Joe Bonacci

Technical Assignment 1

Construction

Advisor: Rob Leicht

Joe Bonacci
Adv. Robert Leicht

Executive Summary

The construction project to be analyzed over the next two semesters is a community centered hospital that centralizes pediatric care for the town of Charlottesville, Virginia. The history of the town revolves around education and health care, and is conveniently located near the University of Virginia. Here, one will notice historic and iconic architecture which is closely associated with the rich culture and pleasant atmosphere of the town.

In past years, child medical care has been segregated among several areas of the hospital, often resulting in patients being transported from one building to another, depending on their current health needs. This system has also been a burden to traveling parents and hospital visitors, who have needed to travel to multiple buildings for their child's care. With the completion of this hospital, all pediatric services will be located under one roof. Some of these services will include 36 specialty clinics, Pediatric Dentistry, Pediatric Radiology, 12 operating rooms, and a complete outpatient rehabilitation and therapy facility.

The building will stand seven stories above ground and cover 200,000 gross square feet. The main construction challenge is the lack of project space. There is essentially no material laydown space on the project and contractor parking is limited. The proposed hospital is also positioned among other buildings such as a university office building, a restaurant, and a newly built parking garage, as seen on the existing site plan. It is also important to notice how closely the construction is positioned to Main Street and the pedestrian sidewalk. The sidewalk immediately in front of the project has been closed to provide more room for construction, and another segment has been given overhead protection from potential falling objects. Due to the sidewalk closing, all pedestrian traffic coming from the project side of Main Street and Jefferson Park Ave must cross the street to bypass the construction.

A Design-Bid-Build project delivery system is being implemented on this project. Additionally, lump sum contracts are held between the owner and general contractor, and between the owner and Architect. The General Contractor is responsible for hiring all trades for construction. They also hold a Lump Sum contract with these trades, some of which are listed on the organizational chart. The General Contractor is fully responsible for payment to the subcontractors it hires. This type of delivery system often takes some of the financial pressure off the owner.

Construction began in the spring of 2011 and is scheduled to be completed during the summer of 2014. Time restraints for certain tasks are not as vital on this project as most others. Although there is a scheduled completion date, quality and meeting owner specifications are more significant matters to the General Contractor. The summary schedule includes a few major tasks throughout the project's life. Once the building is ready for interiors, construction will continue on the 4th floor, and work up, ending construction in the basement. Therefore, early interior building mockups and a finished exam room will be presented on the fourth floor.

As mentioned previously, quality is of highest importance for this state of the art hospital. This is reflected by the square foot estimate value which is well below the total construction cost of the building. This steel frame building with concrete block backup has a suggested cost of $284.45 per square foot. This gives a total square foot estimate of $56.9 million, compared to an actual construction cost of $105 million. Reasons for an inflated actual

cost are due to high end finishes, medical equipment, and architectural features. These features include an illuminated partition system and play space at the North West corner of each floor. This space is visible from the Main Street and is a colorful attraction for both building occupants and spectators. Another feature which is seen in the photo below, is a countertop surface used in exam rooms. Its surface plays with light and shadows, and can serve as a creative distraction to uneasy child patients when they visit the hospital.

SensiTile Countertop Material

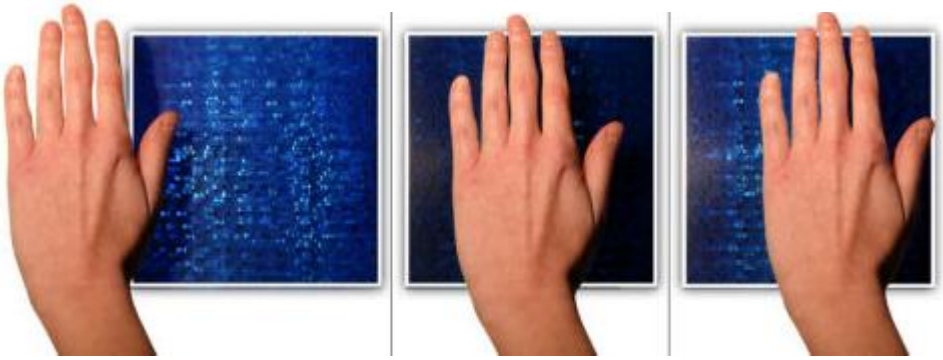

Photo by trendir.com

Before Construction began, the demolition of an existing parking lot was to be completed. This parking lot has recently been replaced by a brand new parking garage which connects to part of the hospital's South Façade. The structure is comprised of a concrete frame. Lateral Shear walls made of poured concrete serve as the buildings primary bracing. An exterior face brick with CMU backup serves as a façade for the East and South elevations, while the North and West elevations have a 1" thick glass curtain wall system. There are ¼" thick by 2 ½" x 2 ½" aluminum mullions that provide support for the glass at seams and corners.

The hospital has a mechanical and electrical system to match its high quality design and features. Three air handling units located on the roof make up the entire building's air to air system. AHU one serves all operating rooms and distributes 30,000 CFM of supply air. AHU two supplies 73,000 CFM, and AHU three supplies 96,000 CFM. A variable air volume system is also prevalent in the building, which acts as the building's water to air system. A dry-pipe sprinkler system is implemented for fire suppression. The electrical system consists of a three phase 480Y/277V main switch board. It is comprised of 4 wires plus one ground wire, and has a max load of 4000 amps. Also 480Y/277V is the main utility transformer which has a max load of 2500KVA. All hospitals are at great risk of losing power, since hospital machines and care devices run on electricity. For added insurance, a diesel powered emergency generator is provided, with output capacities of 1500KW/1875KVA.

The general contractor has a team, both in office and on site that is highly staffed to ensure the quality and safety of the construction. The Senior Project Manager, who facilitates weekly subcontractor meetings, is the main on site contact with the owner. They are ultimately responsible for the quality and completion of finished product. Three project managers, two primarily in main office and one in the field office, help coordinate with superintendents, change orders, and subcontractor relations. The field side of management is somewhat divided by divisions and floors in order to provide a more focused approach. A general superintendent

oversees all construction, they are often needed to make final construction decisions in the field, and they are the main contact to all project managers. An interiors superintendent manages the finish work of floors one to six. This involves coordination with interior trades such as drywall and paint, finished flooring, ceiling grid, and casework. Due to tight site space, there is one material hoist, which is responsible for transporting heavy tools and materials to each floor. This hoist is located in a critical location on the south side of the building, where it can easily be accessed by contractors and there is very little pedestrian traffic. The operator communicates with assistant superintendents throughout the day via radio to coordinate deliveries and other material relocation.

As mentioned earlier, the overall project goal is to build a state of the art pediatric care facility of the highest quality and standards. To complement this goal, the project team is making efforts to earn a LEED Gold Certification and is required to earn at least a LEED Silver Certification. One of the requirements includes a vigorous commissioning plan and report. Other factors include diverting 50-75% of construction waste from landfills, reducing water consumption by 20-30%, and most importantly, optimizing the building's energy performance.

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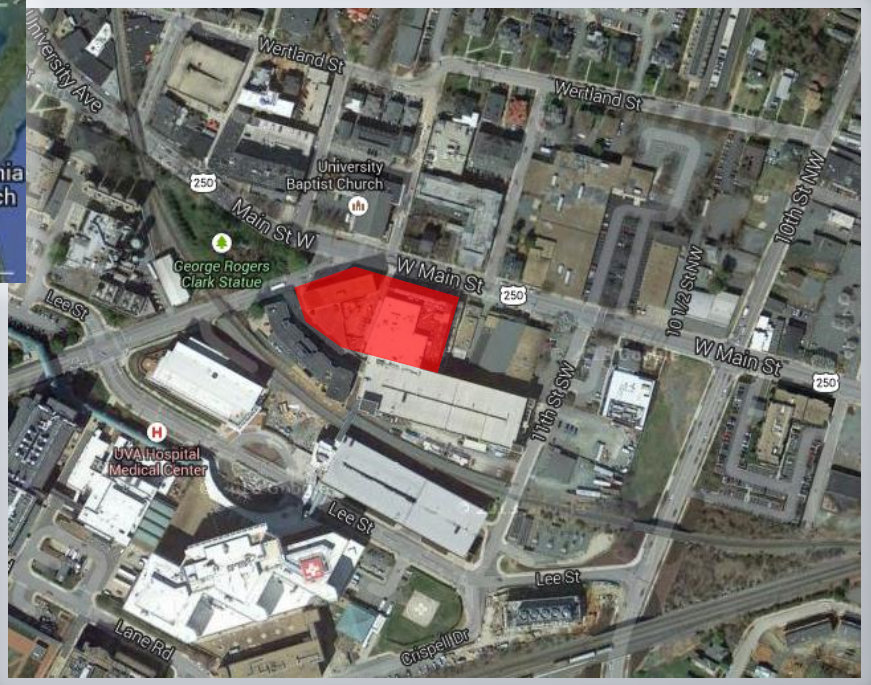

Photos: maps.google.com

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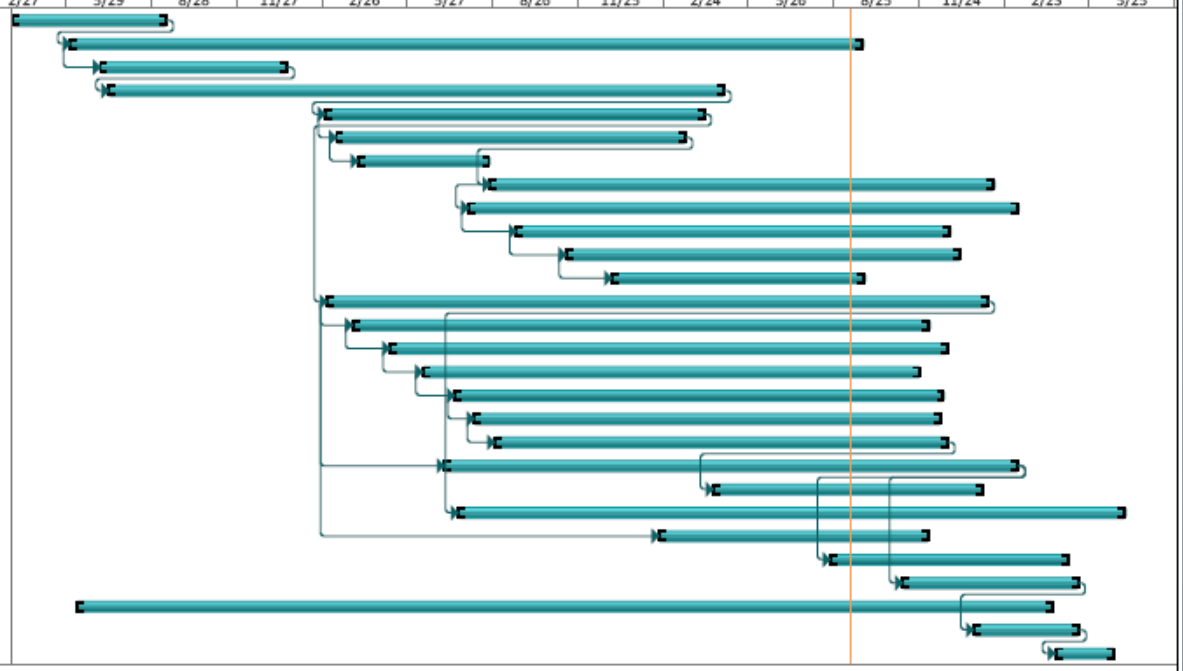
Schedule Summary

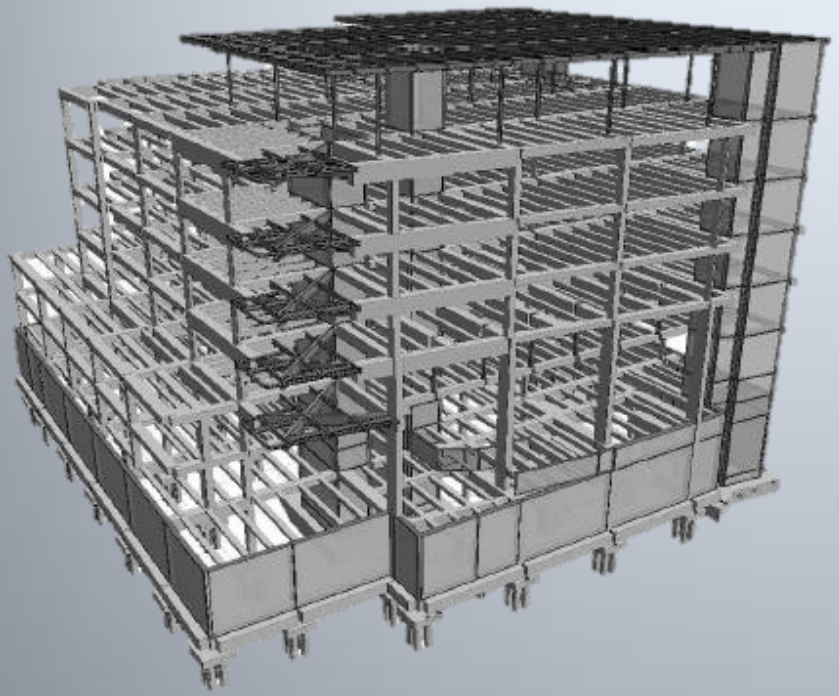
ID	Task Mode	Task Name	Duration	Start	Finish
1		Design	118 days	Fri 4/1/11	Tue 9/13/11
2		Preconstruction	605 days	Thu 6/2/11	Wed 9/25/13
3		Site Prep and Ecavation	145 days	Mon 7/4/11	Fri 1/20/12
4		Foundations	470 days	Wed 7/13/11	Tue 4/30/13
5		Concrete	290 days	Wed 2/29/12	Tue 4/9/13
6		Structural Steel	268 days	Mon 3/12/12	Wed 3/20/13
7		Shoring	101 days	Wed 4/4/12	Wed 8/22/12
8		East Elevation	385 days	Thu 8/23/12	Wed 2/12/14
9		South Elevation	420 days	Tue 7/31/12	Mon 3/10/14
10		North Elevation	332 days	Thu 9/20/12	Fri 12/27/13
11		West Elevation	302 days	Mon 11/12/12	Tue 1/7/14
12		Roofing and Roof Elements	195 days	Mon 12/31/12	Fri 9/27/13
13		MEP First Floor	504 days	Fri 3/2/12	Wed 2/5/14
14		MEP Second Floor	441 days	Thu 3/29/12	Thu 12/5/13
15		MEP Third Floor	426 days	Tue 5/8/12	Tue 12/24/13
16		MEP Fourth Floor	380 days	Tue 6/12/12	Mon 11/25/13
17		MEP Fifth Floor	375 days	Mon 7/16/12	Fri 12/20/13
18		MEP Sixth Floor	357 days	Mon 8/6/12	Tue 12/17/13
19		MEP Penthouse	347 days	Tue 8/28/12	Wed 12/25/13
20		Interior Finishes	438 days	Thu 7/5/12	Mon 3/10/14
21		Elevators	207 days	Thu 4/18/13	Fri 1/31/14
22		Ambulatory Surgery Center	509 days	Fri 7/20/12	Wed 7/2/14
23		IT, Security, etc Systems	207 days	Tue 2/19/13	Wed 12/4/13
24		Major Medical equipment	183 days	Wed 8/21/13	Fri 5/2/14
25		Furnishings	135 days	Wed 11/6/13	Tue 5/13/14
26		Inspections and Certifications	744 days	Thu 6/9/11	Tue 4/15/14
27		Owner Training	82 days	Tue 1/21/14	Wed 5/14/14
28		Turnover	46 days	Fri 4/18/14	Fri 6/20/14



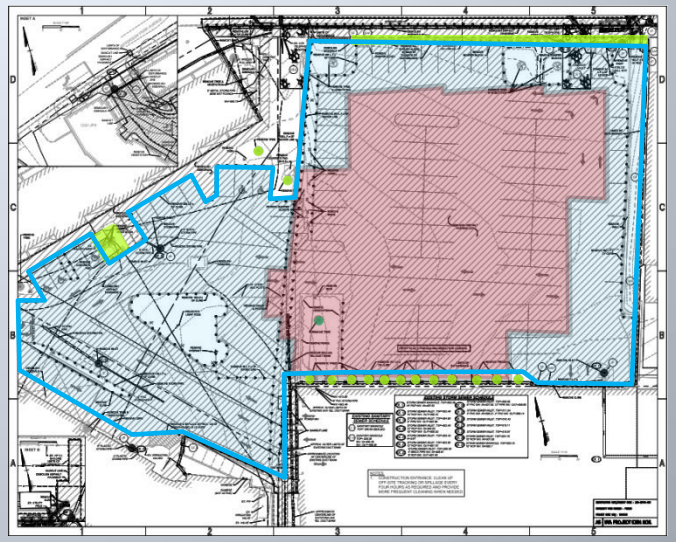
Project:
Date: Fri 9/13/13

Task
Split
Milestone
Summary
Project Summary
External Tasks
External Milestone
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
Deadline
Progress

Concrete Frame

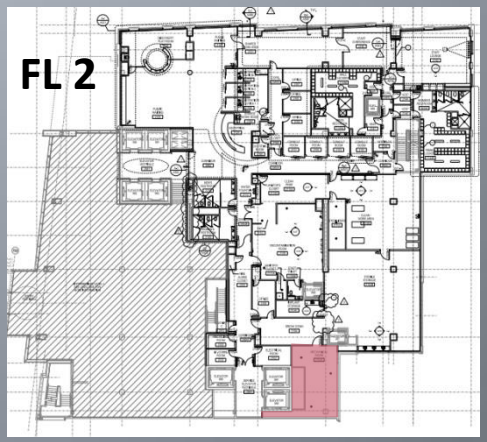


Demolition



Mechanical System

- Room 2104
- Air to Air
- Water to Air
- 3 AHU’s
- Dry-Pipe Sprinkler System



Electrical System

Main Switch Board

*480Y/277V *3 PH, 4W+G *4000 Amps

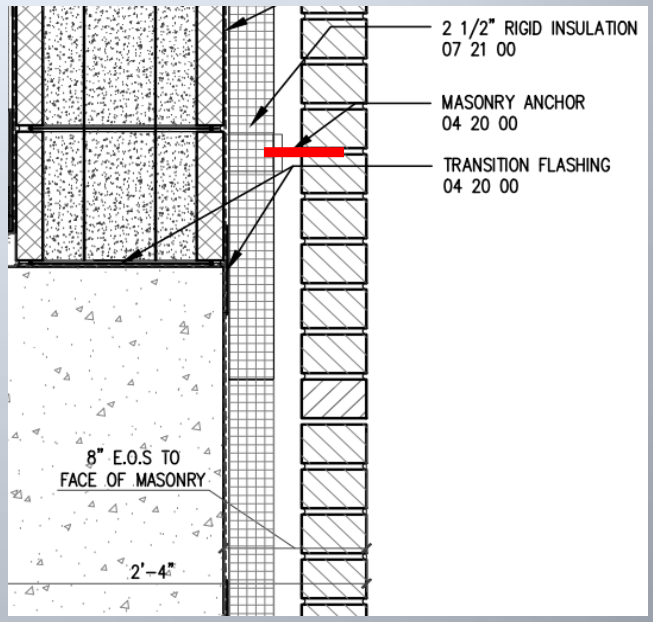
Utility Transformer

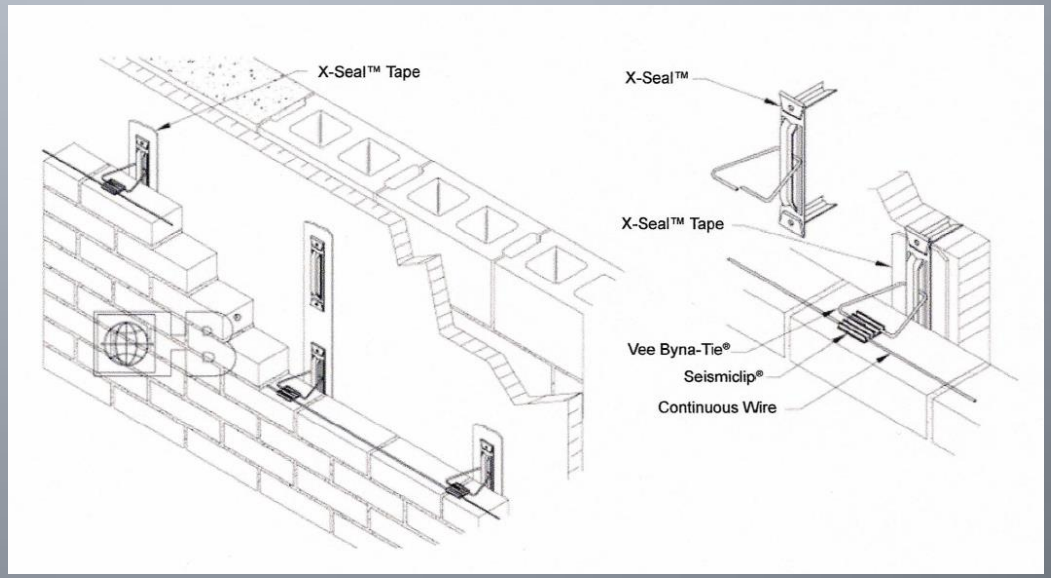
*2500KVA *480Y/277V

Emergency Generator

*1500KW/1875KVA *480Y/277V *Diesel Engine

Masonry





Actual Construction costs

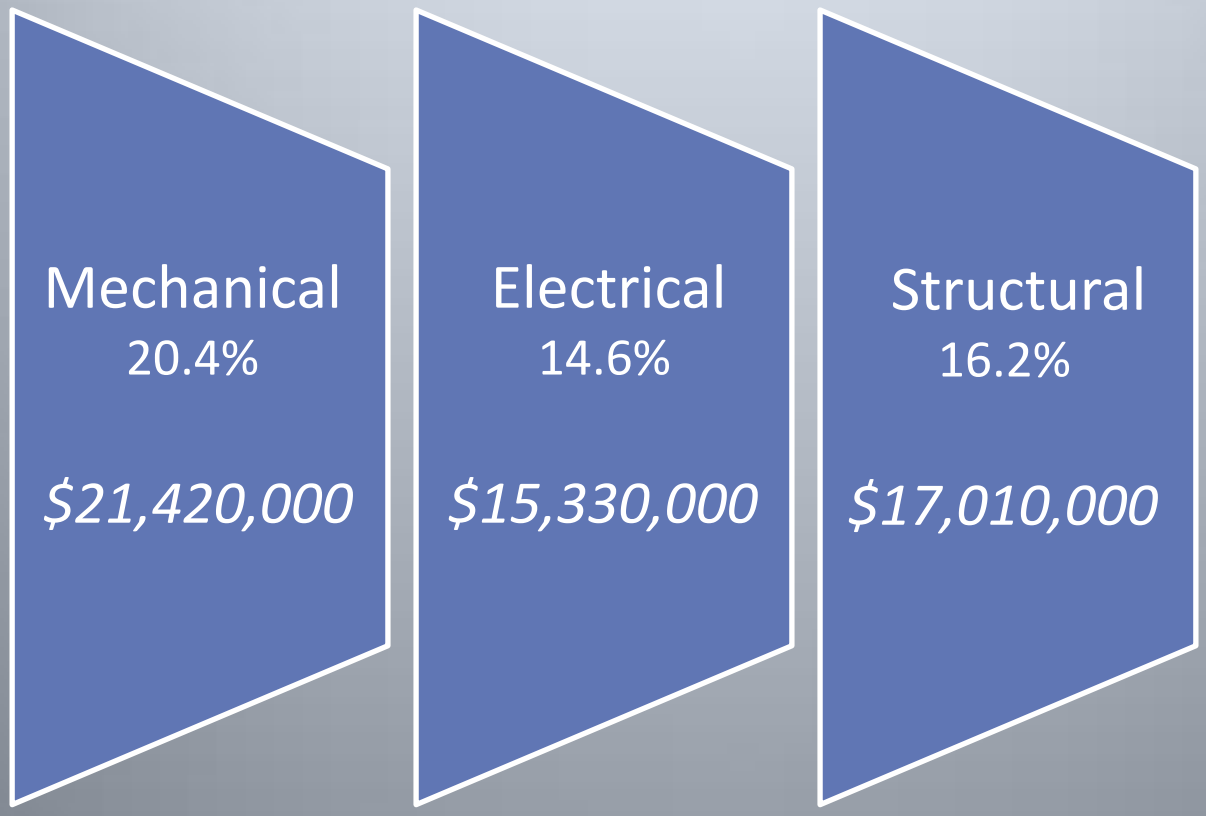
- 105 Million

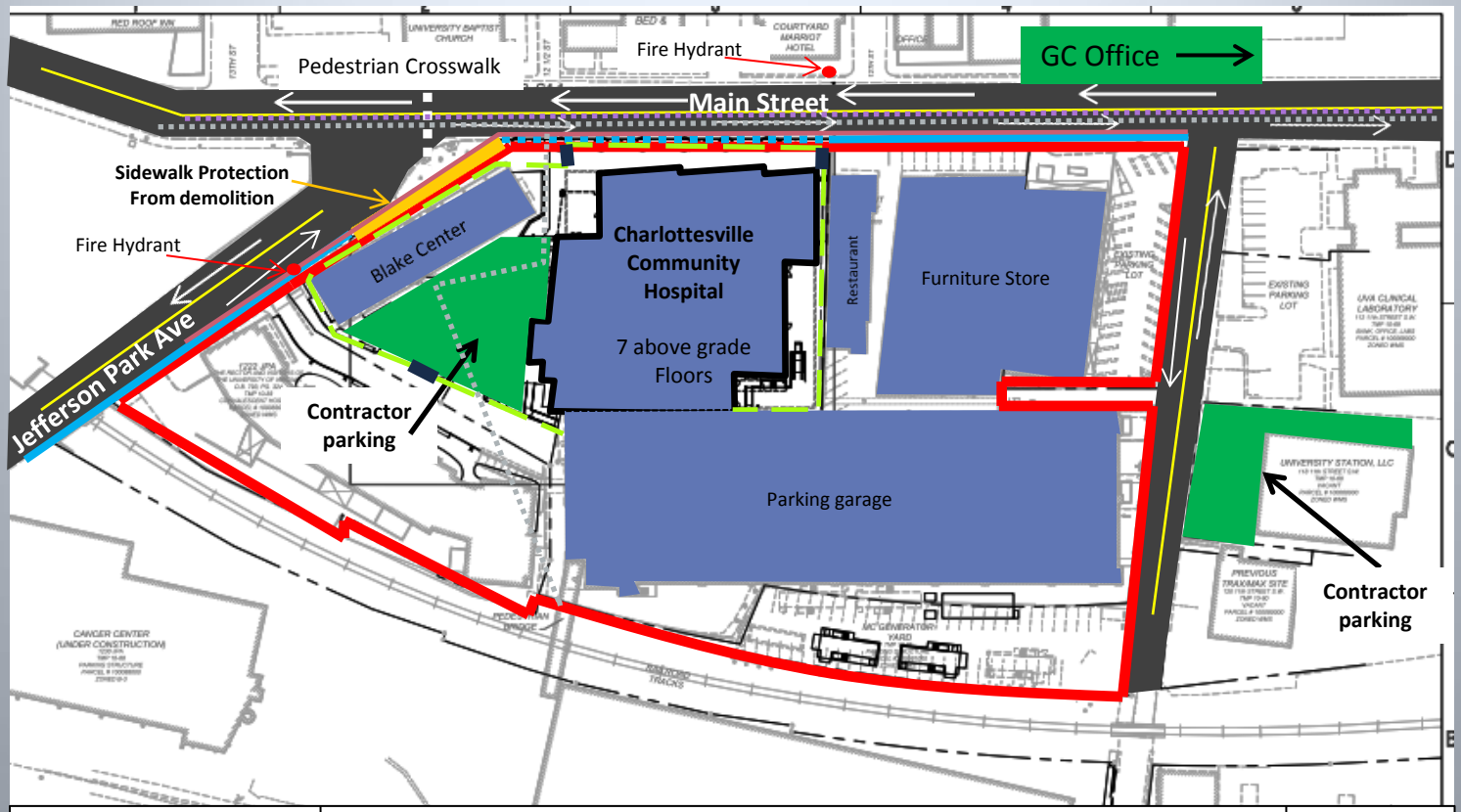
Total Project Costs

- $141.62 million

$284.45 per sq. ft.
x 200,000 sq. ft.

$56,890,000




Pedestrian Crosswalk
Fire Hydrant
GC Office
Main Street
Sidewalk Protection
From demolition
Fire Hydrant
Blake Center
Charlottesville
Community
Hospital
7 above grade
Floors
Restaurant
Furniture Store
Jefferson Park Ave
Contractor
parking
Parking garage
Contractor
parking
Property Line
Pedestrian Sidewalk
Closed Sidewalk
Construction Fence
Entrance Gate
Existing Storm Sewer
Existing water line
Underground Power
Existing Conditions and Site Plans
Charlottesville Community Hospital
Drawn By: Joe Bonacci
Date Drawn: 9/12/2013
N

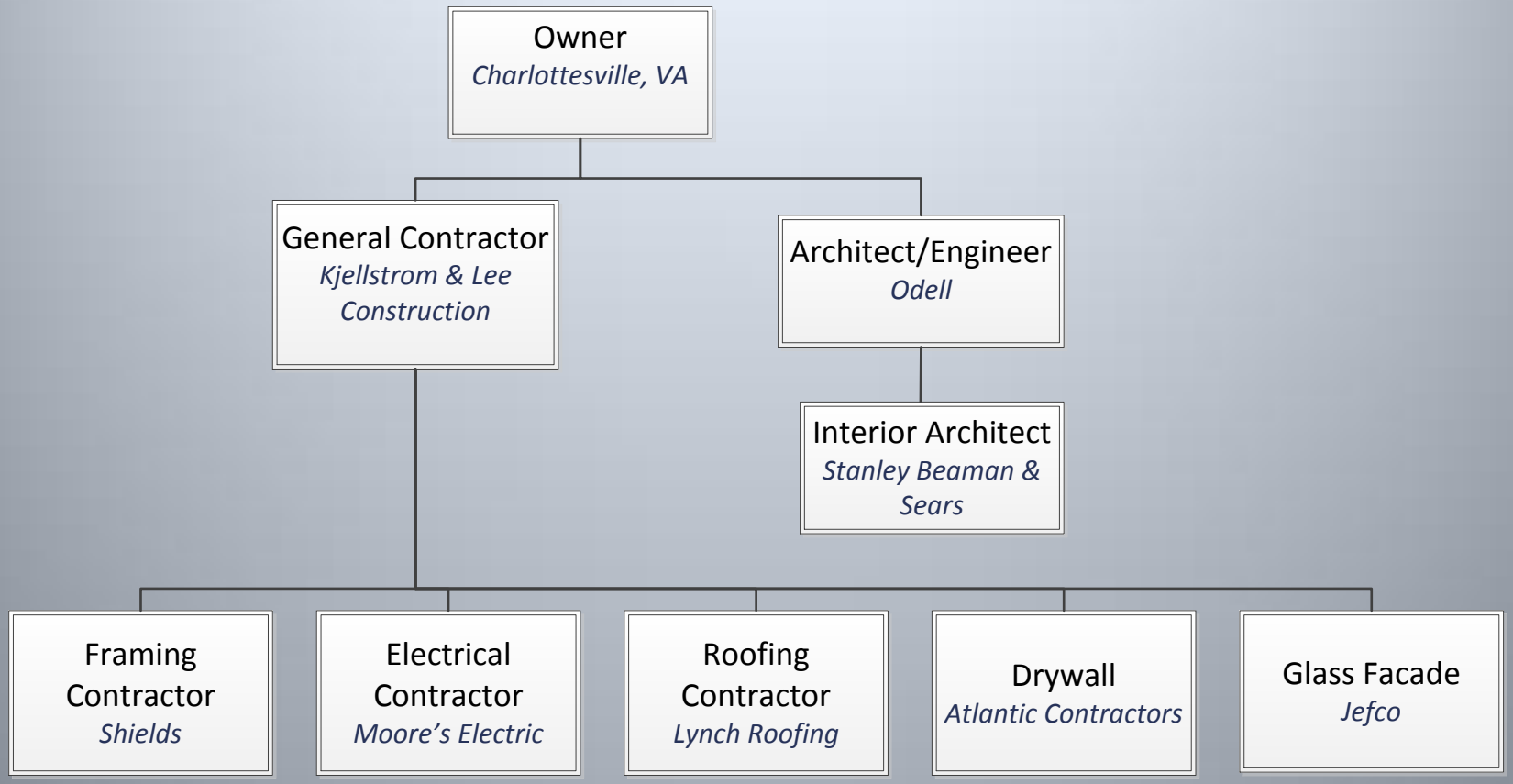
Mission:

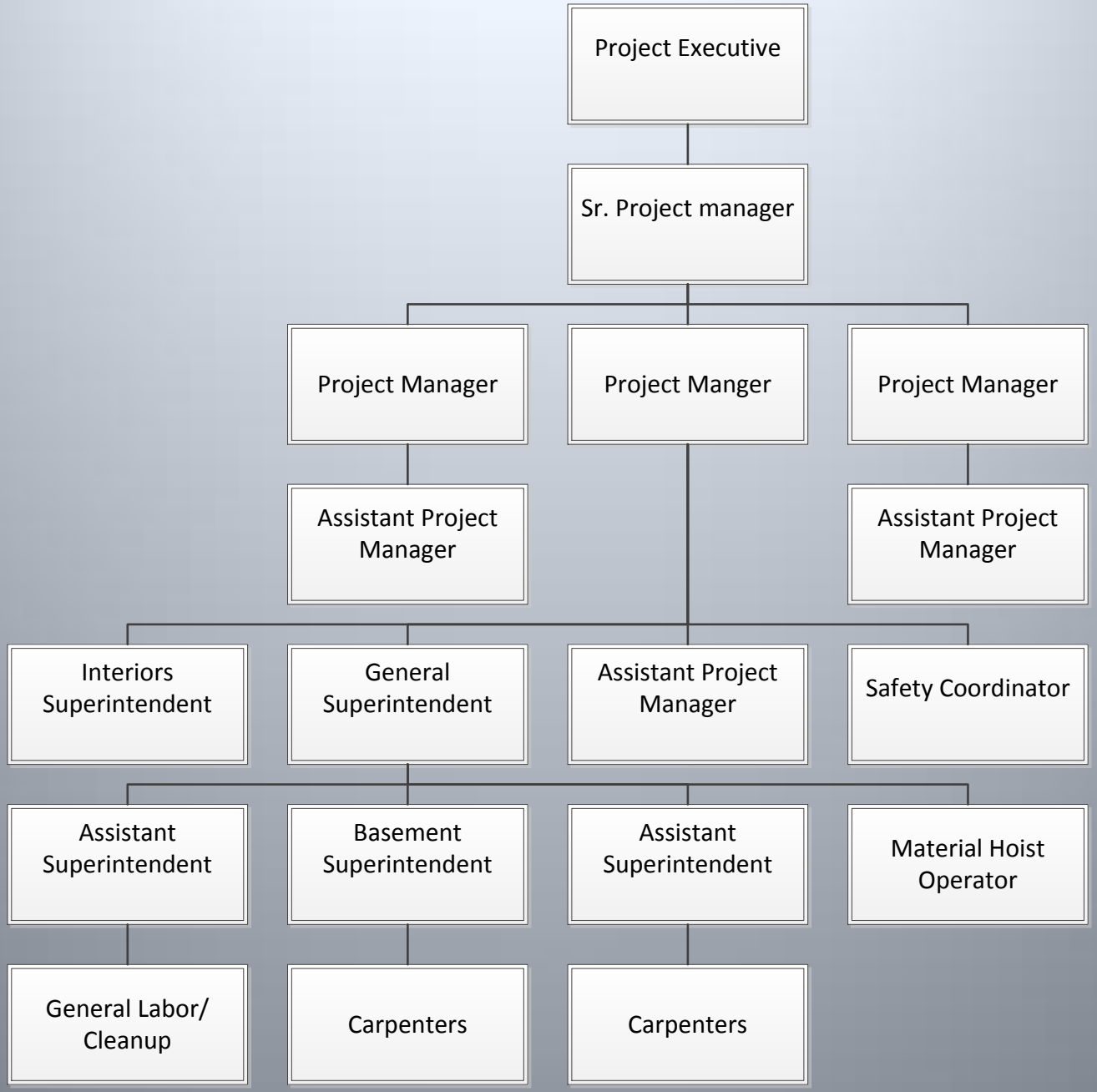
To consolidate all branches of pediatric care to one convenient central location.

* Pristine jobsite working conditions
* Barriers and site protection to hide noise and construction from neighbors
* Identification cards for every employee

* The highest quality craftsmanship
* High end products and materials
* Strict owner inspections

Design Bid Build




Project Executive
Sr. Project manager
Project Manager
Project Manger
Project Manager
Assistant Project Manager
Assistant Project Manager
Interiors Superintendent
General Superintendent
Assistant Project Manager
Safety Coordinator
Assistant Superintendent
Basement Superintendent
Assistant Superintendent
Material Hoist Operator
General Labor/ Cleanup
Carpenters
Carpenters