TECHNICAL ASSIGNMENT ONE

PENN STATE AE SENIOR THESIS

PENN STATE MILTON S. HERSHEY MEDICAL CENTER
CHILDREN'S HOSPITAL
HERSHEY, PA 17033

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PENNSTATE HERSHEY Milton S. Hershey Medical Center
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PAYETTE
Gannett Fleming
BR+A

EXECUTIVE SUMMARY

Technical Assignment One involves an investigation of the various aspects of design and construction of the $115 Million 262,587 SF Penn State Milton S. Hershey Medical Center Children's Hospital located in Hershey, Pa. This project consists of a state of the art facility that will serve the Children of the Central Pennsylvania Region. The Construction of this Hospital will be very complex due to the owner's strict material delivery times as well as the location of the project site sitting between two existing Hospital Building with critical care units looking over the jobsite.

Information regarding the project milestones during the construction period is shown within the report depicting some of the major activities associated with constructing the building and completing it by August 20, 2012. A thorough investigation of the primary systems specifically designed for this facility has been conducted and summarized to provide background information regarding the design-intent and constructability. Actual project costs has been evaluated using computer based software to provide a depth look at some aspects of the building that have been designed above industry standards to meet the needs and quality of healthcare required for the patients. Due to this Project being located in a Medical Campus, an existing and local condition investigation has been conducted to determine the project restrictions set by the daily activities on campus. A client investigation has been conducted to study the owner's goals and expectations for this project as well as concerns regarding the project schedule and budget. Finally, the project delivery system is been described showing how the project team will cooperate and work side by side to deliver this project and satisfying the owner's goals and expectations.

The purpose of this initial analysis is to set ground off of which all further research topics will be based on. Understanding the basic building systems, construction schedule, and associated costs sets ground for thesis research topics to be further investigated such as improved construction means and methods, value engineering ideas, schedule acceleration methods, and process improvement.

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PROJECT SCHEDULE SUMMARY

**** See APPENDIX A for the Project Summary Schedule***

The construction schedule for the Penn State Hershey Medical Center Children's Hospital is relatively straight forward despite the complexity of the project. L.F. Driscoll, Co officially signed their GMP contract with the Penn State Hershey Medical Center on **3/8/2010** and broke ground on **4/12/2010** and is scheduled to be completed on **4/5/2010.** Having an almost complete set of drawings prior to construction has been a great success for L.F. Driscoll due to their ability to schedule activities and plan logistics early prior to breaking ground. This led the CM to not expect any major additions in the scope as they have already considered the new Bulletins to be issued with two new shell space fitouts. Shortly after receiving an official Notice to Proceed on **3/17/2010,** L.F. Driscoll mobilized with three Construction Trailers at the Job Site main gate access area.

Foundation Sequence

The Foundation system consists of a variety of structural elements such as (micropiles, pile caps, grade beams, column piers, and foundation walls). Following the excavation of the jobsite, it was necessary to shore the south side of the project with a beam lagging system to support the excavation from trenching downwards. On the north side of the project lays the Cancer Institute Building where soil nailing and shotcrete was a must to insure the foundation system of the Cancer Institute was not influenced. Micropile drilling and grouting activities began as soon as the support of the excavation was completed starting from the North-West corner of the building and working downwards toward the south side and then moving across the length of the building reaching the east side as shown in *Image 1*. Half way through the micropile drilling, the Concrete Subcontractor phased the work to insure that the pile caps commenced whenever ready followed by grade beams, foundation walls, and column piers.

Structural Sequence

As the Foundation system approaches completion, the structural steel erection begins. A tower crane overlooking the entire site will pick the column and beam members into the desired locations. The sequencing of the structural steel will be as shown in *Image 2*. Once the first level of structural steel is in place, the SOG will be poured in 3 sections as shown in *Image 3*. Metal decks will immediately be placed as soon as the column pieces supporting the next level are in place. There will be a high priority of pouring the 5th floor's slab first so that the mechanical room area is

ready to have all the equipment boomed into place prior to inclosing the building. This will enable the contractor to begin the fitout of the building in a top-down fashion.

Finishing Sequence

As mentioned in the structural sequence; the finishing sequence of the building will be in a top-down method. All trades will be working on the highest level and downward until they exit the building. This method insures minimum damage, cleanup, and re-work as the GC is able to fully punchout and close the whole floor once completed and move down to the lower level.

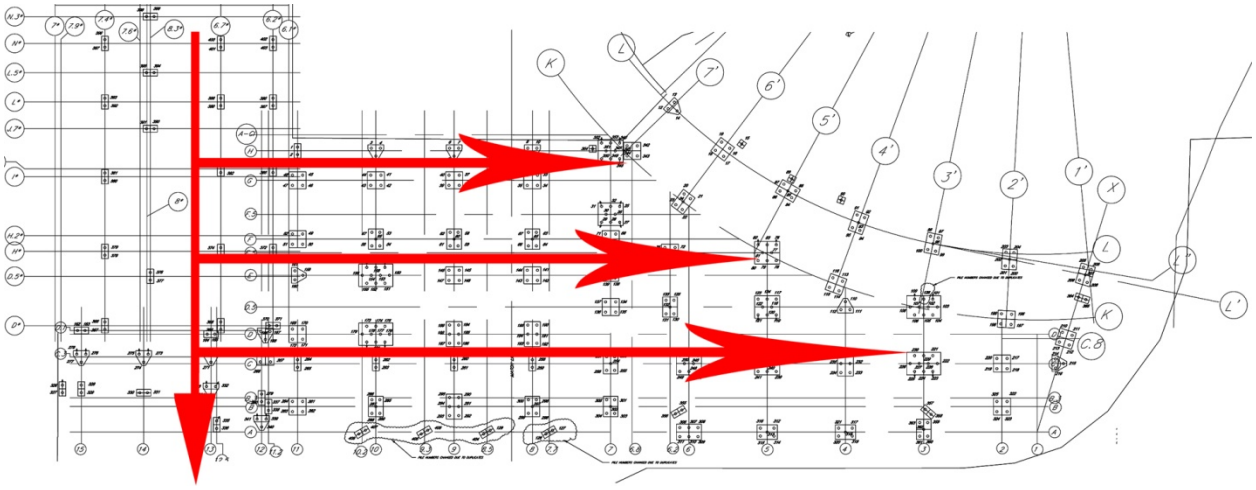


IMAGE 1 Micropile Drilling/Grouting Workflow

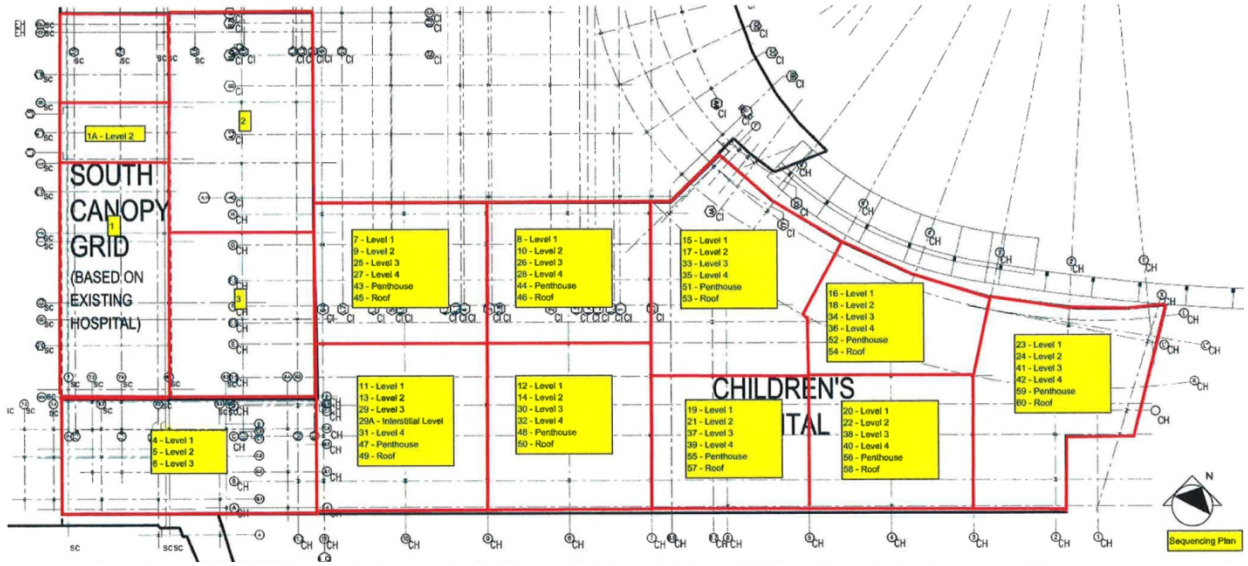


IMAGE 2 Structural Steel Erection Sequence

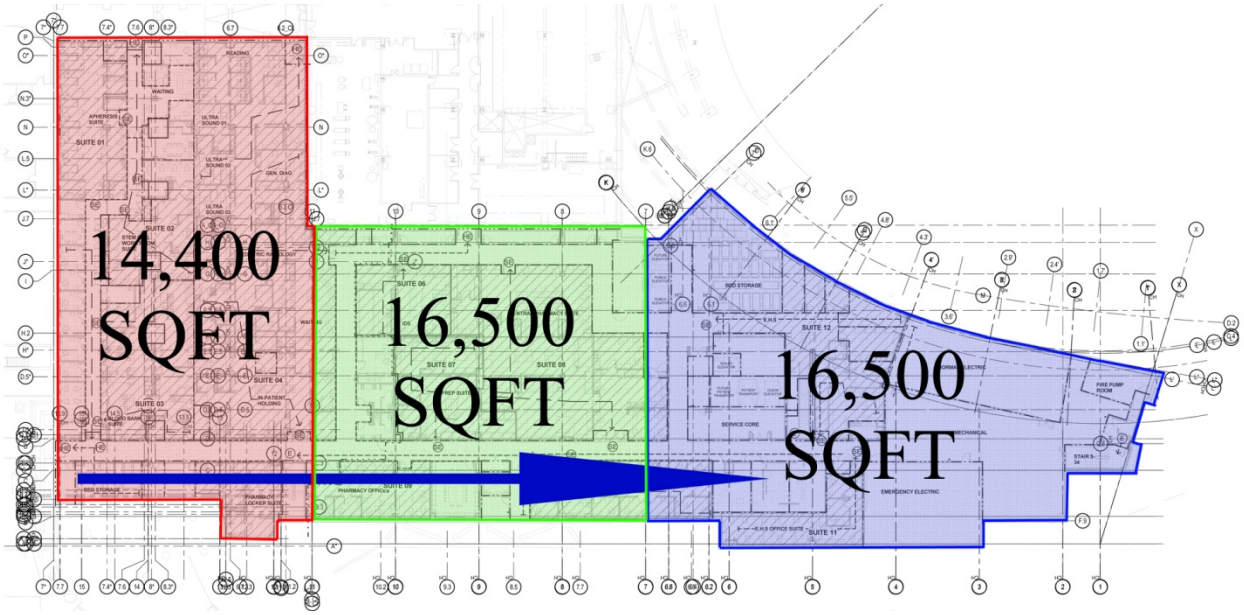


IMAGE 3 SOG Pouring Sequence

Building Systems Summary

YES	NO	SCOPE OF WORK
X		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 Excavations

Demolition

The Children's Hospital will not be involved in critical demolitions. The abandonment and removal work as specified is not intended to be a major wrecking operation but as a preparatory work relative to the performance of the various construction operations of the project. Some of the major demolition activities will include the demo of existing grade beams, plugging and filling existing utilities, removal of valves, removal of hydrants, removal of water fountain, removal of electric services and ductbank including vaults, handholes, and transformers.

Structural Steel Frame

The structural steel framing of the Children's Hospital is designed as a type 2, simple framing with composite steel decks for the elevated slabs. The structural system including the infrastructure has been designed to accommodate two additional full sized floors for future expansion of the Children's Hospital. The majority of the structural steel is composed of W-shaped beams and columns detailed with high-strength bolts as well as field welds for moment connections.

Beam Sizes Range From: W16x26 to W24x55 mostly spanning about 40 feet.
Girder Sizes Range From: W16x26 to W27x84 mostly spanning about 34 feet.
Column Sizes Range From: W10x33 to W14x233 with splices every other floor. (See *Image 4* for Column splices).
The Structural steel Package is to be erected sequentially using a stationary tower crane that overlooks the entire jobsite.

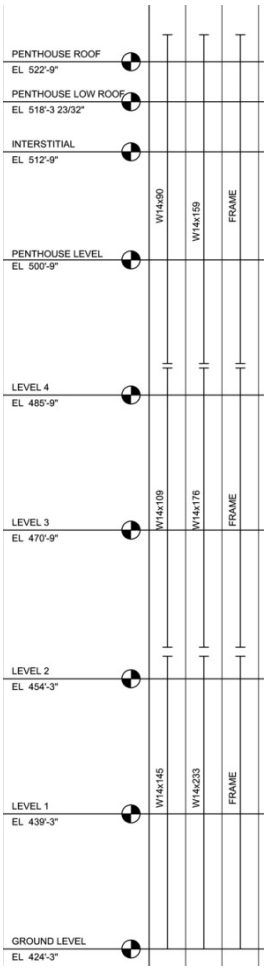


IMAGE 4 Column Schedule

Cast in Place Concrete

The majority of the concrete used throughout The Children's Hospital is Cast-in-Place concrete. CIP Concrete is used for micropiles, pilecaps, concrete walls, grade beams, wall footings, piers, SOG, as well as the elevated slabs. All CIP concrete is to be air entrained with 4000psi at 28 days. The SOG is to be placed on top of 6" compacted Penndot 2A Coarse aggregate. The slab on grade is primarily a 6 inch thick slab with 5" and 8" transitions in some areas. On the other hand, the elevated slabs consists of a (2" deep, 20 gage composite metal deck with a 4-1/2" thick topping slab reinforced with 6x6 W2.1xW2.1 WWF) a total of 6-1/2" thick slabs. In many cases the concrete will be pumped using the pump trucks while in many other cases the trades will use the traditional crane and bucket method.

Mechanical System

The HVAC system at the Children's Hospital is primarily a VAV system consisting of 5 major Air Handling Units located in the Penthouse level. The air handlers feed the building with 100% outside air due to the facility being very critical. The total output of the air handlers is around 350,000 CFM providing the Children's Hospital adequate and proper air circulation. Each air handler is equipped with two fans each supplying 35,000 CFM. The AHU's are all connected to an emergency power system which will run a single fan per AHU in case of an emergency. All air handlers will be mounted on a 4" concrete pad.

The primary chilled water pumps are located at the ground floor level. Each pump is rated at 3300 GPM 88.3 BHP at 1750 RPM. On the other hand, the two primary hot water pumps located at the penthouse level are rated at 1200 GPM 35.8 BHP at 1750 RPM.

Electrical System

The Penn State Hershey Medical Center provides two high voltage loop circuits that feed the entire campus. The new Children's Hospital will run on a15 KV feeder that branches off from the primary campus loop. Feeding power to the hospital will be a 13.8 KV "K" Factor Dry Type Transformer running a 3 phase (4-wire) 480/277V circuit. The emergency backup power will be provided by a natural gas-powered generator.

The lighting system for the Children's Hospital varies across the different areas of the building. Each area will be served with specific light fixtures that will satisfy the aesthetics as well as efficiency in lighting up the spaces. All fluorescent fixtures are to be utilized with T8 lamps and electronic

ballasts. In case of compact fluorescent fixtures, all ballasts must be high power factor ballasts with end of life sensing circuitry.

The Children's Hospital lighting fixture schedules include over a hundred different types of fixtures. The fixtures range from general troffers and pendants to high end surgical room fixtures.

Masonry

The Façade of the Children's Hospital does not incorporate veneer brick. The Façade primarily consists of Limestone and Granite Cladding, an Aluminum curtain wall, and metal panels. The exterior façade is however backed up by 6" concrete masonry units (CMUs) with air and vapor barriers as well as air cavities (see *Image 5* for a wall detail).

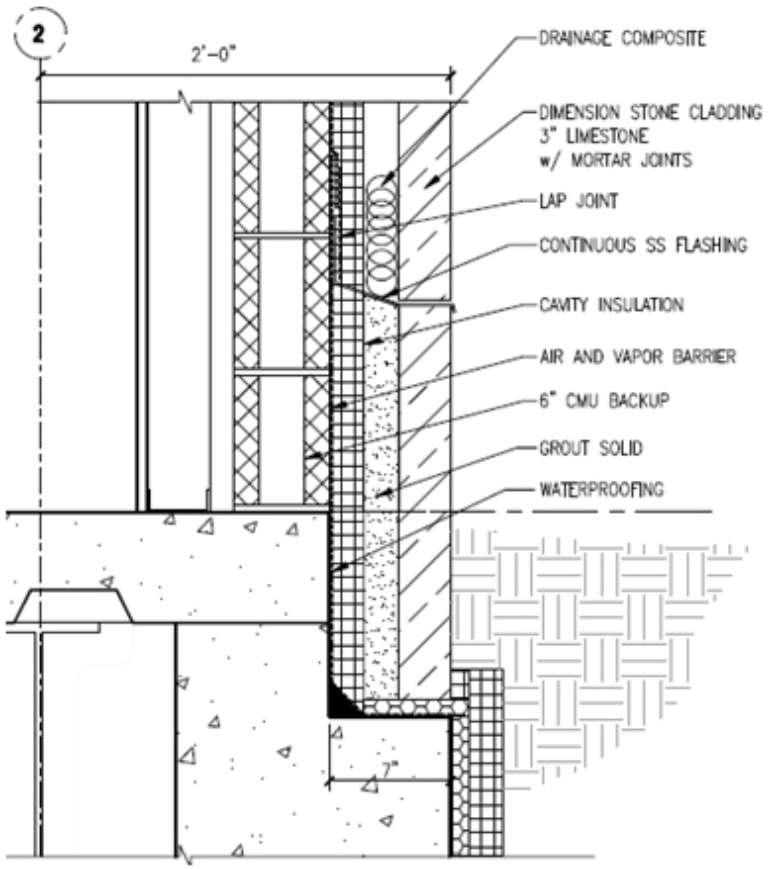


IMAGE 5 Exterior Wall Detail

Curtain Wall

The aluminum curtain wall designed by Payette Associates is aimed to be identical to the system currently existing in the adjacent Cancer Institute Building. Although the design was completed by Payette Associates, connections details are to be submitted by the curtain wall subcontractor i.e. National Glass and Metal Co, INC. This was primarily due to the custom requirements the owner is looking for in the curtain wall system. The Mullions are to incorporate special LED lighting to give a very modern look for a state of the art hospital

Support of Excavation

The Children's Hospital is a complex project in many different ways. Due to the building adjacencies the Structural Engineers had to carefully design the support of excavation systems. Just north of the Excavation lies the new Cancer Institute Building at the Hershey Medical Center, and to the South lies an adjacent road about 100 feet from the excavation wall. Since the Cancer Institute Building is currently occupied, the design of the excavation support mandated that a wall tie back system be installed into the soil to support the foundation system of the adjacent building. Upon completion of the wall tie back system, the contractor had to shotcrete the entire excavation wall (see *Image 7* for a soil nailing detail). This labor intensive system was designed over the design loads to add an extra margin of protection for the adjacent Hospital. On the southern side however, the Engineers designed a Soldier Pile Wall system to support the service road on top of the excavation wall. This method was chosen so that the contractor can use up to 250 psf of loads on top of the excavation (see *Image 6* for acceptable loads on the soldier pile wall).

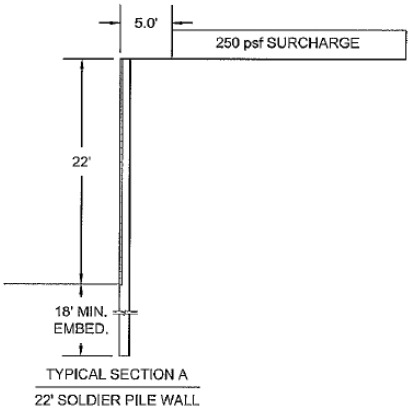


IMAGE 6 Soldier Pile System (Acceptable Load on wall)

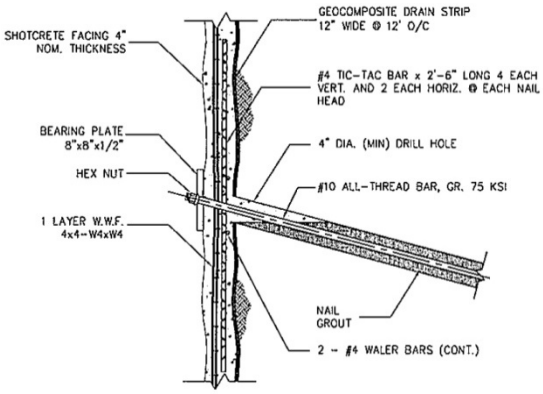


IMAGE 7 Soil Nailing Detail

PROJECT COST EVALUATION

This Section will address the actual project costs and compare it to two different parametric estimates to determine the accuracy of the available estimating resources.

Table 1 : Gross Building Area by Floor	
Ground Floor	56,785 SF
1st Floor	48,733 SF
2nd Floor	40,594 SF
3rd Floor	38,071 SF
4th Floor	38,136 SF
5th Floor	37,052 SF
Mechanical Mezzanine	3,216 SF
TOTAL	**262,587**

Table 2 : Basic Overall Cost Information		
Type	**Cost ($)**	**Cost/SQFT ($/SQFT)**
Construction (CC)	$92,139,328	$350.89
TOTAL (CC)	$115,726,613	$440.72

Table 3 : Major Building System's Cost	
System Name	**System Cost**
Micropiles & Shoring	$1,750,000
Earthwork, Paving & Site Utilities	$1,457,990
Cast-In Place Concrete	$3,555,788
Stone and Masonry	$1,623,000
Structural Steel	$5,597,000
Metal Fabrications	$1,007,700
Spray Fireproofing	$444,000
Composite Metal Panels	$2,474,192
Roofing and Garden Roofs	$2,242,916
Doors, Frames & Hardware	$1,074,800
Aluminum, Glass & Glazing	$5,230,360
Carpentry, Drywall & Acoustical	$6,898,700
Elevators	$1,997,500
Fire Protection	$1,119,118
Plumbing	$5,760,000
HVAC System	$18,823,506
Electrical System	$18,602,000

D4 Cost Estimate

**** See APPENDIX B for D4COST Estimate Reports***

D4 cost estimating software provides a unique way of developing a parametric estimate. Estimates using D4 Cost can take up to 10 minutes to come up with a complete Probable Cost. However, the results can be very close to the actual costs but at the same time could be way off. To develop the parametric estimate for the Children's Hospital, two different case studies were used to relatively test the accuracy of this software. The following lists the two different case studies used.

- Case # MD970139 - Connecticut Children's Hospital - 332,979 SF - $53,764,000.00
- Case # MD051124 – Winship Cancer Institute – 260,000 SF - $54,938,683.00

NOTE: When determining the cost estimate, all values from the original case study needed to be adjusted to match the values of the Children's Hospital (i.e. construction dates, building square footage, etc.)

The Following table briefly summarizes the parametric estimate that was developed using the D4 cost estimate.

Table 4 : D4 Parametric Estimate Summary

Case #	MD970139	MD051124
Case Name	Connecticut Children's Hospital	Winship Cancer Institute
Floor Area	262,587	262,587
Cost/SF	**$279.86/SF**	**$379.20/SF**
Construction Cost	**$73,488,886.00**	**$99,571,196.00**

RS Means Square Foot Estimate

**** See APPENDIX C for RS Means Costworks 2010 SF Estimate Reports***

The RS Means cost estimate was developed using Costworks online software from the Means website. This square foot estimate study was based on a steel framed 4-8 Story Hospital building with concrete block back-up. The estimate was developed with a location adjustment factor specified for Harrisburg, Pa since Hershey, Pa was not listed. All values used in the software are as of 3rd Quarter of 2010.

Table 5 : RS Means Estimate Summary

Stories	5 Stories + Basement
Perimeter	1316 LF
Story Height	16 LF
Floor Area	262,587 SF
Cost/SF	**$197.88**
Construction Cost	**$51,961,000**

COST COMPARISON

Table 6 : Actual vs. Estimate Summary

Estimate Type	ACTUAL	D4COST#1	D4COST#2	RS MEANS
Cost/SF	$350.89/SF	$279.86/SF	$379.20/SF	$197.88
Construction Cost	$92,139328	$73,488,886	$99,571,196	$51,961,000
Delta	**0**	**-$18,650,442**	**+$7,431,868**	**-$40,178,328**

Upon completion of all parametric estimates, it can be clearly seen that values from the D4COST software as well as RS MEANS have been dramatically lower than the actual construction costs aside from D4COST#2 where the estimate was higher. This comparison was based on construction costs rather than total project costs due to the fact that RS MEANS does not account for site work, fees, contingencies, insurance, etc. To be able to compare the estimated costs it was logical to be consistent in what values to compare.

The D4COST estimating software produced a significantly lower cost in both cost per square foot as well as construction costs (see table 6 for values). Upon developing the first estimate, a significant difference in construction cost was noticed. The estimate was short by around $18.65 Million which sparked a high concern in the accuracy of the estimate. Due to this huge margin of error, a second case study was used and developed an estimate that was off by around $7.43 Million. After many failed attempts, it was concluded that it is nearly impossible to get a close rough of magnitude

estimate using this software. This is by no means due to the weakness of the software; however, upon analyzing the case studies provided by the software, it was determined where the error might have been. It is well known that no building has the same exact features as another; hence, it is extremely difficult to compare an existing building with a new building that has been designed with totally different systems. The Children's Hospital design was completed in mid of 2009. Comparing a new state of the art Children's Hospital with very unique systems to a hospital that was completed in the 1990's would be the first hint as to where the error was. The new Children's Hospital incorporates many new systems that did not exist 15 years ago. Hence, there is no chance of even being close to what the actual value is. There might have been a better luck at using D4COST if the case studies were updated to reflect today's technologies and complicated systems.

The estimate from RS MEANS also produced a very significant low cost. In fact, RS MEANS produced the lowest value which differed from the actual construction cost by about $40.17 Million. Upon analyzing the cost reports from RS MEANS, it was very easy to identify the cause of this error. When selecting the hospital building for comparison, there was no way of choosing a structural and façade system that is similar to the Children's Hospital. What triggered the huge difference was the fact that the Children's Hospital was designed to accommodate two additional future floors. This means that the entire structural, mechanical, and electrical systems have been over designed to support the future additions. Those overdesigned systems point out the biggest factor that affected the RS MEANS estimate. In addition to that, the Children's Hospital incorporates state of the art furniture and casework systems as well as enormous curtain wall system, and many other systems that were not accounted for in RS MEANS. Such differences caused the cost estimate to have significant lower costs.

In conclusion, although the cost estimating software produces estimates relatively quickly, they are by no means meant to be accurate. Such softwares are not able to comply their data with the unique systems available in different buildings. There will always be significant margins of error; however, if used cautiously, a rough estimate can be developed to have a sense of the associated costs with a new building. To develop a more accurate estimate, it is of better practice to use historical data within a company as well as taking the time to take detailed quantity take-offs of all the systems to determine the actual market rates.

SITE PLAN OF EXISTING CONDITIONS

**** See APPENDIX D for Existing Conditions Site Plan***

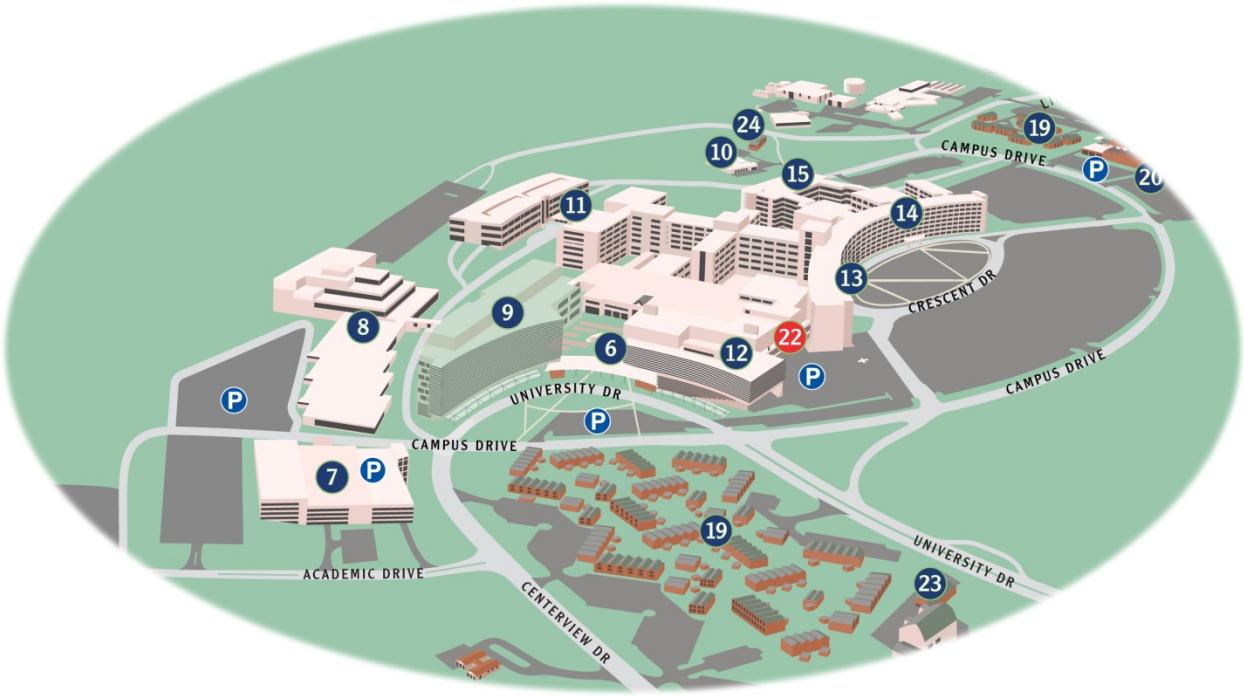


IMAGE 8 PSU HMC Campus Map

The site for the new Children's Hospital is surrounded by 2 major buildings. Just north of the Children's Hospital lays the existing Cancer Institute Building that directly joins with the new Children's Hospital. On the west side the Children's Hospital joins with the existing Main Hospital Building. The new Children's Hospital is the latest addition to the expansion of the medical center's state of the art health care. The site has been disturbed during the construction of the Cancer Institute and some foundation elements have been already in place by the previous contractor. Among the major issues with the building site are vehicular access, tower crane operations, and the Main Hospital's Helicopter paths. The mentioned issues will be thoroughly explained in the next section *Local Conditions*.

LOCAL CONDITIONS

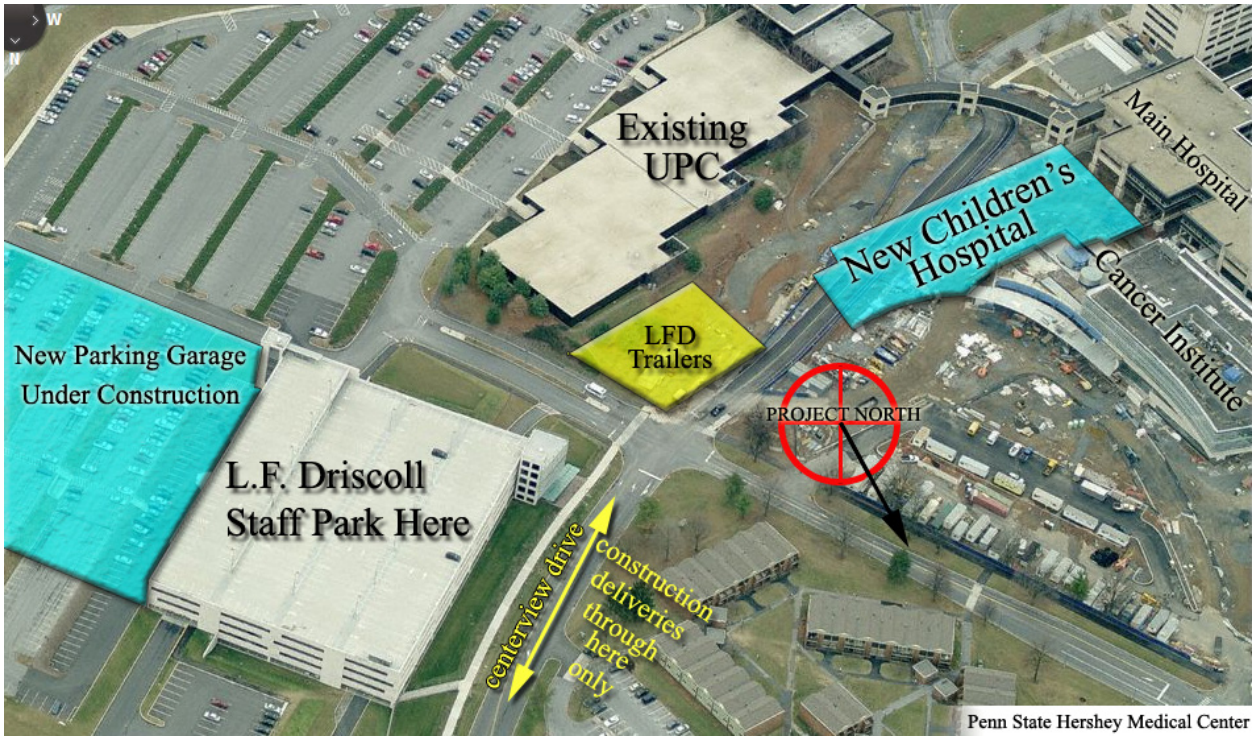


IMAGE 9 PSU HMC Campus Bird's Eye View (Courtesy of bing.com)

The new Children's Hospital is located on 500 University Drive in Hershey, Pa. Spread out over a 550-acre campus, Hershey Medical Center serves the Central Pennsylvania area. The Penn State Campus is commonly known for using structural steel for structural systems on most campus buildings. Due to the vast area of the HMC campus, the project site has access to numerous areas for subcontractor trailers as well as lay down areas. The main concern is the safety of the vehicular and pedestrian traffic throughout the campus due to the daily activities at the existing hospitals, student dormitories, and the school of medicine. As shown in *Image 9* the new addition shown in blue is being constructed between the Cancer Institute, Main Hospital, and the UPC Buildings. Due to the congested area where the new addition is located, the L.F. Driscoll trailers will be the only ones next to the project site with minimal parking area. to resolve this issue, the Office of Physical Plant granted access for all LFD personnel to park at the existing parking deck while all subcontractors park just south of the new parking garage expansion. The subcontractors will also be able to setup all trailers just south of the new parking garage.

The Geotechnical investigation of the project site was conducted by CMT Laboratories, INC. A total of 21 test borings were taken. Of the 21 test borings, 7 borings encountered ground water at approximately 47 feet into the soil. According to the report, the ground water encountered was perched or trapped water above underlying limestone bedrock and not indicative of ground water table. Bedrock is COMPOSED of very finely crystalline medium-grey limestone interbedded with dolomite. Bedrock is moderately resistant to weathering and is slightly weathered to a shallow depth.

Actual costs of trash removal at Hershey, Pa were not able to be identified. L.F. Driscoll has however accounted for it in their general conditions budget. The project budgeted for trash removal once a week for a total of 138 weeks. L.F. Driscoll considered 3.5 units at a rate of $650 per week for a subtotal of $313,950 over the life of the construction project.

CLIENT INFORMATION

Children's Hospital is the latest addition to the Hershey Medical Center campus. Penn State Hershey, a branch campus for The Pennsylvania State University, owns the new Children's Hospital. Penn State Hershey broke ground in 1966 upon approval from Penn State to establish a new Medical School, teaching hospital, and research centers. Since 1970, Penn State Hershey expanded from 218 acres to 550 acres. Today, the Hershey Medical Campus has carefully planned and constructed state of the art buildings that reflect the steady increase in patient demand for services as well as expanding research and teaching programs. The medical center owns 484 licensed beds, performs 23,230 surgical procedures annually, and receives about 820,000 clinic visits per year. As the only Level I pediatric trauma center between Philadelphia and Pittsburg, the Children's Hospital serves the most populous rural region in the nation, with more than a million children in their referral area.

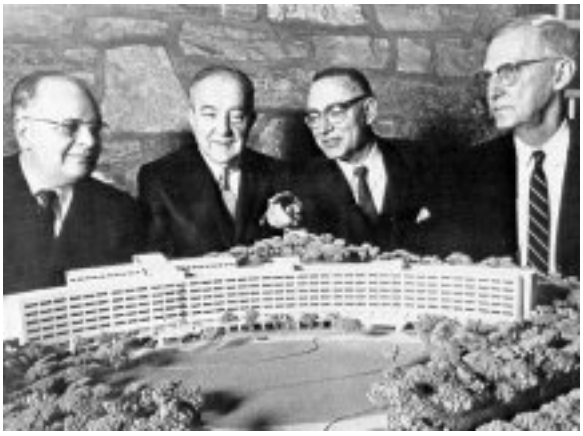


IMAGE 10 The founding fathers of the Medical Center and College of Medicine (from left): Arthur Whiteman, president of the Hershey Trust Company; Samuel Hinkle, president of the Hershey Chocolate Corporation; Eric Walker, president of Penn State University; and George Harrell, M.D., founding dean and CEO.

Given the nature of the construction project on Health Care facilities, schedule is a major concern when discussing expectations with the owner. The project is to be completed over three years without phased occupancy due to the infection control risk associated with phased occupancy in a Children's Hospital. All parties on board are committed to complete the project and turning it over to the owner by August of 2012. Due to the urgency of having a complete facility turned over on time, the contract states liquidated damages start 30 days after substantial completion with value of $5,000 per day.

Project cost and budget is critical in meeting the owner's expectation. Due to the fact that this project is state funded and has received numerous donation from donors and investors, it is critical to be on budget to satisfy the owner as well as all of the contributors. Monthly status reports are required every month to show the progress and budget used to be able to control the cash flow of the project.

Managing a clean and safe site is of a major concern on this project. Since the new Children's Hospital will connect with the existing Cancer Institute and the main hospital, Infection Control Risk Assessment (ICRA) will be a driving factor to the success of the project. Every construction activity will need to comply with the ICRA plan to ensure patient safety during construction. The ICRA plan identifies 4 risk degree levels based on the level of contamination from construction dust and debris. Critical activities within the risk zone will be assigned one of the risk levels, which would then identify the precautionary measures that must be taken prior to starting construction.

Delivering this new Children's Hospital will be no easy task for the project team due to the adjacencies and connections into 2 different buildings. Executing this project safely and on time and budget will be the driving factors for the success of all parties on board including the owner.

PROJECT DELIVERY SYSTEM

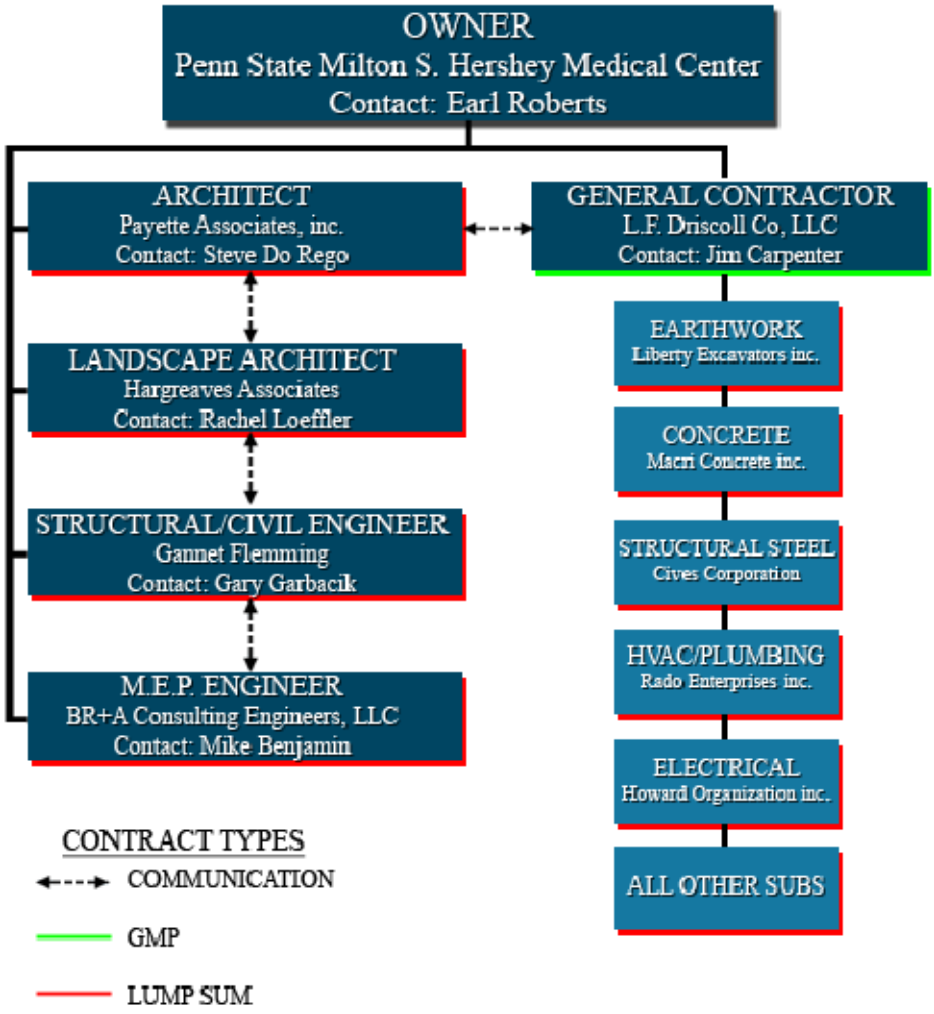


IMAGE 11 Children's Hospital Organizational Chart

The project delivery system for the Children's Hospital is a traditional DESIGN-BID-BUILD system. L.F. Driscoll's contract for Construction Management services is a negotiated guaranteed maximum price (GMP). Previously on the Cancer Institute Project, Penn State Hershey Medical Center utilized a different delivery system. Gilbane was contracted as a Construction Management Agency representing the owner without contractual agreements with the contracting firms. This delivery system complicated the project with Penn State and ended up exceeding the project budget. To avoid similar problems, Penn State decided to proceed with the traditional delivery system having the Construction Manager be the constructor of the project and holding direct contractual agreements with all the subcontractors. This method enables the owner to pursue a GMP with the

Construction Manager and have better control on costs since the construction manager must stay on budget to make the fee on the project. This delivery system was also utilized due to the fact that the Office of Physical Plant at Penn State has gained a lot of experience on health care construction.

Penn State Office of Physical Plant is representing the owner on the Children's Hospital with an experienced staff of Project Managers. To back up the efforts of the Office Physical Plant, the owner has contracted with Leach Wallace as the Owner's Commissioning Agent. The owner has also contracted with Hillis-Carnes Engineering Associates as the Owner's Testing Agency. The two mentioned entities help support the Office of Physical Plant by testing the constructed systems and insuring everything is constructed per Construction Documents and Specifications.

The design team contracted with the Penn State Hershey Medical Center is led by Payette Associates based in Boston, MA. Payette has been an active player at the Medical since 2002 where they have developed a comprehensive Master Plan for the Hershey Medical Center. Payette is in contract with the owner on a Lump Sum contract. Leading the structural and civil designs on the project is Gannet Flemming on a Lump sum contract, M.E.P. Engineering designs led by BR+A Consulting Engineers also on a Lump sum contract.

During this phase of constructing the foundation systems, 37 out of 44 bid packages have been awarded to different subcontractors. The Children's Hospital project is under a Contractor Controlled Insurance Program (CCIP). This insurance program helps out the contractor make a lot of profit; however, many subcontractors have been delayed to get on board due to strict requirements that must be met prior to starting work on the jobsite. This has caused some minor delays; however, L.F. Driscoll has managed to manipulate the project schedule to be back on track.

STAFFING PLAN

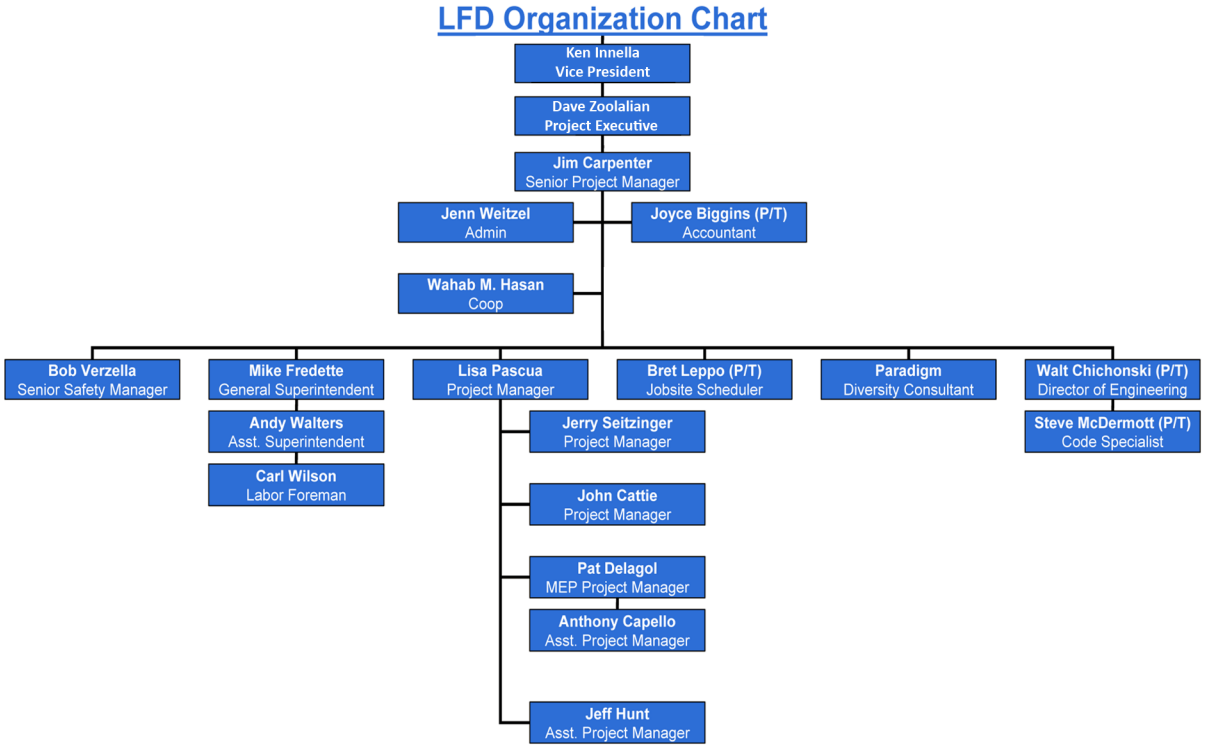


IMAGE 12 L.F. Driscoll Staffing Plan

The Children's Hospital staffing plan was organized in a way to assess full time work for the entire personnel over the construction period. The project is led by three top level managers. The Vice President receives direct correspondence from the Project Executive which typically oversees 3-4 projects at a time. The Senior Project Manager is typically the person in charge of overseeing the project organization, scheduling, and its implementation as well as plan direct and coordinates construction activities.

The allocation of the staff workload at the jobsite was strategically planned by the senior project manager. A schedule was developed comparing the project length versus each staff member's workload. The main idea was to distribute the bid packages among each project manager so that everybody has a doable workload over the entire construction period. It was planned so that each project manager on the job does not get overloaded at any point in time, hence increasing the productivity of each manager (see *Image 13* for allocation of bid packages schedule). Overall, the project management team is sufficient for the project's scope of work.

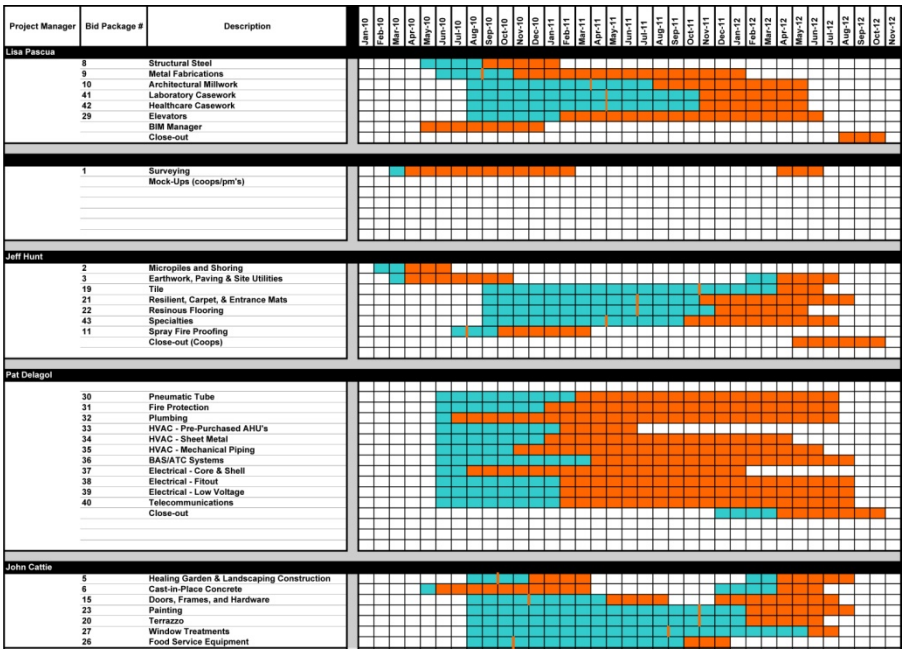


IMAGE 13 Allocation of Bid Packages among Project Managers

The List of Duties of the Primary Project Personnel is as follows:

Senior Project Manager

- Participate in the conceptual development of the project.
- Oversee project organization, scheduling, and its implementation.
- Plan, direct, coordinate construction activities.
- Liaison between Owner, Architect and Subcontractors

Accountant

- Coordinates the Billing Process
- Assists Sr.PM and PMs in generating job cost reports
- Assists Sr.PM and PMs in processing costs

Project Manager/BIM Manager

- Manage and coordinate BIM Process
- Plan, manage and coordinate Specific Trade Contracts.
- Mitigate costs.
- Review and Process Subcontract Submittals and Request for Information.

Project Manager

- Plan, manage and coordinate Specific Trade Contracts.
- Mitigate costs.
- Review and Process Subcontract Submittals and Request for Information.

M.E.P. Project Manager

- Plan, manage and coordinate Mechanical, Electrical Plumbing and Fire Protection Trade Contracts.
- Mitigate costs.
- Review and Process M/E/P/FP Submittals and Request for information

Assistant Project Manager

- Assist Project Managers and MEP coordinator with Submittal processing
- Manage and Track LEEDs submission process

General Superintendent

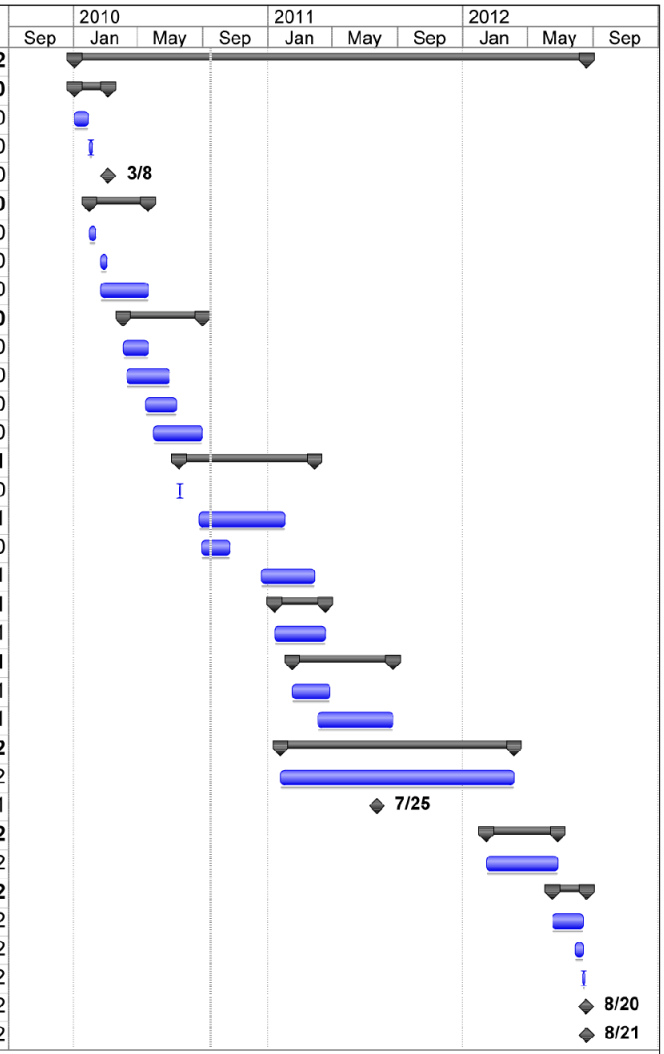
- Manage Safety, Quality and Productivity
- Promote company objectives and direct staff to perform
- Ensure quality and safety standards to meet Owner expectations
- Manage Safety, Quality and Productivity
- Execute Specifications and Drawings
- Implement and Monitor Project Schedule

Assistant Superintendent

- Manage safety, quality and productivity
- Manage specific trades designated by supervisors
- Have direct contact with labor foreman

APPENDIX A: SCHEDULE SUMMARY

ID	Task Name	Duration	Start	Finish
1	**PSU HMC CHILDREN'S HOSPITAL**	**686 days?**	**Mon 1/4/10**	**Tue 8/21/12**
2	**PRECONSTRUCTION**	**45 days?**	**Mon 1/4/10**	**Mon 3/8/10**
3	Secure L&I Permit	20 days?	Mon 1/4/10	Fri 1/29/10
4	Site Survey	5 days?	Mon 2/1/10	Fri 2/5/10
5	GMP Signed	0 days	Mon 3/8/10	Mon 3/8/10
6	**SITE WORK AND UTILITIES**	**80 days?**	**Mon 2/1/10**	**Fri 5/21/10**
7	Mobilization	10 days?	Mon 2/1/10	Fri 2/12/10
8	Locate Site Utilities	10 days?	Mon 2/22/10	Fri 3/5/10
9	Sheeting & Shoring	65 days?	Mon 2/22/10	Fri 5/21/10
10	**SUBSTRUCTURE**	**107 days?**	**Mon 4/5/10**	**Tue 8/31/10**
11	Bulk Excavation/Foundation	35 days?	Mon 4/5/10	Fri 5/21/10
12	Micropiles	58 days?	Mon 4/12/10	Wed 6/30/10
13	Caps & Grade Beams	42 days?	Mon 5/17/10	Tue 7/13/10
14	Foundation Walls	66 days?	Tue 6/1/10	Tue 8/31/10
15	**SUPERSTRUCTURE**	**182 days?**	**Mon 7/19/10**	**Tue 3/29/11**
16	Erect Tower Crane	3 days?	Mon 7/19/10	Wed 7/21/10
17	Set Structural Steel/Deck	115 days?	Wed 8/25/10	Tue 2/1/11
18	SOG	38 days?	Tue 8/31/10	Thu 10/21/10
19	Elevated Slabs	72 days?	Mon 12/20/10	Tue 3/29/11
20	**FIRE PROOFING**	**67 days?**	**Fri 1/14/11**	**Mon 4/18/11**
21	Fire Proofing	67 days?	Fri 1/14/11	Mon 4/18/11
22	**BUILDING WATER TIGHT**	**135 days?**	**Wed 2/16/11**	**Tue 8/23/11**
23	Roof	51 days?	Wed 2/16/11	Wed 4/27/11
24	Skin	101 days?	Tue 4/5/11	Tue 8/23/11
25	**FITOUT**	**314 days?**	**Tue 1/25/11**	**Fri 4/6/12**
26	G-5th Floor Fitout/MEP/Finishes	314 days?	Tue 1/25/11	Fri 4/6/12
27	Permanent Power	0 days	Mon 7/25/11	Mon 7/25/11
28	**SITEWORK**	**96 days?**	**Wed 2/15/12**	**Wed 6/27/12**
29	Sitework	96 days?	Wed 2/15/12	Wed 6/27/12
30	**COMPLETION**	**46 days?**	**Mon 6/18/12**	**Tue 8/21/12**
31	Commissioning	41 days?	Mon 6/18/12	Mon 8/13/12
32	DOH Inspections	10 days?	Tue 7/31/12	Mon 8/13/12
33	Liscensing & Inspections (L&I)	5 days?	Mon 8/13/12	Fri 8/17/12
34	Project Completion	0 days	Mon 8/20/12	Mon 8/20/12
35	Owner Occupancy	0 days	Tue 8/21/12	Tue 8/21/12



Project: MILESTONE SCHEDULE
Date: Tue 9/14/10

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Page 1

APPENDIX A: SCHEDULE SUMMARY

Penn State Hershey Medical Center Children's Hospital
Hershey, Pa

Abdulwahab Hasan
Construction Management

October 4, 2010

Consultant: Dr. Chimay Anumba

APPENDIX B1: D4COST REPORT#1

Statement of Probable Cost

PSU HMC Children's Hospital - Apr 2010 - PA - Harrisburg

Prepared By:	**Abdulwahab Hasan** **PSU AE - 5th Year CM OPTION** **State College, PA 16803** **Fax:**	Prepared For:	**Technical Assignment One** **PSU AE - 5th Year CM OPTION** **State College, PA 16803** **Fax:**
Building Sq. Size:	**262587**	Site Sq. Size:	**152460**
Bid Date:	**11/15/2009**	Building use:	**Medical**
No. of floors:	**6**	Foundation:	**PRG**
No. of buildings:	**1**	Exterior Walls:	**STO**
Project Height:	**96**	Interior Walls:	**GYP**
1st Floor Height:	**16**	Roof Type:	**MEM**
1st Floor Size:	**43764.5**	Floor Type:	**CON**
		Project Type:	**NEW**

Division		Percent	Sq. Cost	Amount
00	**Bidding Requirements**	**1.25**	**3.49**	**915,809**
	Bidding Requirements	1.25	3.49	915,809
01	**General Requirements**	**4.58**	**12.82**	**3,365,256**
	General Requirements	4.58	12.82	3,365,256
03	**Concrete**	**8.42**	**23.56**	**6,187,862**
	Concrete	8.42	23.56	6,187,862
04	**Masonry**	**3.86**	**10.81**	**2,839,008**
	Masonry	3.86	10.81	2,839,008
05	**Metals**	**10.57**	**29.59**	**7,770,707**
	Metals	10.57	29.59	7,770,707
06	**Wood & Plastics**	**1.20**	**3.35**	**880,270**
	Wood & Plastics	1.20	3.35	880,270
07	**Thermal & Moisture Protection**	**3.55**	**9.93**	**2,608,005**
	Thermal & Moisture Protection	3.55	9.93	2,608,005
08	**Doors & Windows**	**5.45**	**15.25**	**4,003,589**
	Doors & Windows	5.45	15.25	4,003,589
09	**Finishes**	**13.09**	**36.65**	**9,622,829**
	Finishes	13.09	36.65	9,622,829
10	**Specialties**	**0.87**	**2.44**	**639,699**
	Specialties	0.87	2.44	639,699
11	**Equipment**	**0.67**	**1.87**	**492,076**
	Equipment	0.67	1.87	492,076
12	**Furnishings**	**2.40**	**6.72**	**1,764,641**
	Furnishings	2.40	6.72	1,764,641
13	**Special Construction**	**0.66**	**1.85**	**486,609**
	Special Construction	0.66	1.85	486,609
14	**Conveying Systems**	**2.19**	**6.13**	**1,608,817**
	Conveying Systems	2.19	6.13	1,608,817
15	**Mechanical**	**27.62**	**77.29**	**20,295,420**
	Mechanical	27.62	77.29	20,295,420
16	**Electrical**	**13.62**	**38.11**	**10,008,289**
	Electrical	13.62	38.11	10,008,289
Total Building Costs		**100.00**	**279.86**	**73,488,886**
02	**Site Work**	**100.00**	**45.45**	**6,929,733**
	Site Work	100.00	45.45	6,929,733
Total Non-Building Costs		**100.00**	**45.45**	**6,929,733**
Total Project Costs		**--**	**--**	**80,418,619**

APPENDIX B1: D4COST REPORT#1

APPENDIX B2: D4COST REPORT#2

Statement of Probable Cost

PSU HMC Children's Hospital-2 - Apr 2010 - PA - Harrisburg

Prepared By:	**Abdulwahab Hasan** **PSU AE - 5th Year CM OPTION** **State College, PA 16803** **Fax:**	Prepared For:	**Technical Assignment One** **PSU AE - 5th Year CM OPTION** **State College, PA 16803** **Fax:**
Building Sq. Size:	**262587**	Site Sq. Size:	**87120**
Bid Date:	**11/15/2009**	Building use:	**Medical**
No. of floors:	**6**	Foundation:	**PRG**
No. of buildings:	**1**	Exterior Walls:	**STO**
Project Height:	**96**	Interior Walls:	**GYP**
1st Floor Height:	**16**	Roof Type:	**MEM**
1st Floor Size:	**43764.5**	Floor Type:	**CON**
		Project Type:	**NEW**

Division		Percent	Sq. Cost	Amount
01	**General Requirements**	**14.92**	**56.56**	**14,852,279**
	General Requirements	14.92	56.56	14,852,279
03	**Concrete**	**13.93**	**52.81**	**13,866,877**
	Concrete	13.93	52.81	13,866,877
04	**Masonry**	**1.38**	**5.22**	**1,371,424**
	Masonry	1.38	5.22	1,371,424
05	**Metals**	**3.09**	**11.74**	**3,081,583**
	Metals	3.09	11.74	3,081,583
06	**Wood & Plastics**	**2.93**	**11.09**	**2,913,221**
	Wood & Plastics	2.93	11.09	2,913,221
07	**Thermal & Moisture Protection**	**2.97**	**11.28**	**2,961,131**
	Thermal Moisture Protection	2.97	11.28	2,961,131
08	**Doors & Windows**	**3.93**	**14.91**	**3,916,356**
	Doors & Windows	3.93	14.91	3,916,356
09	**Finishes**	**11.90**	**45.13**	**11,851,368**
	Finishes	11.90	45.13	11,851,368
10	**Specialties**	**0.88**	**3.34**	**878,038**
	Specialties	0.88	3.34	878,038
11	**Equipment**	**1.13**	**4.28**	**1,124,609**
	Equipment	1.13	4.28	1,124,609
12	**Furnishings**	**3.88**	**14.71**	**3,862,001**
	Furnishings	3.88	14.71	3,862,001
13	**Special Construction**	**1.05**	**3.96**	**1,041,147**
	Special Construction	1.05	3.96	1,041,147
14	**Conveying Systems**	**2.11**	**7.99**	**2,098,117**
	Conveying Systems	2.11	7.99	2,098,117
15	**Mechanical**	**21.80**	**82.67**	**21,708,069**
	Mechanical	21.80	82.67	21,708,069
16	**Electrical**	**14.11**	**53.49**	**14,044,975**
	Electrical	14.11	53.49	14,044,975
Total Building Costs		**100.00**	**379.19**	**99,571,196**
02	**Site Work**	**100.00**	**89.84**	**7,826,602**
	Site Work	100.00	89.84	7,826,602
Total Non-Building Costs		**100.00**	**89.84**	**7,826,602**
Total Project Costs		**--**	**--**	**107,397,798**

APPENDIX C: RS MEANS COSTWORKS REPORT

Square Foot Cost Estimate Report

Estimate Name:	**PSU HMC Childrens Hospital** Abdulwahab Hasan Penn State Hershey Medical Center , Hershey , PA , 17033
Building Type:	**Hospital, 4-8 Story with Face Brick with Concrete Block Back-up / Steel Frame**
Location:	**HARRISBURG, PA**
Story Count:	**5**
Story Height (L.F.):	**16**
Floor Area (S.F.):	**262587**
Labor Type:	**Union**
Basement Included:	**Yes**
Data Release:	**Year 2010 Quarter 3**
Cost Per Square Foot:	**$269.61**
Building Cost:	**$70,797,000**

Costs are derived from a building model with basic components.

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

		% of Total	Cost Per S.F.	Cost
A Substructure		**3.10%**	**$6.09**	**$1,599,000**
A1010	**Standard Foundations** Strip footing, concrete, reinforced, load 14.8 KLF, soil bearing capacity 6 KSF, 12" deep x 32" wide Spread footings, 3000 PSI concrete, load 400K, soil bearing capacity 6 KSF, 8' - 6" square x 27" deep		**$3.33**	**$874,000**
A1030	**Slab on Grade** Slab on grade, 4" thick, non industrial, reinforced		**$0.90**	**$236,500**
A2010	**Basement Excavation** Excavate and fill, 10,000 SF, 8' deep, sand, gravel, or common earth, on site storage		**$0.70**	**$182,500**
A2020	**Basement Walls** Foundation wall, CIP, 12' wall height, pumped, .52 CY/LF, 24.29 PLF, 14" thick		**$1.17**	**$306,000**
B Shell		**18.50%**	**$36.69**	**$9,634,500**
B1010	**Floor Construction** Cast-in-place concrete column, 16" square, tied, 400K load, 12' story height, 251 lbs/LF, 4000PSI Steel column, W10, 200 KIPS, 10' unsupported height, 45 PLF Flat slab, concrete, with drop panels, 6" slab/2.5" panel, 12" column, 15'x15' bay, 75 PSF superimposed load, 153 PSF total load Floor, composite metal deck, shear connectors, 5.5" slab, 30'x30' bay, 26.5" total depth, 75 PSF superimposed load, 116 PSF total load		**$20.52**	**$5,389,500**

	Fireproofing, gypsum board, fire rated, 2 layer, 1" thick, 10" steel column, 3 hour rating, 17 PLF			
B1020	**Roof Construction** Floor, steel joists, beams, 1.5" 22 ga metal deck, on columns, 30'x30' bay, 28" deep, 40 PSF superimposed load, 62 PSF total load		**$1.48**	**$388,500**
B2010	**Exterior Walls** Brick wall, composite double wythe, standard face/CMU back-up, 8" thick, perlite core fill		**$8.13**	**$2,134,500**
B2020	**Exterior Windows** Windows, aluminum, sliding, insulated glass, 5' x 3'		**$4.35**	**$1,143,500**
B2030	**Exterior Doors** Door, aluminum & glass, with transom, full vision, double door, hardware, 6'-0" x 10'-0" opening Door, aluminum & glass, with transom, non-standard, 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		**$0.72**	**$189,000**
B3010	**Roof Coverings** Roofing, single ply membrane, reinforced, PVC, 48 mils, fully adhered, adhesive Insulation, rigid, roof deck, composite with 2" EPS, 1" perlite Roof edges, aluminum, duranodic, .050" thick, 6" face Flashing, copper, no backing, 16 oz, < 500 lbs		**$1.46**	**$382,500**
B3020	**Roof Openings** Roof hatch, with curb, 1" fiberglass insulation, 2'-6" x 3'-0", galvanized steel, 165 lbs		**$0.03**	**$7,000**
C Interiors		**21.70%**	**$42.83**	**$11,247,000**
C1010	**Partitions** Metal partition, 5/8" vinyl faced gypsum board face, 5/8"fire rated gypsum board base, 3-5/8" @ 24",s ame opposite face, no insulation Gypsum board, 1 face only, 5/8" with 1/16" lead		**$6.98**	**$1,832,000**
C1020	**Interior Doors** Door, single leaf, kd steel frame, hollow metal, commercial quality, flush, 3'-0" x 7'-0" x 1-3/8" Door, single leaf, kd steel frame, metal fire, commercial quality, 3'-0" x 7'-0" x 1-3/8"		**$10.47**	**$2,749,000**
C1030	**Fittings** Partitions, hospital curtain, ceiling hung, poly oxford cloth		**$0.91**	**$240,000**
C2010	**Stair Construction** Stairs, steel, cement filled metal pan & picket rail, 12 risers, with landing		**$1.19**	**$312,500**
C3010	**Wall Finishes** Glazed coating Painting, interior on plaster and drywall, walls & ceilings, roller		**$6.96**	**$1,826,500**

	work, primer & 2 coats		
	Vinyl wall covering, fabric back, medium weight		
	Ceramic tile, thin set, 4-1/4" x 4-1/4"		
C3020	**Floor Finishes**	**$9.35**	**$2,454,500**
	Composition flooring, epoxy terrazzo, maximum		
	Terrazzo, maximum		
	Vinyl, composition tile, maximum		
	Tile, ceramic natural clay		
C3030	**Ceiling Finishes**	**$6.98**	**$1,832,500**
	Plaster ceilings, 3 coat prl, 3.4# metal lath, 3/4" crc, 12"OC furring, 1-1/2" crc, 36" OC support		
	Acoustic ceilings, 3/4"mineral fiber, 12" x 12" tile, concealed 2" bar & channel grid, suspended support		
D Services		**47.50%**	**$93.96**	**$24,672,500**
D1010	**Elevators and Lifts**	**$6.91**	**$1,815,500**
	Traction, geared hospital, 6000 lb, 6 floors, 12' story height, 2 car group, 200 FPM		
D2010	**Plumbing Fixtures**	**$11.73**	**$3,081,000**
	Water closet, vitreous china, bowl only with flush valve, wall hung		
	Urinal, vitreous china, wall hung		
	Lavatory w/trim, wall hung, PE on CI, 19" x 17"		
	Kitchen sink w/trim, raised deck, PE on CI, 42" x 21" dual level, triple bowl		
	Laundry sink w/trim, PE on CI, black iron frame, 48" x 21" double compartment		
	Service sink w/trim, PE on CI,wall hung w/rim guard, 22" x 18"		
	Bathtub, recessed, PE on CI, mat bottom, 5'-6" long		
	Shower, stall, baked enamel, terrazzo receptor, 36" square		
	Water cooler, electric, wall hung, wheelchair type, 7.5 GPH		
D2020	**Domestic Water Distribution**	**$6.97**	**$1,831,500**
	Electric water heater, commercial, 100< F rise, 1000 gal, 480 KW 1970 GPH		
D2040	**Rain Water Drainage**	**$0.52**	**$137,000**
	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**	**$3.46**	**$907,500**
	Hot water reheat system for 200,000 SF hospital		
D3020	**Heat Generating Systems**	**$0.38**	**$101,000**
	Boiler, electric, steel, steam, 510 KW, 1,740 MBH		
D3030	**Cooling Generating Systems**	**$2.72**	**$715,500**
	Chiller, reciprocating, water cooled, standard controls, 100 ton		
	Chiller, reciprocating, water cooled, standard controls, 150 ton		

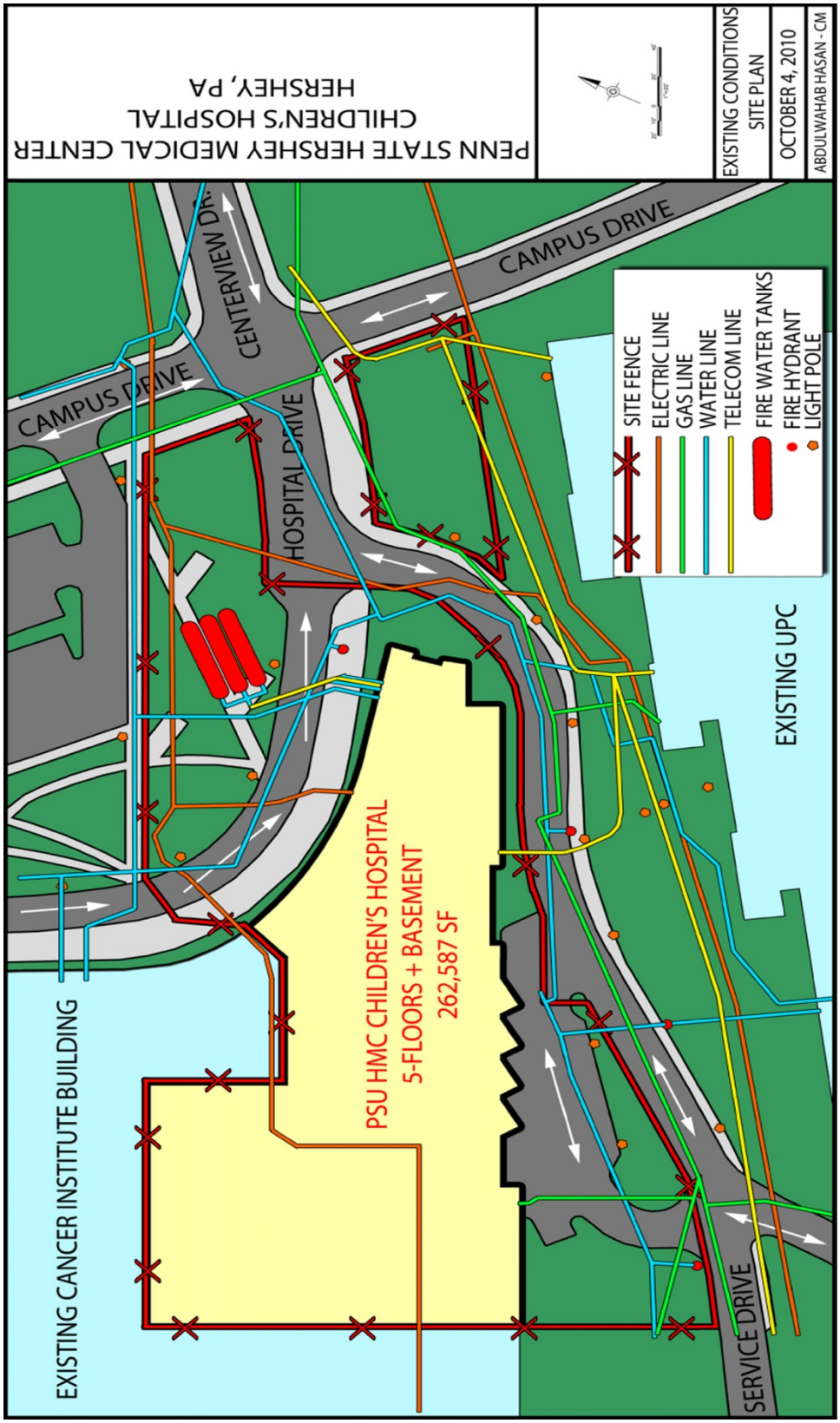
	Chiller, reciprocating, water cooled, standard controls, 200 ton		
D3090	**Other HVAC Systems/Equip**	**$32.35**	**$8,495,500**
	Ductwork for 200,000 SF hospital model		
	Boiler, cast iron, gas, hot water, 2856 MBH		
	Boiler, cast iron, gas, hot water, 320 MBH		
	AHU, rooftop, cool/heat coils, VAV, filters, 5,000 CFM		
	AHU, rooftop, cool/heat coils, VAV, filters, 10,000 CFM		
	AHU, rooftop, cool/heat coils, VAV, filters, 20,000 CFM		
	VAV terminal, cooling, hot water reheat, with actuator / controls, 200 CFM		
	AHU, rooftop, cool/heat coils, VAV, filters, 30,000 CFM		
	Roof vent. system, power, centrifugal, aluminum, galvanized curb, back draft damper, 1500 CFM		
	Roof vent. system, power, centrifugal, aluminum, galvanized curb, back draft damper, 2750 CFM		
	Commercial kitchen exhaust/make-up air system, rooftop, gas, 5000 CFM		
	Plate heat exchanger, 400 GPM		
D4010	**Sprinklers**	**$2.58**	**$677,000**
	Wet pipe sprinkler systems, steel, light hazard, 1 floor, 10,000 SF		
	Wet pipe sprinkler systems, steel, light hazard, each additional floor, 10,000 SF		
	Standard High Rise Accessory Package 8 story		
D4020	**Standpipes**	**$0.40**	**$105,000**
	Wet standpipe risers, class III, steel, black, sch 40, 4" diam pipe, 1 floor		
	Wet standpipe risers, class III, steel, black, sch 40, 4" diam pipe, additional floors		
	Cabs, hose rack assembly, & extinguisher, 2-1/2" x 1-1/2" valve & hose, steel door & frame		
	Alarm, electric pressure switch (circuit closer)		
	Escutcheon plate, for angle valves, polished brass, 2-1/2"		
	Fire pump, electric, with controller, 5" pump, 100 HP, 1000 GPM		
	Fire pump, electric, for jockey pump system, add		
	Siamese, with plugs & chains, polished brass, sidewalk, 4" x 2-1/2" x 2-1/2"		
	Valves, angle, wheel handle, 300 lb, 2-1/2"		
	Cabinet assembly, includes. adapter, rack, hose, and nozzle		
D5010	**Electrical Service/Distribution**	**$2.88**	**$757,500**
	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		

D5020	**Lighting and Branch Wiring**	**$16.78**	**$4,406,500**
	Receptacles incl plate, box, conduit, wire, 20 per 1000 SF,2.4 W per SF, with transformer		
	Wall switches, 5.0 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, 0.8 watt per SF, 20 FC, 5 fixtures @32 watt per 1000 SF		
D5030	**Communications and Security**	**$2.19**	**$575,000**
	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		
	Internet wiring, 8 data/voice outlets per 1000 S.F.		
D5090	**Other Electrical Systems**	**$4.06**	**$1,067,000**
	Generator sets, w/battery, charger, muffler and transfer switch, diesel engine with fuel tank, 100 kW		
	Generator sets, w/battery, charger, muffler and transfer switch, diesel engine with fuel tank, 400 kW		
	Uninterruptible power supply with standard battery pack, 15 kVA/12.75 kW		
E Equipment & Furnishings		**9.30%**	**$18.31**	**$4,808,000**
E1020	**Institutional Equipment**	**$13.65**	**$3,583,500**
	Architectural equipment, laboratory equipment glassware washer, distilled water, economy		
	Architectural equipment, sink, epoxy resin, 25" x 16" x 10"		
	Architectural equipment, laboratory equipment eye wash, hand held		
	Fume hood, complex, including fixtures and ductwork		
	Architectural equipment, medical equipment sterilizers, floor loading, double door, 28"x67"x52"		
	Architectural equipment, medical equipment, medical gas system for large hospital		
	Architectural equipment, kitchen equipment, commercial dish washer, semiautomatic, 50 racks/hr		
	Architectural equipment, kitchen equipment, food warmer, counter, 1.65 KW		
	Architectural equipment, kitchen equipment, kettles, steam jacketed, 20 gallons		
	Architectural equipment, kitchen equipment, range, restaurant type, burners, 2 ovens & 24" griddle		
	Architectural equipment, kitchen equipment, range hood, including CO2 system, economy		
	Special construction, refrigerators, prefabricated, walk-in, 7'-6"		

	high, 6' x 6'		
	Architectural equipment, darkroom equipment combination, tray & tank sinks, washers & dry tables		
E1090	**Other Equipment**	**$0.36**	**$94,000**
	78 - Closed circuit television system (CCTV), surveillance, for additional camera stations, add		
	4 - Closed circuit television system (CCTV), surveillance, one station (camera & monitor)		
E2020	**Moveable Furnishings**	**$4.31**	**$1,130,500**
	Furnishings, hospital furniture, patient wall system, no utilities, deluxe , per room		
F Special Construction		**0.00%**	**$0.00**	**$0**
G Building Sitework		**0.00%**	**$0.00**	**$0**

SubTotal	**100%**	**$197.88**	**$51,961,000**
Contractor Fees (General Conditions,Overhead,Profit)	**25.00%**	**$49.47**	**$12,990,500**
Architectural Fees	**9.00%**	**$22.26**	**$5,845,500**
User Fees	**0.00%**	**$0.00**	**$0**
Total Building Cost		**$269.61**	**$70,797,000**

APPENDIX D: EXISTING CONDITIONS SITE PLAN



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