*ACTION*

HOWARD COUNTY
PUBLIC SCHOOL SYSTEM

# BOARD OF EDUCATION OF HOWARD COUNTY
# MEETING AGENDA ITEM

**TITLE:** Waverly Elementary School Construction Documents **DATE:** March 10, 2016

**PRESENTER(S):** Scott W. Washington, Director, School Construction

Zachary Klee, Project Manager, Grimm + Parker Architects

**VISION 2018 GOAL:** ☒ Students ☐ Staff ☐ Families and Community ☐ Organization

**OVERVIEW:**
The attached construction documents brochure describes in detail the general scope of work for Waverly Elementary School. The project encompasses two phases. The first phase will address the needed additions to the school. This will allow us to replace the existing integrated modular classroom pod, as well as eliminate the existing portables. The second phase will include extensive renovations to the existing building, both programmatic and systemic, such as, the conversion of the existing open area pods into self-contained classrooms, as well as new mechanical, electrical, life safety and technology systems.

Updates that have taken place since the design development brochure include a renovation of the existing kitchen and incorporation of an ADA compliant platform lift. A number of add-alternates have been investigated as well. These add-alternates include a staff lounge expansion, ballfield reconstruction, site entrance modifications and parking lot expansion.

It is the intent of the design to achieve a LEED (Leadership in Energy and Environmental Design) "Certified" designation.

**RECOMMENDATION/FUTURE DIRECTION:**
It is recommended that the construction documents report for Waverly Elementary School be approved as submitted.

**SUBMITTED BY:**
Scott W. Washington, Director
School Construction

**APPROVAL/CONCURRENCE:**
Renee A. Foose, Ed.D.
Superintendent

Camille B. Jones
Chief Operating Officer

Bruce Gist
Executive Director
Facilities, Planning and Mgmt.


# WAVERLY ELEMENTARY SCHOOL

GRIMM AND PARKER

Howard County Public School System

CONSTRUCTION DOCUMENT SUBMISSION | MARCH 10, 2016

# TABLE OF CONTENTS

# WAVERLY ELEMENTARY SCHOOL

## CONSTRUCTION DOCUMENT SUBMISSION

March 10, 2016

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# PLANNING ADVISORY COMMITTEE

| | |
|---|---|
| Kathy Jacobs | HCPSS, Principal, Waverly Elementary School |
| Scott Washington | HCPSS, Director, School Construction |
| Dan Lubeley | HCPSS, Manager of Design and Preconstruction Services |
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| Gloria Mikolajczyk | MSDE School Facilities, Architect Supervisor |
| Olivia Claus | HCPSS, Director of School Facilities |
| Judy Pattik | HCPSS, Special Education Coordinator |
| Nancy Fitzgerald | HCPSS, Executive Director of Special Education |
| Cindi Deckman | HCPSS, Principal's Secretary, Waverly Elementary School |
| Wendy Cain | HCPSS, Custodial Day Chief, Waverly Elementary School |
| Ross Chakrian | HCPSS, Physical Education, Waverly Elementary School |
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| Richard Lucas | HCPSS, Instrumental Music, Waverly Elementary School |
| Reny Toledo | HCPSS, Assistant Manager Network & Audio Visual Services |
| Manish Patel | Parent, Waverly Elementary School |
| Ron Morris | HCPSS, Administrative Director, Elementary Schools |
| Rachel Edolio-Eket | HCPSS, Assistant Principal, Waverly Elementary School |
| Ted Ludicke | HCPSS, Specialist Customer Service |
| Amy Raymond | HCPSS, Resource Teacher, Early Childhood Programs |
| Theresa Frederick | HCPSS, Academic Specialist Rep/Reading Specialist, Waverly Elementary School |
| Jackie McQuarrie | HCPSS, Media Center Paraeducator, Waverly Elementary School |
| Kelly Balchunas | Parent, Waverly Elementary School |
| Melodee Phillips | HCPSS, Assistant Manager, Custodial Services |
| Nicole Geiger | HCPSS, Resource Teacher/LRE, Elementary Schools |
| Carly Josephson | HCPSS, Media, Waverly Elementary School |
| Jennifer Silbaugh | HCPSS, Team Leader, Phelps Luck Elementary School |

# DESIGN DEVELOPMENT PARTICIPANTS

| | |
|---|---|
| Kathy Jacobs | HCPSS, Principal, Waverly Elementary School |
| Scott Washington | HCPSS, Director, School Construction |
| Dan Lubeley | HCPSS, Manager of Design and Preconstruction Services |
| Cece Clement | HCPSS, Manager, Purchasing |
| Tim Ervin | Douron, Inc., Furniture Vendor |
| Rachel Gustafson | HCPSS, Counselor, Waverly Elementary School |
| Zahava Wiener | HCPSS, Psychologist, Waverly Elementary School |
| Debra Leventer | HCPSS, Art, Waverly Elementary School |
| Mary Ellen Miller | HCPSS, Health Services, Waverly Elementary School |
| Melanie Dore | HCPSS, Health Services, Waverly Elementary School |
| William Dunn | HCPSS, Custodial, Waverly Elementary School |
| Robert Tolliver | HCPSS, Custodial, Waverly Elementary School |
| Wendy Cain | HCPSS, Custodial Day Chief, Waverly Elementary School |
| Lynn Frost | HCPSS, Adaptive Physical Education, Waverly Elementary School |
| Lauren Heisey | HCPSS, Related Arts Rep/Physical Education, Waverly Elementary School |
| Ross Chakrion | HCPSS, Physical Education, Waverly Elementary School |
| Jaclyn Klein | HCPSS, 1st Grade ITL, Waverly Elementary School |
| Peggy Schaefer | HCPSS, 2nd Grade ITL, Waverly Elementary School |
| Amanda Entrot | HCPSS, 3rd Grade ITL, Waverly Elementary School |
| Brian Eisentraut | HCPSS, 4th Grade ITL, Waverly Elementary School |
| Karen Fernande | HCPSS, 5th Grade ITL, Waverly Elementary School |
| Sue Arnett | HCPSS, Gifted & Talented, Waverly Elementary School |
| Penny Zimring | HCPSS, Gifted & Talented, Waverly Elementary School |
| Christina Hataway | HCPSS, Technology, Waverly Elementary School |
| Shari Haddaway | HCPSS, Kindergarten, Waverly Elementary School |
| Susan Oh | HCPSS, ESOL, Waverly Elementary School |
| Theresa Frederick | HCPSS, Academic Specialist Rep/Reading Specialist, Waverly Elementary School |
| Andrea Whitehead | HCPSS, RECC ITL, Waverly Elementary School |
| Lisa Ryder | HCPSS, Special Education ITL, Waverly Elementary School |
| Richard Lucas | HCPSS, Instrumental Music, Waverly Elementary School |
| Jonathan Becker | ICF International, BGE Rebate Representative |
| Alamelu Brooks | ICF International, BGE Rebate Representative |

# DESIGN TEAM

| | | |
|---|---|---|
| ARCHITECT | Grimm + Parker Architects | Calverton, MD |
| CIVIL ENGINEER | Fisher, Collins & Carter, Inc. | Ellicott City, MD |
| STRUCTURAL ENGINEER | Columbia Engineering, Inc. | Columbia, MD |
| MEP ENGINEER | James Posey Associates | Baltimore, MD |
| TECHNOLOGY | Educational Systems Planning | Annapolis, MD |
| LANDSCAPE ARCHITECT | Bradley Site Design | Washington, DC |
| ACOUSTICS | Henning Associates, Inc. | Rockville, MD |
| LEED CONSULTANT | Sustainable Design Consulting, LLC | Washington, DC |
| COMMISSIONING AGENT | Lutz Engineering, Inc. | Wilmington, DE |

# PLANNING PROCESS

The design solutions for Waverly Elementary School presented at the end of the schematic design phase, and approved by the Board on September 3, 2015, were developed in response to a detailed analysis of the current and projected educational programs, a comprehensive evaluation of the existing building conditions, and a determination of facilities necessary to support future enrollment and programs. Through an integrative and collaborative process, stakeholders provided valuable insights and data that have been instrumental in guiding the design team. In a series of meetings with school construction staff, facilities staff, construction managers, design team members, and members of the planning advisory committee, the following topics were discussed:

- Overview of the Howard County Public School System (HCPSS) process for completing renovations and additions, including schedule and budget
- Review of the existing educational program, projected enrollment, existing and required facilities
- Review of the site and areas for possible expansion
- Review of the existing floor plan to identify deficiencies in the current school layout
- Discussion about existing classroom pods and how they can be modified to function more effectively for teachers and students
- Review and detailed discussion of proposed new addition layouts and space adjacencies
- Brief overview of Leadership in Energy and Environmental Design (LEED) and potential sustainable practices to be incorporated into the project

In the design development phase of the project, we continued to work closely with the HCPSS staff and end users to refine the proposed building plans. Through a series of meetings with the school principal, educators, and custodial staff, the specific layout of each space was reviewed in detail and their comments were incorporated wherever possible. The design team also worked to reduce the building area and construction cost. Through this process several significant plan changes were made. Those changes generally consisted of:

- Elimination of the proposed administration addition
- Reconfiguration of the existing gymnasium as a new administration suite
- New Ed Spec compliant gymnasium to replace existing, eliminating the need for the PE activity room previously planned as part of the north addition
- Reconfiguration of the north addition to create a more structurally efficient "stacking" plan, reducing cost, and minimizing interior rooms with limited access to daylight
- Reduced new mechanical and electrical room size and incorporated into existing envelope
- Reorganization of some educational spaces based on educator feedback

The Board approved the design development submission on November 5, 2015. The Interagency Committee on School Construction (IAC) authorized the team to proceed with the construction document phase of the project on December 7, 2015.

In the construction document phase the project team continued to refine the project design, coordinate building systems, identify and address site access constraints, stormwater system and reforestation requirements, and generally develop the technical documents required to prosecute the work.

In response to determinations made by the HCPSS administration, the project scope has been increased to include a complete renovation of the existing kitchen. The proposed kitchen renovations will increase serving capacity, which is necessary to accommodate planned student population increase.

On February 2, 2016, the project team met with officials from the Howard County Department of Licensing, Inspections and Permits (DLIP) and the Office of the Fire Marshal to conduct a preliminary code review.

A summary of changes made since the last submission follows. Please refer to the detailed narratives and updated plans for additional information.

# SUMMARY OF CHANGES

**SITE/CIVIL**

- Established forest conservation easement to offset site development impact
- Identified site improvement bid alternates
- Established limit of disturbance, LEED project boundary, and extents of both the temporary construction access paths and the permanent fire access lane

**ARCHITECTURAL**

- Scope of kitchen renovation was refined and related plans and costs developed
- Developed a bid alternate for expansion of staff lounge
- Addition of platform lift for equal accommodation as required by the Americans with Disabilities Act (ADA)
- Minor changes to ensure life-safety compliance throughout all phases of the project

**MECHANICAL AND PLUMBING**

- Kitchen scope added to project, including new ductwork, fan systems, and plumbing.
- Teacher planning areas will be served by a four-pipe system, rather than a direct exchange system (year-round use similar to administration area is not necessary).
- The 2007 classroom addition will have all new ductwork systems including fully ducted return air (no plenum return).
- Stairwells will receive four-pipe fan coil units for heating and cooling.

**VOICE DISTRIBUTION INFRASTRUCTURE**

- The HCPSS will utilize the existing PBX at the site through construction phasing. A final determination will be made by the HCPSS if new telephone electronics will be provided to the project.

**VIDEO DISTRIBUTION**

- The current system is based around MediaMaster equipment and will be fully defined by the owner prior to construction.

**CLASSROOM AUDIO/VIDEO SYSTEM**

- Deleted Pixie controllers from the classroom audio/visual (A/V) systems.

**VIDEO SURVEILLANCE**

- Changed system from coaxial cable and digital video recorders (DVRs) to Category 6 unsheilded twisted pair cable (UTP) and network video recorders (NVRs)
- Currently, the HCPSS utilizes Interlogix cameras connected via Category 6 cable to GE NVRs strategically located within facilities. At a minimum, the closed circuit television (CCTV) system will utilize internet protocol (IP) cameras connected to NVRs via Category 6 horizontal cable and fiber backbone cable. Each IP camera location shall have a Category 6 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 pan/tilt/zoom (PTZ) camera).

**GREEN BUILDING**

- Added "Maximize Open Space" credit to Leadership in Energy and Environmental Design (LEED) Credit Goals
- Updated LEED Scorecard

# PROJECT DESCRIPTION

Waverly Elementary School is a one-story structure serving grades kindergarten through fifth and multiple Regional Early Childhood Center (RECC) programs. The original 70,685 square foot structure was built in 1990. In 2007, an addition of 10,860 square feet expanded the cafeteria to the south and created more than 9,000 square feet of new classroom space on the west side of the building. The current overall gross square footage is approximately 81,545. There are three portable classroom units in use and eight of the existing classrooms are housed in modular constructs that were erected when the building was originally constructed in 1990.

Waverly Elementary School has a reputation for providing a wide range of high quality special education programs and has become a "destination school" for families requiring these services. Enrollment in these programs is proportionally higher than typical and includes both RECC and local students.

The current student population is 769, of whom 66 students are in the RECC program. There are 124 full-time and seven part-time staff members.

Due to the age of the school and its systems and the forecasted student population increase, we have identified several programmatic and functional deficiencies. These deficiencies will be addressed through renovation of the existing building, replacement of existing building systems and services, and the construction of additions at both the north end and southwest corner of the existing building.

The proposed new construction will include the following:

- Replacement of six modular classrooms with permanent construction
- Four new classrooms (100 seats) to accommodate the projected population increase
- Two new classrooms to replace portable classrooms
- Renovation of the existing gymnasium into a new administration suite with a secure entry vestibule
- New gymnasium sized to accommodate the projected population increase
- Renovation of existing spaces to provide COMAR compliant health suite, additional art classrooms and appropriately sized pre-K and kindergarten classrooms
- New addition to accommodate reconfiguration of existing music rooms and to provide two additional music rooms
- Renovation of existing classroom pods to replace operable partitions with permanent walls that provide appropriate acoustic separation
- Renovation of the existing kitchen to accommodate the projected population increase

The following Bid Alternates have been identified for inclusion in the bid package:

- Bid Alternate #1 - Parking lot expansion
- Bid Alternate #2 - Site entry improvements (road widening, restripping and associated retaining walls)
- Bid Alternate #3 - Staff lounge expansion
- Bid Alternate #4 - High intensity, long-throw projector in gymnasium
- Bid Alternate #5 - Reconstruction of the baseball field impacted by two-story addition
- Bid Alternate #6 - Electrically operated blinds for clerestory windows in the gymnasium

The renovations, along with systemic upgrades to the existing building, will comply with the HCPSS "Guidelines Manual for Renovations and Modernizations of Existing Schools." This includes dividing the current open pod classroom arrangements into separate classrooms.

The design will employ sustainable practices to help achieve United States Green Building Council (USGBC) LEED certification. This is in keeping with the sustainable goals of the County; "To reduce negative impact on the environment and enhance the health and comfort of the building occupants, thereby improving building performance and the educational environment."

# SITE/CIVIL NARRATIVE

Waverly Elementary School is located on a 16.29 acre site within the Waverly subdivision. Zoning for this parcel and all of the adjoining lots is R-20 with public water and sewer service. Access to the school is from Wetherburn Road off of Maryland Route 99. Three pathways and two walkways to nearby roads provide community access. The existing bus loop accommodates 13 school buses and 14 parallel parking spaces. The existing parent drop-off area is along the northern portion of the teachers' parking lot which accommodates 75 parking spaces, including four handicap spaces.

The northern side of the existing school will be demolished and replaced with a two-story addition. Minor grading will be required to accommodate the new door locations. Due to its proximity to the new addition, one existing ballfield will need to be removed and replaced. The proposed replacement ballfield (now identified as Bid Alternate #5) will meet current regulations. At the request of the Howard County Fire Marshal, additional fire hydrants and an emergency access lane to the rear of the school will be provided in the construction scope.

Four building additions are proposed. They include two classroom additions, a gymnasium, and an addition to the cafetorium. A generator and chiller enclosure is proposed adjacent to the east side of the existing school. A new macadam play area is proposed adjacent to the gymnasium addition. This play area will replace the existing play area currently in the location of the proposed new gymnasium. Bid Alternate #1 proposes to expand the existing parking lot to accommodate 46 additional parking spaces with an extended drop-off lane.

Storm water management and water quality with bio-retention facilities will be required in proportion to the additional impervious surface areas. The size and quantity of these facilities have been designed in accordance with the Howard County Engineering Division. Soil borings have also been done for the facilities. A forest conservation easement of 2.3 acres will be established adjacent to the western-most tract boundary line.

The Site Development Plan for the proposed work is currently being processed for review at the Howard County Department of Planning & Zoning.

# ARCHITECTURAL NARRATIVE

Waverly Elementary School is currently arranged in a pod configuration with open classrooms divided by operable walls or partial gypsum board partitions. The typical pod has four classrooms, a smaller project room, as well as a central commons area. There are also three portable classrooms on the site that house two gifted and talented classes and instrumental music.

The project construction will be divided into multiple phases to minimize the impact on the occupants of the school. Phasing requirements will be determined as the design progresses and will be largely dependent upon how existing services can be disconnected and transitioned to the new. Regardless of phasing, the project includes three main constituent parts.

The first part is a two-story classroom addition at the north end of the building. This addition will replace the existing modular construction in that area and will provide the additional classrooms required by the educational specification (Ed Spec) and existing program. A portion of the existing building between the current fourth and fifth grade pods will be expanded and renovated for new mechanical and electrical rooms which will initially serve the north addition and ultimately the entire building. The north addition will also include toilet rooms, storage and custodial closets, stairs, and an elevator.

The second part is the construction of a new gymnasium near the southwest corner of the building. The existing gymnasium will be reconfigured as a new administration suite. The existing entrance will be reconfigured to provide a secure entry vestibule directly connected to the new front office. The existing administration and health suite will be reconfigured to provide an additional art room and COMAR compliant health suite.

The third part includes the wholesale renovation of the existing building in accordance with current HCPSS standards for renovations and modernizations, including replacement of the HVAC system, roofs, most plumbing and electrical services, many of the low voltage systems, room configurations, accessibility upgrades, and additional architectural and finish upgrades.

Ultimately, the existing mechanical and electrical rooms will be recaptured and the building will be expanded to the east. These areas and the existing adjacent music rooms will combined and configured as two ensemble and two general music rooms.

The HCPSS recently installed an additional portable five-classroom unit that will be utilized as "swing space" throughout construction.

# MECHANICAL & PLUMBING NARRATIVE

## DESIGN CRITERIA

Applicable Codes and Standards

2015 International Building Code (IBC)

2015 International Mechanical Code (IMC)

2015 International Energy Conservation Code (IECC)

2015 International Fire Code (IFC)

2009 National Standard Plumbing Code with local amendments

2009 National Fuel Gas Code

ASHRAE Standard 55-2007 - Thermal Environmental Conditions for Human Occupancy

ASHRAE Standard 62.1-2010 - Ventilation for Acceptable Indoor Air Quality

ASHRAE Standard 90.1-2013 - Energy Standard for Buildings

NFPA 13: Standard for the Installation of Sprinkler Systems, latest edition

NFPA 90A: Standard for the Installation of Air Conditioning and Ventilating Systems, latest edition

## DESIGN STANDARDS

HVAC system design will be based on the following conditions:

Outdoor Design Temperatures:

- Summer: 95 degrees Fahrenheit Dry Bulb (DB) / 78 degrees Fahrenheit Wet Bulb (WB)
- Winter: 0 degrees Fahrenheit DB

Indoor Design Temperatures (per the HCPSS "Guidelines for Energy Conservation"):

- Occupied Cooling Setpoint: 76 degrees Fahrenheit DB (+2 Fahrenheit) / 50 percent Relative Humidity (Maximum)
- Occupied Heating Setpoint: 70 degrees Fahrenheit DB (-2 Fahrenheit)
- Unoccupied Cooling Setpoint: 85 degrees Fahrenheit DB (+2 Fahrenheit)
- Unoccupied Heating Setpoint: 55 degrees Fahrenheit DB (-2 Fahrenheit)
- Utility Spaces (Mechanical and Electrical Rooms, etc): 55 degrees Fahrenheit DB Heating / 85 degrees Fahrenheit DB Cooling
- Stairwell Heating Setpoint: 65 degrees Fahrenheit DB (-2 Fahrenheit) Occupied / 55 degrees Fahrenheit DB (-2 Fahrenheit) Unoccupied

Building Occupancy Densities:

- Architectural Furnishing Plans
- Estimated Maximum Occupancy Densities Provided in IMC Chapter 4

Ventilation Rates:

- Minimum Ventilation Rates: IMC Chapter 4 and ASHRAE Standard 62.1-2010
- Ceiling Supply Air Systems: 1.0 Ez (Zone Air Distribution Effectiveness)

Filtration Criteria:

- Pre-filters: MERV 8, 30 percent efficient (including all fan coil unit systems)
- Final filters: MERV 13, 85 percent efficient (for compliance with LEED IEQc5)

**LIFE CYCLE COST ANALYSIS**

A 20-year life-cycle cost analysis was performed during the design development phase and confirmed the final mechanical system selection for the facility. The following mechanical system options were considered as part of the analysis:

- Horizontal four-pipe fan coil units for space conditioning and dedicated outdoor air systems with energy recovery for ventilation. The four-pipe distribution system will be served by gas-fired condensing boilers and an air-cooled chiller.
- Horizontal four-pipe fan coil units for space conditioning and dedicated outdoor air systems with energy recovery for ventilation. The four-pipe distribution system will be served by a modular heating and cooling plant, complete with a water-to-water heat pump unit connected to a series of ground-coupled geothermal boreholes.
- Four-pipe rooftop variable air volume (VAV) air-handling units with single-duct VAV terminal units for both space conditioning and ventilation. The four-pipe distribution system will be served by gas-fired condensing boilers and an air-cooled chiller.
- Water-cooled compressorized VAV rooftop units with single-duct VAV terminal units for both space conditioning and ventilation. A water-to-water heat pump unit will be provided for generating heating water for the VAV terminal units. A ground-coupled geothermal heat pump piping loop will be provided for a supporting rooftop unit and water-to-water heat pump unit compressors.

The mechanical systems described above are based on our experience with similar elementary schools. All mechanical system components will be designed in strict accordance with all applicable codes, regulations, and the design standards described previously.

## MECHANICAL SYSTEMS

The majority of the existing mechanical systems supporting Waverly Elementary School, dating back to the school's 1990 construction, have exceeded their useful service life and are recommended for replacement. Select mechanical system components have been installed or replaced since 1990, including those systems serving the 2007 building addition areas. The main equipment will primarily remain under the scope of this project, as described within the paragraphs below. To accommodate the scope of this project, a "phased-while-occupied" implementation of the new mechanical system components is required. New mechanical systems will be installed and operational while the existing systems are removed, maintaining the operation of the existing school throughout construction.

New mechanical components will utilize a four-pipe chilled water and heating water distribution system, allowing for independent heating and cooling year-round, while delivering an extremely high level of overall building energy efficiency. The existing two-pipe chilled/heating water distribution system will be removed in its entirety.

The existing air-cooled chiller and associated chilled/heating water distribution pumps serving the existing school have exceeded their useful service life and will be removed under the scope of this project. A new high-efficiency air-cooled chiller with approximately 260-tons of cooling capacity will be located at grade and positioned near the new main mechanical room, on the east side of the existing building. This equipment will generate chilled water for the school's new four-pipe distribution system, with dual refrigeration circuits for redundancy. Electric heat tracing will provide freeze protection of the outdoor hydronic piping. 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 new main mechanical room, and circulated through a new piping system throughout the entire school.

Similar to the chilled water system, the existing cast-iron sectional gas-fired boilers and associated chilled/heating water distribution pumps serving the existing school have exceeded their useful service life and will be removed under the scope of this project. Production of heating water for the school's new four-pipe distribution system will be accomplished by three gas-fired condensing type boilers located within the new main mechanical room, with approximately 2,000 MBH input capacity each. One boiler is fully redundant. A pair of heating water distribution pumps, located in the new main mechanical room, will circulate heating water through a new piping system throughout the school. A maximum heating water supply temperature of 140 degrees Fahrenheit will be utilized with 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 new main mechanical room.

## HVAC SYSTEMS

### 1990 Classroom, Teacher Planning, and Modular Building Classroom Areas

The existing VAV rooftop units and associated VAV terminal units serving the existing classroom areas have exceeded their useful service life. In addition, the existing single-zone packaged rooftop units serving the modular building classroom areas have also exceeded their useful service life. These systems will be removed in their entirety, including associated piping, ductwork, and air devices under the scope of this project.

Classroom areas and teacher planning areas throughout the renovated school, excluding the 2007 classroom addition, and proposed building addition areas 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 area served. The use of low wall mounted 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 and plate heat exchanger energy recovery devices, chilled water cooling coils, and hot water heating coils will be provided for delivering conditioned ventilation and exhaust airflow to the classroom and teacher planning areas. Airflow supplied from these units will be dehumidified, conditioned, and delivered directly to each space at neutral temperature. 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. Electric heat tracing will provide freeze protection of the outdoor hydronic piping.

### 2007 Classroom Addition

The existing gas-fired packaged VAV rooftop unit serving the 2007 classroom addition will remain under the scope of this project. The existing fan-powered VAV terminal units, heating piping, supply air, and plenum type return air ductwork and associated air devices will be removed. Terminal units will be replaced with new single-duct type VAV terminal units with heating coils sized to

accommodate a 140 degrees Fahrenheit design heating water temperature. The existing plenum-type return air ductwork arrangement will be extended throughout the 2007 classroom areas and reconfigured to a ducted return air arrangement. Resealing and reinsulating the small portion of existing supply and return air ductwork mains will be required.

**Administration, Health, and Technology Areas**

The existing mechanical system components serving the administration and associated support areas, including the packaged direct expansion (DX) rooftop unit, VAV air terminal units, associated duct-mounted heating coils, piping, ductwork, and air devices, will be removed in their entirety, as these systems have exceeded their useful service life. Space conditioning for the new administration, health suite, and the technology classroom areas will be accomplished through a variable refrigerant flow (VRF) system. This system will be complete with heat recovery type air-cooled condensing units. 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 and plate heat exchanger recovery devices, direct expansion (DX) cooling coil, and hot water heating coil will be provided for delivering conditioned ventilation and exhaust airflow to the administration, and the health areas. A similar system with a chilled water coil will be provided for the technology 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 enthalpy wheel for pre-conditioning of outdoor air. Electric heat tracing will provide freeze protection of the outdoor hydronic piping.

**Media Center**

The existing VAV terminal units serving the media center area have exceeded their useful service life and will be removed in their entirety under the scope of this project. A new single-zone VAV rooftop air-handling unit will be provided for space conditioning and ventilation within the renovated media center area. This rooftop unit will be provided with a chilled water cooling coil, hot water preheat and heating coils, and air-side economizer operation. Electric heat tracing will provide freeze protection of the outdoor hydronic piping. 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**

The existing vertical air-handling unit serving the gymnasium area has exceeded its useful service life and will be replaced under the scope of this project. A new single-zone heating-only air-handling unit will be provided for space conditioning and ventilation within the gymnasium building addition. This new air-handling unit will be located on the roof of the new building addition. This unit will be provided with a hot water heating coil and air-side economizer operation. Electric heat tracing will provide freeze protection of the outdoor hydronic piping. 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 is anticipated, consisting of multiple exhaust fans and companion outdoor air intakes for increased room air-change rates during the summer months.

**Cafeteria and Serving Line**

A pair of single-zone indoor air-handling units currently serves the cafeteria/stage and cafeteria expansion areas. The cafeteria/stage area is served by a single-zone air-handling unit, located within the adjacent boiler room. This unit has exceeded its useful service life and is recommended for replacement. The cafeteria expansion is currently served by a single-zone air-handling unit, located above the cafeteria ceiling. This unit was installed in 2007 and is currently provided with DX cooling, hot water heating, and a duct-mounted electric heating coil. While the unit appears to be in good working condition, modifications to the air-handing unit and ductwork components are required to support the proposed cafeteria expansion. Therefore, replacement of this unit as part of the proposed cafeteria expansion is planned.

To support the proposed cafeteria renovation and expansion, two new single-zone VAV rooftop air-handling units are recommended for space conditioning and ventilation. These rooftop air-handling units will be provided with chilled water cooling coils, hot water preheat and heating coils, and air-side economizer operation. Electric heat tracing will provide freeze protection of the outdoor hydronic piping. 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 from the cafetorium to the adjacent kitchen area for exhaust hood make-up.

### Kitchen

Space conditioning for the kitchen area will continue to be accomplished primarily through transfer airflow from the adjacent serving line and cafeteria areas. The existing exhaust fan serving the kitchen area will be replaced in-kind with a new roof mounted fan. Modifications to the kitchen and serving line will require replacement of the existing ductwork and piping systems within the kitchen area with similar new systems. Localized cooling through the installation of a ductless split type air conditioning unit will be provided within the kitchen office.

### Stairwell Areas

Space conditioning for the stairwell areas within the two-story building addition will be accomplished through a series of 4-pipe fan coil units.

## BUILDING AUTOMATION CONTROL SYSTEMS

A complete new building automation system from Johnson Controls or Tridium Honeywell Controls, consisting of direct digital control (DDC) components will be provided for the school. The new control system will be interfaced with the Johnson Controls DDC system serving the 2007 classroom addition mechanical units. Damper and valve components will be provided with electric or electronic actuation. DDC components will be utilized for all fan coil units and dedicated outdoor air systems. DDC interface with the room occupancy sensors provided for lighting control will allow "occupancy based" space temperature reset throughout each zone's occupied mode of operation.

All control system components will be interfaced with the central HCPSS energy management control system for remote monitoring and energy management routines. All system components will be designed to meet the HCPSS automation standards and naming conventions.

## PLUMBING SYSTEMS

### Storm Water Piping Systems

New storm water piping components, including roof drains, overflow drains, and above-grade storm water piping systems will be provided throughout. Below floor storm water piping systems will be reused to the greatest extent possible. Both above-grade and below-grade piping will be constructed from cast-iron, with no-hub piping connections provided only for above-grade piping components. Due to updates in the plumbing code and the reroofing scope in the project, the new roof overflow drains will be piped independently to grade.

**Sanitary and Vent Piping Systems**

The existing 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. Below-grade sanitary piping systems will be reused to the greatest extent possible. New above-grade 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.

New plumbing fixtures are planned within the new two-story building addition, which will be the furthest point from the existing utility connection. The use of a sanitary sewage pump is anticipated for the new classroom sink plumbing fixtures, which may be too far from the existing underground sanitary main.

The expansion of the cafeteria will displace the existing below grade kitchen grease interceptor. The interceptor will be replaced and relocated within the paving outside of the new addition, and piped separately back to the existing underground main on the south side of the building.

**Domestic Water Piping Systems**

All existing domestic water piping mains (cold water, hot water, and recirculation) will be replaced with new piping, valves, and accessories. Branch piping throughout the school (excluding the 2007 classroom addition areas) will be replaced to accommodate the revised architectural floor plan and new plumbing fixture locations. The existing incoming water service will be replaced and relocated to the new main mechanical room. The new water service will be complete with a basket strainer, water meter, and fully redundant reduced pressure zone backflow preventers. The municipal water system street pressure is not adequate to serve the new second story plumbing system; therefore, a domestic booster pump will be required.

The recently replaced gas-fired domestic water heater and the original water heater will be replaced with a single gas-fired condensing type unit. Both 140 degrees Fahrenheit (for the kitchen area only) and 110 degrees Fahrenheit domestic hot water will be distributed throughout the school, with each piping loop complete with a dedicated hot water circulation pump and expansion tank. A new combination high/low master mixing valve will be provided for producing 110 degrees Fahrenheit domestic hot water.

Phasing will require temporary backfeeding of the existing domestic and fire protection systems following the installation of the new combination water service in the new main mechanical room. The temporary line will be routed underground, outside due to limited ceiling space.

### Plumbing Fixtures

The existing plumbing fixtures are not ADA compliant and will be replaced throughout the school. All plumbing fixtures will be institutional grade with 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 0.5 gallons per minute. All plumbing fixtures will comply with the ADA.

### Natural Gas Piping

The existing low pressure (1/4 pound per square inch (PSI)) gas service will be replaced with a new 2.0 PSI gas service. In addition, a majority of the existing gas piping within the building was installed as part of the 1990 construction and is currently located above the existing ceilings throughout the building. This gas piping will be replaced throughout the school. New gas piping will be located at the roof level to serve the remaining 2007 packaged rooftop unit.

Phasing will require temporary backfeeding of the existing low pressure natural gas system following the installation of the new 2.0 PSI gas service outside the new main mechanical room. The temporary line will be routed outside due to limited ceiling space.

## FIRE PROTECTION SYSTEMS

The existing school is currently provided with sprinkler coverage throughout. Under the scope of the renovation, the existing fire service will be replaced, with a double-check backflow preventer provided. The existing sprinkler heads and associated branch sprinkler piping will be removed and replaced, as required to accommodate the revised architectural floor plan, new ceiling systems, and above-ceiling mechanical system components. The existing municipal water system pressure serving the building is very low. Additional design efforts are in process to attempt to size the new system without the need for a fire pump. 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.

# ELECTRICAL NARRATIVE

## DESIGN CRITERIA

Applicable Codes and Standards

ADA Standards for Accessible Design, 2010

Institute of Electrical and Electronics Engineers (IEEE Standards), Power and Telecommunications

Illuminating Engineering Society of North America (IESNA) Lighting Handbook, 10th Edition

IBC, 2015 Edition

International Energy Conservation Code (IECC), 2015 Edition

Life Safety Code, NFPA 101, latest edition

Maryland Occupational Safety and Health Act (MOSH Act)

National Electrical Code (NEC) with local amendments, NFPA 70, 2014

National Electrical Manufacturers Association (NEMA), standards

National Fire Alarm and Signaling Code, NFPA 72, latest edition

## GENERAL

The electrical systems will include work associated with the power, generator power, lighting, lighting controls, and fire alarm systems. The electrical systems will also include power, box and conduit provisions for data/voice, audio/video (instructional technology), intercommunications, sound, master clock and program, and security (access control, intrusion detection, video surveillance) systems. The electrical systems, in concert with the architectural and mechanical considerations, are intended to create spaces that are flexible, functional, energy efficient and respond to the needs of this facility. The electrical design will comply with applicable codes, regulations, standards, and authorities having jurisdiction. Sustainable technologies will be incorporated into the design to achieve the goal of LEED Certification.

## ELECTRICAL SERVICE

The existing 120/208V electrical service for the building will be replaced with a new 277/480V electrical service. The new outdoor BGE pad-mounted utility transformer will be located in a new service yard near the new main electrical room. (The utility transformer will need to be within 20 feet of a paved access road.) A secondary service concrete-encased ductbank (with minimum eight ducts) will be run from the utility transformer to the current transformer (CT) section of the main switchboard in the new main electrical room.

**POWER DISTRIBUTION**

The existing power distribution system (120/208-volt electrical equipment, devices, and branch circuit wiring) for the building will be replaced in its entirety.

The new main electrical room will be installed on the east side of the school and will consist of a main switchboard, distribution panelboards, dry-type step-down transformers, lighting panelboard, branch circuit panelboards, and generator-connected equipment. Generator-connected equipment will consist of automatic transfer switches, dry-type transformers, and branch circuit panelboards.

The main switchboard will be a 2000-ampere, 277/480-volt, three-phase, four-wire switchboard with a CT section, main section with a 2000 ampere electronic-trip main circuit breaker, and distribution section with molded-case branch circuit breakers. The main switchboard will incorporate ground fault protection and surge protection.

Construction phasing will require the existing electrical service equipment (2500A, 120/208V main service switchboard) to be maintained during construction. The new main switchboard will back-feed the existing 120/208-volt electrical service equipment via temporary step-down transformer. The existing BGE electrical service will need to be maintained until electrical equipment in the new main electrical room is energized and feeders are run to back-feed the existing electrical service equipment. The proposed building additions to be constructed in the early phases of the project will not interfere with the existing electrical service. Therefore, the existing electrical service can be maintained while the proposed additions are being constructed.

Panelboards will be rated at 277/480 volts and 120/208 volts and will be installed in electrical rooms, electrical closets and main office corridor. There will be dedicated panelboards for lighting, mechanical loads, general receptacle loads, and "clean power" computer receptacle loads. Panelboards will have a copper bus structure. Panelboards will be sized with approximately 25 percent spare capacity and 25 percent spare breaker space. Computer panels will have a 200 percent rated neutral bus to account for harmonic distortion. A three-phase surge protective device (SPD) will be connected to (and mounted adjacent to) each respective computer panel.

The typical dry-type transformer will have a 480-volt delta primary and 208/120-volt, three-phase, four-wire, wye secondary. Transformers serving general receptacle panelboards will be general-purpose, energy-efficient type, complying with NEMA TP-1. Transformers serving computer panelboards will be UL K-13 type.

Lighting will be connected at 277 volts, single-phase. Mechanical equipment will be connected at either 120 volts, single-phase; 208 volts, single-phase; 208 volts, three-phase; 277 volts, single-phase; or 480 volts, three-phase, depending upon the load requirements. Motors one horsepower or higher

will be connected at 480 volts, three-phase. General receptacles will be connected at 120 volts, single-phase. Each feeder and branch circuit will have a separate copper grounding conductor in the same raceway.

The wiring system will be copper conductors with THHN-THWN insulation installed in metallic conduit. The minimum size conduit will be 3/4 inches. Intermediate metal conduit (IMC) will be used for conduits that are three inches in diameter or larger, wiring to exterior equipment, first five feet of underground conduit extending outside of the building, and elbows penetrating floor slabs. Electrical metallic tubing (EMT) will be used for conduits that are 2 1/2 inches in diameter or smaller. Polyvinylchloride (PVC) conduit will be used for underground feeders and circuits, except where IMC is required. Flexible metal conduit (FMC) will be used to connect to transformers. Liquid-tight flexible metal conduit (LFMC) will be used to connect to motors and other vibrating equipment. FMC and LFMC will be limited to a maximum 6-foot length.

Receptacle branch circuits will utilize 12-gauge wiring when the run is 50 feet or less, 10 gauge wiring when the run is between 50 and 100 linear feet, and 8-gauge wiring when the run is more than 100 linear feet in length. Power wiring will be installed in raceway/conduit. Type MC cable will be limited to a maximum six foot length to serve luminaires (lighting fixtures).

Classrooms will be equipped with computer receptacles at the teacher's desk, teacher's wardrobe, wall-mounted projector, student workstations, and "computer on wheels" charging station connected to "clean-power" computer panelboards.

**EMERGENCY PUBLIC SHELTER REQUIREMENTS**

The Maryland Emergency Management Agency (MEMA) may designate Waverly Elementary School as an emergency public shelter. Considering that recent HCPSS projects have been designated as emergency public shelters, it is likely that Waverly Elementary School will also be designated as an emergency public shelter with the building renovation and proposed building additions. The design team will meet with MEMA representatives to review and coordinate requirements.

Electrical equipment for the MEMA emergency public shelter will include a quick-connect generator switchboard (equal to Square D Power-Style QED-2 Quick Connect Generator Switchboard) with multiple cam-lock connectors per phase to be located in the new service yard. The new main electrical room will have a 1200A 277/480V distribution switchboard with two key-interlocked main circuit breakers, step-down transformer, and 120/208V distribution panelboard. This electrical equipment will be used to connect to electrical loads serving the gymnasium, cafeteria, kitchen, health suite, as well as mechanical loads required to support these spaces. These spaces will be designated by MEMA to be used as an emergency public shelter with the electrical loads connected

to a temporary portable generator.

Per the HCPSS requirements, mechanical equipment for the entire school will also be connected to the 1200A 277/480V distribution switchboard serving MEMA loads.

**GENERATOR POWER DISTRIBUTION**

The existing outdoor 20-kW generator will be replaced with a new outdoor natural-gas generator in a weatherproof enclosure. The new generator will be located in the new service yard. The generator will be rated at 277/480 volts, three-phase, four-wire. The basis-of-design generator manufacturer will be Cummins.

The generator will be sized at 150 kW and be connected to two automatic transfer switches (ATS) located in the new main electrical room. ATS number one will be the "life safety" ATS and will serve emergency panelboard(s). Emergency panelboard(s) will provide power to emergency egress lighting in corridors and classrooms, and exit signs. ATS number two will be the "standby" ATS and will serve the automatic temperature controls/energy management system control panels, kitchen refrigerator and freezer, data/voice communications equipment, intercom equipment, security equipment, fire alarm equipment, heat trace, sump pumps, and other equipment and devices as determined by representatives of the HCPSS. The "standby" ATS will also serve selected receptacles in the principal's office, main office, health suite, corridors, gym, cafeteria, and kitchen.

**LIGHTING**

Building lighting will generally consist of recessed 2' x 2' troffer-type lensed luminaires (lighting fixtures). These luminaires will utilize light-emitting diode (LED) light sources with electronic LED drivers. Building lighting will also include LED pendants in classrooms where there are sloped ceilings for clerestories, high-bay LED luminaires in the gymnasium, a combination of LED pendants and LED downlights in the media center, 2' x 2' LED troffers at lay-in ceiling and 4' surface mounted LED luminaires at exposed area of 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, and exterior perimeter building mounted full-cutoff LED luminaires. The finish of exterior building mounted luminaires will be selected by the Architect. The existing exterior pole mounted luminaires in parking areas and the bus loop will remain and be reused.

The lighting design will comply with the 2015 IECC, which states that the lighting power density (LPD) will not exceed 0.87 watts per square foot for the entire school. The selection of luminaires for the building will be compliant with the energy code.

Lighting levels will be designed in accordance with the recommendations of the IESNA. Maintained illumination values will be calculated using a total maintenance factor of 80 percent. Classrooms will have an average between 30 and 50 foot-candles at the task plane.

**LIGHTING CONTROLS**

Switching of luminaires will be both multi-level and zoned as appropriate for each space. Occupancy sensors will be used for interior lighting. A relay/switching panel will be used to control exterior lighting.

Lighting controls in each classroom will include a dedicated lighting room controller (to be located in the ceiling space above the entrance door), two low-voltage lighting control stations, and ceiling occupancy sensor(s). The lighting control station at the entrance door will be three-button for OFF, 50 percent lighting level, and 100 percent lighting level. The lighting control station at the teacher's desk will be multi-button for OFF, 50 percent lighting level, 100 percent lighting level, audio/video (AV) modes, and raise/lower lighting level capability. AV mode number one will have the front row OFF and the remaining luminaires at 50 percent lighting level. AV mode number two will have the front row at 100 percent lighting level and the remaining luminaires at 50 percent lighting level. One luminaire in each classroom will be connected to an emergency lighting circuit (via transfer relay device) and will be automatically switched ON during a power outage.

Lighting controls in offices and similar spaces will include a lighting room controller (to be located in the ceiling space above an entrance door), entry lighting control station, and ceiling occupancy sensor(s). The lighting control station at the entrance door will be multi-button for OFF, 50 percent lighting level, 100 percent lighting level, and raise/lower lighting level capability.

Occupancy sensors in classrooms, instructional spaces, offices, workrooms, conference rooms, resource rooms, storage rooms, staff lounge, media center, cafetorium, and gymnasium will be set to "vacancy" mode, meaning that lighting in these spaces will need to be manually turned ON via local lighting control station.

Occupancy sensors in lobbies, corridors, stairways, and group toilets will be set to "occupancy" mode, meaning that lighting in these spaces will be automatically turned ON when occupied. Occupancy sensors in corridors will be spaced between 32 and 36 feet apart and controlling every 100-foot section of corridor.

Automatic daylight controls (daylight photocell/sensor that automatically dims lighting when there is sufficient daylight in a space) for daylight harvesting will be utilized only where required by the IECC. Daylight harvesting will be required in rooms where there is more than 150 watts of general

lighting within sidelight or toplight daylight zones.

**FIRE DETECTION AND ALARM SYSTEM**

The existing fire alarm system with Edwards, Model 5721B fire alarm control panel (FACP), will be replaced in its entirety with a new fire alarm system with voice evacuation. The basis-of-design fire alarm system manufacturer will be EST by Edwards/United Technologies Corporation (UTC). Construction phasing will require the existing FACP to be interconnected with the new FACP.

The fire alarm system will be designed to comply with the State of Maryland fire code, local authorities having jurisdiction, the International Building Code, and the NFPA. The fire alarm system will be a stand-alone, addressable, analog system and will have voice evacuation capability. The main fire alarm control panel (FACP) will be located in the main telecommunications room.

There will be two fire alarm annunciators. The first annunciator will be a remote graphic annunciator panel at the main entrance. The second annunciator will be an LED display with a static graphic map in the custodial office. The graphics will show the fire alarm zones. Zoning will follow the sprinkler zones. A fire alarm microphone will be provided in the main office.

Fire alarm manual pull stations will be provided at each exterior egress door and at adjacent to each egress stair on the second floor of the proposed north building addition. Smoke detectors will be provided at the FACP and on each side of a door with fire alarm magnetic door holders. Duct smoke detectors with remote test stations will be provided for air-handling systems where required, and will interface with the HVAC equipment for shutdowns. Each initiation device will have its own address.

Fire alarm combination speaker/strobes will be installed in classrooms, instructional spaces, offices, workrooms, conference rooms, resource rooms, staff lounge, media center, cafetorium, gymnasium, kitchen, lobbies, corridors, group toilets, mechanical rooms, and main electrical room. Fire alarm strobe devices will be installed in individual toilet rooms, custodial closets, large storage rooms, and electrical closet. Notification appliance circuit (NAC) power extender panels will be provided where needed for speaker/strobe and strobe devices. Strobe spacing and locations will be per NFPA requirements for rooms and corridors. Candela minimum required light output intensity will be indicated on the drawings. Fire alarm ceiling speakers will be installed where needed to supplement for audibility. Fire alarm cabling will be installed in conduit.

## ENERGY STATEMENT

Sustainability and energy conservation is a fundamental aspect of the design for the renovation and additions at Waverly Elementary School. Many energy saving techniques are being incorporated into the building to achieve energy efficiency and compliance with LEED energy requirements. These techniques include the following:

- Mechanical, electrical, and plumbing systems will exceed the energy efficiency requirements of ASHRAE Standard 90.1-2013 and the 2015 International Energy Conservation Code.
- The use of high-efficiency central plant equipment is anticipated, including an air-cooled chiller and condensing boilers.
- Mechanical systems will utilize de-coupled ventilation systems, complete with energy recovery devices for pre-conditioning ventilation airflow.
- Premium efficiency motors will be specified for all motors. In addition, fan coil units will be provided with electronically commutated motors (ECM) for increased operating efficiency.
- Mechanical systems will include variable frequency drives to allow systems to operate at lower capacities when building loads are reduced.
- Systems providing outdoor air will include Minimum Efficiency Reporting Value (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.
- High occupancy 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.
- LED luminaires (lighting fixtures) will be provided throughout, in lieu of fluorescent luminaires, in order to significantly reduce the energy used to light the school.
- Lighting controls will include manual ON in classrooms, instructional spaces, offices, workrooms, conference rooms, resource rooms, storage rooms, staff lounge, media center, cafetorium, and gymnasium. Lights will not automatically turn ON in these spaces, therefore reducing energy usage.
- Occupancy sensors will automatically turn OFF lighting in areas when unoccupied.
- Daylight harvesting will be incorporated where required in rooms with vertical glazing and/or operable skylights. A daylight monitoring photocell/sensor will automatically reduce the lighting levels in a room when adequate daylight is present, which in turn reduces energy usage.
- Full-cutoff exterior LED luminaires (lighting fixtures) will reduce light pollution to the surrounding areas.

# TECHNOLOGY SYSTEMS NARRATIVE

**DATA NETWORK GENERAL DESCRIPTION**

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/"head end") and all telecom rooms (TR'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 6 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. 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. 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 Category 6a to provide 10 Gb Ethernet out to 95 meters. In either scenario, the ceiling grid must be tagged and a 15' service loop must be allocated. The school district has currently standardized on Aruba as their wireless solution.

ESP will work with the client to refine the number of data drops in all types of instructional and non-instructional spaces to ensure that it complies with the HCPSS standards and guidelines as well as the MSDE Technology Standards.

The HCPSS currently receives service to the building from Howard County Government fiber as well as Verizon and Comcast. 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 6 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 Category 6 patch panels or 100-pair Category 5e rack mounted 110 blocks. Multipair Category 5e cables shall be installed for analog backbone connectivity and interconnect intermediate telecom rooms with the TER (head end). Category 5e backbone cables shall be terminated in wall-mounted 110-blocks at the TER and connected to various analog services where required. The infrastructure will support analog, digital and IP based services. The HCPSS will utilize the existing PBX at the site through construction phasing. A final determination will be made by the HCPSS if new telephone electronics will be provided to the project.

The school will contain the Category 6 cable described above for voice distribution in offices and classrooms. The infrastructure will support the analog, digital and IP telephone services. Currently, the district is considering options to migrate away from traditional Centrex services and PBX systems.

The school should also maintain a minimum number of separate incoming analog telephone lines for elevator, fax, fire and security connections throughout the facility.

## VIDEO DISTRIBUTION DESCRIPTION

The existing media retrieval system and associated coaxial video cabling will be removed. New coaxial video cabling will not be installed due to the HCPSS moving towards an IP video streaming 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. 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. The current system is based around MediaMaster equipment and will fully be defined by the owner prior to construction.

## CLASSROOM AUDIO/VIDEO SYSTEM DESCRIPTION

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. The HCPSS currently uses Epson Brightlink 595 wall mounted interactive projectors.

Sound reinforcement will be included in each instructional space as part of the A/V 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.

**INTERCOM AND MASTER CLOCK DESCRIPTION**

The existing Rauland Telecenter 21 intercom equipment rack/cabinet in the main telecom (MDF) room will be replaced with a new central intercom equipment rack/cabinet.

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.

**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, cafeterias, music rooms and auditoriums. 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.

**ACCESS CONTROL AND INTRUSION DETECTION DESCRIPTION**

The existing door access control panel in the boiler room will be replaced in its entirety with a new AMAG control panel to be located in the main telecom (MDF) room. The existing intrusion detection

control panels by Ademco and Radionics will be replaced in their entirety with a new intrusion detection control panel by Bosch/Radionics. 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.

**VIDEO SURVEILLANCE DESCRIPTION**

Closed Circuit Television (CCTV) shall provide visual surveillance and recording of the school, internally and externally, 24 hours per day. Currently, the HCPSS utilizes Interlogix cameras connected via Category 6 cable to GE NVRs strategically located within facilities. At a minimum, the CCTV system will utilize IP cameras connected to NVRs via Category 6 horizontal cable and fiber backbone cable. 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). Exterior pole mounted cameras shall receive an RG-6, RG-11 or multimode fiber for signal transmission along with associated power conductors.

Cameras will survey the corridors, specific rooms and portions of the perimeter of the facility. 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.

External cameras shall be a mix of fixed and 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 system will be capable of reviewing images based upon time and location inquiries.

# GREEN BUILDING NARRATIVE

## DESIGN FOR LEED

The USGBC established the LEED program as a tool to evaluate the energy efficiency and environmental impacts of building projects. The LEED building rating system uses six categories in which projects can obtain credits to achieve certification (Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality and Innovation and Design Process). The four levels of certification (from highest to lowest) are: Platinum, Gold, Silver, and Certified. The credit threshold for each level of certification varies for different rating systems. To qualify for certification, a project must meet certain prerequisite credits. The number of additional credits required is dependent on the level of certification that the project is seeking to attain.

## PROJECT OBJECTIVES

Grimm + Parker is pursuing LEED Certification for Waverly Elementary School in Howard County. The project has been registered under the LEED for Schools v3 (LEED-S) rating system. The owner has established the project certification goal as " LEED Certified". Upon continued analysis and a design team effort, 46 credits are being targeted as achievable for the school, with 13 additional possible credits. Credits have been identified as achievable based on economic and design feasibility and potential environmental benefits. The current credit tally shows that achieving the targeted LEED Certified level for the building is possible, and that achieving a Silver rating may be possible.

## LEED CREDIT GOALS

- Providing preferred parking for low-emitting vehicles (LEVs) and fuel-efficient vehicles (FEVs)
- Maximizing open space
- Reducing storm water runoff and pollution
- Reducing potable water usage. A water savings of 30 percent is targeted through the use of water conserving fixtures such as dual flush toilets, low flush urinals, and low flow faucets
- Reducing energy consumption by adopting high efficiency HVAC systems
- Reducing impact of transportation and extraction of virgin material by the use of regional materials and those with significant recycled content
- Providing lighting controls to ensure accommodation of the individual preferences of its staff occupants
- Installing low-emitting paints, adhesives, sealants, and carpet systems
- Reducing waste by diverting construction and demolition waste from landfills by recycling or reusing materials

- Using mercury-free or low-mercury light bulbs
- Implementing a green housekeeping plan

While some credits have a greater first cost, the long-term environmental and economic benefits justify including them in the LEED goals.

All documentation will be submitted via USGBC's website (www.leedonline.com) to be reviewed and approved by the GBCI/USGBC for both the design and construction phases of the project through an account accessible by all team members. The LEED consultant has created a tracking tool and checklist that assigns credit responsibilities to team members. The tool records documentation progress and identifies pending tasks required to complete documentation. This is updated and circulated to the team on a regular basis in keeping with the pace of project progress. A copy of the LEED Scorecard is included.

**PROJECT REGISTRATION INFORMATION**

Project ID: 1000060374

Project Title: Waverly Elementary School

Project Access ID: 1888697960164827

Project Rating System: LEED for Schools v2009

Registration Type: Individual Project1

Registration Date: 07/30/2015

Project Location: Ellicott City, MD, 21042

# LEED SCORECARD

| 8 | 2 | 1 | 13 | **Sustainable Sites** | **Possible Points: 24** |
|---|---|---|---|---|---|
| Y | ?Y | ?N | N | | |
| Y | | | | SSp1 - Construction Activity Pollution Prevention | 0 |
| Y | | | | SSp2 - Environmental Site Assessment | 0 |
| 1 | | | | SSc1 - Site Selection | 1 |
| | | | 4 | SSc2 - Development Density & Community Connectivity | 4 |
| | | | 1 | SSc3 - Brownfield Redevelopment | 1 |
| | | | 4 | SSc4.1 - Alternative Transportation - Public Transportation Access | 4 |
| | 1 | | | SSc4.2 - Alternative Transportation - Bicycle Storage & Changing Rooms | 1 |
| 2 | | | | SSc4.3 - Alternative Transportation - Low Emitting & Fuel Efficient Vehicles | 2 |
| 2 | | | | SSc4.4 - Alternative Transportation - Parking Capacity | 2 |
| | | | 1 | SSc5.1 - Site Development - Protect or Restore Habitat | 1 |
| 1 | | | | SSc5.2 - Site Development - Maximize Open Space | 1 |
| | 1 | | | SSc6.1 - Stormwater Design - Quantity Control | 1 |
| | | 1 | | SSc6.2 - Stormwater Design - Quality Control | 1 |
| | | | 1 | SSc7.1 - Heat Island Effect - Nonroof | 1 |
| 1 | | | | SSc7.2 - Heat Island Effect - Roof | 1 |
| | | | 1 | SSc8 - Light Pollution Reduction | 1 |
| | | | 1 | SSc9 - Site Master Plan | 1 |
| 1 | | | | SSc10 - Joint Use of Facilities | 1 |

| 6 | 1 | 1 | 3 | **Water Efficiency** | **Possible Points: 11** |
|---|---|---|---|---|---|
| Y | ?Y | ?N | N | | |
| Y | | | | WEp1 - Water Use Reduction | 0 |
| 4 | | | | WEc1 - Water Efficient Landscaping | 4 |
| | | | 2 | WEc2 - Innovative Wastewater Technologies | 2 |
| 2 | 1 | 1 | | WEc3 - Water Use Reduction | 4 |
| | | | 1 | WEc4 - Process Water Use Reduction | 1 |

| 12 | 0 | 2 | 19 | **Energy & Atmosphere** | **Possible Points: 33** |
|---|---|---|---|---|---|
| Y | ?Y | ?N | N | | |
| Y | | | | EAp1 - Fundamental Commissioning of the Building Energy Systems | 0 |
| Y | | | | EAp2 - Minimum Energy Performance | 0 |
| Y | | | | EAp3 - Fundamental Refrigerant Management | 0 |
| 8 | | | 11 | EAc1 - Optimize Energy Performance | 19 |
| | | | 7 | EAc2 - On-site Renewable Energy | 7 |
| 2 | | | | EAc3 - Enhanced Commissioning | 2 |
| 1 | | | | EAc4 - Enhanced Refrigerant Management | 1 |
| 1 | | | 1 | EAc5 - Measurement & Verification | 2 |
| | | 2 | | EAc6 - Green Power | 2 |

| 9 | 0 | 1 | 3 | **Materials & Resources** | **Possible Points: 13** |
|---|---|---|---|---|---|
| Y | ?Y | ?N | N | | |
| Y | | | | MRp1 - Storage & Collection of Recyclables | 0 |
| 2 | | | | MRc1.1 - Building Reuse - Maintain Existing Walls, Floors & Roof | 2 |
| | | 1 | | MRc1.2 - Building Reuse - Maintain Interior Nonstructural Elements | 1 |
| 2 | | | | MRc2 - Construction Waste Management | 2 |
| | | | 2 | MRc3 - Materials Reuse | 2 |
| 2 | | | | MRc4 - Recycled Content | 2 |
| 2 | | | | MRc5 - Regional Materials | 2 |
| | | | 1 | MRc6 - Rapidly Renewable Materials | 1 |
| 1 | | | | MRc7 - Certified Wood | 1 |

| 6 | 2 | 2 | 9 | **Indoor Environmental Quality** | **Possible Points: 19** |
|---|---|---|---|---|---|
| Y | ?Y | ?N | N | | |
| Y | | | | IEQp1 - Minimum Indoor Air Quality Performance | 0 |
| Y | | | | IEQp2 - Environmental Tobacco Smoke (ETS) Control | 0 |
| Y | | | | IEQp3 - Minimum Acoustical Performance | 0 |
| | | | 1 | IEQc1 - Outdoor Air Delivery Monitoring | 1 |
| | | | 1 | IEQc2 - Increased Ventilation | 1 |
| 1 | | | | IEQc3.1 - Construction Indoor Air Quality Management Plan - During Construction | 1 |
| | | 1 | | IEQc3.2 - Construction IAQ Management Plan - Before Occupancy | 1 |
| 4 | | | | IEQc4 - Low-Emitting Materials | 4 |
| | | | 1 | IEQc5 - Indoor Chemical & Pollutant Source Control | 1 |
| 1 | | | | IEQc6.1 - Controllability of Systems - Lighting | 1 |
| | 1 | | | IEQc6.2 - Controllability of Systems - Thermal Comfort | 1 |
| | 1 | | | IEQc7.1 - Thermal Comfort - Design | 1 |
| | | | 1 | IEQc7.2 - Thermal Comfort - Verification | 1 |
| | | 1 | 2 | IEQc8.1 - Daylight & Views - Daylight | 3 |
| | | | 1 | IEQc8.2 - Daylight & Views - Views | 1 |
| | | | 1 | IEQc9 - Enhanced Acoustical Performance | 1 |
| | | | 1 | IEQc10 - Mold Prevention | 1 |
| 5 | 0 | 1 | 0 | **Innovation & Design** | **Possible Points: 6** |
| Y | ?Y | ?N | N | | |
| 1 | | | | IDc1.1 - Innovation in Design - Green Housekeeping | 1 |
| 1 | | | | IDc1.2 - Innovation in Design - Low Mercury Lighting | 1 |
| 1 | | | | IDc1.3 - Innovation in Design - Integrated Pest Management | 1 |
| 1 | | | | IDc1.4 - Innovation in Design - EP for SSc5.2 | 1 |
| 1 | | | | IDc2 - LEED Accredited Professional | 1 |
| | | 1 | | IDc3 - The School as a Teaching Tool | 1 |
| 0 | 0 | 0 | 4 | **Regional Priority Credits** | **Possible Points: 4** |
| Y | ?Y | ?N | N | | |
| | | | 1 | RPc1.1 - Regional Priority - SSc4.1 | 1 |
| | | | 1 | RPc1.2 - Regional Priority - SSc6.2 | 1 |
| | | | 1 | RPc1.3 - Regional Priority - SSc5.1 | 1 |
| | | | 1 | RPc1.4 - Regional Priority - EAc1, EAc2, WEc2 | 1 |
| 46 | 5 | 8 | 51 | **Total** | **Possible Points: 110** |

Certified: 40-49, Silver: 50-59, Gold: 60-79, Platinum: 80-110

# PROJECT FACTS

| | Schematic Design | Design Development | Construction Documents |
|---|---|---|---|
| Existing Building: | 81,545 SF | 81,545 SF | 81,545 SF |
| Existing Construction to be Demolished: | -8,031 SF | -7,749 SF | -7,778 SF |
| Remaining Existing Building to be Renovated: | 73,514 SF | 73,796 SF | 73,767 SF |
| New Additions: | 43,060 SF | 41,099 SF | 42,055 SF |
| **Total Building on Completion with Additions:** | **116,574 SF** | **114,895 SF** | **115,822 SF** |

# PROJECT SCHEDULE

Planning Meetings Completed _____ JULY 21, 2015

Schematic Design submission to Board of Education & IAC _____ SEPTEMBER 3, 2015

Design Development submission to Board of Education _____ NOVEMBER 5, 2015

Construction Documents submission to Board of Education _____ MARCH 10, 2016

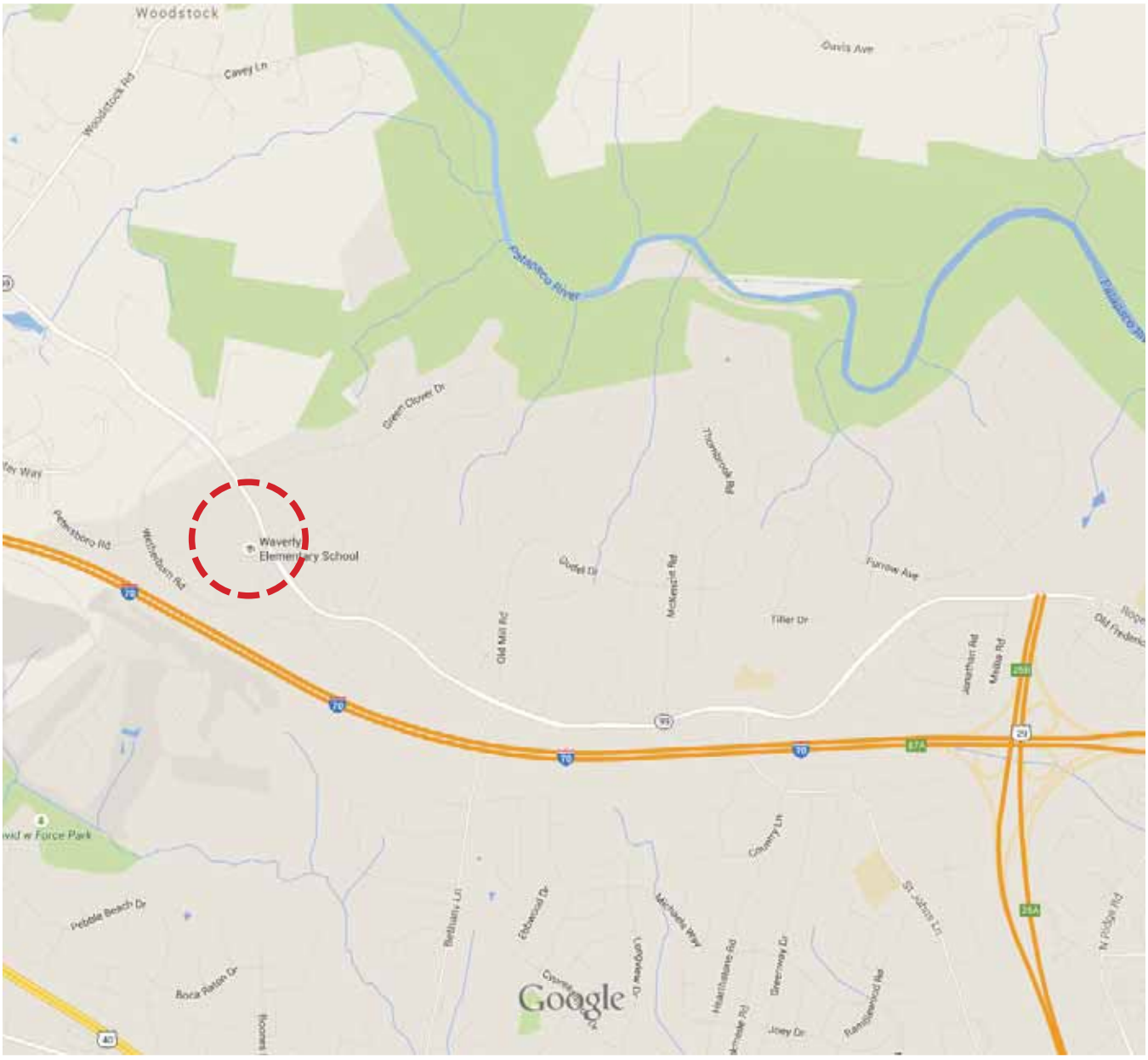
Project out for Bid_____ MAY 2016

Bids Received _____ MAY 2016

Construction Start _____ SEPTEMBER 2016

Construction Complete _____ AUGUST 2018

# VICINITY MAP

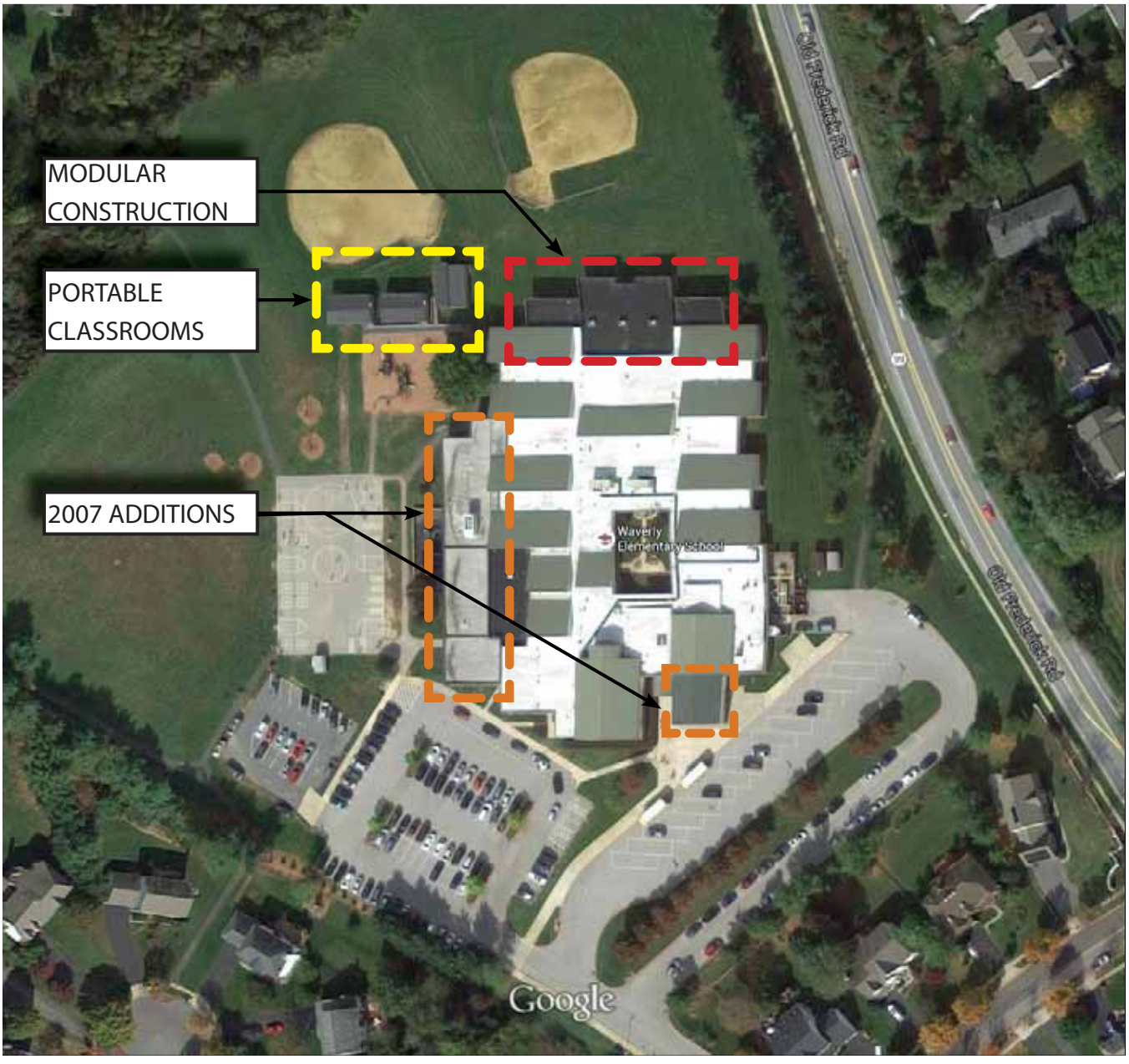



The existing Waverly Elementary School is located at 10220 Wetherburn Road in Ellicott City, Maryland. The 16.29 acre site is located approximately 2.75 miles west of the intersection of Maryland Route 29 and Interstate 70. It is bounded by Old Frederick Road (Maryland Route 99) on the east side and by residential properties on the north, west and south. Site access is limited to the entry on Wetherburn Road with the majority of traffic coming through the intersection of Wetherburn Road and Old Frederick Road.

# AERIAL SITE PHOTO


Imagery ©2015 Google, Map data ©2015 Google 200 ft

# AERIAL BUILDING PHOTO




Imagery ©2015 Google, Map data ©2015 Google 100 ft

# PROPOSED SITE PLAN

The following items are designated with numbers on the site plan on the following page

1. Site access from Wetherburn Road off of Rt. 99/Old Frederick Road
2. Existing bus loop
3. Existing gymnasium and entrance reconfigured as new administration suite and secure entry vestibule, maintains the existing building entrance for community recognition
4. Cafetorium expansion
5. Expanded music program in reconfigured space and new one-story addition
6. New mechanical and electrical rooms in reconfigured space. New mechanical courtyard
7. Reconfigured two-story addition
8. Existing building to be renovated
9. New gymnasium including office, toilet rooms and storage
10. Relocated hard play area, basketball courts
11. Existing RECC and Pre-K play area with playground equipment
12. Existing play area with playground equipment
13. Existing multipurpose field
14. New fire lane
15. Relocated ball field
16. Property line
17. Building restriction line (side yard setback)
18. Old Frederick Road / Route 99

**The following items are changes made since the design development submission:**

19. Reconstruction of ball field included as bid alternate
20. Widening and re-striping of site entrance included as bid alternate
21. Parking lot expansion included as bid alternate


16
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21

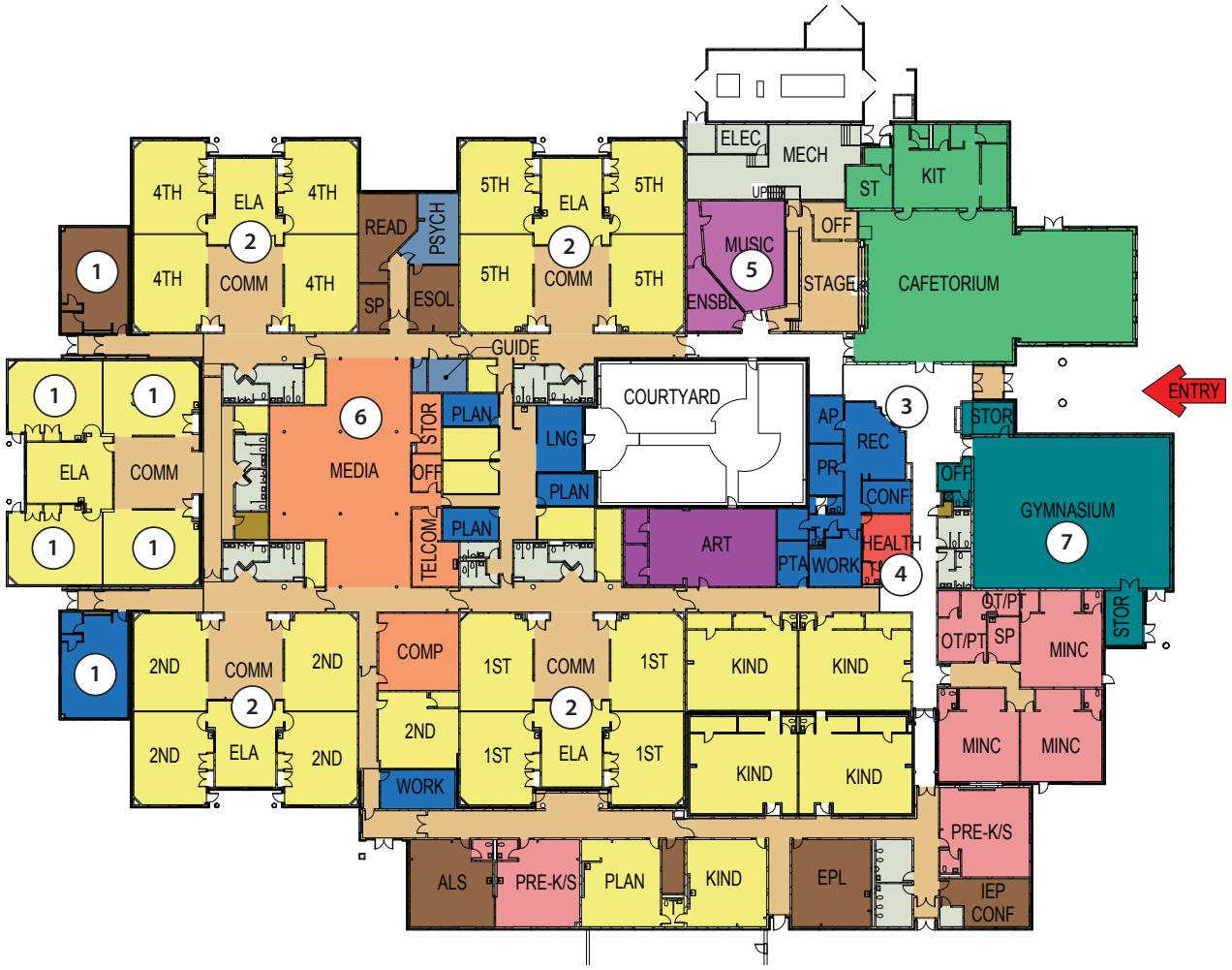
# EXISTING FLOOR PLAN

The following items are designated with numbers on the existing floor plan on the following page:

1. Modular construction classrooms to be demolished.
2. Typical classroom pod layout: Inadequate acoustic separation with use of operable and/or partial walls.
3. Administration Suite: Cannot adequately monitor school entrance and cannot be modified to establish secure entry condition.
4. Health Suite: Size and layout do not meet current state standards.
5. Music Rooms: Insufficient quantity for increased capacity.
6. Media Center: Not enclosed at corridors. Encourages cross traffic and does not provide adequate acoustic separation.
7. Gymnasium is not large enough to accommodate three concurrent classes as will be required by projected student population.

## Legend

- ADMINISTRATION
- ART
- CAFETORIUM / KITCHEN
- CIRCULATION
- CLASSROOMS K-5 & ELR
- COUNSELING
- CUSTODIAL
- HEALTH
- MEDIA
- MUSIC
- PHYSICAL EDUCATION
- REGIONAL SPECIAL EDUCATION
- SPECIAL EDUCATION
- UTILITY/TOILET




**EXISTING FLOOR PLAN**

0 25' 50' 100' N

# PROPOSED FLOOR PLANS

The items below are designated with numbers on the proposed floor plans on the following pages:

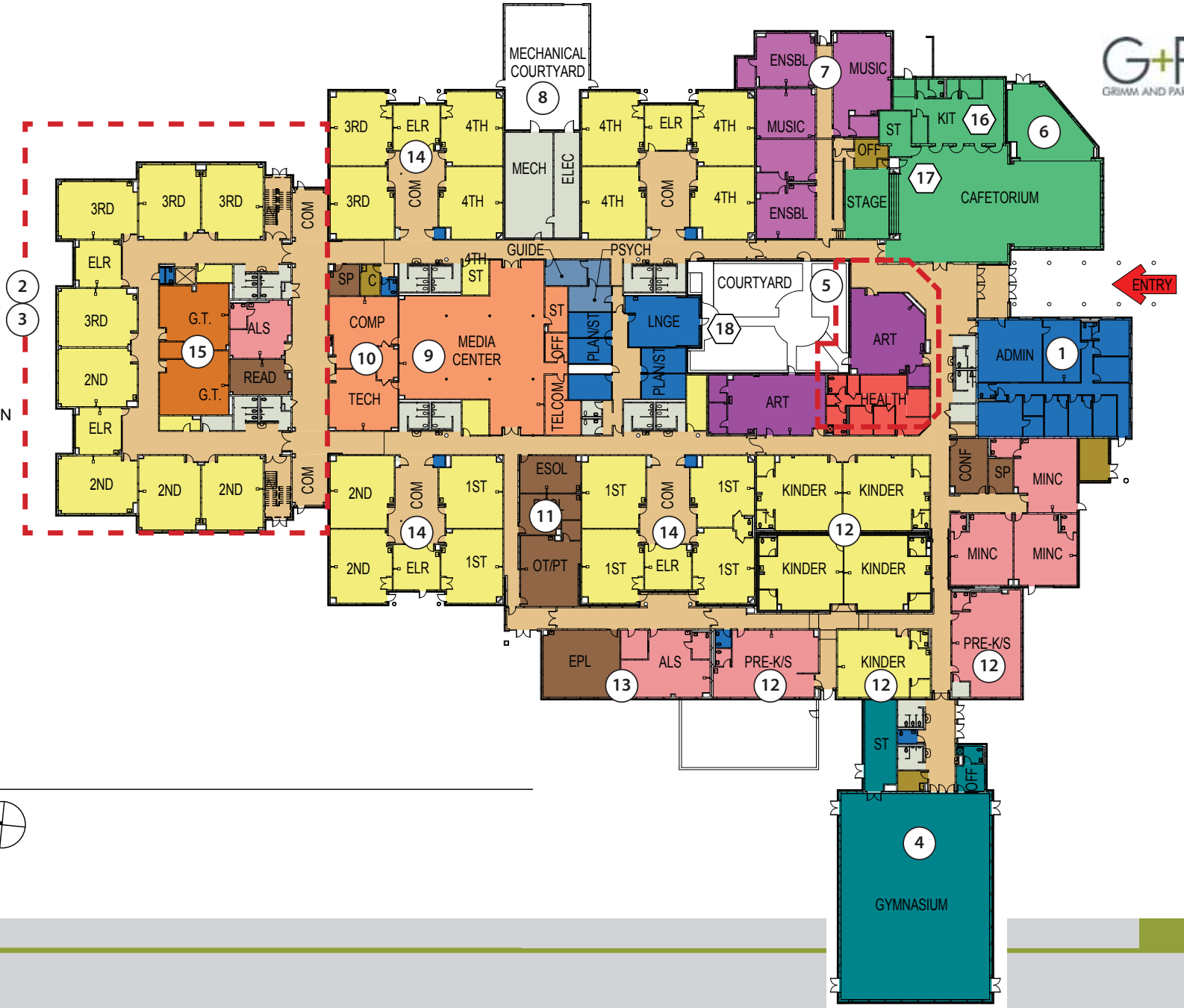
1. Existing gymnasium converted to new administration suite with connected secure entry vestibule. Includes front office, conference room, staff toilet, secure test preparation, work room, secure records storage, principal's office, two assistant principal offices, and PTO office.
2. First floor of two-story addition includes: six classrooms to replace modular classrooms, two classrooms to replace two of three portable classrooms, two extended learning rooms, two gifted and talented classrooms with storage, intermediate ALS room, reading resource room, storage, toilet and utility rooms, stairs and elevator.
3. Second floor of two-story addition includes six classrooms, two extended learning rooms, satellite work room, and toilet and utility rooms.
4. New gymnasium, storage, office and toilet rooms.
5. Existing administration suite converted to new COMAR compliant health suite and second art classroom.
6. Cafetorium expansion.
7. New one-story addition, existing music rooms and existing mechanical and electrical rooms combined and configured to provide two ensemble rooms and two general music rooms with associated storage.
8. Existing area between classroom pods reconfigured for new mechanical and electrical rooms.
9. Media center is enclosed with new walls and doors to separate it from the corridor.
10. New computer and technology rooms connected to media center and surrounding corridors.
11. Existing computer and work rooms reconfigured as OT/PT and ESOL classrooms.
12. Reconfigured pre-k and kindergarten classrooms with ADA compliant toilet rooms.
13. Primary ALS and EPL rooms in reconfigured space. ALS resource room also serves as observation room.
14. Existing pods reconfigured with fixed walls for acoustic separation. Extended learning rooms reconfigured to provide classroom access from pod common area - not through other classrooms.
15. Gifted & talented classrooms.

**The following items are changes made since the design development submission:**

16. Kitchen renovation added to project scope.
17. ADA compliant platform lift added to project scope.
18. Staff lounge expansion included as bid alternate.

## Legend

- ADMINISTRATION
- ART
- CAFETORIUM / KITCHEN
- CIRCULATION
- CLASSROOMS K-5 & ELR
- COUNSELING
- CUSTODIAL
- GIFTED & TALENTED
- HEALTH
- MEDIA
- MUSIC
- PHYSICAL EDUCATION
- REGIONAL SPECIAL EDUCATION
- SPECIAL EDUCATION
- UTILITY/TOILET



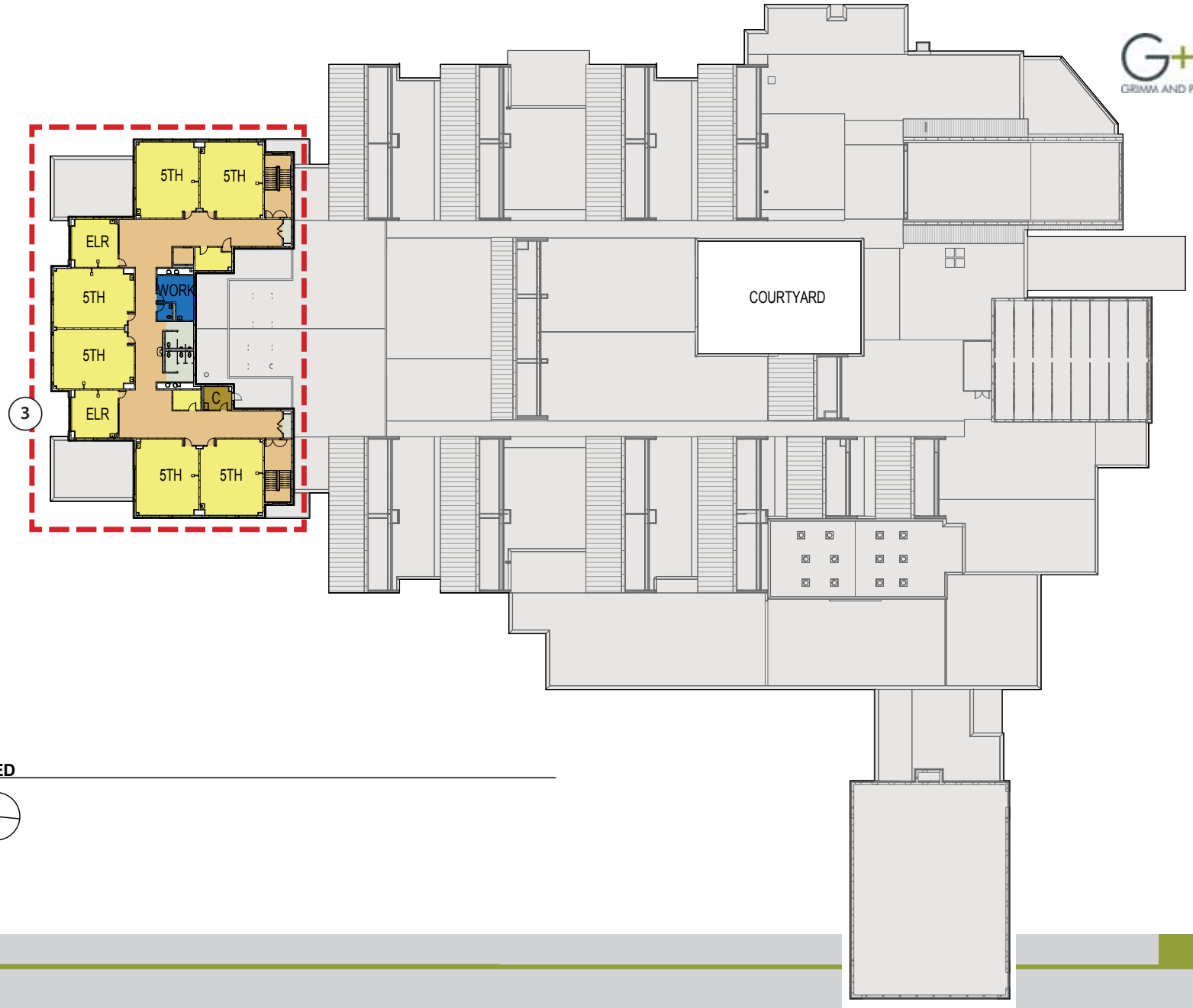

**FIRST FLOOR PLAN - PROPOSED**

0 25' 50' 100'

N

## Legend

- ADMINISTRATION
- CIRCULATION
- CLASSROOMS K-5 & ELR
- CUSTODIAL
- UTILITY/TOILET




**SECOND FLOOR PLAN - PROPOSED**

0 25' 50' 100'

N

# SPACE SUMMARY / PROGRAM ANALYSIS

The space summary / program analysis on the following pages enumerates spaces provided in the proposed building plans as required by the Ed Specs and the Guidelines Manual for Renovations and Modernizations of Existing Schools.

Due to the nature of this project, space requirements were derived from a combination of the 2003 Ed Specs, the current 2010 Ed Specs, and the renovation guidelines. Generally, the number of spaces required have been defined by the 2003 Ed Specs that provides for a rated capacity of 788 students, whereas the size of individual spaces is defined by the 2010 Ed Specs that reflects current needs and educational philosophies.

In addition to spaces defined in the aforementioned Ed Specs, spaces have also been provided for existing educational programs provided at Waverly Elementary School (e.g. special education programs, gifted and talented, etc.).

| FACILITY | | SCHEMATIC DESIGN | | | DESIGN DEVELOPMENT | | | CONSTRUCTION DOCS | | | VARIATION (CD-DD) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ROOM / SPACE DESCRIPTION | QTY | SIZE | TOTAL | QTY | SIZE | TOTAL | QTY | SIZE | TOTAL | |
| **ADMINISTRATION** | | | | **3,022** | | | **3,277** | | | **3,289** | **12.00** |
| | SECRETARIAL/RECEPTION AREA | 1 | 735 | 735 | 1 | 747 | 747 | 1 | 736 | 736 | (11.00) |
| | PRINCIPAL'S OFFICE W/CLOSET | 1 | 203 | 203 | 1 | 212 | 212 | 1 | 212 | 212 | - |
| | PRINCIPAL'S PRIVATE LAVATORY | 1 | 49 | 49 | 1 | 55 | 55 | 1 | 55 | 55 | - |
| | ASST. PRINCIPAL'S OFFICE W/CLOSET | 2 | 149 | 298 | 2 | 171 | 341 | 2 | 171 | 342 | 1.00 |
| | SECURE TEST PREP W/CLOSET | 1 | 149 | 149 | 1 | 165 | 165 | 1 | 165 | 165 | - |
| | CONFERENCE ROOMS | 1 | 404 | 404 | 1 | 417 | 417 | 1 | 428 | 428 | 11.00 |
| | PARENT VOLUNTEER ROOM | 1 | 145 | 145 | 1 | 164 | 164 | 1 | 164 | 164 | - |
| | WORK PREPARATION ROOM (INCL. STORAGE) | 1 | 360 | 360 | 1 | 375 | 375 | 1 | 374 | 374 | (1.00) |
| | SATELITE WORK ROOM (SECOND FLOOR) | 1 | 239 | 239 | 1 | 212 | 212 | 1 | 229 | 229 | 17.00 |
| | STAFF LOUNGE | 1 | 391 | 391 | 1 | 464 | 464 | 1 | 459 | 459 | (5.00) |
| | TOILET ROOM | 1 | 49 | 49 | 1 | 49 | 49 | 1 | 49 | 49 | - |
| | RECORD STORAGE (SECURE) | - | - | 0 | 1 | 76 | 76 | 1 | 76 | 76 | - |
| **ALTERNATIVE EDUCATION AREA** | | | | **0** | | | **0** | | | **0** | **-** |
| | CLASSROOM | - | - | 0 | - | - | 0 | - | - | 0 | - |
| | OFFICE | - | - | 0 | - | - | 0 | - | - | 0 | - |
| **CAFETORIUM/KITCHEN** | | | | **6,749** | | | **6,787** | | | **6,818** | **31.00** |
| | STUDENT DINING | 1 | 4,904 | 4,904 | 1 | 4,904 | 4,904 | 1 | 4,812 | 4,812 | (92.00) |
| | STAGE | 1 | 623 | 623 | 1 | 623 | 623 | 1 | 612 | 612 | (11.00) |
| | CHAIR STORAGE | 1 | 215 | 215 | 1 | 215 | 215 | 1 | 240 | 240 | 25.00 |
| | KITCHEN AND SERVING | 1 | 602 | 602 | 1 | 602 | 602 | 1 | 682 | 682 | 80.00 |
| | DISHWASHING AREA | 1 | 187 | 187 | 1 | 185 | 185 | 1 | 186 | 186 | 1.00 |
| | DRY STORAGE | 1 | 61 | 61 | 1 | 61 | 61 | 1 | 77 | 77 | 16.00 |
| | LOCKER/LAVATORY | 1 | 47 | 47 | 1 | 47 | 47 | 1 | 91 | 91 | 44.00 |
| | JANITOR'S CLOSET/SOAP/LAUNDRY | - | - | 0 | 1 | 40 | 40 | 1 | 43 | 43 | 3.00 |
| | CAN WASH | 1 | 52 | 52 | 1 | 52 | 52 | - | - | 0 | (52.00) |
| | KITCHEN OFFICE | 1 | 58 | 58 | 1 | 58 | 58 | 1 | 75 | 75 | 17.00 |
| **CLASSROOMS K-5 and ELRs** | | | | **38,951** | | | **37,731** | | | **37,718** | **(13.00)** |
| | KINDERGARTEN CLASSROOMS | 5 | 1,019 | 5,095 | 5 | 1,010 | 5,048 | 5 | 1,007 | 5,033 | (15.00) |
| | KINDERGARTEN LAVATORIES | 5 | 50 | 250 | 5 | 57 | 287 | 5 | 58 | 289 | 2.00 |
| | KINDERGARTEN STORAGE | 5 | 77 | 385 | 5 | 65 | 326 | 5 | 65 | 327 | 1.00 |
| | GRADES 1-2 CLASSROOMS | 12 | 806 | 9,672 | 12 | 798 | 9,570 | 12 | 796 | 9,554 | (16.00) |
| | GRADES 1-2 LAVATORIES | - | - | 0 | - | - | 0 | 1 | 64 | 64 | 64.00 |
| | GRADE 3-5 | 18 | 832 | 14,976 | 18 | 811 | 14,589 | 18 | 807 | 14,526 | (63.00) |
| | COMMONS | 6 | 796 | 4,776 | 6 | 636 | 3,816 | 6 | 626 | 3,754 | (62.00) |
| | EXTENDED LEARNING ROOMS (ELR) | 7 | 395 | 2,765 | 8 | 392 | 3,137 | 8 | 385 | 3,076 | (61.00) |
| | GRADES 1-5 STORAGE | 8 | 129 | 1,032 | 6 | 160 | 958 | 7 | 156 | 1,095 | 137.00 |
| | MATH AND READING STORAGE | - | - | 0 | - | - | 0 | - | - | 0 | - |
| **CUSTODIAL AREA** | | | | **574** | | | **849** | | | **763** | **(86.00)** |
| | CUSTODIAL STORAGE ROOM / CLOSETS | 5 | 57 | 285 | 3 | 107 | 321 | 3 | 85 | 254 | (67.00) |
| | STORAGE ROOM W/OFFICE | 1 | 189 | 189 | 1 | 189 | 189 | 1 | 171 | 171 | (18.00) |
| | VENTILATED STORAGE | 1 | 100 | 100 | 1 | 113 | 113 | 1 | 112 | 112 | (1.00) |
| | EXTERIOR STORAGE | - | - | 0 | 1 | 226 | 226 | 1 | 226 | 226 | - |

| FACILITY | | SCHEMATIC DESIGN | | | DESIGN DEVELOPMENT | | | CONSTRUCTION DOCS | | | VARIATION (CD-DD) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ROOM / SPACE DESCRIPTION | QTY | SIZE | TOTAL | QTY | | TOTAL | QTY | | TOTAL | |
| **ESOL AREA** | | | | **721** | | | **819** | | | **812** | **(7.00)** |
| | PRIMARY EXTENDED LEARNING ROOM | 1 | 364 | 364 | 1 | 402 | 402 | 1 | 400 | 400 | (2.00) |
| | INTERMEDIATE EXTEDED LEARNING ROOM | 1 | 357 | 357 | 1 | 417 | 417 | 1 | 412 | 412 | (5.00) |
| **GIFTED & TALENTED AREA** | | | | **1,936** | | | **1,716** | | | **1,587** | **(129.00)** |
| | G/T RESOURCE ROOM | 2 | 797 | 1,594 | 2 | 813 | 1,625 | 2 | 745 | 1,489 | (136.00) |
| | STORAGE | 1 | 190 | 190 | 1 | 91 | 91 | 1 | 98 | 98 | 7.00 |
| | G/T OFFICE | 1 | 152 | 152 | - | - | 0 | - | - | 0 | - |
| **GUIDANCE AND PSYCHOLOGICAL SERVICES** | | | | **291** | | | **501** | | | **501** | **-** |
| | GUIDANCE OFFICE | 1 | 140 | 140 | 1 | 199 | 199 | 1 | 199 | 199 | - |
| | PSYCHOLOGIST OFFICE | 1 | 151 | 151 | 1 | 199 | 199 | 1 | 199 | 199 | - |
| | ASSESSMENT ROOM (SHARED) | - | - | 0 | 1 | 103 | 103 | 1 | 103 | 103 | - |
| **HEALTH** | | | | **741** | | | **841** | | | **841** | **-** |
| | WAITING ROOM | 1 | 107 | 107 | 1 | 100 | 100 | 1 | 100 | 100 | - |
| | TREATMENT/MEDICATION | 1 | 153 | 153 | 1 | 115 | 115 | 1 | 115 | 115 | - |
| | REST AREA | 1 | 229 | 229 | 1 | 167 | 167 | 1 | 167 | 167 | - |
| | OFFICE/CONSULT/EXAM | 1 | 97 | 97 | 1 | 111 | 111 | 1 | 111 | 111 | - |
| | EXAMINATION/ISOLATION | - | - | 0 | 1 | 125 | 125 | 1 | 125 | 125 | - |
| | TOILET ROOM SHOWER & CHANGING TABLE | 1 | 103 | 103 | 2 | 83 | 165 | 2 | 83 | 165 | - |
| | STORAGE | 1 | 52 | 52 | 2 | 29 | 58 | 2 | 29 | 58 | - |
| **LIBRARY MEDIA CENTER** | | | | **5,232** | | | **5,749** | | | **5,745** | **(4.00)** |
| | MAIN READING ROOM | 1 | 2,904 | 2,904 | 1 | 3,474 | 3,474 | 1 | 3,481 | 3,481 | 7.00 |
| | TECHNOLOGY RESOURCE ROOM | 1 | 806 | 806 | 1 | 709 | 709 | 1 | 708 | 708 | (1.00) |
| | COMPUTER ROOM | 1 | 881 | 881 | 1 | 802 | 802 | 1 | 790 | 790 | (12.00) |
| | OFFICE/WORK SPACE | 1 | 120 | 120 | 1 | 120 | 120 | 1 | 120 | 120 | - |
| | MEDIA PRODUCTION/VIDEO AREA | - | - | 0 | - | - | 0 | - | - | 0 | - |
| | MEDIA STORAGE | 1 | 186 | 186 | 1 | 186 | 186 | 1 | 186 | 186 | - |
| | TELECOMMUNICATION/EQUIPMENT ROOM | 1 | 335 | 335 | 1 | 335 | 335 | 1 | 335 | 335 | - |
| | COMPUTER/TECHNOLOGY STORAGE (SHARED | - | - | 0 | 1 | 123 | 123 | 1 | 125 | 125 | 2.00 |
| **MINI-AUDITORIUM** | | | | **0** | | | **0** | | | **0** | **-** |
| | MINI-AUDITORIUM | - | - | 0 | - | | 0 | - | | 0 | - |
| **MUSIC SUITE** | | | | **3,780** | | | **3,301** | | | **3,237** | **(64.00)** |
| | GENERAL MUSIC ROOM | 2 | 1,092 | 2,184 | 2 | 938 | 1,876 | 2 | 917 | 1,833 | (43.00) |
| | ENSEMBLE ROOM | 2 | 615 | 1,230 | 2 | 553 | 1,105 | 2 | 543 | 1,086 | (19.00) |
| | STORAGE | 2 | 183 | 366 | 3 | 107 | 320 | 3 | 106 | 318 | (2.00) |
| **PHYSICAL EDUCATION / GYMNASIUM** | | | | **6,181** | | | **5,717** | | | **6,400** | **683.00** |
| | GYMNASIUM* | 1 | 3,250 | 3,250 | 1 | 5,029 | 5,029 | 1 | 5,690 | 5,690 | 661.00 |
| | PE ACTIVITY ROOM* | 1 | 2,370 | 2,370 | - | - | 0 | - | - | 0 | - |
| | STORAGE | 3 | 153 | 459 | 1 | 504 | 504 | 1 | 510 | 510 | 6.00 |
| | OFFICE (INCL. TOILET & SHOWER) | 1 | 102 | 102 | 1 | 184 | 184 | 1 | 200 | 200 | 16.00 |
| | OUTDOOR ACCESS BATHROOMS | - | - | 0 | - | - | 0 | - | - | 0 | - |
| **READING RESOURCE AREA** | | | | **447** | | | **409** | | | **373** | **(36.00)** |
| | READING RESOURCE (SPECIALIST) | 1 | 447 | 447 | 1 | 409 | 409 | 1 | 373 | 373 | (36.00) |
| | STORAGE | INCLUDED IN ABOVE | | | | | | | | | |

| FACILITY | | SCHEMATIC DESIGN | | | DESIGN DEVELOPMENT | | | CONSTRUCTION DOCS | | | VARIATION (CD-DD) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ROOM / SPACE DESCRIPTION | QTY | SIZE | TOTAL | QTY | | TOTAL | QTY | | TOTAL | |
| **SPECIAL EDUCATION AREA (K-5)** | | | | **2,584** | | | **2,528** | | | **2,316** | **(212.00)** |
| | CLASSROOM | - | - | 0 | - | - | 0 | - | - | 0 | - |
| | STUDENT LAVATORY | - | - | 0 | - | - | 0 | - | - | 0 | - |
| | EXTENDED LEARNING ROOMS (ELR) | SEE PLANNING AREAS BELOW | | | | | | | | | |
| | PLANNING AREAS | 6 | 202 | 1,212 | 6 | 202 | 1,212 | 5 | 201 | 1,005 | (207.00) |
| | EPL CLASSROOM (W/LAVATORY) | 1 | 748 | 748 | 1 | 947 | 947 | 1 | 942 | 942 | (5.00) |
| | IEP CONFERENCE ROOM | 1 | 462 | 462 | 1 | 369 | 369 | 1 | 369 | 369 | - |
| | IEP TOILET | 1 | 59 | 59 | - | - | 0 | - | - | 0 | - |
| | SPECIAL EDUCATION STORAGE | 1 | 103 | 103 | 1 | - | 0 | 1 | - | 0 | - |
| **SPECIAL EDUCATION - REGIONAL EARLY CHILDHOOD CENTER** | | | | **7,200** | | | **7,545** | | | **7,443** | **(102.00)** |
| | PRESCHOOL/PK CLASSROOMS | 2 | 882 | 1,764 | 2 | 1,196 | 2,391 | 2 | 1,183 | 2,366 | (25.00) |
| | PRESCHOOL/PK LAVATORIES | 2 | 56 | 112 | 2 | 58 | 116 | 2 | 55 | 110 | (6.00) |
| | STORAGE | 1 | 103 | 103 | - | - | 0 | - | - | 0 | - |
| | MINC CLASSROOMS | 3 | 700 | 2,100 | 3 | 764 | 2,292 | 3 | 764 | 2,291 | (1.00) |
| | MINC LAVATORIES W/ CHANGING TABLE | 3 | 100 | 300 | 1 | 101 | 101 | 1 | 101 | 101 | - |
| | MINC LAVATORIES W/OUT CHANGING TABLE | - | - | 0 | 2 | 50 | 100 | 2 | 50 | 100 | - |
| | OT/PT LARGE THERAPY ROOM | 1 | 739 | 739 | 1 | 756 | 756 | 1 | 739 | 739 | (17.00) |
| | OT/PT SMALL THERAPY ROOM/STORAGE | 1 | 414 | 414 | - | - | 0 | - | - | 0 | - |
| | OT/PT STORAGE ROOM | 1 | 62 | 62 | 1 | 69 | 69 | 1 | 69 | 69 | - |
| | ALS CLASSROOM | 2 | 672 | 1,344 | 2 | 703 | 1,405 | 2 | 679 | 1,358 | (47.00) |
| | ALS OFFICE/PLANNING | 1 | 126 | 126 | 1 | 143 | 143 | 1 | 143 | 143 | - |
| | ALS TOILETS | 2 | 68 | 136 | 2 | 86 | 172 | 2 | 83 | 166 | (6.00) |
| **SPEECH/LANGUAGE THERAPY** | | | | **156** | | | **320** | | | **324** | **4.00** |
| | SPEECH THERAPY | 1 | 156 | 156 | 2 | 160 | 320 | 2 | 162 | 324 | 4.00 |
| **OT/PT** | | | | **0** | | | **0** | | | **0** | **-** |
| | OT/PT | INCLUDED IN RECC | | | | | | | | | |
| | STORAGE ROOM (INCLUDED IN RECC) | INCLUDED IN RECC | | | | | | | | | |
| **VISUAL ART AREA** | | | | **2,514** | | | **2,352** | | | **2,339** | **(13.00)** |
| | STUDIO | 2 | 1,163 | 2,326 | 2 | 1,042 | 2,083 | 2 | 1,035 | 2,070 | (13.00) |
| | KILN/STORAGE | 2 | 94 | 188 | 3 | 90 | 269 | 3 | 90 | 269 | - |
| **TOTAL NET EDUCATIONAL AREA** | | | | **81,079** | | | **80,442** | | | **80,506** | **64.00** |
| **OVERALL GROSS BUILDING AREA** | | | | **116,574** | | | **114,895** | | | **115,822** | **927.00** |
| **EFFICIENCY** | | | | **70%** | | | **70%** | | | **70%** | |

*** PE ACTIVITY ROOM WAS PROPOSED IN SCHEMATIC DESIGN PHASE TO PROVIDE ADDITIONAL PROGRAM SPACE REQUIRED FOR INCREASED STUDENT CAPACITY AND MULTIPLE CONCURRENT PE CLASSES. ACTIVITY ROOM REMOVED IN DESIGN DEVELOPMENT PHASE AND NEW GYMNASIUM ADDED. GYMNASIUM SIZE WAS INCREASED IN CONSTRUCTION DOCUMENT PHASE TO REFLECT ESM MODEL REQUIREMENTS.**

# PROJECT COST ESTIMATE

**CONSTRUCTION COSTS:**

| | Schematic Design Phase | Design Development Phase | Construction Documents Phase |
|---|---|---|---|
| Phasing & Temporary Facilities: | Included Below | Included Below | |
| Site Work: | $ 840,916 | $ 922,469 | $ 1,578,331 |
| Additions: | $ 11,896,589 | $ 12,205,595 | $ 10,254,640 |
| Renovation: | $ 13,257,041 | $ 11,807,528 | $ 14,487,849 |
| **TOTAL:** | **$ 25,994,546** | **$ 24,935,592** | $ 26,320,821 |

| | | | |
|---|---|---|---|
| Bid Alternate #1 - Site Entry Improvements: | n/a | n/a | $ 71,867 |
| Bid Alternate #2 - Parking Lot Expansion: | n/a | n/a | $ 185,411 |
| Bid Alternate #3 - Gymnasium Projector: | n/a | n/a | $ 25,353 |
| Bid Alternate #4 - Gymnasium Blinds (Electric): | n/a | n/a | $ 16,417 |
| Bid Alternate #5 - Staff Lounge Expansion: | n/a | n/a | $ 47,894 |
| Bid Alternate #6 - Ballfield Reconstruction: | n/a | n/a | $ 81,827 |
| **TOTAL ALTERNATES:** | n/a | n/a | $ 428,768 |
| **TOTAL WITH ALL ALTERNATES:** | **$ 25,994,546** | **$ 24,935,592** | **$ 26,749,590** |

**NOTES:**

- The construction cost estimate was prepared by the construction manager, HESS Construction Inc., and assumes bids will be received May 31, 2016.
- Estimate includes a construction document phase cost estimate contingency of three percent.
- Estimate includes wage rate pricing.