University of Maryland, Baltimore
New Administration Building
Baltimore, MD

Keith Meacham
Construction Management
Technical Assignment 2
Dr. John Messner

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New Administrations Building
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Project Team

Owner: University of Maryland, Baltimore
Architect: Design Collective, Inc.
Civil Engineer: Site Resources, Inc.
MEP and Lighting Engineer: BKM & Associates
Structural Engineer: ReStl Designers, Inc.
Design/Build Contractor - CM: Barton Malow Company

Project Information and Architectural Features

80,000 SF of Office and General Use Space
6 Floors Above Grade
Construction Cost: $29,500,000+
Project Duration: March 29th, 2007 - October 22nd 2008
Facade: Brick and Aluminum Storefront
878 SF Glazed Aluminum Curtain Wall
Brick Pavers in Lieu of Concrete Sidewalks

Structural System

Augercast piles tied into pile caps
-Caps tie into columns and grade beams
-Piles are 18" in diameter and 4000psi
Two shear walls on the North end
9" post-tensioned concrete (5000psi) elevated slabs

Mechanical and Electrical Systems

One 90,000 CFM Rooftop AHU
Eight AC Units (600 - 2500 CFM)
VAV terminal units (single duct)
Diesel Generator System: rated 200kW, 3φ, 4 wire, 208/120V

Executive Summary

This Technical Assignment analyzes the New Administration Building owned by the University of Maryland, Baltimore (referred to as UMB). Areas of focus consist of a detailed project schedule, site layout planning, detailed structural systems estimate, general conditions estimate, and critical industry issues.

The UMB is a campus located in Baltimore and this New Administration Building continues their efforts to have the highest quality facilities. This 6 story, above grade, building will contain the University's executive offices and conference rooms.

The building is 80,000 SF and the structure is cast in place concrete with post tension cables running in each direction. Construction started in March of 2007 and is scheduled to be complete by October of 2008. The total project cost is $29,600,000. Barton Malow Company (referred to as BMC) was awarded the Design/Build contract with a Guaranteed Maximum price.

Design/Build is very fast paced and can benefit all those involved if executed correctly. Schedules must be constantly updated to represent the updated design. It is very easy to fall behind early, so some concerns are staying ahead, sticking with schedule and the budget. Much of the difficulties of Design/Build can be remedied with open lines of communication between the owner, architect, CM and subcontractor.

Within this document is a detailed project schedule focused on the main systems of the building: foundations, superstructure, enclosure, rough-ins and finishes. Large extended schedules have been compartmentalized so that a flow is seen and can be expressed to others.

Site logistics is vital when working on a project, so there is also section that deals with site layout at different times in construction. 3 site plans have been prepared to show how to deal with situations like a tight site, which is seen at the UMB Admin building. A tight site makes everything difficult, whether it be deliveries, traffic, or storage areas. The site plans that follow strive to make use of all space and coordinate so that work can get done uninterrupted.

A highly extensive take-off was done utilizing the building's uniformity wherever possible. It examines all structures within the building: columns, slabs, foundations etc.

A closer look at how this project is staffed and different fees that are involved in running a project is taken by a general conditions estimate. These may be things that people don't think of right away when they hear construction but can make all the difference in keeping a project running smoothly.

Finally the document ends with a reflection on the PACE Roundtable. This year there was much interaction with between students and industry which proved beneficial to both when discussing important issues such as, energy, economy, 4D modeling etc.

Table of Contents

Section	Page
Executive Summary	1
Detailed Project Schedule	3
Site Layout Planning	4
Detailed Structural Systems Estimate	5
General Conditions Estimate	7
PACE Roundtable	8
Appendix A – Project Schedule	11
Appendix B – Excavation Site Layout	12
Appendix C – Superstructure Site Layout	13
Appendix D – Façade Site Layout	14
Appendix E – Substructure Concrete Estimate	15
Appendix F – Substructure Reinforcing Estimate	16
Appendix G – Superstructure Concrete Estimate	17
Appendix H – Superstructure Reinforcing Estimate	18
Appendix I – Concrete Formwork Estimate	19
Appendix J – Concrete Placing & Finishing Estimate	20
Appendix K – General Conditions Estimate	21

1. Detailed Project Schedule

Construction on the University of Maryland, Baltimore New Administration Building began on March 29th, 2007. Site demolition had to occur because there was an existing vacant, 3-story, redbrick shell. Once removed excavation began and foundations were put in place. From foundations all the way to top out the building was split into two halves, North and South (see Appendix A). Starting the North half and moving to the South maximizes efficiency of the contractor and ensures a flow among the trades throughout the job. As soon as foundations were done on the North end, vertical construction could begin. This staggered construction continued all the way up the 6-story building. The slab on grade was left as a mud slab because there was underground mechanical and electrical that still had to be completed. Being Design/Build these contracts were not out at the onset of construction. This is seen visually in the schedule, under "Substructure".

Once vertical construction began, each half, North and South, took roughly 10 days to form, reinforce, pour, tension, and install reshores. The UMB Admin. Building topped out on September 28th, 2007.

Enclosures began around the time Level 4 North was finishing, August 6th, 2007, and was completed on April 10th, 2008. Scaffolding was erected the full length of the building to allow trades, working on the exterior, to continuously work without having to move the scaffold. Two sets of scaffold were used, so with the completion of one elevation the crews could move seamlessly to the next. Once the scaffold was taken down lifts were used to install metal panels and windows on the recently completed exterior.

With the building open, only Rough-Ins could begin, which gave those trades time to get ahead of the finishes. Looking at the schedule you can see this lag behind R/I. Rough-Ins and Finishes began on the 2nd floor, worked its way up to the 6th and then went down to the 1st. This is done so that contractors can keep equipment, materials, and gang boxes on the 1st floor, throughout construction. Duration for R/I and Finishes ranged from 211 to 220 days. The only major variation of this is seen on the 6th floor. The 6th floor is empty shell space that has been left for future fit-out, which obviously shortens the workload.

Following R/I & Finishes, is closeout. This consists of balancing and commissioning the systems. Once completed and inspected, substantial completion was achieved on September 9th, 2008.

There are times the schedule may appear to have the same trades working on two different floors at once, especially during R/I & finishes. This simply represents different crews of the same trade. For instance, the mechanical contractor will have one crew run all the risers up the building and another come in behind them and make connections, so mains and branches can be run throughout the floor. Another reason is, to confine the schedule to 200 line items, many groupings of trades had to be made during the R/I & Finishes stage. Because of these combinations, it is difficult to make logical links. One item may have multiple links at multiple points in time. Many times in the expanded schedule it is seen that a trade will stop working in one area, move to a different area while another trade comes in, and then come back

to finish the work. This is a difficult representation without detailing the schedule to the fullest. (Reference Appendix A for a Complete Schedule)

2. Site Layout Planning

Presented below are three site layouts at different phases of construction: excavation, superstructure and façade. As can be seen in the plans the site is very tight and BMC was not given much space. Roads must stay open, thus the site fence only extended halfway into Pearl Street. The sidewalk of Lexington Street was given, but on Arch Street the sidewalk had to stay open. (For Site Layouts Reference Appendices B,C,D)

2.1 Excavation

Excavation of the site was done with a large excavator, 2 loaders, and trucks coming by to remove spoils. There are 2 piles of spoils located near the 2 entrances to the site. This utilizes the entire site as well as minimizes the congestion on the roads. At this point there was only a Barton Malow trailer on site with no utilities.

2.2 Superstructure

When substructure and superstructure began, Barton Malow's trailer was powered and there were managers present on a daily basis. The concrete contractor had a trailer onsite as well but not in the small trailer lot across from the site. As soon as foundations for the elevator core were complete a tower crane was erected. It was used for transporting materials as well as pouring the columns via crane and bucket. To pour the elevated slabs a pump truck was used. When the South end of the building had to be poured the crane would reach spots that the pump truck could not. The pump truck could only park where it is located on the plan (Northeast corner), otherwise it would block traffic and in the contract that was not allowed. In the Northwest corner is where rodmen fabricated the column cages. There was no on-site parking for workers but cars were tolerated until more trailers moved into the lot with Barton Malow.

2.3 Façade

By the time enclosure and façade began the trailer lot was full and only managers were allowed to park. The lot was filled with storage and office trailers making things tough to maneuver. Construction of the façade was done by scaffolding the entire length of a side and having the masons complete that entire side. Once done they would move on and then the rest of the finishers would get to work. Lifts were utilized for the curtain wall and storefronts. Yet another potential coordination challenge due to the compactness of the site.

3. Detailed Structural Systems Estimate

Structural Estimate Totals	
Foundation Concrete	$252,221
Foundation Reinforcement	$136,307
Superstructure Concrete	$1,769,615
Superstructure Reinforcement	$474,761
Formwork	$670,732
Placement & Finish	$129,622
TOTAL	**$3,433,258**
ACTUAL	**$3,549,211**

The structure of the UMB Admin. Building is a combination of Auger Cast Piles, Pile Caps, Grade Beams, Columns, SOG, and Post Tensioned Elevated Slabs and Roof. A detailed estimate of this system was performed using RSMeans. The level of detail is seen by the fact that the estimate is roughly $100,000 off of what the actual system cost. One reason for the accuracy is that concrete was not rounded until the very end of the calculation. Though close, the estimate is still not exact. Some of the discrepancies can be attributed to generalizing for ease of calculation and interpolating where RSMeans has no reference. Below are brief explanations of how the takeoffs were performed and what assumptions were made.

3.1 Substructure Estimate

The Substructure estimate consists of Auger Cast Piles, Pile Caps, Grade Beams and Slab on Grade. The takeoff includes concrete, reinforcing, formwork, placement and finish.

3.1.1 Auger Cast Piles

Rooting the building in bedrock is 143 Auger Cast Piles. All of the piles are 45’ deep and 18” in diameter, with a #10 rebar extend the full length. Each pile holds about 7.85 CY of grout. They were dug in clusters around the columns, elevators, and shear walls. As the bit is removed from the earth it pumps grout into the freshly made hole. RSMeans did not contain any information on Auger Cast Piles so the numbers were taken from the actual estimate. This is one of the few instances where this was done in the estimate. (Reference Appendix E for a complete breakdown)

3.1.2 Pile Caps

Pile caps are present to tie into the Auger Cast clusters. There are five common designs used on this site, which depend on location (ext. column, int. column, corner, etc.). There are also a couple unique designs around the shear walls and elevator shaft, which also acts

as a shear wall. The number of each pile caps present was found from the drawings and from there the CY of concrete and tonnage of rebar were calculated. In RSMeans the values for labor, material, etc are the same for square or rectangular pile caps. All but one of the pile caps present are rectangles or squares. PC-3 (Pile Cap 3) is shaped differently and thus is the only one with different values. Within RSMeans there are no specific pile cap rebar designations, so the general "Footings" was used. This is also the case for grade beams. (Reference Appendix E for a complete breakdown)

3.1.3 Grade Beams

Grade Beams extend all the way around the perimeter of the building, as well as into the main structural core, elevator core. They tie all the pile caps, and thus the piles, together so loads are distributed more evenly. The widths of the grade beams vary as they travel around but for the most part the width is simply 1'. 1' was used when calculating CY of concrete. All the beams are 48" deep and sit level with the pile caps. Also, most grade beams contained 8#8's with #3 stirrups @ 18", so that was assumed to be in all grade beams. (Reference Appendix E for a complete breakdown)

3.1.4 Slab on Grade

The SOG is the 1st floor of UMB Admin. It was a mud slab until all the underground electrical and plumbing was finished. It was completed after the building was already topped out. Welded wire fabric stretches the entirety of the 6" slab. (Reference Appendix E for a complete breakdown)

3.2 Superstructure Estimate

The Superstructure estimate consists of retaining walls, elevated slabs and roof, and columns. The takeoff includes concrete, reinforcing, formwork, placement and finish.

3.2.1 Retaining Walls

The UMB Admin. 1st floor is partially underground and so in some areas a retaining wall is necessary to hold the earth back from the building. Length of the walls varies, depending on which side of the building. The height of the retaining wall also varies but is most commonly 8' tall. For simplicity this was the assumed height for all areas where the wall is present. Each wall contains 14#4's between exterior columns. (Reference Appendix F for a complete breakdown)

3.2.2 Elevated Slabs & Roof

The elevated slabs and roof are the most uniform aspect of the building. Being an office building all the loads could be considered the same and so all slabs are identical. For the concrete a typical bay (30'x30') was calculated and then extrapolated to incorporate the entire building. This could not be done for the reinforcing because the slabs consist of post

tension and rebar. The post tension design cuts down on the use of rebar, but also makes the rebar not uniform from bay to bay. Therefore rebar was taken off individually. The reinforcing includes mainly #5's and #'6s stretching 14'. Attempting to normalize the rebar layout 14' was used for every piece of rebar. From floor to floor the rebar, like the concrete design, is consistent so rebar only needed to be counted once. Although time consuming this is one of the reasons the estimate is so close to the actual cost. For post tensioning, the quantity was found and then the actual cost was used because again RSMeans did not have data available for PT. (Reference Appendix F for a complete breakdown)

3.2.3 Columns

Within the building there are two main column dimensions, 24"x24" and 20"x20". Using the column schedule, the quantity of each was added. To find the CY of concrete the actual floor heights were used but for reinforcing the average floor height was used(12'-11"). An average was not used for the concrete because it would have significant impact on the CY. It was necessary to use an average for reinforcing, because of the multiple different combinations of column sizes and rebar configurations. It would also have less of an impact on the tonnage of reinforcing.

4. General Conditions Estimate

The overall General Conditions cost of the UMB Admin Building is $1,451,323. The list is made-up of project staff, trailers, dumpsters, clean-up, etc. These were found by looking at the pay applications. The overall budget for the items was given. To find the monthly values the time that each item would spend on site had to be determined. Once the months on site was found they were divided into the overall budget.

Notable GC's
Temporary electric - $4286/mo
Periodic clean-up – 2500/mo
Trailer electric – 400/mo
Temporary toilet - $1000/mo

These numbers are staggering, especially when added up.

5. Critical Industry Issues

5.1 PACE Roundtable: Mentor Program

This year's PACE Roundtable was kicked off with the discussion of a implementing a mentor program within the AE department. This would pair one industry member with one student in AE. The audience was asked to discuss the benefits that would result and the problems that would arise in a program like this.

Industry and students broke up into small mixed groups and were posed with 5 topics of concern: benefits to students, benefits to industry, how to make pairings, how to facilitate interaction, how to assess the relationships effectiveness.

With regards to benefits to students, the group identified that the industry member would be a good 3rd party contact. He/she would especially be helpful in later years, during thesis. The mentee could bounce ideas off the mentor without worrying about biases. Also, having a contact in industry early on would improve the student's interaction skills with industry. The biggest benefit to industry would be keeping strong Penn State contacts alive and keeping their fingers on the pulse of student research.

The group's general consensus was that matching of mentor and mentee should be done after a social meeting that has nothing to do with internships or work of any kind. It would just be a fun gathering to bring the two parties together. Once pairings were made interaction would have to be stressed not only electronically but also through visits.

The only way to assess the relationship's effectiveness is through surveys given to each party. Overall the program would be a great resource for an AE student of any year. It will be a huge commitment of both the mentor and the mentee. Nevertheless a program like this would no doubt have a great impact on the student body of AE.

5.2 PACE Roundtable: Breakout – Energy/Economy

5.2.1 ENERGY

Later on that day there was an opportunity for discussion of three major topics affecting construction today. These breakout sections were: LEED Evolution, BIM Strategies, and Energy/Economy. Industry and students attended the one the intrigued them the most.

Energy and Economy were paired because of their inherent impact on each other. Energy is expensive and the economy is poor. Thus, implementation of efficient practices and systems are on the rise. Energy and its threats on construction, consequences of threats, and possible student research topics were discussed first.

Most commonly mentioned threats were cost of material (both manufacturing and shipping), escalation, and cost of running inefficient systems. These threats cause owners and

industry to re-think techniques and turn their focus onto things that may have been previously over-looked. One such example is life-cycle cost. It was mentioned that life-cycle cost (manufacture, shipping, installation, maintenance, and recycling) is stressed more than ever which emphasizes the greater need for local materials.

Engineers are now looking at design criteria for ways of reducing energy costs. One example given was laboratory mechanical systems and whether 100% outside air is necessary when before it was automatic.

Controls were discussed as receiving much more attention because of the large saving opportunities that come with accurately supplying a space. Smarter controls will minimize expenses by cutting down on full system operating hours.

Making buildings more energy efficient, thus lowering running cost, is a major concern of owners/developers, but they were described by most industry in the room as short-sighted. They do not expect the upfront cost, can't see the future savings and are reluctant to invest the extra money. As a result it is the job of the designer and contractor to educate the owner/developer so they learn to see the whole picture.

These issues fueled thought for student research ideas. The majority centered around material cost. One idea was to study the trends of material and analyze locking cost vs. optimizing, purchasing material at time of construction. This leads into another research topic, developing tactics to keep procurement prices low. Both these are tools that could assist contractors in making the best decision when it comes to procurement of materials.

5.2.2 ECONOMY

The poor situation of the economy has hindered construction and provided opportunities in others. Some markets have been halted such as gaming, residential, and speculative offices. Some have stayed solid like federal work. BRAC (Base Re-Alignment and Closure) is providing new facilities as well as making much needed repairs to old facilities for the armed forces. Retro-fit is gaining popularity to make systems function more efficiently and save money. One example is replacing traditional computer servers with blade servers that produce much less heat.

As bad as the situation is, there are some resulting benefits. Developers/owners are not building, so many projects are lasting longer in preconstruction. This provides more time for improving building systems and educating owner/developers in sustainable design. It allows industry to take a step back and re-invent aspects of construction that are lacking and have been long overdue.

5.2.3 PEOPLE

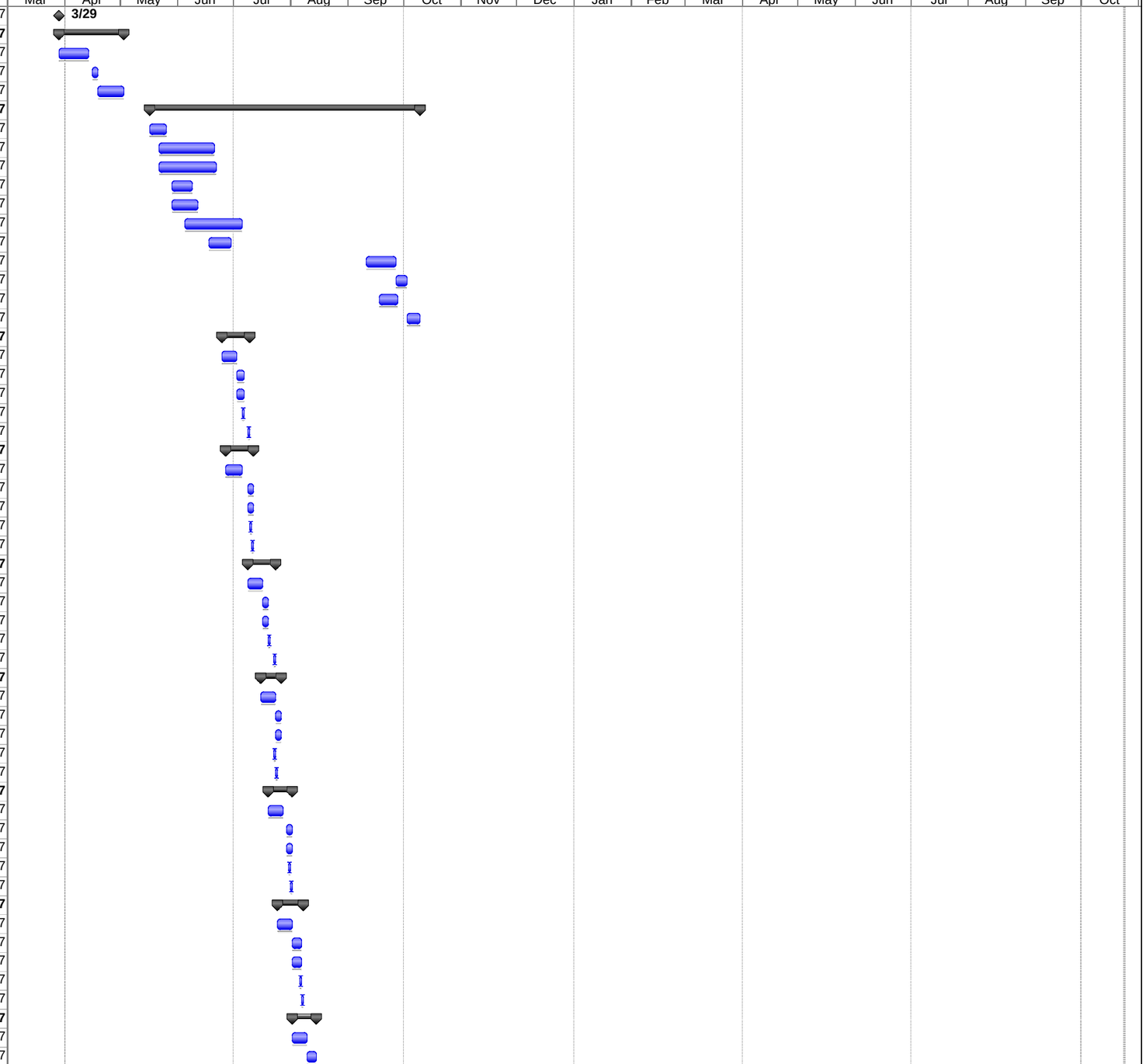
Finally the discussion was lead back to the overall theme of the PACE Roundtable, people (mainly preventing job loss). It was agreed that the best way to stick around as a company and keep employees is to make them, "as sharp as possible." This comes from learning which takes place through training. Training ensures that companies will stay stable in an unstable market. Encouraging to those looking for full time employment, most companies said that feeding the future with talented new hires will always be vital.

5.3 PACE Roundtable: Conclusion

The biggest surprise of these discussions was the confidence exuded by industry. They realize the present issues and future challenges, but were extremely confident in the plans set forth by their companies. Most industry present said that, even during these times, they would be able to continue their steady growth.

Amongst these discussions sparked a couple possible thesis research topics. The first is analyzing material cost and their trends and the other is taking a part of a building system and researching what energy efficient alternatives are out there. Possible contacts could be Truland or Southland Industries.

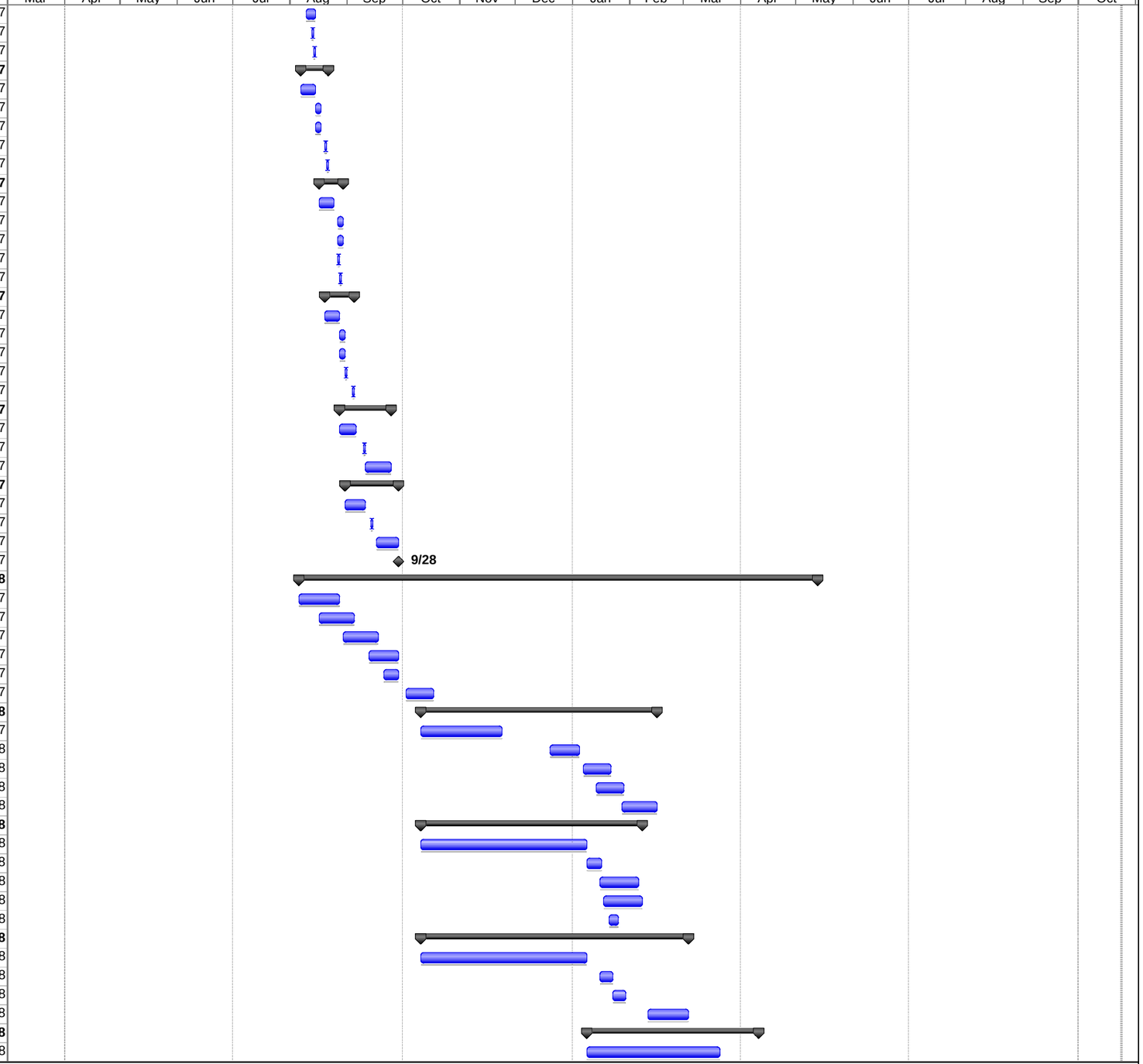
ID	Task Name	Duration	Start	Finish
1	Start of Construction	0 days	Thu 3/29/07	Thu 3/29/07
2	**Excavation**	**25 days**	**Thu 3/29/07**	**Wed 5/2/07**
3	INITIAL SED/ER SITE DEMO	12 days	Thu 3/29/07	Fri 4/13/07
4	MOBILIZE FOR SHEETING & SHORING	3 days	Mon 4/16/07	Wed 4/18/07
5	MASS EXCV/SHEETING & SHORING	10 days	Thu 4/19/07	Wed 5/2/07
6	**Substructure**	**100 days**	**Thu 5/17/07**	**Tue 10/9/07**
7	CL 1-5/A-C (Pilecaps & Grade Beams)	7 days	Thu 5/17/07	Fri 5/25/07
8	FRP Sandfilter	21 days	Tue 5/22/07	Wed 6/20/07
9	FRP Elev/Stair 1 Pilecap Slab	22 days	Tue 5/22/07	Thu 6/21/07
10	CL 1-5/C-F (Perimeter/Interior Pilecaps & Grade Beams	9 days	Tue 5/29/07	Fri 6/8/07
11	CL 1-5/A-F (FRP Cols)	10 days	Tue 5/29/07	Mon 6/11/07
12	FRP Perimeter Walls	22 days	Tue 6/5/07	Thu 7/5/07
13	North/South Backfill	10 days	Mon 6/18/07	Fri 6/29/07
14	North - Underground plumb/elec R/I	12 days	Tue 9/11/07	Wed 9/26/07
15	North - Prep/Pour SOG	4 days	Thu 9/27/07	Tue 10/2/07
16	South - Underground plumb/elec R/I	8 days	Tue 9/18/07	Thu 9/27/07
17	South - Prep/Pour SOG	4 days	Wed 10/3/07	Tue 10/9/07
18	**LV2 North**	**10 days**	**Mon 6/25/07**	**Mon 7/9/07**
19	FRP Slab	6 days	Mon 6/25/07	Mon 7/2/07
20	FRP Columns	3 days	Tue 7/3/07	Fri 7/6/07
21	FRP Shear Walls	3 days	Tue 7/3/07	Fri 7/6/07
22	Post Tension Slab	1 day	Fri 7/6/07	Fri 7/6/07
23	Strip Forms/Install Reshore	1 day	Mon 7/9/07	Mon 7/9/07
24	**LV2 South**	**10 days**	**Wed 6/27/07**	**Wed 7/11/07**
25	FRP Slab	6 days	Wed 6/27/07	Thu 7/5/07
26	FRP Columns	3 days	Mon 7/9/07	Wed 7/11/07
27	FRP Shear Walls	3 days	Mon 7/9/07	Wed 7/11/07
28	Post Tension Slab	1 day	Tue 7/10/07	Tue 7/10/07
29	Strip Forms/Install Reshore	1 day	Wed 7/11/07	Wed 7/11/07
30	**LV3 North**	**11 days**	**Mon 7/9/07**	**Mon 7/23/07**
31	FRP Slab	6 days	Mon 7/9/07	Mon 7/16/07
32	FRP Columns	3 days	Tue 7/17/07	Thu 7/19/07
33	FRP Shear Walls	3 days	Tue 7/17/07	Thu 7/19/07
34	Post Tension Slab	1 day	Fri 7/20/07	Fri 7/20/07
35	Strip Forms/Install Reshore	1 day	Mon 7/23/07	Mon 7/23/07
36	**LV3 South**	**9 days**	**Mon 7/16/07**	**Thu 7/26/07**
37	FRP Slab	6 days	Mon 7/16/07	Mon 7/23/07
38	FRP Columns	3 days	Tue 7/24/07	Thu 7/26/07
39	FRP Shear Walls	3 days	Tue 7/24/07	Thu 7/26/07
40	Post Tension Slab	1 day	Mon 7/23/07	Mon 7/23/07
41	Strip Forms/Install Reshore	1 day	Tue 7/24/07	Tue 7/24/07
42	**LV4 North**	**9 days**	**Fri 7/20/07**	**Wed 8/1/07**
43	FRP Slab	6 days	Fri 7/20/07	Fri 7/27/07
44	FRP Columns	3 days	Mon 7/30/07	Wed 8/1/07
45	FRP Shear Walls	3 days	Mon 7/30/07	Wed 8/1/07
46	Post Tension Slab	1 day	Tue 7/31/07	Tue 7/31/07
47	Strip Forms/Install Reshore	1 day	Wed 8/1/07	Wed 8/1/07
48	**LV4 South**	**10 days**	**Wed 7/25/07**	**Tue 8/7/07**
49	FRP Slab	6 days	Wed 7/25/07	Wed 8/1/07
50	FRP Columns	3 days	Thu 8/2/07	Mon 8/6/07
51	FRP Shear Walls	3 days	Thu 8/2/07	Mon 8/6/07
52	Post Tension Slab	1 day	Mon 8/6/07	Mon 8/6/07
53	Strip Forms/Install Reshore	1 day	Tue 8/7/07	Tue 8/7/07
54	**LV5 North**	**9 days**	**Thu 8/2/07**	**Tue 8/14/07**
55	FRP Slab	6 days	Thu 8/2/07	Thu 8/9/07
56	FRP Columns	3 days	Fri 8/10/07	Tue 8/14/07



Project: Tech 2 Sched
Date: Fri 10/24/08

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

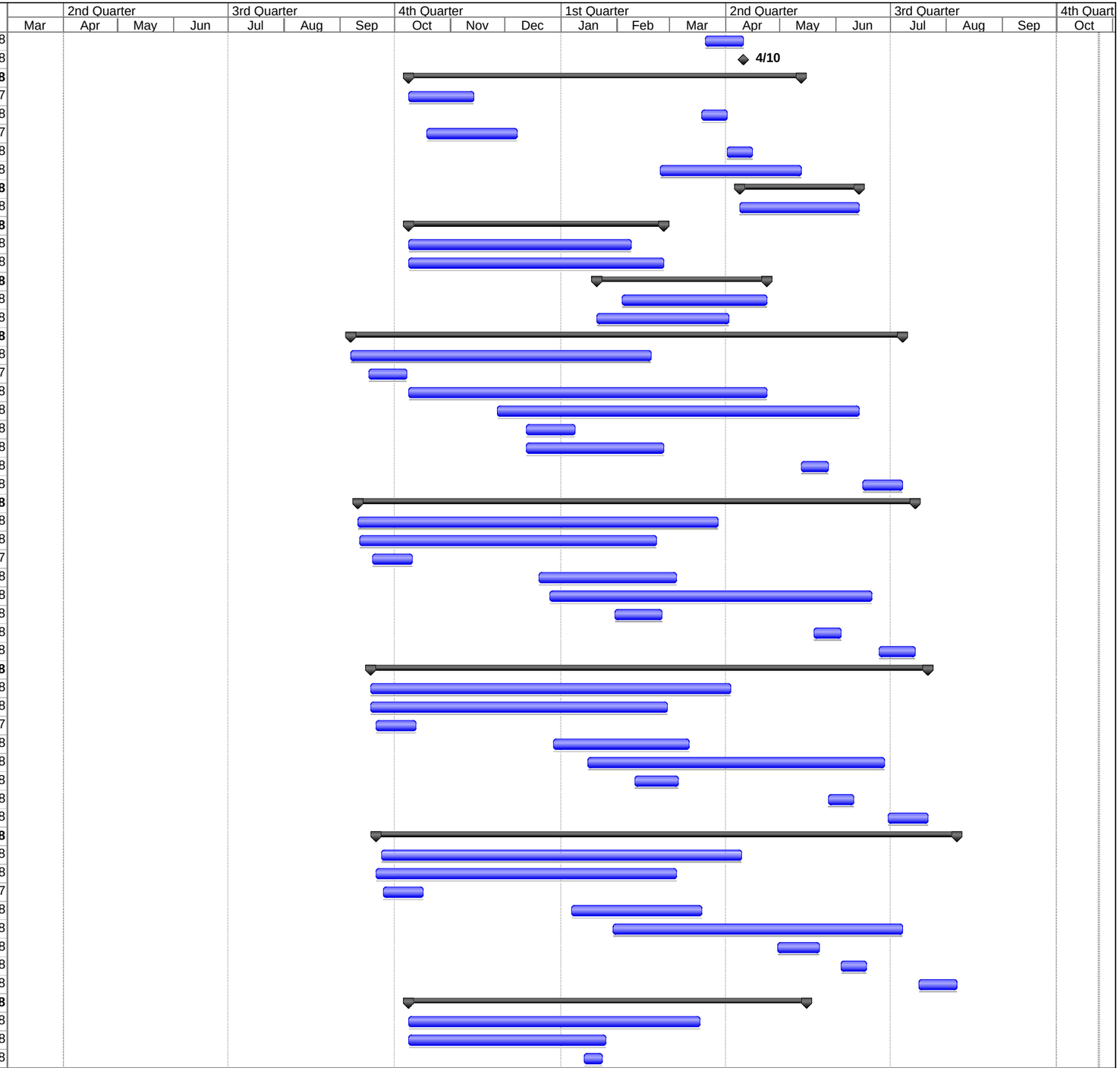
ID	Task Name	Duration	Start	Finish
57	FRP Shear Walls	3 days	Fri 8/10/07	Tue 8/14/07
58	Post Tension Slab	1 day	Mon 8/13/07	Mon 8/13/07
59	Strip Forms/Install Reshore	1 day	Tue 8/14/07	Tue 8/14/07
60	**LV5 South**	**11 days**	**Tue 8/7/07**	**Tue 8/21/07**
61	FRP Slab	6 days	Tue 8/7/07	Tue 8/14/07
62	FRP Columns	3 days	Wed 8/15/07	Fri 8/17/07
63	FRP Shear Walls	3 days	Wed 8/15/07	Fri 8/17/07
64	Post Tension Slab	1 day	Mon 8/20/07	Mon 8/20/07
65	Strip Forms/Install Reshore	1 day	Tue 8/21/07	Tue 8/21/07
66	**LV6 North**	**9 days**	**Fri 8/17/07**	**Wed 8/29/07**
67	FRP Slab	6 days	Fri 8/17/07	Fri 8/24/07
68	FRP Columns	3 days	Mon 8/27/07	Wed 8/29/07
69	FRP Shear Walls	3 days	Mon 8/27/07	Wed 8/29/07
70	Post Tension Slab	1 day	Mon 8/27/07	Mon 8/27/07
71	Strip Forms/Install Reshore	1 day	Tue 8/28/07	Tue 8/28/07
72	**LV6 South**	**11 days**	**Mon 8/20/07**	**Tue 9/4/07**
73	FRP Slab	6 days	Mon 8/20/07	Mon 8/27/07
74	FRP Columns	3 days	Tue 8/28/07	Thu 8/30/07
75	FRP Shear Walls	3 days	Tue 8/28/07	Thu 8/30/07
76	Post Tension Slab	1 day	Fri 8/31/07	Fri 8/31/07
77	Strip Forms/Install Reshore	1 day	Tue 9/4/07	Tue 9/4/07
78	**Roof North**	**19 days**	**Tue 8/28/07**	**Mon 9/24/07**
79	FRP Slab	6 days	Tue 8/28/07	Wed 9/5/07
80	Post Tension Slab	1 day	Mon 9/10/07	Mon 9/10/07
81	Strip Forms	10 days	Tue 9/11/07	Mon 9/24/07
82	**Roof South**	**20 days**	**Fri 8/31/07**	**Fri 9/28/07**
83	FRP Slab	6 days	Fri 8/31/07	Mon 9/10/07
84	Post Tension Slab	1 day	Fri 9/14/07	Fri 9/14/07
85	Strip Forms	10 days	Mon 9/17/07	Fri 9/28/07
86	Building Top Out	0 days	Fri 9/28/07	Fri 9/28/07
87	**Enclosure**	**193 days**	**Mon 8/6/07**	**Mon 5/12/08**
88	LV1 North/South (Perimeter Studs & Sheathing)	16 days	Mon 8/6/07	Mon 8/27/07
89	LV2 North/South (Perimeter Studs & Sheathing)	12 days	Fri 8/17/07	Tue 9/4/07
90	LV3 North/South (Perimeter Studs & Sheathing)	12 days	Thu 8/30/07	Mon 9/17/07
91	LV4 North/South (Perimeter Studs & Sheathing)	12 days	Thu 9/13/07	Fri 9/28/07
92	LV5 North/South (Perimeter Studs & Sheathing)	6 days	Fri 9/21/07	Fri 9/28/07
93	LV6 North/South & Parapet (Perimeter Studs & Sheathing	10 days	Wed 10/3/07	Wed 10/17/07
94	**South Elevation Exterior (w/ curtain wall)**	**87 days**	**Thu 10/11/07**	**Fri 2/15/08**
95	Exterior Brick	30 days	Thu 10/11/07	Fri 11/23/07
96	Metal Panels	10 days	Thu 12/20/07	Fri 1/4/08
97	Windows	10 days	Mon 1/7/08	Mon 1/21/08
98	Storefronts	10 days	Mon 1/14/08	Mon 1/28/08
99	Curtain Wall	15 days	Mon 1/28/08	Fri 2/15/08
100	**West Elevation Exterior (w/ curtain wall)**	**81 days**	**Thu 10/11/07**	**Thu 2/7/08**
101	Exterior Brick	60 days	Thu 10/11/07	Tue 1/8/08
102	Metal Panels	5 days	Wed 1/9/08	Wed 1/16/08
103	Storefronts	15 days	Wed 1/16/08	Tue 2/5/08
104	Curtain Wall	15 days	Fri 1/18/08	Thu 2/7/08
105	Windows	5 days	Mon 1/21/08	Fri 1/25/08
106	**East Elevation Exterior**	**97 days**	**Thu 10/11/07**	**Mon 3/3/08**
107	Exterior Brick	60 days	Thu 10/11/07	Tue 1/8/08
108	Metal Panels	5 days	Wed 1/16/08	Tue 1/22/08
109	Storefronts	5 days	Wed 1/23/08	Tue 1/29/08
110	Windows	15 days	Mon 2/11/08	Mon 3/3/08
111	**North Elevation Exterior**	**65 days**	**Wed 1/9/08**	**Thu 4/10/08**
112	Exterior Brick	50 days	Wed 1/9/08	Thu 3/20/08



Project: Tech 2 Sched
Date: Fri 10/24/08

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

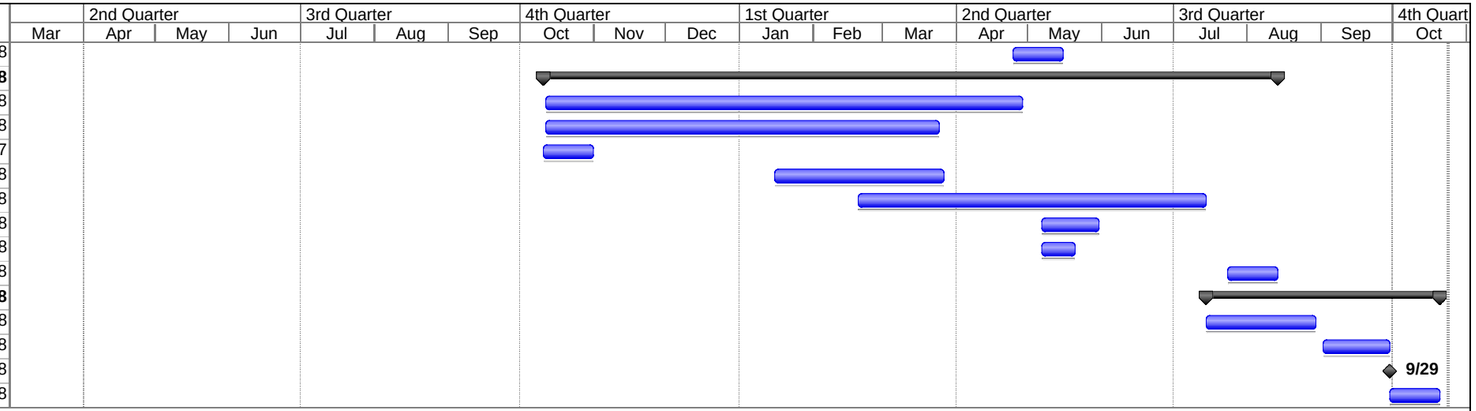
ID	Task Name	Duration	Start	Finish
113	Windows	15 days	Fri 3/21/08	Thu 4/10/08
114	Building Enclosed	0 days	Thu 4/10/08	Thu 4/10/08
115	**Roof**	**149 days**	**Tue 10/9/07**	**Mon 5/12/08**
116	High Roof (Curbs/Drains/Blocking/Roofing)	25 days	Tue 10/9/07	Tue 11/13/07
117	High Roof (Trimout)	10 days	Wed 3/19/08	Tue 4/1/08
118	Low Roof (Curbs/Drains/Blocking/Roofing)	34 days	Fri 10/19/07	Fri 12/7/07
119	Low Roof (Trimout)	10 days	Wed 4/2/08	Tue 4/15/08
120	Rooftop Mechanical	56 days	Mon 2/25/08	Mon 5/12/08
121	**Sitework**	**47 days**	**Wed 4/9/08**	**Fri 6/13/08**
122	Sitework	47 days	Wed 4/9/08	Fri 6/13/08
123	**Electrical/ Mechanical Rooms**	**95 days**	**Tue 10/9/07**	**Tue 2/26/08**
124	Electrical Room	84 days	Tue 10/9/07	Fri 2/8/08
125	Mechanical Room	95 days	Tue 10/9/07	Tue 2/26/08
126	**Elevators**	**67 days**	**Mon 1/21/08**	**Wed 4/23/08**
127	Elevator No. 1	57 days	Mon 2/4/08	Wed 4/23/08
128	Elevator No. 2	52 days	Mon 1/21/08	Wed 4/2/08
129	**LV2 Rough-In and Finishes**	**208 days**	**Fri 9/7/07**	**Mon 7/7/08**
130	Install Electrical and Fire Alarm System	111 days	Fri 9/7/07	Tue 2/19/08
131	Frame/Hang/Tape Dryw. (Corridor)	15 days	Mon 9/17/07	Sun 10/7/07
132	Install/Insulate HVAC Duct/Pipe	136 days	Tue 10/9/07	Wed 4/23/08
133	Install Sprinkler Mains, Branches, Drops	139 days	Tue 11/27/07	Fri 6/13/08
134	Hang/Tape/Finish Dryw. Walls (Inner and Perimeter Offices)	17 days	Thu 12/13/07	Tue 1/8/08
135	Install Domestic and Sanitary Mains/Branches/Vents/Fixtures	50 days	Thu 12/13/07	Tue 2/26/08
136	Install Doors and Hardware	10 days	Tue 5/13/08	Tue 5/27/08
137	Final Clean/Punch Out	15 days	Mon 6/16/08	Mon 7/7/08
138	**LV3 Rough-In and Finishes**	**211 days**	**Tue 9/11/07**	**Mon 7/14/08**
139	Install/Insulate HVAC Duct/Pipe	136 days	Tue 9/11/07	Thu 3/27/08
140	Install Electrical and Fire Alarm System	111 days	Wed 9/12/07	Fri 2/22/08
141	Frame/Hang/Tape Dryw. (Corridor)	15 days	Wed 9/19/07	Wed 10/10/07
142	Install Domestic and Sanitary Mains/Branches/Vents/Fixtures	50 days	Thu 12/20/07	Tue 3/4/08
143	Install Sprinkler Mains, Branches, Drops	124 days	Wed 12/26/07	Fri 6/20/08
144	Hang/Tape/Finish Dryw. Walls (Inner and Perimeter Offices)	17 days	Thu 1/31/08	Mon 2/25/08
145	Install Doors and Hardware	10 days	Tue 5/20/08	Tue 6/3/08
146	Final Clean/Punch Out	13 days	Wed 6/25/08	Mon 7/14/08
147	**LV4 Rough-In and Finishes**	**211 days**	**Tue 9/18/07**	**Mon 7/21/08**
148	Install/Insulate HVAC Duct/Pipe	136 days	Tue 9/18/07	Thu 4/3/08
149	Install Electrical and Fire Alarm System	111 days	Tue 9/18/07	Thu 2/28/08
150	Frame/Hang/Tape Dryw. (Corridor)	15 days	Fri 9/21/07	Fri 10/12/07
151	Install Domestic and Sanitary Mains/Branches/Vents/Fixtures	50 days	Fri 12/28/07	Tue 3/11/08
152	Install Sprinkler Mains, Branches, Drops	116 days	Wed 1/16/08	Fri 6/27/08
153	Hang/Tape/Finish Dryw. Walls (Inner and Perimeter Offices)	17 days	Mon 2/11/08	Wed 3/5/08
154	Install Doors and Hardware	10 days	Wed 5/28/08	Tue 6/10/08
155	Final Clean/Punch Out	15 days	Mon 6/30/08	Mon 7/21/08
156	**LV5 Rough-In and Finishes**	**221 days**	**Fri 9/21/07**	**Wed 8/6/08**
157	Install/Insulate HVAC Duct/Pipe	136 days	Mon 9/24/07	Wed 4/9/08
158	Install Electrical and Fire Alarm System	111 days	Fri 9/21/07	Tue 3/4/08
159	Frame/Hang/Tape Dryw. (Corridor)	15 days	Tue 9/25/07	Tue 10/16/07
160	Install Domestic and Sanitary Mains/Branches/Vents/Fixtures	50 days	Mon 1/7/08	Tue 3/18/08
161	Install Sprinkler Mains, Branches, Drops	111 days	Wed 1/30/08	Mon 7/7/08
162	Hang/Tape/Finish Dryw. Walls (Inner and Perimeter Offices)	17 days	Wed 4/30/08	Thu 5/22/08
163	Install Doors and Hardware	10 days	Wed 6/4/08	Tue 6/17/08
164	Final Clean/Punch Out	16 days	Thu 7/17/08	Wed 8/6/08
165	**LV6 Rough-In and Finishes**	**152 days**	**Tue 10/9/07**	**Thu 5/15/08**
166	Install/Insulate HVAC Duct/Pipe	109 days	Tue 10/9/07	Mon 3/17/08
167	Install Electrical and Fire Alarm System	74 days	Tue 10/9/07	Fri 1/25/08
168	Install Domestic and Sanitary Mains/Branches/Vents/Fixtures	7 days	Mon 1/14/08	Wed 1/23/08

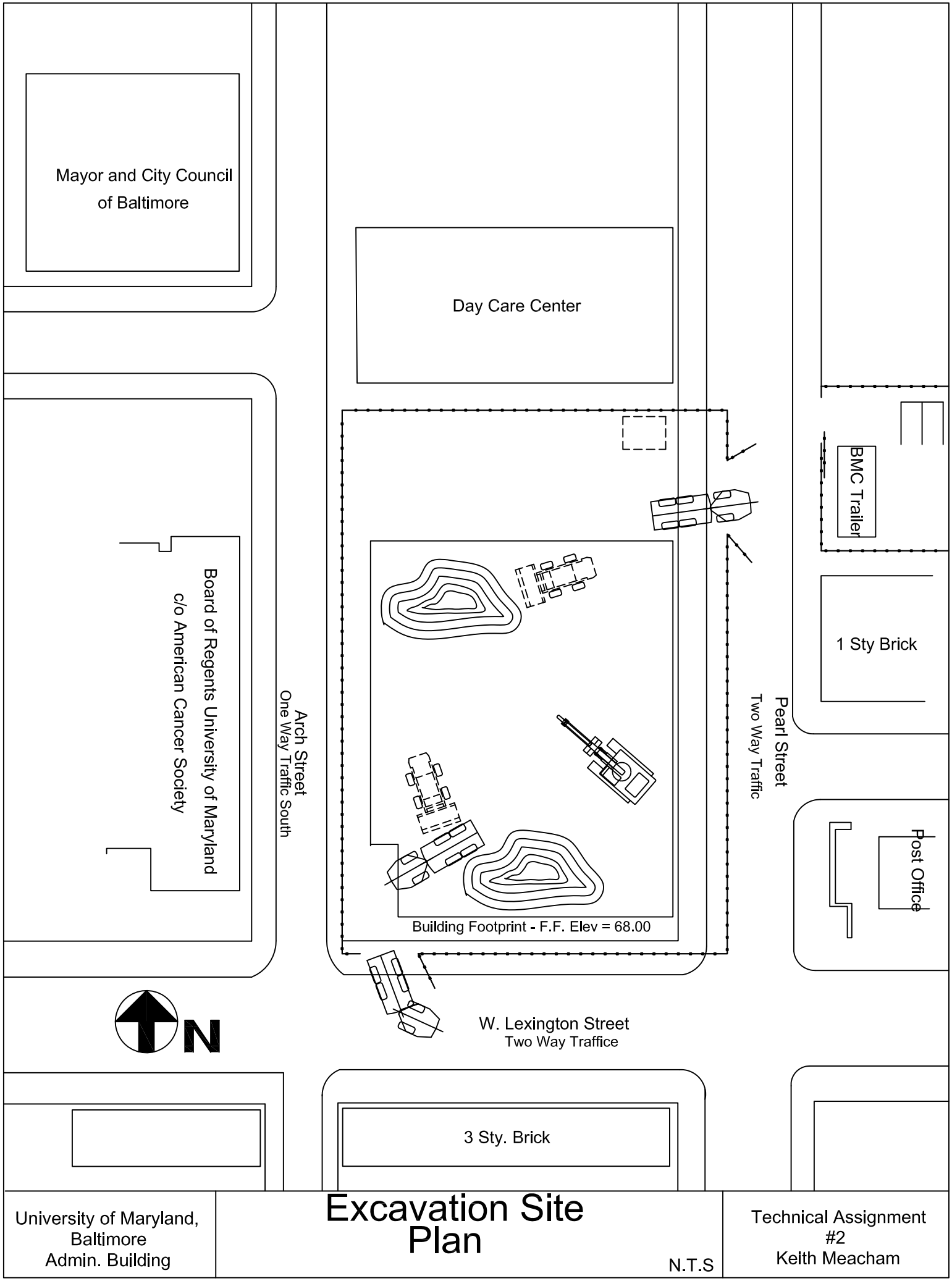


Project: Tech 2 Sched
Date: Fri 10/24/08

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

ID	Task Name	Duration	Start	Finish
169	Final clean/Punch Out	15 days	Fri 4/25/08	Thu 5/15/08
170	**LV1 Rough-In and Finishes**	**213 days**	**Thu 10/11/07**	**Wed 8/13/08**
171	Install/Insulate HVAC Duct/Pipe	136 days	Fri 10/12/07	Mon 4/28/08
172	Install Electrical and Fire Alarm System	111 days	Fri 10/12/07	Mon 3/24/08
173	Frame/Hang/Tape Dryw. (Corridor)	15 days	Thu 10/11/07	Wed 10/31/07
174	Install Domestic and Sanitary Mains/Branches/Vents/Fixtures	50 days	Wed 1/16/08	Wed 3/26/08
175	Install Sprinkler Mains, Branches, Drops	102 days	Wed 2/20/08	Mon 7/14/08
176	Hang/Tape/Finish Dryw. Walls (Inner and Perimeter Offices)	17 days	Wed 5/7/08	Fri 5/30/08
177	Install Doors and Hardware	10 days	Wed 5/7/08	Tue 5/20/08
178	Final Clean/Punch Out	16 days	Thu 7/24/08	Wed 8/13/08
179	**Closeout**	**69 days**	**Tue 7/15/08**	**Mon 10/20/08**
180	Air/Water Balance	35 days	Tue 7/15/08	Fri 8/29/08
181	Commisioning	19 days	Tue 9/2/08	Mon 9/29/08
182	Substantial Completion	0 days	Mon 9/29/08	Mon 9/29/08
183	Owner Move-In	15 days	Tue 9/30/08	Mon 10/20/08



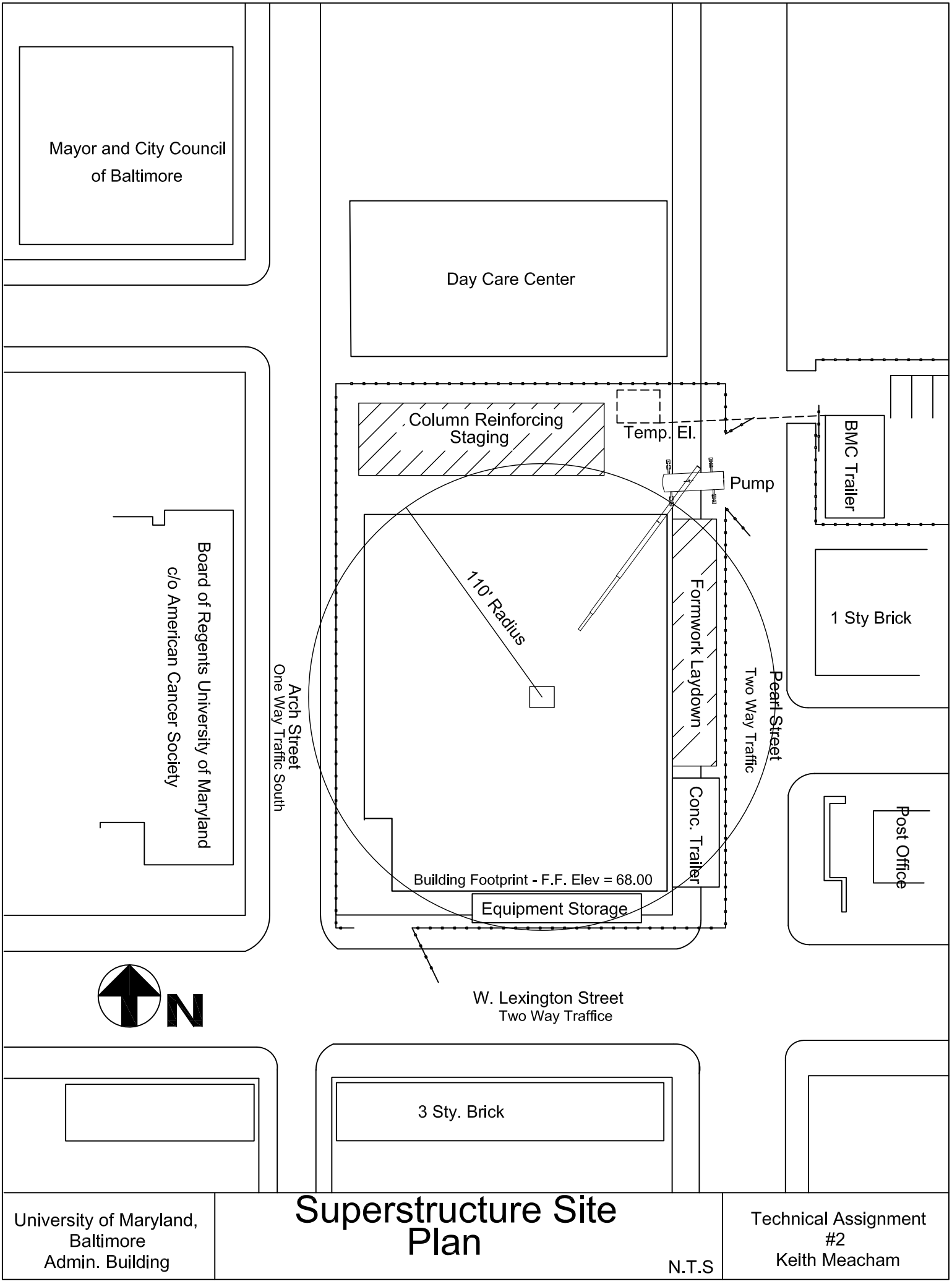


University of Maryland, Baltimore
Admin. Building

Excavation Site Plan

N.T.S

Technical Assignment #2
Keith Meacham

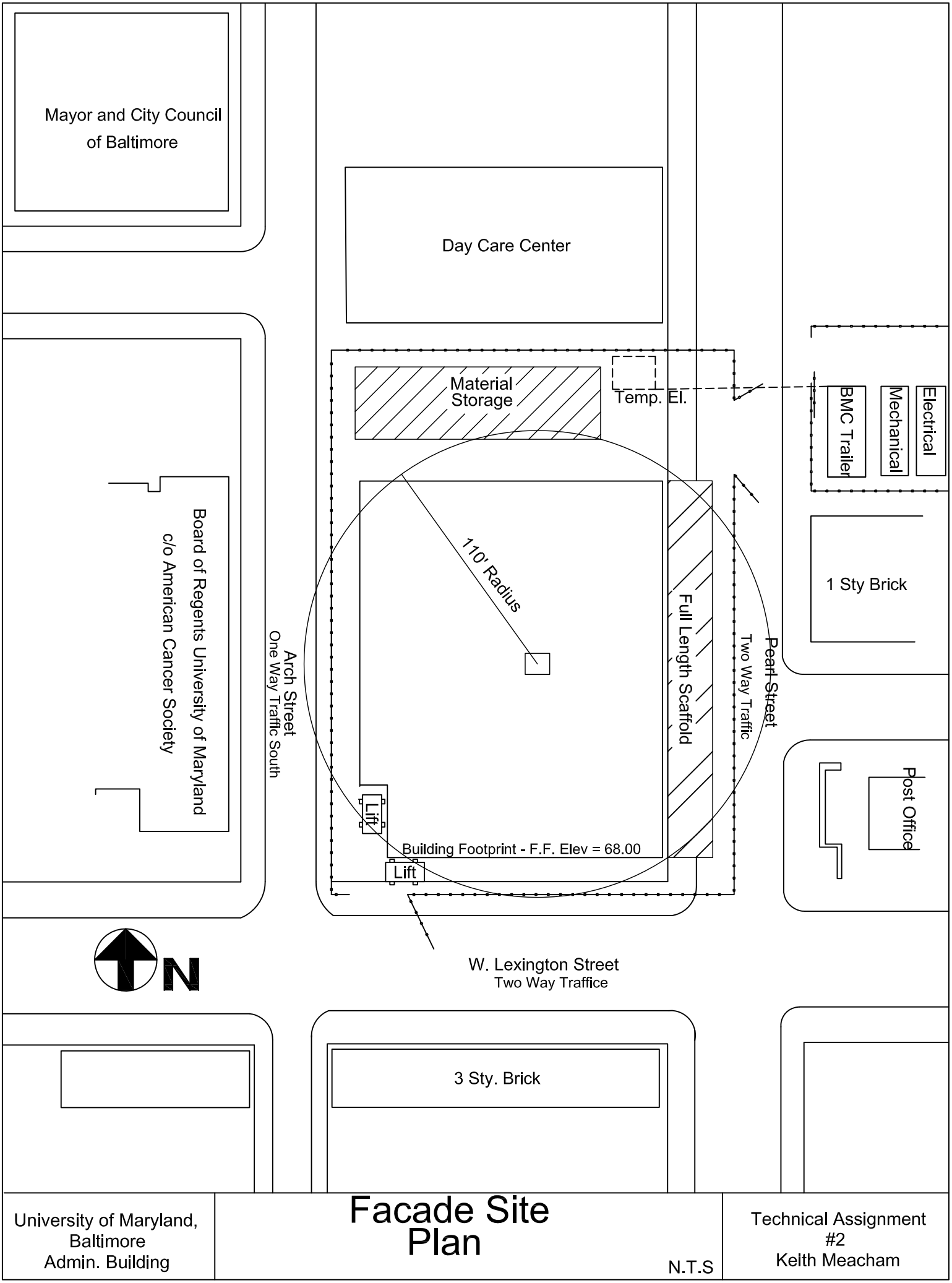


University of Maryland, Baltimore Admin. Building

Superstructure Site Plan

N.T.S

Technical Assignment #2
Keith Meacham



University of Maryland, Baltimore
Admin. Building

Facade Site Plan

N.T.S

Technical Assignment #2
Keith Meacham

FOUNDATIONS CONCRETE ESTIMATE											
							Bare Cost				
Auger Cast Piles		**Quantity**	**Unit**	**AmountPer**	**Unit**	**Extended**	**Material**	**Labor**	**Equipment**	**Total**	
	Column	81	EA	7.85	CY	637	NA	NA	NA	34	$21,658
	Elevator/Stair	62	EA	7.85	CY	487	NA	NA	NA	34	$16,558
Pile Caps											
	PC-2	8	EA	5.63	CY	45	167	57	0.34	224.34	$10,095.30
	PC-3	15	EA	7.73	CY	116	127	81	0.49	208.49	$24,184.84
	PC-4	5	EA	11.40	CY	57	167	57	0.34	224.34	$12,787.38
	PC-5	3	EA	14.67	CY	44	167	57	0.34	224.34	$9,870.96
	Elev/Stair #1	1	EA	254.00	CY	254	167	57	0.34	224.34	$56,982.36
	Shear Walls (Caps)	2	EA	49.50	CY	99	167	57	0.34	224.34	$22,209.66
Grade Beams											
	East Wall	1	EA	18.00	CY	18	158	118	11.70	287.70	$5,178.60
	South Wall	1	EA	15.00	CY	15	158	118	11.70	287.70	$4,315.50
	West Wall	1	EA	14.00	CY	14	158	118	11.70	287.70	$4,027.80
	North Wall	1	EA	15.00	CY	15	158	118	11.70	287.70	$4,315.50
	GB2 - Tie into Elev.	6	EA	6.00	CY	36	158	118	11.70	287.70	$10,357.20
SOG	120'x120'x6"	1	EA	14400.00	SF	14400	1.97	0.78	0.01	2.76	$39,744.00
	30'x120'x6"	1	EA	3600.00	SF	3600	1.97	0.78	0.01	2.76	$9,936.00
									TOTAL		$252,221

FOUNDATIONS REINFORCING ESTIMATE												
								Bare Cost				
		Quantity	Unit	AmountPer	Unit	Extended	Tons	Material	Labor	Equipment	Total	
Auger Cast Piles	(1)#10x45' Per Pile	143	Bars	194.00	lb	27742	13.87	1400	395	0	1795	$24,898
Pile Caps												
	PC-2 (8)											
	(6)#9x9'	48	Bars	30.60	lb	1468.8	0.73	1400	395	0	1795	$1,318
	(6)#5x4.5'	48	Bars	4.69	lb	225.12	0.11	1475	680	0	2155	$243
	PC-3 (15)											
	(7)#9x8' (3 ways)	315	Bars	27.20	lb	8568	4.28	1400	395	0	1795	$7,690
	PC-4 (5)											
	(12)#9x9' (EA Way)	120	Bars	30.60	lb	3672	1.84	1400	395	0	1795	$3,296
	PC-5 (3)											
	(16)#9x11' (EA Way)	96	Bars	37.40	lb	3590.4	1.80	1400	395	0	1795	$3,222
	Elev/Stair #1											
	(50)#9x54' (T&B)	100	Bars	183.60	lb	18360	9.18	1400	395	0	1795	$16,478
	(50)#10x25' (T&B)	100	Bars	430.30	lb	43030	21.52	1400	395	0	1795	$38,619
	(54)#10x25' (B)	54	Bars	232.36	lb	12547.548	6.27	1400	395	0	1795	$11,261
	(54)#8x25' (B)	54	Bars	144.18	lb	7785.72	3.89	1400	395	0	1795	$6,988
Grade Beams												
	East & West Wall(8#8x30')	8	Bars	80.10	lb	640.8						
	30' Lengths	10	EA	640.80	lb	6408	3.20	1400	395	0	1795	$5,751
	North & South Wall (8#8x30')	8	Bars	80.10	lb	640.8						
	30' Lengths	8	EA	640.80	lb	5126.4	2.56	1400	395	0	1795	$4,601
	GB2 - Tie into Elev. (8#8x30')	8	Bars	80.10	lb	640.8						
	30' Lengths	6	EA	640.80	lb	3844.8	1.92	1400	395	0	1795	$3,451
	#3 Stirrups @ 18"	480	EA	3.00	lb	1440	0.72	1475	680	0	2155	$1,552
SOG (1st floor)	**6x6-W1.4xW1.4 W.W.F.**											
	120'x120'	144	CSF	NA	NA	NA	NA	18.05	20.05	0	38.55	$5,551
	30'x120'	36	CSF	NA	NA	NA	NA	18.05	20.05	0	38.55	$1,388
								Total				$136,307

SUPERSTRUCTURE CONCRETE ESTIMATE											
							Bare Cost				
		Quantity	Unit	AmountPer	Unit	Extended	Material	Labor	Equipment	Total	
Retaining Walls											
	East Wall (150'x8'x1')	1200	CFT	44	CYD	NA	146	63.5	6.1	215.60	$9,582
	South Wall (77'x8'x1')	616	CFT	23	CYD	NA	146	63.5	6.1	215.60	$4,919
	West Wall (13'x8'x1')	104	CFT	4	CYD	NA	146	63.5	6.1	215.60	$830
	North Wall (120'x8'x1')	960	CFT	36	CYD	NA	146	63.5	6.1	215.60	$7,666
Elevated Slabs											
	Typical Bay										
	30'x30'x9"	19	EA	25.00	CY	475					
	16'30'x9"	1	EA	14.00	CY	14					
	5 Elevated Slabs (2-6 Floors)	5	EA	489.00	CY	2445	340	163	14.95	517.95	$1,266,388
Columns											
	1st Floor (15')										
	24"x24"	30	EA	2.22	CY	67	410	435	42.5	887.50	$59,167
	2nd & 3rd Floor (12'-8")										
	24"x24"	60	EA	1.88	CY	113	410	435	42.5	887.50	$99,897
	4th Floor (12'-8")										
	24"x24"	4	EA	1.88	CY	8	410	435	42.5	887.50	$6,674
	20"x20"	25	EA	1.30	CY	33	432.5	522.5	51.25	1006.25	$32,703
	16"x24"	1	EA	2.00	CY	2	455	610	60	1125.00	$2,250
	5th Floor (12'-8")										
	24"x24"	21	EA	1.87	CY	39	410	435	42.5	887.50	$34,852
	20"20"	4	EA	1.30	CY	5	432.5	522.5	51.25	1006.25	$5,233
	6th Floor (12')										
	24"x24"	4	EA	1.77	CY	7	410	435	42.5	887.50	$6,284
	20"x20"	21	EA	1.23	CY	26	432.5	522.5	51.25	1006.25	$25,991
Roof											
	120'x120'x9"	1	EA	400.00	CY	NA	340	163	14.95	517.95	$207,180
									TOTAL		**$1,769,615**

SUPERSTRUCTURE REINFORCING ESTIMATE												
								Bare Costs				
		Quantity	Unit	AmountPer	Unit	Extended	Tons	Material	Labor	Equipment	Total	
Retaining Walls												
	East Wall											
	(14)#4x30'	70	Bars	20.04	lb	1402.8	0.7014	1475	680	0	2155	$1,512
	South Wall											
	(14)#4x30'	28	Bars	20.04	lb	561.12	0.28056	1475	680	0	2155	$605
	(14)#4x17'	14	Bars	11.36	lb	159.04	0.07952	1475	680	0	2155	$171
	West Wall											
	(14)#4x13'	14	Bars	8.68	lb	121.52	0.06076	1475	680	0	2155	$131
	North Wall											
	(14)#4x30'	56	Bars	20.04	lb	1122.24	0.56112	1475	680	0	2155	$1,209
Elevated Slabs												
	(684)#5x14'	684	EA	14.60	lb	9987.77	4.99					
	(190)#6x14'	190	EA	21.03	lb	3995.32	2.00					
	5 Elevated Slabs (2-6 Floors)	5	EA	6.99	tons		34.95	1650	490	0	2140	$74,793
	PT Tendons	NA	NA	138,983	lb	NA	NA	NA	NA	NA	2	$277,966
Columns												
	(8)#9x12'-11" (Ave. Height) - 103 Cols	824	Bars	43.92	lb	36190.08	18.10	1550	620	0	2170	$ 39,266
	(4)#9x12'-11" (Ave. Height) - 21 Cols	84	Bars	43.92	lb	3689.28	1.84	1550	620	0	2170	$ 4,003
	(4)#11x12'-11" (Ave. Height) - 42 Cols	168	Bars	68.63	lb	11529.84	5.76	1550	620	0	2170	$ 12,510
	(8)#11x12'-11" (Ave. Height) - 4 Cols	32	Bars	68.63	lb	2196.16	1.10	1550	620	0	2170	$ 2,383
	#3 Stirrups@8"(24"x24")- 119 Cols	2142	EA	3.00	lb	6426	3.21	1550	950	0	2500	$ 8,033
	#3 Stirrups@8"(20"x20") - 50 Cols	900	EA	2.51	lb	2259	1.13	1550	950	0	2500	$ 2,824
	#3 Stirrups@8"(16"x20") - 1 Cols	18	EA	2.26	lb	40.68	0.02	1550	950	0	2500	$ 51
Roof												
	(136)#5x14'	136	Bars	14.60	lb	1985.6	0.99	1650	490	0	2140	$ 2,125
	(38)#6x14'	38	Bars	21.03	lb	799.14	0.40	1650	490	0	2140	$ 855
	PT Tendons	NA	NA	23,163	lb	NA	NA	NA	NA	NA	2	$ 46,326
									TOTAL			**$474,761**

SUBSTRUCTURE & SUPERSTRUCTURE FORMWORK ESTIMATE											
							Bare Costs				
		Quantity	Unit	AmountPer	Unit	Extended	Material	Labor	Equipment	Total	
Retaining Walls											
	East Wall										
	150'x8'	2	EA	1200.00	SFCA	2400	0.95	3.7	0	4.65	$11,160
	150'x1'	2	EA	150.00	SFCA	300	0.95	3.7	0	4.65	$1,395
	South Wall										
	77'x8'	2	EA	616.00	SFCA	1232	0.95	3.7	0	4.65	$5,729
	77'x1'	2	EA	77.00	SFCA	154	0.95	3.7	0	4.65	$716
	West Wall										
	13'x8	2	EA	104.00	SFCA	208	0.95	3.7	0	4.65	$967
	13'x1'	2	EA	13.00	SFCA	26	0.95	3.7	0	4.65	$121
	North Wall										
	120'x8'	2	EA	960.00	SFCA	1920	0.95	3.7	0	4.65	$8,928
	120'x1'	2	EA	120.00	SFCA	240	0.95	3.7	0	4.65	$1,116
Columns											
	24"x24"x12'-11" (Ave. Height)	119	EA	103	SFCA	12257	1.67	2.75	0	4.42	$54,176
	20"x20"x12'-11"(Ave. Height)	50	EA	86	SFCA	4300	2.35	2.88	0	5.23	$22,489
	16"x24"12'-11"(Ave. Height)	1	EA	86	SFCA	86	2.35	2.88	0	5.23	$450
Elevated Slabs											
	Underslab (120'x120')	1	EA	14,400	SFCA	14,400					
	Underslab (30'x110')	1	EA	3300	SFCA	3,300					
	Perimeter (510'x9")	1	EA	382.5	SFCA	383					
	5 Elevated Slabs (2-6 Floors)	5	EA	18082.50	SFCA	90413	1.55	3.43	0	4.98	$450,254
Pile Caps											
	PC-2	8	EA	94.5	SFCA	756	0.8	3.16	0	3.96	$2,994
	PC-3	15	EA	119.00	SFCA	1785	0.93	3.85	0	4.78	$8,532
	PC-4	5	EA	126.00	SFCA	630	0.8	3.16	0	3.96	$2,495
	PC-5	3	EA	176.00	SFCA	528	0.8	3.16	0	3.96	$2,091
	Elev/Stair #1	1	EA	656.00	SFCA	656	0.8	3.16	0	3.96	$2,598
SOG											
		1	EA	540.00	LF	NA	0.38	2.02	0	2.4	$1,296
Roof											
	Underslab (120'x120')	1	EA	14400.00	SFCA	14400	1.55	3.43	0	4.98	$71,712
	Perimeter (480x9")	2	EA	4320.00	SFCA	4320	1.55	3.43	0	4.98	$21,514
									TOTAL		**$670,732**

Concrete Placing and Finish								
				Bare Cost				
	Method	Quantity	Unit	Material	Labor	Equipment	Total	
Columns								
	Crane and Bucket	300	CY	0	35.00	17.10	52.10	$15,630
	No Finish	NA	NA	NA	NA	NA	NA	
Elevated Slabs								
	Pumped	2445	CY	0	13.55	4.94	18.49	$45,208
	Power Screed, Bull Float, Machine Float & Trowel (ride-on)	90000	SF	0	0.22	0.06	0.28	$25,200
Grade Beams								
	Crane & Bucket	98	CY	0	20.5	10	30.5	$2,989
	No Finish	NA	NA	NA	NA	NA	NA	
Retaining Walls								
	Crane & Bucket	107	CY	0	27.5	13.3	40.8	$4,366
	No Finish	NA	NA	NA	NA	NA	NA	
SOG								
	Pumped	334	CY	0	16.70	6.10	22.80	$7,615
	Power Screed, Bull Float, Machine Float & Trowel (ride-on)	18000	SF	0	0.22	0.06	0.28	$5,040
Pile Caps								
	Crane & Bucket	615	CY	0	13.30	6.45	19.75	$12,146
	No Finish	NA	NA	NA	NA	NA	NA	
Roof								
	Pumped	400	CY	0	13.55	4.94	18.49	$7,396
	Power Screed, Bull Float, Machine Float & Trowel (ride-on)	14,400	SF	0	0.22	0.06	0.28	$4,032
					TOTAL			**$129,622**

General Conditions Estimate			
	Budget	**Rate**	**Time (mo)**
Project Manager	$303,027	14430/mo	21
Project Eng	$138,124	6577/mo	21
Closeout Engineer	$27,821	5564/mo	5
Project Eng	$14,787	3697/mo	4
Field Super	$258,509	13605/mo	19
Asst Super-Int	$45,038	11260/mo	4
Asst Super-Structure	$91,554	11445/mo	8
Secretary	$65,017	5418/mo	12
Field Acct.	$30,910	10303/mo	3
Office Trailer Rental	$26,444	1322/mo	20
Labor and Materials - Temp Site Electrical	$90,000	4286/mo	18
Periodic Clean-up	$50,000	2500/mo	20
Dumpsters	$54,000	3000/mo	18
Rubbish Chutes	$8,100	450/mo	18
Testing & Inspections Services	$90,000	4500/mo	20
Existing Conditions Survey	$25,992	All.	
Temp. Fence	$28,000	1400/mo	20
Telephone	$12,000	600/mo	20
Trailer Elec.	$72,000	400/mo	18
Temp. Toilet	$20,000	1000/mo	20
		GC Total	**$1,451,323**