11 5 Total Indoor Environment Quality Credits

IN Innovation Possible Points: 6

5	Credit	Innovation (5 credits)
1	Credit	LEED Accredited Professional

5 0 Total Innovation Credits

RP Regional Priority Possible Points: 4

4	Credit	Regional Priority (4 credits)

0 4 Total Regional Priority Credits

54 **Total Credits (34 'Maybe' Credits)** Possible Points: 110

Key to Possibility of Earning Credit: R = Required # = Yes # = Maybe X = No

Project Credit Totals: Certified 40–49 Silver 50–59 Gold 60–79 Platinum 80+

Detailed Cost Estimate of Scheme 3

IAC/PSCP FORM 302.4

COST ESTIMATE SUMMARY

LEA: Howard County Public School System DATE: 4/6/2017

PROJECT TITLE: Talbott Springs Elementary School PSC NO.

Cost Estimate for: Feasibility Studies [ ] Design Development [ ] Construction Document

Scheme 3

Planned Bid Date

Design Capacity 500 Students

Existing Wall Perimeter

Building Gross Area

New/Add 91,211 S.F.

Renovation

Total 91,211 S.F.

Acres of Site

Developed

Undeveloped

Total

General Building description (number of stories, type of construction, etc.): Two story, structural steel framed (except at masonry load bearing walls around Gymnasium and cafetaria), with concrete slab on grade, composite steel framed slab at second floor and open web steel joists at roof.

C.S.I DIV	CATEGORY	ESTIMATED COST OF NEW CONSTRUCTION	ESTIMATED COST OF RENOVATION	TOTAL COST
00 00 00	PROCUREMENT & CONTRACTING REQUIREMENTS	$0	$0	$0
01 00 00	GENERAL REQUIREMENTS	$1,650,419	$0	$1,650,419
02 00 00	EXISTING CONDITIONS	$810,485	$0	$810,485
03 00 00	CONCRETE	$2,983,790	$0	$2,983,790
04 00 00	MASONRY	$1,934,169	$0	$1,934,169
05 00 00	METALS	$152,516	$0	$152,516
06 00 00	WOOD, PLASTICS & COMPOSITES	$186,879	$0	$186,879
07 00 00	THERMAL & MOISTURE PROTECTION	$711,813	$0	$711,813
08 00 00	OPENINGS	$877,120	$0	$877,120
09 00 00	FINISHES	$1,906,828	$0	$1,906,828
10 00 00	SPECIALTIES	$1,020,053	$0	$1,020,053
11 00 00	EQUIPMENT	$1,125,886	$0	$1,125,886
12 00 00	FURNISHINGS	$1,011,041	$0	$1,011,041
13 00 00	SPECIAL CONSTRUCTION	$86,381	$0	$86,381
14 00 00	CONVEYING EQUIPMENT	$110,851	$0	$110,851
21 00 00	FIRE SUPPRESSION	$346,227	$0	$346,227
22 00 00	PLUMBING	$988,132	$0	$988,132
23 00 00	HVAC	$5,575,344	$0	$5,575,344
25 00 00	INTEGRATED AUTOMATION	$0	$0	$0
26 00 00	ELECTRICAL	$2,544,026	$0	$2,544,026
27 00 00	COMMUNICATIONS	$310,647	$0	$310,647
28 00 00	ELECTRONIC SAFETY & SECURITIES	$298,082	$0	$298,082
31 00 00	EARTHWORK	$234,274	$0	$234,274
32 00 00	EXTERIOR IMPROVEMENTS	$1,414,930	$0	$1,414,930
33 00 00	UTILITIES	$847,973	$0	$847,973
34 00 00	TRANSPORTATION	$0	$0	$0
35 00 00	WATERWAY & MARINE CONSTRUCTION	$0	$0	$0
40 00 00	PROCESS INTEGRATED	$0	$0	$0
41 00 00	MATERIAL PROCESSING & HANDLING EQUIPMENT	$0	$0	$0
42 00 00	PROCESS HEATING, COOLING & DRYING EQUIP.	$0	$0	$0
43 00 00	PROCESS GAS LIQUID & HANDLING & PURIFICATION & STORAGE EQUIPMENT	$0	$0	$0
44 00 00	POLLUTION & WASTE CONTROL EQUIPMENT	$0	$0	$0
45 00 00	INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT	$0	$0	$0
46 00 00	WATER & WASTE WATER EQUIPMENT	$0	$0	$0
48 00 00	ELECTRICAL POWER GENERATION	$0	$0	$0
	TOTAL	$27,127,865	$0	$27,127,865

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Appendix

Talbott Springs Elementary School

A net zero energy building generates as much energy as it uses over the course of a year, as a result of extreme building system efficiencies and on-site renewable energy sources such as solar and geo-exchange systems. The HCPSS opened Maryland's First Net Zero Energy School in January 2017, Wilde Lake Middle School. For that project the existing prototype middle school design was modified to significantly reduce energy consumption and then to generate the balance of energy needed to run the building on the school site. This section will discuss what design elements would need to be added to the Scheme 3 building design for the school to be another Net Zero Energy School.

In order for a building to achieve zero energy without over-reliance on renewable energy, the design must achieve all the basics of sustainable design. According to a comparative study and analysis of eleven net zero energy schools titled "Zero Energy Schools - Beyond Platinum" by author/ architect Paul C. Hutton, the fundamental design strategies necessary to achieve zero energy are:

1. **Building Orientation and Massing:**
   Orienting the long axis of the building within 15 degrees of east-west axis results in energy savings by reducing heating loads on the building in the summer and by facilitating daylight harvesting. Buildings should also seek to utilize multi-story construction in lieu of single floor designs. Combining optimum orientation and massing can easily yield 15 percent energy savings.

2. **Building Envelope:**
   By exceeding the current building code requirements for the thermal design of exterior walls and roofs, a well designed, constructed, and insulated building envelope can yield energy savings of 15 percent over minimal code compliant construction.

3. **Daylighting:**
   Electric lighting can consume as much as 20 percent of the total energy use in a building. Substituting free daylight for costly electric light during the day, can reduce electric lighting energy by half with proper light dimming controls as discussed below.

4. **Electric Lighting and Controls:**
   The first step to reduce energy use related to electric lighting is to minimize lighting power density (LPD) while maintaining comfortable interior lighting. This is accomplished through careful fixture selection and placement, as well as, automated controls such as occupancy sensors and dimming sensors in response to daylighting.

5. **HVAC and Controls:**
   The combination of space heating, ventilation, and air-conditioning consume more energy than any other single component in a school building. It was found that geothermal systems reduce energy use substantially and were utilized in all but two of the eleven net zero energy schools in this study.

6. **Occupant Behavior and Plug Loads:**
   Occupant behavior poses a challenge to school districts attempting to predict energy usage for the designer's energy model. No where is this more evident than in the effort to control potentially excessive and wasteful plug loads. Bringing in an appliance such as a small refrigerator; using incandescent desk lamps; neglecting to turn off computers and monitors each night or storing very little food in a large walk-in kitchen cooler while school is closed for the summer are all examples of staff behavior that can substantially increase energy consumption over the course of a year.

7. **Renewable Energy:**
   Renewable energy sources on a school building or site are necessary in order to achieve Net Zero Energy. Photovoltaic (PV) panels, otherwise known as 'solar panels' and wind power are the two most commonly used technologies for renewable energy. It was found that PV panel systems were utilized in all but one of the eleven net zero energy schools in the study regardless of geographic, climatic, size or programmatic variation among each of the schools.

Net Zero Design for New Wilde Lake Middle School

As a result of pursuing a net zero energy building for the already energy efficient, prototype middle school design, some of the more noteworthy modifications and required upgrades for the new Wilde Lake Middle School design, which would be reviewed and utilized for a net zero design of Scheme 3 are listed below:

A. The prototype geothermal system has been modified to a 'unitary' geothermal design for each room of the building. As a result, heat pump closets and a large centralized mechanical room have been added to the building.

B. The storage and delivery of hot water throughout the school has been redesigned to consist of four heat pump type water heaters distributed in four small loops throughout the school. These water heaters have an extremely high level of production energy efficiency and their varied locations throughout the school will reduce pump energy associated with hot water recirculation.

C. The building lighting plan has been redesigned to minimize the lighting power density by way of careful LED light fixture selection and placement. LED lighting has been utilized for all exterior building and site lighting. All interior lighting utilizes occupancy sensor controls as well as photocell dimming capabilities where required in large spaces with natural daylighting.

D. The building design maximizes daylight opportunities while balancing the amount of wall and roof openings against the overall thermal building envelope goals and rooftop PV system design.

E. The building envelope has been upgraded to provide a minimum of R-25 for the exterior walls by way of increased wall insulation, higher performing double-glazed windows and the use of thermally broken exterior doors and door frames. Sunshades have been added to all east, south and west-facing windows. The roof design will remain at the current minimum of R-30.

F. The current roof structure design has been modified to support the additional PV panel loads of 10 lbs/s.f.

G. Kitchen design includes the most energy efficient food service equipment, walk-in boxes that are configured so that only one door will open to kitchen and use demand defrost, refrigeration system with R-290 refrigerant, 'Energy Star' appliances, lower energy Type II exhaust hood, and boiler-less steamers.

H. Entire PV panel system (both rooftop and at grade) has been designed and engineered.

Energy Use Index Comparison

Existing Wilde Lake Middle School Building	66 kBTU/sf
Base Building per ASHRAE 90.1-2007/ LEED Minimum	51 kBTU/sf
Middle School No.20 (Thomas Viaduct Middle School)	38 kBTU/sf
Net Zero Goal Wilde Lake Middle School Replacement Building	**25** kBTU/sf

Energy Use Index (EUI) is the measure of the total energy consumed in cooling or heating of a building during the course of a year, expressed in thousand British thermal unit (kBtu) per square feet (sf).

Provided below is a listing of mechanical, electrical and plumbing items that would most likely need to be implemented to Scheme 3 for Talbott Springs Elementary School to deliver a net zero energy design:

1. Mechanical system would need to be revised from a boiler / chiller arrangement to distributive geothermal heat pump system. Closet heat pumps would be required, similar to Wilde Lake Middle School, which would result in the increase of gross square footage the school above that which is listed for Scheme 3.

2. Rooftop equipment would need to be located indoors, allowing space for the new rooftop PV system. To accommodate, a new indoor centralized mechanical room is recommended, similar to Wilde Lake Middle School. The addition of this new mechanical room would increase gross square footage the school above that which is listed for Scheme 3.

3. All classrooms would need to be provided with carbon dioxide (CO2) sensors and air terminal units, for monitoring room CO2 levels and controlling ventilation airflow to these spaces.

4. The gas-fired water heaters would need revised to heat pump type water heaters.

5. Sub-metering of the electrical distribution systems would need to be added to the scope of the project. In addition, an energy dashboard would most likely be desired.

6. The addition of switched receptacle controls would need added to reduce / limit plug loads.

7. The addition of a renewable energy source (PV panels) is needed to generate onsite power.

8. The kitchen would need to be re-evaluated for the most energy-efficient design.

9. Finishes would need to be re-evaluated for energy efficiency. This would result in changes such as the use of terrazzo flooring in the corridors and cafeteria.

It is anticipated that the cost of the project would be approximately $33,000,000 in order to provide a new replacement school similar to what is shown in Scheme 3, but as a Net Zero Energy School.

Life Cycle Cost Comparison

Factor	Scheme 1	Scheme 2	Scheme3
Annual operating cost per square foot	$4.55	$4.30	$4.05
Annuel maintenance cost per square foot	$2.22	$2.10	$1.98
Total annual O&M cost per square foot	$6.77	$6.40	$6.03
estimated square feet	54,089	87,670	91,211
Total Annual O&M cost	$366,182.53	$561,088.00	$550,002.33
Period in years	40	40	40
Assumed interest rate	5.00%	5.00%	5.00%
Present value of O&M expense stream	$6,283,326.03	$9,627,708.99	$9,437,489.98
Project Cost (A/E construction estimate)	$8,779,283.00	$23,651,644.00	$27,127,865.00
40-year life cycle cost	$15,062,609.03	$33,279,352.99	$36,565,354.98