HIGH SCHOOL EDUCATIONAL SPECIFICATIONS FOR

ALEXANDRIA CITY PUBLIC SCHOOLS

- 1600 STUDENT CAPACITY PROTOTYPE -

JUNE 2016 | FINAL REPORT

FORWARD

The City of Alexandria (the City) and the Alexandria City Public School Division (ACPS) joined together in the fall of 2012 to develop a Long Range Educational Facilities Plan (LREFP) to improve facilities planning, accommodate the growing student population, and enhance educational programs and services. In the spring of 2016, as part of a Phase Two LREFP update, ACPS engaged Brailsford & Dunlavey and Studio27 Architecture ("the Planning Team") to develop high school educational specifications. An educational specification ("Ed Spec") is the guiding document used for capital improvement planning that describes the proposed outcomes of a school modernization or new construction project.

The document presented here is a result of the application of professional technical expertise and the collaboration of invested and knowledgeable stakeholders. It is outlined in the following table of contents.

The recommended program and concepts presented herein constitute the professional opinions of the Planning Team based on the assumptions and conditions detailed throughout; however, the board of education will make the final recommendation. It is recommended this document be comprehensively updated every 10 years and be a living document updated by the ACPS Facilities Planning Department.

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All the faculty, staff, and committee members who joined the effort throughout.

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INTRODUCTION

PURPOSE

The purpose of these educational specifications ("Ed Specs") is to serve as the guiding recipe and benchmark for future school renovations and new construction projects for Alexandria City Public Schools. The Ed Specs should encourage a school facility design that lends itself to a culturally competent student workplace for a broad range of diverse learners in our early childhood education centers.

Per the National School Boards Association:

> *The purpose of educational specifications ("Ed Specs") is to define the programmatic, functional, spatial, and environmental requirements of the educational facility, whether new or remodeled, in written and graphic form for review, clarification, and agreement as to scope of work and design requirements by the architect, engineer, and other professionals working on the building design.* [i]

The Ed Specs tell the story of the school facility and how the built learning environment will support the academic programs and vision of the school's leadership. This generic high school Ed Spec is primarily intended for use as a planning guide by architects and project planners, but it is also intended to serve as a communication and benchmarking tool for all project stakeholders: students, parents, and families; faculty and administrators; civic leaders and community members; and project design and construction partners.

The general concept embodied in the specifications is to provide adequate details for proposed spaces while leaving ample flexibility for creativity and options in design by the architects. They define expectations among project stakeholders but do not limit creativity. The Ed Specs are also a living document; amendments can be discussed, developed, and issued over time.

PROJECT PLANNING:

During the planning phase of a project, the Ed Specs should be utilized to understand and develop future project scopes of work and budgets. They should be included in project procurements to ensure that interested vendors are clearly and uniformly communicated the intent of a project and, therefore, provide well informed responses to meet actual project needs. While the unique site locations of new schools may necessitate floor plan modifications, the program and space requirements should be modified only as allowed within the parameters of this document.

PROJECT IMPLEMENTATION:

During the implementation phase, the Ed Specs should be used for quality control, allowing ACPS to measure project deliverables against the stated benchmarks and standards. Design deliverables and construction should be reviewed for compliance with the standards and goals stated herein noting, however, that flexibility of +/- 10% is allowed when applying square footage requirements (particularly in the case of renovating an existing structure). Additionally, the Ed Specs will help provide the foundational support for project decisions during implementation, as responses can be measured against their compliance with the Ed Specs.

PROJECT TURNOVER AND OCCUPANCY:

Ed Specs serve as a valuable aid in the turnover of the facility to staff and administrators and other occupants. They comprise a user-friendly document that allows people outside of the design and construction professions to understand the building and the intent of its spaces.

PROCESS

Planning a state-of-the-art school requires the consideration of several influencing factors:

- Historical and forthcoming context of the community
- Current and future learning pedagogy and curricular goals
- Technical expertise of the faculty and administrators
- National and regional trends and benchmarks, and
- Strategic visioning goals and objectives of the Division

Developing the plan requires the cooperative efforts of facility specialists, administrators, faculty, and instructional consultants, in addition to the careful involvement of outside partners and community stakeholders. In order to create the best possible learning environment for children, an effort has been made to incorporate the best ideas from existing plans and facilities and to anticipate future needs for educating Alexandria's children.

As mentioned, ACPS and the City are working together to develop a long range educational facilities plan in order to develop a thoroughly coordinated plan that responds to projected enrollment growth and considers city-wide needs in a comprehensive manner. The LREFP process, shown in Figure 1.0, focuses on updating the LREFP based on technical details from the ACPS School Board approved Educational Specifications, Enrollment Forecasts, and Current Facility Conditions and Capacities. The joint work group will update the LREFP, progress community involvement, and report recommendations to the full work group.

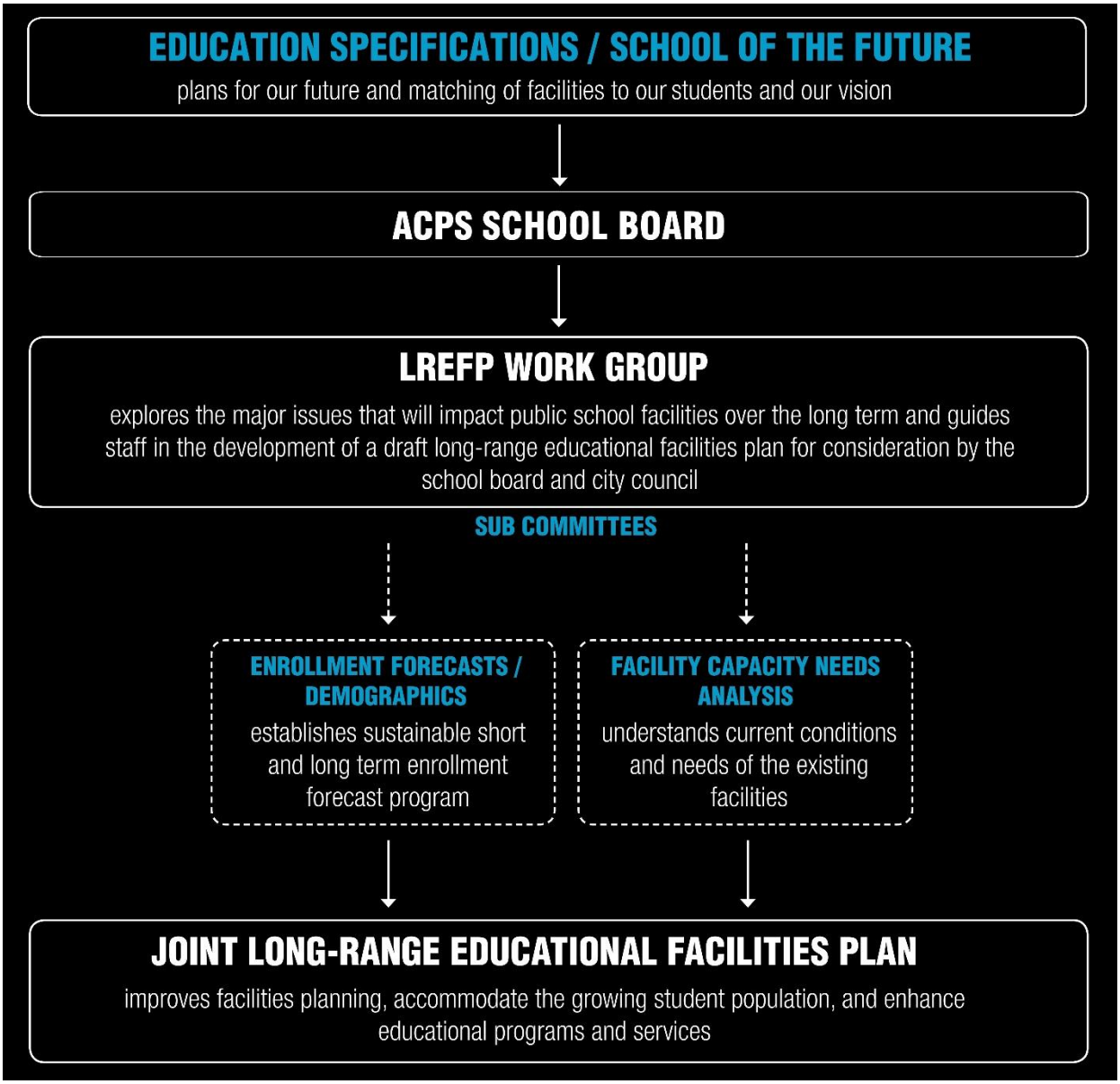


FIGURE 1: Process Diagram

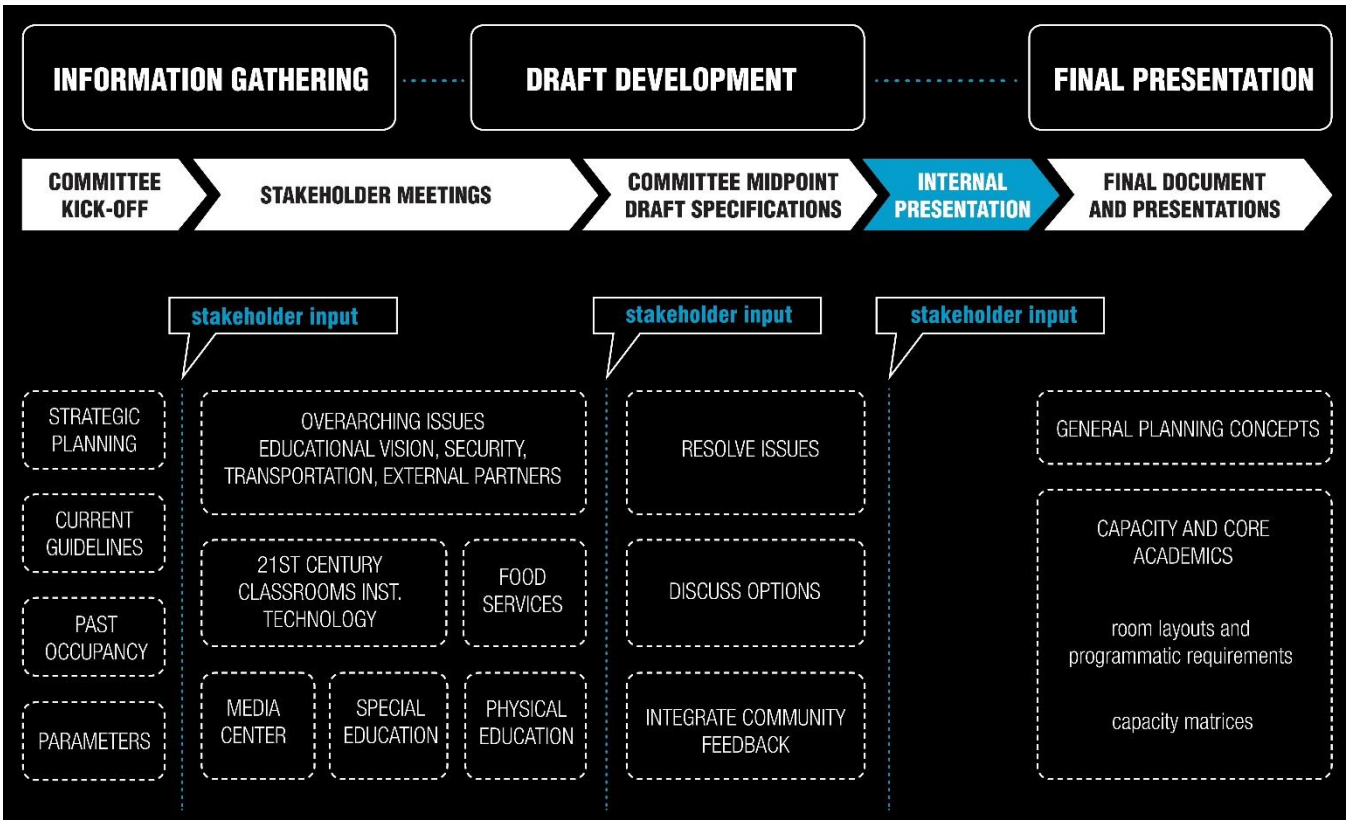


FIGURE 2: Workflow Diagram

NATIONAL TRENDS IN EDUCATIONAL FACILITY PLANNING

Each school system is unique from an educational and building program perspective. When balancing national, state, and local regulations, it is important to understand that one size does not fit all. The trends and planning principles presented here are to provide context to the formulation and development of this document.

21ST CENTURY LEARNERS

Learning environments should be planned and designed to support all learners: auditory, tactual, kinesthetic, and visual. Individual learning styles affect the way in which individual students:

- Concentrate in their immediate surroundings
- Process information
- Make decisions and solve problems
- Complete tasks and assignments
- Behave and interact with others, and
- Retain new information

Educational facility planning and design can help maximize learning by considering differentiated instruction and recognizing that one size does not fit all when it comes to learning environments.

Today's learners were born in a digital era and are used to having the world of information at their fingertips and in their pockets.

"Today, learning can occur 'anytime, anyplace, on any path, and at any pace.' Classrooms are transitioning from environments focused on teacher-directed whole-group instruction to learner-centered workplaces that support a collaborative culture for project-based student work."

Schools and homes continue to be important places for learning, but not exclusively. Understanding the importance of the "third learning space"—the many places where students learn in ways not bounded by the schedule of the school day, the limitations of the four classroom walls, or the location of one's home—is a critical component in planning and designing innovative, inspirational, and thriving educational environments.

CLASSROOMS AND TECHNOLOGY

The 'classroom of the future' should be more personalized, student-directed, collaborative, interdisciplinary and hands-on than those of even 10 years ago. As the focus of education moves away from just the transmitting of information to developing creative problem solving and communication skills, the classroom setting is morphing into a beehive of activity—a learning studio.

At different times, students may be working alone, in pairs, or in groups:

- Working alone: reading, writing, interacting with the computer, or just thinking
- Working together in pairs or groups: dissecting a problem or reading and reacting to one another's written work, role-playing, or sharing ideas, opinions, and experiences
- Interacting with the teacher and the whole class: listening, making presentations, asking questions or brainstorming ideas

Teaching methods should address a variety of learning styles and children with disabilities are educated alongside their non-disabled peers.

The classroom of the future should no longer be just one-directional with rows of desks facing the 'front' of the room. It should have a variety of focal points with mobile resources to support learning, flexible furniture, and robust technology. Rooms should also range in size and purpose, from small incubator and assessment spaces to large seminar and presentation areas. Corridors and informal learning spaces should create a seamless and extended learning environment.

Technology is infused seamlessly into the education program and physical building and wireless connectivity allow for learning to occur whenever and wherever. Classrooms are versatile, flexible, and adaptable to support different mediums.

LIBRARIES AND STUDENT COMMONS

21st Century school libraries are no longer quiet book-lined storage spaces for reading. Today, the library is an interactive studio of social collaboration and research for both teachers and students. They are the learning 'commons'—an extension of the classroom and the social heart of the school. As such, they should incorporate spaces for quiet, solitary reading and spaces for group presentations, collaboration, and socialization. As described by Margaret Sullivan in *Divine Design: How to create the 21st-century school library of your dreams* (2011):

> ***"Learning models are changing, and school libraries need to take the lead. In many schools, collaborative and project-based learning are popular, as are peer-to-peer tutoring and one-on-one learning. Classrooms are moving away from a 'front-of-the room' mentality and adapting to students' learning styles. Libraries need to embrace the same logic and change to reflect the way students prefer to learn. Flexibility is vital; traditional library furniture can be cumbersome and make multiple seating configurations impossible.***

"In the home, when people want to study or create something or chat, they head for the kitchen. People use the kitchen table to spread out their work, to be close to others, to watch TV, or to see what their siblings are doing. In the kitchen, you can drink a beverage without fear of spilling it on a thousand-dollar chair. The same applies to a school library. It's a working environment; it should have a lot of 'appliances' and space to do research, make stuff, and consume a 'big information meal.' Now, that's not to say your library can't be one of the most attractive spaces in the school.

"Color and texture are another way to add sensory excitement to your library. The walls, floors, and ceilings all offer surfaces for bright colors, murals, and artwork. Besides adding some pizzazz, these elements can visually unite different areas in your library or highlight a particular area. Beige, white, and nondescript carpeting have had a monopoly in school libraries for far too long." Excerpts from Divine Design: How to create the 21st-century school library of your dreams, by Margaret Sullivan 2011.

New libraries are more than 50% digital and offer learning, gathering, and production areas. The ideal learning commons might move from noisy to quiet—through a 'café' and mobile computing environment to small, AV-enhanced, group study conference areas, and small pleasure-reading libraries where students can select voluntary independent reading materials, to individual study carrels or a media production room. It is important that the space be a comfortable and inviting space for young learners. The room should not feel cavernous. Rather, libraries should be outfitted with furniture that is comfortable and creates a home-like atmosphere, similar to that of a Barnes and Nobel or a university union.

The technology that this generation of students understands and uses is multi-media. They communicate and learn through online devices, but they also create, publish, and perform. The library may include computer stations for student and faculty research, a publications room for the school newspaper and yearbook, a video production and editing lab for film, a distance learning / videoconferencing lab, a multi-disciplinary makerspace, and a variety of display venues. Interactive electronic presentation devices will help introduce students to workplace technology while meeting the needs of a generation that is growing up with technology as a constant presence.

Furniture, seating, and shelving should flexible and arranged to create multiple natural focal points. These areas should be sized for large-group story times and presentations, small-group resource pockets, and individual reading nooks. Small-group rooms, located off the library space, can accommodate student needs and add important flexibility to the space.

Building and Grounds

The school building itself is a learning tool and community asset. It creates a sense of identity, and the quality of architecture instills a sense of place and pride. The architecture considers learning opportunities over the entire campus, including school grounds and landscaping.

Transparency of spaces helps foster an internal sense of community and excitement about the learning activities that are occurring within. The use of glass allows for visual connections externally and internally. Front entrances are inviting and welcoming for all community members – parents, families, neighbors. The school is a hub of activity before and after school.

Outdoor spaces are extremely important to the learning experience. They provide students with the opportunity to learn about textures, water, plants, animals, and the natural world. Courtyards and other outdoor spaces should be deliberately planned to complement the indoor learning environment and expand the school pedagogy.

EVIDENCE-BASED ENVIRONMENTAL ELEMENTS

Evidenced-based design is the consideration of credible research findings in the planning and design process with a goal of achieving positive outcomes. Researchers have presented findings that link measurable outcomes such as student attendance, academic performance, faculty retention, and disciplinary actions. More specifically, several design elements have been connected to these outcomes: lighting quality, indoor air quality, acoustics, and furniture design.

Lighting Quality

In 1999, the Heschong Mahone Group found statistical correlations between the amount of daylight in an elementary school classroom and the performance of students on standardized math and reading tests. Since then, case studies and further research have supported this finding and the educational facility planning community has generally accepted the following classroom design parameters.

Goal: Improve natural and artificial lighting in classrooms.

Environmental / Air Quality

According to the US Center for Disease Control and Prevention, American children miss approximately 14 million school days each year due to asthma. Controlling environmental factors such as dust, pollen, and carbon monoxide could help prevent more than 65% of asthma cases in elementary-school-age students, according to the American

Journal of Respiratory and Critical Care Medicine. The following classroom design parameters should be considered when modernizing a school facility.

Goal: To ensure comfortable rooms, address temperature control, ventilation, air filtration, carbon dioxide levels, and HVAC background noise.

Acoustics

Research links the importance of maintaining appropriate acoustic conditions for student learning. This relates to noise from external sources and reverberation in the classroom and is linked to academic achievement, behavior, attention, and concentration. Acoustics are also important for teacher wellness and for avoiding straining vocal chords by attempting to speak over noise. Classroom design parameters are generally accepted as outlined.

Goal: Limiting reverberation and background noise and improving sound isolation.

Ergonomics

A 2007 study compared adjustable furniture in schools to traditional fixed furniture. Students using adjustable furniture were found to have higher grades than those in the control group using traditional school furniture. Characteristics of furniture that promote good posture should be considered as well as adjustable tables and chairs to allow students of varying sizes and body types to improve their comfort levels when sitting for long periods of time. Research studies continue to explore this issue.

In summary, these national trends provide an important context for many of the ideas that ACPS is working to implement and how those concepts are articulated within this document.

CITY OF ALEXANDRIA: DEMOGRAPHIC, AND ECONOMIC CONTEXT

The City of Alexandria is divided into 18 planning neighborhoods, each with its own unique history and atmosphere, ranging from the urban historic neighborhoods close to the District of Columbia to the suburban western communities. In general, most neighborhoods consist of higher-income professionals seeking a safe, walkable community close to DC. Typical of the DC metro area, people come from all over the world—ACPS records 127 countries of birth and 115 native languages.

According to the most recent census data released in February 2011, Alexandria is 60% white, 22% black and African-American, 16% Hispanic, and approximately 2% other. Approximately 24% of the population is foreign born, and just over 10% of the population is school-aged children. However, ACPS is more diverse:

- Asian: 4.68%
- Black: 30.13%
- Hispanic: 35.59%
- White: 26.76%
- Native Hawaiian/Pacific Islander: .22%
- Multi-racial: 2.37%

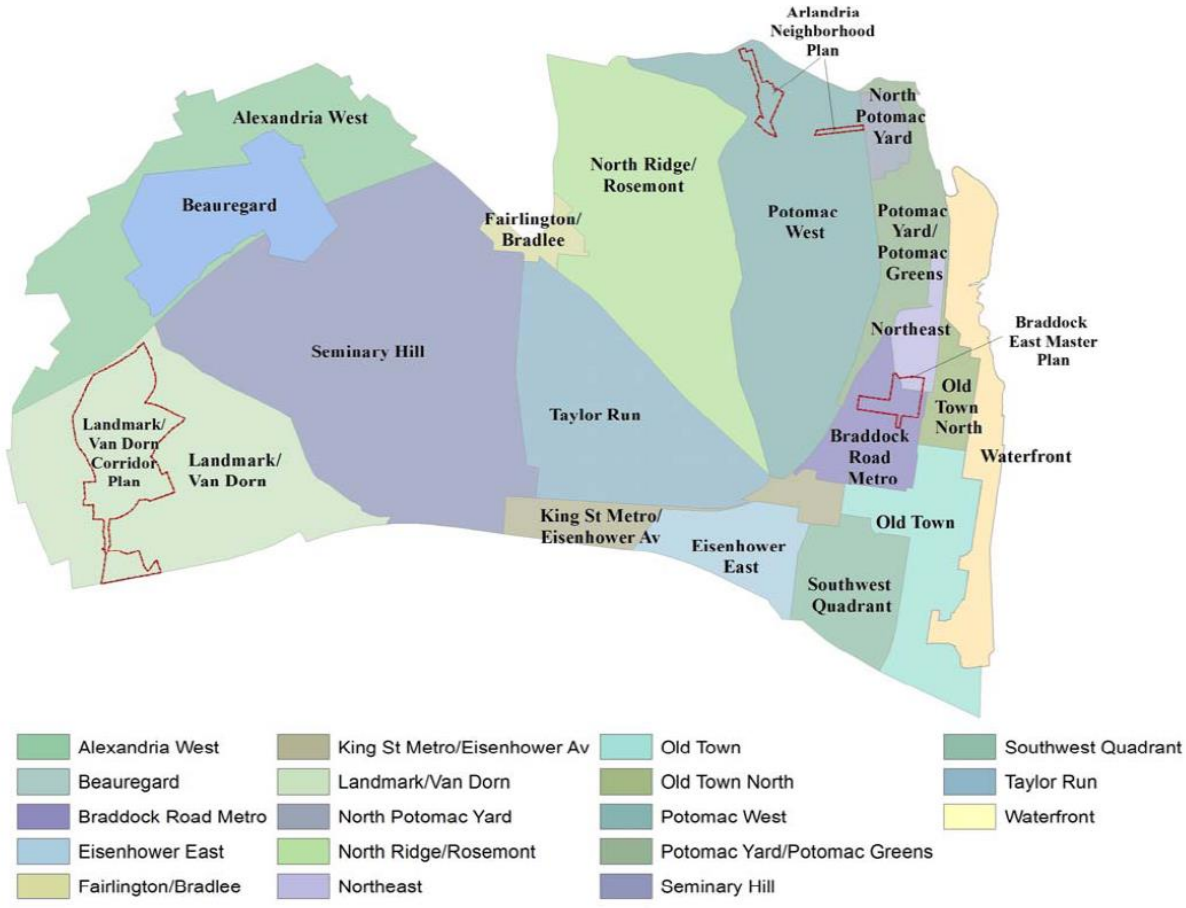


FIGURE 3: Regional Boundaries

	Enrollment by Grade								Enrollment by Subgroup						
School	**PK**	**KG**	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**	**FARM**	**SWD**	**ELL**	**Asian**	**Black**	**Hispanic**	**White**
Barrett	19	88	81	80	85	63	61	477	144	73	86	12	80	116	246
Cora Kelly	2	58	62	70	53	60	52	357	285	58	195	4	80	248	26
MacArthur		130	129	118	114	112	109	712	222	66	110	21	146	138	372
Polk		126	125	118	145	117	112	743	469	68	284	36	272	237	170
Jeff-Houston	53	70	56	47	64	47	38	375	270	68	60	5	231	80	51
Adams	127	174	159	165	145	130	117	1017	642	150	459	93	354	367	184
Mason		103	106	103	103	69	74	558	154	44	133	5	29	180	320
Lyles-Crouch		75	70	80	71	65	50	411	111	35	37	7	132	33	222
Maury		78	82	59	84	74	65	442	139	35	26	6	131	40	252
Mt. Vernon		154	142	147	152	136	122	853	443	71	380	12	57	484	282
P. Henry	95	109	95	108	94	71	71	643	481	61	214	39	327	192	68
Tucker		151	135	131	117	113	102	749	407	62	249	56	304	199	164
Ramsay	32	151	160	139	150	142	128	902	735	42	586	69	221	506	86
TOTAL	328	1467	1402	1365	1377	1199	1101	8239	4502	833	2819	365	2364	2820	2443
School	**6th**	**7th**	**8th**	**9th**	**10th**	**11th**	**12th PG**	**Total**	**FARM**	**SWD**	**ELL**	**Asian**	**Black**	**Hispanic**	**White**
Jeff-Houston	69	53	29					151	106	34	12	5	95	31	19
GW	462	405	420					1287	538	153	153	28	268	415	536
Hammond	428	498	473					1399	1046	158	361	97	546	566	174
M. Howard				854				854	465	94	187	44	267	304	209
TC Williams				121	1069	814	736	2740	1598	264	657	153	885	1073	544
CFC		2	1	4	10	4	2	23	18	4	8	0	12	11	0
NELL				14	3	0	0	17	5	0	3	0	0	17	0
TOTAL	959	958	923	993	1082	818	738	6471	3776	707	1381	327	2073	2417	1482
GRAND TOTAL								**14710**	**8278**	**1540**	**4200**	**692**	**4437**	**5237**	**3925**

*Provided by ACPS

FIGURE 4: ***ENROLLMENT STUDENT DATA***

As a percentage of total population, the school-age population in Alexandria is lower than the United States as a whole. This is due primarily to the fact that much of the City's historic growth in the last 60 years has been from young adults moving to the Washington, DC metropolitan area for jobs. As a result, the city has become more urbanized with over 60% of the housing stock multifamily and an average household size of just over two persons.

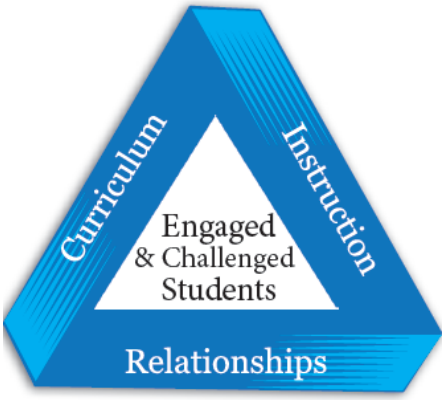
The school-age population in Alexandria had been steadily declining since 1970, but the decline tapered off in 2007. Based on recent trends and recent work with the city's planning department, Alexandria has a projected growth of 8%, while ACPS believes that enrollment growth over the next five years will be 19%. This projected growth outpaces the citywide growth rate by nearly 2.5 times.

To underscore the diversity of the student population in Alexandria it is important to note that, although median incomes in the city are among the highest in the region, approximately 60% of ACPS students are eligible for free-

or reduced-meals programs. Further, the Division has a strong international presence with English Language Learner (ELL) students accounting for nearly 29% of the school population.

ACPS LEARNING AND TEACHING MODEL

Learning and teaching in ACPS is a well-executed balance between a rigorous curriculum, proven instructional strategies (pedagogy), and relationships with students that communicate high expectations and commitment to student success.



ACPS has developed and uses a 21st century curriculum that is focused on helping students become critical thinkers and problem solvers. In addition to helping students acquire declarative and procedural knowledge, each academic unit has a focus on higher-order thinking skills that ensure students are developing critical ability needed for post-secondary success: reading complex text, writing at a post-secondary level, analyzing and interpreting data, and participating in discourse across the disciplines.

ACPS is implementing a standardized curriculum across the Division with the intention of providing purposeful and consistent education throughout the system. The standardized curriculum will include interdisciplinary integration and cross-collaboration of content for both students and staff. A standardized approach will maintain the integrity of the curriculum across the system, which will allow the Division to track student progress and development. Individual schools will maintain control of the delivery method and instruction and the early childhood curriculum will align with the upper grades.

INSTRUCTIONAL METHODS

Instructional methods vary with grade level but maintain continuity from early childhood education through the primary, intermediate, and secondary grades. Predominant elements include:

- Sensory experiences
- Integrated cross-content learning
- Flexible groupings
- Extended-day learning opportunities
- Parent involvement and volunteer activities

The Division is committed to using purposeful differentiation for all students to meet each student's individual learning needs. This differentiation includes students with disabilities as well as students who are advanced learners, all of whom require specialized curriculum.

STRATEGIC VISIONING

In 2014, ACPS leadership was guided through a series of visioning sessions with educators and administrators that challenged them to clarify their expectations related to facility operations, sustainability, architectural quality, space priorities, and the community context. The visioning sessions focused on identifying gaps between ACPS' future goals and its current realities. An update to this visioning was performed in 2016. The following narrative summarizes the areas of greatest dissonance and formulates the concept for the construction and operation of a school of the future in Alexandria.

PROGRAMMATIC STRUCTURE, SCALE, AND PROPORTIONALITY

ACPS desires to offer comprehensive primary and secondary education facilities that provide students with access to educational and extracurricular learning opportunities in local neighborhood communities. The Division also desires to provide citywide early childhood education by providing regionally-located centers that increase the amount of early childhood education available. A center will also centralize early childhood expertise for stronger collaboration and professional development.

Future high schools will be comprehensive schools distributed throughout the city that offer students access to a broad range of educational and extracurricular learning opportunities. All schools will be sized to offer students a strong sense of culture while also ensuring they have access to teachers and administrators as needed by emphasizing the implementation of smaller learning communities throughout the buildings. The Division's desire for students to learn whenever and wherever drives the need for future facilities to implement a spatial organization that provides both formal and informal learning areas and maximizes collaboration and interaction between students and faculty.

School designs should focus on creating collaborative, interdisciplinary, and adaptable learning spaces supported by a robust and seamless integration of technology, and flexible and ergonomic furniture. Incorporating an overall organization of small learning communities with breakout spaces in hallways known as extended learning areas (ELAs), collaborative spaces in classrooms, and spaces that facilitate chance interactions throughout the school should allow teachers to collaborate across disciplines and tailor learning objectives and lessons to students' individual needs.

Providing multifunctional spaces for third-party partner and community programs that extend educational and extra-curricular services to students, families and the community is a priority. The facility should operate as one organism that can be segmented into different functions and zones, depending on the time of day and use.

COMMUNITY CONTEXT

ACPS school facilities and grounds should serve as neighborhood assets and centers for parent, family and community interaction and engagement. Parental and family support play a critical role in the success of students. ACPS students and families come from diverse backgrounds and schools should be welcoming and inviting places that include dedicated space for parent and family engagement and for community and partnership use.

Each school community is unique, and designers should consider what spaces best support the community's needs; however, all schools should be planned and designed to support community use during non-school hours. Implementing a secure separation between the academic core and the shared-use spaces along with the careful application of active and passive design strategies should create safe and secure learning environments.

As previously defined, Pre-Kindergarten Education Campuses (PRKCs) will be regional facilities that offer early childhood education across the Division. Elementary schools are essential components of a walkable neighborhood community. Therefore, new elementary schools should be located within neighborhood communities so that, when it is safe, students can walk to school.

Future high school facilities will be the anchor of their communities. They will offer both choice and specialty programming to all students. High school facilities will respond to the needs and demands of the local community and will serve students from across the city.

ORGANIZATIONAL AND OPERATIONAL PARADIGM

ACPS believes an integrated, interdisciplinary teaming approach will increase student achievement and faculty collaboration. The priority of the Division is to advance student performance and success by enhancing the overall learning experience for students through a collaborative team approach. This is best facilitated with small learning communities, extended learning environments, and a departmental organization of spaces. Libraries should be seen as the 'learning commons' and be used regularly as an extension of a teacher's classroom and workspace.

ACPS desires to increase inter-student collaboration and group learning activities. To support this, flexible and adaptable, informal and formal teaching spaces are required. Emphasis should be on spaces and configurations that support critical thinking and project-based learning—ideally within groups of four students—and the ability to break out of formal learning environments. Using a push-in and team-teaching approach, special education students should learn in the same collaborative learning environment as their peers to the maximum extent possible.

ARCHITECTURAL AND CONSTRUCTION QUALITY

ACPS has a strong belief that high-quality architecture has a positive influence on student success and faculty retention and it is committed to delivering high-quality, state-of-the-art, and sustainable facilities to students, faculty, and the community. This belief applies to the external and internal qualities of the facility. The school facility and grounds are considered to be a learning tool, and creativity in design and architecture is a priority.

Quality of design and engineering should focus attention on areas that most impact the learning environment with a particular emphasis on incorporating research-based facility elements, such as enhanced natural lighting, acoustics, air quality, climate control, and technology that directly impact student achievement and educator effectiveness. Externally, the architecture must be respectful of the historical and cultural context of the community while simultaneously inspiring students and the public.

Materials and system selections should consider extended life cycles. Building systems, materials, and finishes must be resilient, easy to maintain, and create a positive, aesthetically-pleasing learning environment. The life cycle of materials should balance quality and potential for future costs in an effort to ensure appropriate use of public funds is achieved.

ACPS 2020

In June 2015, ACPS formally adopted a strategic plan to act as a foundation for all the actions of the school Division. It directs the actions that the ACPS Division takes in meeting the goals and aspirations of the Alexandria community and guides the activities of employees and leaders as well as the expenditure of all funds entrusted to the school board. The plan reaches far beyond school buildings into all aspects of student life with its six specific goals:

- **Academic Excellence and Educational Equity:** Every student will be academically successful and prepared for life, work, and college.
- **Family and Community Engagement**: ACPS will partner with families and the community in the education of Alexandria's youth.
- **An Exemplary Staff**: ACPS will recruit, develop, support, and retain a staff that meets the needs of every student.
- **Facilities and the Learning Environment**: ACPS will provide optimal and equitable learning environments.
- **Health and Wellness**: ACPS will promote efforts to enable students to be healthy and ready to learn.
- **Effective and Efficient Operations**: ACPS will be efficient, effective, and transparent in its business operations.

PLANNING CONCEPTS

The following sections elaborate on the planning and design concepts for a prototypical High School with an enrollment of approximately 1,600 students. While there is no current capital improvement plan ("CIP") commitment for a comprehensive high school, ACPS is developing the high school prototypical Ed Spec to help the Division plan for future enrollment needs. High school enrollment in the city is expected to increase by nearly 1,000 students in the next 10 years. The prototypical high school Ed Spec is a benchmark against which to measure an existing facility and establish gaps and deficiencies. The analysis of these gaps and deficiencies will inform future CIPs and the updated LREFP. A combination of renovations and new facilities can be expected based on the enrollment growth ACPS is experiencing. Architects and designers should be mindful that the following sections are a guideline and a tool to advance the design of a high school. These rules should be vetted throughout the schematic design phase by coordinating with the professional planning staff of ACPS and its stakeholders.

CAPACITY

Every school project begins with establishing the number of students who will be served when the project is complete, or the 'capacity'. Capacity is the primary driver in determining the number, type, and size of the spaces in any new or modernized building.

To establish the ideal high school capacity for ACPS, the Planning Team reviewed local and national data about high school enrollment. As summarized in figure five on page 25, the average high school enrollment in the United States is approximately 854 students. High schools in the region range in size from 100[1] students to nearly 2,900 students, with an average high school enrollment being 1,614 students.

[1] Schools with capacities under 500 are outliers and are typically academies or schools within a school.

AREA	Quantity of High Schools	Largest	Smallest	Average	Ideal
Arlington County [1]	4	2,193	108	1,445	2,200*
Farfax County [2]	25	2,782	1,755	2,190	2,500
Loundoun County [3]	9	2,157	960	1,531	1,800
Prince William [4]	11	2,897	941	2,305	2,800
Prince George's [5]	22	2,573	775	1,543	1,700
Montgomery [6]	15	2,790	1,202	1,790	1,500
District of Columbia [7]	28	1,696	146	496	NP
Average	16	2,441	841	1,614	2,083
USA	26,407	9,010	NP	854	-
Alexandria	1				1,600

Notes:
np = not provided
High Schools include comprehensive public schools serving grades 9-12
**In Arlington, 2,200 students is the maximum high school facility size*
Sources:
High school enrollment information is from National Center for Education Statistics Common Core Data.
[1]Arlington Facilities and Student Accommodation Plan, FY 2016-25
[2]Fairfax County Public Schools Strategic Facilities Plan, 2012
[3]Loundoun County Public Schools FY 2016 - FY 2020 Capital Improvement Plan
[4]Prince William County Public Schools - Regulations
[5]Prince George's County Public Schools Educational Specification Prototypes, 2015
[6]Montgomery County Public Schools Educational Facilities Master Plan and FY 2015-2020 Capital Improvement Program

FIGURE 5: Regional Benchmarks

In alignment with other school systems in the region, high schools in the ACPS system will have a student capacity no smaller than 1,400 and no larger than 1,800. For the purposes of planning, this educational specification is illustrative of a 1,600-student school and intended to be a planning tool. The ACPS Division has an active, editable spreadsheet that will allow planners and architects to develop facility needs for a range of schools based on the capacity and program desires at the time of planning a new high school facility.

Simply defined, high school capacity is a product of the number of classrooms at a school and the student stations assigned to each room type. Only classrooms that are 600 square feet or more with a teacher and students regularly assigned to the space count toward full-time capacity. Capacity-driving classrooms generally include spaces such as core instruction, art classrooms, music classrooms, science and lab classrooms, gymnasiums, performing art spaces, CTE spaces, and resource rooms. Due to year-over-year changes in classroom use, it is possible for a school's capacity to change in minor ways each year. Other factors such as the ACPS Division-defined planning caps (determined by the budget) also impact the overall capacity of the facility.

By applying actual school staffing to the current enrollment it can be determined that for the ACPS high school, class sizes range from 25 to 30 students in all core classes, with a range of 30 to 35 in the encore and physical education classes. This is in alignment with the Virginia Board of Education Standards of Quality guidelines.[2] However, class size caps are often used to further advance educational outcomes, and ACPS desires to maintain average class sizes near 25 students per class in core academics.

The current high school operates on a block schedule with alternating classes every other day. This unique block schedule allows students to take 3.5 classes a day, where the first class of the day is half the length of a regular class and repeats each day of the week. Teachers usually teach six out of seven periods of the day, giving the building a utilization of approximately 86%. For this educational specification, the maximum capacity will be factored at 86% utilization and at this rate, the facility will have space to accept for future growth without being too large to support the current population.

For the purposes of planning, the following class sizes should be used to calculate a planning capacity. It is important to size all classrooms to accommodate the maximum number of students indicated rather than the target that is used for capacity planning. This allows for program flexibility and interchangeable uses year to year.

Once a capacity is proposed, many other areas of the building are sized to support the enrollment based on ratios and national benchmarking best practices. The number of small group rooms, art rooms, music labs, and support staff offices is based on student-to-teacher ratios. The size of the core areas such as library, dining and food services, physical education facilities, and site amenities is based on local and national benchmarks as they relate to size. The balance of this document outlines the functionality and program of spaces for this sample prototype.

Per the Guidelines for School Facilities in Virginia's Public Schools, the goal of the optional guidelines developed by the Virginia Department of Education is:

"…to provide recommendations that will help local school Divisions ensure that their school sites and facilities support the principles of good teaching and learning and promote sound educational programs."

The guidelines developed here by the project team respond to, or exceed, the Virginia State guidelines and recommendations. It is the responsibility of the architect to ensure the plans meet or exceed the current state guidelines at the time of actual project design in the event the state guidelines have changed and this document has not yet been updated to reflect those changes.

2 http://www.doe.virginia.gov/boe/quality/

Core Academic Spaces	# of Classrooms	Capacity	Total
English	11	25	275
Math	11	25	275
Science Labs	11	25	275
Social Sciences	11	25	275
Economics	3	25	75
World Language	6	25	150
PE (Full Court Gym, Aux. Gym, & Fitness)	3	30	90
Health	3	30	90
Human Growth & Development	3	30	90
Fine Arts (3D, 2D)	2	25	50
CTE	4	25	100
Other CTE Rooms	4	25	100
Electives	0	25	0
	72		**1845**
	**Utilization		87%

*Assumes one planning period out of seven periods
**Utilization equals Enrollment divided by Capacity
***Per Advanced Diploma

Room Type	Class Size Range	Target for Planning
Core Capacity	25-30	25
Electives/CTE	25-35	30
Specialized Inst.	12-Jun	10

FIGURE 6: Class Size and Classroom Capacity

PROGRAM AREA SUMMARIES

The following section provides executive level narrative summaries of the core program space areas.

MAIN OFFICE-RECEPTION / ADMINISTRATION / STUDENT SERVICES

As students, families, and other visitors enter an ACPS building, it is important that they are greeted with an inviting and well-organized front office suite. The primary administrative offices, guidance services, and adult restrooms should be located in this centralized area at the main entrance to the school.

All school locations should include a well-defined main entry that incorporates a double-perimeter secure entry. This approach guides every visitor through a secure exterior door into a secure holding vestibule prior to being able to gain access to the main office. Within the secure vestibule, visitors will verify their identity and transition into the main office before gaining access to student areas of the school.

The main office must be designed to provide direct visual access to the entrance doors. Limiting the number of entry points into the high school is important for student safety and security. Visual access from the main office to the exterior vestibule is mandatory and every entrance to the school should have a CCTV IP camera. Architects and designers should coordinate passive and active security systems with the school during design development.

Appropriately sized office spaces should be provided with an adjoining shared conference room and adjacent staff restroom within the main office. Within or near the main office, there should be an appropriately-sized space that includes itinerant work stations and storage for traveling staff like occupational and physical therapists. Near or adjoining the main office, space should be provided for the Family and Community Engagement center, as defined later in this document.

Apart from the central office of the school, each grade-level academic cluster should include an administrative cluster. This cluster should consist of offices and meeting spaces to support the assistant principal, administrative assistant, and counselors. Additionally, offices for the dean of students, the school resource officer, and other administrative personnel can be dispersed around the school to encourage maximum collaboration and connection.

Visitor parking should be located near the main entry. Wayfinding and building design should clearly indicate the school entrance and immediately upon entry, visitors should be directed to the welcome center / main office. For security reasons, no visitor should be able to enter the classroom areas without being checked through the reception area. See the Security section for additional suggestions.

A digital information kiosk in the lobby may provide real-time data on building operations (including information on energy use, water use, and the latest recycling rates) or be used to announce upcoming events and other announcements, such as the location of community events or classes.

HEALTH SERVICES

Health Services should be located near the high school's main entrance. Health services is responsible for providing health-related amenities to all students and staff. The space should be organized to provide appropriate space for:

- Health screenings
- Illness or injury treatments

- Meetings and trainings
- Prescription medication storage and distribution
- Secure records keeping
- Private consultations
- Rest and recovery units, and
- A waiting area

In addition, it is possible that a facility in the future will provide (location-dependent) partnership-operated wellness centers. The centers may offer amenities such as full medical evaluations, full laboratory services, dental services, radiology services, and pharmaceutical services. Cooperative and collaborative wellness centers are desired (location-dependent) and operated through community partnerships.

If the school Division elects to provide a school-based health center (SBHC), the architect should work with the ACPS Division's officials to ensure full space-programming requirements are met according to federal regulatory standards. This center should be adjacent to the high school clinic with clear separation between students and community members. Implementation of a full SBHC will require significant advanced coordination by ACPS.

CORE INSTRUCTION

To provide a 21st century educational experience, future high schools in the ACPS system should include the spaces described in the following section. The executive level summary of space descriptions is provided to enhance the design professional's understanding of the general spatial intent of each learning environment. A detailed description of the building organization is provided later in this document.

Classrooms

Student arrangements should reflect small collaborative groupings over individual desk arrangements. Classrooms are designed around project-based learning centers. Students will interact in groupings that are representative of workplace operations where collaboration and communication are essential. Classrooms will provide 'teaching and learning' surfaces on multiple walls to include touch-screen interactive boards, magnetic erasable white boards, and tackable surfaces. Voice enhancement systems will ensure that teachers, students, video-conferences, and the audio portion of audio-visual content can be clearly heard. Flexible and easy-to-arrange furniture that is easy to relocate is preferred. Flexible walls that are desired to expand classrooms into multi-class group learning settings should be the same size to promote programming flexibility.

When providing flexible walls, sound separation must be considered to ensure the learning environment is not impacted by sound from adjacent spaces.

Additionally, the provision of an itinerant or hoteling space for drop-in, special-needs instructors, or related service providers should be included in each classroom. As schools embrace technology, electrical outlets are becoming critical to the delivery of education. Classrooms must have enough outlets to support one-to-one teaching devices and other electrical equipment. This includes in-classroom charging locations or customized charging storage for laptops or other student computing devices.

All classrooms will meet these minimum requirements allowing for interchangeability of programs and maximum flexibility in use. New schools and renovations should be constructed to allow for future changes in programs without requiring significant renovations.

Extended learning areas (ELA)

ELAs should be incorporated into designs as additional teaching spaces that occur as part of each learning community. ELAs in classroom extensions are typically open spaces off the corridor that are meant to facilitate break-out instruction, small group, and project-based work, in addition to multi-class collaboration and joint teaching initiatives. These areas are typically large enough for a few small groupings of students. Twenty-first century education encourages students to teach each other, and providing ELAs is a prime opportunity to dedicate space for students to engage in their own learning.

In the anchor, ELAs may vary in size based on the individual needs of the school and the nearest academic clusters. ELAs in the anchor should be designed to accommodate one or two full classrooms at any time and be equipped to accommodate a variety of furniture arrangements. They can be stocked with library books and other materials that encourage students to pursue independent enquiries. ELAs can be defined spaces or can be spaces that capture otherwise unusable space.

Science

High school science classrooms should be designed to support science orations and lab activities within a single classroom space. The space should be designed as one cohesive classroom with two distinctive uses—lecture and lab-based instruction. ACPS desires to focus on lab-based instruction that is collaborative and hands-on but it is necessary to provide space within each classroom for typical oration and learning. Designers will need to integrate technology to support wireless one-to-one device connectivity as well as Bluetooth precision measurement devices. Modern high school labs will use gas, electric, and water to properly educate students.

Due to the specialized equipment needed, science classrooms should be situated together in a specialized wing of the building, as opposed to distributing labs throughout the school or locating individual labs within classroom clusters. Specialized sciences, CTE, and STEM facilities should be co-located near other science lab areas. These spaces require dedicated storage space for books and equipment that are not required year-round. This storage space can be shared by multiple classrooms and should be located near a preparation facility.

Science, Technology, Engineering, and Mathematics (STEM)

The STEM Academy was formed in 2013 to provide a collaborative, caring atmosphere in which all participants use problem-solving and inquiry in a project-based environment. STEM students participate in an engineering explorations course, which immerses them in the investigation of real-world engineering, technology, and the exploration of issues that affect their local, state, national, and global environments and how they relate to human sustainability. This course prepares them for a range of CTE pathways, illustrated in the following figure.

<table>
<tr><th>Pathway Options</th><th>Year I
(9th Grade)</th><th>Year II
(10th Grade)</th><th>Year III
(11th Grade)</th><th>Year IV
(12th Grade)</th></tr>
<tr><td>Engineering and Technology</td><td rowspan="5">Engineering Explorations</td><td rowspan="4">Engineering Analysis & Applications-Robotics</td><td>Aerospace Technology</td><td>DE Engineering Statics</td></tr>
<tr><td>Electronic Systems</td><td>Electronics Systems I</td><td>Electronics Systems II</td></tr>
<tr><td>Computer Systems Networking</td><td>Computer & Cyber Security Solutions</td><td>CISCO Academy: Computer Networking Hardware Applications</td></tr>
<tr><td>Sustainability/ Biotechnology/ Forensics</td><td>Sustainability & Renewable Technologies</td><td>Biotechnology & Forensics</td></tr>
<tr><td>Architectural/ Engineering Design</td><td>Technical Drawing I</td><td>Advanced Architectural Drawing II</td><td>Advanced Engineering Drawing II</td></tr>
</table>

FIGURE 7: CTE & STEM Courses

Career Technical Education (CTE)

T.C. Williams is the only comprehensive high school in Northern Virginia offering a full range of on-site career and technical education courses. The CTE program is divided into six areas of concentration:

- Business and information technology
- Includes the Academy of finance and consumer sciences
- Family and consumer sciences (FACS)
- Health and medical sciences
- Junior Reserve Officer's Training Corps
- Marketing
- Technology educations
- Trade and industrial education

Some course offerings include accounting, fashion or sports marketing, nurse's aide, early childhood education, criminal justice, cosmetology, sustainability and renewable technologies, robotics, and culinary arts. All CTE programs have related industry certifications. A variety of specialized classrooms is required to support the Division's CTE programs. CTE spaces should be integrated and co-located into students' daily experiences rather than providing isolated classrooms to house these programs. Co-location will encourage cross-collaboration and full integration of general academics and CTE course curriculum.

Business and Information Technology

The Business & Information Technology program is an intensive preparation for business and information technology careers. Courses enable students to investigate opportunities in business, prepare for entry and advancement on the job, develop management skills, and identify further education and training necessary within a chosen career cluster. The Business and Information Technology program requires a lab that has the capacity to host approximately 26 students and computers, with enough electrical and data network available to effectively teach and learn. Student computers should be arranged in a horseshoe shape on three perimeter walls of the classroom. Locate moveable student desks in the middle of the horseshoe, oriented towards a teaching wall at the front of the classroom. This arrangement allows students to engage in instruction that requires an oral lesson and then break apart to computer stations to complete their lesson. Consult with the CTE experts at the time of design for specific specialty equipment requirements that exceed the typical classroom design.

Academy of Finance (AOF)

T.C. Williams is the only high school in Virginia to offer an Academy of Finance program through the National Academy Foundation that teaches students money management skills, financial planning, and new business development. Students complete a three-year sequential program, work in an on-site credit union, and earn college

credit. AOF is part of the Business & Information Technology program and is organized as a school within a school that prepares students for post-secondary education and careers through academic learning within a theme-based curriculum.

Family and Consumer Sciences (FACS)

Family & Consumer Sciences prepares students to manage and balance the adult demands of personal, home, and work life in the 21st century. Content focuses on careers in an academic discipline, cultural and environmental issues, health and safety, individual and family relations, leadership and workplace ethics, and the application of technology. Students will engage in both classroom and hands-on lab experiences that use today's technology and teach life skills. Classroom activities may include food nutrition, cooking, clothing and fashion design, sewing, childcare activities, and family budgeting. The department will require three classrooms to efficiently provide the educational programs offered. One space should be a typical classroom where students can receive instruction and prepare for hands-on activity in the lab. Two lab spaces will be required, one equipped with multiple kitchen stations and one equipped with tables—not desks—where students can spread out their work materials. Consult with the CTE experts during design development for additional equipment and design needs.

Health and Medical Sciences

The Health & Medical Sciences program prepares students for employment related to medicine, nursing, dentistry, and other medical-support services. Students in the Health and Medial Sciences course will learn the foundations of health care through this basic course and learn how to use equipment comparable to what is found in the health care industry today. The space should include a small health care laboratory for skills practice, as well as student work stations for group and independent course work. Specialty equipment included in this space may include hospital beds, demonstration patients, small medical equipment, and a mock surgical technology station. The space should provide network connectivity, water, gas, and electrical connections. Consult with the CTE experts during design development for additional equipment and design needs.

Junior Reserve Officer's Training Corps

The JROTC program prepares high school students for responsible leadership roles while making them aware of their rights, responsibilities, and privileges as American citizens. JROTC requires a typical classroom for core instruction as well as administrative support spaces for army instructors. An internal drill area, approximately 50' x 90', and an external paved drill area, approximately 100' x 300' are also required. The internal drill area should be dedicated to JROTC as it will support a rifle range. Secure storage for JROTC equipment is required adjacent to the indoor drill area and accessible only to the Army instructors. Consult with the JROTC experts during design development for additional equipment and design needs.

Marketing

Marketing prepares students for careers in the processes of buying and selling goods and services. Marketing courses prepare students for entry-level positions and/or continued education in a variety of careers that require knowledge of communications, economics, and psychology as well as techniques in sales, promotion, and management. The spatial requirements for the marketing program are similar to those of the business lab. However, the marketing program requires fewer computers and more student work surfaces. Flexible furniture with an arrangement similar to the business lab is preferred. Marketing education will introduce students to Internet marketing, travel and tourism marketing, hospitality marketing, and entrepreneurialism. The marketing program may share space with the school store. Consult with the CTE experts during design development for additional equipment and design needs.

Technology Education

The technology education program provides experiences that lead to the development of technologically-literate people. Students will learn to understand the dynamics of technology, employ the technological processes, analyze the behavior of technological systems, apply scientific principles in the processes of technology, and discover personal interests and abilities related to a wide variety of technology-oriented careers. Technology education require computers with significant processing power and specialized software. Technology education may provide students the opportunity to engage in computer-aided design, drafting, electronics, engineering, and video and film production. Depending on the scheduling of the course, technology education may share a space with the business and information technology lab.

Trade and Industrial Education

Trade and industrial education programs prepare students with occupational skills, knowledge, attitudes, and work habits to become employed or continue their education in the skilled field. Trade and industrial education requires automotive repair facilities and spaces to teach cosmetology. If an auto body shop is included, the space must meet Occupational Safety and Health Administration (OSHA) standards. Classroom space should not be shared with other programs. Locker rooms or washing stations should be provided for students and faculty. Adequate tool and equipment storage must be provided. Specialty spaces may include a repair bay, a wash bay, and a paint booth / oven. Consult with the CTE experts during design development for additional equipment and design needs.

If a cosmetology program is offered, it will provide students the opportunity to develop work-centered competencies and skills that will prepare them for licensure by the Virginia Board of Cosmetology. A laboratory setting should provide approximately 20 student workstations that include hydraulic chairs and mirrors. Appropriate electrical connections must be provided for salon-type equipment. Specialty spaces include mixing rooms, washrooms, and

student / teacher work areas for individualized instruction. A typical classroom should be provided for orated lessons. Consult with the CTE experts during design development for additional equipment and design needs.

Video and film production courses require specialty spaces such as a dark room, video production room, and electronics labs. Consult with the CTE experts during design development for additional equipment and design needs.

Other programs, such as the academy of finance and marketing courses, require standard flexible classrooms. Specific equipment needs exist for a range of programs, from robotics to automotive technology to surgical tech classes. An advanced architectural drawing class and AP computer science could share a computer lab, JROTC and physical education can share training facilities, and fashion merchandising and theatre students can both use a costume shop in a performing arts facility.

Care should be taken not to duplicate highly specialized, single-use spaces on multiple high-school campuses.

Special Education

Special education facilities should be integrated throughout the school to support the concepts of inclusion and to provide reasonably immediate access to students with special needs. Provide at least one special education room per grade. Currently, more than 70% of all ACPS students with disabilities are integrated with their peers in standard learning environments for at least 80% of each day. Resource and pull-out spaces are also required and should be distributed throughout the multiple learning communities to support individualized learning needs (resources), and / or speech therapy, occupational therapy, and / or physical therapy. Typical occupancy of a pullout space is approximately 10 people. Within the classroom, small group breakout areas or spaces for one-on-one teaching are necessary to deliver differentiated teachings on an as-needed basis.

A dedicated, programmatically-sized classroom may be necessary on a location-by-location basis to support city-wide programs and would be identified at the time of individual site planning. Special education facilities should be integrated throughout the school to support the concepts of inclusion, and these specialized requirements should be considered for the identified student groups. Special attention should be given to accessibility of all facilities and an integrated learning program.

English Language Learning (ELL)

Students who are learning English have multiple ways to get the support they need at the high school level. The International Academy program, supported by Internationals Network for Public Schools, is a specialized program

for immigrant-born students with emerging English proficiency scores. This academy is best described as a school within a school model designed to help ELL students learn English, achieve academically, and graduate from high school while preparing them for college and careers. Students take the majority of their courses in academy-specific classrooms, which operate in a similar fashion to a typical classrooms. Designers should be careful to inquire about site-specific requirements for this academy which co-exists with the traditional model of ELL services.

In the traditional model, ELL instruction is pushed-in to the general education classrooms with an itinerant instructor floating into classes as needed. ACPS also provides English for academic purposes (EAP), a break-out class to target academic language development. These break-out classes typically accommodate a larger capacity and may require a full-size classroom.

Talented and Gifted (TAG)

TAG at the high school level is fundamentally different from other age levels. TAG as a program will exist at every high school in the Division, although the teachings are provided through honors, Advance Placement, and Dual Enrollment courses which are taught by subject-specific teachers as part of the regular daily schedule. Therefore, separate TAG classrooms are not necessary. Enrollment in honors courses varies from 10 to 20% of the total high school student population. The TAG program does include a resource teacher who provides curriculum guidance and instructional support to individual subject area teachers. An office for the TAG resource teacher is required. Beyond the office, the TAG resource teacher may ‘float’ from class to class, occasionally requiring the use of itinerant desk space in the classroom. With an emphasis on project-based learning, the TAG resource teacher may also work directly with a small group of students in an ELA space or a resource room, when appropriate.

Advancement Via Individual Determination (AVID)

AVID is a college readiness program that is provided as an elective course and targeted to students in the academic middle who have a desire to attend college. Enrollment in AVID, grades 6 to 12, varies from year to year and school to school, but approximately eight to 10% of students currently take the course. The AVID academic week includes two days of traditional classroom-based instruction, two days of small group tutoring, and one day of team-building activities or guest speakers.

Accommodating all these activities in one space requires a larger classroom that can be partitioned into two smaller rooms to minimize noise and maximize available whiteboard space during tutoring sessions. The average full class size runs between 17 and 27 students. On tutoring days, the class is divided into four smaller groups at a ratio of about seven students to one tutor. Several small tables should be used to maximize flexibility, and all furniture should be on casters due to daily re-arrangement. It is suggested that a small adjacent room be added to

accommodate hoteling space for tutors and storage for student work files. The AVID room should be placed in a centralized location at an equitable distance to all grade levels, with a suggested adjacency to the library.

Visual and Performing Arts

ACPS has a strong arts focus at the high school level and well-designed spaces are needed to support a vigorous curriculum and creative presentations. Visual and performing arts spaces are shared by all grade levels for general class and small group instruction. Locating these learning environments in the central anchor will promote orderly transitions and equitable travel time for students of all ages. Often performing arts spaces are co-located due to their similar architectural requirements for limiting sound transmission.

It is important that dedicated art rooms be provided to support both 2-D and 3-D instruction. The optimal location for the art room is on the ground floor, with a northern daylighting orientation and access to the exterior. Access to an outside patio or seating area will offer additional work and display spaces where students can engage with the environment. Display areas in the school should be designed to accept both 2-D and 3-D projects.

All vocal, instrumental, and orchestral music rooms should be acoustically treated to reduce noise transmission to other areas of the school. Small group practice rooms are required near the performance art spaces for up to five people and the teacher. Provide adjacent to, if not immediately accessible from, access to a larger performance space outfitted with a stage, stage lighting, and sound equipment. The auditorium will showcase student presentations of theatre, music, and dance. It will also serve as a community gathering space for full-school assemblies.

The auditorium should have a flat stage under a proscenium arch with raked seating facing the stage. Appropriate acoustics, sound and lighting systems are critical to the space's flexibility and functionality. Storage and support spaces should be appropriately sized with an understanding of necessary adjacencies. The designer is encouraged to consider flexible seating options that encourage other uses of the auditorium during the typical schedule.

If possible, the music suite should be located near the auditorium and dedicated small group practice rooms should be located within the music suite along with storage areas.

Library

The library serves a dual role—its traditional role as a gathering place for reading and learning and a new role as a technological information base and learning hub. In this new role, the library may house a wireless voice / video / data network that runs throughout the entire building. This network enables the transmission of media services to

the desktops of teachers and students without physically entering the library. The new library will use digital technology to enhance voice, video, and data communications within the school, among ACPS Division facilities and with distant-learning resources.

The AVID learning classroom should be located adjacent to the media center to support the role of the media center as a research and learning hub. This space can serve as an extension of the library to support research and learning by providing students and staff with typical classroom technology and additional working space. This flexible use space can be used for group work, individual work, or class teachings. Additionally, placing books in Extended Learning Areas will expand the reach of the library beyond the walls of the Learning Commons.

Departments will store textbooks and other reading materials for students in classroom storage areas separate from the Learning Commons space. For the English Department, this will include class sets of novels for student use. These reading materials will not be directly accessible to students, as they will be chosen and disseminated by faculty.

Physical Education

ACPS offers formal physical education to high school students daily on a rotating quarterly schedule. Physical education and health studies provide standards-based instruction on motor / movement knowledge and skills, physical activity and fitness knowledge, and personal fitness responsibility. To support the high school physical education program, a variety of indoor and outdoor areas are required.

Outdoor physical education areas should be located near the indoor gymnasium. Physical education facilities must be designed with a focus on community use during non-school hours, since there is a high demand for both indoor and outdoor facilities. Outdoor facilities may include track, courts, ball fields, and open physical fitness space. The size and quantity of theses spaces is dependent on the available land in this urban environment. Co-location with recreation, parks, and cultural activities should be discussed during the development of site-specific educational specifications.

Indoor physical education requires a gymnasium large enough to support approximately 90 students at any one time. The gymnasiums should be easily divisible as needed into three sections with physical barriers that reduce sound between the three spaces. An auxiliary gymnasium, weight fitness room, and three health classrooms are required to support the curriculum. To support school-wide presentations, pep rallies, and events, enough fixed seating must be provided to support the entire school enrollment via bleachers. ACPS also provides intramural sport opportunities each season, which utilize both indoor and outdoor space throughout the year. Appropriate storage is required for these programs.

Technology is changing how physical education is taught in high schools. Physical educators want to incorporate motion tracking and biometric technology into their curricula, giving students information about how they move through space and how their body responds to exercise. Virtual reality spaces for physical activity are anticipated in the near future. These spaces, such as cycling rooms, make physical activity more fun and more personalized to the student.

Parking should be located near the gymnasium and a separate entrance should be provided for after-school activities.

DINING AND FOODSERVICE

The dining and foodservices space should accommodate one-third of the projected student capacity each lunch period. The dining experience for students will begin with food selection via a food court layout where students may select from a variety of food options. The food court layout requires specific space planning and coordination between administration and foodservices to ensure an efficient and smooth lunch experience for students.

The dining area should be a warm and inviting space with plenty of natural light, pleasant acoustics, and multiple varieties of age-appropriate seating choices. It is proposed, through creative design, that the dining area should effectively house multiple functions including assemblies, community meetings, and potentially learning and teaching.

The dining and foodservices area of the school should not be located at the main entry to the school. However, the dining area should be located in the central anchor to benefit all students and to reduce the amount of noise impacting classrooms. This area must also be available after school hours. Architects should consider the room volume, configuration, technology requirements, acoustics, and general layout as they relate to the kitchen and cafeteria. The architects should consider serving and dining areas that incorporate composting and recycling facilities, similar to designs students encounter in the public. The space should be homelike with design qualities that support visual and verbal communication between students and faculty.

Foodservices is responsible for food preparation Division wide. Foodservices facilities should incorporate space for speed scratch and / or speed cooking and warming kitchens with the appropriate equipment. Facilities must include space for frozen storage, cold storage, dry storage, manager and assistant manager offices, a dedicated loading dock, and pot washing equipment. The architect should coordinate with the director of foodservices during the design development phase to ensure current needs are met.

SITE

Site circulation should be organized for safety and efficiency. This should be accomplished through careful separation of vehicular traffic, including the separation of school buses, parents, and staff. Sufficient stacking space should be provided to prevent congestion of busy streets. It is most important that parking be proximate to athletic facilities, then performing arts facilities, and then community-partnership areas, such as health centers. Particular consideration should be given to providing safe passage to pedestrian and bicycle traffic. The space should be arranged to encourage active, multi-modal commuting.

All outdoor areas should be protected from vehicular traffic, so students can be assured of a safe and secure environment on the entire school site. Shading elements should be considered along with an outdoor learning area and garden. Outdoor storage field equipment is also needed.

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*. It is recommended that architects work with ACPS and RPCA to prioritize types of outdoor space developments on a site-specific basis. Architects should endeavor to design new schools or future renovation in a way that will maximize available program space.

Site Management

Recreation, parks, and cultural activities (RPCA) is a partnership program that uses shared ACPS facilities for after-school programming. RPCA operates the majority of playing fields, courts, parks, and playgrounds adjacent to Alexandria schools. When funds are available to enhance the campus or grounds of the school, architects should coordinate and consider RPCA's requirements toward playgrounds, courts, fields, and gymnasium spaces, per the joint ACPS/RPCA Facility and Outdoor Maintenance and Use Agreement.

Parking and Transportation

ACPS transportation provides services to 5,800 students daily and approximately 2,200 of those students attend T.C. Williams and Minnie Howard schools. At school facilities where space can be provided for school bus parking, it is desirable to orient the buses in such a way that prevents them from ever reversing out of a parking space – in a manner similar to that seen in a bus depot. If a bus loop must be used, avoid parallel, double-wide parking during loading and unloading, as this increases danger to the students.

It is important to note that most ACPS schools are located in densely-populated neighborhoods and many students either walk to school or receive rides from parents. Currently, ACPS' policy is to provide transportation only for

students living more than 1.5 miles from their designated school site. If ACPS expands to multiple high school campuses, the Division will offer transportation to all students. Due to the high percentage of students arriving by alternate means, designers should be careful to separate parking lots and school bus loading areas from each other and from student drop-off areas and pedestrian walkways. Furthermore, the use of bicycles should be encouraged by providing bike racks in quantities at a minimum consistent with LEED guidelines.

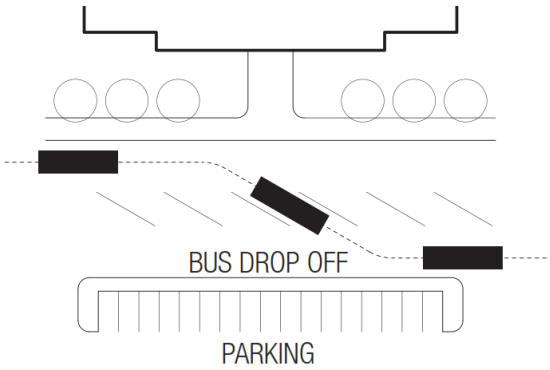


FIGURE 8: Bus Diagram

The minimum parking requirements should be recommended by the architect and are to be based upon the proposed capacity prototype. Actual parking requirements may be impacted by factors such as zoning, site constraints, absence or presence of other modes of transportation, etc. The architect must coordinate at time of design and it should be noted that ACPS offers incentives to encourage carpooling and the use of mass transit by staff.

BUILDING ORGANIZATION

CONCEPT

The careful and thoughtful consideration of building organization during design is critical to the success of a future school program. This conceptual building organization diagram () illustrates relevant adjacencies for the typical high school model.

ACPS currently operates its high school education from two campuses—a ninth grade center and a grade 10 through 12 campus a few blocks away. ACPS desires to provide high schools that serve students in grades nine through 12 at a comprehensive campus with a junior college atmosphere. The basic organizational structure of the school should reflect a learning community concept consisting of an anchoring commons facility and supplementary classroom extensions. These specialized extensions, or wings, create learning communities that each serve a specific academic purpose. These extensions will be organized around a shared common area or anchor building.

The anchors are areas where students will attend whole-school events, specialty classes, and lunch. The anchor will provide space for cross-collaboration as well as individualized learning spaces; however, the majority of learning will occur in the classroom extensions, or wings, that house approximately one-quarter of the school population. The anchor will have public and private zoning to support security separation that allows for afterschool activities.

The classroom extensions will foster learning communities that enhance interdisciplinary collaboration and a modern work culture feeling. Each classroom extension will be dedicated to a specific subject area and students will rotate between extensions, using the anchor as circulation and an extended learning area. Each extension should feel like a small learning community and consist of general purpose classrooms, space for informal instruction, small group rooms, two- and three-dimensional display areas, group breakout areas, and a teacher collaboration room. The extensions will incorporate smaller personalized spaces within the larger whole that allow students to personalize their individual learning environment. The integration of technology throughout all spaces is required to enhance the core curriculum.

Students from all grades should mix and be inspired by what their upper classmates are creating as they pass through the classroom extensions. Each classroom extension will have theme-based academies and flexible use of the overall space to accommodate and adapt to the needs of different programs.

The school will remain flexible enough to incorporate new academies and programs with time. The learning community concept best meets the needs of the educational programs, students, and staff as it facilitates a variety

of instructional strategies and provides a learning environment which is characterized by having a sense of community for the students and teachers, and a safe, well-supervised environment.

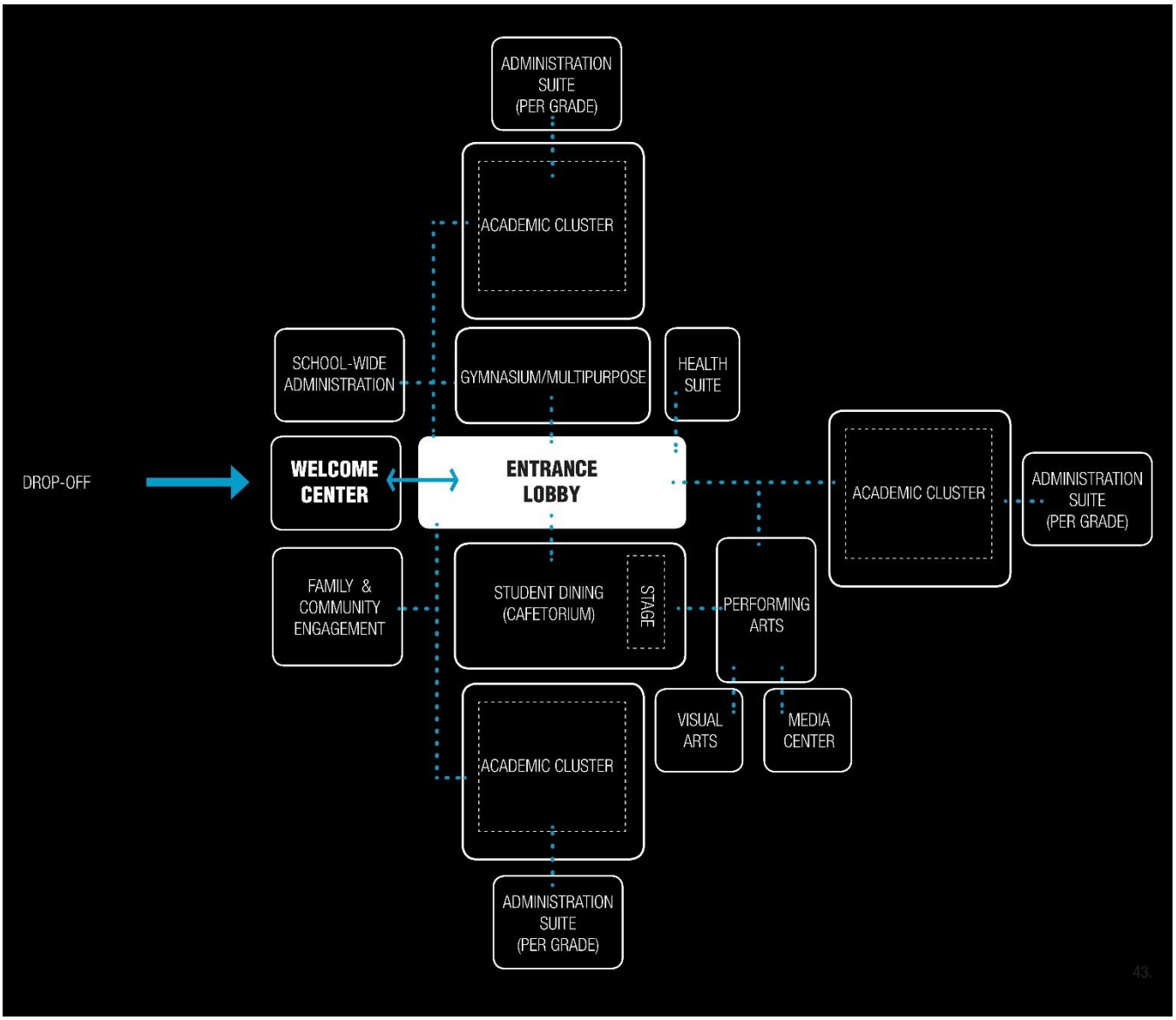


FIGURE 9: Adjacency Diagram

It is desirable that grade levels have separation at core academics to build individual community and focus. Currently, students in the ninth grade campus have a full year to build community, culture, and relationships before they transition into the larger high school. The ability to create these connections is an important quality that any new high school should provide and ACPS wants to maintain.

Administrators will continue to be dispersed among the learning communities to support student supervision and facilitate teacher / student collaboration. Teachers will not own classrooms, rather teacher collaboration rooms and combined offices spaces will be provided to encourage cross-disciplinary collaboration. With rotating teachers, classroom utilization is assumed to be at least 86%.

The number of small group rooms, art and music labs, science labs, and support staff offices is based on staffing formulas. The size of the core areas such as library, dining and foodservices, physical education facilities, and site amenities is based on local and national benchmarks related to size.

DESIGN PRINCIPLES

OVERVIEW

The following section provides executive summaries of the guiding design principles that should be applied to each space within an ACPS school facility. The appendix of this document includes expanded detailed guidance for some of the categories discussed here.

UNIVERSAL DESIGN

The entire facility should be accessible for students, staff, and visitors. This should be accomplished through judicious use of ramping and elevators with sufficient internal clearances for circulation, convenient bus / van loading and unloading, and nearby handicapped parking spaces. All elements of the Americans with Disabilities Act must be complied with, including way-finding and signage, appropriate use of textures, and universal accessibility of all indoor and outdoor school facilities.

FURNITURE & EQUIPMENT

Classrooms vary in shape and size; therefore, the furniture should be flexible to accommodate a variety of classroom formats for both individual and group activities. Teachers and students should have storage space for personal belongings, papers, books, supplies, and teaching materials. Teachers should also have access to a community storage room to exchange and share materials.

To the extent possible, movable furnishings should be used, rather than fixed casework, to provide flexibility for future reconfiguration. Furniture should be selected for its ergonomic traits, with consideration for variability and adjustability to support diverse learning styles. Architects should consider full-height private lockers in hallways for every student.

TECHNOLOGY

The facility should contain the latest in technology, and infrastructure should be provided to support wireless access to data and video throughout the building. It is intended that access to technology will be seamless and pervasive throughout the building with only the minimal number of hard drops needed to support voice, teaching stations, and wall-mounted devices. Technology infrastructure should support the concept that learning can happen anywhere by enabling a one-to-one student to device ratio. The specific tools and design guidance will be determined based on the best practices at the time of construction.

Every learning area should be wired for teacher audio enhancement. Research into this cutting-edge technology suggests that student learning can improve in classrooms where the teacher's voice is amplified and the classroom acoustics are designed to support voice clarity. Please reference Appendix 2 for additional guidance regarding technology infrastructure requirements.

SAFETY AND SECURITY

ACPS wants to maintain a warm and inviting environment, while simultaneously ensuring the safety of students, staff, and community. Security officers will patrol school hallways and screen visitors, but the school system will not integrate metal detectors or physical screenings of students as they enter the school. The organization of a building will have a major impact on student behavior and safety concerns. Architects should refer to Crime Prevention through Environmental Design (CPTED).

All school locations should include a double perimeter approach where every visitor is guided through a secure exterior door into a secure holding vestibule prior to gaining access to the main office. Visual access from the main office to the exterior vestibule is mandatory and every entrance to the school should have a CCTV IP camera. School security is moving away from metal keys and locks to electronic access cards with NFC tracking chips worn by students, faculty, staff, and visitors. Consult with ACPS on the most current keying policy. Please reference Appendix 3 for additional guidance regarding technology infrastructure requirements.

The building will need to include dedicated space for personnel offices and camera monitoring rooms.

ENERGY AND ENVIRONMENTAL PERFORMANCE

ACPS is dedicated to renovating existing, or building new, facilities that meet or exceed Eco-City standards and City of Alexandria environmental performance standards. ACPS desires to offer schools that teach faculty, staff, students, and the community the importance of environmental stewardship. ACPS believes quality architecture and high energy performance facilities positively impact the education of students and increase retention of staff and students. At this time, city development standards require compliance with LEED Silver certification standards for major construction projects. ACPS seeks to exceed these minimum standards.

MATERIALS AND FINISHES

ACPS believes high-quality architectural materials and finishes create an atmosphere that supports and inspires learning. All spaces should be conducive to teaching, provide a warm and welcoming feeling, and meet the principles of Evidence-Based Design (lighting, environmental / air quality, and acoustics). All materials must be highly durable and resilient yet support a creative learning environment. ACPS is cognizant that materials should

be reasonable in cost and not exuberant when considering budget and life-cycle costs to maintain and upkeep. A sensible balance is necessary to maintaining budget and achieve ACPS' facility standards.

OPERATIONS AND MECHANICAL

Mechanical systems that are climate appropriate and responsive to the life cycle, maintenance and efficiency expectations of ACPS should be provided, along with passive systems that pair with active systems and coordinate to achieve maximum efficiencies while coordinating with the users to determine the location of universal and dedicated systems. ACPS requires individual facilities to operate under 20 kw/hr per square foot by the year 2026.

COMMUNITY USE AND PARTNERSHIPS

ACPS is pleased to have community and non-profit partners in its buildings offering valuable services and programs for students and families. Partnership programs and other regular community activities require shared, co-located and sometimes dedicated space that is internal to the school yet has the ability to operate beyond ACPS school hours. Extended hours of operation require the partnership programs and community activity area to have an entrance that can be separated from the main school. This secondary building entrance for after-school program use should be visible to all spaces co-located in the community use and partnership area, specifically the gym and multipurpose rooms. This space will be used by after-school programs for record keeping, registration transactions, secure money storage, and child pickup. This allows partnership programs to operate independently of the school's staffing requirements and provides the necessary security to protect the main school. During general school hours, partnership programs should function under ACPS' security policies and use of secondary entrances should be restricted.

Program offerings are location-dependent and include, but are not limited to:

- Tutoring
- Family and community education centers (FACE)
- Recreation, parks and cultural activities (RPCA)
- Medicaid therapy, and
- Campagna Center.

Functions of these programs should be co-located with the ability to use standard classrooms, the gymnasium, the multipurpose room, and the media center.

ACPS has a standing partnership with the Alexandria Department of Recreation, Parks, and Cultural Activities (RPCA) for the maintenance and after-school programming of fields. At several schools, RPCA operates after-

school and community programs in the gymnasium or multipurpose room, per the joint ACPS / RPCA Facility and Outdoor Maintenance and Use Agreement.

FAMILY AND COMMUNITY ENGAGEMENT CENTERS

ACPS serves a diverse community of families who have immigrated to the DC Metropolitan area from all over the world. It is understandable that for cultural reasons or due to language barriers that newcomers to the school may be hesitant to engage staff and need additional support. The Division wants to establish Family and Community Education Centers (FACE) at each school to welcome families and provide the additional resources to help them succeed.

A typical FACE center would ideally be located near the main office and include:

- A reception area with both comfortable seating for individual conversations and table seating for meetings and classes,
- A private office, and
- Storage

PARENT TEACHER ASSOCIATIONS

Flexible use space should be provided to accommodate the mission and program offerings of the PTA group. PTAs meet on a monthly schedule, typically during the evening, and have 30 to 35 participants in attendance. PTA meetings include school board members, parents, and on occasion the superintendent. PTAs offer volunteer afterschool programs that require access to standard, flexible classrooms, the gymnasium, the library, and the cafeteria. Consideration should be given to co-locating the PTA with other partnership functions like the FACE center. PTA functions require dedicated storage space and direct interaction with the school's main office suite and staff.

1600 STUDENT PROTOTYPE

The following section provides a summary of all spaces required within the facility. Data is provided to serve as an overall guideline and architects should strive to accommodate the stated square footage recommendations; however, latitude of +/- 10% should be provided – particularly when renovating an existing facility.

Building Total	SQFT
Admin	4,250
Student Services	4,975
Core Academics	40,900
Special Education	3,640
Sciences	17,350
Fine Arts	27,025
Specials	5,500
CTE	15,675
Physical Education	36,525
Library	12,625
Foodservices	13,495
Building Services	2,890
Community Space	815
Grossing 40%	74,266
Total	**259,931**

FIGURE 10: 1600 Student Total Size

BUILDING SPACE SUMMARY

Admin	QTY	SQFT	TOTAL
Main Office			
Reception	1	1125	1,125
Conference	1	250	250
Workroom	1	400	400
Storage	1	250	250
Secure Storage	1	75	75
Principal	1	150	150
Administrative Assistant	1	100	100
Flex Office	1	100	100
Coat Closet	1	25	25
Attendance Office	1	100	100
Financial secretary	1	100	100
Sub-Total			*2,675*
Distributed Administration			
Vice Principal	4	150	600
Conference	1	150	150
Storage	1	50	50
Sub-Total			*800*
Faculty Support			
Faculty Lounge	1	775	775
Sub-Total			*775*
TOTAL			***4,250***

Student Services	QTY	SQFT	TOTAL
Guidance			
Office	6	100	600
Waiting	1	400	400
conference	1	350	350
Career Center	1	500	500
Storage	1	100	100
Testing	1	75	75
Sub-Total			*2,025*
Health Suite			
Waiting Area	1	300	300
Exam Room	2	100	200
Student Rest Area	1	575	575
Office	1	100	100
Storage	1	100	100
Student Toilet	1	100	100
Sub-Total			*1,375*
Support Services			
Psychologist	2	100	200
Social Worker	3	100	300
Flex Office	4	100	400
Records Storage	1	75	75
SGA Office	1	275	275
School Store	1	325	325
Sub-Total			*1,575*
Total			***4,975***

Core Academics	QTY	SQFT	TOTAL
Classrooms			
Economics	3	850	2,550
English	11	850	9,350
Math	11	850	9,350
Social Studies	11	850	9,350
Sub-Total			*30,600*
Shared Spaces			
ELA	6	900	5,400
Resource	6	250	1,500
TCR	6	300	1,800
Project Storage	8	200	1,600
Sub-Total			*10,300*
Total			***40,900***

Special Education	QTY	SQFT	TOTAL
General			
Classroom	4	850	3,400
Office	1	120	120
Records Storage	1	120	120
Total			***3,640***

Sciences	QTY	SQFT	TOTAL
Science Labs			
Biology	3	1400	4,200
Chemistry	3	1400	4,200
Physics	3	1400	4,200
Environmental Sciences	2	1400	2,800
Sub-Total			*15,400*
Science Support			
Prep	6	200	1,200
Storage	5	100	500
Chemical Storage	1	50	50
Greenhouse	1	200	200
Sub-Total			*1,950*
Total			***17,350***

Fine Arts	QTY	SQFT	TOTAL
Visual Arts			
Art Studio	1	1200	1,200
Art Studio - 3D	1	1200	1,200
Graphics Media Studio	0	0	1,000
Storage	2	100	200
Kiln / Ceramic Storage	1	100	100
Sub-Total			*3,700*
Music			
Instrumental Music	1	3050	3,050
Vocal Music	1	1675	1,675
Practice Room	1	700	700
Instrument Storage	1	600	600
Uniform Storage	2	100	200
Office	2	100	200
Library / Music Storage	1	150	150
Sub-Total			*6,575*
Drama			
Classroom	1	900	900
Black Box Theatre	1	2000	2,000
Control Room	1	100	100
Sub-Total			*3,000*
Auditorium			
Theatre / Auditorium	1	8525	8,525
Stage w/ pit	1	3125	3,125
Ticket Booth	1	100	100
Control Room	1	150	150
Costume / Prop Storage	1	525	525
Dressing Rooms	1	525	525
Student Toilet	2	50	100
Set Construction	1	700	700
Sub-Total			*13,750*
Total			***27,025***

Specials	QTY	SQFT	TOTAL
Foreign Language			
Classroom	6	900	5,400
Storage	1	100	100
Total			***5,500***

Physical Education	QTY	SQFT	TOTAL
Physical Education			
Gym	1	10000	10,000
Auxiliary Gym	1	8475	8,475
Wrestling	0	0	2,500
Fitness / Weight Room	1	1500	1,500
Dance / Activity Room	0	0	1,500
Health Classroom & Human Growth and Development	6	850	5,100
Sub-Total			*29,075*
Support			
Locker Rooms	1	2775	2,775
Showers / Toilets	1	775	775
Team Rooms	4	300	1,200
PE Teachers/Coach Office	1	200	200
Teacher/Coach Lockers & Toilets	2	90	180
Athletic Director Office	1	120	120
Training / Whirlpool	1	120	120
Laundry / Towels	1	100	100
Concession / Ticket	1	100	100
Outdoor Storage	1	400	400
Indoor Storage	1	450	450
Athletic Storage	1	600	600
Adaptive PE Storage	1	250	250
Officials Lockers	2	90	180
Sub-Total			*7,450*
Total			***36,525***

CTE	QTY	SQFT	TOTAL
CTE 1			
Lab	1	2000	2,000
Project / Material Storage	1	100	100
Sub-Total			*2,100*
CTE 2			
Computer Tech. Lab	1	2000	2,000
Student Storage	1	100	100
Computer Service Lab	1	1050	1,050
Storage	1	100	100
Sub-Total			*3,250*
JROTC			
Classroom	1	850	850
Changing Room	2	150	300
Uniform Storage	1	250	250
Supplies	1	200	200
Armory	1	100	100
Office	1	200	200
Book Storage	1	25	25
Cadet Operations	1	150	150
Indoor Practice	1	4500	4,500
Outdoor Practice	TBD	0	0
Sub-Total			*6,575*
CTE 3			
Engineering Lab	1	1400	1,400
Project / Material Storage	1	100	100
Project / Material Storage	1	200	200
Sub-Total			*1,700*
CTE 4			
Classroom	2	425	850
Production Lab	1	1000	1,000
Project / Material Storage	1	200	200
Sub-Total			*2,050*
Total			***15,675***

Library	QTY	SQFT	TOTAL
Library			
Main Library	1	7800	7,800
Office / Workroom	1	450	450
A/V and Magazine Storage	1	100	100
Head End Room	1	275	275
Historic Collections	1	100	100
General Storage	1	100	100
Project Room	1	525	525
Sub-Total			*9,350*
Communications			
TV / Video Studio	1	1600	1,600
Control / Editing lab	1	150	150
Publication Lab	1	450	450
Storage	1	100	100
Graphics Lab	1	975	975
Sub-Total			*3,275*
Total			***12,625***

Foodservices	QTY	SQFT	TOTAL
Dining			
Cafeteria	1	7700	7,700
Furniture Storage	1	400	400
Sub-Total			*8,100*
Foodservices			
Kitchen	1	1600	1,600
Serving	1	1450	1,450
Office	1	100	100
Walk-in Freezer	1	350	350
Walk-in Chiller	1	350	350
Dry Storage	1	500	500
Dish Room	1	600	600
Soap Storage	1	50	50
Pan Wash	1	50	50
Locker / Toilet	1	120	120
Receiving	1	225	225
Sub-Total			*5,395*
Total			***13,495***

Building Services	QTY	SQFT	TOTAL
Maintenance/Operations			
Receiving	1	400	400
Central Storage	1	450	450
Operations Office	1	250	250
Locker / Showers / Toilets	1	120	120
Security Office	1	150	150
Custodial Closet	7	60	420
Recycling	1	400	400
Outdoor Storage	1	200	200
Sub-Total			*2,390*
Toilet			
Staff Toilet	10	50	500
Sub-Total			*500*
Total			***2,890***

Community Space	QTY	SQFT	TOTAL
Family Resource Suite			
Family Resource Room	1	150	150
Office	1	80	80
Toilet	1	50	50
Sub-Total			*280*
After School Support			
Storage	1	100	100
Pantry	1	50	50
Office	1	80	80
Sub-Total			*230*
Services			
Pantry	1	80	80
Personal Care	1	100	100
Laundry	1	100	100
Storage	1	25	25
Sub-Total			*305*
Total			***815***

APPENDIX

APPENDIX 1:

EVIDENCE-BASED DESIGN PERFORMANCE CRITERIA

Scientists who study the "neuroscience of learning" are finding that certain lighting, acoustics, and spatial relationships support or hinder the learning process. The following criteria should be used when creating optimal learning and teaching environments.

Lighting Quality:

Improving natural and artificial lighting in classrooms

	DESIGN PARAMETERS	PARAMETER NOTES
1) Controlled natural lighting (glazing)	10 – 12% of floor SF	LEED and Green Globe
2) Artificial light	35-50 foot-candles	IES

Environmental and Air Quality:

Addressing temperature control, ventilation, air filtration, carbon dioxide levels, and HVAC background noise to ensure comfortable rooms.

	DESIGN PARAMETERS	PARAMETER NOTES
1) Winter temperature	68.5 to 75.5 degrees	EPA 2000 and ASHRAE 55-04
Summer temperature	74 to 80 degrees	
2) Humidity	30 to 60% relative humidity	EPA 2000 and ASHRAE 55-04
3) Air changes	6-10 per hour	ASHRAE
4) Outdoor air ventilation	10CFM per person	Plus 0.12 per SF of area

5) Air filtration	MERV 13	LEED
	MERV 6 to 8	ASHRAE 52.2-2007 and
		62.1-2007
6) Carbon dioxide levels	Below 700 PPM above	ASHRAE 62.1-2007
	outdoor air	
7) HVAC background noise level	RC(N) Mark II level of 37	ASHRAE Handbook
		Chapter 47

Acoustics:

Limiting reverberation and background noise and improving sound isolation.

	DESIGN PARAMETERS	**PARAMETER NOTES**
1) Reverberation	.6 per second	(ANSI S12.60-2002)
2) Background noise	45 dBA	(LEED)
3) Sound isolation (varies)	STC 45 between classrooms	

Technology:

Providing data connections for online learning resources, AV equipment, closed-circuit televisions, and a sound system with emergency capabilities.

	DESIGN PARAMETERS	PARAMETER NOTES
1) Data / computer drops	At teacher workstation	
	At wireless access points	
2) Audio / video equipment		
Interactive whiteboard		
Document cameras		
Sound reinforcement	Amplifier, microphone, speakers	
3) Clock	Synchronized with bell system	
4) Sound system and emergency call-box		
ceiling or wall speaker	Class change bells, emergency announcements	
5) CCTV camera		
Security, WebEx conferencing, distance learning		

APPENDIX 2:

SAFETY AND SECURITY

ACPS wants to maintain an inviting environment, while simultaneously providing a safe environment for students, staff, and community members who use the facility and adjacent support services. The organization of a building will have a major impact on student behavior and safety concerns.

Building security can be addressed in an active or passive manner: active security is based on security systems; passive security is based on program design, building configuration, and community participation. Schools should be based on passive concepts with applied active concepts where necessary.

The principles of the *Crime Prevention through Environmental Design* ("CPTED") approach should be followed to incorporate passive safety and security measures. CPTED is the broader approach to safety and security that seeks building designs that encourage desirable behavior, heighten functionality, and decrease antisocial behavior.

There are three main considerations in CPTED:

- Natural surveillance: the capacity to see what is occurring without having to take special steps to do so
- Natural access control: the capacity to limit who and how someone can enter a facility
- Territoriality: the capacity to establish an authority over an environment in who is in charge, who is allowed and who is not welcome.

Building Layout

- Avoid blind spots, corners, and cubby holes
- Maintain lines of sight and use openings to create transparency
- Locate administrative and teacher preparation with good visual contact of major circulation areas (i.e., corridors, cafeteria, bus drop-off, parking)
- Develop spatial relationships that naturally transition from one location to another
- Locate toilets in close proximity to classrooms
- Design toilets to balance the need for privacy with the ability to supervise
- Locate areas likely to have significant community (after-school) use close to parking and where these areas can be closed off from the rest of the building

Types of Building Materials

- Use durable wall surfaces and maintainable flooring materials that are easy to clean so graffiti and dirt can be removed
- Incorporate pitched roofs which inhibit roof entry and are aesthetically pleasing
- Ensure that operational part of windows on the ground floor are in the upper portion to prevent access
- Install non-slip floors and walk-off mats at points of entry
- Use interior glass to create a transparent environment within the school
- Manage colors, artificial lighting, and natural day lighting artfully to create an environment that is aesthetically pleasing in order to support student and faculty pride in the building.

Uses of Technology

- Install phones in every instructional and support area
- Ensure the building-wide all-call is designed to be heard throughout the school and on the play fields when needed
- Install motion or infra-red detectors, which can also conserve lighting costs
- Provide video cameras that are used for instructional purposes and can also be used for security purposes during non-school hours
- Provide smoke and heat detectors throughout the building
- Install emergency call buttons in large parking areas,
- Provide magnetic locking systems and carefully selected door hardware to facilitate lock downs as needed

- Give consideration to zoning the building for non-school-day uses in terms of both energy efficiency and security: lighting zones, securable zones, and mechanical zones

Visitor Management

- The front entry lobby should be welcoming and inviting for students, staff, and visitors with a central visitor registration area prominent upon entry
- Clear way-finding signage should be included that directs visitors upon campus arrival to visitor registration and directs them throughout the building to provide overall guidance,
- A secured double vestibule or a video-enabled front entry intercom buzzer system should be provide to manage visitor entry
- Front lobby and exterior displays should be provided for communicating school messages

Vehicular and Pedestrian Traffic

- Separate bus drop-off area from other vehicular traffic
- Separate staff and community parking area
- Separate student (pedestrian) traffic flow

Landscaping, Play / Practice Fields, Site, and Lighting

- Use native high trees and low bushes (less than three feet high) to deter hiding
- Use aesthetically pleasing fencing around building perimeter
- Provide non-intrusive lighting in all areas (not correctional-type lighting) according to the Light Pollution Credit in LEED-Ss with no lighting to leave property line
- Provide security lighting around building and parking lots with photocell timer, motion sensor, and on / off capacity

APPENDIX 3:

COMMUNITY USE OF SCHOOL

Community involvement in education and educational involvement in the community can take a variety of forms before, during, and after the school day. Following is a partial list of potential community uses:

- Touring groups
- Speech / debate clubs
- After-school youth enrichment
- Adult education
- Community meetings
- Mentoring programs
- Parent involvement
- School / business partnerships
- Alternative education programs
- Dance studios
- Community athletics
- Recreation programs
- Health screenings
- Senior citizen programs
- Intramural sports programs
- Child care (staff, student, community)
- Voting
- Emergency shelter

Based on limitations established for the size of the facility and budget constraints, most of the community uses will likely need to focus on shared space that is used primarily for school programs during the school day and community uses during non-school hours. Priorities need to be established at the local site level to determine future community activities that may be added in order to be incorporated in the overall master plan.

Even within these constraints, opportunities exist. The areas that have the greatest possibility for community usage include:

- Performance / meeting area
- Library / media center
- Play fields
- Computer labs
- Conference rooms
- Multipurpose room/gym,
- Cafeteria

Consideration should be given to furniture and equipment selection for shared uses by students, very young children, and adults. The facility and site should be configured and zoned to enhance parking and circulation, security, and energy conservation. Adequate signage to assist community members should be provided and auxiliary storage needs to be made available for community programs

Collaboration and partnership require greater cooperation in the planning of schools and community facilities. It is important for the school ACPS Division, governmental agencies, and corporate partnerships to participate collaboratively in the planning of schools.

Planning for future schools should include joint-use considerations at the beginning of the process. School Divisions and governmental agencies are beginning to realize that cooperation is needed, especially considering the ever-shrinking budgets and the desire to meet the community's diverse needs. There are potential opportunities in jointly developing parks, libraries, and one-stop shopping centers for human services. Partnerships and joint ventures should be considered and are encouraged by the board of education.

APPENDIX 4:

ENERGY AND ENVIRONMENTAL DESIGN

There is a high interest in using school buildings as teaching tools to teach environmental stewardship and awareness, while simultaneously providing engaging environments for students, staff, and community who use the facilities. The organization, understanding, and use of school buildings will have a major impact on student and staff conservation behavior.

The sustainable design and green features of any building can be addressed in an active or a passive manner: active interaction is based on digital displays, educational features and curriculum-integrated learning about environmental issues; passive interaction is based on the program design, building configuration, green building features, and energy efficient building automation.

Passive Concepts

Building Layout

- Concentrate daylight and views to the outside on areas of frequent human interaction (e.g., classrooms, cafeterias, media center, art rooms, music rooms) with passive solar design
- Avoid excessive window areas in corridors, lobbies, and hallways with no gathering opportunities (design for less than 45% of wall area)
- Avoid skylights and use roof monitors with vertical glazing instead

Types of Building Materials

- Use durable wall surfaces that are easy to clean
- Design for cleanability with easy and safe access
- Incorporate light-colored pitched roofs to prevent heat gain and leakage
- Install high performance walk-off mats at all points of entry
- Design with noise abatement in mind

Uses of Technology

- For instructional and administrative purposes, the new school should have extensive technology systems. These same infrastructures and technology components can be used to enhance the perception of the building's environmental components. A digital display of the building's energy and water use can be displayed at the entrance and in the cafeteria
- Website with environmental features of the school should be made available
- Use only vacancy sensors for classrooms, cafeteria, etc. to turn off (not on) lighting
- Provide daylight sensors and dimming in larger areas (cafeteria, multi-purpose rooms, etc.)

Vehicular and Pedestrian Traffic

- Provide sufficient, covered, and secured bicycle storage
- Provide bicycle lanes to the building from all major access directions

Landscaping, Play / Practice Fields, Site, and Lighting

- Use native high trees and low bushes and ground covers and locate to provide shade to the building
- Use on-intrusive lighting of all areas (not correctional-type lighting) according to the Light Pollution Credit in LEED-S with no lighting to leave property line

Green Curriculum

- Provide outdoor classroom area
- Design interior with sense of building's orientation to north – east – south – west

Active Concepts

Building Layout

- Provide signage to educate users about interior and exterior green building features throughout
- Provide signage for user behavior modification, e.g., ACPS policy for thermostat settings, reminders to turn equipment off when not in use
- Provide visitor map with floor plan for location and explanation of green building features

Types of Building Materials

- Provide view window to inside of wall constructions and mechanical room
- Provide materials with environmental massage in selective areas, e.g. 100% recycled post-consumer plastic toilet compartments, wheat board cabinets, or furniture made of wood harvested from school site, and explain with signage.

Uses of Technology

- For instructional and administrative purposes, the new school should have extensive technology systems. These same infrastructures and technology components can be used to enhance the perception of the building's environmental components.
- Provide green morning announcement with update on energy and water use
- Encourage student-conducted energy audits
- Provide school-based resource conservation program with frequent feedback to users

Vehicular and Pedestrian Traffic

- Provide preferred parking for ACPS Green Fleet (for carpooling and fuel-efficient vehicles)

Landscaping, Play / Practice Fields, Site, and Lighting

- Use native high trees and low bushes (less than three feet high) to deter hiding
- Use aesthetically pleasing fencing around perimeter of the building

- Provide non-intrusive lighting in all areas (not correctional-type lighting) according to the Light Pollution Credit in LEED-S with no lighting to leave property line
- Reference the Alexandria City Landscaping Guidelines when providing landscaping.

Green Curriculum

- LEED-credit Schools as a Teaching Tool requires 10 hours of instruction per student, grade, and school year on environmental issues related to the school building. The school building's design should support this requirement wherever possible.



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