



Montgomery County Public Schools

*PPEA Detailed Proposal
#12-20*

*Auburn High School
Auburn Middle School
Blacksburg High School*

July 8, 2011





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Giddings High School | SHW Group

executive summary

Since receiving the Request for a PPEA Detailed Proposal on May 24th, the Branch & Associates | SHW Architects | RRMM Architects PPEA team has worked hard on your behalf to respond to the requirements therein while at the same time working to inform the public about our initial proposal, gather feedback from a broad range of stakeholders, and incorporate said feedback into this proposal and our plans for the Auburn Strand and Blacksburg projects. In the interest of time (for which there appears overwhelming support) we have advanced these projects as far and as quickly as possible in the interim, and we had done so to the best of our ability and with a great deal of care. We recognize, however, that additional development (for which we've allotted time in our proposed schedule) is desired and required. We look forward to continuing our engagement with you and your staff as we work together to achieve our collective goal.

This detailed proposal supersedes our initial, conceptual proposal. Highlights are summarized below:

Local team, local knowledge. Key members of our team, in fact most of our team, hails from the greater Blacksburg/Christiansburg area. Our knowledge of the local conditions – from the Montgomery County Public School's design standards to the local regulatory review and approval process – is unmatched and our vested interest in the success of these projects is second to none. We want to do well by our community!

Regional and national perspective. In addition to our local partners we have teamed with SHW Group, a national K12 design firm with a regional presence in the Commonwealth who will lend breadth to the depth created by our local partners.

Staying the course. By partnering with RRMM Architects our team has been able to further advance the good work done to date by all for the Auburn projects.

Realistic schedule. Contained herein is a schedule that promises the earliest possible opening dates for all three schools given the realities of the PPEA process, the desire for further input, and the requirements for local reviews and approvals. Our assumptions in proposing this schedule include the ability of MCPS to commit to providing input, responding to queries, and making decisions accordingly.

Budget options. As residents of and active members in the community, we are intimately familiar with the budget challenges these projects face. To that end we've proposed options within that allow you to tailor your scope, schedule, and budget to best suit your needs.

Specific designs. Our proposal does not attempt to "resite" a building designed for another community in another place and time. Our design reaches deeper than the printed text of your educational space standards. Based on extensive conversations with Montgomery County Public Schools and the faculty and parents at all three schools, careful analysis of both sites, and an iterative design process that has already garnered feedback, we have developed specific, site-sensitive solutions that address your program needs today while maximizing potential for flexibility and growth in the future.

Student-focused. Because we design from the inside out using your curriculum as the basis for our design, our designs are very student-focused. They are exciting places in which to be, to learn, to achieve, and offer a variety of modalities for a broad spectrum of learners.

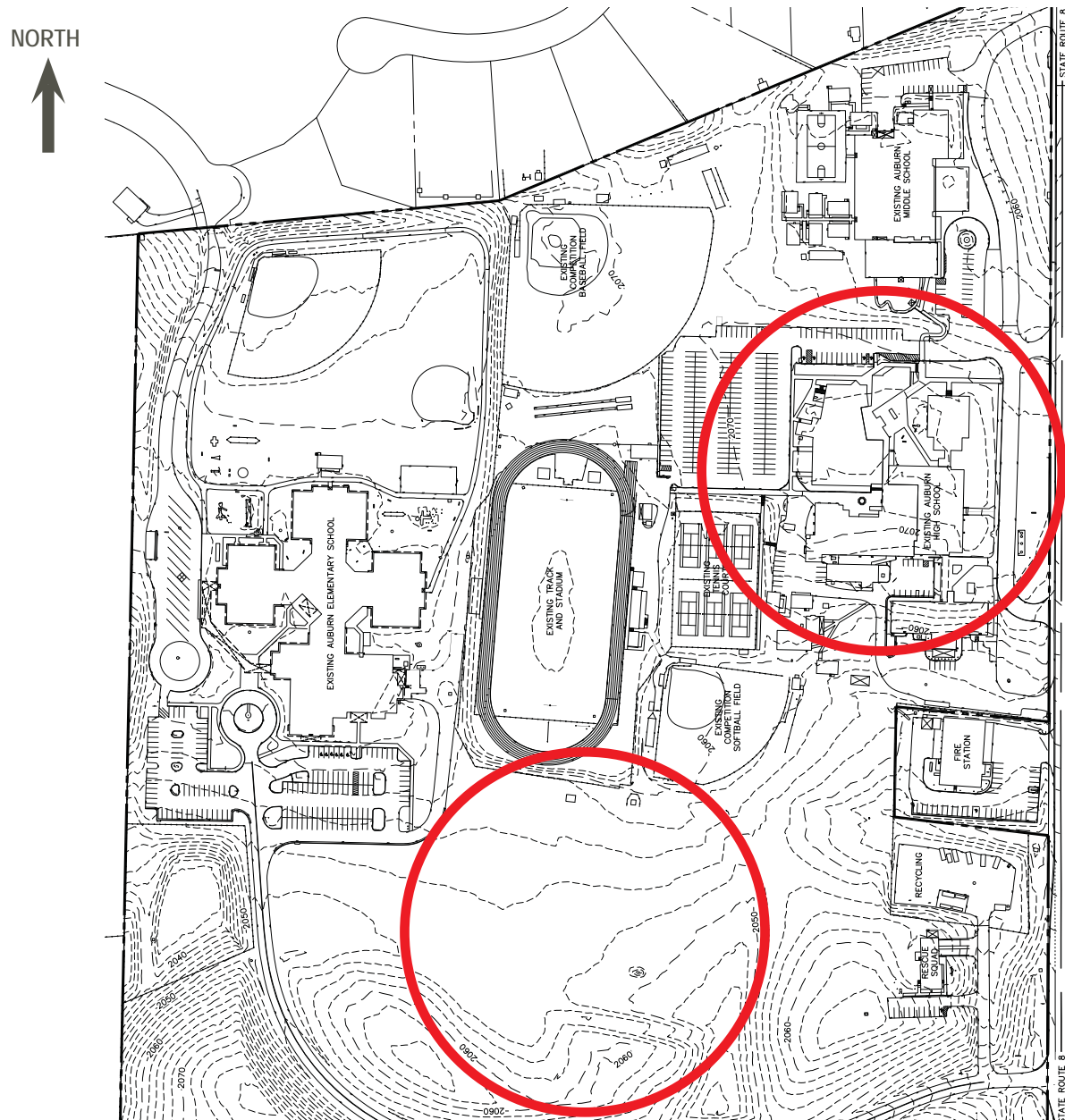
Operational savings. Given that our designs are site specific we were able to orient the buildings optimally to set the stage for maximizing operational savings through the careful harvesting of daylight, reduction of passive solar gain, and right-sizing of mechanical systems. Also, the buildings are zoned so that portions can be “turned off” while community activities are occurring in public spaces.

Community amenities. Again, because of the site-specific nature of our proposed designs we were able to maximize the amenities offered the community via a variety of recreational and competition playing surfaces, walking paths, performing arts spaces, auxiliary gymnasiums, and community- and distance-learning classrooms.

Collaboration. While we believe that our proposed solutions will meet your needs, we also believe that they can only benefit from broader stakeholder input. To the extent that others have not had an opportunity to weigh in, share their ideas, and influence the design, we welcome that opportunity. Additional input sessions will be established during the design development phase and a community web site for both schools will be monitored to encourage open discussion and community input for our designers to consider during this process.

Proven success. Our team has both deep roots in the community and broad success with projects of this scope and magnitude. That’s a winning combination when it comes to delivery these three projects on time, on budget, and beyond expectations. We hope you agree!

10.1.4 Provide a topographical map depicting the location of the proposed projects on the Auburn and Blacksburg Sites;



auburn strand - topographical map

- 10.1.5 Provide a conceptual site plan indicating proposed location and configuration of the projects on the proposed sites (including road-widening, turn lanes, and new traffic signals) based on VDOT Traffic Studies as available. If proposed design includes land that is not currently owned by MCPS, provide alternate option that places all features on MCPS owned land;

conceptual site plan - auburn strand

A Carefully Conceived Site Plan

With such limited land area and numerous constraints from the presence of existing facilities, the Auburn Strand site presents a challenge to satisfy all of the program requirements. Yet, through the study of numerous site schemes and the process of listening carefully to the concerns and priorities of the MCPS staff and the community, we found a way to meet all of the site program requirements and produce a strong functional site diagram.

Starting from the approach to the school along Route 8 and then working into the heart of the campus, consider the following features of the design:

Route 8 and other road improvements. Road-widening, turn lanes, and the reduction in the number of site entrances from Route 8 will improve safety and functionality. Once on site, bus and service traffic for the high school and middle school is completely separated from the automobile traffic of staff, students, visitors and parents dropping off or picking up their children. For student drop-off areas, on-site vehicular queuing is generous and easily managed for both the new high school and middle school. The school road that currently serves the elementary school will be widened along its length to provide additional queuing lanes for the high school and elementary school and dedicated exit lanes onto route 8.

Well-organized Parking. Parking areas for the two schools are appropriately sized and separated to promote the community desired separation of middle and high school students. The larger high school parking areas are well positioned to serve the track/stadium complex and provide the opportunity to provide an improved entry and internal operation of the stadium complex. For both schools, staff, visitors, and students come into each school's singular main entry area that is clearly supervised by each school's main office. Only bus-riding students for the middle school enter into an area separate from the main entrance.

Efficient Bus Staging Area. Notice how the two, linear bus staging drives will efficiently provide separate bus areas for each school. A swinging security gate (or similar method) placed between the middle school bus parking area and the middle school parking can readily allow the bus area to be utilized for after-hours car parking.

Prudent Demolition, Athletic Fields and a Campus Green. One of the major benefits of our proposed site plan is the way it addresses the need for numerous athletic fields in combination with the demolition of existing structures that are the best candidates for demolition. It was a community priority that all athletic fields be located on site. Athletic fields obviously require large rectangular open areas. Given the limited land area, these fields would need to fit like a puzzle. The proposal to demolish the existing middle school, several outbuildings of the existing high school, the tennis courts, and high school parking facilitate the solution to the puzzle. The buildings and site features that have been proposed for demolition are not only a hindrance to an efficient site layout, they are facilities that

provide little opportunity for effective continued service. The existing tennis courts and parking areas are in poor condition and awkwardly graded. The existing middle school is a one-story facility whose configuration does not lend itself to the efficient adaptation of new program requirements (it was designed as an elementary school). The location and elevation, as well as the poor condition, of the other outbuildings make them poor candidates for re-use in an integrated middle school floor plan. Finally, as an added bonus, the location of the new athletic fields creates an internal campus green in the heart of the campus and moves most of the parking outboard. Safety is improved, the relationship between athletic fields and parking is improved, and the plan is more ordered and attractive.

Effective Relationship between Site Features and the Building Plans. The site plan and building layouts are designed to work in harmony for a strong simple diagram. Both schools are configured to provide excellent solar orientation, which allows the building to incorporate exceptional daylight harvesting strategies throughout the schools. Note the relationship between parking and public building spaces such as auditoriums and gymnasiums for both schools. Note also the effective relationship between athletic areas and outdoor athletic fields. For example, a football team room can be part of the new high school making it more cost effective than a separate, stand-alone building located at the stadium.

Other Features of the Site Plan. Approximately 500 parking spaces are provided for the high school, and approximately 120 spaces are provided for the middle school. The bus parking staging areas are designed to accommodate a total of 20 buses and can also be double-striped to provide supplemental after-hours parking. The plan provides for four large multi-purpose fields, six tennis courts, and competition fields for softball, baseball, track, and soccer / football. As an option, the stadium seating can be expanded to provide 1200 home seats and 800 visitor seats, but this cost is not currently contemplated in our price proposal. Due to conflicts generated by the school system's program requirement, the cabin and cannery building must be demolished.

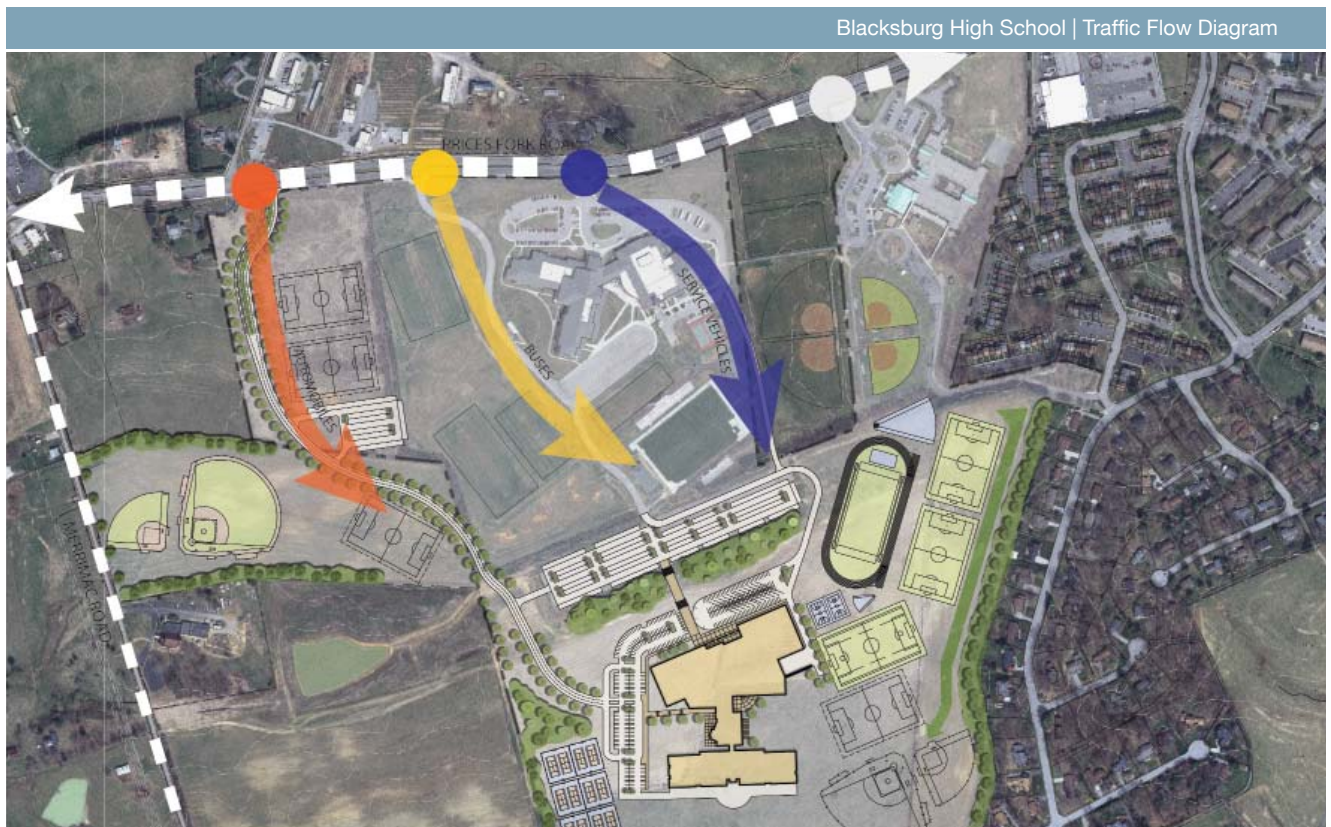


conceptual site plan - auburn strand

A Carefully Conceived Site Plan

At the edge of the town, the Blacksburg High School is just south of the existing Blacksburg Middle School and Kipps Elementary School. It is adjacent to the recently constructed competition field and stadium as well as a variety of community use fields. The site is bordered on the east by the Stroubles Mill neighborhood and to the west by a future private development. A large parking area was constructed on the site to support the stadium facility. A low ridge cuts diagonally across the site offering broad views to the south. After several iterations that included reviewing numerous options with key stakeholders, a strong functional diagram was developed that

- is organized for safety and ease of use,
- is sensitive to topography and climate,
- Is sensitive to neighbors and to plans for future development, and
- maximizes opportunities for community use.



Starting from the approach to the school from Prices Fork Road and then working into the heart of the campus, consider the following features of the design:

Prices Fork Road improvements. Road-widening, turn lanes, and a new traffic controlled intersection on Prices Fork Road will provide safe and functional automobile access to the site; current Traffic Impact Study will determine the best means for traffic control at the new entrance intersection. Once on site, a curving, tree-lined entry drive leads past playfields and ponds toward the new school.

Separated Access. Cars and buses sharing roads - even for short distances - is needlessly risky, so at no point do we propose that they do so. Bus and service traffic are completely separated from the automobile traffic of staff, students, visitors and parents dropping off or picking up their children. The long entry drive allows for generous on-site vehicular queuing for the student drop-off at the front of the school. This entry drive will remain three-lanes wide (at a minimum) up to the school so as to provide adequate means of traffic flow without allowing drop-off and pick-up queues to slow the process of other drivers.

Well-organized Parking. The plan takes advantage of the existing parking lot as the main student parking area and event parking for the completion field/stadium complex. Additional parking is provided near the school for staff, visitor, and handicap parking. Where necessary, parking is provided for other competition and community use fields.

Efficient Bus Staging. One of the major benefits of a multi-school campus is operational efficiency. Since busses will deliver both middle and high school students, the bus staging for the new high school is designed as a continuation of the existing middle school bus loop. Separated from automobiles and service, this allows for an efficient drop-off and pick-up sequence and improves safety by concentrating bus movement into and within the campus. From the bus drop-off, students enter the school through the events lobby. A swinging security gate (or similar method) placed on the access road can readily allow the bus area to be utilized for after-hours car parking.

Efficient and Discreet Service. Similar to the bus access, the new service drive to the high school is an extension of the service to the middle school; this will consolidate the service vehicles to a single driveway and allow for dual-service within the campus. The service area is tucked behind the gyms and some well-planned screening on the existing hill to obscure this area from view in all directions.

Landscaped Buffers Substantial landscape buffers are proposed at the perimeter of the site and at strategic locations within the campus to buffer neighbors. In addition to the vegetative screening, the topography of the site is used to minimize the visibility of the new building from adjacent residential parcels. In addition, the more active site programs (parking, busses, service, competition fields etc.) are concentrated on the north and west of the site, toward the existing schools and Prices Fork Road. No lighted activity areas are proposed along the eastern or southern edges.

Athletic Fields and Community Use Facilities. We have attempted to maximize the value for both the school and the community. One of the major benefits of the proposed site plan is that it maximizes the potential for school and community use fields and facilities on this site. In this proposal, all existing school and community use fields are maintained. To the east of the school, a variety of non-lit practice fields are proposed as an additional buffer to the adjacent neighborhood. A cross-country track beginning in the northeast corner can also serve as an after-hours walking path around the site. A new track and new tennis courts are located near parking to facilitate after-hours community use. A new competition baseball and softball complex is located near dedicated parking to the northwest. Further, the site is planned to accommodate in the future as many as four additional full-size soccer fields adjacent to existing community use fields and another full-size soccer field and a pair of practices softball / baseball fields tucked behind the school.

Effective Relationship between Site Features and the Building Plans. The site plan and building layout are designed to work in harmony and support one another. The building is positioned to work within the existing topography and to minimize costs associated with extensions and/or needless grading. Further, it is configured to provide excellent solar orientation, which allows the building to incorporate exceptional daylight harvesting strategies throughout, thereby helping to offset operational expenses both by capturing natural light and by minimizing the mechanical loads. After hours parking is located strategically adjacent to public building spaces such as the auditorium, gymnasium, media center, health/community classrooms, and fitness rooms. Note also the effective relationship between indoor athletic areas and outdoor athletic fields. Team locker rooms are located for easy access to practice and competition fields. The paved bus loop makes an excellent all-weather play surface and practice space for the marching band.

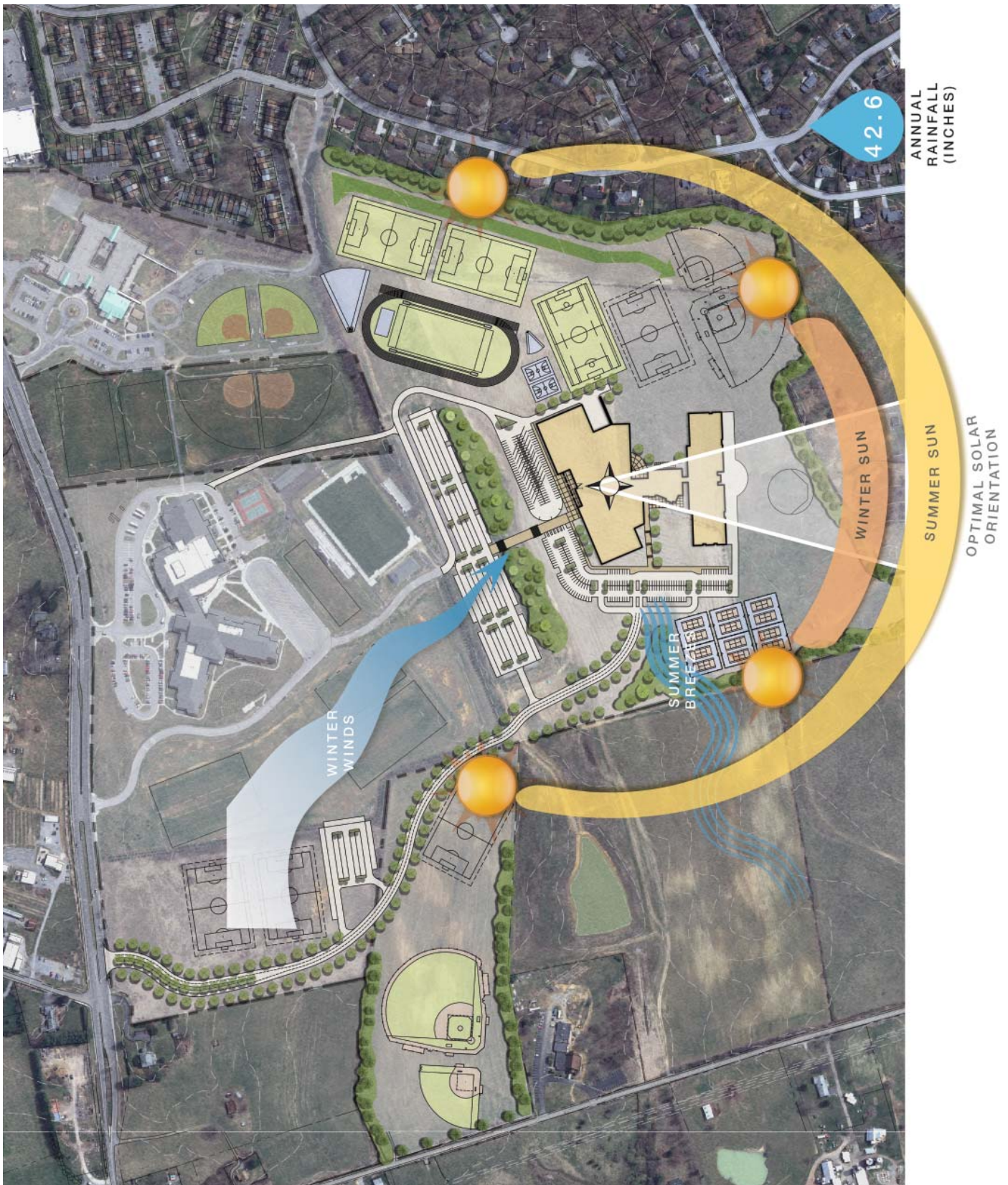
Other Features of the Site Plan. Approximately 800 parking spaces are provided for the high school and approximately 120 spaces are provided for the middle school. The bus staging area is designed to accommodate a total of 20 buses and can be double-striped to provide supplemental after-hours parking (additional ~120 spaces). The plan provides for four large multi-purpose fields, twelve tennis courts, and new competition fields for softball, baseball, and a new track complex. Site plan allows future expansion of fields by others. Options could include providing a pair of practice baseball and softball fields and 5 additional rectangular fields.

NORTH



This is a master plan of the site. Some amenities shown will not be developed as part of this proposal. See Exhibit C of the comprehensive agreement for clarification.

blacksburg high school - concept site plan



blacksburg high school - climate diagram

10.1.6 Provide a list of public utility facilities, if any, that will be crossed by the qualifying project and a statement of the plans of the proposer to accommodate such crossings.

public utilities

auburn strand public utility facilities

The Auburn High School / Middle School site contains several existing public utility facilities to be noted. Water and sanitary sewer facilities serving the elementary school as well as other smaller facilities on site have been located by topographic survey and the current plan attempts to avoid them. The only impact that the proposed concept plan will have on these utilities is that some sanitary sewer manhole tops will need to be adjusted up or down to match the proposed grades of the site. Additionally, an existing power line currently crosses the proposed building pad area of the proposed new high school and other existing utility poles exist on site and along Route 8 that will require relocation. Meetings have already been held with the power company (AEP) to begin the process of relocating that power line as well as other utility poles over which they have jurisdiction. Other utility poles that will need to be relocated are communication only (Verizon). Contact has been initiated with Verizon to begin discussions about relocating these poles.

blacksburg high school public utility facilities

The Blacksburg High School site will not require the crossing of any public utility facilities other than, perhaps, the crossing of underground utility extensions as utility service is extended to the new facility; such crossing will be designed, however, without requiring utility relocations.

10.1.7 Provide a statement and strategy setting out the plans for securing all necessary property. The statement must include the names and addresses, if known, of the current owners of the subject property as well as a list of any property the proposer intends to request the County to condemn;

plan for securing property

auburn strand affected property owners

The current Auburn High School / Middle School concept site plan does not require additional properties with the exception of the proposed road improvements to Route 8 as required for improved traffic safety. Various easements both temporary and permanent as well as right of way will be required in order to accomplish the road improvements. These proposed easements and right of way have been discussed with MCPS as well as Montgomery County in order to prepare for discussions with the affected property owners. A list of the affected properties is included herein. Our team will assist the County in negotiations with the various property owners as required and will provide plats as necessary to facilitate the transactions.

REDACTED

blacksburg high school affected property owners

The current Blacksburg High School concept site plan can be constructed without the need for additional property or easement acquisition; all improvement can be constructed within property owned by the County or School Board, within property currently leased by the School Board, within the public rights-of-way, or within existing utility easements.

REDACTED

10.1.8. *Provide a revised detailed listing of all firms that will provide specific design, construction and completion guarantees and warranties, and a brief description of such guarantees and warranties;*

project team

Guarantees and Warranties

Price Guarantee. Branch & Associates expects to enter into a fixed price contract for all three school buildings. We consider this our price guarantee.

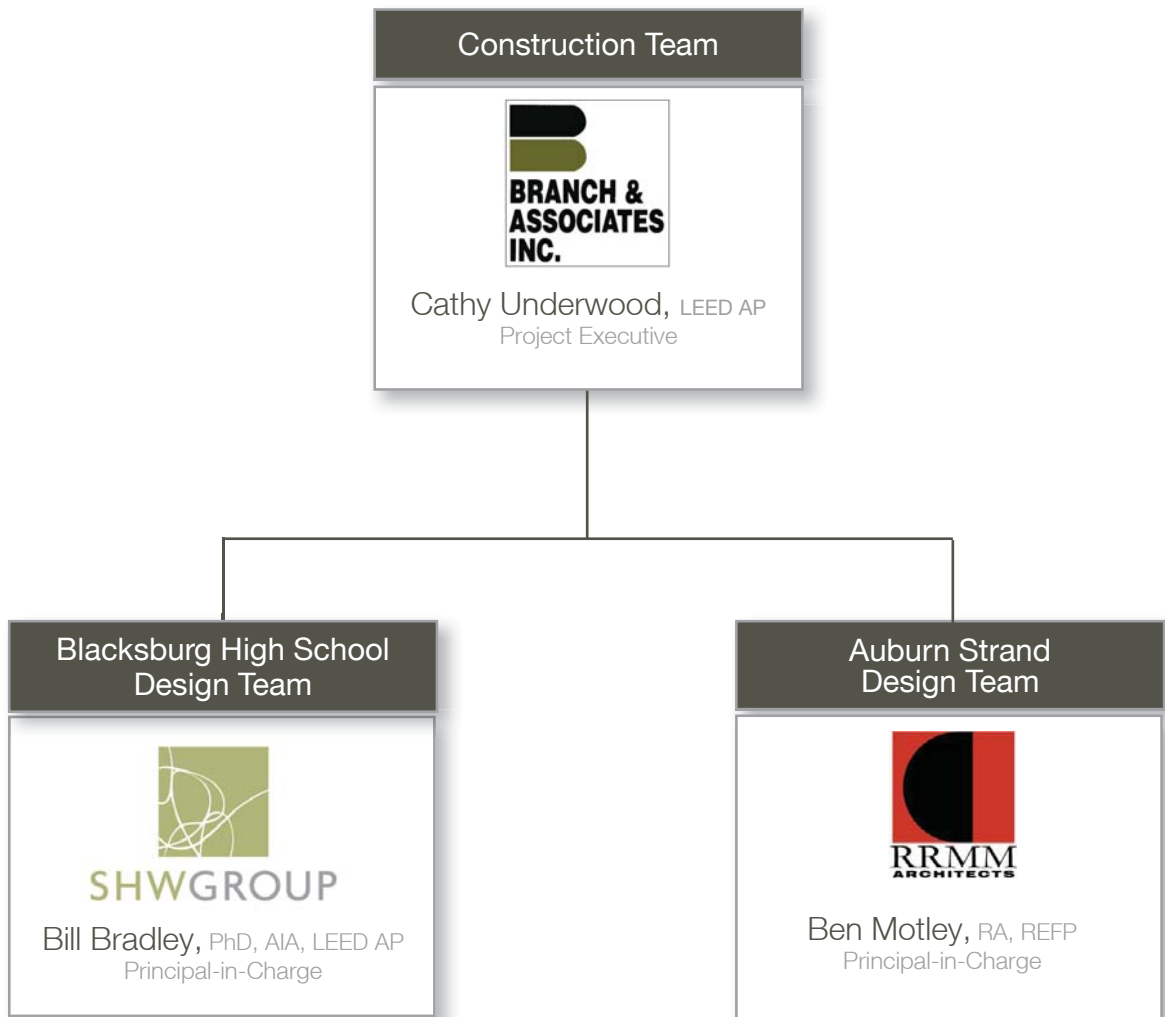
Performance Guarantee. Branch & Associates is prepared to submit a Performance and Payment bond for this project. The bond will be issued by The Hartford Insurance Group. Branch has been a client of The Hartford for 15 years.

Warranty of Work. Branch & Associates will warranty their work for two years from the date of substantial completion. This warranty does not include normal maintenance and wear and tear.

Errors and Omissions and Professional Liability. SHW Group and RRMM Architects carry errors and omission and professional liability.

project team

Branch & Associates is the prime contractor for this proposal. The Branch team includes two design firms, SHW Group and RRMM Architects, providing services for Blacksburg and Auburn, respectively. Details about both along with their consulting engineers are provided on the pages that follow.



We have assembled a team of the top local, regional, and national K12 design and construction specialists to lend both depth *and* breadth to your projects. **Our collective understanding of local conditions is unmatched, and the broad perspective we bring to bear is second to none.** Further, the inclusion of RRMM Architects – selected in 2008 to design the Auburn strand projects – provides you with the option to stay the course at Auburn and take full advantage of the good work done there to date.

Summaries of our team members are provided below. Organization charts for each project and more in-depth descriptions for each firm are provided in the pages that follow.

1. *Branch and Associates* is a Roanoke-based construction firm that has been building in the Valley and delivering public-private enterprises for almost fifty years. Having recently completed several significant projects for Montgomery County and the Town of Blacksburg, **Branch is vastly experienced and intimately familiar with the local market, contractors, and regulations that will play key roles as the process progresses.** Branch will lead construction of all three schools.

2. *SHW Group* is an architectural firm specializing in K12 planning and design for over 60 years. They lend a broad perspective and extensive knowledge of educational best practices to these projects, and **SHW has worked closely with Montgomery County Public Schools to develop tailored educational specifications for Blacksburg High School** that will accommodate today's curriculum while providing the flexibility to adapt and grow in the years to come. SHW Group will lead the design of Blacksburg High School.

3. *RRMM Architects* is a Virginia-based, regional K12 design specialist. Serving Montgomery County from their Roanoke office, they have worked closely with the Montgomery County Public Schools and the Auburn community since 2008 on the development of the Auburn strand projects. Other teams may offer to build on the foundation laid by RRMM, but **no other team brings with it the same level of understanding of the Auburn community's needs that RRMM can having worked closely with them over the past several months.** This will factor significantly during the next phase when the details that will distinguish these projects are determined. RRMM Architects will continue to lead the design of both Auburn projects.

4. *Gay and Neel* is a Christiansburg-based civil engineering firm that has completed numerous projects for Montgomery County and the Town of Blacksburg. They are K12 specialists very familiar with the proposed Blacksburg High School site having already completed several projects on it. As their record of timely approvals attests, **Gay and Neel is skilled at navigating the often difficult submittal and review process that is apt to cause delays.** They will team with OWPR to provide civil engineering and landscape design on the Blacksburg site.

5. *OWPR* is a Blacksburg-based, full-service engineering firm that has worked closely with Montgomery County Public Schools for years on projects large and small and currently serves the schools under their term contract for professional design services. Most recently, OWPR designed Auburn Elementary, East Montgomery High, Blacksburg Middle, and Christiansburg Middle. **No one is more familiar with the system's design standards and preference than OWPR**, and as such they will serve as a critical liaison between our team and Montgomery County Public Schools to ensure correct interpretation of intentions. They will collaborate with Gay and Neel on civil engineering and Lawrence Perry and Associates on mechanical and electrical engineering to ensure parity across the projects.

6. *Lawrence Perry & Associates* is a Roanoke-based engineering firm with a long history of delivering engineering solutions for school systems in the Valley. Along with RRMM Architects, they were selected to provide mechanical and electrical design services for the Auburn projects, and **Lawrence Perry and Associates has already begun developing engineering solutions tailored to each of the Auburn schools**. They will work with OWPR to ensure parity across all three projects.

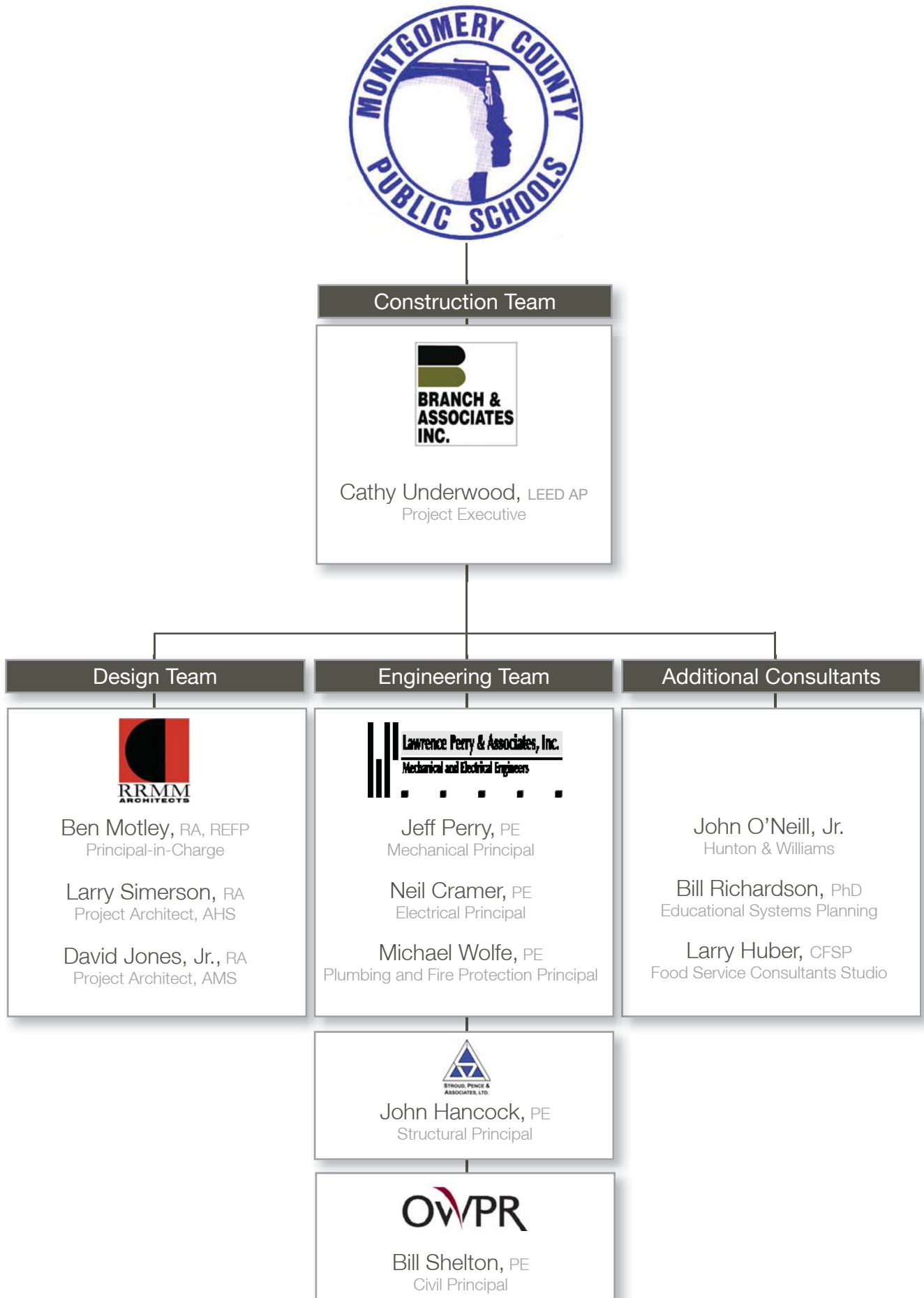
7. *Stroud Pence & Associates*, one of the largest firms in Virginia specializing in structural engineering, has been a trusted name in design since 1974. For almost 40 years they have been delivering safe, reliable solutions for school systems throughout the Commonwealth.

8. *Foodservice Consultants Studio* specializes in creating foodservice designs for schools that resolve operational challenges while also being aesthetically pleasing, sustainable, and flexible.

9. *Educational Systems Planning* is a regionally-based technology design firm specializing exclusively in educational technology. Their experience working with school systems from New England to North Carolina will lend a broad perspective and help Montgomery County align their technology goals with their goals for 21st Century learning.

10. *Hunton & Williams* is a leading PPEA attorney with a long record of successful public-private projects. They specialize in financial instruments related to such, and the financing proposals contained herein were developed by them based on their intimate knowledge of Montgomery County's financial goals and limitations.

Given our local ties, deep roots in the community, and numerous family and friends in both the Auburn and Blacksburg communities, our team is personally invested like no other in the success of these projects!





Construction Team



Cathy Underwood, LEED AP
Project Executive

Design Team



SHWGROUP

Bill Bradley, PhD, AIA, LEED AP
Principal-in-Charge

Doug Gehley, AIA, LEED AP
Project Manager

Rob Winstead, AIA, LEED AP
Project Architect

Tracy Eich, AIA, LEED AP
Project Designer

Engineering Team



Stephen Forkner, PE
Mechanical Principal

Todd Poff, PE
Structural Principal

Daniel Gibson, PE, LEED AP
Electrical Principal

Bill Shelton, PE
Civil Principal

Additional Consultants

John O'Neill, Jr.
Hunton & Williams

Kevin Castner, EdD
Cambridge Strategic Services

Bill Richardson, PhD
Educational Systems Planning

Larry Huber, CFSP
Food Service Consultants Studio

Bill Wuensche, PE, PTOE
Engineering & Planning Resources



Trevor Kimzey, PE
Civil Principal

blacksburg hs project team

Cathy Underwood, LEED AP

Project Executive



As the Vice President of Construction Management, Cathy Underwood leads our team with 10-plus years of construction experience. Cathy is responsible for the overall leadership and is ultimately accountable for the delivery of the projects safely, within budget and schedule of the highest level of quality. Ms. Underwood is the executive point of contact for Montgomery County Public Schools. Cathy is a LEED Accredited Professional (LEED AP, BD+C) who has dedicated a large portion of her career working with educational facilities in the construction capacity. Cathy studied at Virginia Tech and has been with Branch & Associates since 2000.

EDUCATION

Master of Science, Biological Systems
Engineering
Virginia Tech, 2000

Bachelor of Science, Biological Systems
Engineering
Virginia Tech, 1998

REGISTRATIONS

LEED® Accredited Professional

MEMBERSHIP/AFFILIATIONS

Construction Management Association
of America

SELECTED PROJECT EXPERIENCE

- Douglas Freeman High School, Richmond, VA
- Highland Springs High School, Henrico County, VA
- Meadowbrook High School, Chesterfield County, VA
- G.H. Moody Middle School, Richmond, VA
- Virginia Tech CRC Knowledge Works I & II, Blacksburg, VA
- Virginia Tech CRC Integrated Life Sciences Building, Blacksburg, VA
- Virginia Tech Infectious Disease Research Facility, Blacksburg, VA



William S. Bradley, PhD, AIA, LEED AP, REFP

Principal-in-Charge



Bill Bradley brings a unique perspective to the conversation about education and design. An architect motivated by the belief that great design is derived from a fundamental understanding of education, Bill pursued graduate studies at the University of Virginia's Curry School of Education to gain a more relevant perspective from which to design. For the past 12 years, Bill has been applying lessons learned to the design of safe, effective, and inspiring learning environments. Projects on which he collaborated have garnered national recognition from both the design and education communities.

Bill is the Managing Principal of SHW Group's Charlottesville studio, which is dedicated to the synthesis of principles of education, architecture, and sustainable design. He is a participant in the national dialogue and has held leadership positions with, among others, the AIA's Committee on Architecture for Education and Phi Delta Kappa. Bill is a Recognized Educational Facility Planner (REFP) and a LEED accredited professional.

EDUCATION

Doctor of Philosophy in Education
University of Virginia, 1996

Master of Education
University of Virginia, 1994

Bachelor of Science in Architecture
Clemson University, 1991

REGISTRATIONS

Registered Architect | WI
LEED® Accredited Professional
Recognized Ed. Facility Professional

MEMBERSHIP/AFFILIATIONS

American Institute of Architects
Council of Ed. Facility Planners, Int.
VA Ed. Facility Planners, State Director
U.S. Green Building Council
Assoc. for Supervision & Curriculum
Development

SELECTED PROJECT EXPERIENCE

- William Monroe High School Improvements, Greene County, VA
- J. Sargeant Reynolds Downtown Campus renovation Richmond, VA
- Pinchbeck Elementary School Renovations, Henrico County, VA
- Dumbarton Elementary School Additions, Henrico County, VA
- Louisa County High School Addition/Renovations, Mineral, VA*
- Orange County High School Addition/Renovation, Orange, VA*
- John Handley High School Addition/Renovation, Winchester, VA*
- Manassas Park High School Addition, Manassas Park, VA*
- Manassas Park Middle School, Manassas Park, VA*
- Cougar Elementary, Manassas Park, VA*
- Poquoson Elementary School, Poquoson City, VA*

** Noted projects were performed with other firms.*



SHWGROUP

Ben Motley, RA, REFP

Principal-in-Charge



Ben is the Principal-In-Charge of RRMM Architects' Roanoke Educational Design Studio and was the former President of Motley + Associates. He has managed, designed, or served as Project Manager/Principal-in-Charge/Project Designer for numerous educational, library, and commercial projects for public schools, community colleges, universities, and private clients. The emphasis of his personal career has been in public school design, and his work in this arena has produced consistent, award-winning public school projects.

Ben is also adept at facilitating community/stakeholder involvement in projects; he frequently makes presentations to school boards, city/town councils, and other community groups to educate, inform, and invite discussion on architectural projects. He is also adept at providing evaluations, analysis, recommendations, cost and time estimates, reports, feasibility studies, schematic or preliminary designs, field inspections and investigations for clients.

EDUCATION

Bachelor of Architecture
Virginia Tech 1982

REGISTRATION

Registered Architect | VA
Recognized Education Facility Professional

MEMBERSHIP/AFFILIATIONS

American Institute of Architects

SELECTED PROJECT EXPERIENCE

- Cumberland County Middle/High School PPEA, Cumberland County, VA
- King's Fork High School, Suffolk, VA
- William Byrd High School Renovation/Addition, Roanoke, VA
- Culpeper High School Renovation/Addition, Poquoson, VA
- Poquoson High School Renovation/Addition, Poquoson, VA
- Buffalo Gap High School Renovation/Addition, Augusta County, VA
- Rivershead High School Renovation/Addition, Augusta County, VA
- Fort Defiance High School Renovation/Addition, Augusta County, VA
- Dalton McMichael High School, Western Rockingham City-Schools, NC



- 10.1.9. *Provide a total life-cycle cost specifying methodology and assumptions of the project or projects and the proposed project start date. Include anticipated commitment of all parties; equity, debt, and other financing mechanisms; and a schedule of project revenues and project costs. The life-cycle cost analysis should include, but not be limited to, a detailed analysis of the projected return, rate of return, or both, expected useful life of facility, and estimated annual operating expenses;*

life-cycle cost analysis

The following Mechanical System Life Cycle Cost Analysis (LCCA) is a present value (present worth) analysis for the next 25 years using an annual inflation rate of 5 percent. This study will include future replacement cost for any HVAC equipment that does not have a 20 year service life as defined by ASHRAE. This study will also account for yearly energy cost for the entire building and yearly maintenance cost for the HVAC system.

The HVAC systems selected for this analysis are:

1) System 1: Variable Air Volume Gas-Fired Rooftop Units (VAV RTU) with Variable Air Volume (VAV) Boxes:

- a. The major classrooms areas and offices will be served by large gas-fired (80% efficient) VAV RTU's with air distributed to the individual classrooms and offices through VAV boxes. The VAV boxes will have electric reheat. The VAV boxes will allow individual classroom and office temperature control.
- b. Large spaces such as auditoriums, gymnasiums, libraries, and cafeterias will have individual Constant Volume gas-fired (80% efficient) Rooftop Units (CVRTU) with Single Zone VAV (SZVAV) to provide individual space temperature control.
- c. The minimum efficiency of the RTU's shall be as follows:
 - i. 5 Tons and less, 13.0 SEER
 - ii. 5 to 10 Tons, 11.2 EER
 - iii. 10 to 20 Tons, 11.0 EER
 - iv. 20 to 60 Tons, 10.0 EER
 - v. Above 60 Tons, 9.7 EER

2A) System 2A: Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

- a. The DOAU will provide the classrooms code-compliant ventilation air tempered to indoor temperatures to the individual spaces. The DOAUs use total energy wheels to recover approximately 80 percent of the energy from the code-compliant ventilation air.
- b. Each classroom space will have individual WSHPs to allow individual space temperature control. WSHP's for classrooms will be located in individual mechanical rooms and ducted for ease of maintenance and noise reduction.
- c. Large spaces such as auditoriums, gymnasiums, libraries, and cafeterias will have individual Rooftop WSHP's to provide individual space temperature control.

- d. Closed-circuit Cooling Towers will be provided to reject the heat from the WSHP loop.
- e. High-efficiency gas-fired boilers (90% efficient) will inject heat into the water loop.
- f. Base-mounted centrifugal water pumps will move the water to the WSHP through the water loop.

2B) System 2B: Geothermal Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

- a. The DOAU will provide the classrooms code-compliant ventilation air tempered to indoor temperatures to the individual spaces. The DOAUs use total energy wheels to recover approximately 80 percent of the energy from the code-compliant ventilation air.
- b. Each classroom space will have individual WSHPs to allow individual space temperature control. WSHPs for classrooms will be located in individual mechanical rooms and ducted for ease of maintenance and noise reduction.
- c. Large spaces such as auditoriums, gymnasiums, libraries, and cafeterias will have individual Rooftop WSHPs to provide individual space temperature control.
- d. Geothermal vertical bore well field will be provided to reject the heat from the WSHP loop and inject heat into the water loop.
- e. Base-mounted centrifugal water pumps will move the water to the WSHP through the water loop and geothermal vertical bore well field.

3A) System 3A: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, four-pipe with chiller / boiler:

- a. The major classrooms areas and offices will be served by large four-pipe VAV AHUs with air distributed to the individual classrooms and offices through VAV boxes. The VAV boxes will have hot water reheat. The VAV boxes will allow individual classroom and office temperature control.
- b. Large spaces such as auditoriums, gymnasiums, libraries, and cafeterias will have individual four-pipe Constant Volume Air Handling Units (CVAHU) with SZVAV to provide individual space temperature control.
- c. Water-cooled centrifugal chillers with VFD will provide chilled water to the individual AHU's.
- d. High-efficiency gas-fired boilers will provide heating water to the individual AHUs and VAV boxes.

e. Base-mounted centrifugal water pumps will move the chilled water to the AHUs through a chilled water loop.

f. Base-mounted centrifugal water pumps will move the heating water to the AHUs or VAV boxes through a heating water loop.

3B) System 3B: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, four -pipe with geothermal heater/chiller:

a. The major classrooms areas and offices will be served by large four-pipe VAV AHUs with air distributed to the individual classrooms and offices through VAV boxes. The VAV boxes will have hot water reheat. The VAV boxes will allow individual classroom and office temperature control.

b. Large spaces such as auditoriums, gymnasiums, libraries, and cafeterias will have individual four- pipe Constant Volume Air Handling Units (CVAHU) with SZVAV to provide individual space temperature control.

c. Geothermal Heater/Chiller (GHC) (water to water heat pump) will provide chilled water or hot water to the individual AHUs and VAV boxes.

d. Base-mounted centrifugal water pumps will move the chilled water to the AHUs through a chilled water loop.

e. Base-mounted centrifugal water pumps will move the heating water to the AHUs or VAV boxes through a heating water loop.

f. Base-mounted centrifugal water pumps will move the condenser water through the geothermal vertical bore well field and the GHCs.

4A) System 4A: Four-Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four-pipe with chiller / boiler:

a. The DOAU will provide the classrooms code-compliant ventilation air tempered to indoor temperatures to the individual spaces. The DOAUs use total energy wheels to recover approximately 80 percent of the energy from the code compliant ventilation air.

b. Classroom and Office spaces will have individual FPFCUs to allow individual space temperature control.

c. Large spaces such as auditoriums, gymnasiums, libraries, and cafeterias will have individual four- pipe Constant Volume Air Handling Units (CVAHU) with SZVAV to provide individual space temperature control.

- d. Water-cooled centrifugal chiller with VFD, will provide chilled water to the individual FPFCUs and AHUs.
- e. High-efficiency gas boilers will provide heating water to the individual FPFCUs and AHUs.
- f. Base-mounted centrifugal water pumps will move the chilled water to the AHUs through a chilled water loop.
- g. Base-mounted centrifugal water pumps will move the heating water to the AHUs or VAV boxes through a heating water loop.

4B) System 4B: Four-Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four-pipe with geothermal heater/chiller:

- a. The DOAU will provide the classrooms code-compliant ventilation air tempered to indoor temperatures to the individual spaces. The DOAUs use total energy wheels to recover approximately 80 percent of the energy from the code-compliant ventilation air.
- b. Classroom and Office spaces will have individual FPFCUs to allow individual space temperature control.
- c. Large spaces such as auditoriums, gymnasiums, libraries, and cafeterias, etc will have individual four-pipe Constant Volume Air Handling Units (CVAHU) with SZVAV to provide individual space temperature control.
- d. Geothermal Heater/Chiller (GHC) (water to water heat pump) will provide chilled water or hot water to the individual FPFCU's and AHU's.
- e. Base-mounted centrifugal water pumps will move the chilled water to the FPFCUs and AHUs through a chilled water loop.
- f. Base-mounted centrifugal water pumps will move the heating water to the FPFCUs and AHUs through a heating water loop.
- g. Base-mounted centrifugal water pumps will move the condenser water through the geothermal vertical bore well field and the GHCs.

life-cycle cost analysis

The Variable Air Volume Rooftop Units (VAVRTU) with Variable Air Volume (VAV) Boxes HVAC system presents the lowest life cycle cost. However, because sloping roofs were requested by MCPS additional costs must be considered with this system. Also, architectural design considerations are complicated thus increasing cost and leak potentials. **Per MCPS request, System 3A (Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four-pipe with chiller / boiler) serves as the basis for our proposal.**

Closed-loop, vertical geothermal systems typically offer long-term payback to owners such as schools systems and municipalities. However, owners must understand that there are inherent risks involved in establishing a well field in our area because of subsurface conditions and grouting activities. OWPR and LPA have successful installations in the area, but we understand that MCPS is not interested in pursuing this option. Nonetheless, analysis is included herein for reference.

Mechanical Life Cycle Cost Analysis (BHS)

This is a present worth study for 25 years and assuming 5% interest.

System 1 – Variable Air Volume Gas Fired Rooftop Units (VAV RTU) with Variable Air Volume (VAV) Boxes:

First Cost =	\$5,012,500
Yearly Energy Cost =	\$221,769
	PW = \$221,769 x 14.0939 = \$3,125,590

Maintenance Cost =	\$2,872,823
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Replacement Cost =	\$642,600
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Total = \$5,012,500 + \$3,125,590 + \$2,872,823 + \$624,600 = **\$11,635,513**

System 2A – Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

First Cost =	\$6,895,000
Yearly Energy Cost =	\$224,201
	PW = \$224,201 x 14.0939 = \$3,159,866

Maintenance Cost =	\$3,033,999
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Replacement Cost =	\$635,000
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Total = \$6,895,000 + \$3,159,866 + \$3,033,999 + \$635,000 = **\$13,723,865**

System 2B – Geothermal Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

First Cost =	\$9,305,000
Yearly Energy Cost =	\$190,987
	PW = \$190,987 x 14.0939 = \$2,691,752

Maintenance Cost =	\$2,008,337
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Replacement Cost =	\$435,000
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Total = \$9,305,000 + \$2,691,752 + \$2,008,337 + \$435,000 = **\$14,440,089**

life-cycle cost analysis

System 3A: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four pipe with chiller / boiler - based on new chillers, not reuse of existing chillers at BHS:

First Cost =	\$7,020,000
Yearly Energy Cost =	\$202,219
	PW = \$202,219 x 14.0939 = \$2,850,054
Maintenance Cost =	\$2,718,588
Replacement Cost =	\$100,000
Total =	\$7,020,000 + \$2,850,054 + \$2,718,588 + \$100,000 = \$12,688,642

System 3B: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four pipe with geothermal heater/chiller:

First Cost =	\$9,632,500
Yearly Energy Cost =	\$172,270
	PW = \$233,506 x 14.0939 = \$2,427,956
Maintenance Cost =	\$1,692,927
Replacement Cost =	\$625,000
Total =	\$9,632,500 + \$2,427,956 + \$1,692,927 + \$625,000 = \$14,378,383

System 4A: Four Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four pipe with chiller / boiler - based on new chillers, not reuse of existing chillers at BHS:

First Cost =	\$7,020,000
Yearly Energy Cost =	\$221,106
	PW = \$221,106 x 14.0939 = \$3,116,246
Maintenance Cost =	\$3,165,870
Replacement Cost =	\$100,000
Total =	\$7,020,000 + \$3,116,246 + \$3,165,870 + \$100,000 = \$13,402,116

System 4B: Four Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four pipe with geothermal heater/chiller:

First Cost =	\$9,430,000
Yearly Energy Cost =	\$188,360
	PW = \$188,360 x 14.0939 = \$2,654,727
Maintenance Cost =	\$2,140,208
Replacement Cost =	\$580,000
Total =	\$9,430,000 + \$2,654,727 + \$2,140,208 + \$580,000 = \$14,804,935

Mechanical Life Cycle Cost Analysis (AHS)

This is a present worth study for 25 years and assuming 5% interest.

System 1 – Variable Air Volume Gas Fired Rooftop Units (VAV RTU) with Variable Air Volume (VAV) Boxes:

First Cost =	\$5,012,500
Yearly Energy Cost =	\$272,386
	PW = \$272,386 x 14.0939 = \$3,838,981
Maintenance Cost =	\$2,872,823
Replacement Cost =	\$642,600
Total =	\$5,012,500 + \$3,838,981 + \$2,872,823 + \$624,600 = \$12,348,904

System 2A – Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

First Cost =	\$6,895,000
Yearly Energy Cost =	\$241,661
	PW = \$241,661 x 14.0939 = \$3,405,946
Maintenance Cost =	\$3,033,999
Replacement Cost =	\$635,000
Total =	\$6,895,000 + \$3,405,946 + \$3,033,999 + \$635,000 = \$13,969,945

System 2B – Geothermal Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

First Cost = \$9,305,000
 Yearly Energy Cost = \$205,690
 $PW = \$205,690 \times 14.0939 = \$2,898,974$

Maintenance Cost = \$2,008,337

Replacement Cost = \$435,000

Total = \$9,305,000 + \$2,898,974 + \$2,008,337 + \$435,000 = **\$14,647,311**

System 3A: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four pipe with chiller / boiler:

First Cost = \$7,020,000
 Yearly Energy Cost = \$248,406
 $PW = \$248,406 \times 14.0939 = \$3,501,009$

Maintenance Cost = \$2,718,588

Replacement Cost = \$100,000

Total = \$7,020,000 + \$3,501,009 + \$2,718,588 + \$100,000 = **\$13,339,597**

System 3B: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four pipe with geothermal heater/chiller:

First Cost = \$9,632,500
 Yearly Energy Cost = \$211,418
 $PW = \$211,418 \times 14.0939 = \$2,979,704$

Maintenance Cost = \$1,692,927

Replacement Cost = \$625,000

Total = \$9,632,500 + \$2,979,704 + \$1,692,927 + \$625,000 = **\$14,930,131**

System 4A: Four Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four pipe with chiller / boiler:

First Cost = \$7,020,000
 Yearly Energy Cost = \$259,119
 $PW = \$259,119 \times 14.0939 = \$3,651,997$

Maintenance Cost = \$3,165,870

Replacement Cost = \$100,000

Total = \$7,020,000 + \$3,651,997 + \$3,165,870 + \$100,000 = **\$13,937,867**

System 4B: Four Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four pipe with geo-thermal heater/chiller:

First Cost = \$9,430,000
 Yearly Energy Cost = \$220,536
 $PW = \$220,536 \times 14.0939 = \$3,108,212$

Maintenance Cost = \$2,140,208

Replacement Cost = \$580,000

Total = \$9,430,000 + \$3,108,212 + \$2,140,208 + \$580,000 = **\$15,258,420**

First Cost. From local mechanical contractor on a recent study.

System 1 – Variable Air Volume Gas Fired Rooftop Units (VAV RTU) with Variable Air Volume (VAV) Boxes:

$$\$20.05/\text{sf} \times 250,000 \text{ sf} = \$5,012,500$$

System 2A – Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

$$(\$25.58/\text{sf} + \$2.00/\text{sf}) \times 250,000 \text{ sf} = \$6,895,000$$

(\$2.00/ sf for WSHP located in mechanical room and ducted to classroom)

System 2B – Geothermal Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

$$(\$25.58/\text{sf} + \$2.00/\text{sf}) \times 250,000 \text{ sf} = \$6,895,000$$

(\$2.00/ sf for WSHP located in mechanical room and ducted to classroom)

Delete cooling tower (\$100,000) and boilers (\$100,000)

Add well field: 580 tons x 225 lf / ton x \$20/ lf = \$2,610,000

$$\text{Total } \$6,895,000 - \$100,000 - \$100,000 + \$2,610,000 = \$9,305,000$$

System 3A: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four pipe with chiller / boiler:

$$\$28.08/\text{sf} \times 250,000 \text{ sf} = \$7,020,000$$

System 3B: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four pipe with geothermal heater/chiller:

$$\$28.08/\text{sf} \times 250,000 \text{ sf} = \$7,020,000$$

Delete cooling tower (\$100,000) and boilers (\$100,000)

Add well field 625 tons x 225 lf / ton x \$20/ lf = \$2,812,500

$$\text{Total } \$7,020,000 - \$100,000 - \$100,000 + \$2,812,500 = \$9,632,500$$

System 4A: Four Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four pipe with chiller / boiler:

$$\$28.08/\text{sf} \times 250,000 \text{ sf} = \$7,020,000$$

System 4B: Four Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four pipe with geothermal heater/chiller:

$\$28.08/\text{sf} \times 250,000 \text{ sf} = \$7,020,000$

Delete cooling tower (\$100,000) and boilers (\$100,000)

Add well field 580 tons \times 225 lf / ton \times \$20/ lf = \$2,610,000

Total $\$7,020,000 - \$100,000 - \$100,000 + \$2,610,000 = \$9,430,000$

Energy Cost

Energy Analysis Assumptions

Location:	Roanoke, VA
Building Type:	High School
Lighting Load:	1.0 watt/sf
People:	75 sf/person light work
Ventilation:	15 CFM/person
Misc electrical load:	1.0 watt/sf
Domestic water rate:	2.5 BTU/hr/sf
Roof:	Steel deck, 2" insulation, suspended ceiling
Walls:	4" face brick, metal studs and R19 batt insulation
Infiltration:	0.25 AC
Glazing:	Double, 1/2" air space, low E, 40%
Dimension:	1250 feet X 100 feet
Levels:	2
Floor to Floor:	12 feet
Total Area:	250,000 sf
Electricity Cost:	\$0.80/kwhr
Natural Gas Cost:	\$0.95/therm (100,000 btu/therm) (105,263 btu/\$)
LPG Cost:	\$1.89/gal (91,000 btu/gal) (48,663 btu/\$)
LP Gas vs Natural Gas	(105,263 btu/\$ / 48,663 btu/\$) 2.162 x more for propane per btu

life-cycle cost analysis

From Calculations, System 1 – Variable Air Volume Gas Fired Rooftop Units (VAV RTU) with Variable Air Volume (VAV) Boxes:

\$221,769 per year natural gas
\$272,386 per year propane

System 2A – Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

\$224,201 per year natural gas
\$241,661 per year propane

System 2B – Geothermal Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

\$190,987 per year natural gas
\$205,690 per year propane

System 3A: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four pipe with chiller / boiler:

\$202,219 per year natural gas
\$248,406 per year propane

System 3B: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four pipe with geothermal heater/chiller:

\$202,219 per year x .08519 = \$172,270 per year natural gas
\$211,418 per year propane

System 4A: Four Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four pipe with chiller / boiler:

\$221,106 per year natural gas
\$259,119 per year propane

System 4B: Four Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four pipe with geothermal heater/chiller:

\$221,106 per year x .08519 = \$188,360 per year natural gas
\$220,536 per year propane

Maintenance Cost. (2003 ASHRAE Handbook, Chapter 36, Table 4)

The April 2011 CPI was 224.9, July 1983 CPI was 100.1.
 The cost adjustment for 1983 dollar is $224.9/100.1 = 2.24675$.
 The base system for this study is the same system as System 3A.

System 1 – Variable Air Volume Gas Fired Rooftop Units (VAV RTU) with Variable Air Volume (VAV) Boxes:

The heating adjustment factor for this system will be more because of more heaters. $h=+0.01$
 The cooling adjustment factor for this system will be more because of more compressors. $c=+0.01$
 The distribution adjustment factor is the same as the base system. $d=0$
 \$2,872,823 (from spreadsheet)

System 2A – Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

The heating adjustment factor is the same as the base system. $h=0$
 The cooling adjustment factor for this system will be less based on the table. $c=-.0472$
 The distribution adjustment factor for this system will be more based on the table. $d=0.0881$
 \$3,033,999 (from spreadsheet)

System 2B – Geothermal Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

The heating adjustment factor for this system will be less based on none. $h=-0.133$
 The cooling adjustment factor for this system will be less based on the table. $c=-.0472$
 The distribution adjustment factor for this system will be more based on the table. $d=0.0881$
 \$2,008,337 (from spreadsheet)

System 3A: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four pipe with chiller / boiler:

This is the base system. Therefore, $h=0$, $c=0$ and $d=0$
 \$2,718,588 (from spreadsheet)

System 3B: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four pipe with geothermal heater/chiller:

The heating adjustment factor for this system will be less based on none. $h=-0.133$
 The cooling adjustment factor is the same as the base system. $c=0$
 The distribution adjustment factor is the same as the base system. $d=0$
 \$1,692,927 (from spreadsheet)

System 4A: Four Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four pipe with chiller / boiler:

The heating adjustment factor is the same as the base system. $h=0$
 The cooling adjustment factor is the same as the base system. $c=0$
 The distribution adjustment factor for this system is based on the table. $d=0.0580$
 \$3,165,870 (from spreadsheet)

System 4B: Four Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four pipe with geo-thermal heater/chiller:

The heating adjustment factor for this system will be less based on none. $h=-0.133$
 The cooling adjustment factor is the same as the base system. $c=0$
 The distribution adjustment factor for this system is based on the table. $d=0.0580$
 \$2,140,208 (from spreadsheet)

Replacement Cost

Life (2003 ASHRAE Handbook)(Chapter 36, Table 3)

Rooftop Unit	15 years
WSHP's	19 years
Cooling Towers	20 years
Water to water heat pumps	not listed, assume 15 years
Boilers (high efficiency)	not listed, assume 15 years
Boilers, electric	15 years
VAV boxes	20 years
Centrifugal Chiller	23 years
Base mounted pumps	20 years
Fans	20 years

For the purpose of this study, any equipment with a 20 year life or greater will not require replacing.

System 1 – Variable Air Volume Gas Fired Rooftop Units (VAV RTU) with Variable Air Volume (VAV) Boxes:

RTU replacement - 595 tons x \$1080/ton =	\$642,600
System 2A – Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):	
WSHP replacement – 580 tons x \$750/ton	\$435,000
Cooling Tower replacement	\$100,000
Boiler replacement	\$100,000
Total	\$635,000

System 2B – Geothermal Water Source Heat Pump (WSHP) with Dedicated Outdoor Air Unit (DOAU):

WSHP replacement – 580 tons x \$750/ton \$435,000

System 3A: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four pipe with chiller / boiler:

Boiler replacement \$100,000

System 3B: Variable Air Volume Air Handling Units (VAV AHU) with Variable Air Volume (VAV) Boxes, Four pipe with geothermal heater/chiller:

Geo Chiller replacement \$1000/ton x 625 tons = \$625,000

System 4A: Four Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four pipe with chiller / boiler:

Boiler replacement \$100,000

System 4B: Four Pipe Fan Coil Units (FPFCU) with Dedicated Outdoor Air Unit (DOAU), Four pipe with geothermal heater/chiller:

Geo Chiller replacement \$1000/ton x 580 tons = \$580,000

10.1.10. Provide a detailed explanation of assumptions about user fees or rates (if any), and usage of the projects.

user fees and rates

As with any school facility in Montgomery County, ownership and operation will remain the responsibility of Montgomery County Public Schools; hence, the responsibility to maintain security at these facilities will remain within the local law enforcement parameters. Based on this assumption, no user fees or rates would apply to this project. Due to the extent that the unique nature and potential of a PPEA has to alter those arrangements, our team would look to negotiate the fees in the comprehensive agreement following the acceptance of the detailed proposal.

Our team will not impose any restrictions on the use of the facility unless the School Board and the Board of Supervisors choose to lease the facility. If the School Board and the Board of Supervisors choose to lease the facilities, the details of usage would be discussed as part of the leasing agreement. Traditionally, the only restrictions on the County's use of the facilities have been those imposed by applicable federal, state and local laws.

10.1.11 Identify any known government support or opposition, or general public support or opposition for the project. Government or public support should be demonstrated through resolution of official bodies, minutes of meetings, letters, or other official communications.

support and opposition

We believe the need for new and modernized educational facilities is widely recognized and well supported throughout Montgomery County. In fact, for two of the projects proposed herein, the new Auburn High School and to-be-converted Auburn Middle School, the school board and Auburn communities have already indicated their support and are, in fact, well down the path with a design team selected in 2008 to administer these projects.

The local governing bodies (Montgomery County Board of Supervisors and Blacksburg Town Council) have indicated their support of the Auburn High School / Auburn Middle School and Blacksburg High School projects through the following resolutions which were approved in November 2010.

The Montgomery County Board of Supervisors indicated its support of the Auburn High School / Auburn Middle School and Blacksburg High School projects by passing **Resolution R-FY-11-51** on November 22, 2010 which made public the Board of Supervisor's support of the School Board's plan to proceed with construction of all three projects, AHS, AMS, and BHS.

The Blacksburg Town Council indicated its support for the Blacksburg High School project by passing **Resolution 11-E-10** on November 23, 2010 (item VI.A on the meeting minutes) which made public the Town's support of the Montgomery County Board of Supervisors and School Board's efforts to construct a new Blacksburg High School.

Should the Auburn strand projects continue accordingly, the communities served by them would be greatly relieved. Should a change be made mid-stream or a new direction taken, however, there would likely be opposition from the teachers, administrators, and members of the community who have worked hard to establish a solid foundation on which to build.

As for the other project, the new Blacksburg High School, the need is well documented and there is a ground-swell of community support. The faster that order can be restored to the system, the better! To the extent that there are concerns stemming from neighbors that adjoin the site, our team, which includes residents of those same neighborhoods, will work with them to identify and address those concerns to the satisfaction of all.

We believe that our approach to providing facilities tailor-made for the curricula they will house and the communities they will serve, plans to expedite the delivery of each, and opportunities for off-setting or otherwise deferring associated cost will give the School Board and the community confidence in selecting a direction for moving forward. Throughout the design process and construction, and in coordination with Montgomery County Schools, our team will continue to work with all affected groups and individuals to provide up-to-date information to maintain the level of support from and for the administration and community.

10.1.12 *Demonstrate consistency with appropriate local comprehensive or infrastructure development plans or indication of the steps required for acceptance into such plans;*

adherence to local plans

In both communities, the proposed concept site plans were developed in close cooperation with the local comprehensive planning efforts that have been underway for years. The Town of Blacksburg's Comprehensive Plan and the Montgomery County Riner Village Plan were each consulted and allowed to impact and guide the development of the site plans and the design of the infrastructure improvements. Therefore, we are confident that the proposed concepts presented herein are in harmony with the comprehensive development and infrastructure plans for each community.

As soon as practical in the project planning process, the site plan for the Auburn Schools will be presented to the Montgomery County Planning Department for review, and during this review process the site plan will be checked for compliance with the local planning standards as well as with the Riner Village Plan. Our team has also met with VDOT on several occasions to discuss the project's impact on Route 8 and some road improvement plans that VDOT has for a nearby intersection. The road improvements which are conceptually planned for the school projects will mesh seamlessly with the plans VDOT has for other road improvements.

The mechanism that the Town of Blacksburg uses to ensure compliance with the Town's Comprehensive Plan and Planning Standards is through a Conditional Use Permit. The CUP process is typically a four month process through which the Town and local community can provide direction and comment to the site planning process. This process has already been initiated through a pre-application meeting that our team had with the Town of Blacksburg staff. In this meeting the requirements of the application, public hearing, and schedule were discussed, and our team is poised to make application for the CUP as soon as possible after authorized to proceed with the projects.

Consistent with those plans and the recommendations of the Montgomery County School Board we have proposed herein solutions that address the need for modern facilities that will foster life-long learning, promote work-force skills, and increase capacity to accommodate growing enrollment. Further, our plan proposes to maintain a campus approach to housing multiple facilities on a single site with shared amenities accessible to and available for a broad range of community uses. These could easily include partnerships with local businesses, the Towns of Blacksburg and Christiansburg, Montgomery County, New River Community College, Virginia Tech, and other agencies providing public and/or private services. Lastly, as consistent with these long-range plans, our proposal calls for efficient, cost-effective facilities that will not become a burden on the community over time. On the contrary, our designs will lessen the burden on the operating budgets allowing more monies to flow to new educational programs, teachers' salaries, or whatever the school board deems fit.

We view these projects as a true partnership opportunity with Montgomery County Public Schools and the entire community. This proposal embodies the ideas in joining the public and private sectors to create an opportunity to better serve the citizens. Our long-standing commitment to providing an academically stimulating and safe educational environment is evident in this proposal and we are eager to begin work on a project that will help the children – and future children – of Montgomery County achieve success.

10.1.13 Explain how the proposed project would impact local development plans of each affected jurisdiction;

impact on local development

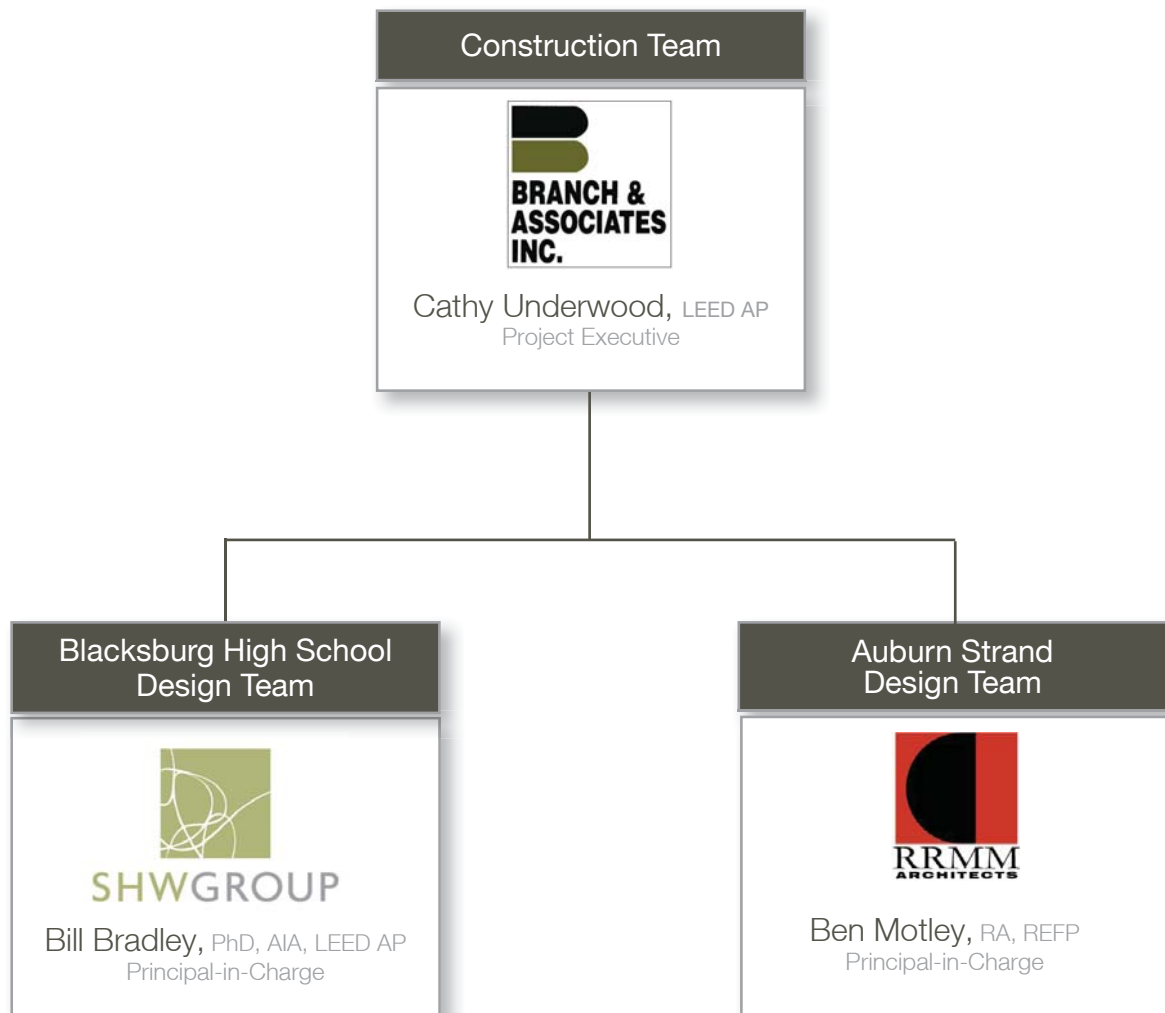
As mentioned previously, the proposed concept site plans were developed in close cooperation with the Town of Blacksburg's Comprehensive Plan and the Montgomery County Riner Village Plan to impact and guide the development of the site plans and the design of the infrastructure improvements. The proposed concepts presented herein are in harmony with the comprehensive development and infrastructure plans for each community. As such, the development of these school projects will involve infrastructure improvements such as roadway, utility, and stormwater improvements. As they are in accordance with the local comprehensive plans, these improvements will serve to enhance the potential of other local development desired by the local communities and serve as a basis for other improvements such as the VDOT improvements to Route 8.

In addition, the development of these school facilities is a partnership with the local communities. Both will feature community use areas within the building as well as easily accessible outdoor facilities for after hours community use. These high performance and flexible facilities will serve not only to enhance the educational potential of each community, but provide community recreation and gathering opportunities. Quality facilities such as these will serve as a base which will draw people and businesses to the communities and allow them to grow.

10.1.14. Confirmation of the executive management and the officers and directors of the firm or firms submitting the proposal and Key Personnel to be assigned. In addition, identify any known conflicts of interest or other disabilities that may impact the School Board 's consideration of the proposal, including the identification of any persons known to the proposer who would be obligated to disqualify themselves from participation in any transaction arising from or in connection to the project pursuant to the Virginia State and Local Government Conflict of Interest Act, Chapter 31 (§ 2.2-3100 et seq.) of Title 2.2;

point of contact

The key individuals on our team are listed below. **Cathy Underwood** will serve as the central point of contact between MCPS and our team.



Conflict of Interests

Branch & Associates has a Conflicts of Interest Policy that is in place to ensure fair treatment for our clients through the effective management of potential conflicts. We are not aware of any material conflicts of interest or disabilities that would impact the School Board or the consideration of our PPEA proposal. After review of applicable Virginia laws and regulations, to the best of our knowledge, no member of our proposed team has any interest and will not participate in a future interest that would conflict in any manner with performance of services required under this PPEA project for Montgomery County Public Schools.

- 10.1.16. *Provide revised conceptual (single line) plans and elevations depicting the general scope, appearance and configuration of the proposed project , taking into account MCPS comments and requirements;*

floor plans and elevations

Features common to Auburn High School and Auburn Middle School

Our design team has worked carefully to incorporate best practices into the layouts of the New Auburn High School and New Auburn Middle School. In addition to the application of best practices for school design, we have had extensive meetings with the Auburn Strand Building Committee, the staff, and community stakeholders to understand and apply their priorities in regard to the physical configuration of each school. Please note the following features as demonstrated in drawings found within our proposal.

There is a direct and clear connection between the main parking areas, parent drop-off, and the main entrance for each school. The administration area is placed at these main entries with clear supervision of those entering the site and the building. Vestibule entry doors can be set (locked) to require all visitors to enter directly into the administrative waiting area as opposed to entering without proper check in.

Public areas of each school are easily secured from the primary classroom areas for after-hours use. Health classrooms are located on the “public” portion of each school, not only for proximity to athletic areas, but also to provide after-hours classroom type space for the community.

Areas of the school needing vehicular access by trucks, vans, or buses have convenient access to service drives or bus staging areas. Note, for example, the relationship of the Kitchens, Fine Arts, and Exploratory / Career and Technical Education Programs to the vehicular roadways.

Characteristics Unique to the Auburn High School Design

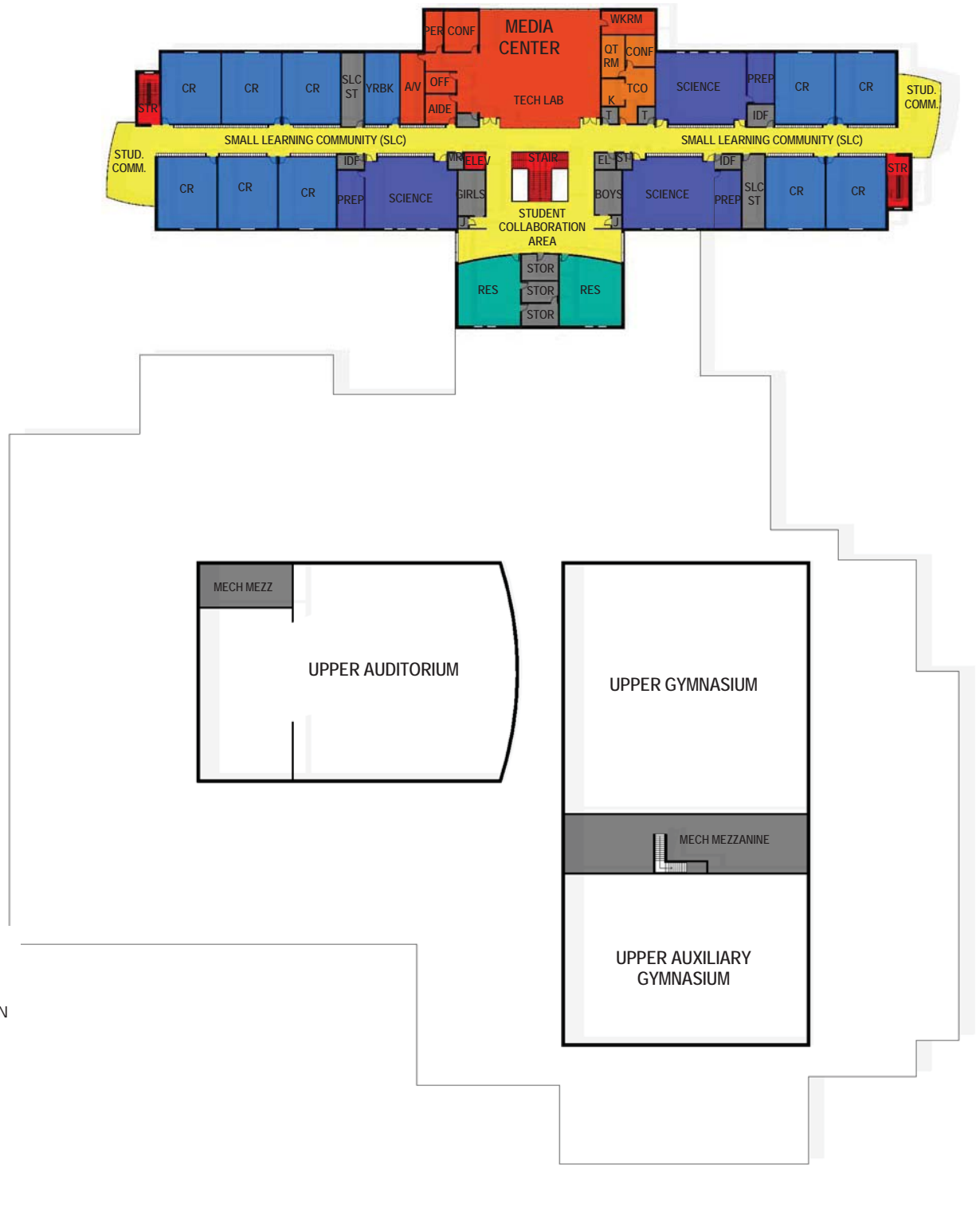
With close scrutiny of the proposed plans, one can see that the academic wings are placed in a nearly ideal orientation for daylight harvesting. With the application of sophisticated energy modeling software, the use of fully dimmable lighting controlled by light sensors, and the careful specification of light shelves, sloped ceilings, and advanced glazing products, we can create beautifully daylit classrooms. This proven approach yields first cost savings of mechanical systems, significant energy savings, glare free lighting, and a healthy environment.

The plan also incorporates many features and ideas desired by the Auburn High School staff. Each smaller learning community has a student collaboration space and dedicated storage. Centralized on each floor are Resource Rooms, Teacher Work Areas, and Toilets. Science labs are grouped near the core of the academic wing to allow either a departmental or decentralized organization.

In terms of exterior building character, the building massing promotes the use of the type of sloped metal roofs preferred by MCPS. The prevalent use of brick in a varied pattern and the use of roof overhangs provide an architecture that is contemporary yet compatible with the new Auburn Middle School.



auburn high school - first floor



auburn high school - second floor



auburn high school - main entrance

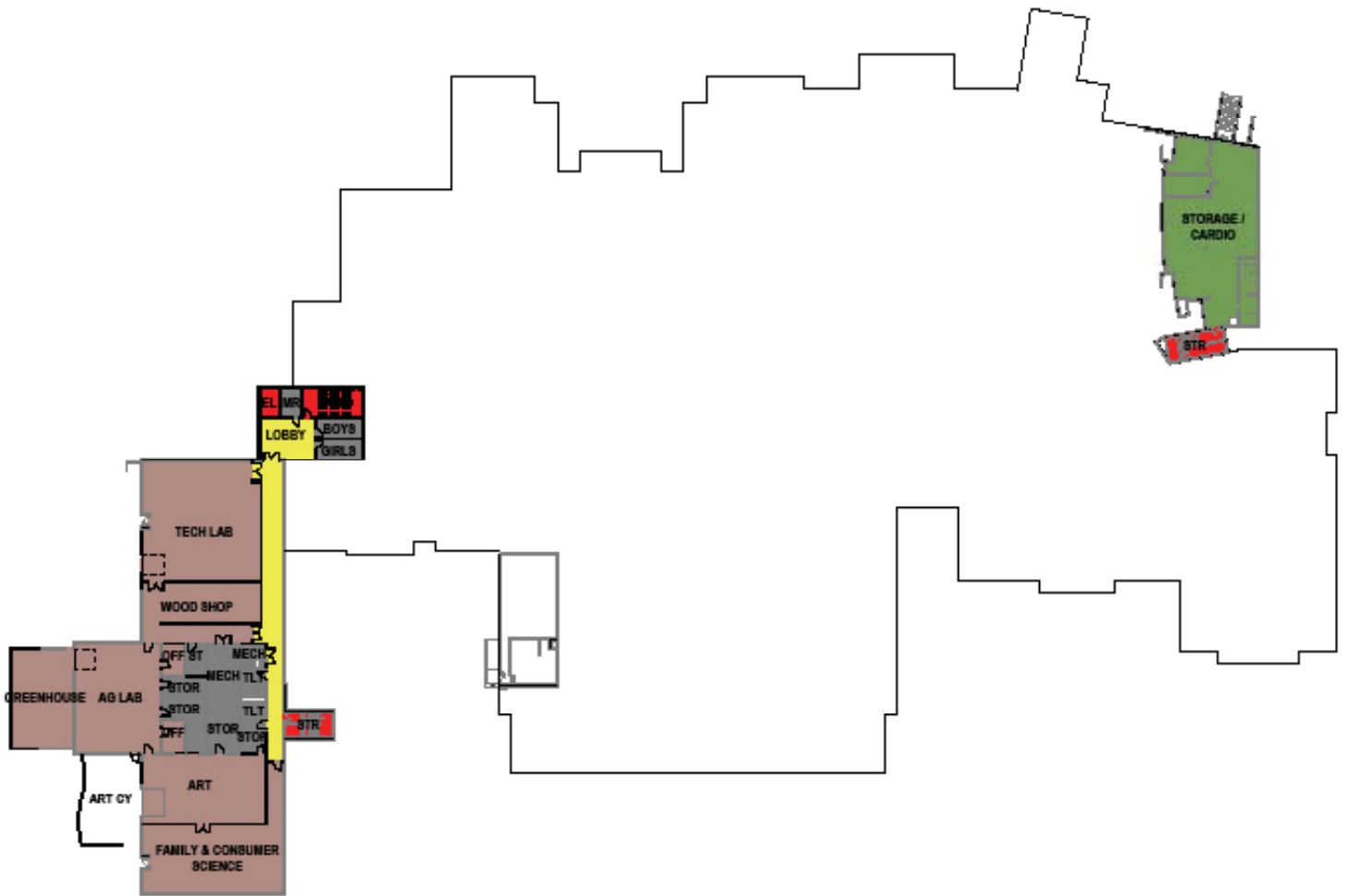


auburn high school classroom wing

Characteristics Unique to the Auburn Middle School Design

For the Auburn Middle school design, a key feature is the preservation and enhancement of the original 1938 Auburn High School, its primary façade, and its 1953 addition. All of these historic components are good candidates for renovation and such will preserve this community treasure and icon. These oldest portions of the complex have good floor-to-floor height to accommodate modern building systems, and the structures are in good condition. Another key feature is the renovation and re-use of the existing auditorium, gymnasium, and vocational building. These portions of the existing complex (most built in 1972) are well placed for re-use, fit well with programmatic requirements, and thus provide a great way to capture the investment already made in these facilities. From an architectural standpoint, the design scheme is respectful of the original high school. Building massing, roof shapes, brick colors, and fenestration follow a pattern reminiscent of the original.

The Middle School plan not only accommodates the program, but also provides a layout that effectively supports a team teaching strategy and a “home” for each grade level. Each grade level home can operate somewhat independently from the others, and students from one grade level have no need to travel into the home of another grade level to accommodate daily class changes. The homes are also interchangeable; allowing the administrators to decide which grade configuration is preferred in a given year.



DEPARTMENT

- CIRCULATION
- CAREER & TECHNICAL EDUCATION (CTE)
- PHYSICAL EDUCATION / HEALTH
- SUPPORT
- VERTICAL CIRCULATION

auburn middle school basement plan



DEPARTMENT

- ADMINISTRATION
- AUDITORIUM
- CIRCULATION
- GENERAL CLASSROOM (CR)
- CTE
- PHYSICAL EDUCATION / HEALTH
- GYMNASIUM
- KITCHEN
- MEDIA CENTER
- MUSIC
- RESOURCE
- SCIENCE LAB
- SUPPORT
- VERTICAL CIRCULATION

auburn middle school first floor



DEPARTMENT

- ADMINISTRATION
- CIRCULATION
- GENERAL CLASSROOM (CR)
- CTE
- MEDIA CENTER
- RESOURCE
- SCIENCE LAB
- SUPPORT
- VERTICAL CIRCULATION

auburn middle school second floor



auburn middle school bird's eye view



auburn middle school entry view

Characteristics Unique to the Blacksburg High School Scenarios

We have worked carefully to incorporate best practices into our plans for the new Blacksburg High School. In addition we have held a number of meetings and workshops with the MCPS staff, BHS faculty, and the public to understand and incorporate their priorities with regard to the types and arrangement of spaces within the school. As a recognized “Top Public High School,” we understand that there are high expectations for this high school in the Blacksburg community. The features described below are illustrated in the floor plans provided earlier.

1. There is a direct and clear connection between the main parking areas, parent drop-off, and the main entrance of the school. The administration area is placed at the main entry with clear supervision of those entering both the site and the building. Vestibule entry doors can be set (locked) to require all visitors to enter directly into the administrative waiting area as opposed to entering directly into the lobby should an extra layer of security be deemed necessary.
2. Students arriving or departing by bus enter the events lobby on the north side of the facility and are directed past the administration on their way to the classroom area.
3. The organization of the building on three stories addresses the significant topography of the site, allows for a large school to remain relatively compact, and creates the potential for a strong connection between CTE programs and the rest of the academic program.
4. The corridor configuration for each school is straightforward and simple to promote ease of supervision.
5. Public areas are easily secured from the academic wing for after-hours use. Health classrooms are located in the “public” portion for proximity to athletic areas and to provide after-hours classroom spaces for the community.
6. Generous main corridors and the location of open dining areas and courtyards provide space to manage heavy attendance at sporting events, performances, and other events drawing the community in large numbers.
7. Areas of the school needing vehicular access by trucks, vans, or buses have convenient access to service drives or bus staging areas. There are ample opportunities for programs desiring direct access to exit on grade.

8. The design allows significant flexibility for a variety of instructional models - grade houses, departments, or small learning communities. Further, CTE programs are integrated throughout the school. With the more hands-on programs located on the lower levels with walk-out -- or drive-out, as the case may be -- access to the site.
9. The center of each classroom grouping is designed to provide a wide variety of learning environments – flexible and technology-rich spaces for student-centered learning.
10. With close scrutiny of the proposed plans, one can see that the academic wings are oriented ideally for daylight harvesting. With the application of sophisticated energy modeling software, the use of fully dimmable lighting controlled by light sensors, and the careful specification of light shelves, sloped ceilings, and advanced glazing products, we can create efficiently daylit classrooms. This proven approach yields first-cost savings of mechanical systems, significant energy savings, glare-free lighting, and a healthy environment. The orientation of the classrooms also celebrates views to landscaped courtyards and the mountains south of the site.

In terms of the building's character, the building massing promotes the use of the type of sloped metal roofs preferred by MCPS. The prevalent use of brick in a varied pattern provides an architecture that is contemporary yet compatible with the existing Blacksburg Middle School and Kipps Elementary School.



blacksburg high school - lower level floor plan



blacksburg high school - main level floor plan





blacksburg high school - facade elevations

10.1.17 Provide a copy of the initial Traffic Study comments for the Auburn Site and for Blacksburg High School that have been received from VDOT and Town of Blacksburg

traffic studies

MCPS has authorized the preparation of a Traffic Impact Analysis for both the Blacksburg and Auburn projects outside the scope of this PPEA proposal, but utilizing members of the proposed project team through existing term and design contracts for procurement of these services. This decision has helped to advance these preliminary and very essential components of the site design while the PPEA review process continues. As these analyses are outside the scope of the PPEA process, MCPS has access to all of the documentation for each TIA at its disposal. The following are brief descriptions of the current status of each TIA and the documentation which is provided herein.

The TIA for the proposed Blacksburg High School site is underway, and the scoping phase and the data collection processes have been completed. The analysis is currently in process, and will be provided to MCPS, the Town of Blacksburg, VDOT, and the Project Team as soon as it is complete. A copy of the TIA Pre-Scoping Form recently approved by VDOT is included herein.

The TIA for the Auburn Schools has been completed, submitted, and comments have been received from VDOT. Those comments have been addressed and the TIA has been re-submitted to VDOT for review and approval. Copies of the comments from VDOT as well as the response letter which accompanied the re-submittal are included herein.



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

PO BOX 3071

SALEM, VA 24153-0560

GREGORY A. WHIRLEY
COMMISSIONER

June 1, 2011



Steve Sandy
Montgomery County Planning & GIS Services
755 Roanoke Street, Suite 2A
Christiansburg, VA 24073-3181

RE: AUBURN AREA SCHOOLS
Montgomery County

Dear Mr. Sandy:

A traffic impact analysis was prepared by Anderson and Associates, Inc. for the proposed Auburn Area Schools redevelopment in Montgomery County dated March 9, 2011 and revised on May 13, 2011. This report was submitted with a concept plan of development on the behalf of Mr. Ben Motley, RRMM Architects. Given the stage of development, this report is not required to meet the requirements of 15.2-2222.1 of the Code of Virginia and the Virginia Traffic Impact Analysis Regulations, 24 VAC 30-155. However, it was prepared to these standards for use in future stages of this project.

We have reviewed the revised report. All previous comments have been addressed and the report is considered complete. No further submissions of the report will be required at this time.

The report shows that the number of access points into the property will be reduced from 5 to 2 which should improve safety along the Route 8 corridor. Additionally, the report recommends 200 foot left and right turn lanes at each of the two access points on Route 8 into the property. The report recommends one ingress and 2 egress lanes at each of the access points onto Route 8. Additionally, at the high school/ elementary school entrance it is recommended to have a traffic control officer controlling traffic in the AM peak hour to allow for vehicles to exit the site.

Finally, I ask that you arrange to have VDOT's summary of the key findings of the traffic impact analysis included in the official public records (meeting minutes, staff report) on the proposed project and to have this letter and the traffic impact analysis placed in the case file for the site plan application. VDOT will make these documents available to the general public through various means such as posting them on VDOT's website.

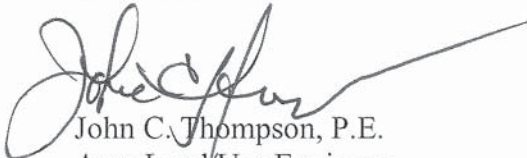
WE KEEP VIRGINIA MOVING

traffic studies - auburn strand

Steve Sandy
Page Two
June 1, 2011

Should you have any questions, please contact John Jones at (540) 381-7198.

Sincerely,

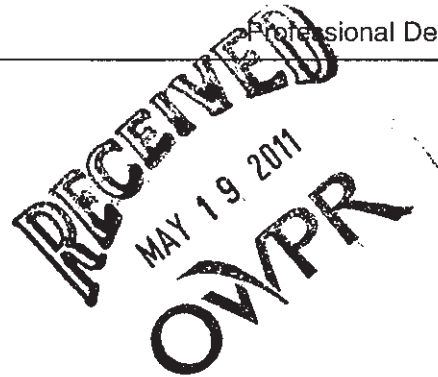


John C. Thompson, P.E.
Area Land Use Engineer

JCJ/gat

May 17, 2011

Mr. John C. Thompson, P.E.
Area Land Use Engineer
Virginia Department of Transportation
PO Box 3071
Salem, VA 24153-0560



Re: Auburn Area Schools TIA
Montgomery County, Virginia
A&A JN 29060.00

Dear John:

I am submitting the final Traffic Impact Study for the Auburn Area Schools re-development for your review and approval. Please find the responses to VDOT comments dated April 14, 2011 below. You can find our responses in italics print. I am including three copies of the complete traffic study and one digital copy of the report and analysis files.

1. Figure 5 – the southbound through movement at the intersection of Route 8 and the proposed Elementary/High School Access shows a volume and not a directional distribution.
 - *Figure 5 has been revised to show the southbound through distribution.*
2. For Synchro analysis, it appears that 0.90 was used as a uniform peak hour factor for all approaches at the intersections being studies for the 2011 existing conditions, 2013 build out conditions and 2019 design conditions. Adjust the peak hour factor to correctly reflect the supporting raw counts for all intersections studied. Schools typically will lead to low peak hour factors and this should be reflected in the analysis.
 - *All Synchro analyses have been updated to reflect approach peak hour factors collected in the field. Updated analysis has been included in the report and supporting appendices.*

4. The SimTraffic analysis results are missing for the 2011 Existing Conditions, 2013 Build-Out conditions and 2019 Build-Out conditions. The analysis should be on page 7 (analysis of Existing Conditions, page 12 (analysis of Build-Out Year Conditions with Development) and page 14 (Analysis of Design Year conditions with Development). It should also include the maximum queue lengths.
 - *In the original submittal, queuing analysis was only completed on the 2019 Build-Out conditions to ensure adequate storage lengths based on VDOT turn lane warrants. The report has been revised to show 95th percentile queues and maximum queues on all analysis tables. The layout of the tables have also been changed to show level of service and delay for each movement as opposed to reporting on the worst movement at each intersection.*
5. There appears to be a conflict with the middle school peak hour trip rates. Using the average rate, the current middle school peak hour has 149 trips for 281 students. However, using a fitted curve equation results in an increase of only 2 trips (to 151) for a potential 480 students. For consistency, the average rate should be used for both the existing and future middle schools.
 - *The trip generation for the middle school has been updated to use rates for both the proposed build out and existing conditions. Rates were originally used for the existing conditions only because the ITE trip generation manual does not have data for less than 300 students.*
6. For Figures 4, 6, and 7, all turning movements should have a level of service associated with them. It appears that a level of service was mentioned for all vehicles within an approach for all intersections.
 - *These figures do not show a level of service for movements where there is no associated delay. The level of service is assumed to be A for through movements and most right turns where vehicles are permitted to proceed through the intersection without stopping. Synchro does not report a level of service for these movements.*
7. Figure 5 – it is unreasonable for all middle school traffic to be entering and exiting to the north. Adjust the percentages or note assumptions in the report.
 - *Middle school traffic has been distributed based on existing traffic counts as noted in the report. The initial trip generation only showed 2 additional vehicles for the middle school, therefore all trips were distributed in one direction. Figure 5 has been revised to show the distribution factors used based on the new trip generation.*

Mr. John C. Thompson, PE
May 17, 2011
Page 3 of 3

8. The report indicates VDOT does not want a signal. It should say that since the peak hours only occur for a short amount of time, twice a day and only during the school year, VDOT would prefer not to use signals.
 - *The text revision has been made on page ii of the Executive Summary and page 2 of the report.*
9. The turn lane analysis gives 100' turn lanes for the left and right turn lanes at both the Middle School entrance and the High School/Elementary School entrance. During the peak hours of the school, when the school speed zone is in effect, this would be fine. However, since there are after school activities that will occur at all of the schools when the school speed zone is not in effect, the turn lanes should meet the minimum lengths for a 45 mph roadway. For a 45 mph roadway, the minimum turn lane length is 200' and the minimum taper is 200'.
 - *VDOT turn lane warrants have been analyzed for the 45 mph speed limit and included in the Appendix of the report.*
10. On page 10, it says that in the peak hour, only 1 bus enters and 16 buses exit the site. This does not seem reasonable as there is only one elementary school access from Riner Road.
 - *Buses were counted as part of the data collection, and actual counts were used in the study. The middle school and high school share buses which enter the site prior to the beginning of the AM peak hour, release students at the same time, and exit the site together. The elementary school buses have a separate access which was not analyzed as part of this study. It is located off Fairview Church Road. A note has been added to page 10 of the report.*

As part of this submittal, please find an electronic copy of the report to be included in the document posting with Montgomery County. Feel free to contact me anytime at 540-552-5592 or email: johnson@andassoc.com.

Sincerely,

ANDERSON & ASSOCIATES, INC.



J. Michael Johnson, EIT
Project engineer

JMJ/jmm
Enclosure
Cc: Ben Motley
Bill Shelton

Information on the Project Traffic Impact Analysis Base Assumptions

The applicant is responsible for entering the relevant information and submitting the form to VDOT and the locality no less than three (3) business days prior to the meeting. If a form is not received by this deadline, the scope of work meeting may be postponed.

Contact Information

Consultant Name:	Bill Wuensch, P.E., PTOE, Engineering & Planning Resources, P.C.
Tele:	804 647 7700
E-mail:	w.wuensch@epr-corp.com
Developer/Owner Name:	Dan Berenato, Montgomery County Public Schools
Tele:	540 382 5141
E-mail:	dberenato@mail.mcps.org

Project Information

Project Name:	Blacksburg High School	Locality/County:	Blacksburg, VA
Project Location: (Attach regional and site specific location map)	Town of Blacksburg, West Prices Fork		
Submission Type	Comp Plan <input type="checkbox"/>	Rezoning <input checked="" type="checkbox"/>	Site Plan <input type="checkbox"/> Subd Plat <input type="checkbox"/>
Project Description: (Including details on the land use, acreage, phasing, access location, etc. Attach additional sheet if necessary)	-1600 student high school on 70 +/- acres - Built in one phase. See attached exhibit - The zoning action is a CUP		
Proposed Use(s): (Check all that apply; attach additional pages as necessary)	Residential <input type="checkbox"/>	Commercial <input type="checkbox"/>	Mixed Use <input type="checkbox"/> Other <input checked="" type="checkbox"/>
	Residential Uses(s) Number of Units: _____ ITE LU Code(s): _____ _____ _____ Commercial Use(s) ITE LU Code(s): _____ _____ _____ Square Ft or Other Variable: _____		_____ _____ _____ Other Use(s) ITE LU Code(s): 530 _____ _____ Independent Variable(s): Students _____ _____
Total Peak Hour Trip Projection:	Less than 100 <input type="checkbox"/>	100 – 499 <input type="checkbox"/>	500 – 999 <input checked="" type="checkbox"/> 1,000 or more <input type="checkbox"/>

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

traffic studies - blacksburg high school

- 10.1.18. *Provide a description of an ongoing performance evaluation system or database to track key performance criteria, including but not limited to, schedule, cash management, quality, worker safety, change orders, and legal compliance.*

performance evaluation systems

Branch & Associates will implement several processes and systems during the preconstruction phase to ensure budget, schedule, safety and quality expectations are met and that our team complies with PPEA and public procurement requirements. The project budget will be updated continuously during the design development stage so that we can react quickly to any undesirable variations in budget. A preconstruction document review log will be utilized throughout preconstruction to document changes, clarifications and additional information requested through our constructability and quality assurance reviews.

During development of the GMP, Branch will utilize **GradeBeam** to post project information, search for subcontractors and suppliers, send bid invitations, distribute project documents through local printing firms, track bid responses and issue project change information. We use GradeBeam to query a database of thousands of subcontractors and vendors for those interested in the project. Those expressing interest will be vetted through our subcontractor/vendor prequalification system which establishes minimum criteria to submit a bid on the project. Our prequalification criteria includes key performance areas such as financial health, past performance, safety record, experience with similar projects, claims history, etc. We will engage legal counsel at regular intervals to ensure compliance with PPEA and public procurement requirements.

During construction Branch & Associates will utilize **Common Systems**, our in house project management system to track many of the facets of our projects. Common Systems was developed to cater to our specific information management needs. Many of the day to day administrative project functions are monitored through Common Systems including submittals, RFI's, change proposals, subcontracts, cash management (along with our accounting system). The project team is responsible to produce a monthly financial projection in Common Systems to ensure the project budget is on track and that the contingency is being managed effectively.

We will implement **Microsoft Project** for development of the project schedule and monitoring of progress. In addition to our monthly schedule, we utilize three week look ahead schedules to focus on the many important details that develop during the project but are too cumbersome to include in the overall project schedule. Additionally, we will engage the services of a third party scheduling consultant to perform a technical review of our initial construction schedule and then to provide monthly schedule update audits.

Quality is a mentality and an attitude. Our focus on quality begins in prequalification through subcontractor prequalification and our document review log and continues during construction. Our construction phase team will implement preconstruction conferences, manufacturer's inspections, quality inspections and weekly deficiency logs in the foreman meetings to ensure the work is done once and done right.

Overall safety management begins during prequalification and scoping and continues with the inclusion of safety requirements and expectations in our subcontracts. At the jobsite our supervision assumes overall responsibility for all jobsite safety requirements and will implement safety orientation meetings, weekly foreman meetings and safety inspections throughout the project. Our direct jobsite efforts are supplemented by random OSHA type inspections from the Branch Group corporate safety office.

10.1.19. Provide a schedule of site visits to High School Projects completed by the 3 main firms (Branch, RRMM, SHW).

Members of our team will be available to conduct a site tour of the following projects at the convenience of Montgomery County Public Schools.

Branch & Associates

*New Franklinton High School
Franklin County Schools, Franklinton, NC*

The new Franklinton High School is being constructed just south of Franklinton, in the heart of the growing area. The school is situated on 78 acres of undeveloped rolling timberland, typical of the region. The new school is designed for an initial population of 1,200 students; however the campus is planned for growth and includes infrastructure to accommodate future needs.

SHW Group

*Eastern View High School
Culpeper County Public Schools, Culpeper, VA*

The new Eastern View High School, the second-ever high school in Culpeper County, integrates career and technology classrooms into the overall fabric of the core instructional areas. The school is organized utilizing an interdisciplinary framework with abundant opportunities for students and teachers to collaborate.

*Landry High School
Orleans Parish School District and Recovery School District, New Orleans, LA*

An existing facility was slated for demolition and replacement after the devastation from Hurricane Katrina. Several features also echo the school's original plan, such as two longitudinal academic wings, stacked classroom floors, a community clinic, and a dual-use student/public media center.

*Frisco Career and Technical Education Center
Frisco Independent School District, Frisco, TX*

SHW developed a design that combined a traditional career and technology center with a prep center offering advanced coursework for students. The center was designed to allow students to explore interests and focus on possible job options to offer students unique cross-collaborative opportunities.



RRMM

Since the work of RRMM would comprise new construction for Auburn High School and renovations and additions to the existing high school to become a middle school, we recommend the following projects for site visits:

*Floyd T. Binns Middle School
Culpeper County Public Schools, Culpeper, VA*

This is a conversion and expansion of a 1940's era high school into a middle school on a very restricted site. The challenges faced here are in many ways parallel to those at the Auburn Strand. This also represents a project that was designed by RRMM and built by Branch and Associates.

*New Kent High School
New Kent County Public Schools*

A conventional high school utilizing multi stories and sloped metal roofs.

*Renaissance Academy
Virginia Beach City Public Schools*

A progressive and specialized school that demonstrates many of the high performance features that could be utilized for the New Auburn High School.

More information and scheduled tours can readily be arranged.

New Kent High School



10.1.20. *Provide a narrative or chart explaining how project will meet LEED and EnergyStar Standards.*

high performance narrative

Sustainable features will be vigorously pursued where in conformance to the stated goal of MCPS to apply well known, tested systems that are not excessively complicated. The primary emphasis shall be low maintenance and energy conservation. Therefore, central to our high performance strategies will be daylight harvesting. Through careful energy-modeling and building orientation at the outset of our design work, we can create delightful, daylit instructional spaces that require not only smaller HVAC equipment (less first cost) but will consume less (energy savings) in comparison to conventional buildings. Our daylighting strategies use carefully placed windows and clerestories. We will apply LEED principles and Energy Star Equipment where appropriate, however, MCPS does not wish to pursue formal certification.



REQUEST FOR PPEA DETAILED PROPOSAL
NUMBER12-20

Attachment 3 - Square Footage Comparison

	MCPS			DETAILED PROPOSAL (ALTERNATE)			DETAILED PROPOSAL		
	Facility Planning Standards			Branch & Associates (Branch/SHW Group/RRMM)			Branch & Associates (Branch/SHW Group/RRMM)		
	BHS	AHS	AMS	BHS	AHS	AMS	BHS	AHS	AMS
Initial Capacity - Classroom	1,400	600	480	1,458	600	480	1,608	800 (804)	600
Initial Capacity - Core	1,600	800	600	1,608	800	600	1,608	800 (804)	600
Future Capacity - Classroom	1,600	800	600						
Future Capacity - Core	1,600	800	600						
Typical Classroom Size	800-850	800 - 850	800-850	850	850	725 - 850**	850	850	725 - 850**
Science Lab	1,200 - 1,400	1,200 - 1,400	1,000 - 1,200	1,350	1,300	1,030-1,180	1,350	1,300	1,030-1,180
Administration	5,500	5,500	4,500	9,800	7,035	5,290	9,800	7,035	5,290
Artroom + Storage	1200 + 180	1,200 + 180	1,200 + 180	1,200 + 200	1,200 + 200	1,330+280	1,20 + 200	1,200 + 200	1,330+280
Choral	1600	1,400 - 1,600	1,400 - 1,600	1,450	1,485	1,350	1,450	1,485	1,350
Band (including 380 practice)	2280-2680	2,280 - 2,680	2,080	2,350	2,550	1,630+210	2,350	2,550	1,630+210
Business	1200	1,200	900	1,100	1,065	900	1,100	1,065	900
Computer Lab	1000	1,000	900	950	N/A	900	950	N/A	900
Wrestling & Fitness Studies	no standard	no standard	N/A	4,820	4,220	N/A	4,820	4,220	N/A
Library	9,100	6,300	4,500	7000****	4505*****	4,810	7000****	4505*****	4,810
Gymnasium - Seating Capacity	2,400	1,200	600	2,400	1,200	500+/-****	2,400	1,200	500+/-****
Gymnasium - NSF	17,500	11,800	8,000	14,700	12,500	8,310***	14,700	12,500	8,310***
Auxiliary Gymnasium - Seating Capacity	no standard	no standard	N/A	150	150	N/A	150	150	N/A
Auxiliary Gymnasium - NSF	7,000	7,000	N/A	7,000	7,950	N/A	7,000	7,950	N/A
Food Service	6,400	3,200	2,400	8,400	4,100	3,260	8,400	4,100	3,260
Dining - Seating Capacity	533	267	200	550+	300+	200+	550+	300+	200+
Dining - NSF	8,000	4,000	3,000	10,600	5,520	2,950	10,600	5,520	2,950
Auditorium - Seating Capacity	1,400	800	300	1,400	800	470+/-****	1,400	800	470+/-****
Auditorium - NSF	15,500	13,700	5,000	15,000	11,615	6,850***	15,000	11,615	6,850***
Net Square Feet (assigned)				210,000	142,595	85,070	230,000	149,395	91,190
Calculated NET to Gross Multiplier				1.33	1.33	1.59	1.33	1.34	1.54
Total Gross SF				280,000	175,000	121,000	305,000	200,000	140,000
Students*				1,458	655	480	1,608	804	600
SF per Student				192	290	281	190	249	233
General Notes:				Note: net SF for BHS is estimated.			*No. of Students calculated using (HS - CAP=TSx22x.85). For MS (CAP=CORE CR'S x 20). **Classroom sizes vary in existing CR spaces. ***Existing space area. **** Below MCPS standard but within State Guidelines.		



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- 10.1.22. *Provide Price Proposal. Provide a Contract Cost Limit in the format provided. Supporting cost information and calculations are encouraged. (Attachment A1- Contract Cost Limit Worksheet) including:*
1. *Quality Standards (Attachment A2)*
 2. *Building Systems, Components, Construction, Materials and Equipment Quality Standards for MCPS School Facility Projects and Guide Specifications for Price's Fork Elementary School (Attachment A3)*
 3. *Add Alternates (Attachment A4)*

price proposal

Refer to Exhibit C - CCL Worksheet in the Comprehensive Agreement dated 7-8-11 for the pricing proposal and associated assumptions and clarifications.

price proposal

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price proposal

Refer to Exhibit C - CCL Worksheet in the Comprehensive Agreement dated 7-8-11 for the pricing proposal and associated assumptions and clarifications.

price proposal

Refer to the Comprehensive Agreement Exhibit E -- Draw Schedule for an updated draw schedule reflecting the CCL dated 7-8-11.

Refer to the Comprehensive Agreement Exhibit E -- Draw Schedule for an updated draw schedule reflecting the CCL dated 7-8-11.

- 10.2. *Provide Written Responses to questions and comments to be documented during the stakeholder meetings. (Attachment A5)*

response to stakeholder questions

Auburn Strand

For the Auburn Strand projects, there have been numerous meetings with stakeholders, the community, and school board. The entire design approach has been formed out of input provided by the community and the MCPS staff. There has been substantial support for the site and building design concepts presented. More recently, there have been extensive meetings with the staff of various departments within Auburn High School and Auburn Middle School, and these meeting have had a direct influence on the plans as they have matured. A few questions were asked and have been answered as follows:

Auburn Site Plan

Questions from parents and staff regarding the traffic congestion that can be experienced at parent pick-up times at the elementary school and for any traffic exiting the school onto Route 8 at dismissal and other peak events. Is a traffic light warranted at this intersection?

Response. A traffic study has been completed and a traffic light is not warranted or even desired by VDOT. A traffic signal at this location would have an overall negative impact on traffic in that region of the County. Nonetheless several other road improvements are being design to improve traffic safety and congestion. The road will be widened along route 8 to provide turning lanes into the site for traffic traveling in both directions. The school road will now be widened to 3 lanes, which provides additional queuing space for parent pick-up as well as dedicated right and left turn lanes when exiting the site onto route 8.

Auburn High School

Questions from parents and staff about the Auxiliary Gymnasium be designed so that is a fully separate space from the Main Gymnasium.

Response. Separate gymnasiums have been designed in place of one large 3-court gym shown in earlier design schemes.

Questions from some about the new high school not having large, full-height windows along the full width of exterior classroom walls like the original Auburn High School.

Response. This type of window design is rarely used in modern construction because of problems associated with energy loss and proper control of daylight. Depending on the solar orientation, we find that many schools that have large expanses of windows such as this keep their windows covered much of the time. RRMM is proposing a design solution that provides abundant daylight in a properly

controlled manner. It also provides vision windows at eye level to help the user experience the outdoors, but the size of these vision windows is moderated to provide flexibility in the use of the classroom. When members of the building committee visited one of our schools that utilizes the proposed window / daylighting scheme, they were delighted with the classroom environment.

Questions from some that the Library/Media Center is located on the second floor of the high school.

Response. Many school functions compete to have a primary presence at the main entry of a school. Given the nature of use of the Libraries in the MCPS system (they are school libraries, not public libraries) and given the success of the Eastern Montgomery High School Plan, it was decided that a prominent and central location for the Library within the academic wing was a good choice. It also provided for better function and access of spaces with heavier public use such as the Auditorium, Gyms, Community Use Spaces, and the Dining Area. For this issue there were also many in support of the proposed location.

Auburn Elementary Play Area

Questions from some that the green space south of the Auburn Elementary School Parking Lot will be supplanted by new parking and tennis courts for the new high school.

Response. RRMM reviewed the plan and discussed options with the Auburn Building Committee. It was determined that the green space north of the elementary school is the most appropriate and safest space for any outdoor activities for the elementary students. Furthermore, given the land area limitations, the proposed tennis court location is considered the most appropriate choice.

Several meetings with the Blacksburg High School building committee, faculty, and parents were held over a very short period of time. During these meetings we reviewed our initial (and subsequently revised) site and building plans after which discussion followed, questions were asked, and suggestions were made. In the interim we attempted to incorporate as much of the feedback as feasible within the limits of the prescribed program and the constraints of time. Questions raised are noted below.

Questions from faculty were asked about the proximity of the gymnasium to the locker rooms.

Response. We redesigned the gymnasium so that it would be on the same floor as the locker rooms. Doing so eliminates the possibility for using the dining area as a lobby for the gymnasium, but we addressed that in other ways.

Questions from the faculty were asked about the relative proximity of the gymnasium to the auditorium.

Response. We redesigned the gymnasium so that the main entrance to the auditorium would be offset from the main entrance of the gymnasium. Additional storage will buffer the wall immediately adjacent to the gymnasium to provide further sound-proofing. In so doing we created a new lobby for the gymnasium on the north side.

Questions from the faculty were asked about the number and kinds of locker rooms proposed.

Response. In conjunction with faculty from the physical education and athletic departments, we developed a matrix detailing the fall, winter, and spring varsity and junior varsity boys and girls programs plus physical education. We designed locker rooms to accommodate those programs accordingly.

Questions from the faculty were asked about the location of the chorus room relative to the band room.

Response. We moved the chorus room further from the band room as directed.

Questions from the faculty were asked about the number of science classrooms.

Response. The number of science classrooms initially proposed was consistent with the RFP requirements. Subsequent to input from faculty, MCPS issued an addendum clarifying (and adding to) the number of science classrooms. We have incorporated them into our design accordingly.

Questions from the faculty were asked about the size, location, and organization of the CTE programs.

Response. We worked closely with CTE faculty and their director to develop a CTE program that accommodates their needs within the confines of the prescribed program. Outdoor service yards were provided for “heavy” CTE programs, adjacencies were provided for drafting and pre-engineering, a

greenhouse and southern exposure was provided for horticulture, child and family services and cosmetology have ready access to the public, and a science lab was positioned in relation to shops to facilitate the creation of, for instance, robots. Marketing and business programs are located on the same level as core curriculum to facilitate interdisciplinary study. Likewise, cinema, graphics, and photography are integrated. In addition, offices and storage for all programs were accommodated.

Questions from the faculty were asked about the ability to departmentalize.

Response. The school is designed to permit a number of flexible arrangements including departmentalization, small learning communities, grade-level houses, or whatever the administration chooses.

Questions from faculty were asked about the location and orientation of the science classrooms.

Response. Because the biology, earth science, and ecology classrooms need access to direct sunlight in order to grow specimen, we reoriented the science classrooms to the south side of the building.

Questions from the faculty were asked about the arrangement of offices in the administrative suite.

Response. The administrative suite has been located to command a view and provide security for those coming and going to and from the school. As yet, the details of the arrangement of particular offices – including the guidance, assistant principals, resource officers, and reception – has yet to be finalized. These will be resolved as the design develops.

Questions from the faculty were asked about the location of the school store.

Response. Currently, the school store is not shown on the plans. A store will be incorporated during the design development phase.

Questions from the faculty were asked about the location of their parking spaces.

Response. Every effort will be made to provide direct (or otherwise unfettered) access to teacher parking given the site restraints and limitations. We understand the importance of this matter and have begun developing different scenarios to address this issue.

Questions from the faculty were asked about the traffic on Price Fork Road.

Response. A traffic study is underway to determine the best solution(s) given the traffic on Prices Fork Road.

Several concerns were raised about the size of the school and the number of teaching stations included within it. The number of teaching stations included is per the prescribed specification and the size of the school provides more SF/pupil than the average high school. We've attempted to balance the desire for more space within the limitations of the budget.

10.3. *Project Understanding. Provide a narrative of your understanding of this project's goals, constraints and opportunities. List any exceptions to the RFP or contract provisions as Assumptions and Clarifications.*

project understanding

Educational Facility Improvements – Auburn Strand Project Description

The general goal of MCPS for the Auburn Strand, as has been recently clarified, is to build a new Auburn High School to accommodate 800 students in grades 9-12. For the new Auburn Middle School, the goal is to design for 600 students for grades 6-8 students. It is intended that the quantitative space programs for each school will follow the MCPS Planning Standards that were adopted by the School Board in 2000 and other program clarifications provided by MCPS as indicated in Attachment 3.

Since the funding provisions for these Auburn Improvements (as well as those for Blacksburg High School) have not been precisely identified, our team has provided pricing options for MCPS consideration.

The schedule goal is to have the new Auburn High School ready for beneficial occupancy by mid-summer of 2013. The schedule goal for the new Auburn Middle School is to have beneficial occupancy by mid-summer of 2014.

In response to the need to improve and expand the educational facilities at the Auburn Strand, our team has prepared designs that have been developed through extensive discussions with MCPS staff and with input from numerous meetings with the community and Auburn teaching staff. These designs provide for a new high school, the renovation and expansion of the existing high school to become a middle school, and significant site improvements to the campus. The elementary school is not addressed in this proposal.

Since the funding provisions for these Auburn Improvements (as well as those for Blacksburg High School) have not been precisely identified, our team has provided design and pricing options for MCPS consideration.

Educational Facility Improvements – Blacksburg High School Project Description

In response to the need to replace the recently closed Blacksburg High School, our team has prepared solutions developed through extensive discussions with building level staff and central office administrators from Montgomery County Public Schools, representatives from the Town of Blacksburg, and members of the greater community at large. These solutions include, among other things, a new high school and significant improvements to the campus on Prices Fork Road shared with Blacksburg Middle School and Kipps Elementary School.

The general goal of the MCPS staff is to build a new Blacksburg High School to accommodate 1600 students in grades 9-12. To provide flexibility, we have designed our concept so that the capacity can be reduced to 1400 should other priorities take precedence over sheer volume. It is intended that the solutions proposed herein will follow the MCPS Planning Standards that were adopted by the School Board in 2000.

Refer to Exhibit C - CCL Worksheet in the Comprehensive Agreement dated 7-8-11 for the associated assumptions and clarifications.

- 10.4. *Work Plan/Approach. Explain your team's approach to this project, to include: management of the design/build team; communications plan; design approach; cost control; schedule control; quality control; and monitoring of customer needs and satisfaction. Provide sketches, illustrations, plans (if needed) to illustrate your understanding and proposed direction for this particular site and project.*

work plan

Through our lessons learned and previous experience with K-12 renovation projects, we understand that critical issues associated with this project would include:

- Detailed planning, scheduling, and execution that must happen throughout the preconstruction phase in order to meet project construction dates. It is imperative we identify every possible challenge the project will face during this time.
- Detailed planning, coordination, design, and the procurement of qualified subcontractors and materials is essential to scheduling and obtaining best value.
- The project must be completed on time, within budget and with the highest standards of quality possible.

Branch & Associates is able to provide the full spectrum of services required by the PPEA delivery process to help Montgomery County Public Schools, meet the goals of this project. Through our preconstruction services, solid field performance, and professional construction management services, we will ensure quality constructed facilities, proper documentation, and a carefully managed process to avoid surprises. Throughout the entire process we will promote teamwork with open, honest communications and comprehensive information upon which sound decisions can be made.

Over the past 48 years, Branch & Associates has developed and refined preconstruction systems and services to provide timely and accurate information to our clients. From our numerous K-12 and higher education projects, we know the success of this project will be determined during the preconstruction phase.

One of the true tests for this type of PPEA project is having the ability to provide accurate conceptual estimates. It will be critical to the success of the project that accurate and timely estimates be developed in parallel with program scope and definition in order to maximize scope. It takes years of training and expertise to be able to look at a program, schematic or design development drawings, visualize the completed product and estimate the correct cost. Branch & Associates brings these skills and years of experience to your project.

Our working relationships with area subcontractors enables Branch & Associates to provide detailed and accurate cost estimates. Our in-house capabilities include all 16 divisions of work, including mechanical and electrical systems. We have a proven historical cost database founded on actual project experiences which we validate against information we receive from subcontractors, vendors and suppliers. This database ensures accurate conceptual construction costs can be developed early during the design phase so that the maximum scope can be designed for this project.

Branch & Associates will carefully track the project scope and costs throughout preconstruction, developing the Guaranteed Maximum Price (GMP) based on phased design documents. We will closely monitor the development of the balance of the design to ensure that the scope and cost of the project does not exceed the GMP. The GMP will be established through in-house cost estimates validated by cost information from subcontractors, vendors and suppliers. It will be a complete representation of the scope of work and will communicate detailed line by line cost information.

As the Branch & Associates team monitors development of design and prepares our initial milestone estimate, we will review the documents with a builder's eye. Our team will apply past experiences to ensure that the documents convey the necessary information to bidders from the start thus eliminating any chance for later delay resulting from lack of information.

Branch & Associates will prequalify subcontractors for your project. We will perform a formal review to evaluate experience, past performance, current workload and resource availability, references, bonding capacity, financial standing and safety performance. Once prequalified, we will solicit competitive bids from a minimum of three (3) subcontractors for each trade. Bid packages will include schedule requirements, site logistics, project site rules and conditions, phasing, quality and overall expectations. We stimulate interest early in the preconstruction process to ensure broad coverage and competitive advantage for the owner.

While the procurement process on any project is a critical function, it is of particular importance when procurement must identify and include specific instruction relative to coordinating material deliveries and timing so that with ongoing daily operations and student/faculty/staff comings and goings are always a first consideration. Accordingly, we will formulate a procurement strategy that will very likely include restrictions in terms of narrow delivery windows, parking while waiting to be off-loaded (large deliveries will be restricted from the site until a prescribed hour) so that busing schedules and vehicle traffic is never affected.

The first thirty days is the most critical to the project. This is the time frame that the planning process begins. The process is begun with a kick off meeting with all the stakeholders to establish the strategies, goals and timeframes for the project. We will take our conceptual logistics plans and breakdown into additional phases as the constraints of the project are identified.

Understanding the importance of quality assurance and quality control to the Montgomery County Public School System, we have a number of quality assurance protocols as well as several of our in-house approaches to quality control. These tools have been utilized successfully in the past to ensure that high quality products are produced on time and within budget. Branch & Associates begins the quality assurance process during the scoping phase and continues it through project completion. We use a series of checks and balances to ensure quality as well as schedule and budget meet or exceed client expectations.

On this project our project manager will manage the team along with support from our preconstruction department to work together to achieve a seamless project delivery. Our thought process is simple; the people who are closest to the design and owner teams need to understand both the design and the construction aspects of the project as well as the costs. The project managers, design architects, and engineers staff will provide critical support to this process.

Construction Schedule

Branch & Associates will develop a detailed CPM schedule. This plan will show the sequence and interdependence of all activities required for complete performance of the work, including submission and approval of shop drawings. Material lead times and deliveries will be tracked. Branch will provide a detailed review of the CPM schedule and compile a report with respect to logic and durations. The schedule will be vetted with the subcontractors for input and “buy-in”.

Cost Estimating and Analysis

Branch & Associates, Inc. has significant experience preparing estimates for projects in all phases, ranging from conceptual estimates during the early design phase to final estimates immediately prior to submitting the project for bids. Cost estimating is a core component of our firm’s mission to enhance the client’s overall return of investment. All estimates incorporate our firm’s extensive understanding of current market prices.

Progress Reporting

A construction schedule update meeting, to be held at monthly intervals, will be conducted by Branch & Associates and attended by the project team. The previous period’s actual progress will be recorded and future activities will be reviewed. The estimated impact on performance and completion of other activities and an explanation of corrective action taken or proposed by the Project Team will also be addressed. Branch & Associates will provide an analysis of the progress from the data submitted by the project team and from on-site observations for the purpose of verifying:

- Percentage of completion of each activity/the project
- Revised logic and activity durations
- Future start and completion dates
- Delays affecting the project completion

Branch & Associates has a team of professionals with an incredible energy only possible with an integrated team with years of experience. Branch & Associates has built its reputation on not being just a general contractor, but instead we thrive on new challenges, while providing single source responsibility.

Organizational Philosophy

Branch's philosophy regarding the many issues and challenges that occur in the design/construct process may be summarized as "Worry Hard Early". This phrase defines our approach. The attitude driving this approach is our understanding that issues are best resolved when:

- they are identified and defined early,
- available options are thoroughly and carefully considered,
- such options are openly and respectfully discussed, and
- Branch persistently works for a solution that fully addresses the issue.

Partnering

Our experience at Branch is that partnering is a valuable addition when the parties are fully committed at all levels to:

- seek win-win solutions,
- place principles above personalities,
- solve problems at the lowest level,
- provide clear, open timely communication, and
- mutual respect for each party's role.

- 10.5. *Project Schedule. Provide a detailed schedule for the design, permitting, bidding and construction phases of the project. Include schedule items for Owner's actions.*

schedule

Refer to Exhibit G - Schedule Milestones in the Comprehensive Agreement dated 7-8-11 for the project milestone dates.

Montgomery County Public Schools - Proposed PPEA Project Schedule

ID	Task Name	Duration	Start	Finish
1	PPEA TEAM SELECTION / NEGOTIATION	81 days	Mon 3/21/11	Mon 7/11/11
2	✓ Receive Competing Conceptual Proposals	1 day	Mon 3/21/11	Mon 3/21/11
3	✓ PPEA Committee Review of Competing Proposals	27 days	Mon 3/21/11	Wed 4/27/11
4	✓ PPEA Committee creates Shortlist of Teams and Detail Phase Criteria Recommendations to School Board	1 day	Wed 4/27/11	Wed 4/27/11
5	✓ Public Presentation to Community by PPEA Finalist	1 day	Mon 5/16/11	Mon 5/16/11
6	✓ Preliminary Meeting with MCPS, Arcadis, Branch	1 day	Tue 5/17/11	Tue 5/17/11
7	✓ Public Hearing	1 day	Tue 5/17/11	Tue 5/17/11
8	✓ Issue RFP for Detailed proposal	2 days	Wed 5/18/11	Thu 5/19/11
9	Detail Phase Proposal Preparation by Selected Teams	16 days	Tue 5/24/11	Tue 6/14/11
10	Meeting with Arcadis and MCPS to discuss detail proposal preparation	1 day	Fri 6/3/11	Fri 6/3/11
11	Follow up Meeting with Arcadis and MCPS to discuss detailed proposal requirements	1 day	Fri 6/10/11	Fri 6/10/11
12	Special School Board meeting to review the schematic design of all three schools-RRMM and SHW Group presentations	1 day	Tue 6/14/11	Tue 6/14/11
13	School Board Approves Schematic Designs for schools at special meeting	1 day	Tue 6/21/11	Tue 6/21/11
14	Review of Detail Phase Proposals	5 days	Fri 4/29/11	Thu 5/5/11
15	Special School Board meeting with Arcadis to review detailed proposal and decide if negotiations should start (Go/No Go decision)	1 day	Tue 6/21/11	Tue 6/21/11
16	Negotiate Comprehensive Agreement	8 days	Wed 6/22/11	Fri 7/1/11
17	Possible Joint Board meetings to discuss PPEA	1 day	Thu 6/23/11	Thu 6/23/11
18	Committee review and recommendation to Board of comprehensive agreement	1 day	Tue 7/5/11	Tue 7/5/11
19	School Board Final approval of Comprehensive Agreement	1 day	Tue 7/5/11	Tue 7/5/11
20	Board of Supervisors Funding Decision and review of Comprehensive agreement	1 day	Mon 7/11/11	Mon 7/11/11
21	CRITICAL DESIGN ACTIVITIES AUBURN STRAND	297 days	Mon 1/3/11	Tue 2/21/12
22	✓ Authorize RRMM / OWPR to continue with Development of Early Sitework Package for AHS plus School Board Approval of Site Concept for Auburn Strand	1 day	Tue 6/7/11	Tue 6/7/11
23	Schematic Design Phase (AHS and AMS)	117 days	Mon 1/3/11	Tue 6/14/11
24	✓ Detailed Input from Committees (admin, faculty, stakeholders, etc)	2 days	Wed 5/25/11	Fri 6/10/11
25	Develop Pre-Grading Construction Documents for AHS	17 days	Wed 6/8/11	Fri 7/1/11
26	Regulatory Approval of Pre-Grading for AHS	20 days	Mon 7/4/11	Fri 7/29/11
27	Design Development Phase (AHS, AMS)	60 days	Tue 7/12/11	Mon 10/3/11
28	Building Permit Set - 65 % Construction Documents for AHS and AMS	60 days	Tue 10/4/11	Mon 12/26/11
29	65% Construction Documents Submittal per Comprehensive Agreement	1 day	Tue 12/27/11	Tue 12/27/11
30	Review and Approval of 65% CD Submittal	10 days	Wed 12/28/11	Tue 1/10/12
31	Develop and establish GMP at 65% Documents	30 days	Wed 1/11/12	Tue 2/21/12
32	Development of early foundation, structural and underslab rough package	40 days	Tue 9/6/11	Mon 10/31/11
33	Regulatory Approval of Building Designs for AHS and AMS	20 days	Tue 12/27/11	Mon 1/23/12
34	Finalize Construction Documents	20 days	Tue 1/24/12	Mon 2/20/12
35	CRITICAL DESIGN ACTIVITIES BLACKSBURG HS	904 days	Tue 5/17/11	Fri 10/31/14
36	✓ MCPS Develop Criteria for Traffic Study and Survey at BHS	3 days	Tue 5/17/11	Thu 5/19/11
37	MCPS Commissions Traffic Study and Survey for BHS Site	1 day	Mon 5/23/11	Mon 5/23/11
38	Preparation of Topographic and Utility Survey for BHS	15 days	Mon 6/6/11	Fri 6/24/11
39	MCPS Commissions Geotechnical Study of BHS sites	25 days	Mon 6/6/11	Fri 7/8/11
40	Finalization of Traffic Study	1 day	Tue 7/5/11	Tue 7/5/11
41	Schematic Design Phase (BHS)	20 days	Wed 5/18/11	Tue 6/14/11
42	Detailed Input from Committees (admin, faculty, stakeholders, etc)	5 days	Wed 5/25/11	Wed 6/15/11
43	Community/Parent input meeting	1 day	Fri 6/10/11	Fri 6/10/11
44	Authorize SHW / GNI to Develop an Early Sitework Package for BHS plus School Board Approval of Site Concept for BHS	1 day	Tue 6/21/11	Tue 6/21/11
45	Develop Pre-Grading Construction Documents for BHS	30 days	Wed 6/22/11	Tue 8/2/11
46	Regulatory Approval of Pregrading for BHS	20 days	Wed 8/3/11	Tue 8/30/11
47	Conditional Use Permit	53 days	Fri 7/1/11	Tue 9/13/11
48	Submit Site Plan for approval to Town of Blacksburg	1 day	Thu 9/15/11	Thu 9/15/11
49	Review Site Plan	30 days	Fri 9/16/11	Thu 10/27/11
50	Design Development Phase (BHS)	55 days	Tue 7/12/11	Mon 9/26/11
51	Development of early foundation, structural and underslab rough package	40 days	Tue 9/6/11	Mon 10/31/11
52	Building Permit Set - 65% Construction Documents for BHS	40 days	Tue 9/27/11	Mon 11/21/11
53	65% Construction Documents Submittal per Comprehensive Agreement	1 day	Tue 11/22/11	Tue 11/22/11
54	Review and Approval of 65% CD Submittal	10 days	Wed 11/23/11	Tue 12/6/11
55	Develop and establish GMP at 65% Documents	25 days	Wed 11/23/11	Tue 12/27/11
56	Complete CDs for Construction use and approvals	40 days	Wed 12/28/11	Tue 2/21/12
57	Approve foundation permit set	20 days	Tue 11/1/11	Mon 11/28/11
58	Regulatory Approval of Building Designs for BHS	20 days	Wed 2/8/12	Tue 3/6/12
59	Finalize Construction Documents	20 days	Wed 3/7/12	Tue 4/3/12
60	CONSTRUCTION ACTIVITIES AUBURN STRAND	850 days	Mon 8/1/11	Fri 10/31/14
61	Bidding or Negotiation Period for Pre-Grading at AHS	15 days	Mon 8/1/11	Fri 8/19/11
62	AHS Pre-Grading Construction	50 days	Mon 8/22/11	Fri 10/28/11
63	AHS foundation and procurement of steel pkg	80 days	Tue 11/15/11	Mon 3/5/12
64	AHS Construction (Substantial Completion)	18.5 mons	Tue 2/21/12	Mon 7/22/13
65	AHS Move-In / Project Closeout	2 mons	Tue 7/23/13	Mon 9/16/13
66	AMS Construction (Substantial Completion)	300 days	Mon 6/17/13	Fri 8/8/14

Branch / SHW / RRMM

1

schedule

Montgomery County Public Schools - Proposed PPEA Project Schedule

ID	Task Name	Duration	Start	Finish
67	AMS Final Completion	60 days	Mon 8/11/14	Fri 10/31/14
68	CONSTRUCTION ACTIVITIES BLACKSBURG HS	536 days	Wed 8/3/11	Wed 8/21/13
69	Bidding or Negotiation Period for Pre-Grading at BHS	20 days	Wed 8/3/11	Tue 8/30/11
70	BHS Pad Pre-Grading Construction	2 mons	Wed 8/31/11	Tue 10/25/11
71	Site grading including utility work	2 mons	Fri 10/28/11	Thu 12/22/11
72	BHS Foundation and procurement of steel structures pkg	3 mons	Tue 11/29/11	Mon 2/20/12
73	BHS Construction (Substantial Completion)	18.5 mons	Fri 2/24/12	Thu 7/25/13
74	Substantial Completion Punch / T/O O&Ms classroom wing	10 days	Thu 7/25/13	Wed 8/7/13
75	Owner to begin FFE in classroom wing	20 days	Thu 7/25/13	Wed 8/21/13
76	Substantial Completion of remainder of building	1 day	Wed 8/14/13	Wed 8/14/13
77	Owner Occupancy	1 day	Wed 8/14/13	Wed 8/14/13
78	BHS Project Final Completion	60 days	Thu 8/15/13	Wed 11/6/13

Green. Key Decision Points
Blue. Critical Design Activities
Yellow. Projected Substantial Completion Dates for Construction

schedule

The 65% Construction Document Submittal outlined in the Comprehensive Agreement draft is the only design submittal accounted for in this schedule. Other design submittals, including estimates and value engineering workshops, have not been accounted for in this schedule. Additional reviews could delay the schedule, compromise the delivery date, and void any penalties associated with said date.

This is a very aggressive schedule that will require great urgency and nearly perfect execution by the entire project team to be accomplished. It will also require the collaboration and cooperation of the entire project team, including the various regulatory entities involved, and a “big picture” mentality on the end goal of delivering BHS and AHS by the start of the 2013-2014 school year. We have attempted to identify herein key assumptions, critical activities/milestones and decision making points in our schedule. However, while we have made an attempt to identify key decisions and approvals by MCPS and their representatives, we know there will be many more decisions that will require a timely response by MCPS that are difficult to identify at this time.

The assumptions stated on the previous page(s) along with those above are absolutely imperative for achieving the desired schools. **Any deviation is likely to compromise the schedule.** Any deviation voids any associated penalties.

comprehensive agreement exclusions

Refer to Comprehensive Agreement dated 7-8-11.

Refer to Comprehensive Agreement dated 7-8-11.

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