ACTION

HOWARD COUNTY
PUBLIC SCHOOL SYSTEM

BOARD OF EDUCATION OF HOWARD COUNTY
MEETING AGENDA ITEM

TITLE: Waverly Elementary School Schematic Design Report **DATE:** September 3, 2015

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 schematic design brochure describes the general scope of work for Waverly Elementary School. The project encompasses two phases. The first phase addresses the need for additions to the school. This includes a two-story classroom addition that will address the capacity expansion needs of the school, replace the existing integrated modular classroom pod, as well as eliminate the existing relocatable portables. Also included is a new administration addition at the southwest corner of the building with a secured vestibule. The creation of the new administration area will allow for renovation of the existing space to provide a COMAR compliant health suite, additional art room, work room and offices.

The second phase will include extensive renovations to the existing building. These renovations include both programmatic and systemic upgrades such as the conversion of the existing open area pods into self-contained classrooms, as well as new mechanical, electrical, and technology systems. 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 schematic design 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

SCHEMATIC DESIGN SUBMISSION | SEPTEMBER 3, 2015

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WAVERLY ELEMENTARY SCHOOL

SCHEMATIC DESIGN SUBMISSION

SEPTEMBER 3, 2015

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Carly Josephson	HCPSS, Media, Waverly Elementary School
Jennifer Silbaugh	HCPSS, Team Leader, Phelps Luck Elementary School

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
LEED CONSULTANT	Sustainable Design Consulting, LLC	Washington, DC

PLANNING PROCESS

The design solutions for Waverly Elementary School have been 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 and 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

This submission reflects carefully considered solutions that, to the fullest extent possible, satisfy all of the school and student needs and that incorporate the insights, knowledge and expertise generously shared by the broad range of participants throughout this consensus based design process.

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. Alternates will be identified for possible inclusion as the project budget may allow.

The proposed new construction will include the following:

- Replacement of six modular classrooms with permanent construction
- Four new classrooms (100 seats) to accommodate projected population increase
- Two new classrooms to replace portable classrooms
- One new large OT/PT room
- Administration suite addition at the southwest corner of the building to provide a secure entry sequence and a health suite conforming to state requirements

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 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 their proximity to the new addition, the two existing ballfields will need to be removed and replaced. The enw ballfields will mee current ballfield regulations. Upon request of the Howard County Fire Marshal, additional fire hydrants and an emergency access lane will be required to access the rear of the school.

The proposed administration addition will require removal of existing concrete sidewalk along with the relocation of an existing light pole. There are existing four-inch and eight-inch sewer lines in the area of the proposed addition. These will need to be removed and replaced with ductile iron pipes.

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 will be determined in consultation with the Howard County Engineering Division. Soil borings will then be required for design of these facilities.

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 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 and existing program. It will also include new mechanical and electrical services, toilet rooms, storage and custodial closets, stairs, and an elevator.

The second part is a new administration suite and entry addition at the southwest corner of school. This will provide a secure, supervised entrance and adequate administration space. The existing administration suite will be renovated to provide an additional art room, support areas, and offices.

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, and additional architectural and finish upgrades.

A portion of the existing mechanical room will be recaptured and renovated to provide adequately sized music rooms. Modifications to other existing rooms and spaces will provide new educational program areas.

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

MECHANICAL & PLUMBING NARRATIVE

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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)
- 2015 National Standard Plumbing Code
- 2015 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: 30 percent efficient (including all fan coil unit systems)
- Final filters: 85 percent efficient (for compliance with LEED IEQc5)

LIFE CYCLE COST ANALYSIS

A 20-year life-cycle cost analysis will be performed during the design development phase to confirm the final mechanical system selection for the facility. The following mechanical system options will be considered as part of this 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

Heating and Cooling 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. These systems 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 or 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 the roof level of the proposed two-story building addition and positioned near the building addition's main mechanical room. This equipment will generate chilled water for the school's new four-pipe distribution system. A variable primary chilled water arrangement will be utilized. Chilled water will be piped from the chiller to a pair of chilled water distribution pumps, located within the building addition mechanical room, and circulated throughout the 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 two 3,000 MBH input gas-fired condensing type boilers located within the building addition's main mechanical room. A pair of heating water distribution pumps, located in the building addition mechanical room, will circulate heating water throughout the school. A maximum heating water supply temperature of 140 degrees Fahrenheit will be utilized with this supply water temperature reset based on outdoor air temperature.

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

HVAC Systems

1990 Classroom Areas, Including the 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 supporting ductwork and air devices) under the scope of this project.

Classroom areas throughout the renovated school (excluding the 2007 classroom addition areas) 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 or corridor ceilings with supply and return air ductwork extending from these units to the classroom area served. The use of filter return grilles (rather than filters within the fan coil units) will be provided, minimizing above ceiling maintenance requirements.

A series of rooftop dedicated outdoor air systems with enthalpy wheel energy recovery devices, chilled water cooling coils, and hot water heating coils will be provided for delivering conditioned ventilation airflow to the classroom areas. 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.

2007 Classroom Areas

The existing packaged VAV rooftop unit serving the 2007 classroom addition areas will remain under the scope of this project. The existing fan-powered VAV terminal units will be replaced with single-duct type VAV terminal units, with the existing supply air ductwork and air device systems remaining as currently installed. New terminal unit heating coils will be sized to accommodate a 140 degrees Fahrenheit design heating water temperature. The existing plenum-type return air ductwork arrangement will be maintained throughout the 2007 classroom areas as reconfiguring to a ducted return air arrangement is not feasible without replacement of the existing-to-remain supply air ductwork and associated air device systems. Resealing and re-insulating the existing supply air ductwork may be desired, and will be evaluated as the design progresses.

Administration and Administration Support Areas

The existing mechanical system components serving the administration areas, including the

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

Media Center

The existing VAV rooftop units and associated VAV terminal units serving the media center area have exceeded their useful service life and will be replaced under the scope of this project. A new single-zone 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. 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 area. This new air-handling unit will either be located within the existing mechanical room, or at the roof level (due to spatial limitations within the existing mechanical room). This unit will be provided with a hot water heating coil and air-side economizer operation. Supply and return air fans will be equipped with variable frequency drives for airflow balancing purposes. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy.

In addition to the rooftop air-handling unit, a "summer ventilation" system 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 is anticipated to be 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 anticipated.

To support the proposed cafeteria renovation and expansion, two new single-zone 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. Supply and return air fans will be equipped with variable frequency drives for reducing airflow quantities during periods of reduced cooling demand. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy. Excess outdoor air quantities will be transferred to the adjacent kitchen area for exhaust hood make-up.

Kitchen

Space conditioning for the kitchen area will 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. Modifications to the existing ductwork and piping systems within the kitchen area are currently not anticipated. 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 heating-only cabinet unit heaters.

BUILDING AUTOMATION CONTROL SYSTEMS

A building automation system consisting of direct digital control (DDC) components will be provided for the school. The new control system will be interfaced with the existing Johnson Controls DDC system serving the 2007 classroom addition mechanical systems. Damper and valve components will be provided with electric or electronic actuation. DDC control components will be utilized for all fan coil units and dedicated outdoor air systems. DDC interface with the room occupancy sensors provided for lighting control will be evaluated during the design development phase, allowing "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.

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.

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 within the existing boiler room. The new water service will be completed with a basket strainer and dual reduced pressure zone backflow preventers.

The recently replaced gas-fired domestic water heater will remain under the scope of the renovation. The other water heater will be replaced with a 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.

Plumbing Fixtures

The existing plumbing fixtures are not Americans with Disabilities Act (ADA) compliant and will be replaced throughout the school (with the exception of the 2007 classroom addition areas). 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 0.35 gallons per minute. All plumbing fixtures will comply with the ADA.

Natural Gas Piping

The existing low pressure (1/4 pounds per square inch (PSI)) gas service will be replaced with a new two 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.

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 municipal water system will be evaluated during the design development phase to confirm adequate pressure to serve the 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

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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, data/voice, audio/video (instructional technology), intercommunications, sound, master clock and program, security (access control, intrusion detection, video surveillance), and fire alarm 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. It is anticipated that the new outdoor BGE pad-mounted utility transformer will be located at or near to where the existing BGE pad-mounted utility transformer is located in the existing service yard. (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 in the north building addition 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.

If construction phasing requires maintaining the existing electrical service equipment (2500A, 120/208V main service switchboard) 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 north building addition will not interfere with the existing electrical service. Therefore, the existing electrical service can be maintained while the proposed north building addition is being constructed.

Panelboards will be rated at 277/480 volts and 120/208 volts and will be installed in electrical rooms and electrical closets. 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, ten-gauge wiring when the run is between 50 and 100 linear feet, and eight-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 REQUIREMENT

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 proposed building additions.

Electrical equipment for the MEMA emergency public shelter will include an outdoor 1200A generator docking station (equal to Trystar GDS) with multiple cam-lock connectors per phase. The 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. It needs to be determined if the new generator will be located near or within the existing service yard, or near the new main electrical room, which will be in the north

building addition of the school. 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 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 high-bay LED luminaires in the gymnasium, a combination of LED pendants and LED downlights in the media center and cafetorium, recessed LED downlights in selected areas, vandal-resistant LED luminaires in group toilet rooms, gasketed LED luminaires with smooth lenses (for easier cleaning) in the kitchen, industrial-type LED luminaires for support spaces with open ceilings, LED exit signs with red lettering, exterior perimeter building mounted full-cutoff LED luminaires, and exterior pole mounted full-cutoff LED luminaires in parking areas and the bus loop. The finish of exterior luminaires will be selected by the Architect.

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 lighting fixtures 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.

DATA/VOICE SYSTEMS

The existing data cabling infrastructure will be replaced with a new data cabling infrastructure to include equipment data racks, active data hardware, uninterruptable power supply (UPS) for each rack, wireless access points, fiber optic backbone cables, data patch panels, one foot data patch cords, Category Six blue data cables, Category Six VoIP (voice-over internet protocol) data cables, jacks, outlet boxes, conduits and raceways, and conduit sleeves through walls and floors for the installation of data cabling. Analog voice cables will also be provided for the fire alarm system. Ceiling-mounted wireless access points (wireless routers by Aruba) will be located throughout the school. Category Six cable will run from each wireless access point to respective telecom room. The data/voice systems design will include outlet boxes, conduit within walls, and j-hooks in ceiling spaces for the installation data/voice cabling. The data/voice equipment will be connected to generator power.

Representatives of the HCPSS will select the head-end phone system for the school.

AUDIO/VIDEO (INSTRUCTIONAL TECHNOLOGY) SYSTEMS

The existing media retrieval system and associated coaxial video cabling will be removed. New coaxial video cabling will not be installed.

The general classroom design will include a DVD/Blu-ray player, audio mixer/amplifier, audio override relays (for intercom and fire alarm systems), and teacher wardrobe outlet housed in the teacher's wardrobe. The general classroom will also have a wall-mounted LCD short-throw projector (by Epson, model 595Wi), ceiling-mounted wireless microphone and media interface, ceiling speakers, high projector outlet, low projector outlet, and associated cabling. The audio mixer/amplifier, wireless microphone and media interface, and ceiling speakers are for classroom sound enhancement. Outlet jack configurations and connections will be in accordance with the the HCPSS' latest standards.

INTERCOMMUNICATIONS, SOUND, MASTER CLOCK AND PROGRAM SYSTEMS

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 intercom system will interface with the Owner's telephone system. Classrooms, instructional spaces, corridors, and large toilet rooms will have ceiling-mounted speakers. Offices and support spaces will have ceiling mounted speakers and wall-mounted volume control switches.

Clocks will be connected to the central intercom equipment rack/cabinet. Battery-powered wireless analog secondary clocks will be provided in the classrooms, instructional spaces, offices, workrooms,

conference rooms, resource rooms, staff lounge, media center, cafetorium, kitchen, activity room, and gymnasium. Dual-face digital secondary clocks will be provided in the corridors.

The intercommunications, sound, master clock and program systems design will include outlet boxes, conduit within walls, and j-hooks in ceiling spaces for the installation in systems cabling. The central intercom equipment rack/cabinet will be connected to generator power.

SOUND SYSTEMS

The existing cafetorium and gymnasium local sound systems will be replaced. Individual sound systems for the cafetorium and gymnasium, each with a listening assistance system (for the hearing impaired), will be provided. Each system will be complete with speakers, microphone jacks, auxiliary jack(s), and wall mounted equipment cabinet with mixer/amplifier, CD/MP3 player, wireless microphone receiver, and hearing assistance transmitter.

SECURITY SYSTEMS (ACCESS CONTROL, INTRUSION DETECTION, AND VIDEO SURVEILLANCE)

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. Proximity card readers will be provided at locations determined by representatives of the HCPSS. The main entrance will have a door entry phone system equal to Aiphone.

The two existing intrusion detection control panels by Ademco and Radionics will be replaced in its entirety with a new intrusion detection control panel by Bosch to be located in the main telecom (MDF) room. Keypads, door contacts, and wall-mounted motion detectors will be provided at locations determined by representatives of the HCPSS.

The existing video surveillance system TruVision (UTC/Interlogix) DVR 60 network video recorder (NVR) with four terabytes of storage, located in the main telecom (MDF) room can be re-used. Video surveillance monitors will be provided in the main office (42-inch monitor), principal's office (32-inch monitor), and a third location (32-inch monitor) determined by representatives of the HCPSS. Interior IP-based dome-type cameras with motorized varifocal lenses and exterior IP-based bullet-type cameras with motorized varifocal lenses will be provided at locations determined by the HCPSS.

The security systems design will include device outlet boxes, conduit within walls, and j-hooks in ceiling spaces for the installation security cabling. The security systems will be connected to generator power.

FIRE DETECTION AND ALARM SYSTEM

The existing fire alarm control panel (FACP) Edwards, Model 5721B, will be replaced in its entirety with a new fire alarm control panel with voice evacuation to be located in the new main telecom (MDF) room. The basis-of-design fire alarm system manufacturer will be Edwards Systems Technology (EST).

The fire alarm system will be designed to comply with State of Maryland Fire Code, local authorities having jurisdiction, International Building Code, and 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 telecom (MDF) 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.

Fire alarm manual pull stations will be provided at each exterior egress door. 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 cabling will be installed in conduit. Equipment will be expanded to serve the project areas. This item will be reviewed with the HCPSS at the design development phase.

VIDEO SURVEILLANCE SYSTEM

Changes to the existing video surveillance system are anticipated and will be reviewed with the HCPSS at the design development phase.

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.

GREEN BUILDING NARRATIVE

GRIMM AND PARKER

Design for LEED

The USGBC established the Leadership in Energy and Environmental Design (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 will be registered under the LEED for Schools v3 (LEED-S) rating system. After a preliminary analysis, 45 credits were targeted as achievable for the school, with 25 additional possible credits. Credits have been identified as achievable based on economic and design feasibility and potential environmental benefits. The preliminary credit tally is at a reasonable level for the schematic design phase, and shows that achieving the targeted certification level for the building is possible. Additional credits will need to be secured as the project develops so that well over 50 points are submitted for review. It is not uncommon for a few credits to become unattainable due to any number of factors.

LEED Credit Goals

- Providing preferred parking for Low-Emitting Vehicles and Fuel-Efficient Vehicles.
- Reducing storm water runoff and pollution.
- Reducing potable water usage. A water savings of 30-35 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 and thermal controls to ensure accommodation of the individual preferences of its 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 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 will create 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 Credit 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

LEED® 2009 for Schools New Construction and Major Renovation

Project Checklist - Preliminary Forecast by Grimm + Parker

Y	?Y	?N	N			
5	**5**	**8**	**6**		**Sustainable Sites**	Possible Points **24**
Y				Prereq 1	**Construction Activity Pollution Prevention**	
Y				Prereq 2	**Environmental Site Assessment**	
1				Credit 1	**Site Selection**	**1**
			4	Credit 2	**Development Density & Community Connectivity**	**4**
			1	Credit 3	**Brownfield Redevelopment**	**1**
		4		Credit 4.1	**Alternative Transportation:** Public Transportation Access	**4**
		1		Credit 4.2	**Alternative Transportation:** Bicycle Storage & Changing Rooms	**1**
2				Credit 4.3	**Alternative Transportation:** Low Emitting & Fuel Efficient Vehicle	**2**
	2			Credit 4.4	**Alternative Transportation:** Parking Capacity	**2**
		1		Credit 5.1	**Site Development:** Protect or Restore Habitat	**1**
1				Credit 5.2	**Site Development:** Maximize Open Space	**1**
	1			Credit 6.1	**Stormwater Design:** Quantity Control	**1**
			1	Credit 6.2	**Stormwater Design:** Quality Control	**1**
		1		Credit 7.1	**Heat Island Effect:** Non-Roof	**1**
1				Credit 7.2	**Heat Island Effect:** Roof	**1**
	1			Credit 8	**Light Pollution Reduction**	**1**
	1			Credit 9	**Site Master Plan**	**1**
		1		Credit 10	**Joint Use of Facilities**	**1**

Y	?Y	?N	N			
6	**1**	**2**	**2**		**Water Efficiency**	Possible Points **11**
Y				Prereq 1	**Water Use Reduction: 20% Reduction**	
4				Credit 1	**Water Efficient Landscaping**	**4**
			2	Credit 2	**Innovative Wastewater Technologies**	**2**
2	**1**	**1**		Credit 3	**Water Use Reduction: 30%/ 35%/ 40%**	**4**
		1		Credit 4	**Process Water Use Reduction**	**1**

Y	?Y	?N	N			
12		**2**	**19**		**Energy & Atmosphere**	Possible Points **33**
Y				Prereq 1	**Fundamental Commissioning of Building Energy Systems**	
Y				Prereq 2	**Minimum Energy Performance**	
Y				Prereq 3	**Fundamental Refrigerant Management**	
8			**11**	Credit 1	**Optimize Energy Performance: 8% and up**	**19**
			7	Credit 2	**On-Site Renewable Energy: 1%-13%**	**7**
2				Credit 3	**Enhanced Commissioning**	**2**
1				Credit 4	**Enhanced Refrigerant Management**	**1**
1			**1**	Credit 5	**Measurement & Verification**	**2**
		2		Credit 6	**Green Power**	**2**

Y	?Y	?N	N			
9		**1**	**3**		**Materials & Resources**	Possible Points **13**
Y				Prereq 1	**Storage & Collection of Recyclables**	
2				Credit 1.1	**Building Reuse:** Maintain Existing Walls, Floors, and Roof	**2**
		1		Credit 1.2	**Building Reuse:** Maintain 50% of Interior Non-Structural Elements	**1**
2				Credit 2	**Construction Waste Management: 50%/ 75%**	**2**
			2	Credit 3	**Materials Reuse: 5%/ 10%**	**2**

Materials & Resources, Cont.

Y	?Y	?N	N			
2				Credit 4	**Recycled Content: 10%/ 20%**	2
2				Credit 5	**Regional Materials: 10%/ 20%**	2
			1	Credit 6	**Rapidly Renewable Materials: 2.5%**	1
1				Credit 7	**Certified Wood: 50%**	1

Indoor Environmental Quality — Possible Points 19

8	1	2	8			
Y	?Y	?N	N			
Y				Prereq 1	**Minimum IAQ Performance**	
Y				Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	
Y				Prereq 3	**Minimum Acoustical Performance**	
			1	Credit 1	**Outdoor Air Delivery Monitoring**	1
			1	Credit 2	**Increased Ventilation: 30%**	1
1				Credit 3.1	**Construction IAQ Management Plan:** During Construction	1
1				Credit 3.2	**Construction IAQ Management Plan:** Before Occupancy	1
1				Credit 4.1	**Low-Emitting Materials:** Adhesives & Sealants	1
1				Credit 4.2	**Low-Emitting Materials:** Paints & Coatings	1
1				Credit 4.3	**Low-Emitting Materials:** Flooring Systems	1
1				Credit 4.4	**Low-Emitting Materials:** Composite Wood & Agrifiber Products	1
			1	Credit 4.5	**Low-Emitting Materials:** Furniture & Furnishings	1
			1	Credit 4.6	**Low-Emitting Materials:** Ceiling & Wall Systems	1
		1		Credit 5	**Indoor Chemical & Pollutant Source Control**	1
1				Credit 6.1	**Controllability of Systems:** Lighting	1
1				Credit 6.2	**Controllability of Systems:** Thermal Comfort	1
	1			Credit 7.1	**Thermal Comfort:** Design	1
			1	Credit 7.2	**Thermal Comfort:** Verification	1
		1	2	Credit 8.1	**Daylight & Views:** Daylight 75% of Spaces	3
			1	Credit 8.2	**Daylight & Views:** Views for 90% of Spaces	1
			1	Credit 9	**Enhanced Acoustical Performance**	1
			1	Credit 10	**Mold Prevention**	1

Innovation & Design Process — Possible Points 6

5		1				
Y	?Y	?N	N			
1				Credit 1.1	**Innovation in Design - Green Housekeeping**	1
1				Credit 1.2	**Innovation in Design - Low Mercury Lighting**	1
1				Credit 1.3	**Innovation in Design - Integrated Pest Management**	1
1				Credit 1.4	**Innovation in Design - EP for SSc5.2**	1
1				Credit 2	**LEED Accredited Professional**	1
		1		Credit 3	**The School as a Teaching Tool**	1

Regional Priority Credits — Possible Points 4

		2	2			
Y	?Y	?N	N			
		1		Credit 1.1	**Regional Priority - SSc4.1**	1
			1	Credit 1.2	**Regional Priority - SSc6.2**	1
		1		Credit 1.3	**Regional Priority - SSc5.1**	1
			1	Credit 1.4	**Regional Priority - EAc1, EAc2, WEc2**	1

Total — Possible Points 110

45	7	18	40

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110 points

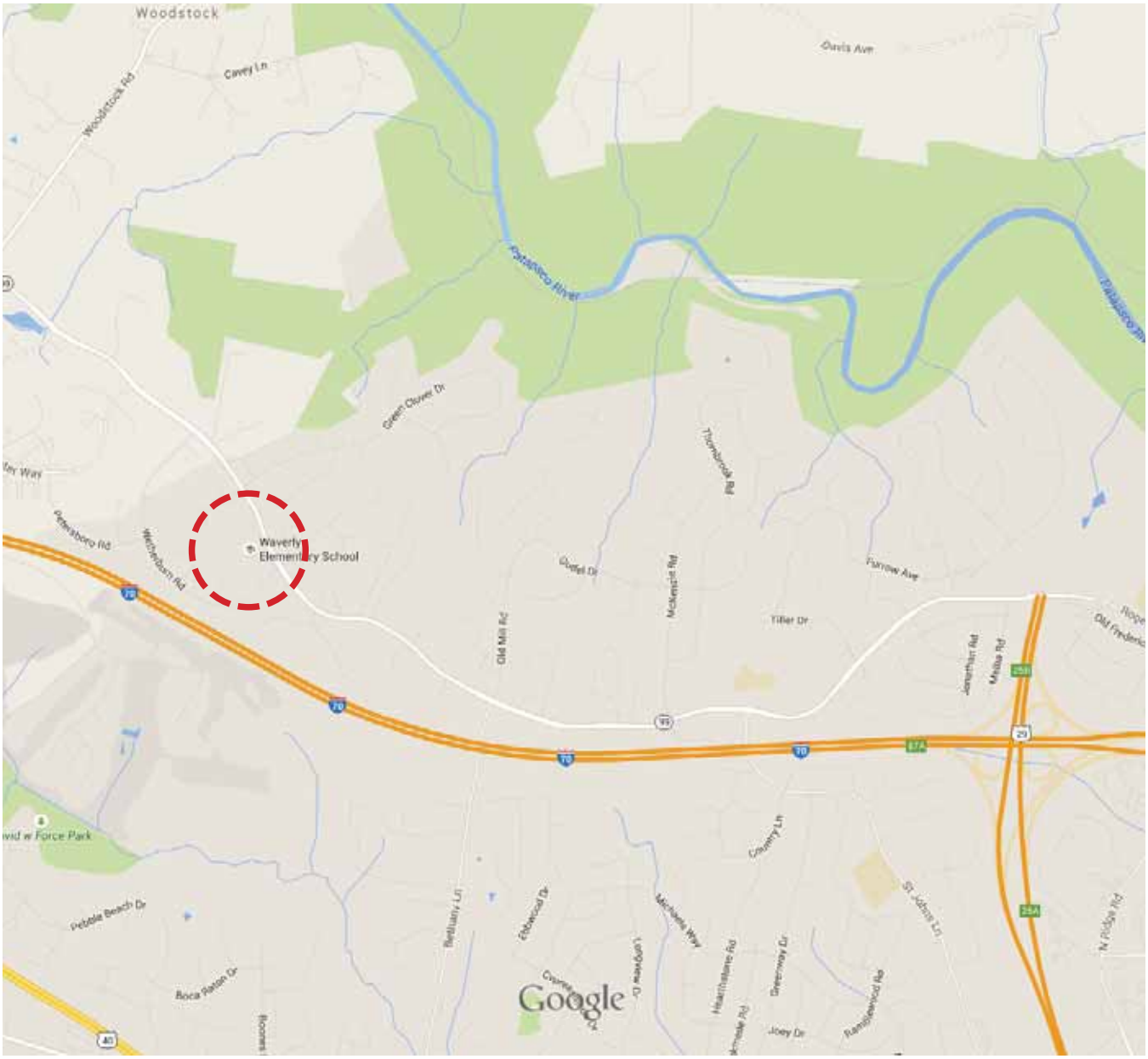
PROJECT FACTS

Existing Building:	81,545 SF
Existing Construction to be Demolished:	- 8,031 SF
Remaining Existing Building to be Renovated:	73,514 SF
New Additions:	43,060 SF
Total Building with Additions:	**116,574 SF**

PROJECT SCHEDULE

Planning Meetings Completed	JULY 21, 2015
Schematic Design anticipated submission to Board of Education & IAC	SEPTEMBER 3, 2015
Design Development anticipated submission to Board of Education	NOVEMBER 2015
Construction Documents anticipated submission to Board of Education	APRIL 2016
Project out for Bids	MAY 2016
Bids Received	JUNE 2016
Construction Start	SEPTEMBER 2016
Construction Complete	AUGUST 2018

VICINITY MAP



Map data ©2015 Google 1000 ft

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. Existing bus loop
2. Reconfigured drop-off lane
3. New administration and secure entry addition
4. New two-story classroom addition
5. Existing building to be renovated
6. Existing courtyard
7. Existing service area
8. Existing RECC and Pre-K play area with playground equipment
9. Existing hard play area, basketball courts
10. Existing play area with playground equipment
11. Existing multipurpose field
12. Relocated ball field
13. Building restriction line (side yard setback)
14. Property Line
15. Old Frederick Road / Route 99
16. Wetherburn Road
17. New fire lane


14
15
13
12
4
12
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10
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9
17
11

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.

- K-5 CLASSROOM
- ADMINISTRATION
- HEALTH
- GUIDANCE
- REGIONAL SPECIAL ED
- SPECIAL ED
- MEDIA
- MUSIC
- ART
- PHYSICAL EDUCATION
- CAFETORIUM
- CUSTODIAL
- UTILITY/TOILET
- CIRCULATION

EXISTING FLOOR PLAN

PROPOSED FLOOR PLANS

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

1. Two-story addition includes: six classrooms to replace modular classrooms, two classrooms to replace two of three portable classrooms, one new OT/PT room, new PE Activity room, and five new classrooms to accomodate existing program (note: rooms labled "ALS" are relocated from existing rooms that will be returned to use as classrooms).

2. Administration and secure entry addition. Includes front office, conference room, staff toilet, secure test preparation, work room, secure record storage, principal's office, two assistant principal offices, and Parent Teacher Organization office.

3. New health suite to meet current State standards.

4. Portion of existing mechanical room is incorporated into renovated music room.

5. Classrooms are enlarged and renovated to provide required general music rooms.

6. Media center is enclosed with new walls and doors to separate it from the corridor.

7. Existing computer and work rooms are reconfigured as standard classrooms.

8. Classrooms are reconfigured as new computer and technology rooms proximate to Media Center.

9. Existing administration and health suites reorganized to provide additional art classroom, work room, and offices.

10. Second floor of two-story addition includes four classrooms, satellite work room, toilets and building systems (elevator machine room and custodial closet).

11. Cafetorium expansion.

PROPOSED FIRST FLOOR PLAN

PROPOSED SECOND FLOOR PLAN

SPACE SUMMARY / PROGRAM ANALYSIS

The Space Summary / Program Analysis on the following pages enumerates spaces provided in the proposed Schematic Design building plans as required by the Ed Specs and the Guidelines Manual for Renovations and Modernizations of Existing Schools ("Renovation Guidelines").

Due to the nature of this project, space requirements were derived from a combination of the 2003 Ed Spec, the current 2010 Ed Spec, and the Renovation Guidelines. Generally, the number of spaces required have been defined by the 2003 Ed Spec that provides for a rated capacity of 788 students, whereas the size of individual spaces is defined by the 2010 Ed Spec 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			
	ROOM / SPACE DESCRIPTION	QTY	SIZE	TOTAL	
ADMINISTRATION					**3,022**
	SECRETARIAL/RECEPTION AREA	1	735	735	
	PRINCIPAL'S OFFICE W/CLOSET	1	203	203	
	PRINCIPAL'S PRIVATE LAVATORY	1	49	49	
	ASST. PRINCIPAL'S OFFICE W/CLOSET	2	149	298	
	SECURE TEST PREP W/CLOSET	1	149	149	
	CONFERENCE ROOMS	1	404	404	
	PARENT VOLUNTEER ROOM	1	145	145	
	WORK PREPARATION ROOM	1	360	360	
	SATELITE WORK ROOM	1	239	239	
	STAFF LOUNGE	1	391	391	
	TOILET ROOM	1	49	49	
ALTERNATIVE EDUCATION AREA					**0**
	CLASSROOM	-	-	0	
	OFFICE	-	-	0	
CAFETORIUM/KITCHEN					**6,749**
	STUDENT DINING	1	4,904	4,904	
	STAGE	1	623	623	
	CHAIR STORAGE	1	215	215	
	KITCHEN AND SERVING	1	602	602	
	DISHWASHING AREA	1	187	187	
	DRY STORAGE	1	61	61	
	LOCKER/LAVATORY	1	47	47	
	JANITOR'S CLOSET	-	-	0	
	CAN WASH	1	52	52	
	KITCHEN OFFICE	1	58	58	
CLASSROOMS K-5 and ELRs					**39,336**
	KINDERGARTEN CLASSROOMS	5	1,019	5,095	
	KINDERGARTEN LAVATORIES	5	50	250	
	KINDERGARTEN STORAGE	5	77	385	
	GRADES 1-2 CLASSROOMS	12	806	9,672	
	GRADES 1-2 LAVATORIES	INCLUDED IN CLASSROOM AREA ABOVE			
	GRADE 3-5	18	832	14,976	
	COMMONS	6	796	4,776	
	EXTENDED LEARNING ROOMS (ELR)	7	395	2,765	
	KINDERGARTEN STORAGE	5	77	385	
	GRADES 1-5 STORAGE	8	129	1,032	
	MATH AND READING STORAGE			0	
CUSTODIAL AREA					**574**
	CUSTODIAL STORAGE ROOM / CLOSETS	5	57	285	
	STORAGE ROOM W/OFFICE	1	189	189	
	VENTILATED STORAGE	1	100	100	
ESOL AREA					**721**
	PRIMARY EXTEDED LEARNING ROOM	1	364	364	
	INTERMEDIATE EXTEDED LEARNING ROOM	1	357	357	
GIFTED & TALENTED AREA					**1,936**
	G/T RESOURCE ROOM	2	797	1,594	
	STORAGE	1	190	190	
	G/T OFFICE	1	152	152	
GUIDANCE AREA					**140**
	GUIDANCE OFFICE	1	140	140	
HEALTH					**741**
	WAITING ROOM	1	107	107	
	TREATMENT/MEDICATION	1	153	153	
	REST AREA	1	229	229	
	OFFICE/CONSULT/EXAM	1	97	97	
	EXAMINATION/ISOLATION	-	-	0	
	TOILET ROOM SHOWER & CHANGING TABLE	1	103	103	
	STORAGE	1	52	52	

FACILITY		SCHEMATIC DESIGN			
	ROOM / SPACE DESCRIPTION	QTY	SIZE	TOTAL	
LIBRARY MEDIA CENTER					**5,232**
	MAIN READING ROOM	1	2,904	2,904	
	TECHNOLOGY RESOURCE ROOM	1	806	806	
	COMPUTER ROOM	1	881	881	
	OFFICE/WORK SPACE	1	120	120	
	MEDIA PRODUCTION/VIDEO AREA	-	-	0	
	MEDIA STORAGE	1	335	335	
	TELECOMMUNICATION/EQUIPMENT ROOM	1	186	186	
MINI-AUDITORIUM					**0**
	MINI-AUDITORIUM	-	-	0	
MUSIC SUITE					**3,780**
	GENERAL MUSIC ROOM	2	1,092	2,184	
	ENSEMBLE ROOM	2	615	1,230	
	STORAGE	2	183	366	
PHYSICAL EDUCATION / GYMNASIUM					**6,181**
	GYMNASIUM	1	3,250	3,250	
	PE ACTIVITY ROOM*	1	2,370	2,370	
	STORAGE	3	153	459	
	OFFICE	1	102	102	
	OUTDOOR ACCESS BATHROOMS	-	-	0	
PSYCHOLOGICAL SERVICES AREA					**151**
	PSYCHOLOGICAL SERVICES	1	151	151	
READING RESOURCE AREA					**447**
	READING RECOVERY (SPECIALIST)	1	447	447	
	STORAGE	INCLUDED IN ABOVE			
SPECIAL EDUCATION AREA (K-5)					**2,584**
	CLASSROOM	-	-	0	
	STUDENT LAVATORY	-	-	0	
	EXTENDED LEARNING ROOMS (ELR)	SEE PLANNING AREAS BELOW			
	PLANNING AREAS	6	202	1,212	
	EPL CLASSROOM (W/LAVATORY)	1	748	748	
	IEP CONFERENCE ROOM	1	462	462	
	IEP TOILET	1	59	59	
	SPECIAL EDUCATION STORAGE	1	103	103	
SPECIAL EDUCATION - REGIONAL EARLY CHILDHOOD CENTER					**7,200**
	PRESCHOOL/PK CLASSROOMS	2	882	1,764	
	PRESCHOOL/PK LAVATORIES	2	56	112	
	STORAGE	1	103	103	
	MINC CLASSROOMS	3	700	2,100	
	MINC LAVATORIES	3	100	300	
	OT/PT LARGE THERAPY ROOM	1	739	739	
	OT/PT SMALL THERAPY ROOM/STORAGE	1	414	414	
	OT/PT STORAGE ROOM	1	62	62	
	ALS CLASSROOM	2	672	1,344	
	ALS OFFICE	1	126	126	
	ALS TOILETS	2	68	136	
SPEECH/LANGUAGE THERAPY					**156**
	SPEECH THERAPY	1	156	156	
OT/PT					**0**
	OT/PT	INCLUDED IN RECC			
	STORAGE ROOM (INCLUDED IN RECC)	INCLUDED IN RECC			
VISUAL ART AREA					**2,514**
	STUDIO	2	1,163	2,326	
	KILN/STORAGE	2	94	188	
TOTAL NET EDUCATIONAL AREA					**81,464**
OVERALL GROSS BUILDING AREA					**116,574**
EFFICIENCY FACTOR					**70%**

*** PE ACTIVITY ROOM IS PROPOSED FOR ADDITIONAL PROGRAM SPACE REQUIRED FOR INCREASED STUDENT CAPACITY AND MULTIPLE CONCURRENT PE CLASSES**

PROJECT COST ESTIMATE

CONSTRUCTION COSTS:	
Phasing & Temporary Facilities:	Included Below
Site Work:	$ 840,916.00
Additions:	$ 11,896,589.00
Renovation:	$ 13,257,041.00
TOTAL:	$ 25,994,546.00

NOTES:

- The construction cost estimate was prepared by the construction manager, HESS Construction Inc., and assumes bids will be received in June 2016.
- Estimate includes a schematic design phase cost estimate contingency of ten percent.
- Estimate does not include a project contingency.
- Estimate includes wage rate pricing.
- The following additional options are being considered for this project and will be investigated further:
  - Expansion of the southwest parking lot
  - Reconfiguring site access to improve circulation and safety
  - Reconfigure parallel parking along bus loop to increase parking capacity
  - Expansion of staff lounge into existing courtyard