

## EXISTING CONDITIONS



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## **EXECUTIVE SUMMARY**

The Health Care Center, located in central Pennsylvania, is an addition and renovation project. The existing building is owned by an anonymous boarding school and is located on its campus. Due to the increase in student population, the additions and renovation will be added on to the building to add more care for these students. The project is being carried out with Gilbane as a CM Agent. When the building was originally constructed, hazardous materials, such as asbestos and lead paint, were a part of the structure. In the buildings design, the environment was taken into consideration and the project is going for LEED certification.

In the following technical assignment topics of discussion for the Health Care Center will include the existing conditions and the construction project management. In the existing conditions section will be the projects schedule, the buildings systems and a D4 cost comparison. In this first report, the general construction sequence, the buildings systems, and the cost of the project will all be analyzed. The construction project management report will include a site plan with existing conditions, a summary of the local conditions, project delivery system and staffing plan.

Two of the most interesting parts of this building are its history and that it will be a “green” building. The history dates all the way back to the early 1900s. The Health Care Center was originally built in 1930 to care for the students of a boarding school. The boarding school was formed from a wealthy business man for children who were less fortunate. The design of the building combines the 1930s Art Deco style with today’s technology to obtain LEED certification. The building will add features like a green roof and sun shades, and on the construction side an indoor air quality plan and a waste management plan were implemented to keep the environment clean.

The project right now is in the early phase of construction. The only construction in progress is demolition and excavation. Conflicts, change orders, and other issues may arise during the projects duration due to unforeseen problems. Logistics and planning will be necessary to solve these kinds of problems. Throughout the rest of the research more interesting topics and issues will form.

## **PROJECT SCHEDULE SUMMARY**

*Please See Appendix A.1 for Schedule*

### **SOUTH ADDITION**

The project is split up into four phases and the building is split up into 6 sections, A through F (pictured in Appendix A.1). Phase one will begin in August 2006 with the demolition of existing parking lots and construction of new parking lots and the building of an access road. The first phase is to prepare for site mobilization. Phase two begins in October 2006. This year long phase will start with the demolition of the southwest corner of the existing building. From there deep excavation will begin and continue around the south addition of the building. Foundations, both footings and foundation walls, will then be reinforced and poured to prepare for the steel erection. Erection of the structural steel will take approximately 20 day. They will sequence the erection phasing by starting with section A and working in order to section F. The steel will then be plumbed and bolted. Next floor deck and roof deck will be installed and then later poured with concrete. Finishes will commence once the structure of the south addition is completed and the exterior façade is well under construction. Both MEP and interior finishes begin around the same time. MEP installation starts with risers and rough-ins and shortly after interior/exterior walls are being framed.

### **GYMNASIUM & RENOVATION**

About the time when equipment start up and commissioning are going on, the gymnasium and the renovation of the existing building are just beginning their construction (phases 3 and 4). The gym has similar sequencing to the south addition starting with FRP of the concrete foundations. The crane will be moved to another location to erect the structural steel and trusses. Once the roof of the gym is completed MEP work and interior partitions will be installed. The existing building will start off with some demolition of the HVAC system and lighting and asbestos removal. From there MEP will be installed and interior finishes including lighting fixtures, partitions, and floor finishes will also be installed. The total completion of the construction will end in June of 2008.

## **BUILDING SYSTEMS**

### **SUPPORT OF EXCAVATION**

There is no support system being used for the excavation. This is due to the fact that all excavation will be benched back. The water line determined by the geotechnical engineer was found at a depth 20' below the existing ground surface elevation. The basement level of the Health Care Center will not reach the depth of 20' below ground concluding that a dewatering system is not needed.

### **DEMOLITION**

The Health Care Center is 80% new construction and 20% renovation work making up the 100,000 SF of total construction. Due to the fact that the existing building was originally constructed in the 1930s, hazardous materials were constructed in the original design of the building. A special demolition contractor has to remove asbestos and lead paint during the renovation work of the existing building. Also, the additions have to be completed before renovation work can begin. This is because the Health Care Center must remain operational for the students. Also, all existing HVAC and lighting, including wiring, fixtures, raceways, light switches, and receptacles are to be removed from the existing building.

### **STRUCTURAL**

The frame of the Health Care Center is a typical structural steel frame. Each steel column is erected on top of cast-in-place concrete spread footings. Foundation walls will be poured in sections B and C (sections shown in Appendix A.1). Sections A and B will have basements. The rest of the buildings perimeter will have a 3 foot deep continuous footing. Also building sections C through E will have a 4" slab-on-grade. All cast-in-place concrete will use both horizontal and vertical formwork. Most of the building's framing is made up by wide flanges with metal decking and a 4" slab-on-deck. The roofing uses wide flanges in some areas and steel joists in other areas. Some examples of this are the gymnasium roof and other low roof areas. For the crane to cover all of the 100,00SF of the Health Care Center, it will be moved to three temporary locations, sitting on a concrete pad (shown in Appendix A.2).

## **BUILDING SYSTEMS**

### **MECHANICAL**

There are a total of 10 air-handling-units throughout the Health Care Center. There are three located in the basement while the other seven are on the roof. The three in the basement will serve the existing building and cafeteria area, while the other seven will serve the gymnasium, the penthouses, and the rest of the additions. Throughout the building there are exhaust fans, VAV boxes, cooling towers, and humidifiers. An Electric Control System will be operating and monitoring the air system. The mechanical system is very important for the Health Care Center. One reason being a section of the building will be used as an infirmary. The air must be clean in an infirmary to insure diseases cannot spread through the air. Another reason is that the building must maintain good indoor air quality for the building to be LEED certified.

### **ELECTRICAL/LIGHTING**

The Health Care Center's electrical system is composed up of a 500 KVA, 150 KVA and two 30 KVA dry transformers. The 500 and 150 KVA transformers are located in the basement of the building. These transformers are converting the electricity down to 120/208 V and distributing the power to panel boards located on the first and second floors. The two 30 KVA transformers are located in the penthouse area where they will be converting the electricity to 120/208V and distributing the power to panel boards around the penthouses. Most of the lighting in the building is by fluorescent light fixtures; although there are in some areas incandescent and metal halide fixtures.

### **MASONRY / FAÇADE**

All of the CMU in the Health Care Center is load bearing. The block wall will be built up along the foundation wall or continuous footing. It will be reinforced by rebar then grouted. Then there is brick veneer that will be tied into the CMU by anchor ties. There will be an air cavity between the CMU and brick. Most of the building has a brick façade except where the penthouse and cafeteria are. The penthouse has aluminum siding and the cafeteria has aluminum clad windows sitting on CMU block and brick veneer.

## **D4 COST EVALUATION**

The D4 program was used to compare two existing medical buildings to the Health Care Center (see chart on next page). The Health Care Center was estimated to cost \$223/SF. The first was Memorial Medical Center, located in Livingston, TX. This is a two floor, 105,269 SF medical building. Memorial Medical Center costs \$246/SF. When comparing these numbers they tend to differ in many areas. Like in the conveying systems, Memorial has a higher cost because it has three elevators, where the Health Care Center only has one. When looking at the concrete costs the Health Care Center is much higher. A reason for this can be that the Memorial Medical Center has no basement. A lot of concrete gets poured into the foundation walls for the basement of the Health Care Center.

The other medical building that was compared to the Health Care Center is Stormont-Vail Surgery Addition and Renovation. This project was chosen to be compared to the Health Care Center because both projects are addition and renovation jobs, even though Stormont is a little bit bigger. Stormont is a four floor 163,825 SF big, medical facility located in Overland Park, KS. Stormont's cost came out to be \$158/SF. The numbers seem to be very similar with only a few differences in some areas. On significant difference in pricing is the cost per SF. The Health Care Center is \$223/SF which is higher than Stormont because of the location. Construction costs are more expensive in central Pennsylvania than in Kansas. Another comparison is in the equipment cost. The Health Care Center has an addition of a gym. The equipment for the gym including the bleachers and basketball nets add additional cost to the medical equipment that is installed in both buildings.

## D4 COST EVALUATION

Construction Costs	Memorial Medical Center			Stormont-Vail Surgery ADD/REN			Health Care Center
	%	SF Cost	Projected	%	SF Cost	Projected	Projected
General Requirements	14.72	22.52	2,370,954	5.46	8.20	1,343,473	746,804
Site Work	100	4.20	2,039,421	100	0	1,345,832	1,608,840
Concrete	6.07	9.29	977,717	9.05	13.60	2,227,416	2,824,228
Masonry	4.77	7.30	764,262	4.76	7.16	1,172,172	1,284,748
Metals	8.16	12.49	1,314,794	8.61	12.95	2,120,977	2,000,000
Woods & Plastics	2.27	3.47	365,413	4.53	6.81	1,115,375	626,155
Thermal & Moisture Protection	5.98	9.16	963,955	10.05	15.10	2,474,014	1,150,286
Doors & Windows	3.27	5.00	526,107	3.48	5.32	857,086	699,055
Finishes	10.93	16.73	1,761,133	8.82	13.26	2,172,082	2,568,766
Specialties	0.93	1.43	150,174	0.49	0.74	120,593	190,700
Equipment	3.34	5.11	538,078	0.24	0.36	58,544	404,320
Furnishings	0.12	0.19	19,624	0.15	0.22	35,825	890,000
Special Construction	-0.25	-0.38	-39,618	0.65	0.97	159,250	105,000
Conveying Systems	1.05	1.60	168,517	2.48	3.72	609,846	46,000
Mechanical	28.38	43.44	4,572,556	29.43	44.23	7,246,269	4,274,515
Electrical	10.29	15.75	1,657,747	11.82	17.77	2,911,246	2,933,448
<b>TOTAL</b>			<b>18,150,834</b>			<b>25,970,000</b>	<b>22,352,865</b>

## **R.S. MEANS SF ESTIMATE**

The following information was based off of the computer program Cost Works. The following are a list of assumptions that were chosen in the program to come up with the square foot estimate of the Health Care Center:

- Hospital, 2-3 stories
- Steel Frame
- Face brick with concrete block back up
- 100,000 SF

Cost Works estimated a material cost of \$10,530,000 and \$8,950,000 of labor cost equaling a total construction cost of \$19,480,000. The estimated project cost using Cost Works is \$195/SF. As mentioned in the D4 cost evaluation, the Health Care Center cost is \$223/SF. Some differences in pricing may be that the Health Care Center has a gymnasium and cafeteria. These extra equipment costs will have an increased value in the construction cost. Also, Cost Works assumes that the entire buildings façade is of face brick. The Health Care Center's façade also includes aluminum siding.

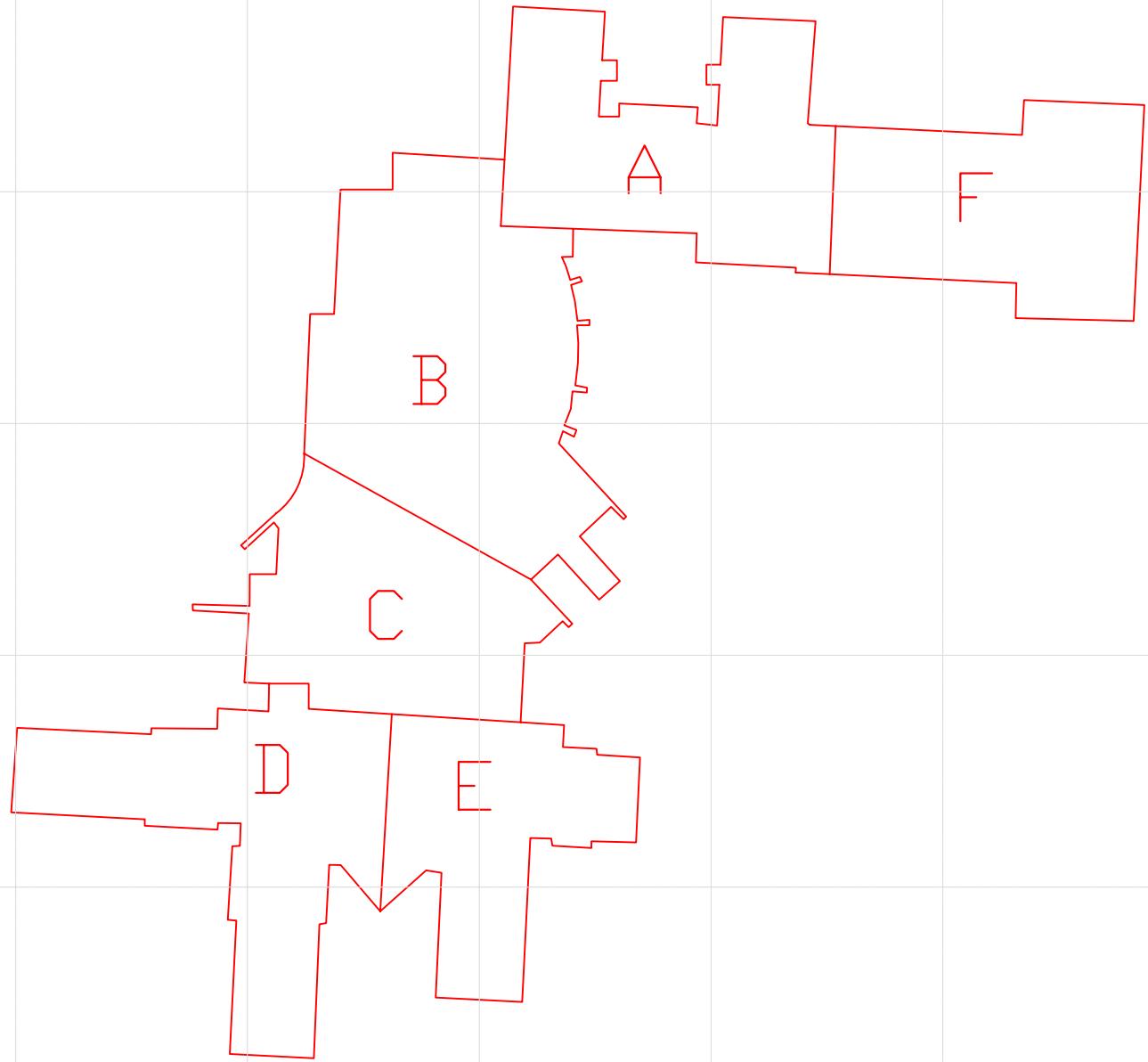



## APPENDIX A.1

### Project Schedule

Activity ID	Activity Name	Duration	Start	Finish	2006												2007												2008												2009																				
					J			J			A			S			O			N			D			J			F			M			A			M			J			J			A			S			O			N			D		
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52					
<b>Heath Care Cen...</b>					562	13-Jun-06	14-Aug-08	14-Aug-08, Heath Care Center																																																					
0260	DESIGN PHASE	72	13-Jun-06	22-Sep-06	DESIGN PHASE																																																								
0010	MOBILIZE / SE...	16	17-Aug-06	08-Sep-06	MOBILIZE / SET UP SITE																																																								
0270	PROCUREMENT	77	24-Aug-06	13-Dec-06	PROCUREMENT																																																								
0020	SITE UTILITIES	30	08-Sep-06	19-Oct-06	SITE UTILITIES																																																								
0030	EXCAVATION ...	36	13-Nov-06	05-Jan-07	EXCAVATION & FOUNDATION																																																								
0040	STRUCTURAL ...	35	08-Jan-07*	23-Feb-07	STRUCTURAL STEEL / CONCRETE ON DECK																																																								
0050	ROOF	70	19-Feb-07	25-May-07	ROOF																																																								
0060	UNDERSLAB U...	39	26-Feb-07	19-Apr-07	UNDERSLAB UTILITIES / SLAB ON GRADE																																																								
0070	EXTERIOR FA...	75	26-Feb-07	08-Jun-07	EXTERIOR FACADE																																																								
0080	M.E.P. ROUGH...	265	20-Apr-07	24-Apr-08	M.E.P. ROUGH INS / FINISHES																																																								
0090	INTERIOR ARC...	255	04-May-07	24-Apr-08	INTERIOR ARCHITECTURAL FINISHES																																																								
0100	FA / DEVICES ...	225	15-Jun-07	24-Apr-08	FA / DEVICES TERMINATIONS / LOCAL INSPECTIONS																																																								
0110	ELEVATORS	70	25-Jun-07	28-Sep-07	ELEVATORS																																																								
0120	FOOD SERVIC...	55	10-Aug-07	25-Oct-07	FOOD SERVICES EQUIPMENT / TEST / L&I INSPECTION																																																								
0130	MECHANICAL ...	50	24-Aug-07	01-Nov-07	MECHANICAL EQUIPMENT START UP / COMMISSIONING																																																								
0140	GYM FOUNDA...	20	12-Oct-07	08-Nov-07	GYM FOUNDATIONS																																																								
0210	ASEBESTOS &...	30	02-Nov-07	13-Dec-07	ASEBESTOS & DEMOLITION																																																								
0150	STRUCTURAL ...	20	09-Nov-07	06-Dec-07	STRUCTURAL STEEL (GYM)																																																								
0160	ROOF	15	07-Dec-...	27-Dec-07	ROOF																																																								
0220	M.E.P. ROUGH...	50	14-Dec-07	21-Feb-08	M.E.P. ROUGH INS AND FINISHES																																																								
0170	M.E.P. ROUGH...	55	28-Dec-07	13-Mar-08	M.E.P. ROUGH INS / FINISHES																																																								
0230	INTERIOR PAR...	45	15-Feb-08	17-Apr-08	INTERIOR PARTITIONS & FINISHES																																																								
0180	INERIOR PART...	50	22-Feb-08	01-May-08	INERIOR PARTITIONS AND FINISHES																																																								
0190	M.E.P. START ...	25	04-Apr-08	08-May-08	M.E.P. START UP & COMMISSIONING																																																								
0200	GYM EQUIPME...	30	18-Apr-08	29-May-08	GYM EQUIPMENT																																																								
0240	PUNCH LIST	25	27-Jun-08	31-Jul-08	PUNCH LIST																																																								
0250	FINAL SIGN OFF	5	08-Aug-08	14-Aug-08	FINAL SIGN OFF																																																								

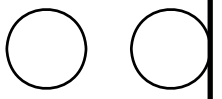
█ Actual Work     █ Critical Remaining ...  
█ Remaining Work     ◆ Milestone




 ERECTION SEQUENCE  
 SCALE: N.T.S.



CREATED BY:  
 KEN LORENZ



**HEALTH  
 CARE  
 CENTER**

OWNER:  
 ANONYMOUS  
 LOCATION:  
 DAUPHIN COUNTY, PA

MARK	DATE	DESCRIPTION

PROJECT NO.	PROJECT
AS BUILT FILE	FILE
DRAWN	DRAWN
CHECKED	CHECKED
DATE	TITLE