TECHNICAL REPORT 1

National Intrepid Center of Excellence
Bethesda, MD

10/5/2009
Ronza Abousaid
AE Faculty Consultant: Christopher Magent
Construction Management

TABLE OF CONTENT

EXECUTIVE SUMMARY

The following technical assignment is a detailed report of the existing conditions of the National Intrepid Center of Excellence in Bethesda, MD. The construction management process obtained by Turner Construction is thoroughly discussed throughout this report. This includes: the project schedule, cost estimations and evaluations, and the project delivery methods. In addition, an overview of the buildings systems, local conditions, client information, and the exiting site will also be presented.

The Intrepid Fallen Heroes Fund, a national leader in supporting the men and women of the United States Armed Forces and their families, has launched an important new effort to serve our military community. The Fund is for designing and building the National Intrepid Center of Excellence (NICoE), an advanced facility dedicated to research, diagnosis and treatment of military personnel and veterans suffering from traumatic brain injury (TBI) and psychological health issues. NICoE will be a 72,000 square foot, two-story facility located on the National Navy Medical Center campus in Bethesda, Maryland.

Turner Construction was awarded the construction contract in July 2008 for the National Intrepid Center of Excellence costing approximately $65 million. The budget used for this project is fully funded by public and private sectors. Therefore the owner could not reveal any of the project's breakdown costs. Construction began after mobilization was set on March 6, 2009 with the ground breaking event. The project's completion date is set for July 2010. The facility has a very simple structure, which includes a concrete slab-on-grade with shallow foundations (spread footings) and elevated cast –in-place concrete slabs. The façade is precast concrete panels with punched in windows along with mechanical louvers. The northwest façade, housing the spacious lobbies, is composed of a curved curtain wall system which extends the height of the building.

This project's design and construction complexity begins with the exceeding high level materials used for the interiors and the finishes. Also, the high-tech equipment included within the clinical rooms, which is owner provided, can cause many schedule delay issues since most of the equipment's shop drawings are not available to the GC at this time. NICoE is pursuing a LEED certified project, having some sustainability features incorporated within the design and the construction of the project.

The owner's expectations for this project are very high. Turner Construction contracted as a design-assist project. Therefore, Turner was brought in early in the design phase for constructability review and initial schedule analysis to be able to meet the quality expectations required. Building Information Modeling is used as a primary tool for the design and construction activities on this project. It acts as a solution for many of the design issues that can be eliminated early on. The site of National Naval Medical Center is also building multiple different projects concurrently. This can be challenging for the site logistic planning of all phases of the construction activities that are to occur.

"*Far too many are suffering from the signature injuries of the wars in Iraq and Afganistan. Post Traumatic Street Disorder brain injury …the servicemen and women who embody what's best about America, should get the best care we have to offer*" -***Barack Obama***

PROJECT SCHEDULE SUMMARY

The Schedule for National Intrepid Center of Excellence is relatively straight forward in its nature. Turner Construction was awarded the construction contract for the National Intrepid Center of Excellence in July 2008. Looking over the Gant chart shown on the next page in figure 1, NICoE broke ground on March 6th, 2009 and is scheduled to be completed within a 16 month period. The project budget was developed around design documents dated Oct 15, 2008. Since then, six (CCD's) design development documents have been issues. Due to user group meeting and numerous RFI's the design was complete by issuing the last CCD-006 dated July 27, 2009. Notice to Proceed was delivered on March 4, 2009. Mobilization promptly followed, by having three main Turner Construction trailers on site, fencing around the area and laying asphalt pathways for ease of pedestrian access.

Foundation Sequence:

American Infrastructure began with cutting the site to grade and setting up the gravel road around the perimeter of the building. Miller & Long contractor began the foundation and footing activities (Figure 2) on May 2009. Starting from the northeast edge of the building and continuing around the perimeter in a clockwise direction, spread footings were formed, poured and striped within 42 days. This was a very easy and smooth process.

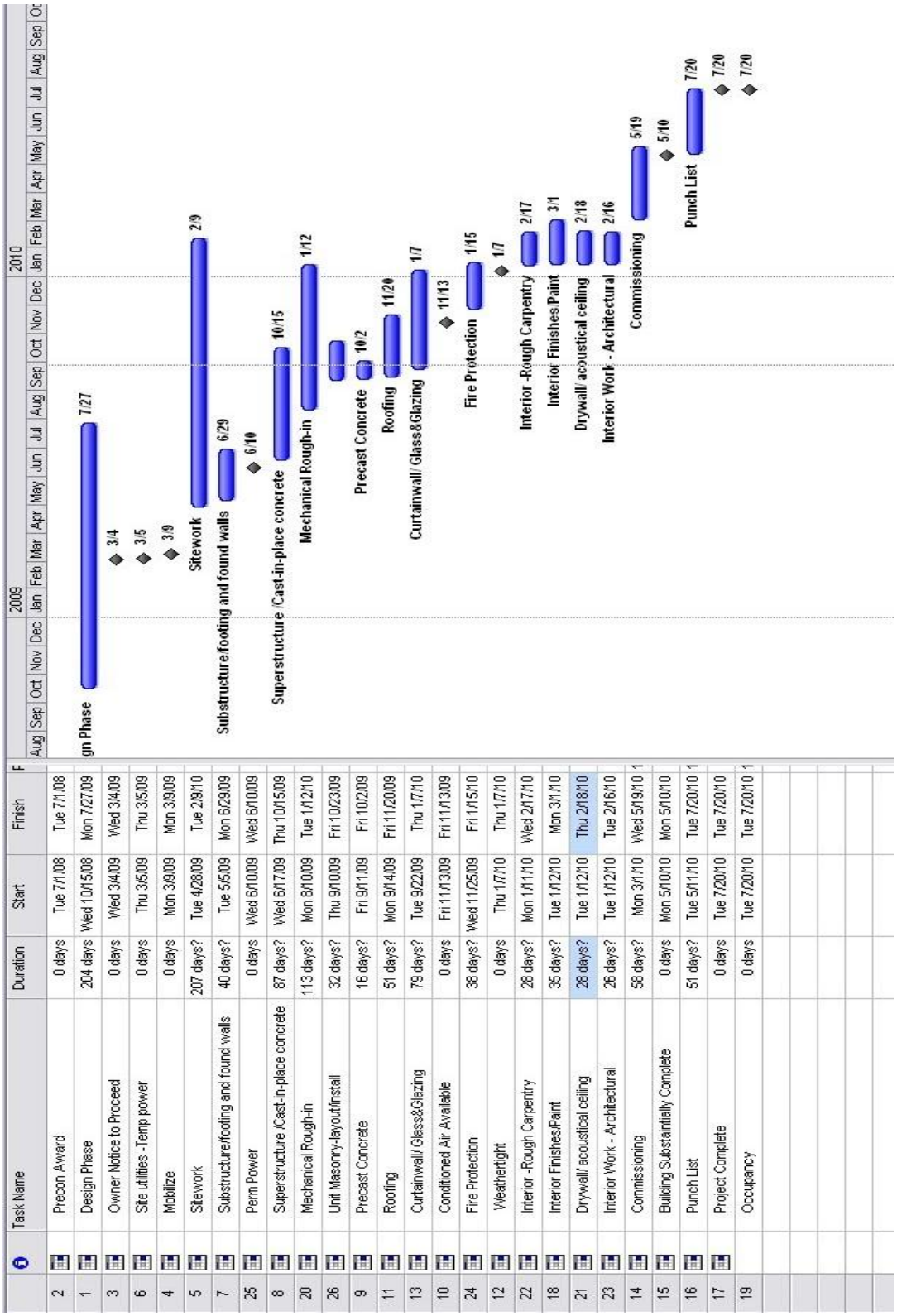
Structural Sequence:

The slab on glad is poured in 7 sections starting June 10, 2009. Following the substructure, pour-1 (which is composed of 8100 Sq.Ft) will begin at the northeast edge of the building. The process will continue by pouring each section around the perimeter in a clockwise direction and ending with the last section at the northwest side (figue3). A small section on the south side will be left un-poured for the tower crane location. Twelve days after SOG has been poured, level two is formed and poured in the same process excluding the open area at the northwest side (figure 4). Level two is poured in 5 sections. Following this process, the low roof is then formed and poured in 3 sections (Figure 5). Last but not least, the high roof is poured from east to west in a 3 pour section process (figure6). The tower crane sections will be poured after the removal of the crane on September 11, 2009.

Finishing Sequence:

The interiors in this building are comprised of high-end finishes and sophisticated clinical equipment. The sequencing of the finishes will continue in the same fashion as the rest of the building. The finishing sequence starts from the northeast and moves in a clockwise direction in 4 quadrants. Most of the equipment in this facility will be provided by the owner.

NICoE Summary Schedule:



	Task Name	Duration	Start	Finish	F
2	Precon Award	0 days	Tue 7/1/08	Tue 7/1/08	
1	Design Phase	204 days	Wed 10/1/08	Mon 7/27/09	
3	Owner Notice to Proceed	0 days	Wed 3/4/09	Wed 3/4/09	
6	Site utilities - Temp power	0 days	Thu 3/5/09	Thu 3/5/09	
4	Mobilize	0 days	Mon 3/9/09	Mon 3/9/09	
5	Sitework	207 days?	Tue 4/28/09	Tue 2/9/10	
7	Substructure/footing and found walls	40 days?	Tue 5/5/09	Mon 6/29/09	
25	Perm Power	0 days	Wed 6/10/09	Wed 6/10/09	
8	Superstructure /Cast-in-place concrete	87 days?	Wed 6/17/09	Thu 10/15/09	
20	Mechanical Rough-in	113 days?	Mon 8/10/09	Tue 1/12/10	
26	Unit Masonry-layout/install	32 days?	Thu 9/10/09	Fri 10/23/09	
9	Precast Concrete	16 days?	Fri 9/11/09	Fri 10/2/09	
11	Roofing	51 days?	Mon 9/14/09	Fri 11/20/09	
13	Curtainwall/ Glass&Glazing	79 days?	Tue 9/22/09	Thu 1/7/10	
10	Conditioned Air Available	0 days	Fri 11/13/09	Fri 11/13/09	
24	Fire Protection	38 days?	Wed 11/25/09	Fri 1/15/10	
12	Weathertight	0 days	Thu 1/7/10	Thu 1/7/10	
22	Interior -Rough Carpentry	28 days?	Mon 1/11/10	Wed 2/17/10	
18	Interior Finishes/Paint	35 days?	Tue 1/12/10	Mon 3/1/10	
21	Drywall/ acoustical ceiling	28 days?	Tue 1/12/10	Thu 2/18/10	
23	Interior Work - Architectural	26 days?	Tue 1/12/10	Tue 2/16/10	
14	Commissioning	58 days?	Mon 3/1/10	Wed 5/19/10	1
15	Building Substaintially Complete	0 days	Mon 5/10/10	Mon 5/10/10	
16	Punch List	51 days?	Tue 5/11/10	Tue 7/20/10	1
17	Project Complete	0 days	Tue 7/20/10	Tue 7/20/10	
19	Occupancy	0 days	Tue 7/20/10	Tue 7/20/10	1

Figure 1

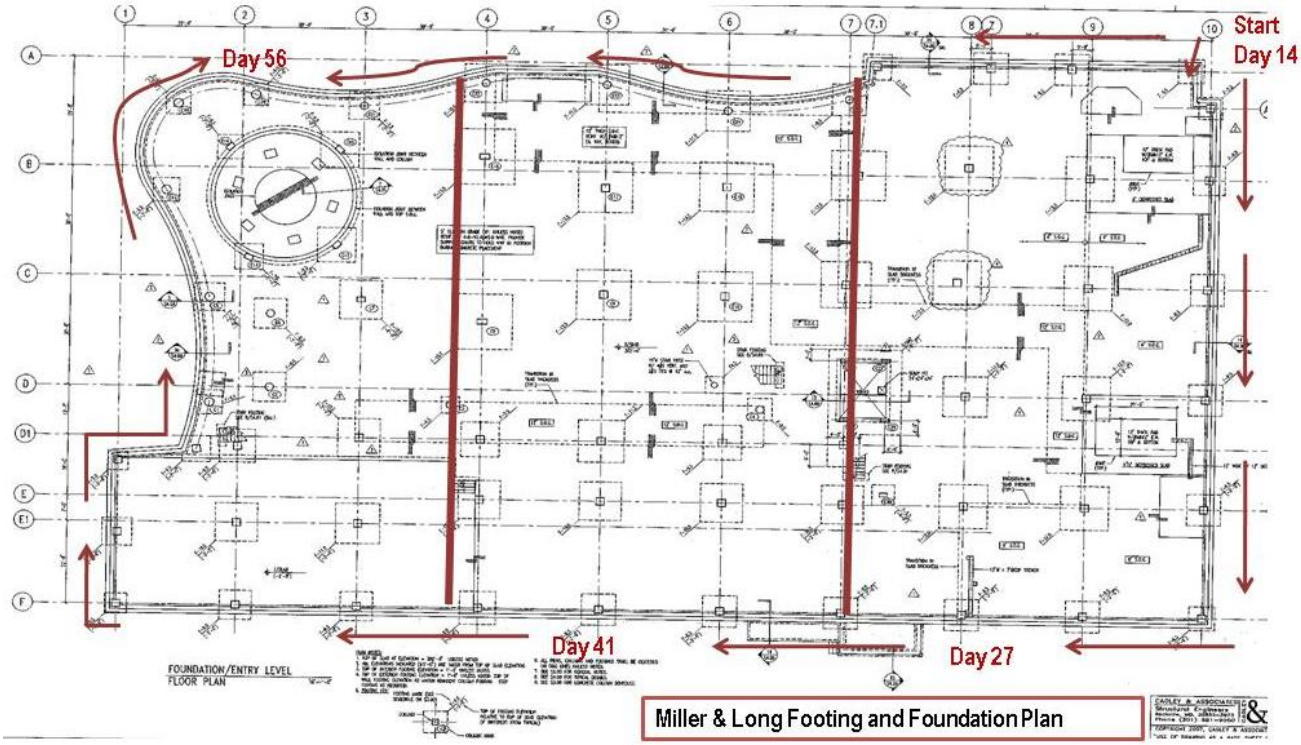


Figure 2

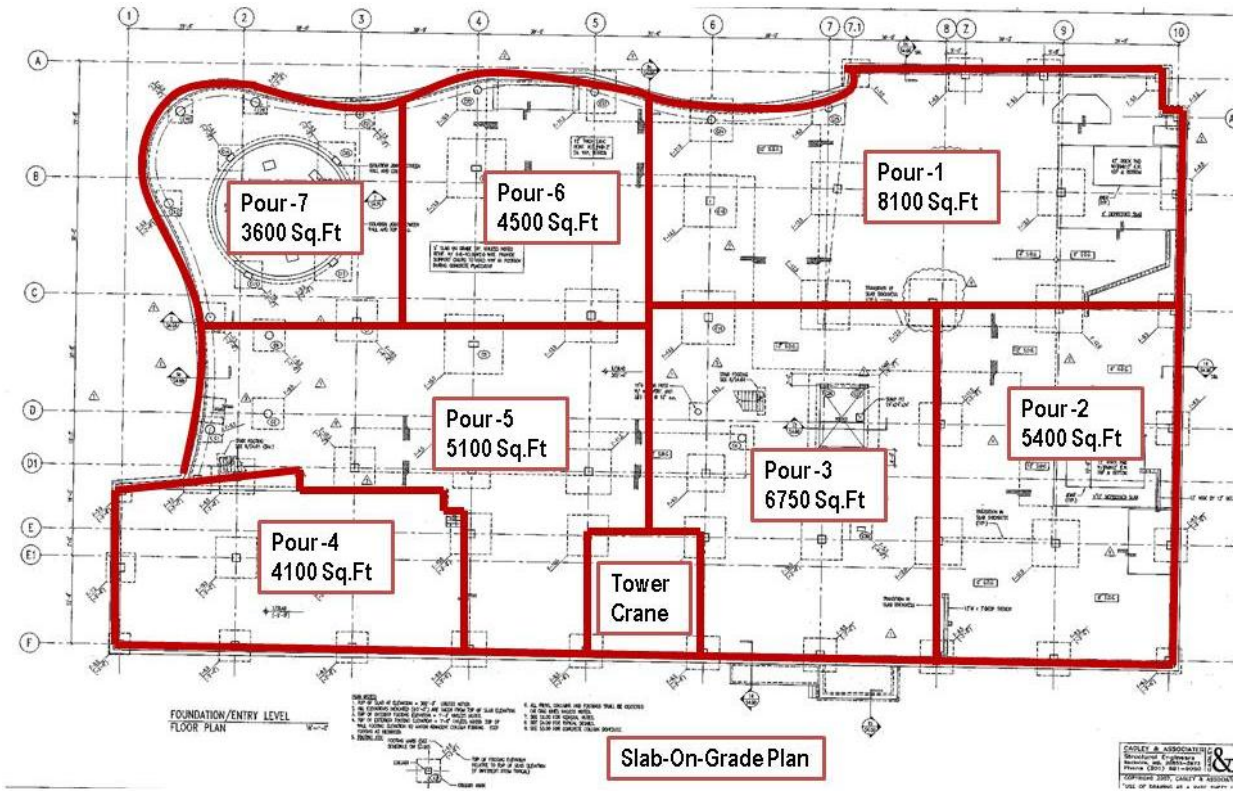


Figure 3

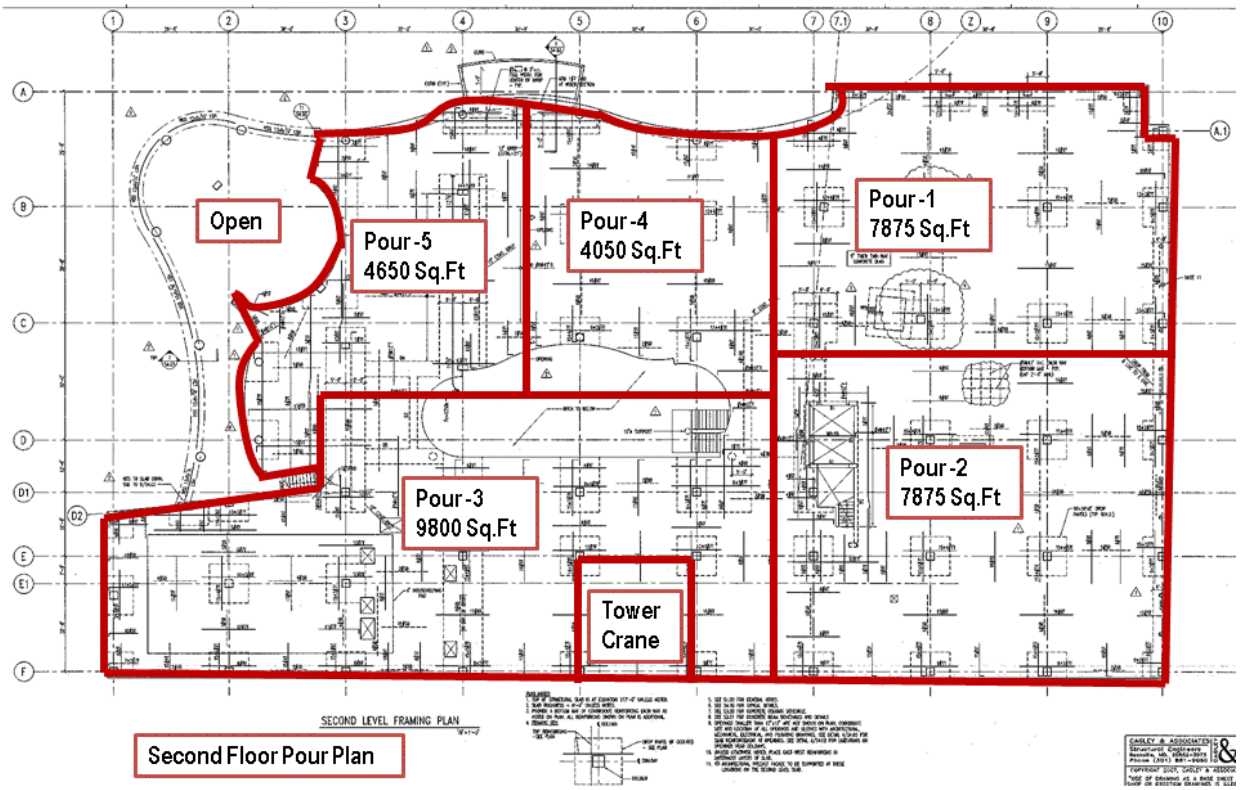


Figure 4

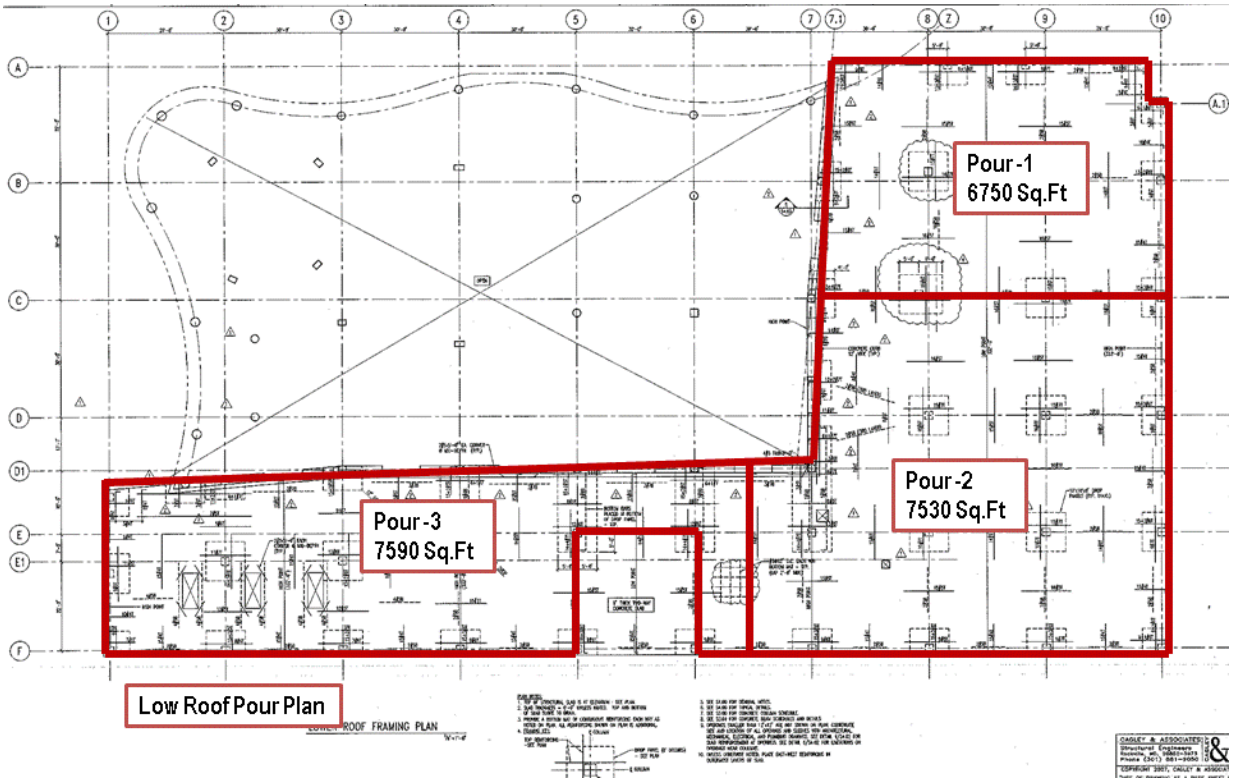


Figure 5

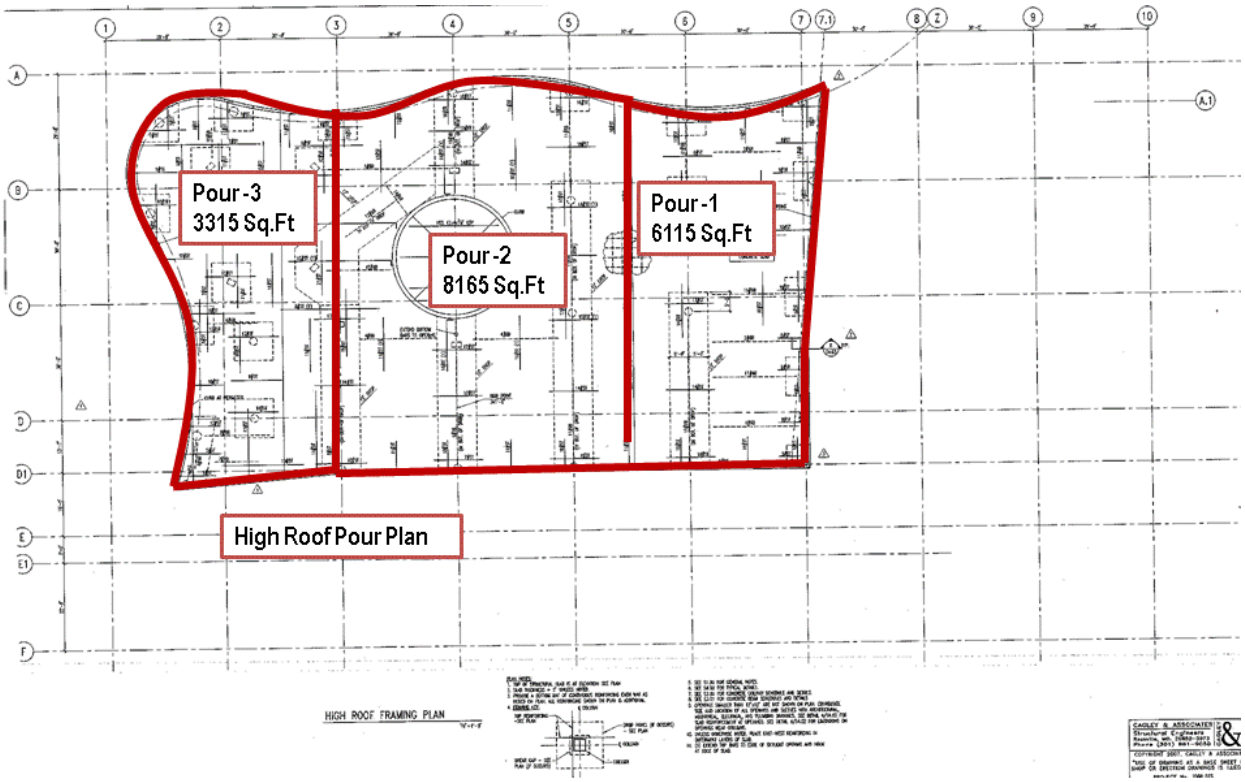

Pour -3
3315 Sq.Ft
Pour -2
8165 Sq.Ft
Pour -1
6115 Sq.Ft
High Roof Pour Plan
HIGH ROOF FRAMING PLAN

Figure 6

BUILDING SYSTEM SUMMARY

Yes	No	Work Scope (If yes, address these questions / issues)
x		**Demolition:** The NICoE site was previously a dormitory for noncommissioned officers (NCO). Therefore, a demolition plan needed to be put in place before any construction had begun. The demolition was not done by Turner construction. A large portion of sidewalks, trees and shrubs had to be removed. Some asbestos material was found and was removed from the site. Unsuitable soils became a factor in the design and construction of the project. Taking into consideration the soil borings that were done on site, it was known that the soils were non-compacted and needed to be disturbed and re-compacted to get to the required strength.
	x	**Structural Steel Frame:** Not used
x		**Cast-in-place Concrete:** Cast-in-place concrete is used for footings, foundation walls, SOG, both floor levels, high and low roof. The concrete spread footings (3000psi) rang from 4'-6"x 4'-6" x 12" to 15'x 15'x33" (WxLxD). Also, the first level is a 5" thick slab on grade (3500psi) with a 6" - 12" transitions in some spaces. SOG is placed on a vapor barrier over a minimum of 4" layer of clean, well-graded gravel or crushed stone over compacted sub-grade, reinforced with 6x6 W2.0 x W2.0 WWF. The cast–in-place concrete columns range from 24"x 24", 12"x 24", 16"x30" and 16"x24". The second floor, low roof and high roof structural plan is composed of a 9" thick two–way reinforced concrete slab (4000psi) with various location drops ranging from 8" – 15". In addition The central park area requires a post tension reinforced concrete due its heavy loads. The reinforced concrete columns extend to the second floor and require a change in the compressive strength to a 4000psi with a 10'x10'x8"drop panels. At the high roof, low roof and around the curved northwest exterior walls are 24" diameter circular concrete columns with HSS steel connections. As for the types of formwork used, the concrete formwork is a high load WACO scaffold with 67-1/2" aluminum beams used for both purlins and joists. 5/8" BB plyform is the cast against the surface. Concrete placement methods were: ground level concrete was placed using both back of truck and Gabrow 3 yard bucket. Columns used a side chute bucket. A couple of the elevated decks were placed with a 47meter Putzmaster truck mounted pump. The placing rate for elevated decks is about 60 yards per hour, limited by the screeding activities not by the placement methods.  Cast in place elevated slabs  Temp. bracing supports

Central Park location w/ post tension Reinforcement

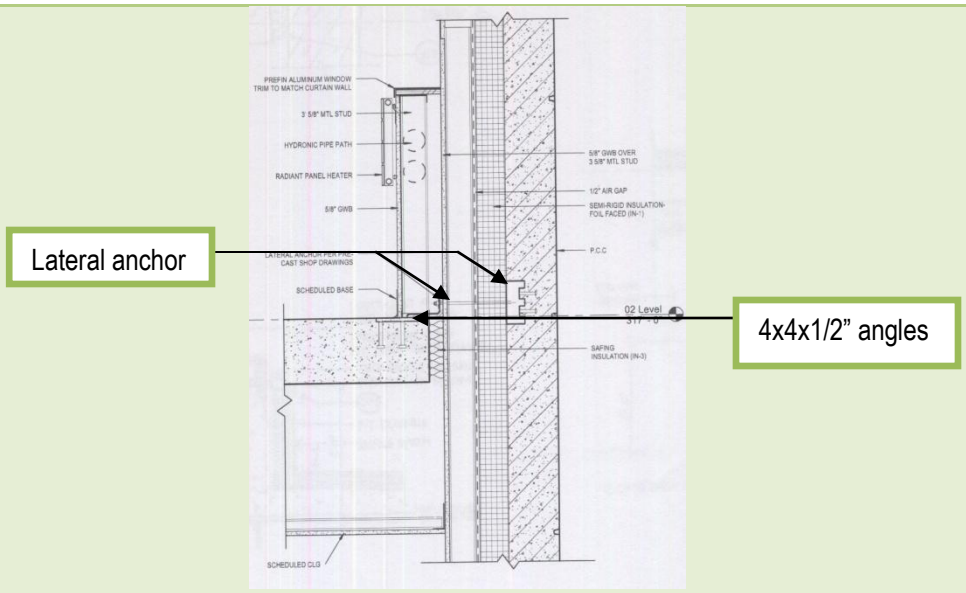
Post tensioning reinforced slab

Column Formwork

Low-roof reinforcement before slab is poured

Concrete placement methods-chute bucket

x		**Precast Concrete:** Precast concrete panels along with punched in windows and mechanical louvers will be used throughout the east and south facade of the building. Seen below are precast panel connection details, which are pins in grout pockets at the bottom. Embedded weld plates and 4x4x1/2" angle bolted to the insert in the panel and welded to the embed in the concrete.



One crane is used for the placement of the concrete precast panels. The crane is located on the south side of the building, one column line into the building. It is able to pick the 3 yard bucket at the tip of the jib which is 212'. Hook height is 99' above the first floor. The location of the crane was chosen based upon the allowable reaching distance without swinging over the adjacent buildings. The crane was unable to be placed outside of the building due to existing utilities. The foundation for the crane is 30' square and is placed on the 45 to the column grid so it does not interfere with the building foundation.

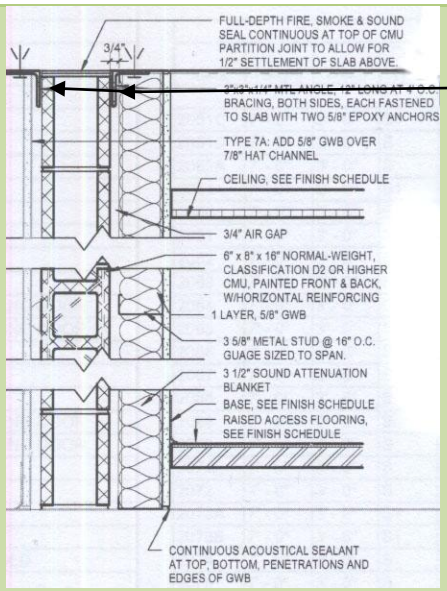
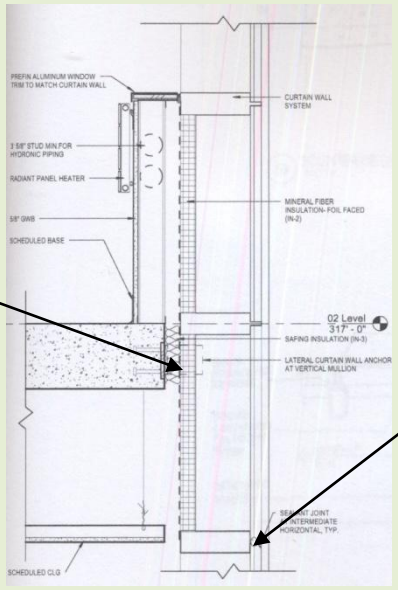
Crane Used on site

x

Mechanical System :

The chilled water supply and return lines along with the high pressure steam and the electrical pump condensate lines are run underground from the central utility plant on base to the building mechanical room. Two mechanical rooms are located on both floors at the southwest side of the building. The high pressure steam system is used for the domestic hot water and also as a main source for heating the building. A field erected air handling unit located on the second floor in the mechanical room is used as a main source to cool the building. The AHU's supply airflow max is 86,000CFM and min of 68,000 CFM. In addition, variable air volume (VAV) and constant volume control boxes are used through the building to maintain the required temperature. Chilled water pumps located on the first floor in the mechanical room will have a capacity of 950 GPM with a motor data of 25HP, 1.750RPMs, 460 volts, and 3PH. Heating hot water pumps located on the second floor mechanical room will have a capacity of 300 GPM with a motor data of 15HP, 1,750RPMs, 460 volts and 3PH. Lastly, an air conditioning unit located in the computer

		rooms is used in the: server room, MRI equipment, PET/CT room, CAREN equipment, and media "Dive" room. **Fire Suppression system:** The NICoE is designed with a wet-Pipe Sprinkler system. The interior of the building is broken into light hazard occupancy (admin areas, assembly areas, computer rooms etc and normal hazardous occupancy (storage areas, mechanical and electrical rooms and similar stockpiles of combustion materials do not exceed 8'-0"). This provides for the light hazard areas a 0.10GPM per Sq.Ft and a 0.15GPM for the ordinary hazard areas over the hydraulically most remote 3000sq.ft.The fire command center is located on the ground floor in the engineering equipment room on the southwest edge of the building. This room houses the fire alarm control panel, voice amplifier panel, voice evacuation panel, transient voltage surge suppression, and 2 notification appliance power extended panel etc. A pre-action sprinkler system is installed in the server room on the second floor. Each floor, including core and shell is equipped with fire alarm strobe-speaker appliance; manual pull stations, ceiling and wall mounted smoke detectors, and heat detectors.
x		**Electrical System:** NICoE's electrical system begins at the central utility plant on base and is transferred to the electrical room which is located on southwest side of the building. The power is serviced from an upgraded 15KV primary feeder located in the concrete ductbank. The power is received using a 2500 KVA transformer which steps down the voltage from a 13.8KV to a nominal system voltage of a 480Y/277V, 3PH, 4-Wire which services most of the loads in the building. Receptacles and some lighting fixtures receive power through a 208Y/120V, 3P, 4W system. In addition, a 3000A Main-Bus continuous 480Y/277V, 3PH, 4-Wire switchboard provides power to all loads in the building. As for emergency power in the building, an exterior factory –assembled and tested standby diesel generator rated at 400KW, 480Y/277V, 3p, 4W system with sub-base fuel tank is provided. Along with the generator are two different circuit breakers rated at 600A, 3p and 225A, 30P. Also, a 225 KVA UPS battery backup system is connected to two PDUs that serve the emergency power in the service room located on the second floor.
x		**Masonry:** There is a very minimum amount of masonry used in this building. A large portion of the CMU is used as a load bearing curved 22' wall, surrounding the CAREN system, in the northwest side of the building. The CMU dimensions used around the CAREN system is 8"x16", whereas in the mechanical room area it is 6"x8"x16" Normal –weight CMU. The CMU connections seen below, are 3"x3"x1/4"MTL angle which is 12" long at 4" O.C. bracing both sides and each is fastened to the slab with a two 5/8" epoxy anchors. No veneer is used. The scaffolding used is a typical masonry walk through with outriggers.

		 3"x3"x1/4" MTL angle, 12" Long at 4" o.c.
x		**Curtain Wall:** There are two different types of glass used within the curtain wall system. Both the IGU-1 and the IGU-3 is a 1.153inch thick glass which is a tinted heat strength float glass. It has a low emissivity coating laminated with clear float glass (LGU-1) with a visible light transmission value of 54%. The IGU-1 has a UV transmittance value of <1% and IGU-3 has a winter U-value of 0.28 and a summer U-value of 0.26. Seen below is the curtain wall connection details, which are mostly Halfin embeds in the concrete with "T" bolts connection to the steel sub frame. Additionally, the curtain wall system is pre-assembled in the glazing factory and will be delivered in sections.  Lateral Curtain wall Anchor Sealant Joints at intermediate Horiz.,TYP.
x		**Support of Excavation:** Excavation was accomplished using a combination of laid back and shield/trench boxes depending on the space available around the perimeter of the building. There is no constant ground water so no permanent dewatering systems are done. During excavation, pumping purge and surface water was done, and later transferred to the sediment tanks.

LEED Design Aspects

The NICoE is a LEED certified building which incorporates many sustainability design features. One of the most visible features is the curtain wall system which is located on the north and west side of the building. There are two different types of glass used within the curtain wall system. Both the IGU-1 and the IGU-3 is a 1.153inch thick glass which is a tinted heat strength float glass. It has a low emissivity coating laminated with clear float glass (LGU-1) with a visible light transmission value of 54%. The IGU-1 has a UV transmittance value of <1% and IGU-3 has a winter U-value of 0.28 and a summer U-value of 0.26. This will help maintain the space at a comfortable temperature environment and at the same time minimize the energy used to cool and heat the building.

Site developments, water use reduction, construction waste management, enhance commissioning and using both regional and low-emitting material has given the NICoE a drive to comprise a certified LEED building. Refer to LEED-NC point checklist in appendix II for other LEED construction and design aspects taken into consideration for this project.

PROJECT COST EVALUATIONS

The National Intrepid Center of Excellence is a 100% funded project through public and private donations. The land is fully donated along with approximately 20% of the materials used for the construction of the NICoE. Therefore, the subcontractors of this project were involved heavily in the donations of this project. Also, the major high technical equipment is provided by the owner and is therefore directly paid by them (Fisher house). For this reason, it has been requested by the owner that the cost information pertaining to the project not be revealed. The total project cost is approximately $65million. This number is the only number being released to the public. The hard cost for this project cannot be obtained for the reasons mentioned above. Therefore, the actual building construction cost and the major building system costs will be revealed in this report as an estimate using D4cost and RS Means and also a rough order estimate directly from the project manager on site (David Wysong).

For comparison, two methods of cost estimate were used to examine the project cost. A parametric estimate for the NICoE was first run using D4Cost estimating software. As the parameters were expanded, such as the square footage, number of levels, building use, the number of related projects decreased. The Emergency & Med-Surgical Pavilion project in NJ was the closest project that compared to the NICoE. The summary data used from the D4 project seen below, affected the difference in the project cost. The Emergency & Med-Surgical Pavilion project is a new construction project built in April 2003, with a total square footage of 111,871. This project was chosen since it was very similar to NICoE: 2 story hospital, concrete structure with precast concrete walls and floor to floor height of 15.4'. After having to readjust the data used from the Emergency Med-Surgical Pavilion hospital to the NICoE's data; the estimate became further away from the original building cost. A full print out of the estimate has been included in Appendix 1. In conclusion the D4 cost estimate per Sq.Ft, the cost is over 200% low when compared to the actual TC/SF.

The second method used to examine the project cost is a Square Foot estimate using R.S. Means data. A reference from the source on the cost information is shown below. Using the S.F area of a hospital 2-3 story high, along with the type of exterior walls, perimeter and story height adjustments, time and location adjustments and any common additives to the project, originated a typical cost estimate for the specific type of project. In addition to using the RS Means 2009 Sq. Ft estimate, a CostWorks RS Means was also run on a computer program to make sure the hand estimation was done correctly. Both reports are included in appendix II. After having run the calculations, the cost figure comes in 300% lower compared to the actual project cost.

Comparing both estimates to David Wysong's rough order of magnitude seen below, it is obvious that there is a big difference in cost. In addition, after having run both cost estimation methods, both figures have come extremely lower than the actual project cost. Both the D4 Cost and the R.S. means estimates were more than $20 million under the actual project cost of $65million(Including equipment). However, comparing R.S Means estimate to D4 estimate there are very close to each other. This is due to many special construction activities and equipment used on the National Intrepid Center of Excellence. Some of those specialties are:

1. The type of glass used for curved curtain wall system, which extends from north to the west façade.
2. The central park area, which extends the height of the building and has a unique structure with a skylight.
3. The high end interior finishes used.
4. The blast rating of the glazing required on all government projects.
5. The high tech equipment which is used throughout the building such as:
    a. CAREN system (Computer Assisted Rehabilitation Environment)

b. Hearing and Vision equipment
c. PT/OT/CT equipment
d. Virtual reality equipment
e. Recreational Therapy-Golf Stimulator
f. Fluoroscope systems

PM Rough Order Estimate

Building Systems	Cost	Donated Amount
Concrete	$3,500,000	$1,000,000
Precast	$1,300,000	$200,000
Glazing	$3,600,000	$500,000
Fire Protection	$250,000	$30,000
Mechanical & Plumbing	$6,000,000	$1,000,000
Electrical	$5,500,000	$300,000
Masonry	$200,000	$50,000
Major Medical Equipment	$20,000,000	N/A

Actual Building Cost

Total Project Cost (TC)	**$45,000,000.00**
Building Equipment Cost	**$20,000,000.00**
TC/ Sq.Ft	**$ 625.00**

D4Cost Estimate 2002 [Parametric Estimate]

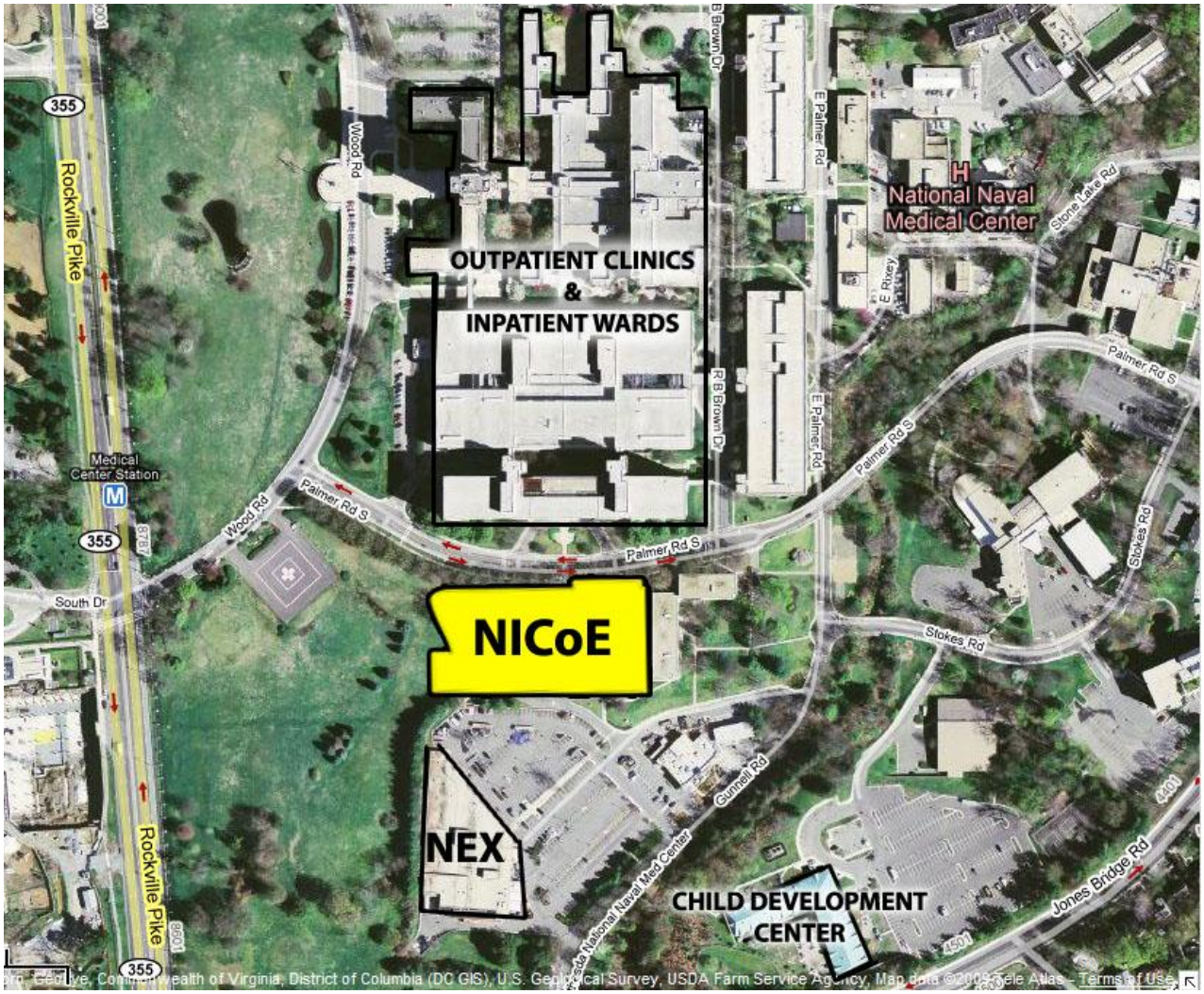
Total Project Cost	**$22,117,920.00**
Total Project Cost/Sq.Ft	**$307.193**
Building Cost	**$19,665,443.00**
General Requirements	**$1,661,678.00**
Site Work	**$2,452,487.00**

Square Foot Estimate –R.S. Means

Interpolated for adjustments for story height (12' to 15')	Add	**$ 1.6433 Per Ft.**
Interpolated for adjustments for story levels (3 floors to 2 levels)	Deduct	**$ 1.6433 Per Ft.**
Interpolated for Perimeter Adjustment	Add	**$ 3.226 Per 100 Ft.**
Interpolated for RS Means value		**$290.643 Per SF**
Location Factor		**0.90 (Silver Spring, MD)**
Finial RS Means SF Cost		**$213.36 Per SF**
Finial RS Means Total Cost		**$15,362,000**

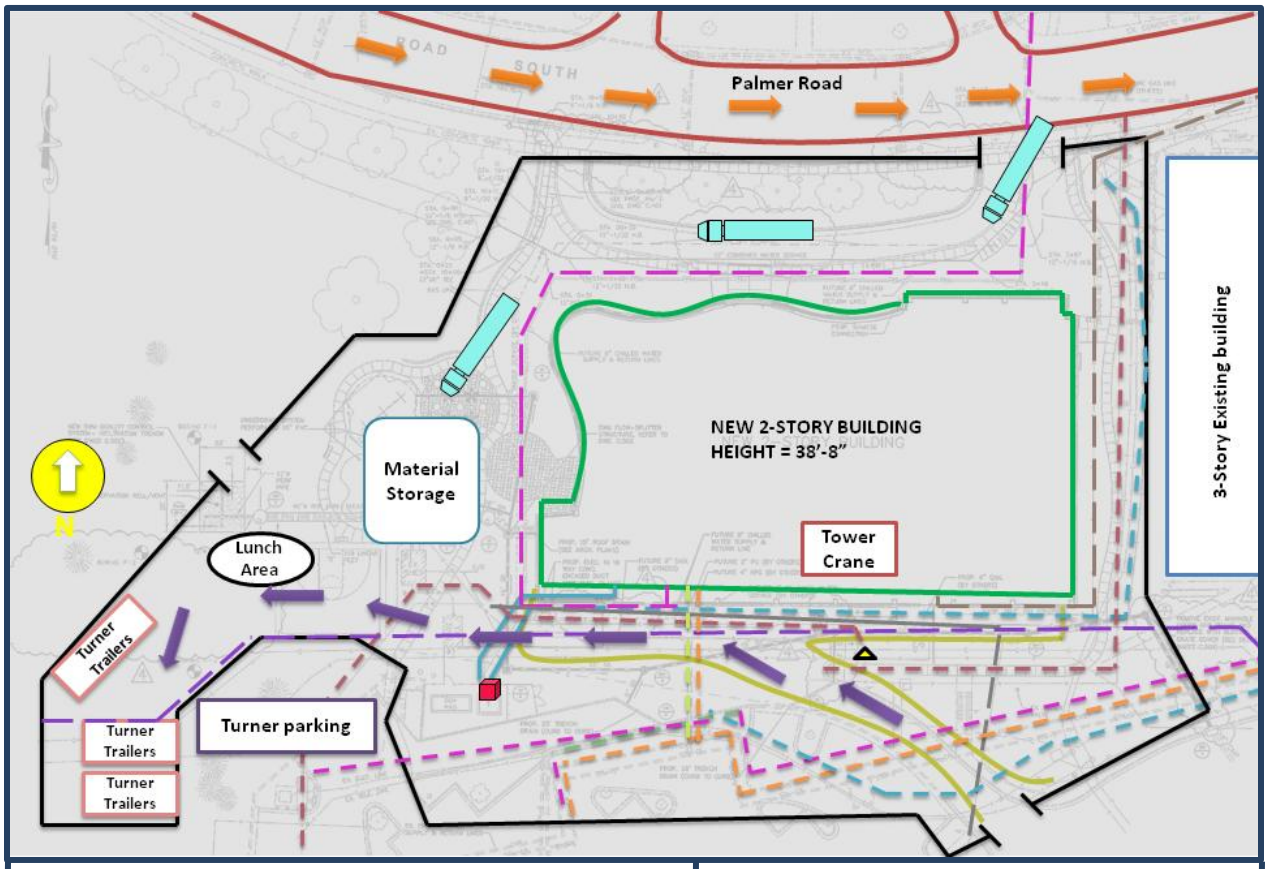
SITE PLAN OF EXISTING CONDITIONS

The site is composed of 12 facilities including the National Intrepid Center of Excellence, Children Development Center, the Fisher House, and the USUHS (refer to Google map shown below). In addition to the NICoE project, there are a total of six projects which are under construction concurrently on the same site. This causes some planning between the other projects. The site logistics plan, which is shown in figure 9, has been put in place by Turner Construction. This plan has been in favor of the construction methods that take place on a daily basis. The tower crane location along with the positioning of the material staging has made the lifts and placements of the materials a very manageable task. Palmer road acts as the main access to the site for all of material deliveries. Along with that comes a temporary gravel road which was constructed around the building's footprint for ease of access. Since this site is already occupied, all utilities such as: electrical, water, gas, storm drain, chilled water supply, chilled water return, steam water supply, steam water return, fire hydrant rails, communication, and sewer lines are existing utilities and ready to be tied into NICoE.



Key:

- Fence/Gate
- Material rout
- Construction access
- Asphalt area/ pedestrian access
- Transformer
- Existing Electrical lines
- New Construction/Building outline
- Pumped Condensate Line
- Existing telephone lines
- New gas lines
- Existing Chilled water supply and return lines
- Existing Steam water supply and return lines
- Existing sewer lines
- Existing Water Lines
- Fire Hydrant
- Pedestrian access



National Intrepid Center of Excellence

Site Plan of Existing Conditions

Ronza Abousaid

October 5, 2009

Figure 9

LOCAL CONDITIONS

The National Intrepid Center of excellence will be constructed within the Naval Medical Center site, located on the corner of Rockville Pike and Jones Bridge Road, in Bethesda, Maryland. The majority of the site is currently under construction as mentioned above.

Construction in the Washington D.C metro area is predominately cast-in-place concrete with post-beam structure. Structural steel projects are not common since there is a height restriction that the district has put forth for all new construction in the region. Concrete tends to be used for buildings with levels up to 12-15 stories. Concrete is cost effective, durable, and unlike steel, has no lead time. However, NICoE is owned and run by a government navy base and does not have any zoning restrictions appeal to the design or construction of the building.

As for staff parking, there is a minimum amount of parking spaces on site. Additional parking is available throughout the naval medical center via shuttles. Parking decks are shared with other construction projects occurring concurrently and also the occupants of the navy medical center facilities. Additionally, most of the facilities are fully functional throughout the construction periods. Therefore, all parking decks are typically full during the weekdays. Construction workers are encouraged to either use the metro, which is across from the medical center, or carpool whenever possible. Also, the security for the Naval Medical Center is very tight and can potentially cause some schedule delays.

Turner Construction, with the expectation of recycling for LEED points, has been achieving a 75% diversion goal on the construction site of the NICoE. Turner has contracted Noble East to collect the dumpsters set on site and sort out each of the recycled materials into: concrete, steel, wood and plastic. Therefore, since this is a small project, the materials recycled are not sorted out on site. A 30 yard box, containing 5-6 tons of debris is collected weekly from the site at a cost of $500/pull.

Soil Stratification

Six geotechnical engineering soil test borings were drilled from April 22 through April 24, 2008, and an additional boring was drilled on May 15, 2008 to evaluate the subsurface conditions at the proposed NICoE building site. A boring Location Plan is included in appendix III.

An identification of soils sheet along with a sample of the Boring log taken from boring test 1, has been attached in appendix III. The soils encountered in the seven geotechnical borings are generalized into the following strata.

Stratum A (FILL): From the ground surface below the topsoil to depths of about 1.0 ft to 13.5 ft. Brown silty sand, and sandy lean clay FILL, with mica, gravel, rock fragments and organic were found.

Stratum B1 (Residual): Below Stratum A to depths of about 8.5 ft to 13.5 ft. Reddish-brown Lean Clay with Sand (CL), and elastic silt (MH), with mica were found

Stratum B (Residual): Below Stratum A to depths of about 5.0Ft to 23.5 ft. Brown to gray, mottled silty san(SM) and sandy silt (ML), trace mica were found.

Stratum C (Residual): Below Stratum B to depths of about 15.0 Ft to 38.6 Ft (max depths investigated in the borings). Brown to gray, mottled, Disintegrated rock was found.

The soil boring tests indicated what type of soil Turner Construction will have to account for in their schedule in the excavation phase. During the excavation phase, Turner encountered some asbestos that was not shown during the boring tests. However, this did not affect the schedule since Turner expected for such issues in the planning phase of the project.

Groundwater

Groundwater was encountered at a depth of about 33ft below existing surface grades within boring #4 only. Upon completion of drilling of boring-04, after removal of the augers, groundwater was observed in the open borehole at a depth of about 34 ft below exiting grades. Twenty four hour groundwater level reading were also obtained from boring-04 at a depth of about 18.6 ft below exiting grades and also boring B-07 at a depth of about 24.4 ft below exiting grades. However, groundwater was not observed within the other borings drilled at the site to the depths that the borings terminated.

This will not be a problem since the expected cut of surface is to about 7 ft and up to 1.5 ft fill will be required to reach the proposed lowest slab sub-grade elevation. Therefore an under floor sub -drainage system is not necessary.

CLIENT INFORMATION

The Intrepid Fallen Heroes Fund was established in the year 2000 to provide financial support for the dependents of United States military personnel lost in performance of their duty. This continued an effort begun in 1982 by Zachary and Elizabeth Fisher, founders of the Fisher House Foundation. Following the bombing of the U.S. Marine barracks in Beirut in 1982, the Fishers sent contributions of $10,000 to every child who lost a parent in the attack. Until Zachary's passing in 1999, the Fishers made hundreds of similar contributions following military losses. These gifts, usually of $25,000, were intended to assist military families through any financial hardships they might face following the loss of their loved ones. This tradition was carried on by Zachary's nephews, Arnold, Richard and Tony Fisher. Following the terrorist attacks on September 11, 2001, and the United States' involvement in the war and terrorism, the need for this support greatly increased and this effort was expanded to the public to help generate the growing need for funds.

The Intrepid Fallen Heroes Fund was established officially as an independent not-for-profit organization in 2003. Through 2005, the Fund provided close to $20 million to families of United States military personnel lost in performance of their duty, mostly in service in Iraq and Afghanistan. The national Intrepid Center of Excellence will be funded for a very important and critical issue faced by the wounded troops: the treatment of TBI. The Intrepid Fallen Heroes Fund is continuing to collect donations from both public and private funds to complete this project. . This facility will serve as a national leader in supporting the men and women of the United States Armed Forces and their families.

Sine this project is fully funded by public and private donations, lots of eyes lay upon it. This raises the expectation levels from both Turner Construction and SmithGroup. As it usually is, cost is crucial factor for a funded project. The owner expects for the project budget to be met. As for quality expectations, it needs to meet the medical facility standards with high-end level 5 finishes. NICoE's project schedule is flexible. Since the majority of the amount of funding for this project is in progress, the owner does not recommend the use of extra dollars on overtime work to be able to recover the schedule. But also expects the project completion date to be met. As for safety, the owner is very stringent for an accident free site. This has been met so far by Turner Construction and continues to endorse an accident free project. Regular owner meetings are held (every 2 weeks) to make sure that the project is going along as expected. Other meetings such as: staff meetings (2-3 weekly), subcontractor meeting (weekly), equipment meetings (weekly), and BIM weekly meetings are held. During the meetings the following is discussed: major issues, 2 week look ahead schedule, start of new activities, coordination meetings, and major changes to the project. These meetings are required by the owner to be able to run the project smoothly without any problems and to meet the expectations discussed above.

One of the most important sequencing phases to the owner is the facility's equipment phase. The owner will be providing all the major high-tech equipment and expects all connections and requirements to be ready on time when the equipment arrives.

Upon completion the National Intrepid Fallen Heroes Fund will transfer the NICoE to the department of defense for staffing and ongoing operations.

PROJECT DELIVERY SYSTEM

National Intrepid Center of excellence is being delivered as a design-assist project along with design-build contract for the mechanical and plumbing package. Due to the complexity and uniqueness of the project, the owner chose for Turner construction to be involved earlier on and assist SmithGroup (Architecture firm) in the design stages of the project. SmithGroup was chosen based upon their past experience with the owner. They have designed many of the Naval Medical campus's projects and have met the owner's high expectations. As shown in figure 10, SmithGroup has been hired and is under a fixed price contract with the owner.

Turner's early involvement in the project has made both the design and construction phase run smoother by illuminating the problems earlier on, which could have been faced through the construction phase. This also helped the owner from spending the money on potential change orders and therefore a delay in the schedule of the project. No bids were collected for this job. Mr. Ronald fisher had asked the CEO of Turner Construction to build this project as a contribution to the soldiers of this country. Therefore, Turner construction's fees are very low. In July 2008, Turner was awarded the construction contract for the NICoE.

Turner would not disclose the bonding or insurance requirements for this project in details. However, the subcontractors which are under Turner's contract have been selected through competitive bids, along with the expectation of a contribution to the project. All of the subcontractor's contracts are fixed price contracts. Insurance is required from all the subcontractors. The amount of the contract determines the insurance requirements. For many of major building's system contracts, such as those shown in figure10, have bondage requirements.

Again, this project is not a typical hospital project. It has given this project an advantage for Turner Construction to be involved early on and use Building Information Modeling with the different subcontractors to understand the complexity and the vision of the project before the bidding process had begun.

Organizational Chart:

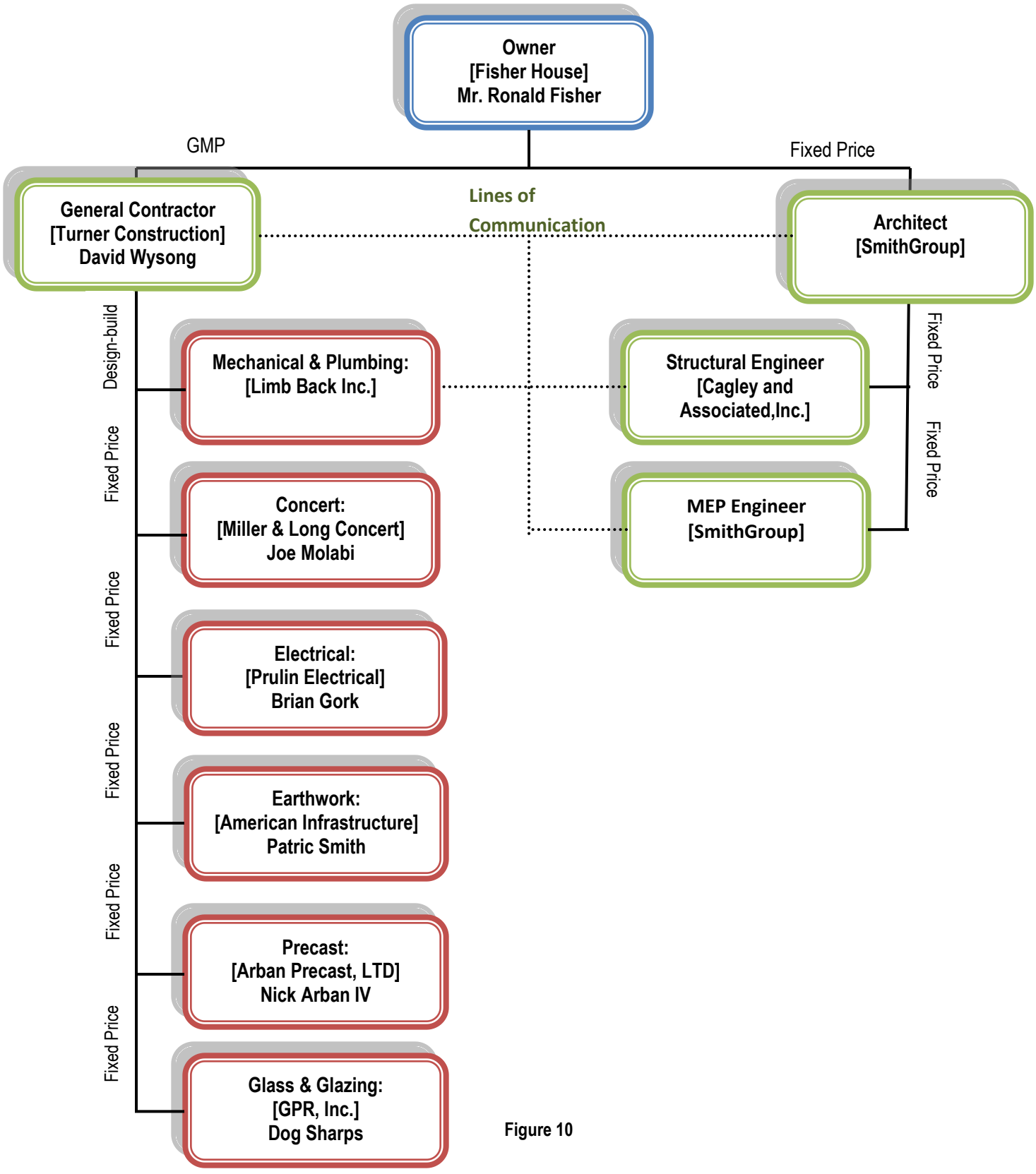


Figure 10

STAFFING PLAN

Turner Construction's staffing plan is relatively straight forward. This is seen in the figure 11. The project executive oversees the project and visits about once a month and whenever needed. The Project executive provides executive authority necessary to overcome the project team's obstacles and barriers, which are faced on the job. He is also ultimately responsible for this project success. David Wysong, the project manager, is the primary person in charge of the daily activities on site. He is responsible for the agreed-upon projects tasks and activities are completed on time, on budget and within the quality standards which meets the owner's expectations. David works very closely with both his superintendents and the project engineer. Making sure both the field and the office are communicating and work is done correctly and run smoothly without any problems. The Project engineer with his assistants handle all project submittals, most of the RFI's, and review the payment requisitions from the subcontractors. As for the Superintendents and their assistant, they handle all field installations using approved submittal and shop drawings. Superintendents also supervise the subcontractor's daily activities. The BIM coordinator, Brian Krause, coordinates all shop drawings given by SmithGroup and runs the clashes before any drawings are approved. He also runs weekly BIM coordination meetings. As for safety, all of Turner's project team is responsible to bring the attention to any hazardous construction activities that are seen on site. In addition, Dan Garripoli is a full time safety manager on the NICoE. He also takes the role of the second full time superintendent on the job. His main responsibility is to help create a safe environment by preventing dangerous practices on site. He is accountable for being aware of proper procedures and safe construction methods during the hours of construction.

Staffing Chart:

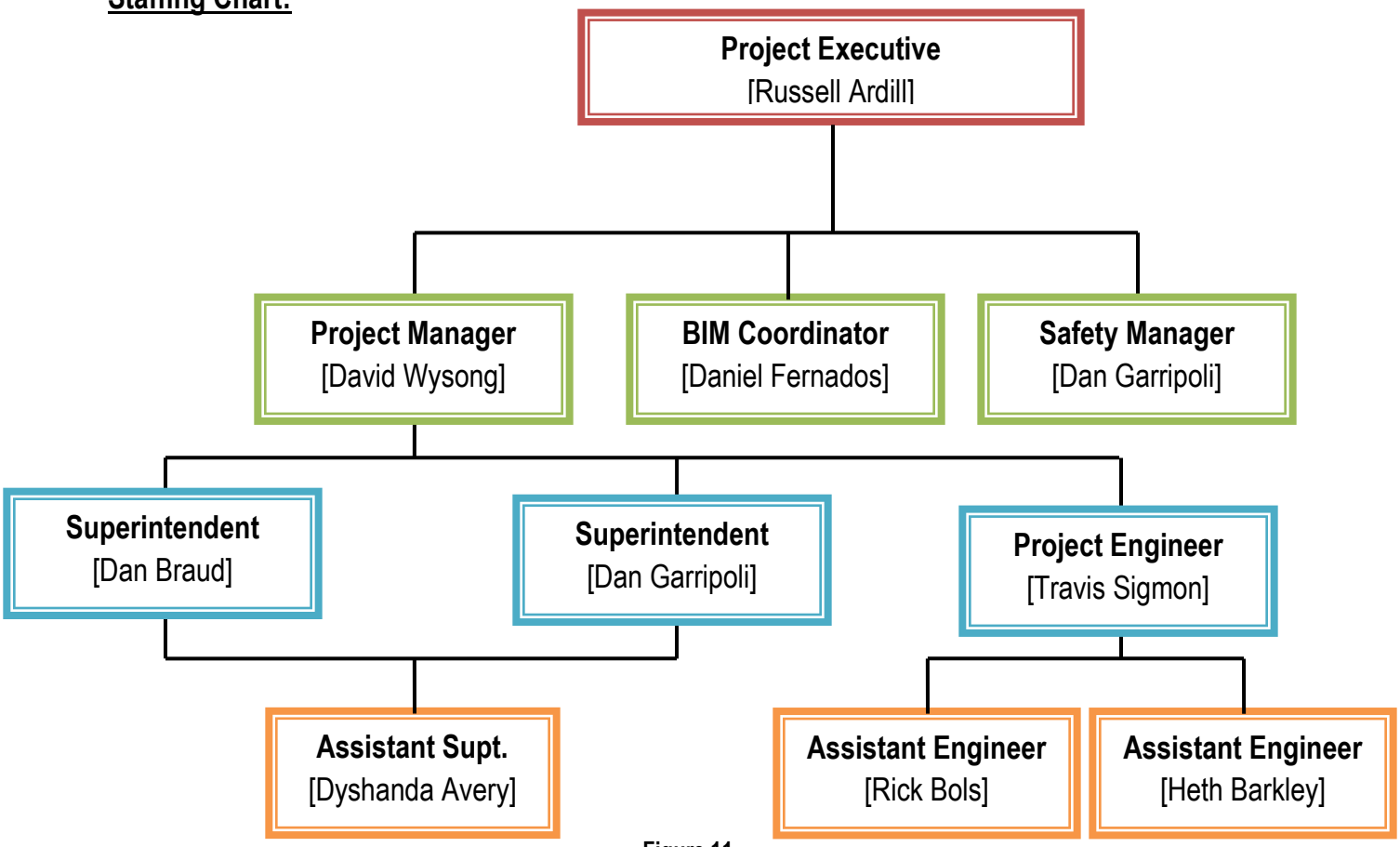


Figure 11

APPENDIX I

D4Cost Estimate 2002 [Parametric Estimate]

Wednesday, September 23, 2009 — Page 1

D4 Cost Estimate for NICoE

NICoE - Mar 2009 - MD - Rockville

Prepared By:	Rose Abousaid PSU-AE	Prepared For:	Tech 1 PSU-Senior Thesis
	, Fax:		, Fax:
Building Sq. Size:	72000	Site Sq. Size:	621166
Bid Date:	7/1/2008	Building use:	Medical
No. of floors:	2	Foundation:	CON
No. of buildings:	1	Exterior Walls:	PRE
Project Height:	46.11	Interior Walls:	MSD
1st Floor Height:	15	Roof Type:	BIT
1st Floor Size:	36678	Floor Type:	CON
		Project Type:	NEW

Division		Percent	Sq. Cost	Amount
00	**Bidding Requirements**	**9.79**	**26.75**	**1,925,650**
	Bonds & Certificates	1.03	2.81	202,035
	General Conditions	8.76	23.94	1,723,615
01	**General Requirements**	**8.45**	**23.08**	**1,661,678**
	Alternates/Alternatives	2.45	6.70	482,699
	Constr. Facilities & Temp. Controls	1.74	4.74	341,493
	Contract Closeout (Trade Cleanup)	1.16	3.16	227,255
	Summary Of Work (Insurance)	3.10	8.48	610,232
03	**Concrete**	**4.36**	**11.91**	**857,273**
	Cast-In-Place	4.36	11.91	857,273
04	**Masonry**	**1.32**	**3.61**	**259,962**
	Unit	1.32	3.61	259,962
05	**Metals**	**5.39**	**14.73**	**1,060,650**
	Fabrications	0.56	1.54	111,021
	Structural Framing	4.83	13.19	949,629
06	**Wood & Plastics**	**4.21**	**11.50**	**828,311**
	Architectural Woodwork	3.52	9.61	691,868
	Rough Carpentry	0.69	1.90	136,443
07	**Thermal & Moisture Protection**	**8.19**	**22.36**	**1,609,672**
	EIFS	0.22	0.60	43,121
	Exterior Wall Assemblies	5.18	14.15	1,018,785
	Fireproofing	0.54	1.46	105,277
	Firestopping	0.10	0.28	20,032
	Joint Sealers	0.11	0.31	22,043
	Membrane Roofing	1.83	5.00	360,190
	Waterproofing & Dampproofing	0.20	0.56	40,225
08	**Doors & Windows**	**4.28**	**11.68**	**840,765**
	Doors/Frames/Hardware	1.34	3.65	263,071
	Glazing	2.89	7.88	567,718
	Special Doors	0.05	0.14	9,976
09	**Finishes**	**12.52**	**34.20**	**2,462,439**
	Metal Stud/Gypsum Board	8.57	23.42	1,686,276
	Painting/Wall Coverings	0.91	2.49	179,564
	Resilient Flooring/Carpet	1.76	4.80	345,612
	Stone Flooring/Tile	1.28	3.49	250,987
10	**Specialties**	**0.41**	**1.11**	**79,861**
	Comp. & Cubicles/Curtain & IV Track	0.34	0.92	65,937
	Fire Protection	0.02	0.04	3,089
	Partitions	0.05	0.13	9,654
	Wall & Corner Guards	0.01	0.02	1,181
14	**Conveying Systems**	**1.23**	**3.36**	**241,993**
	Elevators	1.23	3.36	241,993

15	**Mechanical**	**27.37**	**74.76**	**5,382,976**
	Basic Materials & Methods	3.93	10.73	772,318
	Fire Protection	1.44	3.93	282,813
	Plumbing & HVAC	22.01	60.11	4,327,845
16	**Electrical**	**12.48**	**34.09**	**2,454,202**
	Basic Materials & Methods	11.76	32.12	2,312,610
	Testing	0.72	1.97	141,592
Total Building Costs		**100.00**	**273.13**	**19,665,433**
02	**Site Work**	**100.00**	**3.95**	**2,452,487**
	Demolition	5.22	0.21	128,000
	Earthwork	65.91	2.60	1,616,487
	Improvements	10.19	0.40	250,000
	Landscaping	11.17	0.44	274,000
	Preparation	7.50	0.30	184,000
Total Non-Building Costs		**100.00**	**3.95**	**2,452,487**
Total Project Costs		**--**	**--**	**22,117,920**

APPENDIX II

Square Foot Estimate –R.S. Means

COMMERCIAL/INDUSTRIAL/ INSTITUTIONAL	M.330	Hospital, 2-3 Story

Costs per square foot of floor area

Exterior Wall	S.F. Area	25000	40000	55000	70000	85000	100000	115000	130000	145000
	L.F. Perimeter	388	520	566	666	766	866	878	962	1045
Face Brick with Structural Facing Tile	Steel Frame	305.15	296.65	289.20	286.70	285.05	283.95	281.30	280.60	280.05
	R/Conc. Frame	310.00	301.45	294.00	291.50	289.90	288.75	286.15	285.45	284.85
Face Brick with Concrete Block Back-up	Steel Frame	296.65	289.50	283.55	281.50	280.15	279.20	277.15	276.55	276.10
	R/Conc. Frame	294.55	287.45	281.45	279.40	278.05	277.10	275.10	274.50	274.00
Precast Concrete Panels	Steel Frame	304.10	295.80	288.50	286.05	284.50	283.35	280.85	280.10	279.55
	R/Conc. Frame	308.95	300.60	293.30	290.85	289.30	288.15	285.70	284.90	284.35
Perimeter Adj., Add or Deduct	Per 100 L.F.	9.20	5.75	4.15	3.30	2.75	2.25	2.00	1.80	1.60
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	2.65	2.20	1.75	1.65	1.60	1.50	1.35	1.30	1.25
For Basement, add $32.90 per square foot of basement area										

The above costs were calculated using the basic specifications shown on the facing page. These costs should be adjusted where necessary for design alternatives and owner's requirements. Reported completed project costs, for this type of structure, range from $161.20 to $407.15 per S.F.

Common additives

Description	Unit	$ Cost
Cabinet, Base, door units, metal	L.F.	256
Drawer units	L.F.	505
Tall storage cabinets, 7' high, open	L.F.	480
With doors	L.F.	565
Wall, metal 12-1/2" deep, open	L.F.	192
With doors	L.F.	345
Closed Circuit TV (Patient monitoring)		
One station camera & monitor	Each	1850
For additional camera, add	Each	1000
For automatic iris for low light, add	Each	2600
Hubbard Tank, with accessories		
Stainless steel, 125 GPM 45 psi	Each	27,600
For electric hoist, add	Each	3000
Mortuary Refrigerator, End operated		
2 capacity	Each	13,600
6 capacity	Each	24,500

Description	Unit	$ Cost
Nurses Call Station		
Single bedside call station	Each	310
Ceiling speaker station	Each	143
Emergency call station	Each	192
Pillow speaker	Each	296
Double bedside call station	Each	385
Duty station	Each	325
Standard call button	Each	169
Master control station for 20 stations	Each	6025
Sound System		
Amplifier, 250 watts	Each	2350
Speaker, ceiling or wall	Each	191
Trumpet	Each	365
Station, Dietary with ice	Each	16,800
Sterilizers		
Single door, steam	Each	166,000
Double door, steam	Each	213,500
Portable, countertop, steam	Each	3975 - 6225
Gas	Each	41,200
Automatic washer/sterilizer	Each	57,000

Location Factors

STATE/ZIP	CITY	Residential	Commercial
STATES & POSS.			
969	Guam	.97	1.07
IDAHO			
832	Pocatello	.86	.90
833	Twin Falls	.72	.82
834	Idaho Falls	.74	.83
835	Lewiston	.96	.97
836-837	Boise	.86	.90
838	Coeur d'Alene	.93	.95
ILLINOIS			
600-603	North Suburban	1.11	1.09
604	Joliet	1.14	1.10
605	South Suburban	1.11	1.09
606-608	Chicago	1.20	1.15
609	Kankakee	1.00	.99
610-611	Rockford	1.06	1.05
612	Rock Island	.97	.97
613	La Salle	1.05	1.00
614	Galesburg	.99	.97
615-616	Peoria	1.03	1.01
617	Bloomington	1.01	1.00
618-619	Champaign	1.03	1.01
620-622	East St. Louis	1.01	.99
623	Quincy	.99	.95
624	Effingham	.98	.95
625	Decatur	1.01	.99
626-627	Springfield	1.01	1.00
628	Centralia	.99	.96
629	Carbondale	.95	.93
INDIANA			
460	Anderson	.90	.90
461-462	Indianapolis	.93	.93
463-464	Gary	1.01	.99
465-466	South Bend	.90	.90
467-468	Fort Wayne	.89	.88
469	Kokomo	.91	.88
470	Lawrenceburg	.85	.85
471	New Albany	.85	.85
472	Columbus	.90	.88
473	Muncie	.91	.89
474	Bloomington	.92	.89
475	Washington	.89	.88
476-477	Evansville	.90	.91
478	Terre Haute	.90	.92
479	Lafayette	.91	.89
IOWA			
500-503,509	Des Moines	.89	.89
504	Mason City	.76	.81
505	Fort Dodge	.75	.80
506-507	Waterloo	.78	.81
508	Creston	.79	.82
510-511	Sioux City	.84	.86
512	Sibley	.72	.76
513	Spencer	.73	.77
514	Carroll	.73	.77
515	Council Bluffs	.81	.89
516	Shenandoah	.73	.77
520	Dubuque	.84	.89
521	Decorah	.74	.77
522-524	Cedar Rapids	.92	.91
525	Ottumwa	.82	.85
526	Burlington	.85	.85
527-528	Davenport	.95	.95
KANSAS			
660-662	Kansas City	.98	.96
664-666	Topeka	.79	.85
667	Fort Scott	.87	.86
668	Emporia	.74	.81
669	Belleville	.78	.83
670-672	Wichita	.79	.84
673	Independence	.84	.84
674	Salina	.77	.83
675	Hutchinson	.78	.80
676	Hays	.81	.83
677	Colby	.82	.83
678	Dodge City	.81	.85
679	Liberal	.79	.83
KENTUCKY			
400-402	Louisville	.91	.92
403-405	Lexington	.88	.88

STATE/ZIP	CITY	Residential	Commercial
KENTUCKY (CONT'D)			
406	Frankfort	.85	.89
407-409	Corbin	.75	.81
410	Covington	.97	.96
411-412	Ashland	.91	.94
413-414	Campton	.76	.82
415-416	Pikeville	.83	.89
417-418	Hazard	.72	.78
420	Paducah	.89	.89
421-422	Bowling Green	.89	.90
423	Owensboro	.86	.89
424	Henderson	.90	.89
425-426	Somerset	.76	.82
427	Elizabethtown	.87	.87
LOUISIANA			
700-701	New Orleans	.86	.89
703	Thibodaux	.82	.85
704	Hammond	.77	.81
705	Lafayette	.80	.83
706	Lake Charles	.82	.84
707-708	Baton Rouge	.84	.86
710-711	Shreveport	.78	.81
712	Monroe	.73	.80
713-714	Alexandria	.74	.80
MAINE			
039	Kittery	.86	.85
040-041	Portland	.88	.88
042	Lewiston	.87	.87
043	Augusta	.88	.87
044	Bangor	.86	.87
045	Bath	.86	.86
046	Machias	.87	.85
047	Houlton	.88	.86
048	Rockland	.87	.85
049	Waterville	.86	.86
MARYLAND			
206	Waldorf	.85	.88
207-208	College Park	.88	.92
209	Silver Spring	.86	.90
210-212	Baltimore	.90	.93
214	Annapolis	.84	.91
215	Cumberland	.86	.88
216	Easton	.67	.73
217	Hagerstown	.86	.89
218	Salisbury	.73	.77
219	Elkton	.79	.80
MASSACHUSETTS			
010-011	Springfield	1.04	1.01
012	Pittsfield	1.02	.99
013	Greenfield	1.00	.98
014	Fitchburg	1.11	1.04
015-016	Worcester	1.12	1.07
017	Framingham	1.13	1.07
018	Lowell	1.13	1.10
019	Lawrence	1.13	1.09
020-022, 024	Boston	1.20	1.15
023	Brockton	1.12	1.08
025	Buzzards Bay	1.10	1.04
026	Hyannis	1.10	1.06
027	New Bedford	1.12	1.07
MICHIGAN			
480,483	Royal Oak	1.00	.97
481	Ann Arbor	1.01	.98
482	Detroit	1.06	1.03
484-485	Flint	.97	.97
486	Saginaw	.91	.92
487	Bay City	.92	.92
488-489	Lansing	.96	.96
490	Battle Creek	.92	.92
491	Kalamazoo	.91	.91
492	Jackson	.92	.92
493,495	Grand Rapids	.80	.83
494	Muskegon	.87	.88
496	Traverse City	.78	.83
497	Gaylord	.81	.84
498-499	Iron Mountain	.87	.90
MINNESOTA			
550-551	Saint Paul	1.11	1.07
553-555	Minneapolis	1.15	1.10
556-558	Duluth	1.07	1.02

CostWorks® RSMeans **Square Foot Cost Estimate Report** Back Print Export

Estimate Name: **Untitled**

Building Type: **Hospital, 2-3 Story with Precast Concrete Panels / R/Conc. Frame**

Location:	**SILVER SPRING, MD**
Stories:	**2**
Story Height (L.F.):	**15**
Floor Area (S.F.):	**72000**
Labor Type:	**Union**
Basement Included:	**No**
Data Release:	**Year 2009**
Cost Per Square Foot:	**$213.36**
Building Cost:	**$15,362,000**

Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly.

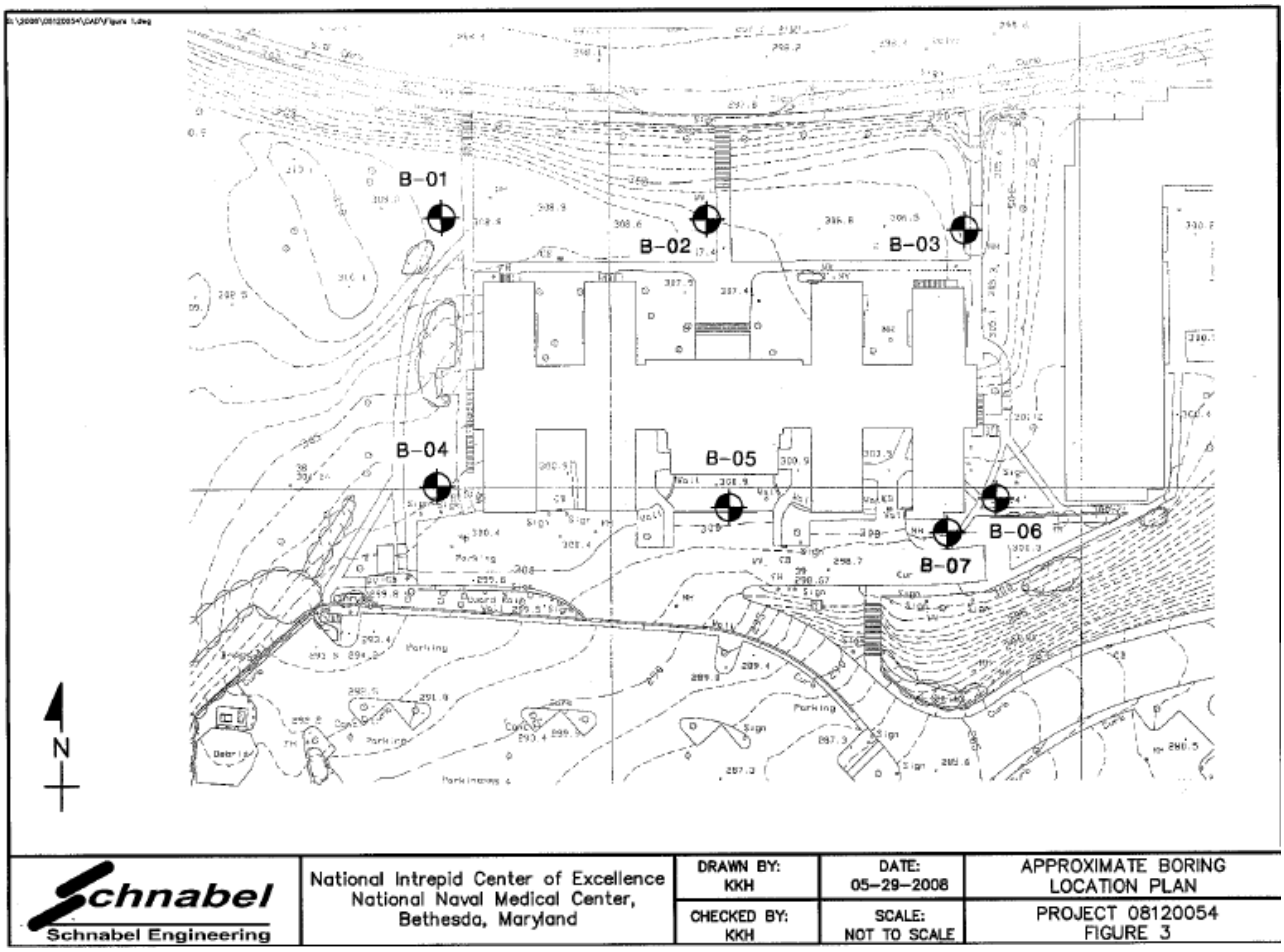
	% of Total	Cost Per S.F.	Cost
A Substructure	**2.5%**	**$4.74**	**$341,000**
A1010 Standard Foundations		**$1.78**	**$128,000**
Strip footing, concrete, reinforced, load 11.1 KLF, soil bearing capacity 6 KSF, 12" deep x 24" wide			
Spread footings, 3000 PSI concrete, load 400K, soil bearing capacity 6 KSF, 8' - 6" square x 27" deep			
Spread footings, 3000 PSI concrete, load 600K, soil bearing capacity 6 KSF, 10' - 6" square x 33" deep			
A1030 Slab on Grade		**$2.17**	**$156,000**
Slab on grade, 4" thick, non industrial, reinforced			
A2010 Basement Excavation		**$0.06**	**$4,000**
Excavate and fill, 30,000 SF, 4' deep, sand, gravel, or common earth, on site storage			
A2020 Basement Walls		**$0.74**	**$53,000**
Foundation wall, CIP, 4' wall height, direct chute, .148 CY/LF, 7.2 PLF, 12" thick			
B Shell	**18.5%**	**$35.05**	**$2,523,500**
B1010 Floor Construction		**$10.71**	**$771,000**
Cast-in-place concrete column, 20" square, tied, 500K load, 12' story height, 394 lbs/LF, 4000PSI			
Cast-in-place concrete beam and slab, 8" slab, one way, 18" column, 30'x35' bay, 75 PSF superimposed load, 196 PSF total load			
B1020 Roof Construction		**$8.22**	**$591,500**
Floor, concrete, beam and slab, 30'x35' bay, 40 PSF superimposed load, 16" deep beam, 8" slab, 158 PSF total load			
B2010 Exterior Walls		**$12.04**	**$867,000**
Exterior wall, precast concrete, flat, 6" thick, 4' x 8', white face, low rise			
B2020 Exterior Windows		**$1.42**	**$102,000**
Windows, aluminum, awning, insulated glass, 4'-5" x 5'-3"			
B2030 Exterior Doors		**$0.29**	**$21,000**
Door, aluminum & glass, with transom, narrow stile, double door, hardware, 6'-0" x 10'-0" opening			
Door, steel 18 gauge, hollow metal, 1 door with frame, no label, 3'-6" x 7'-0" opening			
B3010 Roof Coverings		**$2.36**	**$170,000**
Roofing, asphalt flood coat, gravel, base sheet, 3 plies 15# asphalt felt, mopped			
Insulation, rigid, roof deck, composite with 2" EPS, 1" perlite			

Communication and alarm systems, fire detection, addressable, 100 detectors, includes outlets, boxes, conduit and wire			
Fire alarm command center, addressable with voice			
Communication and alarm systems, includes outlets, boxes, conduit and wire, intercom systems, 50 stations			
Communication and alarm systems, includes outlets, boxes, conduit and wire, master TV antenna systems, 30 outlets			
Internet wiring, 8 data/voice outlets per 1000 S.F.			
D5090 Other Electrical Systems		**$4.15**	**$299,000**
Generator sets, w/battery, charger, muffler and transfer switch, diesel engine with fuel tank, 200 kW			
Uninterruptible power supply with standard battery pack, 15 kVA/12.75 kW			
E Equipment & Furnishings	**8.0%**	**$15.17**	**$1,092,000**
E1020 Institutional Equipment		**$9.44**	**$679,500**
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, medical gas system for small 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		**$0.00**	**$0**
E2020 Moveable Furnishings		**$5.73**	**$412,500**
Furnishings, hospital furniture, patient wall system, no utilities, deluxe , per room			
F Special Construction	**0.0%**	**$0.00**	**$0**
G Building Sitework	**0.0%**	**$0.00**	**$0**

SubTotal	**100%**	**$189.91**	**$13,673,500**
Contractor Fees (GC,Overhead,Profit)	**5.0%**	**$9.49**	**$683,500**
Architectural Fees	**7.0%**	**$13.96**	**$1,005,000**
User Fees	**0.0%**	**$0.00**	**$0**
Total Building Cost		**$213.36**	**$15,362,000**

APPENDIX III

Boring Locations Plan



Identification of Soils

SCHNABEL ENGINEERING

Consulting Geotechnical Engineers

IDENTIFICATION OF SOIL

I. DEFINITION OF SOIL GROUP NAMES — ASTM D-2487-83

			Symbol	Group Name
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels - More than 50% of coarse fraction retained on No. 4 sieve Coarse, ¾" to 3" Fine, No. 4 to ¾"	Clean Gravels Less than 5% fines	GW	Well graded gravel
			GP	Poorly graded gravel
		Gravels with Fines More than 12% fines	GM	Silty gravel
			GC	Clayey gravel
	Sands - 50% or more of coarse fraction passes No. 4 sieve Coarse, No. 10 to No. 4 Medium, No. 40 to No. 10 Fine, No. 200 to No. 40	Clean Sands Less than 5% fines	SW	Well-graded sand
			SP	Poorly graded sand
		Sands with fines More than 12% fines	SM	Silty sand
			SC	Clayey sand
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays - Liquid Limit less than 50 Low to medium plasticity	Inorganic	CL	Lean clay
			ML	Silt
		Organic	OL	Organic clay
				Organic silt
	Silts and Clays - Liquid Limit 50 or more Medium to high plasticity	Inorganic	CH	Fat clay
			MH	Elastic silt
		Organic	OH	Organic clay
				Organic silt
Highly Organic Soils	Primarily organic matter, dark in color, and organic odor		PT	Peat

II. DEFINITION OF MINOR COMPONENT PROPORTIONS

Minor Component	**Approximate Percentage of Fraction by Weight**
Adjective Form	
Gravelly, Sandy	30% or more coarse grained
With	
Sand, Gravel	15% or more coarse grained
Silt, Clay	5% to 12% fine grained
Trace	
Sand, Gravel	Less than 15% coarse grained
Silt, Clay	Less than 5% fine grained

III. GLOSSARY OF MISCELLANEOUS TERMS

SYMBOLS - Unified Soil Classification Symbols are shown above as group symbols. Use A Line Chart for laboratory identification. Dual symbols are used for borderline classification.

BOULDERS & COBBLES - Boulders are considered rounded pieces of rock larger than 12 inches, while cobbles range from 3 to 12 inches.

DISINTEGRATED ROCK - Residual rock material with a standard penetration resistance (SPT) of more than 60 blows per foot, and less than refusal. Refusal is defined as a SPT of 100 blows for 2" or less penetration.

ROCK FRAGMENTS - Angular pieces of rock, distinguished from transported gravel, which have separated from original vein or strata and are present in a soil matrix.

QUARTZ - A hard silica mineral often found in residual soils.

IRONITE - Iron oxide deposited within a soil layer forming cemented deposits.

CEMENTED SAND - Usually localized rock-like deposits within a soil stratum composed of sand grains cemented by calcium carbonate or other materials.

MICA - A soft plate of silica mineral found in many rocks, and in residual or transported soil derived therefrom.

ORGANIC MATERIALS (Excluding Peat) -

Topsoil - Surface soils that support plant life and which contain considerable amounts of organic matter;
Organic Matter - Soil containing organic colloids throughout its structure;
Lignite - Hard, brittle decomposed organic matter with low fixed carbon content (a low grade of coal).

FILL - Man made deposit containing soil, rock and often foreign matter.

PROBABLE FILL - Soils which contain no visually detected foreign matter but which are suspect with regard to origin.

LENSES - 0 to ½ inch seam of minor soil component.

LAYERS - ½ to 12 inch seam of minor soil component.

POCKET - Discontinuous body of minor soil component.

COLOR SHADES - Light to dark to indicate substantial difference in color.

MOISTURE CONDITIONS - Wet, moist, or dry to indicate visual appearance of specimen.

Q:\WP\forms\ADMIN Forms\Forms\ID of Soil 3-03.doc

Test Boring Log #1

Schnabel Engineering — TEST BORING LOG

Project: National Intrepid Center of Excellence (NICoE)
National Naval Medical Center
Bethesda, Maryland

Boring Number: B-01
Contract Number: 08120054
Sheet: 1 of 1

Contractor: Recon Drilling
Contractor Foreman: W. Rodas
Schnabel Representative: K. Haggard
Equipment: CME 450 ATV
Method: 2-1/4" I.D. Hollow Stem Auger
Hammer Type: Manual
Dates Started: 4/23/08 Finished: 4/23/08
Location: See Location Plan
Ground Surface Elevation: 309.0 (ft) Total Depth: 23.6 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Completion	4/23	---	Dry	---	---
Casing Pulled	4/23	---	Dry	---	20.6'
After Drilling	4/24	---	Dry	---	---

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.1	Topsoil	FILL	308.9	A				
1.0	FILL, sampled as sandy silt with roots, moist, brown, estimated <5% rock fragments		308.0			SS 5+10+14 REC=6", 33%		
	SANDY SILT, moist, mottled light brown	ML		B		SS 7+9+12 REC=15", 83%	MC = 15.3%	
5.0	DISINTEGRATED ROCK, sampled as sandy silt, moist, light gray to light brown, estimated <5% rock fragments		304.0		5	SS 23+45+60 REC=15", 83%	MC = 9.7%	
					10	SS 25+30+64 REC=16", 89%		
		DR		C	15	SS 100/6" REC=5", 83%		
					20	SS 100/3" REC=1", 33%		
23.6	Bottom of Boring at 23.6 ft. Spoon refusal at 23.6 feet.		285.4			SS 100/1" REC=1", 100%		

TEST BORING LOG 08120054.GPJ SCHNABEL DATA TEMPLATE 2008_04_01.GDT 5/29/08

LEED-NC

LEED-NC Version 2.2 Registered Project Checklist

NATIONAL INTREPID CENTER OF EXCELLENCE
Bethesda Naval Medical Center

10/15/200

Yes	?	No			
9	3	2	**Sustainable Sites**		14 Points
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
1			Credit 1	**Site Selection**	1
1			Credit 2	**Development Density & Community Connectivity**	1
		1	Credit 3	**Brownfield Redevelopment**	1
1			Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
1			Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
		1	Credit 4.3	**Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles	1
1			Credit 4.4	**Alternative Transportation**, Parking Capacity	1
	1		Credit 5.1	**Site Development**, Protect or Restore Habitat	1
1			Credit 5.2	**Site Development**, Maximize Open Space	1
1			Credit 6.1	**Stormwater Design**, Quantity Control	1
1			Credit 6.2	**Stormwater Design**, Quality Control	1
	1		Credit 7.1	**Heat Island Effect**, Non-Roof	1
1			Credit 7.2	**Heat Island Effect**, Roof	1
	1		Credit 8	**Light Pollution Reduction**	1

Yes	?	No			
4		1	**Water Efficiency**		5 Points
1			Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	
1			Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
		1	Credit 2	**Innovative Wastewater Technologies**	1
1			Credit 3.1	**Water Use Reduction**, 20% Reduction	1
1			Credit 3.2	**Water Use Reduction**, 30% Reduction	1

Yes	?	No			
4	3	10	**Energy & Atmosphere**		17 Points
Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**Fundamental Refrigerant Management**	Required
2	2	6	Credit 1	**Optimize Energy Performance**	1 to 10
		3	Credit 2	**On-Site Renewable Energy**	1 to 3
1			Credit 3	**Enhanced Commissioning**	1
1			Credit 4	**Enhanced Refrigerant Management**	1
		1	Credit 5	**Measurement & Verification**	1
	1		Credit 6	**Green Power**	1

Over .

Yes	?	No	Materials & Resources	13 Points
4	2	7		

Y			Prereq 1	**Storage & Collection of Recyclables**	Required
		1	Credit 1.1	**Building Reuse,** Maintain 75% of Existing Walls, Floors & Roof	1
		1	Credit 1.2	**Building Reuse,** Maintain 100% of Existing Walls, Floors & Roof	1
		1	Credit 1.3	**Building Reuse,** Maintain 50% of Interior Non-Structural Elements	1
1			Credit 2.1	**Construction Waste Management,** Divert 50% from Disposal	1
1			Credit 2.2	**Construction Waste Management,** Divert 75% from Disposal	1
		1	Credit 3.1	**Materials Reuse,** 5%	1
		1	Credit 3.2	**Materials Reuse,**10%	1
1			Credit 4.1	**Recycled Content,** 10% (post-consumer + ½ pre-consumer)	1
	1		Credit 4.2	**Recycled Content,** 20% (post-consumer + ½ pre-consumer)	1
1			Credit 5.1	**Regional Materials,** 10% Extracted, Processed & Manufactured Regionally	1
	1		Credit 5.2	**Regional Materials,** 20% Extracted, Processed & Manufactured Regionally	1
		1	Credit 6	**Rapidly Renewable Materials**	1
		1	Credit 7	**Certified Wood**	1

Yes	?	No	Indoor Environmental Quality	15 Points
7	3	5		

Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required
1			Credit 1	**Outdoor Air Delivery Monitoring**	1
		1	Credit 2	**Increased Ventilation**	1
1			Credit 3.1	**Construction IAQ Management Plan,** During Construction	1
	1		Credit 3.2	**Construction IAQ Management Plan,** Before Occupancy	1
1			Credit 4.1	**Low-Emitting Materials,** Adhesives & Sealants	1
1			Credit 4.2	**Low-Emitting Materials,** Paints & Coatings	1
1			Credit 4.3	**Low-Emitting Materials,** Carpet Systems	1
	1		Credit 4.4	**Low-Emitting Materials,** Composite Wood & Agrifiber Products	1
1			Credit 5	**Indoor Chemical & Pollutant Source Control**	1
1			Credit 6.1	**Controllability of Systems,** Lighting	1
		1	Credit 6.2	**Controllability of Systems,** Thermal Comfort	1
		1	Credit 7.1	**Thermal Comfort,** Design	1
	1		Credit 7.2	**Thermal Comfort,** Verification	1
		1	Credit 8.1	**Daylight & Views,** Daylight 75% of Spaces	1
		1	Credit 8.2	**Daylight & Views,** Views for 90% of Spaces	1

Yes	?	No	Innovation & Design Process	5 Points
1	4			

	1		Credit 1.1	**Innovation in Design:** Per LEED HC MR 4.2 PBT Source Reduction: Mercury	1
	1		Credit 1.2	**Innovation in Design:** Per LEED HC EQ 2 Acoustic Environment	1
	1		Credit 1.3	**Innovation in Design:** Exemplary Performance	1
			Credit 1.4	**Innovation in Design:** Exemplary Performance	1
			Credit 2	**LEED® Accredited Professional**	1

Yes	?	No	Project Totals (pre-certification estimates)	69 Points
29	13	25		

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points