

TECHNICAL REPORT

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DIAB SHETAYH

CONSTRUCTION OPTION

PAINT BRANCH HIGH SCHOOL

BURTONSVILLE, MARYLAND

DR. RILEY

10/04/10

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EXECUTIVE SUMMARY

The purpose of Technical Report 1 is to become familiar with the conditions under which the Pain Branch project is constructed and its scope of work. Paint Branch High School was originally constructed in 1969 with a classroom addition in 1986. The existing facility is approximately 260,680 square feet and has an estimated capacity of 1,800 students. The outdated facility will be demolished at the completion of the new facility in July of 2013. The new Paint Branch High School will be 344,000 square feet housing nearly 2,400 students on a 45 acre campus. The new \$81,000,000 facility will be LEED Gold certified and will be the latest state of the art facility for Montgomery County Public Schools (MCPS). The project is being delivered as a Modified CM at Risk with Hess Construction + Engineering Services serving as the CM.

The original design process for the new facility started back in 2005 and took about two and a half years to form a bid set. However, due to a lack of funding by the owner, MCPS, the project was put on hold until June 2009 when MCPS acquired the necessary funding. The project obtained a notice to proceed on December 15, 2009 and will be expected to be complete on July 30, 2013 prior to the start of the 2013 school year. A project schedule summary is included in this report along with a project schedule attached in Appendix A.

A project cost was conducted using estimating software and was compared to the actual building cost estimate used by the Construction Manager. The two estimating software used to conduct the estimates were R.S. Means Costworks and D4 Cost Estimate. The R.S. Means estimate was substantially lower than the actual cost whereas the D4 estimate was much closer and only off by about \$3.5 million. Reasons for such discrepancies in cost are further explained in the Project Cost Evaluation sections section of this report and full reports of the R.S. Means Costworks Estimate and D4 Cost Estimate are included in Appendix B and Appendix C respectively.

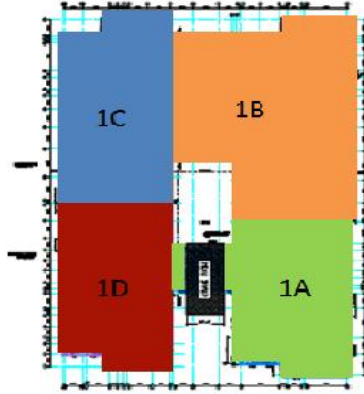
PROJECT SCHEDULE SUMMARY

The original design process for the Paint Branch project started back in 2005 and took approximately two and a half years to go from 20% schematic design to 90% construction documents. The bid set was complete in 2007 but was put on hold for two years due to a lack of funding. By 2009, Montgomery County Public Schools (MCPS) gained enough funding to start the project back up. Around June of 2009, HESS Construction + Engineering Services joined back with MCPS to complete the preconstruction services. The project was then set to bid in December of 2009 and contracts were awarded in January 2010.

The project will need to be constructed in three phases. The project needed to be constructed in phases to allow the existing facility to remain open during construction of the new facility. Since the new Paint Branch High School would not be fully complete until the 2013 school year, the existing educational facility will be demolished at the completion of the new facility. Phase 1 consist of preparing the existing site and construction of the new facility. Phase 2 consist of reconfiguring the parking lots for the staff, bussing, and student parking. Finally, phase 3 will deal with the abatement, demolition of the outdated facility, and completion of the overall site.

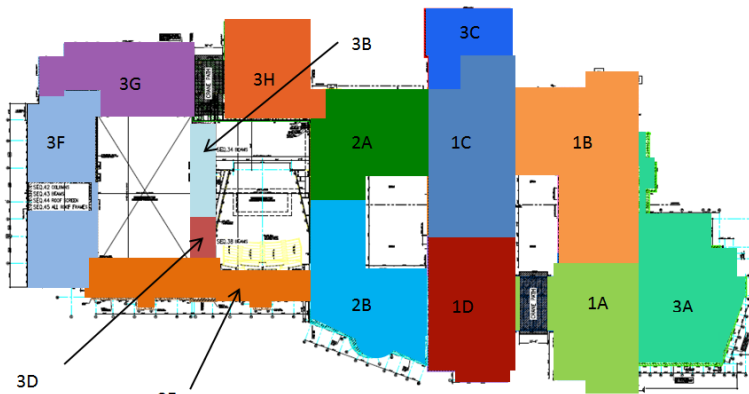
Phase one is to meet a contract substantial completion date of June 1, 2012. At this point of the project, the facility is said to be ready to move in staff and students. Phase two is set to meet contract substantial completion by August 19, 2011. Finally, Phase three is set to meet contract substantial completion by July 30, 2013.

Steel erection began on May 24, 2010 and will be broken down into a total of ten sets. They will begin erecting steel in areas 1A, 1B and 1C as their first of ten sets. (See *Figure 1.1*). The first floor of steel will be complete with set two which is composed of steel erection in area 1D. Sets 3 and 4 will include erecting steel for areas 2A and 2B. (See *Figure 1.2*). Finally, sets 5 through 10 will conclude steel erection for areas 3A to 3H. (See *Figure 1.3*). Steel erection is scheduled to complete on April 11, 2011.



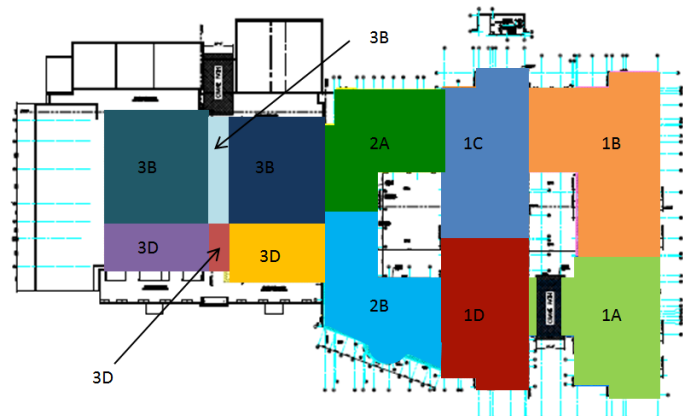
MAIN ROOF PLAN

Figure 1.1



SECOND FLOOR AND LOW ROOF PLAN

Figure 1.2



THIRD FLOOR AND HIGH ROOF PLAN

Figure 1.3

BUILDING SYSTEMS SUMMARY

Work Scope	Yes	No
Demolition	X	
Structural Steel Frame	X	
Cast In Place Concrete	X	
Precast Concrete	X	
Mechanical System	X	
Electrical System	X	
Masonry	X	
Curtain Wall		X
Support of Excavation		X
Support of Excavation		X
Curtain Wall		X
Masonry	X	

DEMOLITION

Demolition of the out-dated Paint Branch High School will be part of Phase 3 of the project and will begin July 18, 2013. Since the out-dated facility was originally built in 1969 abatement will be necessary.

STRUCTURAL STEEL FRAME

Paint Branch High School will have a moment frame structural system. It will consist of diagonal and cross bracing for wind load resistance. The diagonal cross bracing occurs on levels 2 and 3 and consists of W8X24 steel members on level 3 and W8X28 on level 2. Level one is braced with W8X31 steel members. Diagonal bracing occurs on the eastern part of the building on level 3 and uses an HSS66x6X1/4 steel member.

The floors are composed of 4 – ½” thick nominal weight concrete poured over a 2” composite 20 gage metal deck with wire mesh. The roof deck utilizes an 11 – ½” 22 gage type B galvanized metal deck with 4” thick nominal weight concrete.

CAST IN PLACE CONCRETE

There will be smooth-formed finished concrete and rough-formed finished concrete on the Paint Branch project. The smooth finished concrete will be formed with form-facing panels that will provide continuous, true, and smooth concrete surfaces. They will also be furnished in the largest possible size to minimize the number of joints. The materials used to

form the smooth finished concrete will be plywood and metal. The rough-formed finished concrete will be formed with plywood, lumber and metal and the lumber will be dressed on at least two edges and one side for a tight fit.

The forms for the cylindrical columns, pedestals and supports will be metal, glass-fiber-reinforced plastic, paper or fiber tubes that will produce surfaces with gradual or abrupt irregularities. The form liners for the exposed textured portions will be GrayLastic Formliners manufactured by Fitzgerald Formliners in Santa Ana, California.

PRE-CAST CONCRETE

The pre-cast concrete will be provided by David Kucera Inc., located out in Cardiner, New York. The pre-cast panels will be attached by H&B 444 Z clips at the top and bottom of the pre-cast panels. These Z clips will be embedded 3" into a 12" concrete masonry unit with non-shrink grout in a ½" diameter hole. *Figure 3* is a section detail showing the connections made to the pre-cast concrete panels.

MECHANICAL SYSTEMS

The mechanical system used for Paint Branch High School will be a geothermal heat pump system. There are approximately 600 wells that vary between 300 and 450 feet deep that will be installed below completion fields to act as the heat source for the system. The teaching spaces and conditioned zones will be served with multiple vertical floor-mounted water-source heat pump units accompanied with roof top energy recovery units. The geothermal heat pumps along with the roof top energy recovery units are being incorporated in the design to attain LEED Gold Certification.

ELECTRICAL SYSTEM

The electrical distribution system used on Paint Branch High School will be 277/480 volt, 3-phase, and 4-wire. This distribution system will serve all lighting, motor, and other heavy power type loads throughout the facility. There will be step down transformers located throughout the building to serve the 120/208 volt, 3-phase, 4-wire requirements. The step down transformers are to carry minor miscellaneous loads and receptacle loads. An emergency generator will handle the critical loads such as fire alarm, emergency lighting, communications, kitchen freezers and refrigerators, and the roof top energy recovery units.

MASONRY

There is concrete masonry units and face brick masonry used on the project. The concrete masonry units are used for the load bearing walls whereas the face brick is used for aesthetics and serve no structural purpose. The concrete masonry units will be bonded with

vertical and horizontal reinforcing. The vertical reinforcing will be placed every 24" on center and the horizontal reinforcing will be placed every 8" on center. The 4" face brick masonry will be connected to the concrete masonry units with horizontal joint reinforcement at 16" on center. Provided in Figure 2 is a wall section showing the connections of the concrete masonry units and the face brick.

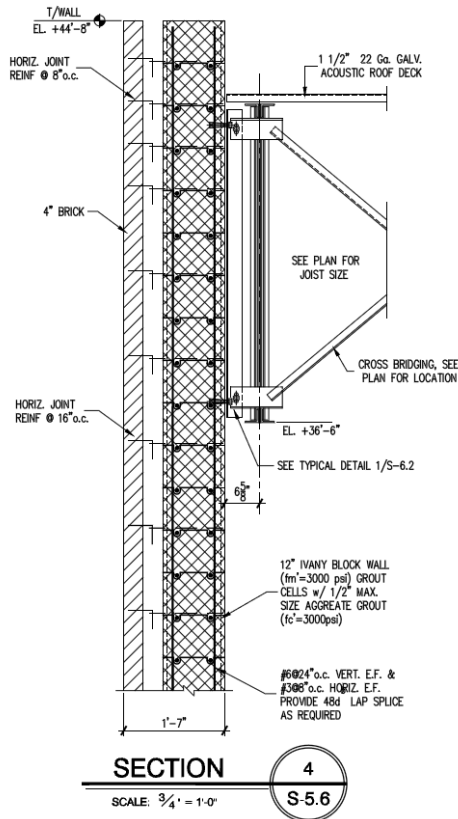


Figure 2

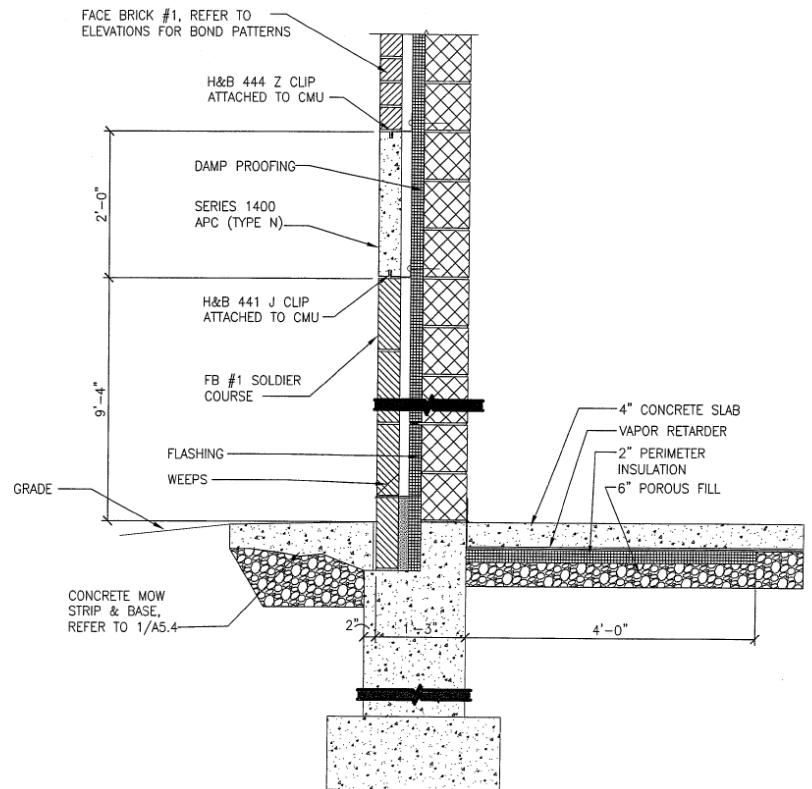


Figure 3

PROJECT COST EVALUATION

The following construction costs are based on a GMP provided by HESS Construction + Engineering Services. For comparison purposes, the amounts are slightly altered. The amounts provided only include construction cost of the building, not total project cost.

PROJECT PARAMETERS & CONSTRUCTION COST

Total Building Square Footage	344,000
Total Building Perimeter	2,000
Actual Construction Cost	\$ 68,000,000
Construction Cost/SF	\$ 197.67

Table 1: Project Parameters & Construction Cost

BUILDING SYSTEMS COST ESTIMATE

Major Building Systems		
System	Actual	Per SF
Cast In Place Concrete	\$ 2,011,534	\$ 5.85
Masonry	\$ 6,948,000	\$ 20.20
Structural Steel	\$ 4,798,000	\$ 13.95
Windows	\$ 1,358,000	\$ 3.95
Mechanical/Plumbing	\$ 14,082,000	\$ 40.94
Electrical	\$ 7,700,000	\$ 22.38
Roofing	\$ 2,019,830	\$ 5.87

Table 2: Building Systems Cost Estimate

R.S. MEANS SQUARE FOOT ESTIMATE

R.S. Means Square Foot Estimate	
Actual Building Cost	\$ 36,560,000
Building Cost Per Square Foot	\$ 106.28

Table 3: R.S. Means Square Foot Estimate

The cost estimate obtained from the R.S Means Square Foot estimate was substantially lower than the actual building cost. The difference in cost between the R.S. Means estimate and the actual building cost is \$31,440,000. The reason for such a huge difference in prices may be due to the fact that R.S. Means does not include site work, contingencies, fees, bonds and so on. Also, R.S. Means may not take into account the cost to incorporate LEED features in a building that would add a substantial increase in cost. See Appendix B for the full R.S. Means CostWorks Square Foot Estimate.

D4 COST ESTIMATE

D4 Cost Estimate	
Actual Building Cost	\$ 64,428,378
Building Cost Per Square Foot	\$ 187.29

Table 4: D4 Cost Estimate

The cost estimate obtained from the D4 Cost Estimate was much more accurate in the actual building cost estimate compared to the R.S. Means Square Foot estimate. The D4 Cost Estimate shows a difference in actual building cost of \$3,571,622 compared to the actual building cost. The D4 Cost Estimate is more accurate than R.S. Means because D4 allows the option of choosing a project relevant in size and cost and then altering the selected preloaded project to the actual project. However, like the R.S. Means Cost Works Estimate, D4 does not take into account contingencies, fees, bonds and so on. A possible reason for the difference in cost between the D4 Cost Estimate and the actual building cost can be attributed to the mechanical/plumbing estimate. The actual building’s mechanical and plumbing estimate is approximately \$14,082,000 where D4 Cost Estimate gives a value of \$8,101,114. The actual building’s mechanical and plumbing estimate includes the geothermal system which is a LEED feature and has a cost of \$3,100,000, where D4 may not take into account any LEED design costs. See Appendix C for the full D4 Cost Estimate Repot.

SITE PLAN FOR EXISTING CONDITIONS

The new Paint Branch Facility will be constructed to the south east of the existing out-dated facility. This location of the new facility was chosen to allow for the existing facility to remain open during construction. The site is approximately 45 acres; however, since there is already an existing facility on the site, it will make each construction phase very tight with limited laydown areas. Due to the tight construction space, coordination between field activities with all trades will be necessary. *Figure 4* is a site plan showing trailers, temporary fencing, laydown areas, temporary utilities, dumpsters, and the access path. A copy of the site condition and existing conditions plan can be found in Appendix D.

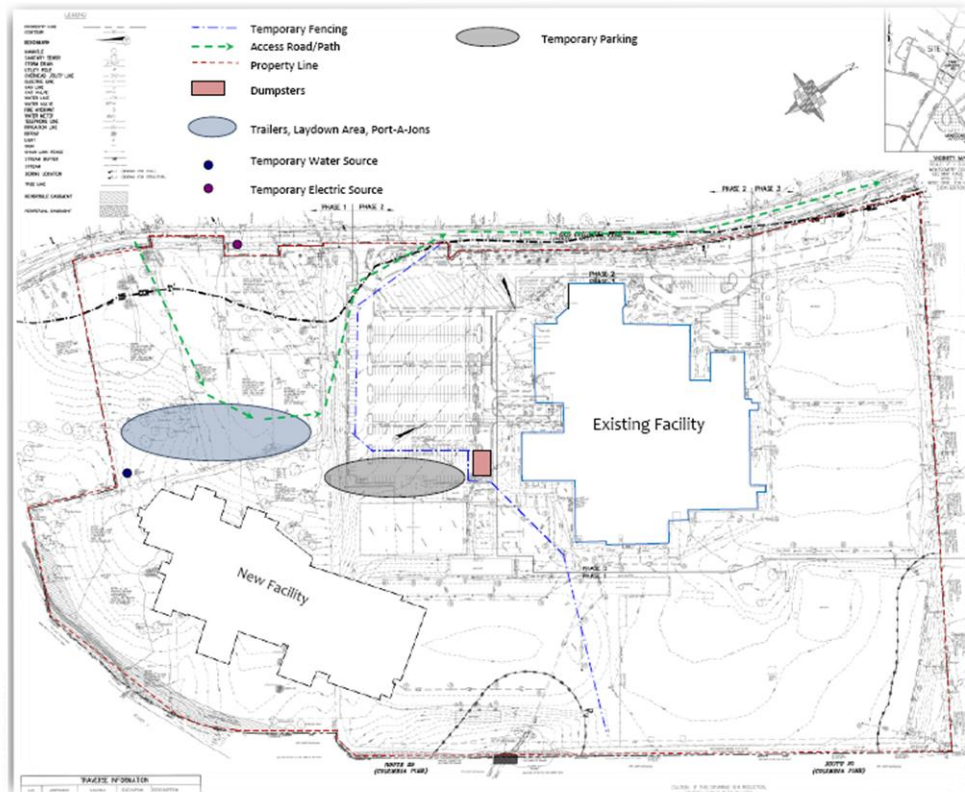


Figure 4

LOCAL CONDITIONS



Photo courtesy of Google maps.

Paint Branch High School is located at 14121 Old Columbia Pike Burtonsville, Maryland. The school property is surrounded by residential houses, and roadways. There are residential houses to the north of the site. Columbia Pike (Rt. 29) is on the eastern side of the site followed by Old Columbia Pike which is on the west side of the site. Finally, there is an existing parcel to the south of the existing site which is owned by The Maryland-National Capital Park and Planning Commission (M-NCPPC). M-NCPPC has given the parcel to MCPS. The existing site is said to slope to the east toward Columbia Pike.

The soil conditions on site are primarily sand. Prior to construction there were about 40 boring samples taken 30-40 feet out of the ground. When analyzed, there was no indication of sand. It was not until the excavation began when they had found sandy conditions. Along with the unexpected sandy soil conditions, there was an immense amount of bamboo that needed to be hauled off site during excavation.

HESS will use approximately 100 parking spots from the existing parking lot for parking and lay down areas. As for temporary utilities, HESS is using Baltimore Gas and Electric to power their trailer along with the building. Temporary power arrived on site in June of 2010. Temporary water was obtained by a fire hydrant meter until permanent water was installed on October 1, 2010.

CLIENT INFORMATION



Montgomery County Public schools (MCPS) has approximately 200 schools and facilities. MCPS strives to achieve high performance in academics. They are the 16th largest school district in the United States and have approximately 140,000 students enrolled in the school district. They are building the new Paint Branch High school simply due to the fact the existing facility was constructed back in 1969 and has now become outdated. Also, the existing school housed a total of 1,800 students and Paint Branch High School is growing in student population, therefore, a bigger facility will be a necessity. The new facility is said to house a total of 2,400 students.

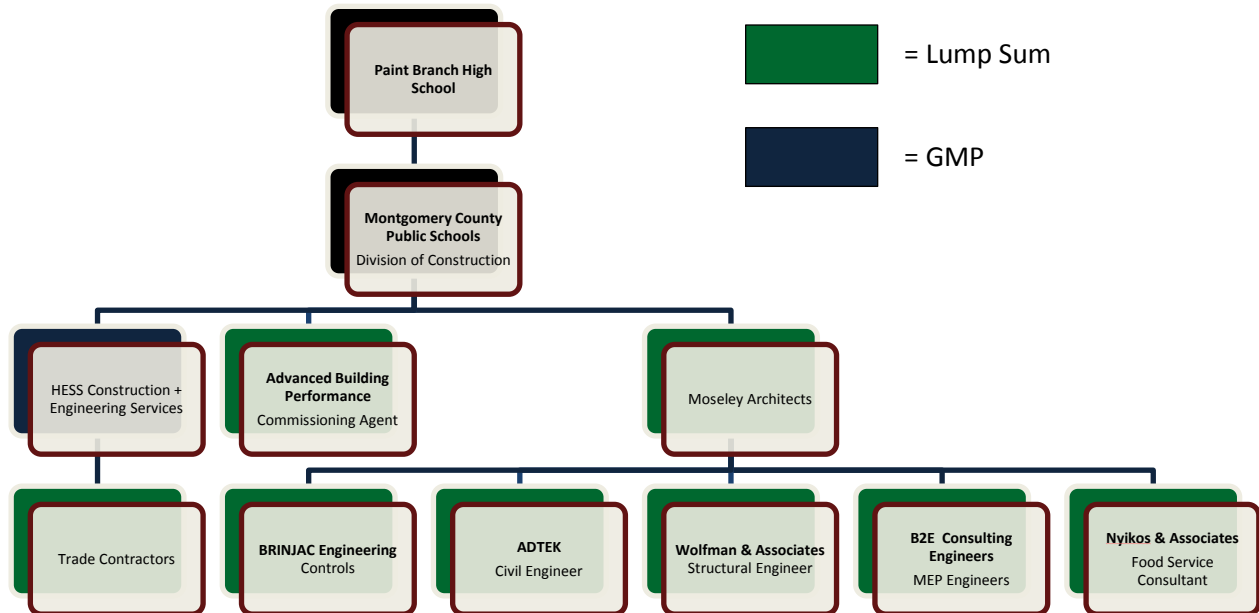
MCPS expects great quality work. The MCPS Department of Construction stresses a great deal on quality control on all of their projects. MCPS is an experienced owner and have an understanding of what they want on each of their school projects.

The schedule for this project is not a concern for MCPS. This is due to the fact that there already is an existing facility to house the staff and students until the project is complete on July 30, 2013. Also, the demolition of the existing outdated facility will not begin until July 18, 2013 which is another reason there is not a lot of stress being placed on schedule.

While there may not be a strong emphasis on schedule, there is a strong emphasis on the cost of the project. MCPS is a public organization and needed to gather enough funding to support the construction of the new facility. MCPS is thankful for all the donations they have received in order to start construction of the new Paint Branch High School.

Since there will be construction conducted during the school year and around students and faculty, safety is a huge concern for MCPS. MCPS and HESS have teamed up to create a strong safety plan to isolate the construction site from students, faculty, pedestrians, and traffic. Safety is the number one priority for MCPS as well as HESS and HESS will do their best job to keep a safe work environment at all times.

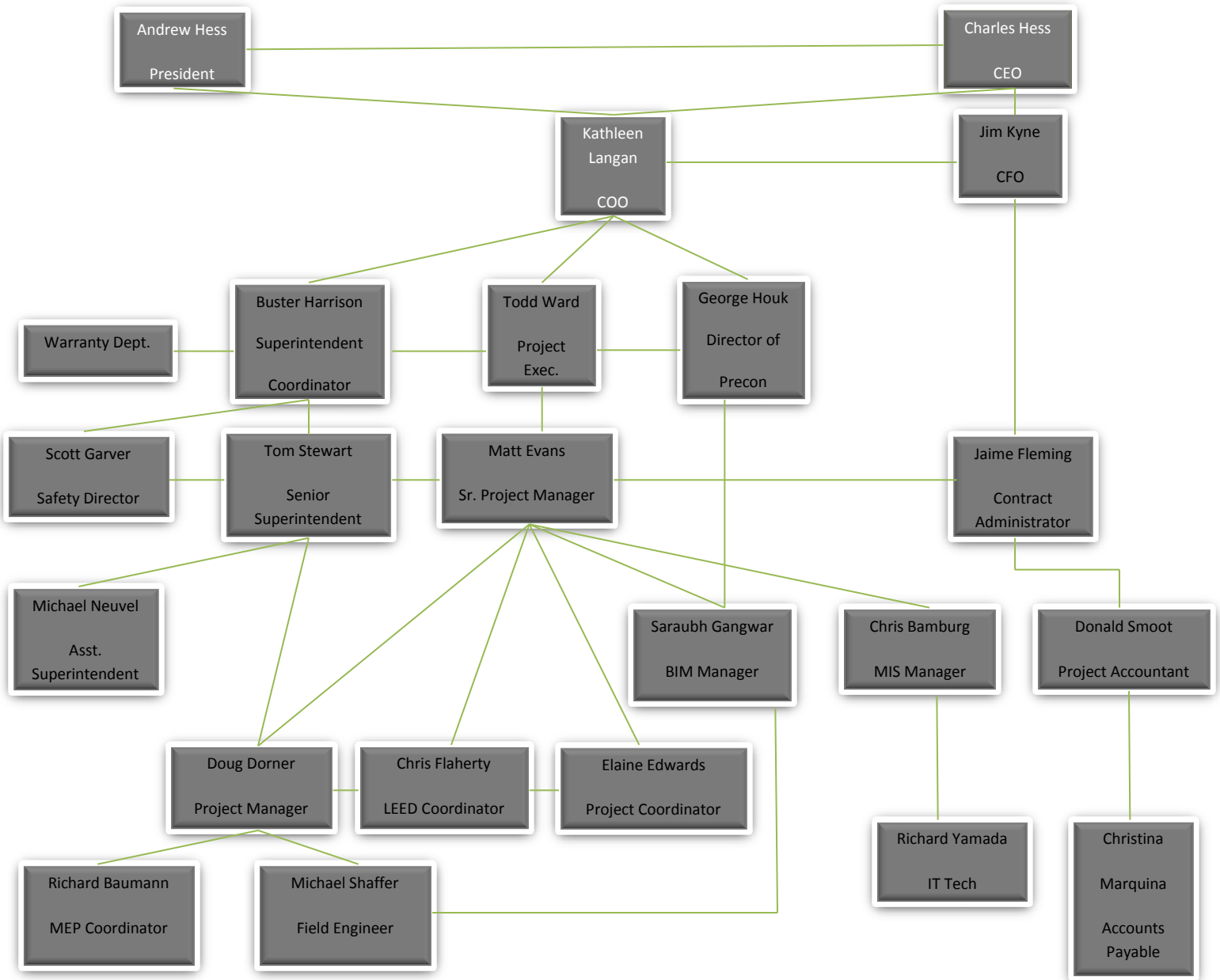
PROJECT DELIVERY



The project deliver is a modified CM at risk. Initially, Montgomery County Public Schools (MCPS) and HESS executed a purchase order agreement for preconstruction services. The preconstruction services included design review, construction document bidding, budgeting, value engineering ideas, scope and schedule development, and the bid process. After the bid process, HESS put together a GMP for the Paint Branch project and were issued a change order to the original purchase order of the preconstruction services for construction services.

The reason a modified CM at risk delivery system was used on this project is because Montgomery County Public School projects are bid publically to award the contract to lowest bidder. The contracts are then reassigned for HESS to manage. HESS and MCPS have a great relationship with each other and HESS has about two to three MCPS projects every year.

HESS STAFFING PLAN



This is the staffing plan on the Paint Branch Project. Since Paint Branch is such a large project both financially and physically, the staffing plan needed to have experience and quantity. The staffing plan includes both field personnel and office personnel on the project. Everyone in the office and on site need to work together in order to achieve overall success of the project. The staffing plan is also set up in such a manner where everyone has the opportunity to learn from other team member.

APENDIX A
PROJECT SCHEDULE SUMMARY


ID	Task Name	Duration	Start	Finish	2010				2011				2012			
					Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	
1	Notice To Proceed	0 days	Tue 12/15/09	Tue 12/15/09		▶ 12/15										
2	Pre-Construction Meetings	6 days	Tue 12/15/09	Tue 12/22/09	■											
3	Clean/Prep Site	49 days	Wed 12/23/09	Mon 3/1/10	■											
4	Excavation & Building Pad	52 days	Tue 3/2/10	Wed 5/12/10		■										
5	Critical Perimeter Wall Ftgs	16 days	Thu 5/13/10	Thu 6/3/10			■									
6	SEQ.1 Erect Steel	201 days	Thu 5/13/10	Thu 2/17/11				■								
7	SEQ. 2 Erect Steel	41 days	Fri 2/18/11	Fri 4/15/11						■						
8	3 Story Enclosure	113 days	Tue 4/19/11	Thu 9/22/11							■					
9	Aud/Gym Enclosure	99 days	Thu 6/16/11	Tue 11/1/11								■				
10	SEQ. 3 Erect Steel	73 days	Mon 6/20/11	Wed 9/28/11								■				
11	1 Story Enclosure	26 days	Mon 7/11/11	Mon 8/15/11									■			
12	Aud/Gym Rough-In	83 days	Tue 7/5/11	Thu 10/27/11									■			
13	1 Story Rough-In	29 days	Wed 8/24/11	Mon 10/3/11										■		
14	2 Story Enclosure	37 days	Fri 9/23/11	Mon 11/14/11											■	
15	1 Story Finishes	104 days	Mon 10/3/11	Thu 2/23/12												■
16	Aud/Gym Finishes	88 days	Mon 10/3/11	Wed 2/1/12												■
17	3 Story Rough-In	9 days	Fri 11/11/11	Wed 11/23/11												■
18	2 Story Rough-In	14 days	Fri 11/11/11	Wed 11/30/11												■
19	3 Story Finishes	65 days	Mon 11/28/11	Fri 2/24/12												■
20	2 Story Finishes	62 days	Thu 12/1/11	Fri 2/24/12												■
21	Final Close-out	72 days	Thu 2/2/12	Fri 5/11/12												■

Project: Tech 1 Schedule Date: Sun 10/3/10	Task		External Milestone		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Deadline	
	External Tasks		Duration-only		Progress	

APENDIX B

R.S. MEANS COST WORKS REPORT

Square Foot Cost Estimate Report	
Estimate Name:	Untitled
Building Type:	School, High, 2-3 Story with Face Brick with Concrete Block Back-up / Steel Frame
Location:	BALTIMORE, MD
Story Count:	3
Story Height (L.F.):	14
Floor Area (S.F.):	344000
Labor Type:	Union
Basement Included:	No
Data Release:	Year 2010 Quarter 3
Cost Per Square Foot:	\$106.28
Building Cost:	\$36,560,000



Costs are derived from a building model with basic components.

Scope differences and market conditions can cause costs to vary significantly.

Parameters are not within the ranges recommended by RSMeans.

		% of Total	Cost Per S.F.	Cost
A Substructure		2.80%	\$2.65	\$910,500
A1010	Standard Foundations Strip footing, concrete, reinforced, load 5.1 KLF, soil bearing capacity 3 KSF, 12" deep x 24" wide Spread footings, 3000 PSI concrete, load 100K, soil bearing capacity 6 KSF, 4' - 6" square x 15" deep Spread footings, 3000 PSI concrete, load 150K, soil bearing capacity 6 KSF, 5' - 6" square x 18" deep		\$0.68	\$235,500
A1030	Slab on Grade Slab on grade, 4" thick, non industrial, reinforced		\$1.50	\$517,500
A2010	Basement Excavation Excavate and fill, 30,000 SF, 4' deep, sand, gravel, or common earth, on site storage		\$0.05	\$17,500
A2020	Basement Walls Foundation wall, CIP, 4' wall height, direct chute, .148 CY/LF, 7.2 PLF, 12" thick		\$0.41	\$140,000
B Shell		27.70%	\$26.23	\$9,024,500
B1010	Floor Construction Steel column, W8, 100 KIPS, 16' unsupported height, 31 PLF Steel column, W10, 150 KIPS, 16' unsupported height, 45 PLF Floor, concrete, slab form, open web bar joist @ 2' OC, on W beam and column, 25'x25' bay, 29" deep, 100 PSF superimposed load, 145 PSF total load Fireproofing, gypsum board, fire rated, 2 layers, 1" thick, 8" steel column, 3 hour rating, 14 PLF		\$12.05	\$4,144,500
B1020	Roof Construction Floor, steel joists, beams, 1.5" 22 ga metal deck, on columns, 25'x25' bay, 20" deep, 40 PSF superimposed load, 60 PSF total load		\$2.12	\$728,000

B2010	Exterior Walls Brick wall, composite double wythe, standard face/CMU back-up, 8" thick, perlite core fill		\$4.64	\$1,597,000
B2020	Exterior Windows Aluminum flush tube frame, thermo-break frame, 2.25" x 4.5", 5'x6' opening, 2 intermediate horizontals Glazing panel, insulating, 1/2" thick, 2 lites 1/8" float glass, tinted		\$3.66	\$1,258,000
B2030	Exterior Doors Door, aluminum & glass, with transom, narrow stile, double door, hardware, 6'-0" x 10'-0" opening Door, steel 18 gauge, hollow metal, 1 door with frame, no label, 3'-0" x 7'-0" opening Door, steel 24 gauge, overhead, sectional, manual operation, 8'-0" x 8'-0" opening		\$0.43	\$147,500
B3010	Roof Coverings Roofing, single ply membrane, EPDM, 60 mils, fully adhered Formed roofing, zinc-copper alloy, standing seam, 2-1/2" min slope, .020" thick, 0.87 PSF Insulation, rigid, roof deck, polyisocyanurate, 2#/CF, 2" thick Insulation, rigid, roof deck, polyisocyanurate, tapered for drainage Base flashing, aluminum, .016" thick, fabric 2 sides, .025" aluminum reglet, .032" counter flashing Roof edges, aluminum, duranodic, .050" thick, 6" face		\$3.32	\$1,143,500
B3020	Roof Openings Roof hatch, with curb, 1" fiberglass insulation, 2'-6" x 3'-0", galvanized steel, 165 lbs		\$0.02	\$6,000
C Interiors		22.50%	\$21.32	\$7,335,000
C1010	Partitions Concrece block (CMU) partition, light weight, hollow, 6" thick, no finish 1/2" fire ratedgypsum board, taped & finished, painted on metal furring		\$4.17	\$1,435,000
C1020	Interior Doors Door, single leaf, kd steel frame, hollow metal, commercial quality, flush, 3'-0" x 7'-0" x 1-3/8"		\$1.33	\$459,000
C1030	Fittings Toilet partitions, cubicles, ceiling hung, stainless steel Chalkboards, liquid chalk type, aluminum frame & chalktrough		\$1.25	\$429,500
C2010	Stair Construction Stairs, steel, cement filled metal pan & picket rail, 16 risers, with landing		\$0.53	\$183,000
C3010	Wall Finishes Painting, masonry or concrete, latex, brushwork, primer & 2 coats Painting, masonry or concrete, latex, brushwork, addition for block filler Wall coatings, acrylic glazed coatings, maximum		\$2.56	\$882,000

	Ceramic tile, thin set, 4-1/4" x 4-1/4"			
C3020	Floor Finishes		\$5.81	\$1,997,000
	Carpet, tufted, nylon, roll goods, 12' wide, 36 oz			
	Carpet, padding, add to above, minimum			
	Terrazzo, maximum			
	Vinyl, composition tile, maximum			
C3030	Ceiling Finishes		\$5.67	\$1,949,500
	Acoustic ceilings, 3/4" mineral fiber, 12" x 12" tile, concealed 2" bar & channel grid, suspended support			
D Services		44.20%	\$41.79	\$14,376,000
D1010	Elevators and Lifts		\$0.64	\$219,500
	Hydraulic passenger elevator, 2500 lb., 2 floor, 125 FPM			
D2010	Plumbing Fixtures		\$4.70	\$1,616,500
	Water closet, vitreous china, bowl only with flush valve, floor mount			
	Urinal, vitreous china, wall hung			
	Lavatory w/trim, wall hung, PE on CI, 20" x 18"			
	Kitchen sink w/trim, countertop, stainless steel, 44" x 22" triple bowl			
	Lab sink w/trim, polyethylene, single bowl, flanged, 23-1/2" x 20-1/2" OD			
	Service sink w/trim, PE on CI, corner floor, 28" x 28", w/rim guard			
	Service sink w/trim, PE on CI, wall hung w/rim guard, 24" x 20"			
	Group wash fountain, stainless steel, circular, 54" diam			
	Shower, stall, baked enamel, terrazzo receptor, 36" square			
	Water cooler, electric, wall hung, wheelchair type, 7.5 GPH			
D2020	Domestic Water Distribution		\$0.85	\$292,500
	Gas fired water heater, commercial, 100< F rise, 600 MBH input, 576 GPH			
D2040	Rain Water Drainage		\$0.58	\$200,500
	Roof drain, CI, soil, single hub, 4" diam, 10' high			
	Roof drain, CI, soil, single hub, 4" diam, for each additional foot add			
	Roof drain, CI, soil, single hub, 5" diam, 10' high			
	Roof drain, CI, soil, single hub, 5" diam, for each additional foot add			
D3010	Energy Supply		\$4.21	\$1,449,000
	Commercial building heating system, fin tube radiation, forced hot water, 100,000 SF, 1mil CF, total 3 floors			
D3030	Cooling Generating Systems		\$14.39	\$4,950,500
	Packaged chiller, water cooled, with fan coil unit, schools and colleges, 60,000 SF, 230.00 ton			
D4010	Sprinklers		\$2.26	\$778,500
	Wet pipe sprinkler systems, steel, light hazard, 1 floor, 50,000 SF			
	Wet pipe sprinkler systems, steel, light hazard, each additional floor, 50,000 SF			
D4020	Standpipes		\$0.26	\$90,500
	Wet standpipe risers, class III, steel, black, sch 40, 6" diam pipe, 1			

	floor			
	Wet standpipe risers, class III, steel, black, sch 40, 6" diam pipe, additional floors			
D5010	Electrical Service/Distribution Service installation, includes breakers, metering, 20' conduit & wire, 3 phase, 4 wire, 120/208 V, 2000 A Feeder installation 600 V, including RGS conduit and XHHW wire, 2000 A Switchgear installation, incl switchboard, panels & circuit breaker, 2000 A	\$0.49		\$169,500
D5020	Lighting and Branch Wiring Receptacles incl plate, box, conduit, wire, 8 per 1000 SF, .9 W per SF, with transformer Wall switches, 2.0 per 1000 SF Miscellaneous power, 1.2 watts Central air conditioning power, 4 watts Motor installation, three phase, 460 V, 15 HP motor size Motor feeder systems, three phase, feed to 200 V 5 HP, 230 V 7.5 HP, 460 V 15 HP, 575 V 20 HP Fluorescent fixtures recess mounted in ceiling, 1.6 watt per SF, 40 FC, 10 fixtures @32watt per 1000 SF	\$9.10		\$3,131,500
D5030	Communications and Security Communication and alarm systems, includes outlets, boxes, conduit and wire, sound systems, 100 outlets Communication and alarm systems, fire detection, addressable, 100 detectors, includes outlets, boxes, conduit and wire Fire alarm command center, addressable with voice, excl. wire & conduit Communication and alarm systems, includes outlets, boxes, conduit and wire, master clock systems, 50 rooms Communication and alarm systems, includes outlets, boxes, conduit and wire, master TV antenna systems,100 outlets Internet wiring, 2 data/voice outlets per 1000 S.F.	\$3.77		\$1,298,500
D5090	Other Electrical Systems Generator sets, w/battery, charger, muffler and transfer switch, diesel engine with fuel tank, 250 kW	\$0.52		\$179,000
E Equipment & Furnishings			2.70%	\$2.55
				\$877,000
E1020	Institutional Equipment Architectural equipment, laboratory equipment, counter tops, acid proof, economy Architectural equipment, laboratory equipment, counter tops, stainless steel Architectural equipment, laboratory equipment, cabinets, wall, open Architectural equipment, laboratory equipment, cabinets, base, drawer units	\$1.71		\$589,500
E1090	Other Equipment Architectural equipment, school equipment basketball backstops, suspended type, electrically operated	\$0.84		\$287,500

Architectural equipment, school equipment bleachers-telescoping,
manual operation, 15 tier, economy (per seat)

Architectural equipment, school equipment, weight lifting gym,
universal, economy

Architectural equipment, school equipment, scoreboards, basketball,
1 side, economy

F Special Construction		0.00%	\$0.00	\$0
G Building Sitework		0.10%	\$0.05	\$18,000
G2040	Site Development		\$0.05	\$18,000
	Specialties, flagpole, on grade, aluminum, tapered, 59' high			
SubTotal		100%	\$94.60	\$32,541,000
Contractor Fees (General Conditions,Overhead,Profit)		7.00%	\$6.62	\$2,278,000
Architectural Fees		5.00%	\$5.06	\$1,741,000
User Fees		0.00%	\$0.00	\$0
Total Building Cost			\$106.28	\$36,560,000

APPENDIX C

D4 COST ESTIMATE REPORT

Statement of Probable Cost

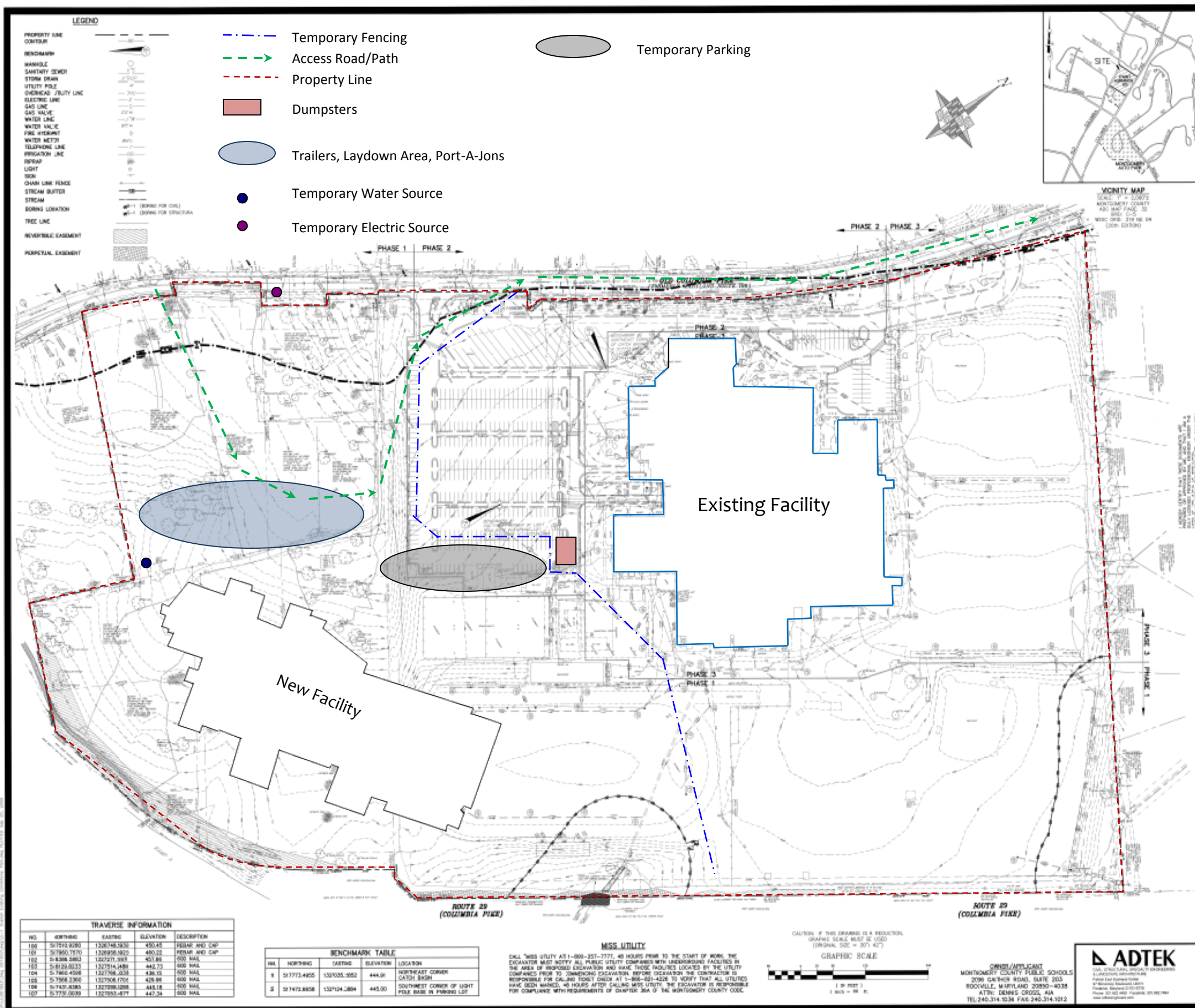
Paint Branch High School - Jan 2010 - MD - Baltimore

Prepared By:	Hollis + Miller Architects 8205 W 108th Terrace #200 Overland Park, KS 66210 Fax:	Prepared For:	
Building Sq. Size:	344000	Site Sq. Size:	12327480
Bid Date:	12/1/2009	Building use:	Educational
No. of floors:	3	Foundation:	CAS
No. of buildings:	1	Exterior Walls:	MAS
Project Height:	29.4	Interior Walls:	CMU
1st Floor Height:	14	Roof Type:	MEM
1st Floor Size:	167471	Floor Type:	CON
		Project Type:	NEW

Division		Percent	Sq. Cost	Amount
00	Procurement and Contracting Require	4.71	8.82	3,034,343
	Procurement & Contracing Req.	4.71	8.82	3,034,343
01	General Requirements	7.96	14.90	5,125,751
	General Requirements	7.96	14.90	5,125,751
03	Concrete	9.36	17.53	6,030,955
	Concrete	9.36	17.53	6,030,955
04	Masonry	13.42	25.13	8,646,347
	Unit	13.42	25.13	8,646,347
05	Metals	8.93	16.73	5,755,291
	Metals	8.93	16.73	5,755,291
06	Wood, Plastics, and Composites	3.97	7.43	2,556,830
	Rough Carpentry	3.40	6.37	2,192,964
	Finish Carpentry	0.56	1.06	363,866
07	Thermal and Moisture Protection	5.57	10.43	3,587,511
	Membrane Roofing	2.69	5.03	1,730,692
	Flashing & Sheet Metal	2.44	4.57	1,572,621
	Joint Protection	0.44	0.83	284,198
08	Openings	3.89	7.29	2,507,727
	Doors & Frames	0.84	1.58	542,846
	Specialty Doors & Frames	0.22	0.42	142,898
	Entrances Storefronts & Curtainwall	2.32	4.35	1,496,873
	Hardware	0.39	0.73	250,697
	Glazing	0.12	0.22	74,413
09	Finishes	7.49	14.02	4,822,897
	Plaster & Gypsum Board	4.16	7.80	2,682,769
	Ceilings	0.79	1.48	508,006
	Flooring	1.60	3.00	1,031,416
	Painting & Coating	0.93	1.75	600,706
10	Specialties	1.06	1.98	682,565
	Information	0.04	0.08	28,580
	Interior	0.52	0.97	334,434
	Other	0.50	0.93	319,550
11	Equipment	2.62	4.90	1,686,033
	Foodservice	1.20	2.24	772,083
	Educational & Scientific	0.04	0.07	23,259
	Athletic & Recreational	0.59	1.10	378,443
	Other	0.80	1.49	512,248
12	Furnishings	1.25	2.34	803,771
	Casework	0.80	1.49	512,698
	Multiple Seating	0.15	0.28	95,657
	Other	0.30	0.57	195,416

14	Conveying Systems	0.29	0.54	187,035
	Elevators	0.29	0.54	187,035
21	Fire Suppression	1.02	1.92	660,281
	Water-Based Fire-Suppression	1.02	1.92	660,281
22	Plumbing	3.76	7.05	2,424,620
	Piping & Pumps	3.15	5.90	2,029,213
	Fixtures	0.45	0.84	289,683
	Gas & Vacuum Systems	0.16	0.31	105,724
23	HVAC	11.17	20.93	7,198,213
	Piping & Pumps	1.91	3.57	1,228,724
	Air Distribution	2.70	5.06	1,740,144
	Decentralized HVAC Equipment	6.56	12.29	4,229,346
26	Electrical	11.70	21.91	7,536,138
	Medium-Voltage Distribution	9.43	17.66	6,075,035
	Lighting	2.27	4.25	1,461,103
27	Communications	1.83	3.44	1,182,071
	Data	1.01	1.88	647,832
	Audio-Video	0.83	1.55	534,238
Total Building Costs		100.00	187.29	64,428,378
02	Existing Conditions	0.32	0.00	40,000
	Subsurface Investigation	0.32	0.00	40,000
31	Earthwork	37.62	0.38	4,652,640
	Earthwork	37.62	0.38	4,652,640
32	Exterior Improvements	33.42	0.34	4,132,536
	Bases Bollards & Paving	15.68	0.16	1,939,366
	Improvements	8.79	0.09	1,086,545
	Planting	8.95	0.09	1,106,625
33	Utilities	28.64	0.29	3,541,335
	Water	0.81	0.01	100,024
	Wells	11.25	0.11	1,390,633
	Sanitary Sewerage	13.30	0.13	1,644,371
	Storm Drainage	3.29	0.03	406,307
Total Non-Building Costs		100.00	1.00	12,366,511
Total Project Costs		--	--	76,794,889

APPENDIX D
SITE PLAN AND EXISTING CONDITIONS



**Paint Branch High School
 Burtonsville, Maryland**

General Existing Conditions And Site Utilities Plan

Drawn By: Diab Shetayh
Date: October 4, 2010

Assignment: Technical Report 1
Advisor: Dr. Riley