

# COMMUNITY HEALTHCARE

MID-ATLANTIC



# TECHNICAL ASSIGNMENT I

KENNA MARKEL

The Pennsylvania State University  
Architectural Engineering  
Construction Option



PERKINS  
+ WILL



2015  
2016

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## Executive Summary

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Community Healthcare is a medical office facility under construction in the Mid-Atlantic region. The design intent is to create a three story healthcare project to extend the network of care to the local community. The goal is to create a space where the specialists come to the patients and not the other way around. The primary tenant of this facility has a long standing history of providing exceptional healthcare to this community and has teamed up with Frauenshuh HealthCare Real Estate Solutions, one of the leading developers of medical office and ambulatory care facilities, to create this building.

The flat site in this suburban neighborhood drew attention from other corporations interested in developing the site as well. In fact, Walmart created much controversy in this area as they were ultimately prevented from developing this land on the basis of zoning. Fortunately, the primary tenant of this facility was warmly welcomed by the community and is expected to complete construction in January 2016, just 15 months after the notice to proceed

Frauenshuh brought Perkins +Will on as the architect of record and DPR Construction as the construction manager. This project was split into the core and shell (C&S) as one GMP package and the tenant interiors (TI) as another, of which both have the same project partners. While Frauenshuh holds both the C&S and TI contracts through their LLC, Frauenshuh is most interested in the C&S and the primary tenant in the TI. This medical office building is set to open in the spring of 2016.

## Client Information

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Frauenshuh HealthCare Real Estate Solutions is the owner of the Community Healthcare Building. Frauenshuh is one of the leading developers of medical office and ambulatory care facilities. With over \$3 Billion of work in 38 states, Frauenshuh is well experienced in projects such as this one and know exactly what to expect in terms of cost and schedule. Frauenshuh created a LLC for the purpose of this project. All entities are contracted to their LLC instead of Frauenshuh directly in order to mediate risk.

Community Healthcare is bought out into a core and shell package and a tenant interiors (TI) package. The primary tenant of this project has requested to be undisclosed. This tenant has contracted with Frauenshuh to build their new medical facility with their preferences in mind. The tenant has a long standing reputation for providing exceptional healthcare to the local community and hopes to expand their network with this project. Their concern will be in the quality of their new faculty with a focus on their end users.

Even though this project was bought out in two separate GMP contracts, this project is not phased and has only one schedule which includes the work for both contracts. In fact there are certain additions that were made to core and shell contract that will be supplied by the primary tenant in order to make the final space best fit their needs. Phased occupancy is still under consideration, but currently is not being implemented.

## Project Delivery

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As mentioned, Frauenshuh created an LLC for this project. All contracts are tied to the LLC not Frauenshuh directory. Both the core and shell work as well as the tenant interiors work are contracted to this LLC and not to the primary tenant. The primary tenant is instead taking advantage of Frauenshuh's experience, using them

similar to an owner’s representative. Perkins +Will was brought on early and is the architect of record for both the core and shell and the TI. They were awarded as lump sum and selected their own engineers and consultants by lump sum contract as well. Cagley & Associates were selected as the structural engineers, AHA for MEP, and Fredrick and Ward Associates for civil and landscaping.

DPR Construction was brought on to the project to provide estimates for the core and shell as early as the concept plan. Frauenshuh reached out to DPR in 2013. The project was delivered as a construction management at risk, and DPR was selected based on their general conditions, fee, and project team. DPR was selected for the TI package as well after providing pricing for schematic design, design development, and construction documents/GMP.

DPR began awarding bid packages in late September 2014 following notice to proceed. The bid packages were awarded to the lowest bidders. The major subcontractors per contract amount include Emjay for mechanical, Windsor Electric for electrical, Hanover for structural steel, and Brightbill Industries, Inc. for casework.

Staffing Plan

DPR Construction does not believe in titles, and therefore, individuals have roles and responsibilities, but not official titles. The staffing plan in Figure 1 shows the roles that each team member is performing on the Community Healthcare faculty. The DPR team could benefit by adding a project engineer to this role since John Stull the performing PE typically holds the role of project manager. The standing project manager Bill Hahner is working part time on both this project and another project while trying to fulfill PE responsibilities as well. Both Bill and John Anania helped to establish DPR’s relationship with this project being that they both have history with the primary tenant. The field team is working full-time on this project at the trailers onsite.



Figure 1 DPR Staffing Plan

Cost Estimate

RS Means was used to create the cost estimate for Community Healthcare. The building types provided by RS Mean unfortunately did not fit this building type well. This project is primarily a medical office building; however, it does contain some features of a hospital faculty. RS Means’ Medical Office building only goes up to two stories despite this building being three stories. After adjustments were made to the medical office building square foot cost, the unadjusted cost was used for estimating since it was closer to the actual cost. Despite these efforts, the estimate still came in over the actual GMP. Table 1 shows the results from the cost comparison.

One of the sources of variation between the GMP cost and the cost estimate was in the indirect costs. RS Means calls for 9% for Architect Fees and an additional 25% in other indirect costs. These costs are far greater than the costs called out in the GMP because DPR needed to make their bid competitive. Another cost that varies is for the superstructure. Since RS Means could only go up to two stories, it is expected that the superstructure in the GMP would be greater than that in the cost estimate. Once these variations were sorted out the cost estimate came close to the GMP.

Table 1 Cost Breakdown

	Actual GMP		Estimate	
<b>Total Project Cost</b>	\$25,900,000	\$244	\$32,900,000	\$310
<b>Construction Cost</b>	\$19,800,000	\$187	\$22,400,000	\$211
<b>Superstructure</b>	\$2,550,000	\$24	\$1,400,000	\$13
<b>HVAC</b>	\$2,100,000	\$20	\$2,160,000	\$20
<b>Electrical</b>	\$3,160,000	\$30	\$2,650,000	\$25

Schedule

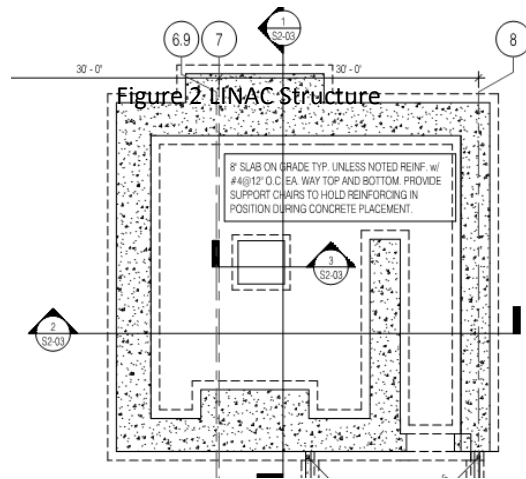
The core and shell and TI GMP schedules are actually compiled into one schedule for both. Even though there are two separate GMPs, the construction is not technically phased. The building is constructed from the south to the north then the main entrance last. This sequence is completed for both the foundations and superstructure. Once the south slabs are completed work can begin on the facades. Work then moves from the west elevation clockwise finishing at the south elevation. Since interiors are on the critical path in this 15 month construction duration, steps need to be taken to make the watertight the building before the roof is complete. Interiors can begin once the building has temporary provisions to make it watertight starting on Level 1. Currently, the project does not have phased occupancy, but the schedule is created to allow this option in the future. The remaining floors follow level one every three weeks. Commissioning is also sequenced similar to the interior finishing by level, once again to keep the possibility of phased occupancy open. The schedule can be found in the appendix below.

Site Logistics

The site is located in a suburban area of the Mid-Atlantic Region of the country. The building will be adjacent to two neighboring buildings one of which is a pharmacy and the other a fast-food restaurant. The property is ideal and fairly level to begin with. This makes it ideal for ample laydown area and parking. Traffic to and from the site will be made through the intersection on the street approaching the site. The trailer complex will visible from the entrance gate. Deliveries can enter site from entrance gate then loop around the laydown and staging area to the exit gate. Mobile cranes will be used along with lifts throughout the duration of the project due to the large size of the site. Additionally the flat land and decent soils create an ideal crane path. The project will utilize a trash shoot at the corner of the building facing the trailers.

Building Systems

**Substructure & Superstructure** - The building’s foundations are comprised of spread footings at column bases and stepped footing at concrete walls with a 5” slab on grade. In addition to the building foundations, a foundation and concrete vault had to be built for the Linear Accelerator Machine (LINAC) for the primary tenant. This room requires a minimum 4’ thick concrete walls and up to 7’-6” thick to prevent radiation from the machine from leaving the chamber. The LINAC structural plan is shown in Figure 2. The building structure is structural steel frame with elevated concrete slabs on composite steel floor decking. The elevated slab also includes a cantilever over the main entrance.



**Curtain Wall** - The building has three glazing systems including curtain wall, storefront, and ribbon windows. The curtain wall system is incorporated into the main entrance along with decorative metal panels. The storefront windows are located on the first level where the curtain wall is not and some places on the second level on the front of the building. The ribbon windows then appear on the second and third levels. Figure 3 below shows an elevation of these three systems on the front façade.

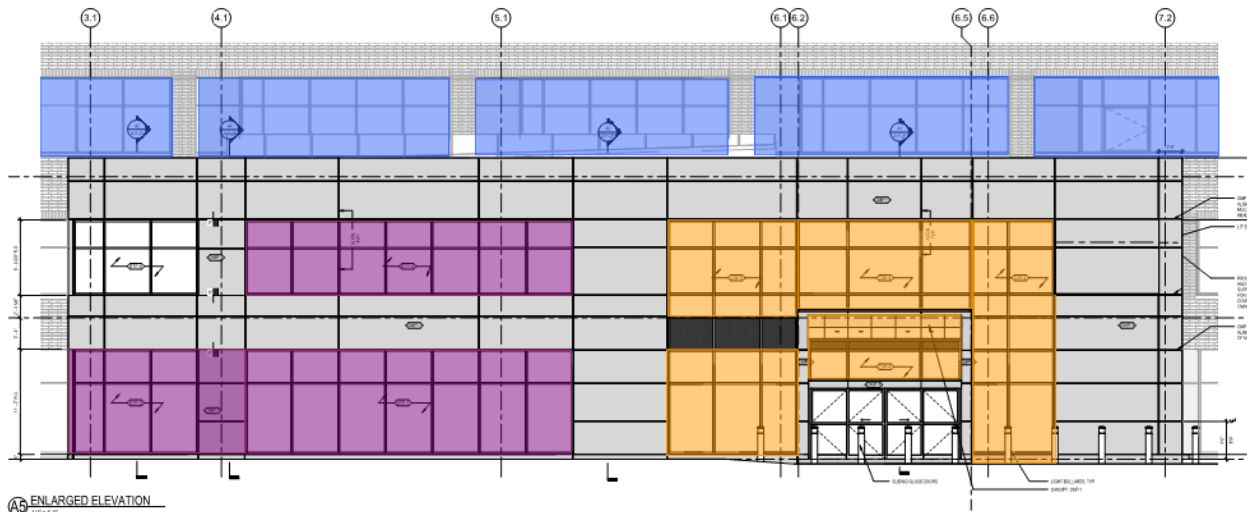


Figure 3 Glazing Systems in Elevation View

**Masonry System** - Masonry is one of the three major components of the facade system of this building. The masonry veneer is fairly typical of masonry systems. The veneer ties back to Purple gypsum board that is attached to the cold formed metal framing. A vapor barrier is applied to the Purple board before the veneer is placed. Approximately every ten to twelve brick courses a shelf, which is L-shaped is mounted. The brick sits then on this shelf and ensures that the load is distributed down to ground.

**Electrical System** - High voltage is provided by the local utility and comes into a transformer. From the transformer power is carried to the 4000 AMP main switchboard by way of eight sets of 4#500KCMIL wires providing 480/277V, 3PH, 4W power. Two transformers step down power from 480/277V to 208/120V to bring

power to the first and second levels. There is also a distribution panel located on the third level for future buildout of that space. There is also a plan for a future generator to be added to the project in years to come.

*Mechanical System* - The mechanical system of this building is fairly simple. Three rooftop air handling units (AHU) deliver approximately 37K CFM per unit. Variable air volume terminals (VAV) are located throughout each floor to ensure occupant thermal comfort. Ensuring that there are different zones is especially important in this building since different rooms have varying purposes in the health and treatment of patients. Fan powered terminals are there to be sure to distribute air equally through large open spaces. Unit heaters can be found in spaces that are not continuously occupied for example stairwells and storage rooms.

## APPENDIX



# COST ESTIMATE

# COMMUNITY HEALTHCARE

## MID-ATLANTIC

Building Parameters		
Gross Area	106,000	SF
Perimeter	910	LF
Story Height	15	Ft

Cost per SF of Floor Area	
Exterior Wall Type	Face Brick with Concrete Block Back-up
Structural System	Steel Frame
Base SF Cost	\$231.65/SF

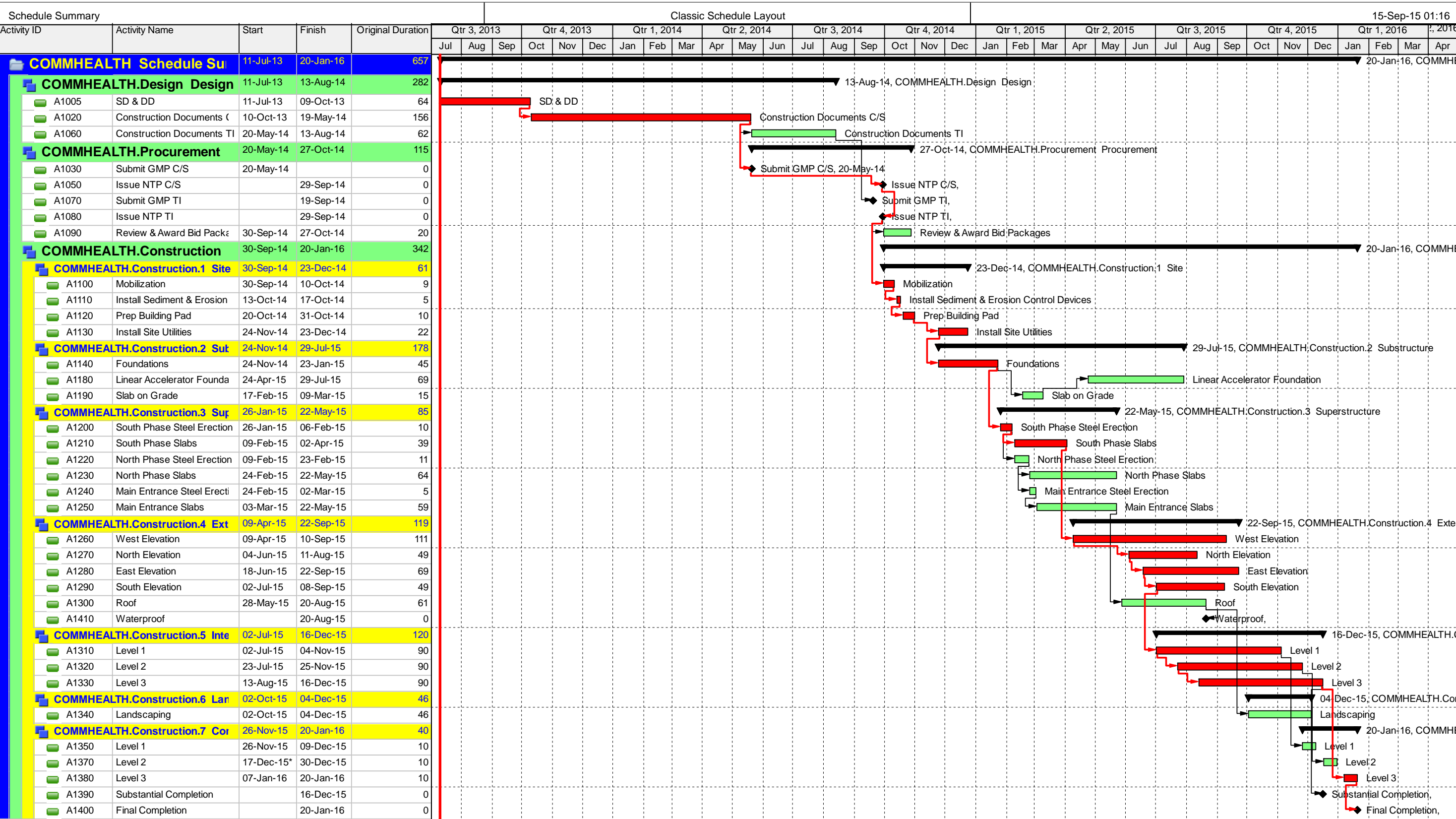
Cost Adjustments		
	Factor	Cost/SF
Perimeter Adjustment	7.75	40.61
Story Ht Adjustment	2.50	7.5
Adjusted Total		279.76
Location Correction	0.93	260.18

Cost Estimate			
Summary	Floor Area	Cost/SF	Total Cost
Cost without Adjustments	106000	231.65	\$24,554,900.00
Cost with Adjustments	106000	260.18	\$27,578,740.80
		<b>Total</b>	<b>\$27,578,740.80</b>

Uniformat II - Total Project Costs								
System	GMP					Estimate		
	%	Cost/SF	Core & Shell	Tenant Interior	Total	%	Cost/SF	Cost
<b>A - Substructure</b>	1.88%	\$4.22	\$447,000	\$0	\$447,000	4.30%	\$9.96	\$1,055,861
<b>B - Shell</b>								
<b>B10 - Superstructure</b>	10.73%	\$24.09	\$2,553,887	\$0	\$2,553,887	5.70%	\$13.20	\$1,399,629.30
<b>B20 - Exterior Enclosure</b>	13.41%	\$30.12	\$2,807,113	\$385,375	\$3,192,488	10.40%	\$24.09	\$2,553,709.60
<b>B30 - Roofing</b>	1.92%	\$4.30	\$451,853	\$4,096	\$455,949	2.30%	\$5.33	\$564,762.70
<b>C - Interiors</b>	21.11%	\$47.40	\$839,778	\$4,184,337	\$5,024,115	23.80%	\$55.13	\$5,844,066.20
<b>D - Services</b>								
<b>D10 - Conveying</b>	1.91%	\$4.29	\$455,190	\$0	\$455,190	8.70%	\$20.15	\$2,136,276.30
<b>D20 - Plumbing</b>	3.49%	\$7.84	\$481,912	\$349,600	\$831,512	16.50%	\$38.22	\$4,051,558.50
<b>D30 - HVAC</b>	8.85%	\$19.86	\$1,075,589	\$1,030,020	\$2,105,609	8.80%	\$20.39	\$2,160,831.20
<b>D40 - FP</b>	1.37%	\$3.08	\$219,800	\$106,700	\$326,500	3.30%	\$7.64	\$810,311.70
<b>D50 - Electrical</b>	13.31%	\$29.88	\$1,458,686	\$1,708,125	\$3,166,811	10.80%	\$25.02	\$2,651,929.20
<b>E - Equipment and Furnishing</b>	0.21%	\$0.47	\$0	\$50,000	\$50,000	5.40%	\$12.51	\$1,325,964.60
<b>F - Special Construction</b>	0%	\$0.00	\$0	\$0	\$0	0.00%	\$0.00	\$0.00
<b>G - Site Work</b>	9.38%	\$21.05	\$2,231,774	\$0	\$2,231,774	0.00%	\$0.00	\$0.00
<b>Additional Items Included in GMP</b>								
<b>Demolition</b>	0.34%	\$0.76	\$80,500	\$0	\$80,500			
<b>Jobsite Management</b>	2.81%	\$6.31	\$668,619	\$0	\$668,619			
<b>Project Requirements</b>	5%	\$10.20	\$422,794	\$658,294	\$1,081,088			
<b>TI to be performed with C/S</b>	5%	\$10.65	\$1,129,193	\$0	\$1,129,193			
<b>Total</b>	<b>100%</b>		<b>\$15,323,688</b>	<b>\$8,476,547</b>	<b>\$23,800,235</b>	<b>100%</b>		<b>\$24,554,900</b>

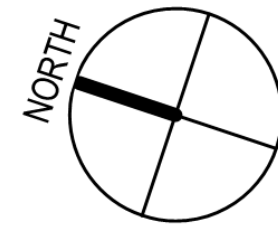
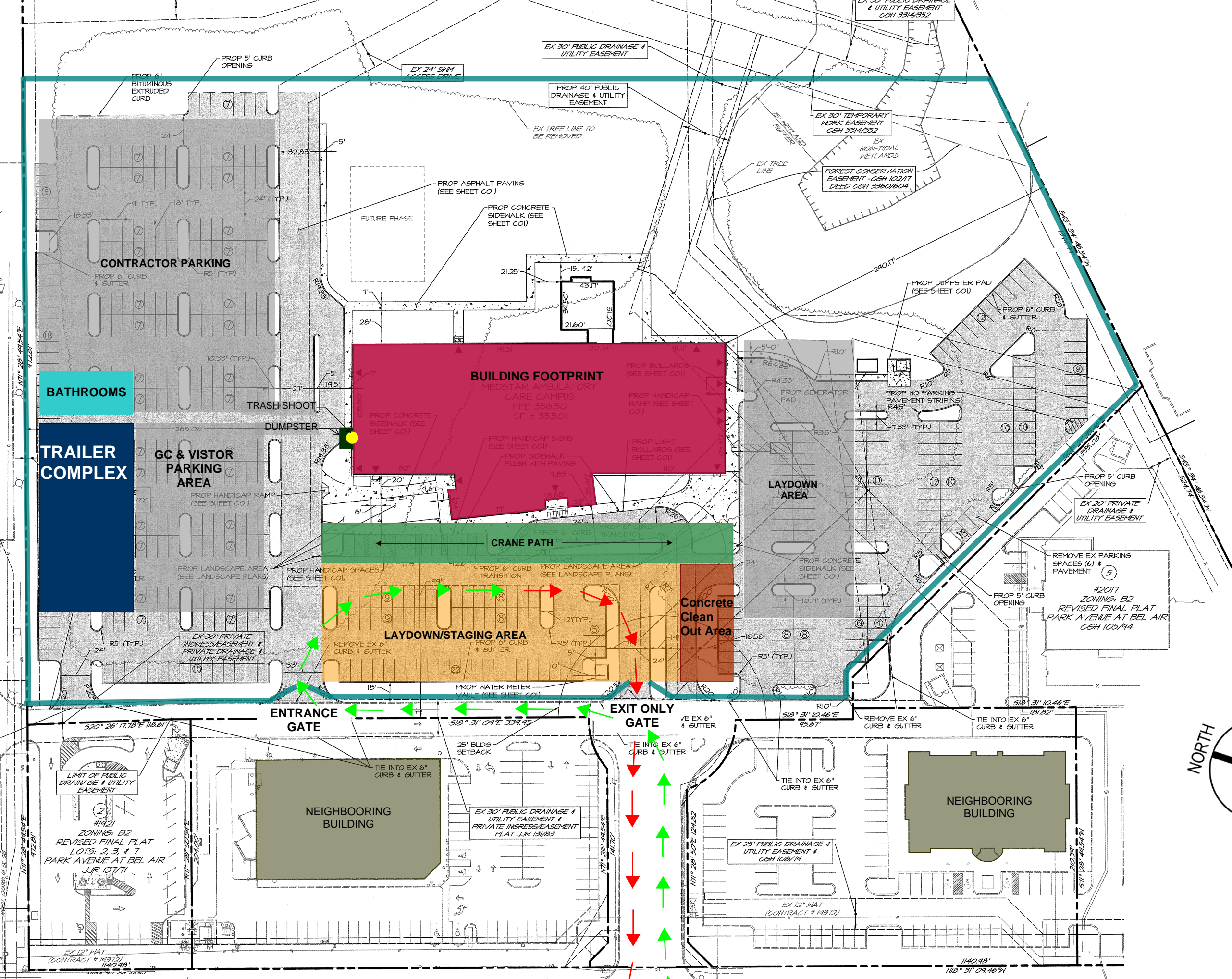
<b>Subtotal</b>	\$23,800,235.00	<b>Subtotal</b>	\$24,554,900
<b>Indirect Costs C/S</b>	\$1,301,806.00	<b>Architect Fees</b>	9.00% \$2,209,941.00
<b>Indirect Costs TI</b>	\$794,341.00	<b>General Requirements</b>	10.00% \$2,455,490.00
<b>Total</b>	\$25,896,382.00	<b>Overhead</b>	5.00% \$1,227,745.00
<b>Cost/SF</b>	\$244.31	<b>Profit</b>	10.00% \$2,455,490.00
		<b>Total</b>	\$32,903,566
		<b>Cost/SF</b>	\$310

\*The actual building costs are being submitted for education purposes only and will not be posted for public knowledge.



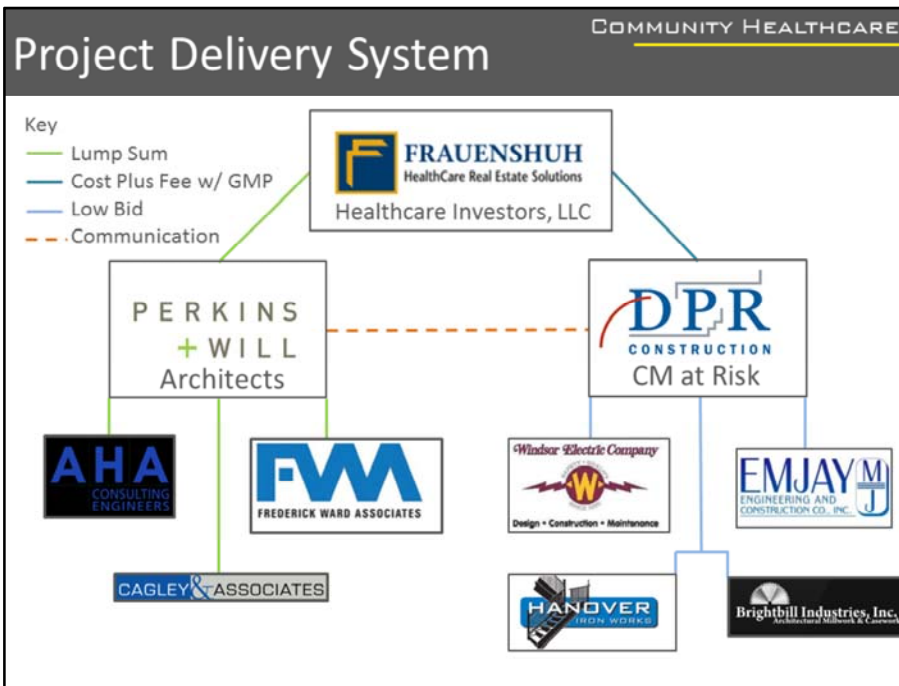
█ Actual Level of Effort     █ Remaining Work     ◆ Milestone  
█ Actual Work     █ Critical Remaining Work     → summary

ZONING: B2  
REVISED FINAL FLAT LOTS, 1  
JAMES D. STONE TRUSTEE,  
CHARITABLE REMAINDER TRUST JLR 13/1/84






- Community Healthcare → Mid-Atlantic Region
- Technical Assignment I



- Frauenshuh is the owner/developer → created LLC company to reduce risk
- LLC contracted to Arch. by Lump Sum
- LLC contracted to DPR by cost plus fixed fee w/GMP
- DPR selected contractors by competitive bid
- Arch. contracted to engineers by Lump Sum
- Communication between Arch and DPR. Arch to connect DPR to engineers

Client Information COMMUNITY HEALTHCARE



38 States  
\$3 Billion

Ambulatory Care  
Medical Office

Cost  
Schedule

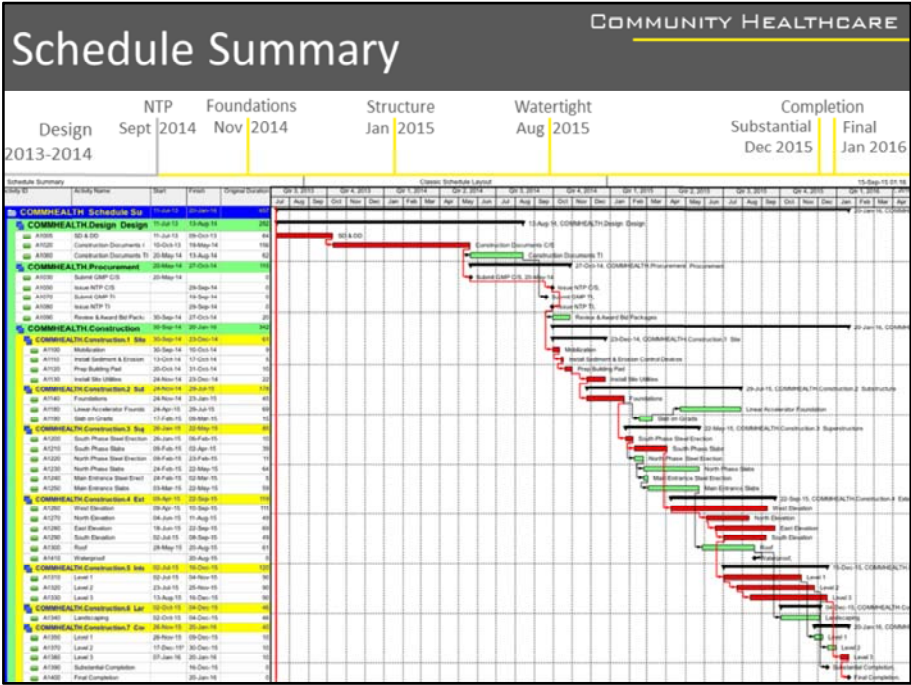
### Primary Tenant

“Committed to providing individuals and families with convenient, compassionate, coordinated healthcare services close to where they live and work.”

- Frauenshuh experienced → see slide
- Primary Tenant focus on expanding network and quality of care



- Know anything about DPR? Know DPR has roles not titles
- Believe in the person best fit to carry out the action should do it
- Hence why there is no hierarchy to this organization chart
- For example John Stull who is acting as a project engineer typically acts as a senior project manager but is only doing submittals and PE duties



- Total duration of approximately 2.5 years
- Construction only 15 months
- NTP on Sept 29, 2014
- Substantial Completion mid Dec
- Final Completion one month later Jan 20, 2016



COMMUNITY HEALTHCARE				
Cost Evaluation				
	Actual GMP		Estimate	
Total Project Cost	\$25,900,000	\$244	\$32,900,000	\$310
Construction Cost	\$19,800,000	\$187	\$22,400,000	\$211
Superstructure	\$2,550,000	\$24	\$1,400,000	\$13
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Electrical	\$3,160,000	\$30	\$2,650,000	\$25


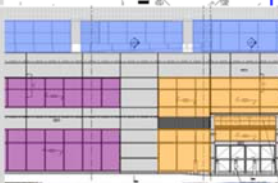

**Sources of Variation**

- \* Indirect costs RS Means has 34% in fees, profit, & general requirements
- \* Superstructure RS Means only 2 story MOB

- Go over chart values
- Variation from indirect costs:
  - RS Means calls for 9% for Architect Fees and an additional 25% in other indirect costs. These costs are far greater than the costs called out in the GMP because DPR needed to make their bid competitive.
  - Superstructure → RS Means could only go up to two stories, it is expected that the superstructure in the GMP would be greater than that in the cost estimate

# Building System Summary

COMMUNITY HEALTHCARE

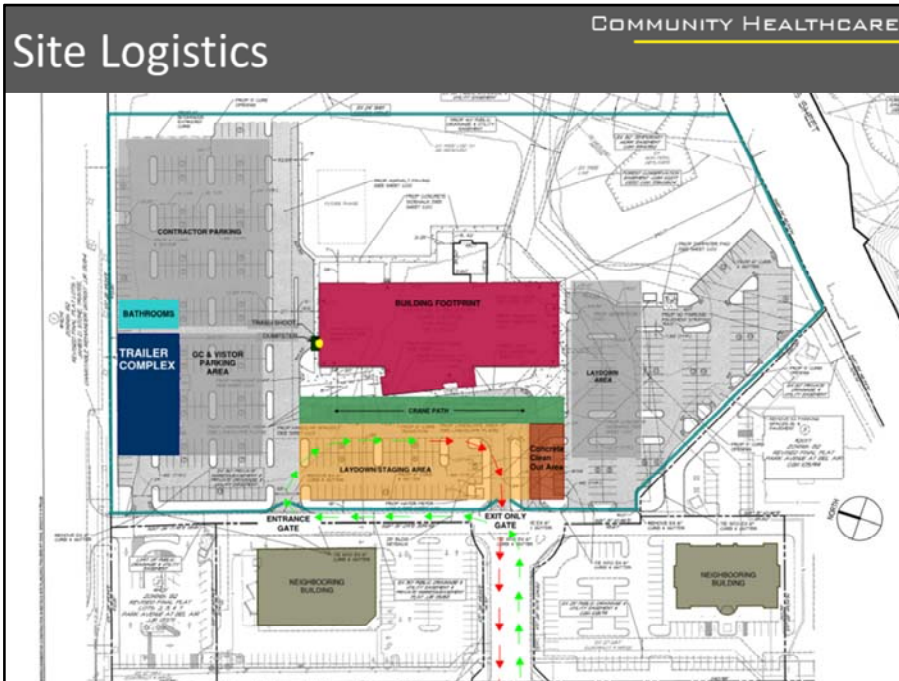
Substructure + Superstructure	<ul style="list-style-type: none"><li>• Spread footings at column bases</li><li>• Stepped footing at concrete walls</li><li>• 5" SOG</li><li>• Structural Steel + Elevated Slabs</li><li>• LINAC</li></ul>	
Curtain Wall	<ul style="list-style-type: none"><li>• Curtain wall system to Main Lobby</li><li>• Storefront system on 1<sup>st</sup> Level</li><li>• Windows on 2<sup>nd</sup> &amp; 3<sup>rd</sup> Floors</li></ul>	
Masonry	<ul style="list-style-type: none"><li>• Primarily brick veneer to Purple board &amp; cold formed metal framing</li><li>• Brick shelves every 10-12 courses</li></ul>	

- Substructure + Superstructure
  - Talk about bullet points
  - Image is of Linac
- Curtain Wall
  - Talk about bullet points
  - Image of three different glazing systems
- Masonry
  - Talk about bullet points
  - Image of purple board

# Building System Summary

<p>Mechanical</p>	<ul style="list-style-type: none"> <li>• AHUs deliver 37K CFM</li> <li>• VAVs critical to building type</li> <li>• Unit heaters</li> </ul>	
<p>Electrical</p>	<ul style="list-style-type: none"> <li>• 4#500KCMIL provide 480/277V, 3PH, 4W power</li> <li>• 4000 AMP main switchboard</li> <li>• Future generator</li> </ul>	

- Mechanical
  - Talk about bullet points
  - Image AHU roof units
- Electrical
  - Talk about bullet points
  - Image future generator



- Suburban area of the Mid-Atlantic region of the country
- The property is fairly flat
- Two neighboring building and one main entrance coming from the intersection
- Neighboring Buildings → drug store and fast-food restaurant
- Show site fence, building footprint, access & traffic flow, trailers, parking, crane, laydown