III. George Mason Master Plan and Technical Data

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Introduction

George Mason Elementary School

George Mason was built in 1939 on a generous 9 acre lot, and since then has undergone 5 previous phases of work, which has resulted in a fragmented construction of additions used to address immediate challenges.

Critical Findings

Given the projected student capacity, the current site would exhibit a strain on on-site access for parking and drop-off, the playground space will over-utilized due to an increase in student population, and less open green space would be available. George Mason is situated in a residential context with a historic fabric that requires careful attention to site access without disrupting the character of the neighborhood. In both masterplan scenario studies, the historic frontage would be maintained and clear site access has been established on Cameron Mills Road. The master plan study provides possible scenarios in either relocating the school to the east end of the site and maintaining the historic frontage as a community building. The recreational and open green space would be shared between the community and the school. This scenarios would not require swing space or co-location. The other master plan study explores the possible scenarios of replacing the school in place and maintaining the historic frontage for the community.

The Limits and Benefits of a Feasibility Study

Although a TSSA and a Masterplan Study provide a plethora of information with respect to cost, time, and quantity, the TSSA and Masterplan do not offer, nor does it try to offer, a level of specificity that can be used as a solution or design. The benefits of a TSSA and Feasibility Study can be found both in its objective assessment of current conditions, and conceptual rigor of conveying the possible approaches to current challenges.

Issues that Require Future Study

The George Mason Park and street access entry are critical in understanding the limits and possibilities of future growth, whether it is an addition or replacement and reorientation of the school. Currently, George Mason park is limiting the school's expansion to the east, although the park is within the parcel of the school. The current site access will be critical if the student capacity grows. The school is located in a dense residential neighborhood, and an increase in vehicular movement within the neighborhood may cause unintentional disruption to the neighborhood. If George Mason experiences a substantial growth of student capacity, the current site configuration will experience severe limitations with accommodating a new addition while maintaining public open space and easing site access.

Educational Specifications

Capacity and Program

George Mason is currently **60,875 gross square feet.** Per the Ed Specs, the school is **39,940 square feet deficient** in gross building area and **49,600 square feet deficient** in the outdoor play space area. George Mason's **projected** capacity is **670 students**, with a current enrollment of 420 students based on Sept 30, 2019 enrollment data.

Site Plan

1. Insufficient area for required growth. Multiple additions built at different phases. All building systems need to be replaced.
2. No drop-off for cars and Buses, limited on-site parking.
3. Insufficient area for loading; limited turn-around space. 28 existing parking spaces.
4. Limited exterior play space bound by George Mason Park.

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Site Assessments

Zoning and Site Utilization

George Mason Elementary school is located on 2601 Cameron Mills Rd in an R8 (Single Family) zoning district. The current lot is 407,290 square feet and the school currently shares the lot with George Mason Park which houses outdoor recreation activities.

Map and Zoning Information

Address	2601 Cameron Mills Road
Tax Map	23.04
Zoning	R8
Lot Size	407,290
Current SF	50,935
FAR	0.35
Allowed SF	142,552
Setbacks	Front- 30'
	Side- 25', 1:1 ratio
	Rear- 25', 1:1 ratio
Max Height	40'
Parking	~27 reqd, ~28 exst

Site Access and Circulation

Table 10 provides a summary of the existing and future demands for George Mason. The planned increase in student population will increase the number of buses serving the site, parking demand, and the maximum dismissal queue length. This assumes that each category of demand will increase linearly by approximately 48% to 59%, due to the 48% to 59% increase in student population. It is important to note that the existing parking supply includes the reserved spaces in the adjacent church parking lot and is currently supplemented by on-street parking on adjacent streets. If the staff population grows, the projected parking supply will still require a supplemental parking supply to accommodate the demand. If the adjacent church parking lot becomes unavailable in the future and parking on the school site does not increase, overflow onto the streets will increase, which will cause further disruption to the neighborhood.

Table 10
George Mason

	Population/Demand	
	Existing	Future
Students	420 students	650-700 students
Buses Serving Demand	3 buses	4-5 buses
Parking Demand	77 spaces	114-123 spaces
Max Dismissal Queue	6 vehicles	9-10 vehicles

Play and Open Space

In addition to the state requirements, Alexandria's new Green Building Policy requires that the existing and future stormwater demands for Cora Kelly and George Mason are 100% treated by green infrastructure practices.

To achieve 100% treatment of stormwater and meet BMP requirements, it is recommended to divide the site into multiple drainage areas. A combination of rain gardens, stone base, and under basins below permeable turf fields, over 50% green roof, and permeable parking spaces would achieve a phosphorous removal over the required 2.81 lb/yr.

All play areas should be protected from vehicular and pedestrian traffic, so students can be assured of a safe and secure environment on the entire school site. The Virginia Department of Education Facilities Guidelines recommends that each school "site have areas that can be developed to provide the minimum number of play areas require for physical education" as indicated by the chart on **Table 11.**

Alexandria school sites are urban in nature and most current and future sites cannot accommodate the recommendations outlined in the Guidelines for School Facilities in Virginia's Public Schools. However, every elementary school site should accommodate non-structured or natural play-areas as well as at least one playground. It is recommended that architects work with ACPS and RPCA to prioritize types of outdoor space development on a site-specific basis.

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Due to the configuration and siting of George Mason and the abrupt adjacency to George Mason Park to the East, play space is heavily deficient. George Mason averages around 34,000 Sf of play area making it **49,600 sf deficient.**

Table 11
Playspace Size and Quantity

SPACE	QUANTITY
Multiuse (Hard Surface)*	(2) 100' x 120'
Fitness Development Fenced Equipment Area (PK-1)	(1) 100' x 120'
Fitness Development Fenced Equipment Area (2-5)	(1) 100' x 120'
Multiuse Field Play Area	(2) 180' x 140'

*A gymnasium may substitute for one multiuse (hard surface) play area
**Ed Specs are for a school population of 600+

Building Assessment

Safety and Security

ACPS maintains an inviting and de-institutionalized environment, while simultaneously providing a safe environment for students, staff, and community who use the facility and adjacent support services. Studio 27 Architecture evaluated the safety and security of each school in 6 categories: Building Layout, Building Materials, Uses of Technology, Visitor Management, Vehicular and Pedestrian Traffic, and Other Site Concerns.

The categories of largest concern for George Mason Elementary are Building Layout, Building Materials, Visitor Management, and Vehicular and Pedestrian Traffic. Interior circulation paths have many blind spots. Staff spaces are isolated to the front entrance and do not have views of major circulation paths. Interior finishes were adequate when installed but are now in poor condition. While the school has a very small entrance vestibule, there is no security desk and sightlines are very restricted from the entrance lobby. Bus and car drop off should occur in individual designated lanes separate from public roads and pedestrian traffic should not cross these lanes if possible.

Envelope

Cora Kelly and George Mason Elementary schools are housed in aging facilities and will require a substantial renovation or upgrade to meet LEED and Net Zero standards. Studio 27 Architecture interviewed school leaders and visited both schools to assess the current conditions of the building envelopes and evaluate the impact of the observed envelope issues.

The George Mason envelope is in poor condition. The two areas of largest concern are the windows and roof. School leaders reported concerns about the condition of the windows. Windows have been replaced in different areas of the building at different times, and there are unique issues related to each type. Older wood windows are water damaged and have non-thermal single pane glass. The newer replacement windows are very poor quality, leak, and do not lock. School leaders also reported that the roof leaks often, and S27 observed that there is visible ponding at drain locations. Other issues to note are visible cracks in the masonry, exterior entrances are in poor condition with visible rust and flaking paint, as well as large undercuts that allow an unwanted thermal transfer. Floor slab and exterior settlement cracking can be seen from the interior of the building at the main entrance and in classrooms. Like Cora Kelly, George Mason also has a very high form factor, which has a negative impact on building energy efficiency and use

Accessibility

ACPS has made it a strong priority to make its facilities accessible to all students and staff. Universal Design is one of ACPS's 10 driving design principles, established in the 2015 Educational Specifications. Universal Design is the design of buildings and environments to make them accessible to all people, regardless of age, disability, or other factors.

Since 2012, accessibility in schools has been the law. Title II of the Americans with Disabilities Act prohibits disability discrimination by all public entities, including schools, at the local and state level.

George Mason has similar accessibility deficiencies. Water fountains, classroom sinks, and bathroom facilities are not up to current standards. The majority of entrances do not have ramps and most exterior stair railings are not ADA or code compliant. Most play areas are not connected to accessible paths, and no accessible play equipment was observed.

Existing Envelope Condition

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Technical Information

Traffic Study

This memorandum presents the findings of an operational review of the existing George Mason Elementary School located at 2601 Cameron Mills Road in Alexandria, Virginia. The purpose of this memorandum is to review site circulation, student arrival and dismissal, and parking at this location to help plan for future improvements.

At the time when Gorove/Slade our certified traffic engineering firm observed conditions at the existing location, George Mason ES served a total of 440 students. The site includes a 23-space surface parking lot with an additional 10 spaces reserved for school-use in the church parking lot adjacent to the site. The school is planned to increase its student population to include approximately 650 to 700 students in the future. Potential changes to arrival/dismissal operations and parking on the site are currently being evaluated. Figure 1 provides a map showing an overview of the George Mason ES site.

This memorandum reaches the following conclusions:

- Based on observations, the existing George Mason ES does not have any significant parking or queuing issues during arrival and dismissal. This is mainly because most of these activities being dispersed around the site and heavy use of the adjacent church parking lot for pick-up/drop-off activities.
- Parent/guardian pick-up/drop-off activity primarily occurs outside of the designated pick-up/drop-off area on Cameron Mills Road. The majority of pick-up/drop-off activity occurs in the church parking lot adjacent to the site. Several other locations are used, including Virginia Avenue and Taylor Avenue. No significant queuing issues were observed on the adjacent streets due to this

Site Operations

Regular school hours for George Mason ES are from 7:50 AM to 2:35 PM. Gorove/Slade performed arrival/dismissal site observations on Tuesday, November 12, 2019, from 7:15 AM to 8:15 AM and on Tuesday, November 19, 2019, from 2:15 PM to 3:15 PM. Based on these observations, the arrival and dismissal operations are summarized in Figure 2 and Figure 3.

Arrival Operations

Bus

There are three (3) buses that serve the school and the existing bus area can accommodate the demand with no queuing issues during arrival. Buses drop-off students in the designated bus in front of the school along Cameron Mills Road. Bus arrivals begin at approximately 7:25 AM. The second and third buses arrive in 5- to 10-minute intervals after the first, dropping-off students in the same location. Parents/guardians that arrive after all buses have departed use the bus area to drop-off their student(s) closest to the front door of the school.

Parent/Guardian Drop-off

Parent/guardian drop-off operations occur between 7:20 AM and 7:50 AM. The designated area for parent/guardian drop-off is located along Cameron Mills Road behind the bus loading/unloading area. No queues were observed in the designated drop-off area on Cameron Mills Road, most likely because (1) drop-off does not operate as first-in/first-out, so vehicles can use any available curb space and depart as soon as they drop-off independent of other vehicles and (2) the primary location for drop-offs is in the church parking lot. The church parking lot is accessible from Monticello Boulevard. Students are dropped off in the lot and enter the school property through the playground between the parking lot and the school building. Once students exit each vehicle, the vehicle departs the parking lot onto Monticello Boulevard, as shown in Figure 2. Additional drop-off activity occurs curbside along Virginia Avenue and Taylor Avenue. Overall, arrival operations are effective with no significant queuing issues.

Student Bike/Walk

In addition to bus and parent/guardian drop-off, there are several students that bike and walk to George Mason ES. Starting from 7:20 AM, crossing guards are stationed on Cameron Mills Road at the intersections of Monticello Boulevard and Virginia Avenue to assist with students that are crossing. Students begin arriving at approximately 7:30 AM. The heaviest period for walk-in students is between 7:40 AM and 7:50 AM. Most students arrive via Summit Avenue from the east, Monticello Boulevard from the west, and Cameron Mills Road from the north and south, and enter the school through the front entrance on Cameron Mills Road. Students also utilize the walking path behind the school between Westminster Place and George Mason Place.

Dismissal Operations

Bus

Three (3) buses queue in the bus loading area on Cameron Mills Road by approximately 2:20 PM to wait for student dismissal at 2:35 PM. Once dismissed, students exit the school from the front entrance and load onto their respective buses. Parents/guardians that arrive after all buses have departed use the bus area to pick-up their student(s) closest to the front door of the school.

Parent/Guardian Pick-up

Parent/guardian drop-off operations occur between 2:25 PM and 3:10 PM. The

designated area for parent/guardian drop-off is located along Cameron Mills Road behind the bus loading/unloading area. Because vehicles arrive before students are dismissed at 2:35 PM, a queue builds in the designated area. The maximum peak queue length during the dismissal period was observed to consist of six (6) vehicles. This queue did not extend past Virginia Avenue thus the queue minimally impacts non-school traffic.

Similar to arrival, heavy pick-up activity occurs in the adjacent church parking lot. Vehicles enter and exit on Monticello Boulevard. Pick-up activity also occurs in several other curbside locations, particularly along Virginia Avenue, Taylor Avenue, Summit Avenue, and Clay Street through the pedestrian path behind the school. Overall, dismissal operations are effective with no significant queuing issues.

Student Bike/Walk

Similar to arrival, there are a number of students that bike and walk from George Mason ES. It was observed that fewer students bike/walk at dismissal than arrival. A crossing guard is stationed at the intersection of Cameron Mills Road and Monticello Boulevard to assist with students that are crossing. Students exit the school through the front entrance on Cameron Mills Road that they enter through in the morning. Most students exit to the north along Cameron Mills Road, east along Monticello Boulevard, and west on Summit Avenue.

Parking

George Mason ES provides a total of 33 parking spaces. There is a 23-space surface parking lot located on the site behind the school building. An additional 10 spaces of off-street staff-only parking is provided in the church parking lot adjacent to the school. On-street parking on the adjacent streets serves as overflow parking for school staff.

The 23 spaces located behind the school building are typically occupied first. These spaces are mostly full by approximately 7:15 AM before students arrive. Once these spaces are full, staff rely on the 10 spaces in the church parking lot and the adjacent streets. It was observed that school staff currently utilize more than the designated 10 spaces in the parking lot, approximately 20 spaces. These staff parking locations remain mostly full throughout the day and during the dismissal period. Based on observations, around 30-35 staff park on-street near the school, mainly on Virginia Avenue and Taylor Avenue.

Expected Future Demand

The planned increase in student population will increase the number of buses serving the site, parking demand, and the maximum dismissal queue length. This memorandum assumes that each category of demand will increase linearly by approximately 48% to 59%, due to the 48% to 59% increase in student population. The future demands projections are based on linear growth and maybe lower, either through having fewer than the planned number of students or through additional Transportation Demand Management (TDM) programs and policies. Thus, they represent the worst-case projections of demand. It is important to note that the existing parking supply includes the reserved spaces in the adjacent church parking lot and is currently supplemented by on-street parking on adjacent streets. If the staff population grows, the projected parking supply will still require a supplemental parking supply to accommodate the demand.

- Buses Serving Demand

  The increased bus demand can be accommodated within the existing bus area on Cameron Mills Road. If a formal, on-site bus facility is added in the future, it should be able to accommodate up to five (5) buses.

- Parking Supply and Demand

  The increased parking demand cannot be accommodated within the existing 33-space parking supply on-site and in the adjacent church parking lot. If additional parking cannot be added on-site, there will be increased overflow onto the nearby streets. The existing parking supply is dependent on the availability of the adjacent church parking lot. Considerations should be as to how the site will accommodate the parking demand should this lot become unavailable.

- Maximum Dismissal Queue

  The increased bus demand can be accommodated within the existing designated pick-up/drop-off area on Cameron Mills Road. Most arrival/dismissal activity occurs in the adjacent church parking lot. If that is expected to be the long-term plan, considerations should be made as to how the site is accessed from the direction. If a formal, on-site pick-up/drop-off facility is added in the future, it should be able to accommodate up to 10 vehicles (assuming the Church lot is also used in conjunction).

Table 1
Summary of Demand

	Population/Demand	
	Existing	Future
Students	420 students	650-700 students
Buses Serving Demand	3 buses	4-5 buses
Parking Demand	77 spaces	114-123 spaces
Max Dismissal Queue	6 vehicles	9-10 vehicles

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Conclusions

The goal of arrival/dismissal operations is to minimize impacts the site may have on the surrounding areas. This memorandum concludes that the arrival and dismissal operations observed and outlined above are adequate for the needs on the site and can be conducted efficiently and effectively with minimal impacts on nearby streets. The planned increase in student population and potential site improvements present opportunities to better meet the demands of the site. Based on the projections outlined above, this memorandum recommends providing a bus loading/unloading area that can accommodate up to five (5) buses, up to 123 parking spaces, and up to 10 queued pick-up vehicles during dismissal to meet the anticipated demand. Several changes can be made to better accommodate these projected demands, specifically adjustments to; (1) the size and location of the bus area, (2) the amount of available parking, and (3) the size and location of the designated pick-up/drop-off area.

The projected five (5) bus demand can be accommodated in the existing curbside area, but a more formal or relocated area may be desired. The 123-parking space recommendation is based on anticipated growth in staff. The anticipated parking supply assumes that a supplemental parking supply will continue to be utilized, the adjacent church parking lot and nearby on-street parking in this case. If the adjacent church parking lot becomes unavailable in the future and parking on the school site does not increase, overflow onto the streets will increase. The existing designated parent/guardian pick-up/drop-off location on Cameron Mills Road is underutilized as the adjacent church parking lot is the preferred scenario. Potential site improvements present the opportunity to create a designated pick-up/drop-off area that will better meet the demands of the site. If a formal, on-site pick-up/drop-off facility is added in the future, it should be able to accommodate up to 10 vehicles (assuming the Church lot is also available, if the Church lot is not available a larger facility would be necessary).

Figure 5
Existing Site Overview

December 12, 2019

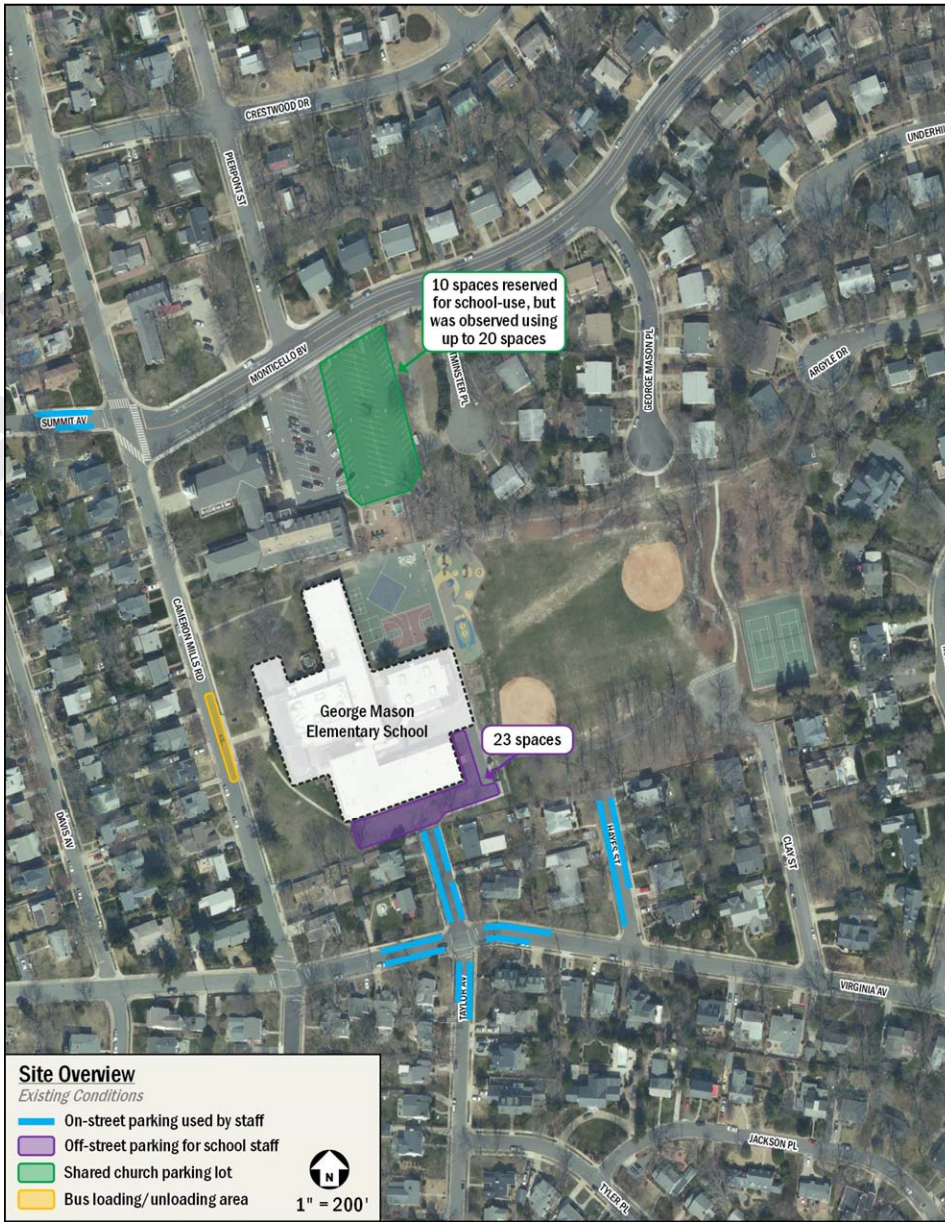

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Figure 6
Existing Drop-off Procedure Driving Arrival

December 12, 2019

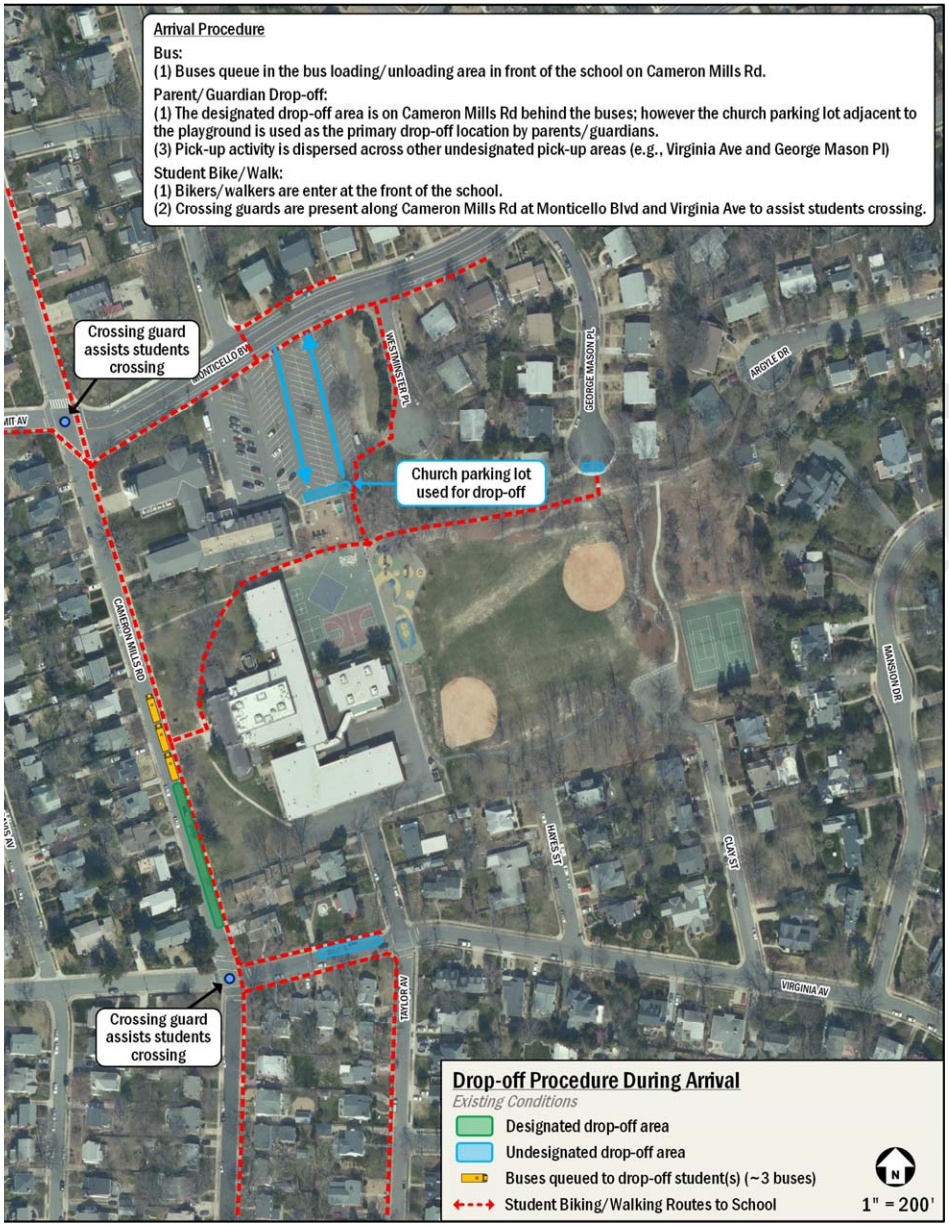
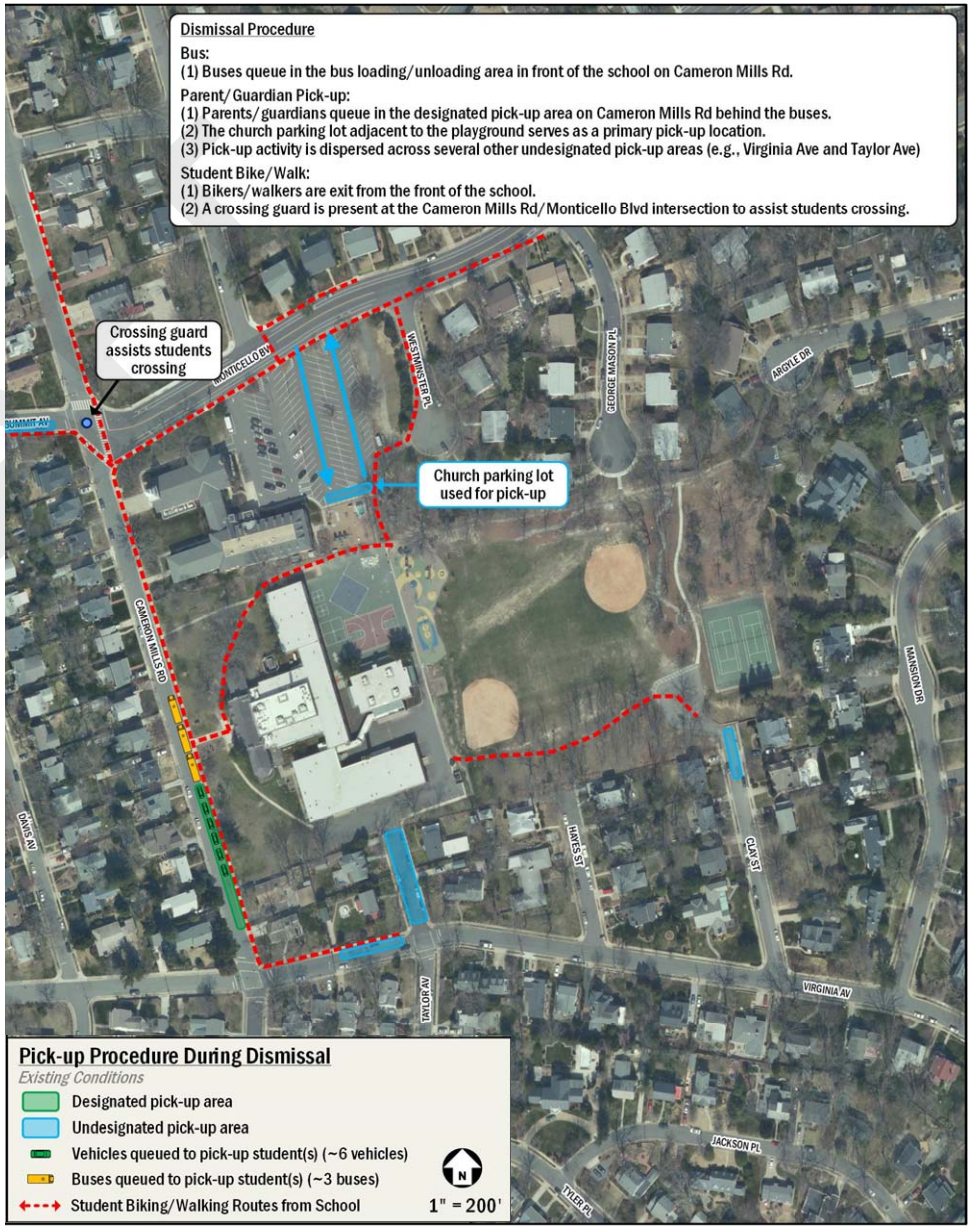


Figure 7
Existing Pick-up Procedure During Dismissal

December 12, 2019



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Technical Information

Building Assessment Data

Structural Assessment

The existing school was constructed in 1939 with numerous additions in the years since. A classroom wing was built on the south-east end of the building in 1949 and a second level was added above the central portion of the original building. In 1961 a multipurpose room was built to the east of the original building. In 2014, the space between the multi-purpose room and the 1949 classroom wing was filled with additional classrooms and the cafeteria was expanded on the west side. Apart from the second story addition, the remainder of the building is one story. Two mechanical and electrical rooms are constructed below grade, one in the original building, and one in the 1949 addition.

Existing Structural Systems

The roof systems are typically open web steel joists with bulb tee purlins supporting gypsum sheathing. Often with this type of construction, a shallow layer of gypsum is poured on top of the sheathing, but this could not be verified as it was hidden by the roofing. The typical roof is flat or slightly sloped for drainage. There is a gabled roof over the west entrance and the kindergarten classrooms that were part of the original building. The cafeteria expansion also features a gabled roof; that likely is framed with prefabricated trusses. Access to the attic spaces of the gable roofs to verify the structural framing was not possible. Mechanical units are supported with steel dunnage or curbs above the roof structure. A steel-framed roof-mounted screen wall shields the mechanical equipment zone on the 2014 classroom addition.

The 2014 classroom addition was built using modular construction. Each classroom is formed with two prefabricated units that were manufactured off-site. The roofs of these modular units are framed with cold-formed steel channels with steel deck. The ground floors are typically concrete grade slabs. The building is likely supported on shallow spread footings which are commonly used for buildings of this type. Typically, the vertical support for the floors and roof are load-bearing masonry walls. The load-bearing walls are a mixture of multi-wythe brick and concrete masonry blocks. The modular classroom units have cold-formed steel stud bearing walls. The basement walls for the mechanical and electrical rooms are a combination of multi-wythe brick and concrete block masonry.

Existing Conditions Assessment

A site visit was performed on August 27th, 2019 by Lee Ressler, PE. Generally, the existing buildings are in good structural condition, with no significant deteriorations or deficiencies observed. The existing roof membrane appeared to have been replaced within the last fifteen years, although we understand that it leaks in numerous locations. Many loose roofing screws were observed scattered on the low slope roof surfaces, and in a few instances, sticking through the membrane. From conversations with the building staff, we understand that these screws are leftover from the roof being tarped in anticipation of heavy rains that were expected from a hurricane.

Around the exterior perimeter of the original building, there are a few cracks observed in the brick masonry. Many of these cracks were around openings and appeared to be related to thermal movement, restraint cracking, rust jacking of the lintels, and minor settlement of the building. (see photos #7 thru #10). In select locations, cracked mortar joints have been routed and repointed (see photos #7 and #8).

Several roof drains were observed clogged or filled with debris. This problem typically occurred where trees were in close proximity to the roof structure (see photos #11 and #12).

At one of the stairs down to the below-grade mechanical rooms, the structural steel supporting the roof of the stairwell was badly rusted. This is likely caused by water intrusion, and being in direct contact with masonry basement walls (see photo #13).

Summary

Generally, the structure of the building is in good working condition with only minor deficiencies observed. The gypsum roof system used in the original building construction is susceptible to degradation if exposed to water. The roof leaks described by the building staff are likely related to holes in the membrane caused by tarping the roof. Water damage to the roof was not observed in the survey, but it seems probable that some damage has occurred and is hidden from view. To identify and locate any damage, the roofing would need to be removed and the gypsum deck inspected. The exterior masonry walls of the building have age-related deterioration. This deterioration will continue to progress and require periodic maintenance.

Limitations

The services provided were limited to visual observation of the condition of the building structure. No physical testing was performed and no analysis or calculations have been performed to determine the adequacy of the structural systems. Portions of the buildings and building systems were below grade or finished with materials which made them inaccessible and unobservable. In these areas, latent problems may exist which could not be identified. This report has been prepared solely and exclusively for the client to assist in the evaluation and rehabilitation of this project. It is not intended for use by others or for other than the stated purpose. The conditions reported are as visually observed on the denoted timeframes. We reserve the right to amend this report in the future, if and when previously unknown or unseen conditions are discovered or additional information becomes available.

Ehlert Bryan has strived to perform the services in a manner consistent with that level of care and skill ordinarily exercised by members of the architectural/engineering profession currently practicing in the same locality under similar conditions. No other

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representation, express or implied, and no warranty or guarantee is included or intended in this report.

MEP Narrative

Current Code and Standard Compliance:

2015 Virginia Statewide Building Code (VUSBC)

2015 International Building Code (IBC) with Virginia Amendments

2015 International Mechanical Code (IMC) with Virginia Amendments

2015 International Plumbing Code (IPC) with Virginia Amendments

2015 Virginia Statewide Fire Prevention Code
NFPA 90A

2014 National Electric Code / NFPA 70

2015 International Fuel Gas Code (IFGC) with Virginia Amendments

2015 International Energy Conservation Code (IECC) (or ASHRAE equivalent)

ASHRAE 90.1-2010

ASHRAE 55-2013

2005 SMACNA HVAC Duct Construction Standards - Metal and Flexible

Existing Facility Mechanical

Overview

George Mason Elementary School was built in 1939. The building had two major renovations, in 1949 and 1977. Other building renovations took place in 1988, 1997, and 2005. In 2014 the school had an expansion which included an enlarged cafeteria, and four new classrooms.
The majority of the existing building is served by floor-mounted fan coil units, rooftop-mounted VAV air handling units that were manufactured in 2013, DX split systems as well as VRF systems in the newer addition. RTUs are gas-fired and DX cooled. In a replacement scenario, it is not recommended to repurpose any of these units.

Fan coil units are in poor condition. They are no longer being controlled with thermostats and are extremely noisy. It is recommended that these units be replaced.

The rooftop units are in fair condition and have 5-10 years of remaining expected useful life.

DX split system was observed to be inoperable. It was noted by the building staff that the unit was not connected and is inoperable. It is recommended that this unit be investigated and repaired/replaced.

The VRF system in the new addition was in good condition. These systems have an additional expected useful of 10-12 years.

Hydronic piping is noted that is experiencing leaks and throughout the system. It is recommended that the existing building piping be replaced.

Heating hot water for the fan coil units is produced via (2) Fulton Gas Fired pulse combustion boilers. The boilers appear to be approximately 15 years old. Expect to replace in the next 3-5 years.

Chilled water for the fan coil units is produced by a Carrier air-cooled chiller. The chiller appears to be new and in good condition.

Heating hot water and chilled water is distributed throughout the facility by centralized pumps with variable frequency drives. The pumps appear to be in fair condition.

Building air is exhausted with roof-mounted exhaust ventilators. The ventilators are in fair condition.

All existing units, associated ductwork, controls, and air devices in areas to be renovated shall be removed. Existing terminal equipment, such as unit heaters, VAVs, etc. shall be removed. It is not anticipated that any existing mechanical infrastructure in renovated areas will be utilized for future use.

Demolition of existing equipment shall be performed in a phased manner as required by overall project phasing.

Photo #7
Typical Brick Deterioration & Repairs

Photo #8
Typical Brick Deterioration & Repairs

Photo #9, #10
Typical Brick Crack & Deterioration

Photo #11
Clogged Roof Drain

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Scope of Work

New Facility Mechanical

If it is determined that the existing building will be demolished or be required to have a major renovation, see the following recommendations for new system design.

Replacement Design Conditions

The design criteria listed below shall be used for conceptual HVAC design, payback evaluation, and heating/cooling load calculations.

Site Data:

Building Location: Alexandria, VA
Physical Address: 3600 Commonwealth Ave
Square Footage of Renovated Area: See Architectural sq. ft.
Main Building Total Area: See Architectural sq. ft.
Latitude: 38.82 / Longitude: -77.07, Elevation: 60 feet
Building Orientation: Main entrance faces East/Southeast
ASHRAE 90.1 Climate Zone: 4A

Outdoor Design Conditions

Based on ASHRAE 2017 Handbook - Fundamentals for Ronald Reagan Washington Natl, VA, USA

Heating - ASHRAE 99.6% Peak Design Condition: 17.9 deg F DB

Cooling - ASHRAE 0.4% Peak Design Condition: 94.7 deg F DB / 75.5 deg F MCWB

Indoor Design Conditions

Equipment shall be sized and designed to maintain the following setpoints within a 2-degree deadband. The maximum class size is assumed to be 24 students and one teacher.

Classrooms / Support Spaces:

Heating Season:	Occupied Mode:	70 deg F DB / no humidity control
	Vacant Mode:	68 deg F DB
	Unoccupied Mode:	60 deg F DB
Cooling Season:	Occupied Mode:	75 deg F DB / 40-60% RH
	Vacant Mode:	78 deg F DB
	Unoccupied Mode:	85 deg F DB

Toilet Rooms / Group Restrooms: Ventilated/Exhausted

Cafeteria:

Heating Season:	Occupied Mode:	70 deg F DB / no humidity control
	Vacant Mode:	68 deg F DB
	Unoccupied Mode:	60 deg F DB
Cooling Season:	Occupied Mode:	78 deg F DB / 40-60% RH
	Vacant Mode:	82 deg F DB
	Unoccupied Mode:	85 deg F DB

Building Occupancy & Schedule

The facility is anticipated to be occupied Monday through Friday, 7 am-5 pm and Saturday/Sunday based on a special event scheduling only. The building will not be utilized year-round. The administration area (out of scope) is the only area that was stated to have year-round occupancy. Detailed occupancy and loading schedules shall be provided as part of future space by space analysis.

System Options

System modeling and selection will be determined during the design phase. For budgeting purposes, two probable system options are as follows:

Option 1 - Geothermal Heat Pumps with DOAS

This option has been explored by CMTA due to energy performance and overall system simplicity as it relates to controls and operation. The HVAC system for this option consists of unitary geothermal heat pumps for zone thermal comfort control and dedicated outdoor air handling units (DOAS) with fixed-plate energy recovery for delivery of code required outside air. The ventilation (outside) air is de-coupled from the HVAC heating and cooling with each space (or zone) receiving outside air separately utilizing demand control ventilation.

Photo #12
Clogged Roof Drain

Photo #13
Rusted Steel Roof Over Mechanical Room Stair

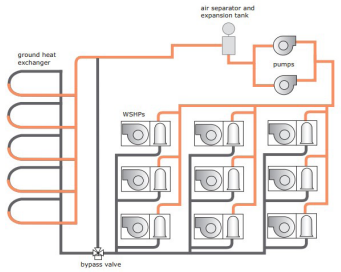

Figure 3
Ground Loop Heat Pumps

Figure 4
Water Source Heat Pump

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Each heat pump will be a high efficiency, variable speed compressor heat pump unit (below 5 tons) with an ECM fan motor. Units can be horizontally hung and installed in the plenum space above the ceiling or floor mounted in closets outside of the classroom. Each heat pump unit will utilize refrigerant R-410A and will have an ozone-depleting potential (ODP) of 0.05 or less.

Each classroom zone is anticipated to have its heat pump and space temperature sensor, one per room or shared (1 per two adjacent classrooms – TBD). The unit will operate by maintaining the temperature of the space based on the adjustable space temperature setpoint. Each space temperature sensor shall have a push-button override for a 2-hour (adjustable) override to the occupied mode of operation.

Each office and corridor zone is anticipated to have a shared heat pump with VAV diffusers to allow thermal comfort control in each office. The unit will operate with a static pressure reset controlling the ECM fan motor. Each space temperature sensor shall have a push-button override for a 2-hour (adjustable) override to the occupied mode of operation. The Cafeteria will each have a new single-zone VAV geothermal water-cooled packaged RTU installed. The unit will operate by maintaining the temperature of the space-based on averaging multiple space temperature sensors. Each space temperature sensor shall have a push-button override for a 2-hour (adjustable) override to the occupied mode of operation. Where demand control ventilation is applied, spaces will include a CO2 sampling/measuring port and occupancy sensors. The thermostat (and associated sensors), CO2, and occupancy sensors are to interface to the building automation system. The CO2 measuring port and occupancy sensor inputs will be utilized to control the space ventilation terminal unit and space temperature setpoints.

All heat pump units shall have a fully ducted supply and return with sheet metal ductwork. Each heat pump unit will include a duct-mounted pre-filter rack. The pre-filters shall be 24”x24” Flanders/FFI PrePleat 40. Each heat pump shall include an integral disconnect switch. Condensate for each unit will be disposed of through a floor drain or open receptacle into the sanitary system.

Approximate sizes are as follows:

- Classrooms - The heat pump unit zones serving classrooms will utilize units sized between 2-6 tons, depending on classroom size and location within the building.
- Corridors - The heat pump unit zones serving corridors will utilize units sized at approximately 2 tons.
- Offices - The heat pump unit zones serving offices will utilize units sized at approximately 2 -3 tons, depending on office zone size and location within the building.
- Cafeteria – The water-cooled packaged RTU will be sized for approximately 25-tons.

Ventilation Systems (DOAS)

The DOAS unit shall provide ventilation air as described in Option 2. However, it shall be configured as a water-cooled unit with listed manufacturers as Trane, Valent, or Carrier or other approved equal.

Geothermal Well Field and Piping System

The well field geothermal system pumping system shall consist of two variable flow pumps (one operational – one 100% standby) for pumping the water to all heat pumps and geo AHU’s/RTU’s throughout the building. The pumps shall be located in the Mechanical Room and circulate water throughout the well field.

Option 2 – 4-Pipe Fan Coil Units and Dedicated Outdoor Air System (DOAS)

The HVAC system for this option shall utilize 4-pipe fan coil units for zone thermal comfort control and outside air handling units with fixed-plate energy recovery for delivery of code required outside air. A central air-cooled chiller, pumping system, and chilled water piping network will be utilized to circulate chilled water to each unit. Chiller shall be equal to Trane Stealth, tonnage to be determined. Chiller contains two refrigerant circuits. The boilers shall be gas-fired, high-efficiency condensing style boilers to reduce energy consumption. Boilers shall be equal to Viessmann Vitocrossal 300, 3,000 MBH, 2 each.

The ventilation (outside) air is de-coupled from the HVAC heating and cooling with each space (or zone) receiving outside air separately utilizing demand control ventilation. Each fan coil unit will be equipped with an ECM fan motor, 1” disposable MERV 8 filter, hydronic heating and cooling coil,

Figure 1
Fan Coil Units

Figure 2
DOAS Unit with Heat Recovery

piping package with two-way modulating control valve, strainer, balance valve, and isolation valves. Units can be configured horizontally (hung and installed in the plenum space above the ceiling) or vertically (floor-mounted in the space). The unit controller shall either be provided by Temperature Controls Contractor and field installed or provided by Unit Manufacturer and factory-installed.

Hydronic (chilled water and heating hot water) piping and insulation shall be as follows:

- 2" and smaller: Type L drawn-copper tubing with brazed or pressure-seal (Propress) joints and wrought, cast copper fittings, brazed or pressure-seal. Mineral fiber preformed pipe insulation with all service jacket for indoor, concealed piping.

- 2 ½" and larger: Carbon steel, Schedule 40, with wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, welded and flanged joints. Mechanical grooved couplings may be considered as a bid alternate. Mineral fiber preformed pipe insulation with all service jacket for indoor, concealed piping. Outdoor exposed piping shall have stucco embossed aluminum jacket.

- Each classroom zone is anticipated to have it's unit and space temperature sensor, one per room. The unit will operate by maintaining the temperature of the space based on the adjustable space temperature setpoint. Each space temperature sensor shall have a push-button override for a 2-hour (adjustable) override to the occupied mode of operation.

- Each office zone is anticipated to have a shared unit with VAV diffusers to allow thermal comfort control in each office or a dedicated unit. The unit will operate with a static pressure reset controlling the ECM fan motor for variable flow with shared units. Each space temperature sensor shall have a push-button override for a 2-hour (adjustable) override to the occupied mode of operation.

- The Cafeteria will be served by a single-zone VAV Air Handling Unit, 4-pipe. The unit will operate by maintaining the temperature of the space-based on averaging multiple space temperature sensors. Each space temperature sensor shall have a push-button override for a 2-hour (adjustable) override to the occupied mode of operation.

- IT Rooms shall be served by air-cooled DX split systems, approximately 1 to 1.5 tons each.

Where demand control ventilation is applied, spaces will include a CO2 sampling/measuring port and occupancy sensors. The thermostat (and associated temperature sensors), CO2, and occupancy sensors are to interface to the building automation system. The CO2 measuring port and occupancy sensor inputs will be utilized to control the space ventilation terminal unit and space temperature setpoints.

All fan coil units mounted above the ceiling shall have a fully ducted supply and return with sheet metal ductwork. Each unit shall include an integral disconnect switch. Condensate for each unit will be gravity drained where possible.

Approximate sizes are as follows:

- Classrooms - The zones serving classrooms will utilize units sized between 2-6 tons, depending on classroom size and location within the building.
- Corridors - The zones serving corridors will utilize units sized at approximately 2 tons.
- Offices - The zones serving offices will utilize units sized at approximately 2 -3 tons, depending on office zone size and location within the building.
- Cafeteria – The RTU will be sized for approximately 25-tons.

Ventilation Systems (DOAS)

The outside air systems for the building shall be de-coupled from the conditioning systems. In general, outside air shall be provided directly to the occupied zone. The dedicated outside air handling unit will be outdoor, roof-mounted, double-wall construction, and include dual supply/exhaust plenum fans. The units shall be variable volume energy recovery type units utilizing building exhaust and general exhaust air to precondition the outside air through a total energy recovery enthalpic plate. All conditioned outside air ductwork and building exhaust air ductwork will not be insulated – this applies to positive pressure outside air ductwork and negative pressure exhaust air ductwork. All unconditioned air ducts shall be insulated with 3" thick, ¾ pcf duct wrap with vapor barrier – this applies to negative pressure outside air ductwork and positive pressure exhaust air ductwork.

The DOAS unit shall be a packaged air-cooled, DX cooling, natural gas heat, unit with listed manufacturers like Trane, Valent, Carrier, or other approved equal. The outside air units will consist of the following sections/components: stacked and in the direction of airflow will be an inlet filter, enthalpic plate, plenum type, dual exhaust air fans (each sized at 50% airflow), on the bottom will be an inlet filter, enthalpic plate, access, gas-fired heating section, access, plenum type, dual supply air fans (each sized for 50% airflow), and final filter bank. Each fan bank will be controlled by a VFD for varying airflow conditions. During low ventilation conditions, only one of the fans would be needed to meet the ventilation requirements. The exhaust fan is sized at 20% reduction in capacity (thus maintaining building pressurization). The supply air distribution system will supply outside air to terminal units for distribution of outside air to each zone. The outside air conditioning system will be provided with an air-cooled DX circuit. The resulting winter supply temperature is approximately 70 degrees F and the summer supply air temperature shall be approximately 68 degrees F DB/63 degrees F WB.
To control outside air, a central CO2 monitoring system (Aircuity) will be provided to take advantage of building diversity. Each variable occupied area/room will contain

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a CO2 measuring port with a high quality central CO2 sensor. The VAV terminal will modulate in accordance with space CO2 measurements. The VAV terminal will also be interlocked with a room occupancy sensor. The ventilation rate will be modulated based on occupied and vacant spaces conditions. The total space by space occupancy count is expected to exceed actual building occupancy. Designing a variable ventilation system based on actual building occupancy reduces the central ventilation system by approximately 30 percent, thus reducing the overall HVAC load.

Building Automation System (BAS) / HVAC Controls

All new packed equipment shall be provided with DDC controllers for integration to BAS. All existing equipment shall be integrated into new BAS.

The following shall be included as part of the controls scope of work:

- Control or integration of new terminal equipment (fan coil units).
- Control devices (valves, sensors, etc.) and controller by TCC or equipment manufacturer has not yet been determined.
- Integration of new Air Handling Units and DOAS Units. It is anticipated that unit level controls and controller will be provided by unit manufacturer.
- Integration of rooftop HVAC units (gym, etc).
- Integration of HVAC central plant (boilers/chillers)
- Control of hydronic pumps
- Exhaust fan control for toilet rooms, restrooms, etc.
- Supplemental heater control (unit heaters, cabinet heaters, etc.)
- IT Server / MDF rooms – space temperature monitoring and alarming
- Plumbing –domestic hot water heater temperature monitoring and alarming
- Plumbing –domestic water circulation pump control and monitoring
- Kitchen –makeup air unit monitoring and cooler/freezer temperature monitoring and alarming
- Energy Meters – monitoring and BTU/energy tabulation for primary natural gas and electric consumption

Existing Facility Plumbing

Overview

The existing building plumbing systems, including domestic hot and cold water, sanitary and vent piping. The existing piping systems in the original building appears to be original to building.

Natural Gas Service

A metered natural gas service is currently supplied to the building by Washington Gas. The service serves the RTUs and domestic hot water heaters . No documentation was found to indicate the age of the existing piping system. The exterior piping has flaking paint and is beginning to rust on surface and at flanges.

Recommend refinish/paint exposed piping if building is to remain and be renovated.

Plumbing Waste and Vent Piping

Waste and Vent piping that was observed appeared to be original which is 60+ years old and past its rated useful life. Recommend replace all building original piping with new.

Roof Drains and Piping

Roof Drains appear to have been recently replaced and are in fair to poor condition. Storm piping that was observed throughout the building appears to be original which is 60+ years old and is past its rated useful life. Recommend replace all building original piping with new. Some roof drains were observed as being blocked with plants growing out of them recommend walking the roof and cleaning out all roof drains.

Domestic Water Piping

Domestic water enters the building into a classrooms casework on Commonwealth Ave side of the building. The service size is approximated as 2 1/2”. Domestic water piping that was observed appeared to be original which is 60+ years old and past its rated useful life. Recommend replace all building original piping with new. In addition it is recommended to relocate the service entrance to an area where it can be serviced. A check valve was not observed.

Plumbing Fixtures

Plumbing fixtures appear to be original to building.

- Water closets – White vitreous china; with battery or manual operated flush valve
- Urinals – White vitreous china; with battery operated flush valve
- Sinks – Wall mounted are white vitreous china
- Sinks – Wall mounted gang are solid surface (3) gang; sensor operated
- Sinks – Counter mounted are stainless steel.
- Electric water fountains in facility are found to wall mounted and free standing.

New Facility Plumbing

If it is determined that the existing building will be demolished or be required to have a major renovation, see the following recommendations for new system design.

Plumbing Waste and Vent Piping

- Extra Heavy Hubless Cast Iron pipe and fittings shall be manufactured from gray cast iron and shall conform to ASTM A 888 and CISPI Standard 301. All pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute ® and listed by NSF® International. Hubless

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Couplings shall conform to CISPI Standard 310 and be certified by NSF® International. Heavy Duty couplings shall conform to ASTM C 1540 and shall be used. Gaskets shall conform to ASTM C 564. All pipe and fittings to be produced by a single manufacturer and are to be installed in accordance with manufacturer's recommendations and applicable code requirements. Couplings shall be installed in accordance with the manufacturer's band tightening sequence and torque recommendations. Tighten bands with a properly calibrated torque limiting device. The system shall be hydrostatically tested after installation to 10 ft. of head (4.3 psi maximum).

- Type DWV copper drainage piping with cast bronze drainage pattern fittings with solder joints.
- The sanitary piping will require cleanouts at every pipe direction change and on 75 foot centers. All sanitary and roof drainage piping shall service weight cast iron hub and spigot piping with compression gasket joints. All plumbing vents shall terminate a minimum of 50 feet from any outdoor air intake.

Roof Drains and Piping

The primary roof drainage system shall consist of standard round dome-type drains with cast iron body, flashing clamp, sump receiver, and 15" cast iron locking strainers. The secondary roof drainage system shall consist of overflow scuppers provided on flat roof areas with parapets or roof drains adjacent to the primary drains with standard round dome-type drains, cast iron body, flashing clamp, sump receiver, 15" cast iron locking strainers, and 4" pipe overflow extension.

Domestic Water Piping

The domestic water system for the building shall be served by a NSF 61 compliant water supply with gate service valves and ASSE or CSA compliant reduced pressure zone backflow preventer located in the main mechanical room. A domestic water booster pump is not anticipated to be required.

Domestic water distribution within the building will serve the toilet rooms, janitor closets, classrooms, kitchen, health unit, pantries, drinking fountains, hose bibbs, and non-freeze wall hydrants. Piping shall be NSF 61 compliant type L Hard Copper with lead-free solder and 150 lb, flanged or screwed, gate or ball, bronze valves. Piping insulation shall be a minimum of 1 inch for all hot water and a minimum of 1/2 inch for cold water 4 inches and above.

Domestic Hot Water shall be provided by two (2) hydronic natural gas-fired condensing style boilers, an indirect storage tank, ASME rated thermal expansion tank, in-line circulating pumps, and ASSE 1017 compliant central thermostatic mixing valve. Domestic hot water shall be designed for 140 deg F supply distribution temperature and a 120 deg F return water temperature at peak demand.

Plumbing Fixtures

Plumbing fixtures shall be lead-free, low flow, Water Sense type, and ADA compliant. All water closets, lavatories, sinks, drinking fountains, emergency showers, floor drains, etc. shall be commercial grade.

- Adult water closets shall be Water Sense and ADA compliant wall-mounted type with "Capacitive sensor" type handsfree, top spud flush valves with the side-mounted operator, and a maximum flow rate of 1.28gpf. The power source shall be (4) "C" size battery or self-generating with battery backup..
- Urinals shall be Water Sense and ADA compliant wall-mounted type with "Capacitive sensor" type handsfree, top spud flush valves with the side-mounted operator, and a maximum flow rate of 0.125gpf. The power source shall be (4) "C" size battery or self-generating with battery backup.
- Urinals shall be Water Sense and ADA compliant wall-mounted type with "Capacitive sensor" type handsfree, top spud flush valves with side mounted operator and a maximum flow rate of 0.125gpf. Power source shall be (4) "C" size battery or self-generating with battery backup.
- Lavatory faucets shall be Water Sense and ADA compliant "Capacitive sensor" type handsfree faucets with a maximum flow rate of 0.5gpm. The power source shall be battery or self-generating with battery backup. Lavatories shall have an ASSE 1070 compliant manual thermostatic mixing valve w/ lockable box centrally located to control a maximum of 4 lavatories.
- Sinks serving pantries, classrooms, and art areas shall be stainless steel type with a maximum flow rate of 2.5gpm and local sediment interceptors provided as required. Classroom sinks shall have a 5.25" radius gooseneck faucet, less bubbler, centered on the back ledge with lever handles.
- Electric water cooler and drinking fountains shall be bi-level ADA compliant with manually operated bubbler controls. Indoor electric water coolers shall have bottle fillers and filters while the exterior non-chilled drinking fountains shall be non-freeze type units.

Floor drains shall be provided to serve mechanical equipment, drain discharges, bathrooms, kitchens, and washdown areas. Floor drains shall be of size and type suitable for the application.

Existing Facility Electrical

Electrical Distribution

The facility is served by a 208Y/120 volt, 3-phase,4 wire 2500A electric service. The main electric switchboard is manufactured by Siemens in 2003 with a bus rated at 2500A with a 2500A switch. The switchboard is in fair condition. It was noted that the facility has experienced ingress of stormwater from outside and into the electrical room through and around the switchboard area. It is recommended that this be fully investigated and that the switchboard be repaired/maintained to prevent future damage. Recommend annual maintenance, infrared scanning as well as

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completion of a short circuit/coordination/arc flash hazard study. Surge protection was not observed on the main switchgear or on any of the secondary panel boards. The addition of surge protection is recommended to minimize the effects of electrical transients that may be transmitted on the incoming power lines. Voltage surges and other electrical transients can cause damage to equipment resulting in untimely equipment replacement or repair.

The normal power main switchboard and some distribution panel boards are located in the main Electric Room. Branch panel boards are located throughout the school in hallways, classrooms, etc. Many of the Panel boards appear to be antiquated and original to the building and it is recommended that they along with their feeders be replaced. Infrared scanning is recommended for all electrical connections in the panel boards that are to remain to ensure proper operation and prevent future failures.

Emergency Electrical Distribution

Building is served by a 150KW diesel fueled emergency generator. The generator is located on the exterior of the building. It is estimated that the generator and associated automatic transfer switch was manufactured and installed in 2003/2004. There is no reported issues with the operation of the generator. It is recommended that ACPS continue with regular scheduled maintenance and plan for replacement in the next 3-5 years.

Interior Lighting

Most areas in the facility utilize linear fluorescent lighting. Linear fluorescent fixtures in the facility are typically 2'x4' troffers with acrylic or parabolic lens with T-8 lamps. The fluorescent lighting is estimated to be near or past its rated useful life, in addition is very inefficient as compared to current LED lighting solutions. Recommend replacement with new LED light fixtures. This will assist with energy efficiency and help lower electric utility costs. Other lighting such as specialty lighting in private restrooms and closets appears to be original to building. It is recommended that these fixtures be replace with new LED lighting fixtures.

Exterior Lighting

Exterior lighting is provided by wall mounted high intensity discharge wall packs. These are inefficient and should be replaced.

Wiring Devices

Switches and receptacles that were observed in the original sections of the school appeared to be original. Multiple layers of paint has been applied to the devices which can affect their operation. In addition, some of the light switches did not appear to be switching normally and were a little "spongy". It is recommended that all wiring devices that are original to the facility be replaced with new.

Wiring

Wiring that is existing to building is estimated to be approximately 63 years old. The useful life expectancy for wiring is 50 years. It is recommended that all wiring that is original to the facility be replaced with new.

Fire Alarm

The building is served by a Firelite addressable fire alarm system. Devices throughout the facility are both newer and those that are past their useful life. Recommend complete replacement of FA devices and antiquated system components.

New Facility Electrical

If it is determined that the existing building will be demolished or be required to have a major renovation, see the following recommendations for new system design.

Electrical Distribution

Underground primary electric service shall be routed to a new pad mounted utility transformer located near the new building. A new secondary service will be extended from the utility transformer to feed the new 2500A/208/120V/3PH/4W (est) switchgear located in the main electric room. Each floor of the building shall have dedicated electrical spaces with 208/120V/3PH/4W branch circuit panel boards separated for specific loads such as mechanical equipment, lighting, receptacles, etc.

All new panel boards that are installed to replace old ones shall be hinged cover (door-in-door) construction. All feeders and exposed branch circuits shall be insulated copper conductors routed in EMT conduit.

A multi-circuit sub-metering device connected to the building automation system shall monitor all building load categories including renewable energy and report to the energy dashboard system.

All wiring shall be copper, minimum #12AWG installed in conduit, minimum size ¾". MC cable is not acceptable. Power connections and code required disconnecting means will be provided for all HVAC and plumbing equipment. Combination starter/ fusible disconnects will be provided for selected equipment as required.

Integral surge protective devices will be provided for the main service switchgear and all branch circuit panels. Main Circuit breaker on the switchgear will be equipped with Phase loss monitors and undervoltage/overvoltage trip settings.

Receptacles will be located at each teacher's workstation location, equipment locations, and on each wall for convenience. All collaboration spaces in the corridors will be provided with additional power per classroom standards.
Emergency Electrical Distribution

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A new 150kW diesel generator (BOD: Cummins) with a 48-hour dual-wall sub-base fuel tank will be provided for life-safety and general emergency loads.

All Life safety emergency electrical distribution equipment will be housed in a separate room from the normal power equipment. The Emergency system shall consist of two automatic transfer switches - one each for life-safety and general branch, two distribution transformers - one each for life-safety and general branch, and a limited number of life-safety and general branch panel boards. All life-safety emergency loads shall be selectively coordinated to 0.1 seconds. A remote generator annunciator panel will be provided.

Interior Lighting

Interior artificial lighting will be accomplished with recessed high-performance LED direct/indirect fixtures throughout the building with more decorative LED lighting in selected spaces such as Media Center, Entry Lobby, Dining, etc. Alternate pricing shall be provided for Dynamic Lighting fixtures (tunable white) in all classrooms with the ability to independently raise/lower lighting intensity and CCT. Lighting in the Gymnasium will be LED high bays with semi -diffuse acrylic lens. Lighting throughout will meet the latest Illuminating Engineering Society of North America (IESNA)

Interior egress lighting shall be connected to the life-safety branch of emergency power.

100% occupancy/vacancy sensor coverage will be provided throughout except in electrical and mechanical rooms. Occupancy sensors will be automatic on/automatic off. Vacancy sensors will be manual on/automatic off. Automatic daylight dimming will be employed in all daylight zones.

Dimming controls/scene controls will be provided in all classrooms and offices. All interior lighting controls will be stand-alone systems (BOD: nLight).

Exterior Lighting

Dark sky compliant LED exterior lighting will be provided at all exit doors for egress lighting. Site pathway lighting will be post top LED fixtures (BOD: Lithonia #DSX) on a straight round aluminum poles and in accordance with the site guidelines. Color temperature shall be 4000K. Backlight shielded optics will be utilized to minimize glare to adjacent properties as necessary. Exterior lights will also feature integral motion sensing for reduced glare, energy usage, and extended LED lamp life. Exterior egress lighting shall be connected to the life-safety branch of emergency power.

Exterior lighting will be controlled through a photocell/timeclock combination. A lighting contractor will be provided with HOA option and tied into the BAS system. Exterior light fixtures will feature integral motion sensors for reduced glare, energy usage, and extended LED lamp life.

Fire Alarm

A new fully addressable voice evacuation type fire alarm system (BOD: Simplex) shall be provided with notification and initiation devices per NFPA requirements. All peripheral devices shall be installed per ADA requirements. Manual pull stations will be located within five (5) feet of each exterior egress door, and within 150 feet of an egress door. Fire alarm strobe/audio devices will be provided to comply with ADA requirements. Smoke detectors will be photoelectric type. Connections will be provided to all fire suppression equipment, air handling units over 2,000CFM, door access controls, etc. A Graphic annunciator panel will be placed at the main entrance to the building and at each fire department entrance into the building.

Technology

Telephone/Data

The contractor will provide all rough-in's, faceplates, cabling paths, cabling, and patch panels for all telephone and data systems. The telephone system shall be IP based. The owner shall provide active components including wireless access points. The minimum stub-out conduit size will be 1'' and cabling paths will consist of 12'' cable tray with J-hook assemblies on 48'' centers.

The horizontal data network will utilize CAT 6 infrastructure. Wireless coverage will be provided for the entire school utilizing CAT 6A cabling.
WAPs will be laid out to create a fence to fence coverage pattern both on the interior of the building and the exterior of the building.

The phone system will be as per the owner's specification.

Fiber backbone will consist of 12 strand multimode OM3 fiber optic cable with LC connectors supporting full 10gig uplinks.

Public Address System

A building-wide Public Address System will be integrated into the Unified Communications system with visual devices in select rooms that will be determined as the design progresses.

Electronic Safety & Security

A new ESS system will include interior and exterior Video Management Systems (VMS) coordinated with Dedicated Micros and a Security Management Control System (SMS) (BOD: Software House).

The SMS includes door access and logic capabilities such as visitor management, time schedules, intrusion detection, and digital signage for emergency notification features. VMS will include security cameras that will be specified along with servers

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and analytics (motion detection) that run them. Both VMS and SMS systems will be integrated with a single web portal interface at a later time after this project is complete by the District.

Lightning Protection

See attached document for lighting protection risk analysis. The building shall feature a complete Lightning Protection System certified to NFPA 780 standards. The system shall comply with UL #96A. Building steel shall not be used as a down conductor. Down conductors shall be concealed within the building. Each down conductor shall be terminated to a dedicated ground rod. Surge protective devices shall be provided for all systems identified in NFPA 780.

Fire Protection

The building currently does not have a fire suppression system.

Safety and Security

ACPS maintains an inviting and de-institutionalized environment, while simultaneously providing a safe environment for students, staff, and community who use the facility and adjacent support services. Studio27 Architecture evaluated the safety and security of each school in 6 categories: Building Layout, Building Materials, Uses of Technology, Visitor Management, Vehicular and Pedestrian Traffic, and Other Site Concerns.

The categories of largest concern for George Mason Elementary are Building Layout, Building Materials, Visitor Management, and Vehicular and Pedestrian Traffic. Interior circulation paths have many blind spots. Staff spaces are isolated to the front entrance and do not have views of major circulation paths. Interior finishes were adequate when installed but are now in poor condition. While the school has a very small entrance vestibule, there is no security desk and sightlines are very restricted from the entrance lobby. Bus and car drop off should occur in individual designated lanes separate from public roads and pedestrian traffic should not cross these lanes if possible.

Envelope

George Mason Elementary schools are housed in aging facilities and will require a substantial renovation or upgrade to meet LEED and Neto Zero standards. Studio 27 Architecture interviewed school leaders and visited both schools to assess the current conditions of the building envelopes and evaluate the impact of the observed envelope issues.

Condition and stains on the brick below window sills Water appear to pool where the play surface meets the exterior brick. Most entrance doors are in poor condition with visible rust and large undercuts allowing unwanted thermal transfer between the The George Mason envelope is in poor condition. The two areas of largest concern are the windows and roof. School leaders reported concerns about the condition of the windows. Windows have been replaced in different areas of the building at different times, and there are unique issues related to each type. Older wood windows are water damaged and have non-thermal single pane glass. The newer replacement windows are very poor quality, leak, and do not lock. School leaders also reported that the roof leaks often, and S27 observed that there is visible ponding at drain locations. Other issues to note are visible cracks in the masonry, exterior entrances are in poor condition with visible rust and flaking paint, as well as large undercuts that allow an unwanted thermal transfer. Floor slab and exterior settlement cracking can be seen from the interior of the building at the main entrance and in classrooms.

Like Cora Kelly, George Mason also has a very high form factor, which has a negative impact on building energy efficiency and use.

Systems

Per the building assessment, it was observed that George Mason require either a full system upgrade or complete replacement of MEP systems due to its antiquated nature and sometimes, a complete lack of system usage or availability, like a sprinkler and fire alarm system, which are crucially linked to the life safety of building occupants.

In addition to code requirements of the state of Virginia, the City of Alexandria has implemented a new 2019 Green Building Policy. This newly approved policy requires that major or new public projects be required to meet minimum level certifications of LEED and/or other Green building certifications as well as they shall perform as a Net Zero Energy building. In order for a facility to meet the aforementioned requirements, it would be expected that the building's annual energy consumption be in the 18-22 EUI (Energy Use Intensity) range where EUI is defined as kBtu/SF/YEAR. This requirement further justifies the complete upgrade or replacement of building systems.

Accessibility

ACPS has made it a strong priority to make its facilities accessible to all students and staff. 'Universal Design' is one of ACPS's 10 driving design principles, established in the 2015 Educational Specifications. Universal design is the design of buildings and environments to make them accessible to all people, regardless of age, disability, or other factors.

Since 2012, accessibility in schools has been the law. Title II of the Americans with Disabilities Act prohibits disability discrimination by all public entities, including schools, at the local and state level.

George Mason has similar accessibility deficiencies. Water fountains, classroom sinks, and bathroom facilities are not up to current standards. The majority of entrances do not have ramps and mot exterior stair railings are not ADA or code compliant Most play areas are not connected to accessible paths, and no accessible play equipment was observed.

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George Mason Safety and Security Evaluation

Category	Consideration	Rating	*Notes*
Building Layout	Maintain clear lines of sight along circulation paths and avoid blind spots, corners, and cubby holes	Poor	
	Locate administrative and teacher preparation with good visual contact of major circulation areas	Inadequate	
	Develop spatial relationships that naturally transition from one location to another	Poor	
	Locate toilets in close proximity to classrooms	Good	
	Design toilets to balance the need for privacy with the ability to supervise	Fair	
	Locate areas likely to have significant community use (after school) close to parking and where these areas can be closed off from the rest of the building	Good	
Building Materials	Use durable wall surfaces and maintainable flooring material that are easy to clean so graffiti and dirt can be removed	Fair	*Glazed block in corridors is very durable and graffiti resistant however it is in bad condition*
	Operational windows should high above ground to prevent access	Inadequate	
	Install non-slip floors and walk-off mats at points of entry	Poor	
	Use of interior glass to create a transparent environment within the school	Inadequate	
	Use of colors, natural day lighting, and interior furnishings to create an environment that is aesthetically pleasing in order to support student and faculty pride within the building	Poor	
Uses of Technology	Phones in every instructional and support area	TBD	
	Building wide all-call or intercom system to be heard throughout the school and in outdoor play spaces when needed	TBD	
	Exterior and interior video security cameras	Poor	*No interior or exterior security cameras were observed*
	Motion or infra-red detectors	TBD	
	Smoke and heat detectors location throughout the building	Poor	*Smoke detectors are present however there is no sprinkler system*
	Magnetic locking systems and carefully selected door hardware to facilitate lock downs if needed	TBD	
Visitor Management	The main lobby should be welcoming and inviting for students, staff, and visitors and a central visitor registration area should be prominent upon entry	Poor	
	Clear wayfinding signage should be included that directs visitors upon campus arrival to visitor registration as well as throughout the building to provide overall building guidance	Poor	
	A secured double vestibule system with either clear sight lines to a security desk or a video enabled front intercom buzzer system should be provided to manage visitor entry	Inadequate	
	Front lobby and security desk should have clear views to parking lot and building approach	Inadequate	
Vehicular and Pedestrian Traffic	Bus drop off area should be separated from other vehicular traffic	Inadequate	
	Clear wayfinding signage and pavement striping should direct vehicular traffic on where to go	Inadequate	
	Sperate staff and community parking areas	Inadequate	
	Sperate pedestrian traffic from vehicular traffic and if possible avoid having pedestrian traffic cross vehicular drive lanes	Inadequate	
Other Site Concerns	Use native high trees and low bushes (less than 3'-0" high) to deter hiding	Fair	
	Use aesthetically pleasing fencing around perimeter of the building	Inadequate	*No perimeter fence*
	Non-intrusive lighting should light all areas or site, according to the LEED light pollution credit guidelines with no lighting to leave the property line	Fair	
	Provide security lighting around building and parking lots with photocell timer, motion sensor, and on/off capacity	Poor	

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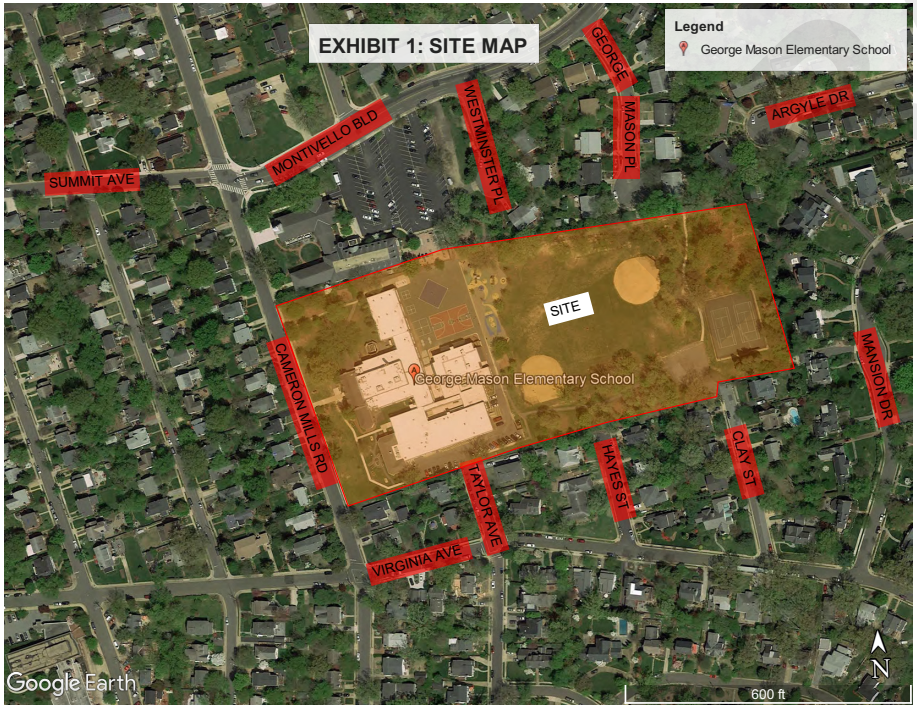
III. George Mason Master Plan and Technical Data

Site Assessment Data

The subject site for this study is George Mason Elementary School and it is located in City of Alexandria at 2601 Cameron Mills Rd, Alexandria VA 22302. Refer to **Exhibit 1** for the Site Location Map. The scope of our site study for the subject project included the evaluation of Best Management Practices (BMP), Storm Water Management (SWM), Sanitary Sewer, and Waterline. For our analysis, we gathered information from:

- Available records of approved plans of surrounding relevant projects
- Existing utility locations of the project area
- Boundary survey of the project area
- Soil maps of the area
- RPA maps of the area
- City of Alexandria stormwater technical criteria.
- City of Alexandria GIS, and
- CAD provided by Studio 27

Exhibit 1

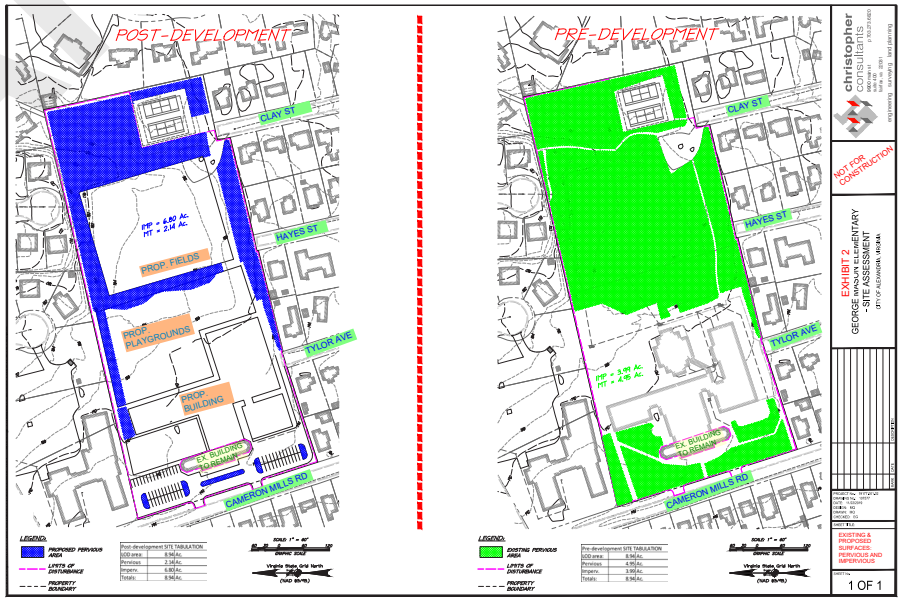


Findings

BMP Evaluation

To determine BMP requirements, we used the Virginia Runoff Reduction Method (VRRM) spreadsheet and made some assumptions of the area disturbed and the pre-developed and post-developed pervious/impervious areas. During our preparation, we looked into three possible scenarios. For scenarios 1 and 2, we assumed a total disturbed area of 8.94 acres as the BMP area. For scenario 3, we excluded the area of proposed turf fields and assumed a total disturbed area of 4.63 acres. We calculated the amount of existing and proposed pervious/impervious areas and entered the VRRM spreadsheet to calculate the required Total Phosphorus removal of 7.84 lb/yr, 4.38 lb/yr, and 3.50 lb/yr for scenario 1, scenario 2, and scenario 3, respectively. Refer to **Exhibit 2** for existing and proposed pervious/impervious areas.

Exhibit 2

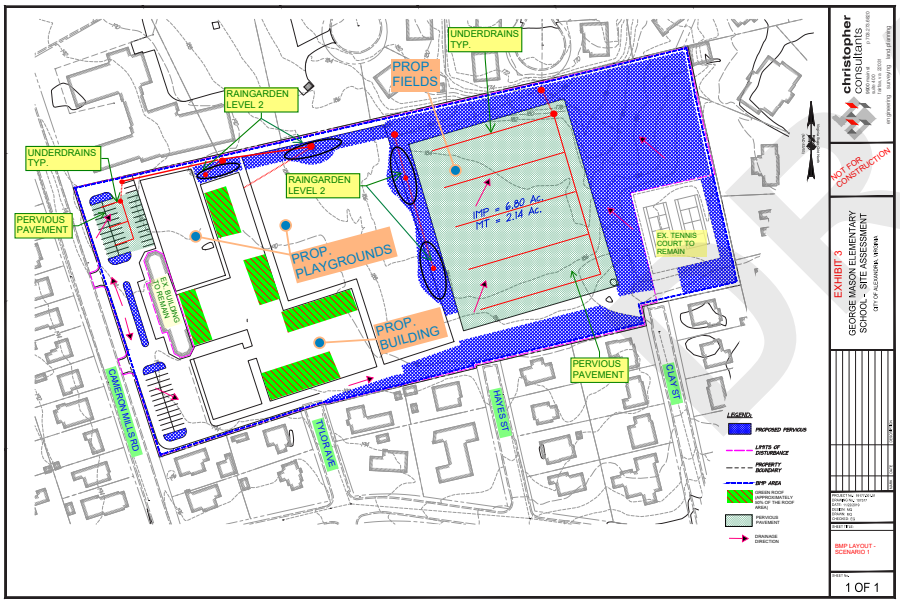


In addition to the state requirements, City's new Green Building Policy requires the treatment of 100% of the stormwater through green infrastructure. To achieve 100% treatment of stormwater and meet BMP requirements, we assumed the site consists of one drainage area and analyzed the three scenarios.

III. George Mason Master Plan and Technical Data

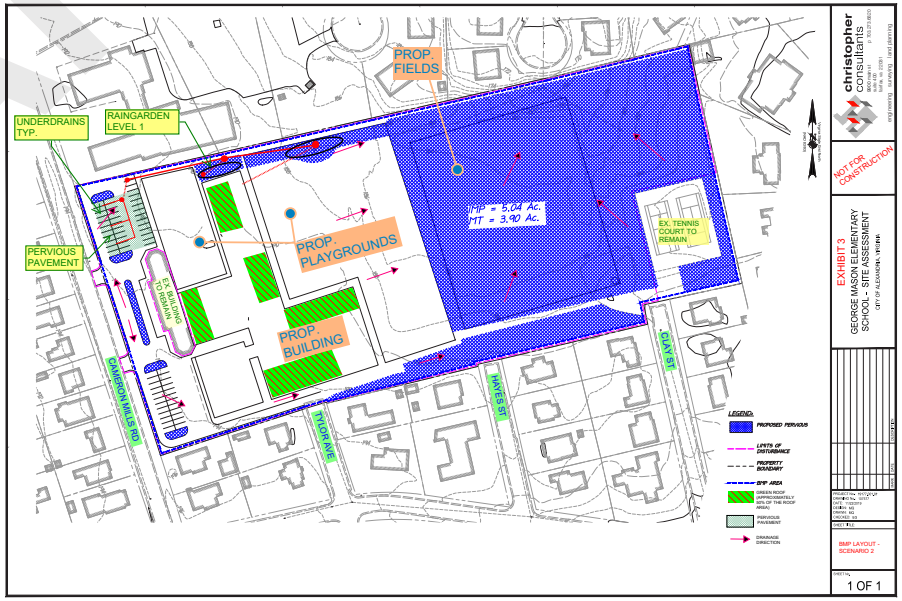
For scenario 1, we have proposed a pervious pavement for the proposed parking area with underdrains tying to an existing storm structure, considered the proposed fields as pervious pavement with underdrains, proposed level 2 rain gardens along the northern and eastern edges of the proposed playground, and included 50% of proposed building roof as green roof. Refer to **Exhibit 3** for the layout of these measures.

Scenario 1



For scenario 2, we considered the proposed fields as a grass surface. This scenario decreases the required Total Phosphorus removal by approximately half in comparison to scenario 1 thus requiring a thinner stone layer of the pervious pavement for the proposed parking area, level 1 rain garden along the northern edge of the proposed playground, and included 50% of proposed building roof as green roof.

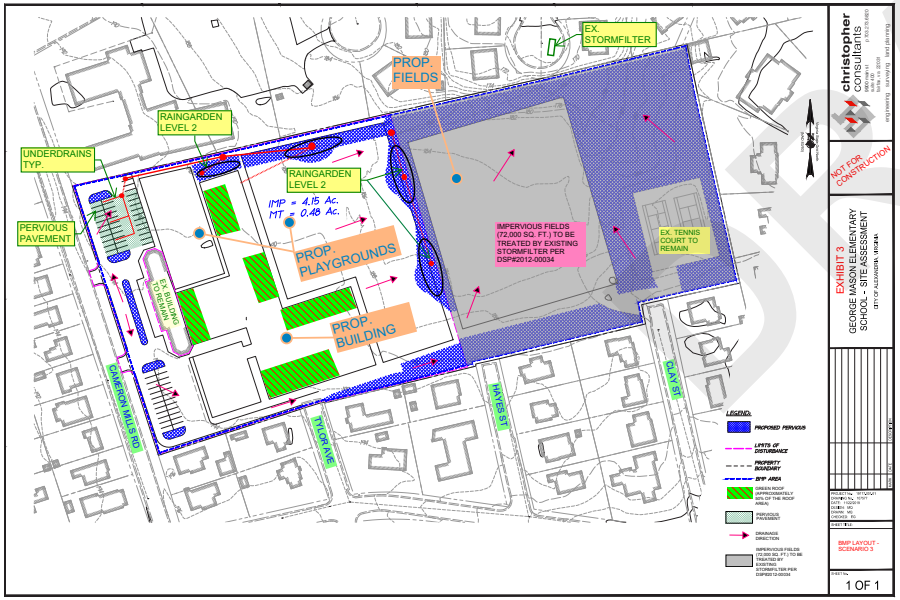
Scenario 2



III. George Mason Master Plan and Technical Data

For scenario 3, we assumed that the proposed fields of overall size of 72,000 Sq. Ft. will be treated by an existing stormwater Filter structure with cartridges per plans of DSP2012-00034. Therefore, we considered the limits of disturbance approximately the western half of the site and analyzed accordingly. We proposed pervious pavement for the proposed parking area with underdrains tying to an existing storm structure, level 2 rain gardens along the northern and eastern edges of the proposed playground, and included 50% of the proposed building roof as green roof.

Scenario 3



Assumptions Made

- The overall site drains to the east to the existing storm system therefore we assumed that the proposed layout will maintain the same drainage divides as the existing condition.
- We assumed that the proposed fields will be turf and its ground cover is considered impervious and outfalling to the northeast for scenario 1.
- Overall green roof area on the roof accounts for up to 50% of the roof surface area.
- The building's roof drains outfall to the east.
- For any impervious area that is untreated, a contribution will need to be paid into City's WQIF at $2 per SF.

SWM Evaluation

To meet SWM requirements in Section 13-109 of City of Alexandria, we analyzed Channel Protection and Flood Protection of the drainage area of the proposed development. The site is located within the Four Mile Run Watershed. Refer to below values of Pre and Post development of drainage areas, curve number, peak discharge (Q), and runoff volume (RN). Since the majority of the site flows to a single outfall location, we are analyzing the site as a whole for the channel protection and flood protection requirements.

Pre-development		
	Area (ac)	8.94
	CN	86
	1-year	
	Q (cfs)	21.22
	RV (qf)	42,905
	2-year	
	Q (cfs)	27.5
	RV (qf)	55,894
	10-year	
	Q (cfs)	53.23
	RV (qf)	111,296

Post-development		
	Area (ac)	8.94
	CN	95
	1-year	
	Q (cfs)	30.28
	RV (qf)	65,630
	2-year	
	Q (cfs)	36.63
	RV (qf)	80,469
	10-year	
	Q (cfs)	61.74
	RV (qf)	140,489

Channel Protection

The extent of the review to meet channel protection for the site ends in a pipe, not causing any erosion, therefore no detention is required.

Flood protection

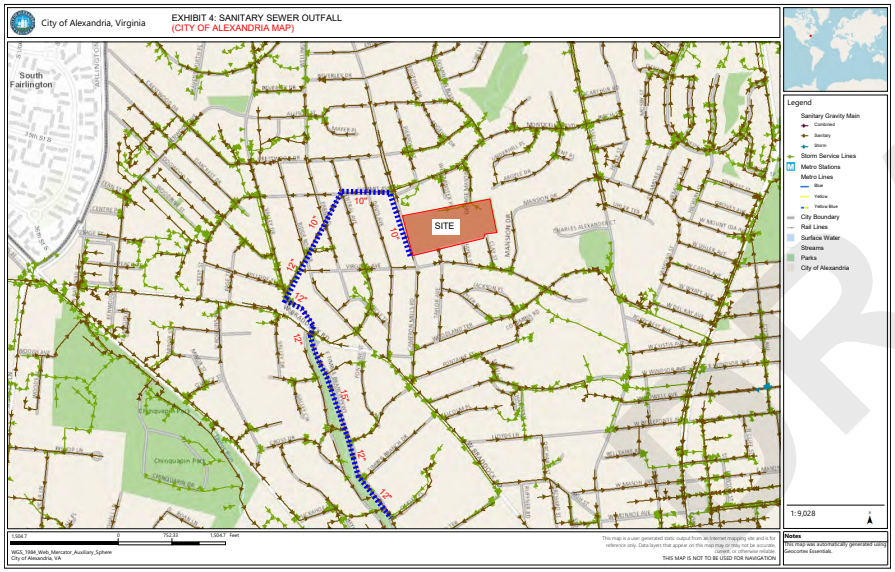
To meet flood protection requirements per city code 13-109-F-2, the 10-year post-developed peak flow must be less than the pre-developed peak flow for the same storm. Based on our assumptions made on the site's drainage areas and ground covers, the 10-year peak flow for the drainage area slightly increases the among of peak flow and some detention will be required. The detention can be provided in the pervious pavement stone layer.

III. George Mason Master Plan and Technical Data

Sanitary Sewer Analysis

The current existing sanitary sewer system outfalls to the west into an existing sanitary pipe then north along Cameron Mills Rd. It is assumed that the proposed building sanitary sewer lateral will tie into the existing sanitary sewer system located on the west of the existing building. The extent of the sanitary sewer review, per City of Alexandria Memo to Industry 06-14, doesn't require review if a net increase is below 10,000 gpd. The proposed building will increase by 38% in the net area. The current capacity will increase in the existing sanitary sewer system. Refer to **Exhibit 4** of the Sanitary sewer analysis.

Exhibit 4



Waterline Analysis

The proposed building can tap into the existing 8" waterline located along Cameron Mills Rd. Based on a fire hydrant flow test completed by Virginia American Water on 11/18/19, the calculated flow is 4355 gpm at a residual pressure of 20 psi. See **Exhibit 5** of Virginia American Water Flow test.

Exhibit 5a

Virginia American Water – Fire Flow test

Virginia American Water
Fire Hydrant Flow Test Summary

Location:	2601 Cameron Mills Rd		
Date:	11/18/2019	**Main Size**	8 inches
Time:	1:30PM		
		Flow Hydrant #	
Total Flow	**2273** gpm	3028	
		Residual Hydrant #	
Static pressure	50 psi	**3023**	
Residual pressure	41 psi		

Contact Person
Matthew Ganci
Project Engineer
Virginia American Water
2225 Duke St.
Alexandria, VA 22314
Office: 703-706-3862
Email: matthew.ganci@amwater.com

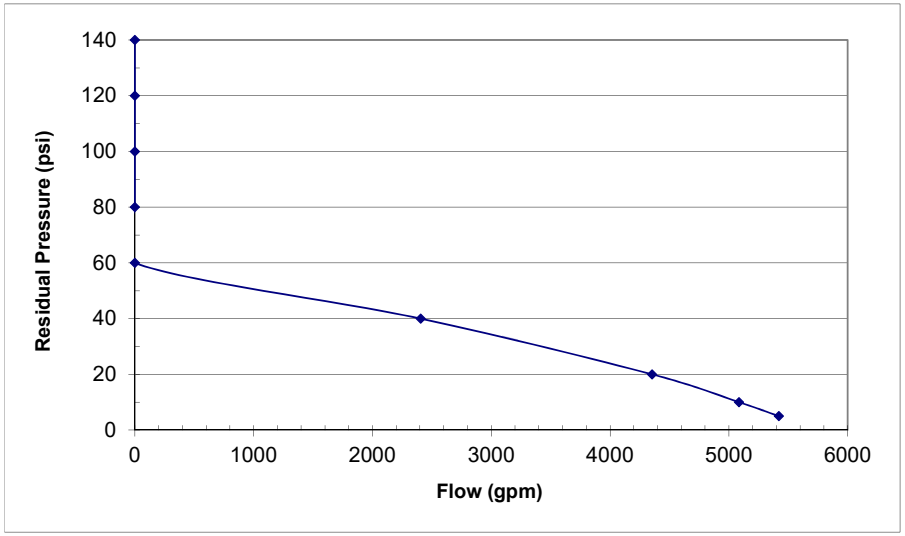
Calculated Flow gpm	Residual psi
5420	5
5086	10
4355	**20**
2406	40
#NUM!	60
#NUM!	80
#NUM!	100
#NUM!	120
#NUM!	140

Notes:
1. Table calculation is for reference only. Virginia American Water will not guarantee the calculated flow.

2. 3500 gpm is the limit of available fire flow.

3. Individual (Non-public water supply) fire suppression systems shall be designed by the property owner to meet needed fire flow in excess of 3,500 gpm.

4. VAW does not provide hydrant elevations.



III. George Mason Master Plan and Technical Data

Exhibit 5b

REQUEST FOR FIRE FLOW TEST INFORMATION

Requested by: Moustafa Qaddora
Phone: (703) 766-3925 Fax:
Email: moustafaqaddora@ccl-eng.com
Project Name: George Mason Elementary School Expansion
Request Reason: Need flow information for hydraulic calculations

District: (A) P
Project address: 2601 Cameron Mills Rd
Map sheet #:

Flow Hydrant#: 3028 use 4" nozzle w/diffuser
Residual Hydrant #: 3023
Main size: 8 inches

Note: Before running this flow test, check all surroundings to avoid any potential damage to nearby residents landscaping, grounds, etc.

Flow duration 3-5 minutes

Tester D. Kinkamp
Date 11/18/19
Time 1:30 pm

Residual Hyd# 3023 Make mueller

Residual FH MUST Get at least a 10 lb. drop

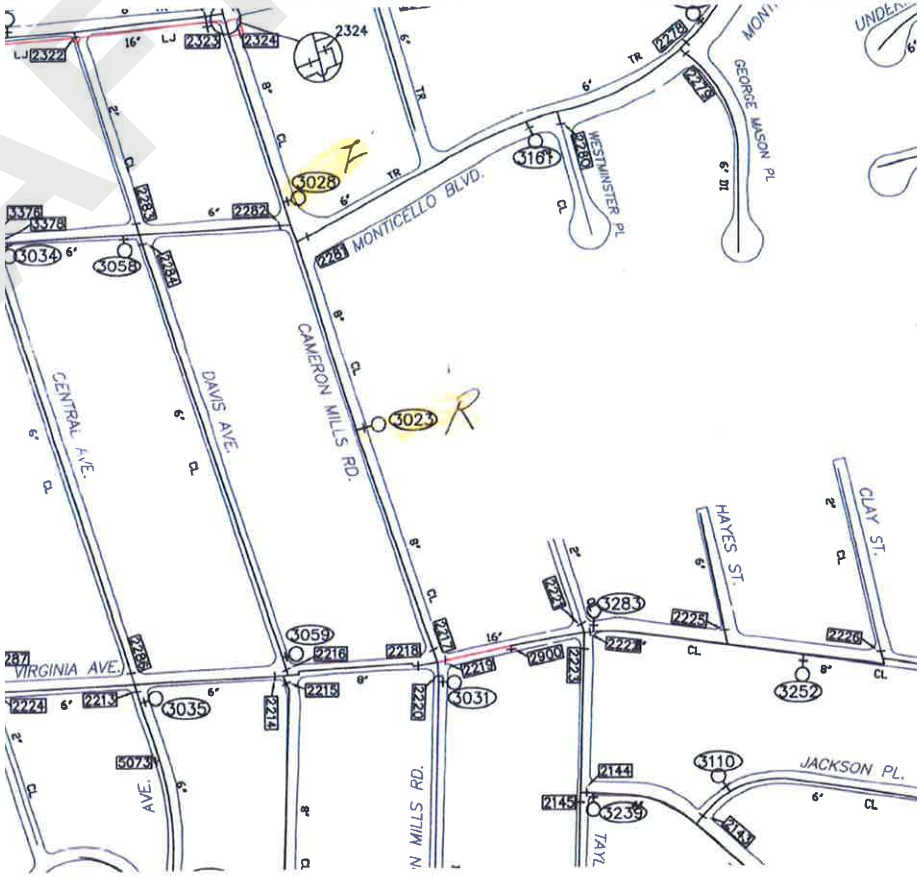
Static Pressure (PSI) 50
Residual Pressure (PSI) 41

Flow Hydrants	1	2	3	4
Hydrant#	3028			
Hydrant make	mueller			
Nozzle Diameter (inch)	4			
Flow reading (PSI)	28			
Static Reading (PSI)	50			

Engineering Department

Requested by: Matthew Ganci Date: 11/11/2019

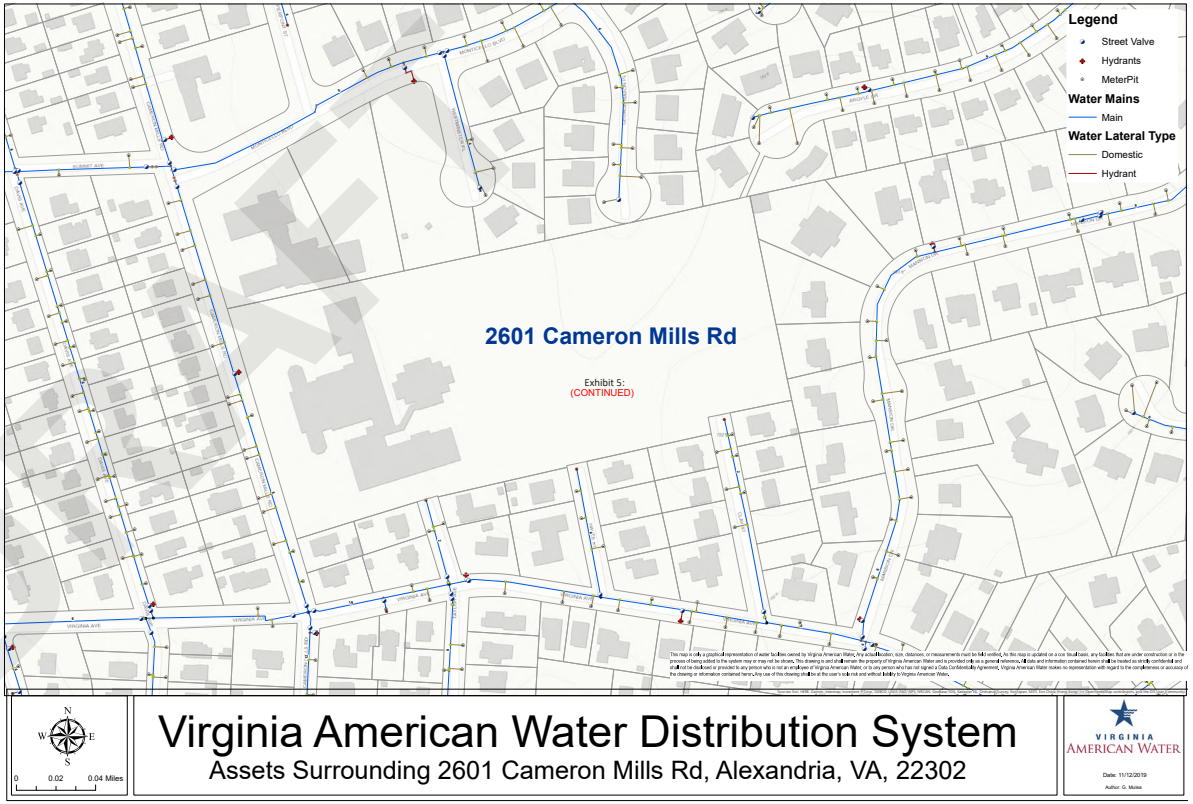
Exhibit 5c



Recommendations

- To reduce the requirements for BMP and SWM, changing the field and playground material from turf to grass will greatly help.
- Utilize the 72,000 Sq. Ft. excess capacity of the existing storm filter to minimize the number and size of BMP and SWM facilities. More research and discussions with the City are required to determine the feasibility of this approach.

Exhibit 5d



III. George Mason Master Plan and Technical Data

Cost Estimate - New Construction

EXECUTIVE SUMMARY

PROJECT:	**ACPS GEORGE MASON ES**
OWNER:	**ALEXANDRIA CITY PUBLIC SCHOOLS**
LOCATION:	**ALEXANDRIA, VA**
A / E:	**STUDIO 27 ARCHITECTS**
C/M:	**N/A**
PHASE:	**MASTER PLAN ESTIMATE**

February 4, 2020

EXECUTIVE SUMMARY

The project is to give Alexandria City Public Schools a new Elementary School with a proper program to support the children attend the school. The original school will be raised all but 10,300 sf of the building and a new Elementary School will be built in different location, as the existing school will not be raised until the new school is built. The new school will have a separate bus entrance for children drop off and a separate entrance for the cars to drop off the children at the school.

$ 61,068,512 is the current estimated total value of the project.

CLARIFICATIONS & ASSUMPTIONS

PROJECT:	ACPS GEORGE MASON ES
OWNER:	ALEXANDRIA CITY PUBLIC SCHOOLS
LOCATION:	ALEXANDRIA, VA
A / E:	STUDIO 27 ARCHITECTS
C/M:	N/A
PHASE:	MASTER PLAN ESTIMATE

February 4, 2020

CLARIFICATIONS & ASSUMPTIONS

BUILDING INFORMATION

- Building Type: EDUCATIONAL
- Project Type: NEW CONSTRUCTION
- Building GSF: 110,940 SF
- Stories: 2

MARK-UPS

- General Conditions: 10.0%
- Cm Fee: 5.0%
- Design Contingency: 15.0%
- Bonds & Insurance: 2.0%
- Escalation: EXCLUDED

DOCUMENTS

- Technical Site Study Assessment dated November 13, 2019 as issued by Studio 27 Architects

EXCLUSIONS

- A-E Fees
- Phasing
- Overtime
- Escalation
- Deep foundation systems
- Furniture and loose equipment
- Library shelving
- Lockers
- Photovoltaic systems
- Playground equipment
- Bleachers (exterior)
- Electronic score boards
- Trash compactors/bins
- Change order contingency
- Finance cost

QUALIFICATIONS

- Assume conventional concrete strip foundation systems
- Assume 12' floor to slab height for existing building
- Assume structural steel frame construction with concrete on metal deck slabs
- Structural steel framing assumed @ 12lbs/sf for the 1st level and 6.5lbs/sf for the 2nd level
- Assume typical floor to slab height of 14', double volume areas 25'
- Assume conventional built-up roof waterproofing system to 30% of overall roof area, green roof of 70% of roof area
- Assume 30lf of millwork per classroom
- Assume one (1) elevator with two (2) stops
- New school is assumed without a basement a slab on grade
- The existing building is assumed to maintain existing site utilities no upgrades

PROJECT SUMMARY

PROJECT:	ACPS GEORGE MASON ES
OWNER:	ALEXANDRIA CITY PUBLIC SCHOOLS
LOCATION:	ALEXANDRIA, VA
A / E:	STUDIO 27 ARCHITECTS
C/M:	N/A
PHASE:	MASTER PLAN ESTIMATE

February 4, 2020

DIVISION	DESCRIPTION	TOTAL *GROSS SF:* TOTAL	*110,940 SF* RATE/GSF	COMMENTS
DIVISION 01	GENERAL REQUIREMENTS	$ 78,000	$ 0.70	
DIVISION 02	EXISTING CONDITIONS	$ 1,678,593	$ 15.13	
DIVISION 03	CONCRETE	$ 2,097,220	$ 18.90	
DIVISION 04	MASONRY	$ 3,341,250	$ 30.12	
DIVISION 05	METALS	$ 2,857,927	$ 25.76	
DIVISION 06	WOODS & PLASTICS	$ 771,410	$ 6.95	
DIVISION 07	THERMAL AND MOISTURE PROTECTION	$ 2,540,029	$ 22.90	
DIVISION 08	OPENINGS	$ 2,360,775	$ 21.28	
DIVISION 09	FINISHES	$ 3,361,482	$ 30.30	
DIVISION 10	SPECIALTIES	$ 167,034	$ 1.51	
DIVISION 11	EQUIPMENT	$ 1,755,000	$ 15.82	
DIVISION 12	FURNISHINGS	$ 83,205	$ 0.75	
DIVISION 13	SPECIAL CONSTRUCTION	$ -	$ -	
DIVISION 14	CONVEYING EQUIPMENT	$ 110,000	$ 0.99	
DIVISION 21	FIRE SUPPRESSION	$ 676,734	$ 6.10	
DIVISION 22	PLUMBING	$ 1,664,100	$ 15.00	
DIVISION 23	HVAC	$ 8,875,200	$ 80.00	
DIVISION 25	INTEGRATED AUTOMATION	$ 1,664,100	$ 15.00	
DIVISION 26	ELECTRICAL	$ 3,993,840	$ 36.00	
DIVISION 27	COMMUNICATIONS	$ 1,020,648	$ 9.20	
DIVISION 28	ELECTRONIC SAFETY AND SECURITY	$ 887,520	$ 8.00	
DIVISION 31	EARTHWORK	$ 1,487,500	$ 13.41	
DIVISION 32	EXTERIOR IMPROVEMENTS	$ 3,168,600	$ 28.56	
DIVISION 33	UTILITIES	$ 435,000	$ 3.92	
	DIRECT COST TOTAL	$ *45,075,167*	$ *406.30*	
	GENERAL CONDITIONS: 10.0%	$ **4,507,517**	$ **40.63**	
	SUB TOTAL	$ *49,582,684*	$ *446.93*	
	CM FEE: 5.0%	$ **2,479,134**	$ **22.35**	
	SUB TOTAL	$ *52,061,818*	$ *469.28*	
	DESIGN CONTINGENCY: 15.0%	$ **7,809,273**	$ **70.39**	
	SUB TOTAL	$ *59,871,091*	$ *539.67*	
	BONDS & INSURANCE: 2.0%	$ **1,197,422**	$ **10.79**	
	SUB TOTAL	$ *61,068,512*	$ *550.46*	
	ESCALATION: EXCLUDED	$ -	$ -	
	TOTAL CONSTRUCTION COST	$ **61,068,512**	$ **550.46**	

ESTIMATE

PROJECT:	ACPS GEORGE MASON ES
OWNER:	ALEXANDRIA CITY PUBLIC SCHOOLS
LOCATION:	ALEXANDRIA, VA
A / E:	STUDIO 27 ARCHITECTS
C/M:	N/A
PHASE:	MASTER PLAN ESTIMATE — GROSS SF: 110,940 SF — *February 4, 2020*

DIVISION	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
01	**DIVISION 01 - GENERAL REQUIREMENTS**				
	Temporary construction fence	3,900	LF	$ 20.00	$ 78,000
					$ -
TOTAL FOR	**DIVISION 01 - GENERAL REQUIREMENTS**				$ 78,000
02	**DIVISION 02 - EXISTING CONDITIONS**				
	Demolish existing building	50,575	SF	$ 13.00	$ 657,475
	Allowance for removal of hazardous materials	50,575	SF	$ 13.00	$ 657,475
					$ -
	Gut interior of existing building front to remain (historical remain)	10,300	SF	$ 10.25	$ 105,575
	Allowance for removal of hazardous materials	10,300	SF	$ 18.00	$ 185,400
					$ -
	Remove existing roof remaining	5,200	SF	$ 2.75	$ 14,300
					$ -
	Existing building façade repair at demoed building	4,864	SF	$ 12.00	$ 58,368
					$ -
TOTAL FOR	**DIVISION 02 - EXISTING CONDITIONS**				$ 1,678,593
03	**DIVISION 03 - CONCRETE**				
	Concrete foundations for new building	100,640	GSF	$ 6.50	$ 654,160
					$ -
	Concrete slab-on-grade, including stone fill, damp proofing complete	50,320	SF	$ 10.25	$ 515,780
	Under slab drainage system	50,320	SF	$ 3.50	$ 176,120
					$ -
	Concrete on metal decking	50,320	SF	$ 13.00	$ 654,160
					$ -
	New concrete stairs and landings	6	FLIGHTS	$ 13,000.00	$ 78,000
					$ -
	Elevator pit complete	1	EA	$ 19,000.00	$ 19,000
					$ -
TOTAL FOR	**DIVISION 03 - CONCRETE**				$ 2,097,220
04	**DIVISION 04 - MASONRY**				
	Allowance for Brick veneer on back-up system, includes insulation, air barriers, damp proofing, etc. complete (assume 70% is brick veneer and 30% is glazed system) Excludes curtain wall systems	44,550	SF	$ 75.00	$ 3,341,250
					$ -
TOTAL FOR	**DIVISION 04 - MASONRY**				$ 3,341,250
05	**DIVISION 05 - METALS**				
	Structural steel framing at 1st level @ 12lbs/sf	302	TON	$ 5,500.00	$ 1,661,000
					$ -
	Structural steel framing 2nd floor @ 6.5lbs/sf	164	TON	$ 5,500.00	$ 902,000
	Structural steel framing for roof MEP and equipment screens (allow 20lbs/lf of screen area)	5	TON	$ 4,900.00	$ 24,500
					$ -

ESTIMATE

PROJECT:	ACPS GEORGE MASON ES
OWNER:	ALEXANDRIA CITY PUBLIC SCHOOLS
LOCATION:	ALEXANDRIA, VA
A / E:	STUDIO 27 ARCHITECTS
C/M:	N/A
PHASE:	MASTER PLAN ESTIMATE — GROSS SF: 110,940 SF — *February 4, 2020*

DIVISION	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	Stair handrails	6	FLIGHTS	$ 4,300.00	$ 25,800
	Stair handrails to existing bldg.	4	FLIGHTS	$ 4,300.00	$ 17,200
					$ -
	Miscellaneous metals allowance	110,940	GSF	$ 2.05	$ 227,427
					$ -
TOTAL FOR	**DIVISION 05 - METALS**				$ 2,857,927
06	**DIVISION 06 - WOODS & PLASTICS**				
	Rough carpentry	110,940	GSF	$ 1.50	$ 166,410
	Allowance for millwork/casework	1	ALLOW	$ 605,000.00	$ 605,000
					$ -
TOTAL FOR	**DIVISION 06 - WOODS & PLASTICS**				$ 771,410
07	**DIVISION 07 - THERMAL AND MOISTURE PROTECTION**				
	Insulation, damp proofing, air barrier, etc. to brick veneer façade				*Incl. in Div. 4*
	Insulation to the interior face of the existing exterior walls				*Assume not required*
					$ -
	Roof waterproofing system 30% of total roof area (built-up roofing)	15,096	SF	$ 25.00	$ 377,400
	Roof waterproofing system with green roof 70% of roof total	35,224	SF	$ 51.00	$ 1,796,424
	New roofing at existing building (built-up roofing)	5,200	SF	$ 25.00	$ 130,000
					$ -
	Metal panels at roof screens assume 375lf at 8' high	3,000	SF	$ 51.00	$ 153,000
					$ -
	Allowance for joint sealants, fireproofing, etc.	110,940	GSF	$ 0.75	$ 83,205
					$ -
TOTAL FOR	**DIVISION 07 - THERMAL AND MOISTURE PROTECTION**				$ 2,540,029
08	**DIVISION 08 - OPENINGS**				
	Exterior glazing at new building 930% of total façade)	13,365	SF	$ 95.00	$ 1,269,675
	Replace existing windows of existing bldg.	10,300	SF	$ 12.00	$ 123,600
					$ -
	Skylights allowance	1,000	SF	$ 250.00	$ 250,000
					$ -
	Exterior double doors at main entrance	2	PAIR	$ 20,000.00	$ 40,000
	Secondary entrance double doors	6	PAIR	$ 15,000.00	$ 90,000
					$ -
	Existing main entrance doors	2	PAIR	$ 20,000.00	$ 40,000
	Existing secondary entrances	4	PAIR	$ 15,000.00	$ 60,000
					$ -
	Interior doors allowance	150	LEAFS	$ 2,500.00	$ 375,000
	Interior of existing doors	45	LEAFS	$ 2,500.00	$ 112,500
					$ -
TOTAL FOR	**DIVISION 08 - OPENINGS**				$ 2,360,775

ESTIMATE

PROJECT:	ACPS GEORGE MASON ES
OWNER:	ALEXANDRIA CITY PUBLIC SCHOOLS
LOCATION:	ALEXANDRIA, VA
A / E:	STUDIO 27 ARCHITECTS
C/M:	N/A
PHASE:	MASTER PLAN ESTIMATE — GROSS SF: 110,940 SF — *February 4, 2020*

DIVISION	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
09	**DIVISION 09 - FINISHES**				
	Interior wall construction (allowance includes all types of walls, including interior glazing)	110,940	GSF	$ 8.10	$ 898,614
					$ -
	Wall finishes, including tack boards, acoustical panels, paint, ceramic wall tile etc.	110,940	GSF	$ 6.50	$ 721,110
					$ -
	Floor finishes allowance	110,940	GSF	$ 8.75	$ 970,725
	Ceiling finish allowance	110,940	GSF	$ 6.95	$ 771,033
					$ -
					$ -
TOTAL FOR	**DIVISION 09 - FINISHES**				$ 3,361,482
10	**DIVISION 10 - SPECIALTIES**				
	Toilet partitions, accessories, mirrors and vanity counter tops	110,940	GSF	$ 1.10	$ 122,034
					$ -
	Interior signage/way finding allowance	1	ALLOW	$ 35,000.00	$ 35,000
	Interior signage/way finding allowance	1	ALLOW	$ 10,000.00	$ 10,000
					$ -
TOTAL FOR	**DIVISION 10 - SPECIALTIES**				$ 167,034
11	**DIVISION 11 - EQUIPMENT**				
	Food service equipment	1	ALLOW	$ 650,000.00	$ 650,000
					$ -
	Gymnasium equipment (bleachers, scoreboards, basketball hoops,	1	ALLOW	$ 205,000.00	$ 205,000
					$ -
	Audiovisual equipment - gymnasium	1	ALLOW	$ 150,000.00	$ 150,000
	Audiovisual equipment - cafeteria	1	ALLOW	$ 75,000.00	$ 75,000
	Audiovisual equipment - Music classroom	1	ALLOW	$ 75,000.00	$ 75,000
	Audiovisual equipment - classrooms, etc.	1	ALLOW	$ 475,000.00	$ 475,000
					$ -
	Dry eraser marker boards, etc.	1	ALLOW	$ 125,000.00	$ 125,000
					$ -
TOTAL FOR	**DIVISION 11 - EQUIPMENT**				$ 1,755,000
12	**DIVISION 12 - FURNISHINGS**				
	Window blinds @ exterior windows	110,940	GSF	$ 0.75	$ 83,205
					$ -
TOTAL FOR	**DIVISION 12 - FURNISHINGS**				$ 83,205
13	**DIVISION 13 - SPECIAL CONSTRUCTION**				
					N/A
					$ -
TOTAL FOR	**DIVISION 13 - SPECIAL CONSTRUCTION**				$ -

ESTIMATE

PROJECT:	ACPS GEORGE MASON ES
OWNER:	ALEXANDRIA CITY PUBLIC SCHOOLS
LOCATION:	ALEXANDRIA, VA
A / E:	STUDIO 27 ARCHITECTS
C/M:	N/A
PHASE:	MASTER PLAN ESTIMATE — GROSS SF: 110,940 SF — *February 4, 2020*

DIVISION	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
14	**DIVISION 14 - CONVEYING EQUIPMENT**				
	Elevator 2 stops	1	EA	$ 110,000.00	$ 110,000
					$ -
TOTAL FOR	**DIVISION 14 - CONVEYING EQUIPMENT**				$ 110,000
21	**DIVISION 21 - FIRE SUPPRESSION**				
	Fire sprinkler system	110,940	GSF	$ 6.10	$ 676,734
					$ -
TOTAL FOR	**DIVISION 21 - FIRE SUPPRESSION**				$ 676,734
22	**DIVISION 22 - PLUMBING**				
	Plumbing system allowance	110,940	GSF	$ 15.00	$ 1,664,100
					$ -
TOTAL FOR	**DIVISION 22 - PLUMBING**				$ 1,664,100
23	**DIVISION 23 - HVAC**				
	HVAC systems allowance	110,940	GSF	$ 80.00	$ 8,875,200
					$ -
TOTAL FOR	**DIVISION 23 - HVAC**				$ 8,875,200
25	**DIVISION 25 - INTEGRATED AUTOMATION**				
	HVAC systems controls allowance	110,940	GSF	$ 15.00	$ 1,664,100
					$ -
TOTAL FOR	**DIVISION 25 - INTEGRATED AUTOMATION**				$ 1,664,100
26	**DIVISION 26 - ELECTRICAL**				
	Electrical systems allowance	110,940	GSF	$ 36.00	$ 3,993,840
					$ -
TOTAL FOR	**DIVISION 26 - ELECTRICAL**				$ 3,993,840
27	**DIVISION 27 - COMMUNICATIONS**				
	Telecommunications, public address, clock and radio	110,940	GSF	$ 3.25	$ 360,555
	IT/Data systems	110,940	GSF	$ 5.20	$ 576,888
	A/V conduits and cabling	110,940	GSF	$ 0.75	$ 83,205
					$ -
					$ -
TOTAL FOR	**DIVISION 27 - COMMUNICATIONS**				$ 1,020,648

ESTIMATE

PROJECT:	**ACPS GEORGE MASON ES**
OWNER:	**ALEXANDRIA CITY PUBLIC SCHOOLS**
LOCATION:	**ALEXANDRIA, VA**
A / E:	**STUDIO 27 ARCHITECTS**
C/M:	**N/A**
PHASE:	**MASTER PLAN ESTIMATE** — **GROSS SF: 110,940 SF** — *February 4, 2020*

DIVISION	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
28	**DIVISION 28 - ELECTRONIC SAFETY AND SECURITY**				
	Access control and CCTV systems	110,940	GSF	$ 3.75	$ 416,025
	Fire alarm	110,940	GSF	$ 2.75	$ 305,085
	Intrusion detection system	110,940	GSF	$ 1.50	$ 166,410
					$ -
TOTAL FOR	**DIVISION 28 - ELECTRONIC SAFETY AND SECURITY**				$ 887,520
31	**DIVISION 31 - EARTHWORK**				
	Rough grading site	370,000	SF	$ 3.75	$ 1,387,500
					$ -
	Erosion and sediment control measures	1	ALLOW	$ 100,000.00	$ 100,000
					$ -
TOTAL FOR	**DIVISION 31 - EARTHWORK**				$ 1,487,500
32	**DIVISION 32 - EXTERIOR IMPROVEMENTS**				
	Clearing and grubbing site preparations	240,000	SF	$ 1.65	$ 396,000
					$ -
	Asphalt driveways and parking area	65,000	SF	$ 6.75	$ 438,750
	Concrete curbs	4,050	LF	$ 40.00	$ 162,000
					$ -
	Walkway allowance	4,000	SF	$ 22.00	$ 88,000
					$ -
	Site fencing allowance	2,500	LF	$ 90.00	$ 225,000
					$ -
	Landscaping allowance	1	ALLOW	$ 225,000.00	$ 225,000
					$ -
	Site lighting allowance	1	ALLOW	$ 150,000.00	$ 150,000
					$ -
	Baseball field backstop, bases, etc.	1	ALLOW	$ 35,000.00	$ 35,000
	Soccer field artificial turf	12,000	SF	$ 21.00	$ 252,000
	Goals	2	EA	$ 3,500.00	$ 7,000
	Field lighting	1	ALLOW	$ 360,000.00	$ 360,000
					$ -
	Courtyard for outdoor activities and views	12,330	SF	$ 45.00	$ 554,850
					$ -
	Stormwater bio-retention area	1	ALLOW	$ 275,000.00	$ 275,000
					$ -
					$ -
TOTAL FOR	**DIVISION 32 - EXTERIOR IMPROVEMENTS**				$ 3,168,600
33	**DIVISION 33 - UTILITIES**				
	Domestic water service	1	ALLOW	$ 100,000.00	$ 100,000
	Sanitary sewer service	1	ALLOW	$ 75,000.00	$ 75,000
	Strom water service	1	ALLOW	$ 75,000.00	$ 75,000
	Electrical service	1	ALLOW	$ 185,000.00	$ 185,000
					$ -
TOTAL FOR	**DIVISION 33 - UTILITIES**				$ 435,000

III. George Mason Master Plan and Technical Data

Cost Estimate - Renovation

Division Code	Description	Qty	Unit	Unit Cost	Subtotal	Division Total
	Conceptual Construction Total Direct Cost (Renovation and New Construction)					**$35,807,469.62**
-	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Mark-up Total**
-	**Markups**					
	General Conditions	1	ALLOW	10%	*$3,580,747*	$39,388,217
	CM Fee	1	ALLOW	5.00%	*$1,969,411*	$41,357,627
	Design Contingency	1	ALLOW	15.00%	*$6,203,644*	$47,561,272
	Bonds & Insurance	1	ALLOW	2.00%	*$951,225*	$48,512,497
	Total Conceptual Construction Cost (Renovation and New Construction)					**$48,512,496.95**
	Cost / SF					**$481.20**
	Exclusions					
	Architectural Engineering Fees					
	Escalation					
	Fees and Permits					
	Phasing					
	Overtime					
	Deep foundation systems					
	Library Shelving					
	Photovoltaic Systems					
	Playground Equipment					
	Bleachers					
	Electronic Scoreboards					
	Trash compactors/bins					
	loose Furniture Fixtures and Equipment					
	Locker refurbishment					
	Site Utilities					
	change order contingency					
	Finance Costs					
	Qualifications					
	Assume conventional concrete strip foundation systems					
	Assume 12' floor to slab height for existing building					
	Assume structural steel frame construction with concrete on metal deck slabs					
	Structural steel framing assumed @ 12lbs/sf for the 1st level and 6.5lbs/sf for the 2nd level					
	Assume typical floor to slab height of 14', double volume areas 25'					
	Assume conventional built-up roof waterproofing system to 30% of overall roof area, green roof of 70% of roof area					
	Assume 30lf of millwork per classroom					
	Assume one (1) elevator with two (3) stops					
	New school is assumed without a basement a slab on grade					
	The existing building is assumed to maintain existing site utilities no upgrades					

Project	George Mason Elementary School					
Client	Alexandria City Public Schools					
Location	2601 Cameron Mills Road Alexandria, Virginia 22302					
	Construction and Renovation Area	**100,815**				
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
1.0	**General Requirements**					
	Temporary Construction Fence	3,900	LF	$20.00	$78,000.00	*$78,000.00*
		Division 1 Subtotal				**$78,000.00**
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
2.0	**Existing Conditions**					
	Shell interior of building	44,466	SF	$10.25	$455,776.50	*$455,776.50*
	Allowance for removal of hazardous material	44,466	SF	$18.00	$800,388.00	*$800,388.00*
		Division 2 Subtotal				**$1,256,164.50**
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
3.0	**Concrete**					
	Concrete foundation for new building	39,940	GSF	$6.50	$259,729.82	*$259,729.82*
	Concrete slab-on-grade	19,970	SF	$10.25	$204,692.50	*$204,692.50*
	Underslab drainage	19,970	SF	$3.50	$69,895.00	*$69,895.00*
	Concrete on metal decking	19,970	SF	$13.00	$259,610.00	*$259,610.00*
	New concrete stairs and landings	6	FLIGHTS	$13,000.00	$78,000.00	*$78,000.00*
	Elevator Pit	1	EA	$19,000.00	$19,000.00	*$19,000.00*
		Division 3 Subtotal				**$890,927.32**
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
4.0	**Masonry**					
	Brick Façade and assembly (air barrier, insulation etc.)	21,195	SF	$75.00	$1,589,625.00	*$1,589,625.00*
		Division 4 Subtotal				**$1,589,625.00**
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
5.0	**Metals**					
	Structural Steel Framing @ first level	120	TON	$5,500.00	$660,000.00	*$660,000.00*
	Structural Steel Framing @ Second Level	65	TON	$5,500.00	$357,500.00	*$357,500.00*
	Structural Steel Framing for roof MEP equipment and screens	5	TON	$4,900.00	$24,500.00	*$24,500.00*
	Stair handrails	6	FLIGHTS	$4,300.00	$25,800.00	*$25,800.00*
	Miscellaneous metals allowance	39,940	GSF	$2.05	$81,877.00	*$81,877.00*
		Division 5 Subtotal				**$1,149,677.00**
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
6.0	**Woods and Plastics**					
	Rough Carpentry	39,940	GSF	$1.50	$59,910.00	*$59,910.00*
	Allowance for millwork/casework	1	ALLOW	$605,000.00	$605,000.00	*$605,000.00*
		Division 6 Subtotal				**$664,910.00**

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Division Code	Description	Qty	Unit	Unit Cost	Subtotal	Division Total
7.0	**Thermal and Moisture Protection**					
	Insulation and damp proofing incl. in Div 4					
	Built-up Roof waterproofing system 30% total roof area	5,991	SF	$25.00	$149,775.00	*$149,775.00*
	Green Roof water proofing system 70% total roof area	13,979	SF	$51.00	$712,929.00	*$712,929.00*
	New roofing at existing building	44,466	SF	$25.00	$1,111,650.00	*$1,111,650.00*
	Metal Panels at roof	3,000	SF	$51.00	$153,000.00	*$153,000.00*
	Allowance for joint sealers, fireproofing, etc.	64,436	GSF	$0.75	$48,327.00	*$48,327.00*
		Division 7 Subtotal				**$2,175,681.00**

Division Code	Description	Qty	Unit	Unit Cost	Subtotal	Division Total
8.0	**Doors and Windows**					
	Exterior glazing at new building (30% of façade)	6,359	SF	$95.00	$604,057.50	*$604,057.50*
	Replace existing windows of existing bldg.	60,875	SF	$12.00	$730,500.00	*$730,500.00*
	Skylight allowance	1,000	SF	$250.00	$250,000.00	*$250,000.00*
	Exterior double doors at main entrance	2	PAIR	$20,000.00	$40,000.00	*$40,000.00*
	Secondary entrance double doors	6	PAIR	$15,000.00	$90,000.00	*$90,000.00*
	Existing main entrance doors	4	PAIR	$20,000.00	$80,000.00	*$80,000.00*
	Existing secondary entrances	5	PAIR	$15,000.00	$75,000.00	*$75,000.00*
	Interior doors allowance	54	LEAFS	$2,500.00	$135,000.00	*$135,000.00*
		Division 8 Subtotal				**$2,004,557.50**

Division Code	Description	Qty	Unit	Unit Cost	Subtotal	Division Total
9.0	**Finishes**					
	New Construction Interior wall construction allowance (includes interior glazing)	39,940	GSF	$8.10	$323,514.00	*$323,514.00*
	New Construction Wall finishes (paints, tack boards, ceramic, etc.)	39,940	GSF	$6.50	$259,610.00	*$259,610.00*
	Floor Finishes	39,940	GSF	$8.75	$349,475.00	*$349,475.00*
	Existing Ceiling Finish	39,940	GSF	$6.95	$277,583.00	*$277,583.00*
	Existing Interior wall construction allowance (includes interior glazing)	44,466	GSF	$8.10	$360,174.60	*$360,174.60*
	Existing Interior wall construction allowance (includes interior glazing)	44,466	GSF	$6.50	$289,029.00	*$289,029.00*
	Existing Floor Finishes	44,466	GSF	$8.75	$389,077.50	*$389,077.50*
	Existing Ceiling Finish	44,466	GSF	$6.95	$309,038.70	*$309,038.70*
		Division 9 Subtotal				**$2,557,501.80**

Division Code	Description	Qty	Unit	Unit Cost	Subtotal	Division Total
10.0	**Specialties**					
	Toilet Partitions, accessories, mirrors and vanity counter tops	39,940	SF	$1.10	$43,934.00	*$43,934.00*
	Interior signage way finding allowance	1	ALLOW	$35,000.00	$35,000.00	*$35,000.00*
		Division 10 Subtotal				**$78,934.00**

Division Code	Description	Qty	Unit	Unit Cost	Subtotal	Division Total
11.0	**Equipment**					
	Gymnasium Equipment	1	ALLOW	$205,000.00	$205,000.00	*$205,000.00*
	Audiovisual equipment - gymnasium	1	ALLOW	$150,000.00	$150,000.00	*$150,000.00*
	Dry Eraser marker boards	1	ALLOW	$125,000.00	$125,000.00	*$125,000.00*
	Audiovisual equipment - Cafeteria	1	ALLOW	$75,000.00	$75,000.00	*$75,000.00*
	Audiovisual equipment - Music Classroom	1	ALLOW	$75,000.00	$75,000.00	*$75,000.00*
	Audiovisual equipment - Classrooms	1	ALLOW	$475,000.00	$475,000.00	*$475,000.00*
		Division 11 Subtotal				**$1,105,000.00**

Continued on next page

Division Code	Description	Qty	Unit	Unit Cost	Subtotal	Division Total
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
12.0	**Furnishings**					
	New Construction Window blinds	39,940	GSF	$0.75	$29,955.00	*$29,955.00*
	Existing Construction window blinds	44,466	GSF	$0.75	$33,349.50	*$33,349.50*
		Division 12 Subtotal				**$63,304.50**
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
14.0	**Convey Systems**					
	Elevator 2 Stops	1	EA	$110,000.00	$110,000.00	*$110,000.00*
		Division 14 Subtotal				**$110,000.00**
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
21.0	**Fire Suppression**					
	New Sprinkler System (Existing and New Construction)	100,815	GSF	$6.10	$614,971.50	*$614,971.50*
		Division 21 Subtotal				**$614,971.50**
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
22.0	**Plumbing**					
	Plumbing System Allowance (Existing and New Construction)	100,815	GSF	$15.00	$1,512,225.00	*$1,512,225.00*
		Division 22 Subtotal				**$1,512,225.00**
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
23.0	**Mechanical**					
	HVAC System allowance (Existing and New Construction)	100,815	GSF	$80.00	$8,065,200.00	*$8,065,200.00*
		Division 23 Subtotal				**$8,065,200.00**
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
25.0	**Integrated Automation**					
	HVAC System controls allowance (Existing and New Construction)	100,815	GSF	$15.00	$1,512,225.00	*$1,512,225.00*
		Division 25 Subtotal				**$1,512,225.00**
Division Code	**Description**	**Qty**	**Unit**	**Unit Cost**	**Subtotal**	**Division Total**
26.0	**Electrical**					
	Electrical System allowance (Existing and New Construction)	100,815	GSF	$36.00	$3,629,340.00	*$3,629,340.00*
		Division 26 Subtotal				**$3,629,340.00**

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Division Code	Description	Qty	Unit	Unit Cost	Subtotal	Division Total
27.0	**Communications**					
	Telecommunications, public address, clock and radio	100,815	GSF	$3.25	$327,648.75	*$327,648.75*
	IT/Data Systems	100,815	GSF	$5.20	$524,238.00	*$524,238.00*
	A/V Conduits and Cabling	100,815	GSF	$0.75	$75,611.25	*$75,611.25*
		Division 26 Subtotal				**$927,498.00**

Division Code	Description	Qty	Unit	Unit Cost	Subtotal	Division Total
28.0	**Electronic Safety and Security**					
	Access control and CCTV systems	100,815	GSF	$3.75	$378,056.25	*$378,056.25*
	Fire Alarm	100,815	GSF	$2.75	$277,241.25	*$277,241.25*
	Intrusion detection system	100,815	GSF	$1.50	$151,222.50	*$151,222.50*
		Division 26 Subtotal				**$806,520.00**

Division Code	Description	Qty	Unit	Unit Cost	Subtotal	Division Total
31.0	**Earthwork**					
	Rough grading site	349,762	SF	$3.75	$1,311,607.50	*$1,311,607.50*
	Erosion and Sediment Control	1	ALLOW	$100,000.00	$100,000.00	*$100,000.00*
		Division 26 Subtotal				**$1,411,607.50**

Division Code	Description	Qty	Unit	Unit Cost	Subtotal	Division Total
32.0	**Exterior Improvements**					
	Clearing and grubbing site preparations	240,000	SF	$1.65	$396,000.00	*$396,000.00*
	Asphalt driveways and parking area	65,000	SF	$6.75	$438,750.00	*$438,750.00*
	Concrete curbs	4,050	LF	$40.00	$162,000.00	*$162,000.00*
	Walkway allowance	4,000	SF	$22.00	$88,000.00	*$88,000.00*
	Site Fencing allowance	2,500	LF	$90.00	$225,000.00	*$225,000.00*
	Landscaping allowance	1	ALLOW	$225,000.00	$225,000.00	*$225,000.00*
	Site lighting allowance	1	ALLOW	$150,000.00	$150,000.00	*$150,000.00*
	Baseball filed	1	ALLOW	$35,000.00	$35,000.00	*$35,000.00*
	Soccer Field	12,000	SF	$21.00	$252,000.00	*$252,000.00*
	Goals	2	EA	$3,500.00	$7,000.00	*$7,000.00*
	Field lighting	1	ALLOW	$360,000.00	$360,000.00	*$360,000.00*
	Outdoor activities and views	12,330	SF	$45.00	$554,850.00	*$554,850.00*
	Stormwater bio retention area	1	ALLOW	$275,000.00	$275,000.00	*$275,000.00*
		Division 26 Subtotal				**$3,168,600.00**

Division Code	Description	Qty	Unit	Unit Cost	Subtotal	Division Total
33.0	**Utilities**					
	Domestic water service	1	ALLOW	$100,000.00	$100,000.00	*$100,000.00*
	Sanitary sewer service	1	ALLOW	$75,000.00	$75,000.00	*$75,000.00*
	Storm water service	1	ALLOW	$75,000.00	$75,000.00	*$75,000.00*
	Electrical service	1	ALLOW	$185,000.00	$185,000.00	*$185,000.00*
		Division 26 Subtotal				**$435,000.00**
	Conceptual Construction Total Direct Cost (Renovation and New Construction)					**$35,807,469.62**

III. George Mason Master Plan and Technical Data

Program and Capacity

Table 5 Core Academic Program

		George Mason Existing Program			Ed Spec Student Model		
Jse	Program Space	# of spaces	Avg SF / Room	Total SF	# of Spaces	SF / Room	Total SF
Core Academic	Pre-K				*4*	*1,175*	*4,700*
	Kindergarten	4	983	3,930	*5*	*1,175*	*5,875*
	K2						
	1st Grade	4	881	3,525	*5*	*900*	*4,500*
	2nd Grade	4	710	2,840	*4*	*900*	*3,600*
	3rd Grade	4	795	3,180	*4*	*900*	*3,600*
	4th Grade	4	715	2,860	*4*	*900*	*3,600*
	4th+5th Grade	1	715	715			
	5th Grade	3	715	2,145	*4*	*900*	*3,600*
	Extended Learning Area				*5*	*600*	*3,000*
	Classroom Bathroom						
	Special Ed	1	350	350	*3*	*250*	*750*
	Resource Classroom (Other)				*2*	*250*	*500*
	TAG	1	715	715	*1*	*900*	*900*
	Student Project Storage						*150*
	Reading Specialist	5	316	1,580			
	ELL				*3*	*700*	*2,100*
	Student Services	1	275	275	*4*	*100*	*400*
	Counselor	1	340	340			
	Speech Language Provider (SLP)	1	270	270			
	Occupational Therapist (OT)				*1*	*400*	*400*
	Storage				*4*	*200*	*800*
	Teacher Collab Room				*5*	*250*	*1,250*
	Early Childhood Learning				*1*	*2,000*	*2,000*
	Early Childhood Storage				*1*	*200*	*200*
	Total			**22,725**			***41,925***

19,200 ***SF Deficiency*** ***45.80%*** **Deficiency**

Table 6 Shared Program

		George Mason Existing Program			Ed Spec Student Model				
Use	**Program Space**	**# of spaces**	**Avg SF / Room**	**Total SF**	**# of Spaces**	**SF / Room**	**Total SF**		
Visual Art / Music / Science	Art Lab	1	775	775	*1*	*1,200*	*1,200*		
	Kiln Room				*1*	*75*	*75*		
	General Music Room				*1*	*1,200*	*1,200*		
	Instrumental Music Room				*1*	*1,000*	*1,000*		
	General Music Storage				*1*	*150*	*150*		
	Instrument Storage				*1*	*250*	*250*		
	Orchestra/Music	3	varies	2,190					
	Total			**2,965**			***3,875***	***910* SF Deficiency**	***23.48%* Deficiency**
Media Center / Library	Reading / Learning / Circulation	1	2,925	2,925	*1*	*3,000*	*3,000*		
	Technical Processing Room				*1*	*200*	*200*		
	Combined Office / Workroom				*1*	*200*	*200*		
	Device / Changing Room				*1*	*150*	*150*		
	Storage				*1*	*200*	*200*		
	Small Group Room				*2*	*150*	*300*		
	Total			**2,925**			***4,050***	***1,125* SF Deficiency**	***27.78%* Deficiency**
Physical Education	Gymnasium				*1*	*6,500*	*6,500*		
	PE Office				*2*	*150*	*300*		
	PE Storage				*2*	*250*	*500*		
	Multipurpose	1	4,760	4,760	*1*	*1,500*	*1,500*		
	Total			**4,760**			***8,800***	***4,040* SF Deficiency**	***45.91%* Deficiency**
Student Dining and Food Services	Student Dining Area	1	5,355	5,355	*1*	*3,000*	*3,000*		
	Chair and Table Storage				*1*	*350*	*350*		
	Serving Area				*1*	*700*	*700*		
	Kitchen Suite	1	2,600	2,600	*1*	*2,150*	*2,150*		
	Stage with Storage				*1*	*1,100*	*1,100*		
	Total			**7,955**			***7,300***	***-655* SF (Excess)**	***-8.97%* (Increase)**

Table 7 Admin. Program

	George Mason Existing Program				Ed Spec Student Model				
Use	**Program Space**	**# of spaces**	**Avg SF / Room**	**Total SF**	**# of Spaces**	**SF / Room**	**Total SF**		
Administration	**Lobby**	1	355	355	*1*	*700*	*700*		
	Welcome Center	2	varies	1,005	*1*	*450*	*450*		
	Conference Room	1	425	425	*1*	*250*	*250*		
	Principals Office				*1*	*180*	*180*		
	Asst. Principals Office				*1*	*150*	*150*		
	Misc. Office	2	190	380					
	Administrators' Workroom	1	150	150	*1*	*200*	*200*		
	Teacher Lounge	1	550	550					
	Mail Room				*1*	*125*	*125*		
	Records Room				*1*	*150*	*150*		
	Family and Community Engagement				*1*	*470*	*470*		
	Staff Toilet				*1*	*50*	*50*		
	Student Services Office				*2*	*150*	*300*		
	Student Services Conference				*1*	*200*	*200*		
	Health Suite	1	305	305	*1*	*900*	*900*		
	Child and Family Network								
	After School Storage				*1*	*250*	*250*		
	Total			**3,170**			***4,375***	***1,205* SF Deficiency**	***27.54%* Deficiency**

Table 8 Support Program and Total

		George Mason Existing Program			Ed Spec Student Model				
Use	**Program Space**	**# of spaces**	**Avg SF / Room**	**Total SF**	**# of Spaces**	**SF / Room**	**Total SF**		
Maint./ Custodial Services	**Total**			**120**			*850*	***730* SF Deficiency**	***85.88%* Deficiency**
Building Services and Restrooms	Corridors			7,870			*13,400*		
	Other Services and Restrooms			4,865			*8,600*		
	Total			**12,735**			***22,000***	***9,265* SF Deficiency**	***42.11%* Deficiency**
Total Neta Area (SF)				**57,355**			*93,175*	***35,820* SF Deficiency**	***38.44%* Deficiency**
Total Gross Bldg. Area (sf)				**60,875**			*100,815*	***39,940* SF Deficiency**	***39.62%* Deficiency**