West Village Commons
Towson University
Towson, Maryland

Technical Assignment #2
October 28th, 2009

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-Executive Summary-

Technical Assignment #2 dives into deeper construction aspects of West Village Commons. It allowed an in-depth study on the construction schedule, site plans for different phases, a detailed structural estimate, a general conditions estimate, and a discussion on the PACE roundtable event held on October 15th 2009. Information found and created during this assignment will serve as a basis of comparison for future research this year.

First, a breakdown of the detailed construction schedule was created, depicting a breakdown by different trades. The project duration is around 24 months, with a 7 month structural concrete overall duration followed by two months of steel erection. The interior work will begin approximately in mid-March 2010 and finish the following December. Crews for each trade will work on two floors simultaneously, each floor taking about 7months to completely finish. The kitchen areas have a dense amount of MEP equipment and distribution and will require close coordination with kitchen vendors.

Site layout plans were then created using Autocad 2010, where the overall lack of space become apparent. A site plan was created for three phases: excavation and foundation, superstructure, and enclosures. The plans do not have much variance in overall logistics, but construction staging and activity areas change. The site plans show that traffic flow will be a problem, as trucks must turnaround on site to exit the campus. This will prove to be an unproductive and inefficient means for egress for trucks and deliveries, though the site constraints offer very little plausible solutions.

The third part to this assignment was to create a detailed structural estimate, and I chose to take a different approach than most other students. I was not given a model of West Village Commons so I took the opportunity to create one. While a great deal of time was put into the model, it made extracting quantities much easier than by hand. The overall structural steel estimate came to around $830,000 and the concrete estimate is $2.4 million. A comparison to actual budget costs is hard to make, as I was only given broad costs items. There are several items that Barton Malow included in their schedule of values for concrete, not associated with the structural system. The overall process provided pro's and con's of the process that may help with my thesis later on.

A general conditions estimate was created to show the monthly cost associated with the construction team. The dominant factor of the general conditions estimate was the staffing costs, which accounted for nearly 64% of the total. Finally technical assignment #2 includes a discussion on the topics brought up at the PACE roundtable on October 15th. The even provided a vast amount of research topics that could be applied to West Village Commons.

-Detailed Project Schedule-

The project schedule for West Village Commons follows a straight forward pattern that does not stray too far from conventional methods. The project duration lasts around 24 months, opening in time for vendors to move into their respective areas in preparation for the 2011-2012 school year. Please see Appendix A for a detailed breakdown of the project schedule. As stated before in Technical Assignment #1, bid package A included all initial site work and utilities, excavation, cast in place concrete, and initial under slab MEP work. Mid June 2009 marks the beginning of bid package A, when excavation subcontractors move on site.

Towson West Village Commons is essentially broken up into two separate sections. The north side of the building made up of a concrete structure is the focus of construction for the beginning of the project. Foundations and structural concrete follow a west to east pattern, toping out on February 24th 2010. The second section of this project is the north building span over Emerson Drive, which is made of structural steel and rests on a concrete foundation/crawlspace built into a hill. Structural Steel erection begins right after concrete tops out on February 24th, and lasts approximately 30 days. During this time masonry veneer and curtain wall enclosures begin on the north end moving in both an east and west direction around the building. The interior completion of the building is a long process beginning with interior partitions in March 2010 and subcontractor substantial completion around 11 months later.

After analyzing the schedule for Technical Assignment #2, several things stood out to me. The first is the amount of open space between single trades. For instance, there is an 11 day lapse between sprinkler pipe branch installation for the first floor and second floor. While I was not able to speak to the superintendent who created this schedule, it would be interesting to see if this was done intentionally to have some leeway on possible delays. I would also like to know his methods for determining which trades should have float built into the schedule. The other interesting aspect was the lack of detail in mechanical sequencing. A plausible reason may be that it is unclear when or where the owner vendors will be installing kitchen equipment on the project. Close coordination between MEP subcontractors and the kitchen vendors will need to occur.

-Site Layout Planning-

The overall site for West Village Commons is very restricted without much room for lay down and staging areas. This will prove to be a production issue throughout the life of the project. The lack of parking on site forces subcontractors to park their vehicle a half mile away. This distant parking lock also serves as staging and shakeout areas for construction activities. In Technical Assignment #1 I stated that Emerson Drive must stay open during construction, but that was inaccurate; it will be shutdown during the duration of the project. An issue still arises as in that the exit and entrance to the site are the same. There is a turnaround area where trucks will have to make a U-turn and go back out the way they came in. This could lead to construction traffic issues and process delays.

Three site plans are utilized (which can be found in Appendix B) for three separate phases of construction – Site excavation and foundations, superstructure construction, and exterior enclosures.

Site Excavation and Foundations

Construction Activities

- Initial site mobilization
- Site utility hook-up
- Support of excavation
- Foundations

Certain aspects that should be paid attention to on this plan is the lack of space for storing materials and inability to access the site efficiently. Dump trucks and direct pour concrete trucks will have to back into the excavation area from the east, between the sheathing and shoring and the elm tree protection. Excavation on the south side will be even more difficult, for that area is up a hill and very tight. The traffic flow situation for this project is least desire able. Trucks traveling to the site must stop and turn around either in the location indicated on the site plan, or in the construction parking lot further down Emerson Drive. Either situation will cause delays

Barton Malow trailers are located beyond the North West area of the site fence, strategically close to the temporary power hook ups. The sidewalk to the east of the Barton Malow trailer is blocked off by a fence to prevent pedestrian access to Emerson Drive and construction traffic. This will remain for the duration of the project, restricting access to Towson Run Apartments. There are two portable toilets available to all construction personnel, and a general dumpster for construction rubbish. There is not enough room to have separate dumpsters for recyclable materials, so Barton Malow has hired a company that will remove the debris, sort it, and report the recycled material weight for LEED requirements.

Superstructure

Construction Activities

- Concrete superstructure
- Steel Erection

There are few changes to overall site logistics between any of the site plans, but a few accommodations are made. It is apparent that there is still a traffic and construction flow problem due to the tight site conditions. The north side of the building where there are pedestrian sidewalks, overhead protection is employed to give greater safety to students from falling debris. Small staging areas for concrete and rebar are located off of Emerson Drive, and a steel staging area on the east and west side of the south building. The path of the crane boom will be restricted so as not swing over the great elm.

Enclosures

Construction Activities

- Masonry Veneer
- Curtain Wall
- Exterior Glazing

When looking at the site plan for the enclosures phase of construction, it is quite clear that the site becomes congested. The pink arrows indicated the work flow also represent the extent to how much work can occur at one time. Each arrow indicates the extent of each individual enclosure activity. The north exterior face seems too tight to perform effectively and will probably require an extension of site fence during that construction period. Elevated scaffolding will be used to help mitigate some of the area restrictions around the building, and overhead protection is again utilized to protect pedestrians walking near the site. Staging areas for materials again are minimal and the majority of materials will be brought in when they are ready for installation. The curtain wall will be prefabricated in panels to help increase the speed in which they are installed. It is also important to note that no material hoist ways are utilized on the project due to site restrictions; the permanent elevator systems will be used to deliver materials to different floors.

-Detailed Structural Estimate-

I used the detailed estimate portion of this technical assignment to try using a building information model to perform a quantity take off for the concrete and steel structural systems. I was not provided a model, so I used the hard copy structural drawings to recreate the structural system on Revit. Figures 1, 2, and 3 are screenshots of three-dimensional views of concrete and steel used for this building. Careful attention to detail came when recreating the foundation elevations. I made sure to use exact elevations to depict of differences in height between the foundations. Revit's scheduling function was used to gather take-off quantities of concrete and steel. Figure 4 is a screenshot of a Revit schedule of concrete quantities. Several lessons were learned from this process and I believe there are pro's and con's to my approach.

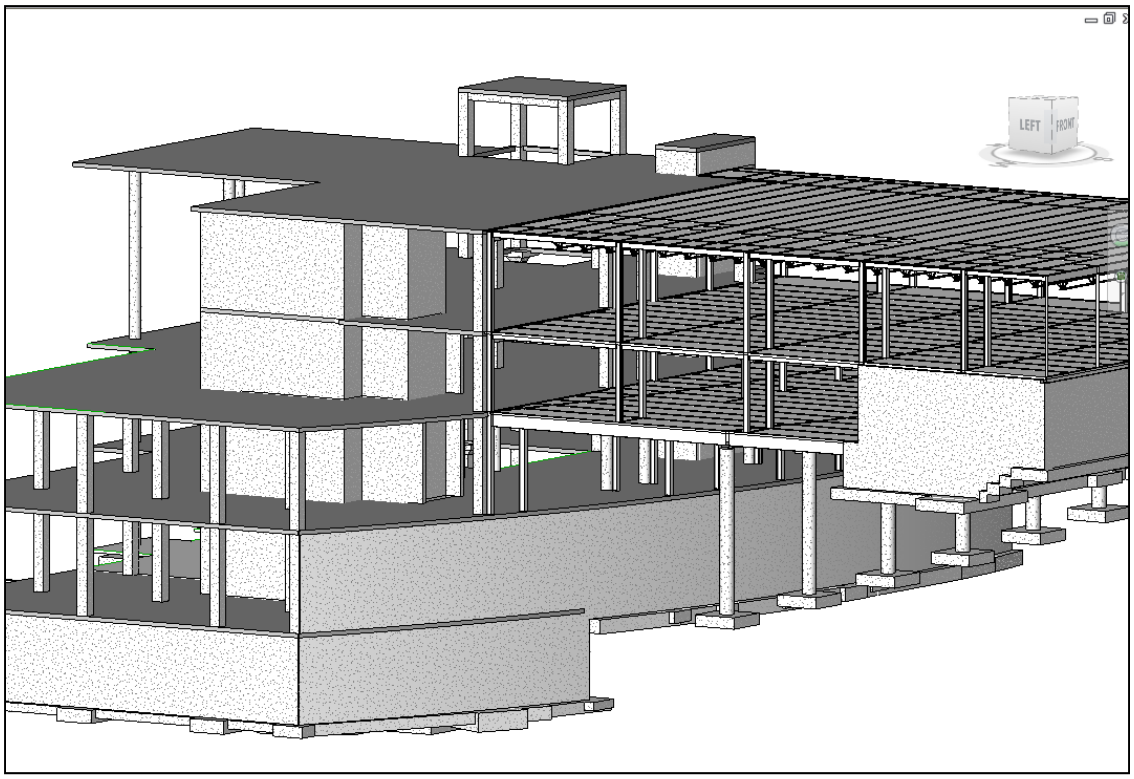


Figure 1: A view from a Southwest angle depicting both the concrete steel and concrete structure.

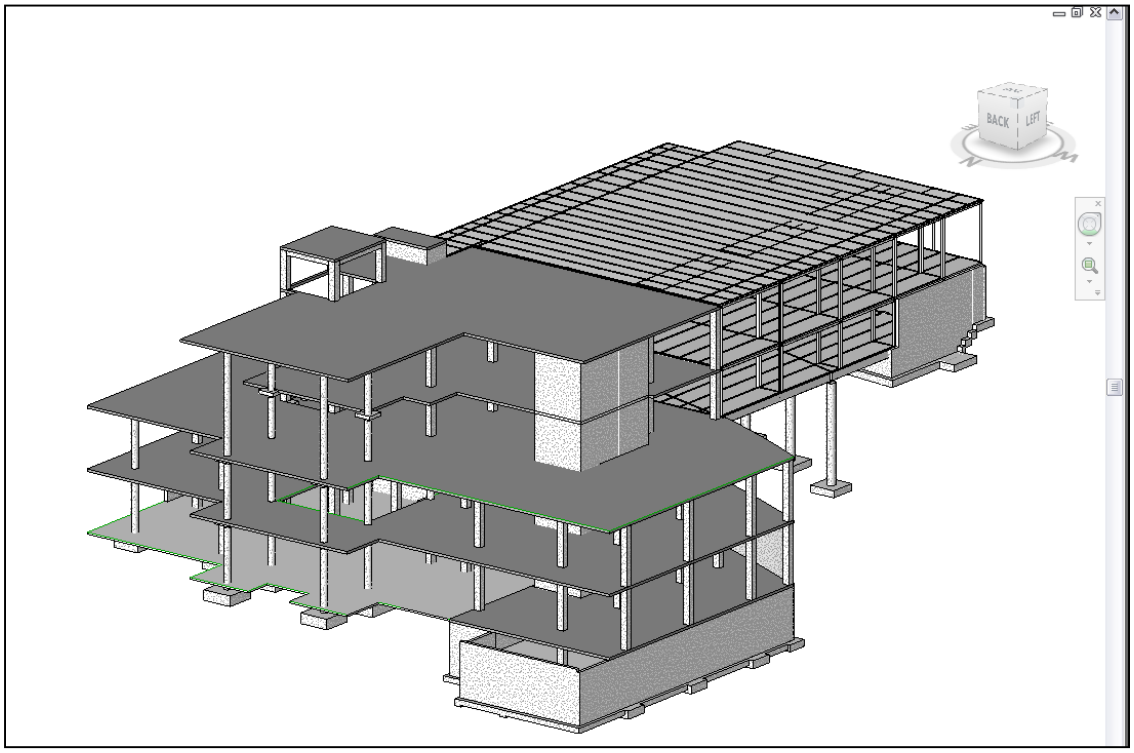


Figure 2: A bird's eye view of the concrete slabs and roof, and of the steel joists and metal decking.

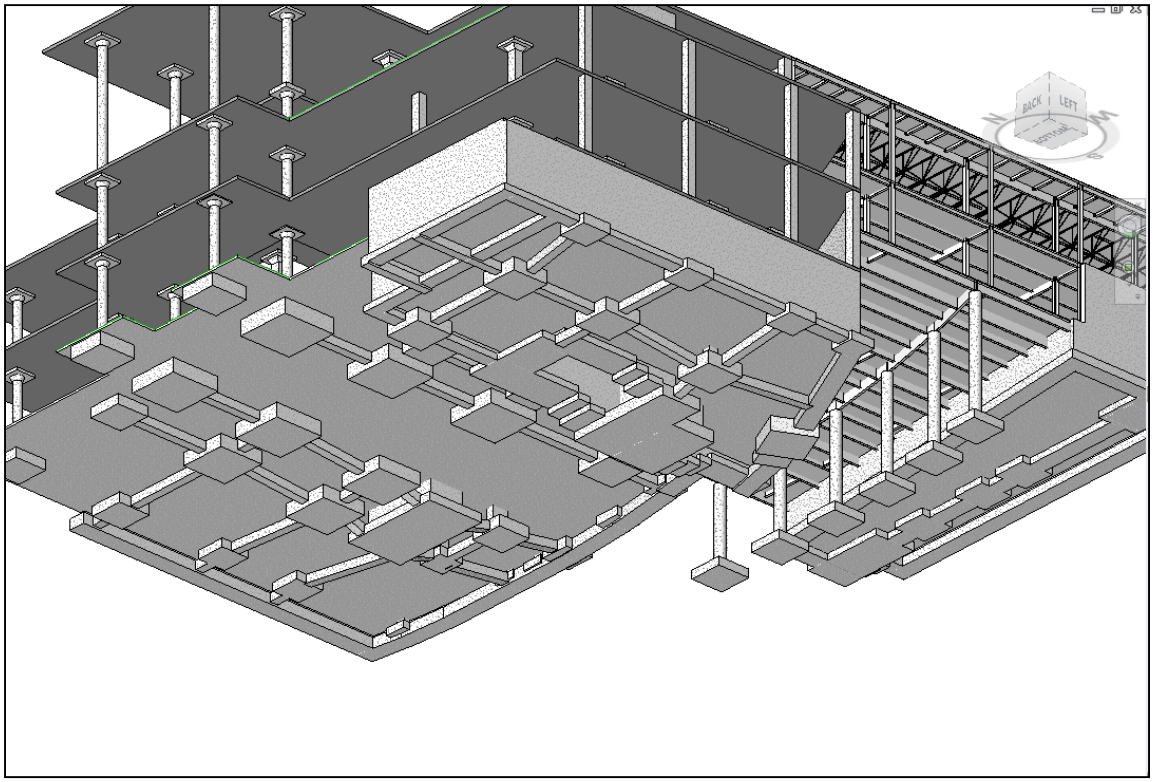
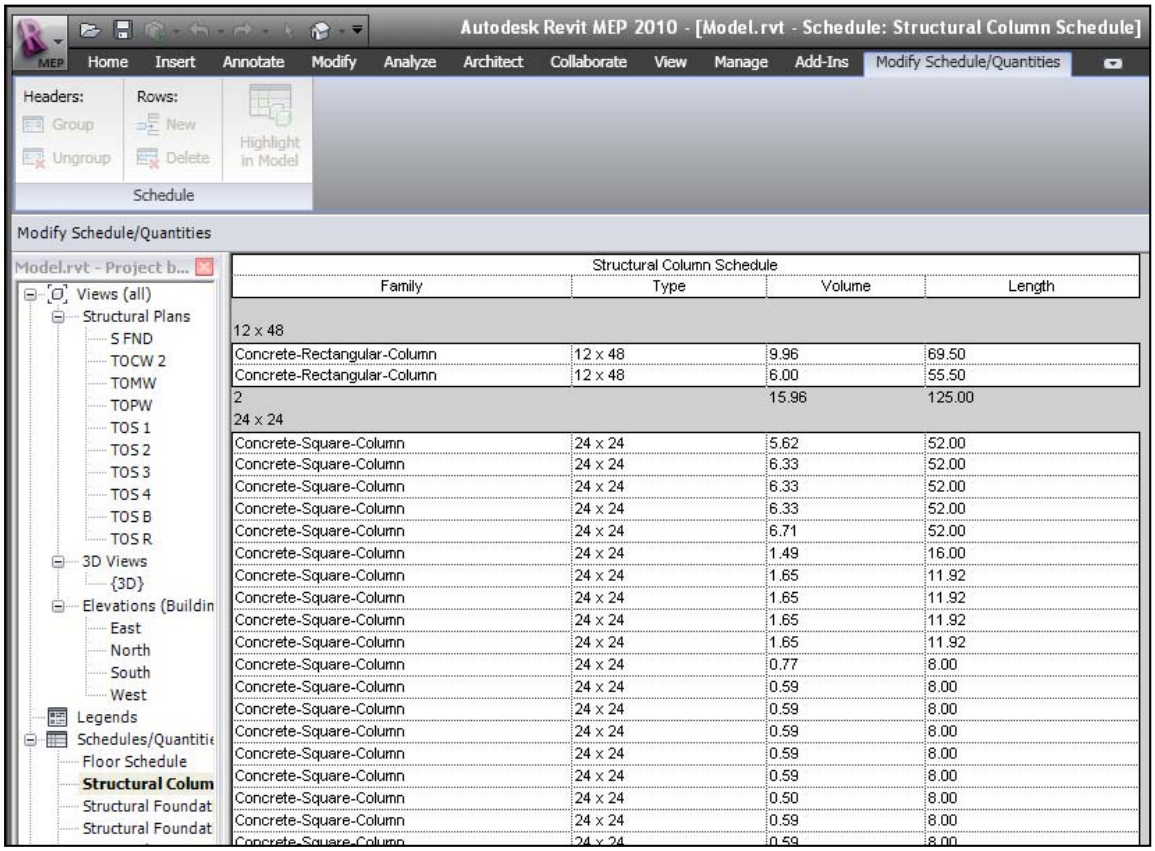


Figure 3: A view of the spread footing supporting West Village Commons



Structural Column Schedule

Family	Type	Volume	Length
12 x 48			
Concrete-Rectangular-Column	12 x 48	9.96	69.50
Concrete-Rectangular-Column	12 x 48	6.00	55.50
2		15.96	125.00
24 x 24			
Concrete-Square-Column	24 x 24	5.62	52.00
Concrete-Square-Column	24 x 24	6.33	52.00
Concrete-Square-Column	24 x 24	6.33	52.00
Concrete-Square-Column	24 x 24	6.33	52.00
Concrete-Square-Column	24 x 24	6.71	52.00
Concrete-Square-Column	24 x 24	1.49	16.00
Concrete-Square-Column	24 x 24	1.65	11.92
Concrete-Square-Column	24 x 24	1.65	11.92
Concrete-Square-Column	24 x 24	1.65	11.92
Concrete-Square-Column	24 x 24	1.65	11.92
Concrete-Square-Column	24 x 24	0.77	8.00
Concrete-Square-Column	24 x 24	0.59	8.00
Concrete-Square-Column	24 x 24	0.59	8.00
Concrete-Square-Column	24 x 24	0.59	8.00
Concrete-Square-Column	24 x 24	0.59	8.00
Concrete-Square-Column	24 x 24	0.59	8.00
Concrete-Square-Column	24 x 24	0.50	8.00
Concrete-Square-Column	24 x 24	0.59	8.00

Figure 4: Actual Revit schedule used to create Excel spreadsheets for the quantity take off.

The time to create a model is long and tedious, but if the information is entered correctly, it can prove to be a very accurate tool. By create arrays of beams and columns, recreating the structural steel portion of West Village Commons took very little effort. Creation of the model will also help later in my thesis when I experiment with different systems, as I plan to do for my proposal. New quantities are instantly updated in the schedule cutting down the time it would take to perform new hand calculations.

Some of the drawbacks for recreating and using a BIM model are mainly attributed to the time aspect. The time put into the model may not have been efficient for just this estimate. It may have taken less time to use hand take offs to calculate cubic yardage of concrete, tonnage of reinforcing steel, elevated slabs, and foundations. One of the issues I had was that after gathering all of the concrete quantities, I still had to use the drawings to figure out how much reinforcing needed to be accounted for. I did not enter reinforcement into the model, extending the time it took find tonnage quantities.

Figure 5 shows the final cost estimations of the structural concrete and steel. The schedule of values from technical assignment #1 shows some discrepancies. First of all, the concrete contract

value includes aspect that I did not account for in my estimate, such as the extensive site concrete used to create stair pathways up and around the south end of the building. I also did not take into account the deep foundation system of the RAM Aggregate Piers (Geopiers) that West Village Commons utilizes. There is insufficient information regarding the system so far in the construction documents and no standard way of contributing a cost without a contractors bid (which I was not allowed to view). Overhead and profit was not included in the unit pricing for any materials as I wanted to see how much the actual system would cost so I can have a better comparison to proposal ideas I have. I have intentions of exploring the cost and construction implications of creating an all concrete structure with post-tensioned concrete for the bridge span in the south end.

Structural Cost Summary	
	Total Cost
Structural Steel	$830,506.34
Structural Concrete	$2,404,891.36

Figure 5: Final Cost Summary for the Structural Systems

Please note that labor unit pricing includes equipment rates, and because Barton Malow is not responsible for the tower crane, this expense was included in the estimate for both concrete and structural steel. RSMeans was used for unit pricing and all quantities were obtained from the model. Reinforcing steel was calculating using the structural drawings and quantities obtain from the Revit take offs. Elevated slab reinforcing was calculated using an average steel quantity for 1 square foot with the average bar dimensions and extrapolated through the extent of the slab. Structural steel unit pricing not available in RSMeans was calculated through extrapolation of the next beam size up and the next beam size down. A detailed breakdown of all items can be found in Appendix C.

While the process may have taken more time than planned, and a comparison is tough to make without individual budget items for the project, the lessons learned helped me learn the power that a BIM take off has. I am confident in the quantities I obtained through the process, and I now have a working model to use throughout my thesis research. This model will continue to be developed as a tool for the rest of the year.

-General Conditions Estimate-

The general conditions estimate summary shown in figure 6 was calculate using several sources. Items to include were gathered from the Barton Malow project team on West Village Commons. While I was not allowed to use their budget items, industry standard data used by the Barton Malow Company provided me the data for unit prices. Appendix D depicts a more detailed breakdown of individual line items. Where information was lacking, RSMeans was used to fill in holes. 63% of the general conditions cost was comprised of staffing costs; Appendix E is a staff monitoring chart used to calculate the percentage of time spent on the project. Staff information was collected from the Barton Malow Team. Please note that protection of material and finished products is the responsibility of the individual contractor. Also there is no material hoists cost in the general conditions as the permanent elevator systems will be used as delivery methods. Also note that this does not include preconstruction costs, as that was a separate lump sum contract of $300,000.

General Conditions Estimate Summary	
Personnel	**$1,232,971.25**
Field Office Support	**$172,370.00**
Weather Protection	**$78,800.00**
Safety	**$19,000.00**
Relocation, Travel, Meals	**$24,700.00**
Temporary Utilities	**$24,100.00**
Temporary Facilities, Fences, and Barricades	**$141,200.00**
Clean-up	**$157,500.00**
Protection of Finished Work	**$0.00**
Tools and Equipment	**$1,000.00**
Material Handling and Hoists	**$0.00**
Consultants	**$50,000.00**
Permits	**$50,000.00**
Grand Total	**$1,951,641.25**

Figure 6: General conditions summary. A full breakdown can be seen in Appendix D

-Critical Industry Issues-

On October 16th, 2009, the Partnership for Achieving Construction Excellence (PACE) held their 18th annual roundtable discussion on critical construction industry issues. The event brings industry leaders, students, and Penn State Faculty together to address issues and views on the current state of the construction business. It is one of the few times competitors sit down and discuss strategies and concerns they have within their respective companies.

The morning kicked-off with a continental breakfast and moved quickly into introductions from Dr. Anumba, Dr. Messner, and Dr. Riley. Dr. Anumba spoke about a possible mentoring program for current architectural engineering students. Penn State AE alums would be linked with a student throughout their time at school, assisting with any questions or concerns they may have. Dr. Messner introduced the "BIM Project Execution Planning Guide" which can serve as a tool for applying BIM technologies on individual projects. He also announced that the department received a grant from the National Science Foundation to improve the 4D simulation exercise used to teach construction scheduling. Dr. Riley touched on the research Dr. Horman was conducting, and assured us itwould continue in his memory. Dr. Horman paved the way for new and invaluable sustainable research.

Industry panel

After the opening words from the faculty, a panel of industry members was invited to speak on the "State of Construction." The panel included John Bechtel (Penn State Office of Physical Plant), Jim Salvino (Clark Construction Group), Scott Mull (Barton Malow Company), Jeremy Sibert (Hensel Phelps Construction), and Mike Arnold (Foreman Group). The consensus of the panel was that diversification of niche markets and services would be key to persevering through tough times. Many of the companies represented said that while slimming down company staff is a difficult procedure, it would create a lean company with skillful individuals. It can be a time of internal reinvestment and expansion.

Strong lessons have been learned in the past two years, especially with relationship building. Growing a strong connection with building owners can lead to repeat work and financial security. Company culture and standards cannot be short sighted and the goal of every project should be to build a good reputation as a builder for that owner. Before when bidding on new projects, a contractor expected to see 2 or 3 competitors but now that list has grown to over 20 different companies. Contractors are expanding on the type of work they are bidding so they can keep their people busy. It will be interesting to see in a few years how well these companies performed in work they have no experience in. The same situation is seen with subcontractors as they are scrounging for work and dipping into markets or regions unfamiliar to them. Even in healthy economic times, expansion of this nature is a huge risk.

After touching on the difficult subject of the economy, the topic of discussion shifted to BIM utilization and the green building market. The panel had a range of BIM usage; the Foreman Group has just started implementing BIM on their projects while Barton Malow and Clark have made some BIM technologies a standard on all of their jobs. A tough issue that was brought up here and in the BIM breakout session was on how to sell BIM to owners. It has definitely become an efficient tool for contractors, but how can we justify the cost to owners. BIM has though continued to advance even in hard economic times due to companies looking for a better way to conduct business.

The panel identified the areas in the green market that have become a focus for not only the government but private business owners. It is no secret that the green building ideal and LEED requirements have become an industry standard due to the lifecycle cost savings that are incorporated with them. As more and more reports of building energy savings are released, owners are dictating LEED requirements with their designers. This push for greener technology implementation has led to great advancements in building materials and energy sources. A strong market for construction that is emerging is in energy plants and green renovations.

BIM Breakout Session

Building Information Modeling has been a "buzz" word in the industry for around 10 years, but only recently has BIM potential really taken off. It is slowly becoming an industry standard as it leads to a more efficient design and construction process. While there is vast room for advancement, everyone agreed that the tools that BIM provides leads to delivering a better product to the owners. This breakout group's goal was to identify some of the problems and hurdles that BIM faces and to discuss plausible solutions.

Some of the issues that we discussed included problems with the older and younger generation gap. Older employees are used to a certain way of working and have a great deal of experience. The younger generation has become very adept to different technologies, but they lack the construction experience to apply the tools. This gap will shorten in time, but finding a way for the experienced construction experts to work with BIM softwares, or at least those who know how to use it, will heighten construction efficiencies.

The group spent a good amount of time on the owner's role in BIM and what they want after closeout. Owners have realized the efficiencies that BIM brings, but what benefits do they see for themselves. If they are going to invest their own money into the use of technology, they should see some product that they can utilize. Facilities management and as-built models are good selling points, but owners may not even know how to ask for those services. There needs to be an effort to educate owners on what BIM can do for the life of their projects.

With the room full of contractors, the topic of field use of BIM came up. If a project is going to take the time and money to develop an informational model, field use should also be

utilized. BIM can be used for layout in conjunction with total stations, cost estimation, site utilization, and field bust corrections. The value that BIM can bring to field coordination can help shorten schedules and increase advanced awareness of potential problems.

The breakout session helped the students in the room not only gain knowledge of industry use of BIM, but also possible research areas for their thesis. The industry men and women in the room eluded to exploring the possible effects that a delivery method would have on BIM use. How early a contractor is brought on can open more doors for BIM usage.

Student Panel

Each year a panel of students is selected to discuss topics regarding younger generations. This year the focus was on communication patterns and technologies that college students utilize on a daily basis. How can these communication patterns be utilized in industry or do they not belong. Social networking sites such as Facebook and Myspace were scrutinized by not only students but also industry leaders. Interestingly enough many of the industry members believe that we are lacking many of the dialogue skills necessary for the construction industry. Some believe that modern means of communicating are detracting soft skills that used to be second nature.

Many of suggestions mentioned mainly focused on company policies. Industry members are worried that texting or twittering are distractions on the jobsite. But if company standards embraced these communication means, they could be used to our advantage. Sending a quick text to a coworker while one is on site can lead to quicker answers. A site like twitter can be used as PR externally or a means of sharing exciting news and photos from other jobsites. Company rules would need to be made much like rules already in place for email and work phones. Young employees grew up in an age of quick information; why not embrace their communicating patterns and use it to a company's advantage.

Key Contacts

The event was very advantageous toward working on a successful thesis, mainly on the people I met there. While I know some of the Barton Malow employees well, the new ones I met gave me full support and told me that they would be pleased to help. I have been interested in using integrated project delivery (IPD) as a possible research study for my thesis, and Rob Leicht of DPR Construction set he could set me up with contacts who have worked on an IPD project. Jerry Shaheen of Gilbane Building Company was a good source of experience and construction knowledge. He has been in the business for awhile and he knows what works and what does not. He seemed very knowledgeable on BIM utilization and offered his experiences in the use to all the students in the breakout session.

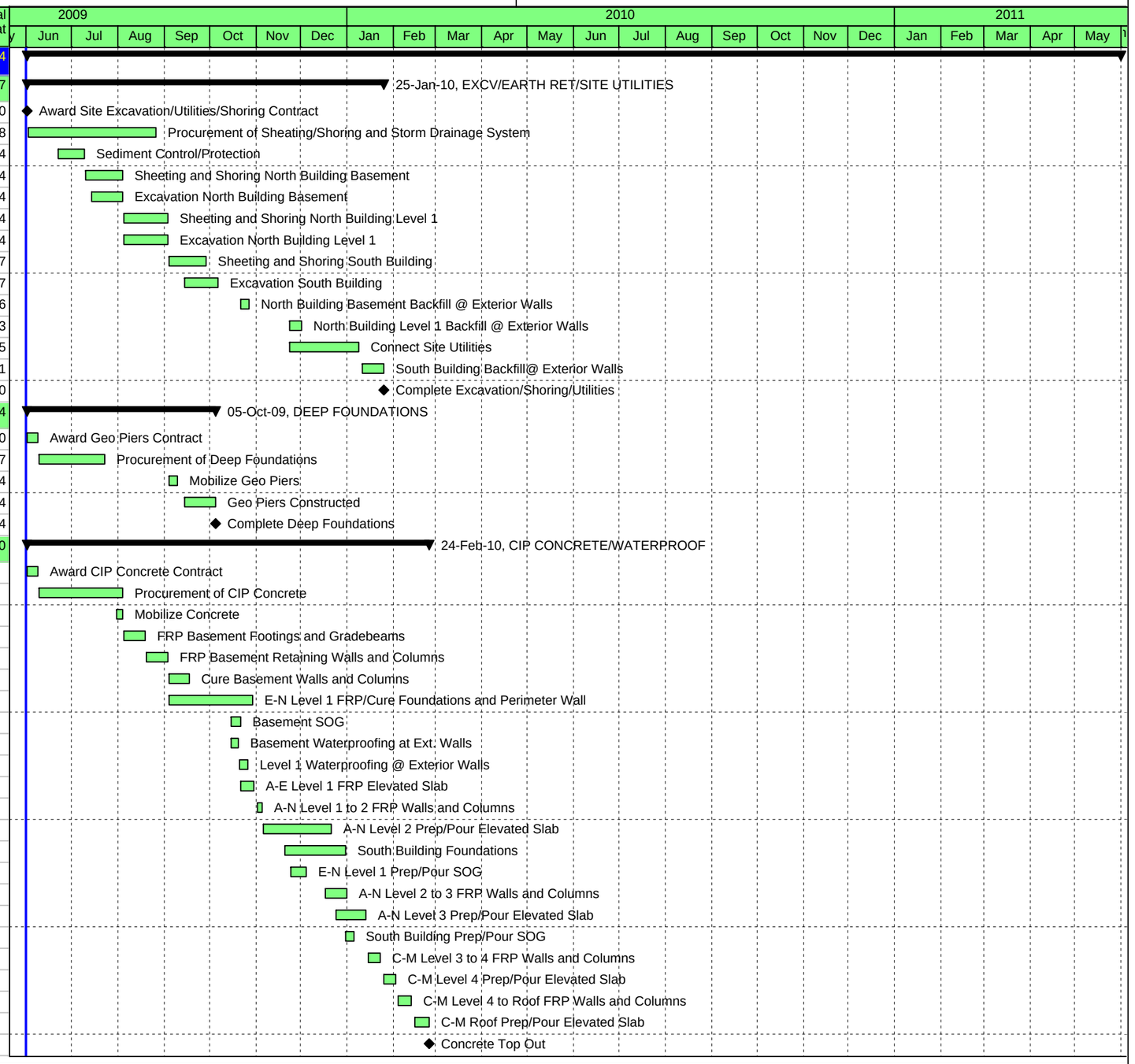
The PACE conference really helped open doors for my thesis project. It proved to me that when I feel stuck or unsure of where to look next, industry members could spark ideas just from

conversations. The contacts I made will be good sources of information when it comes time to prepare my proposal.

-Appendix A-

Detailed Project Schedule

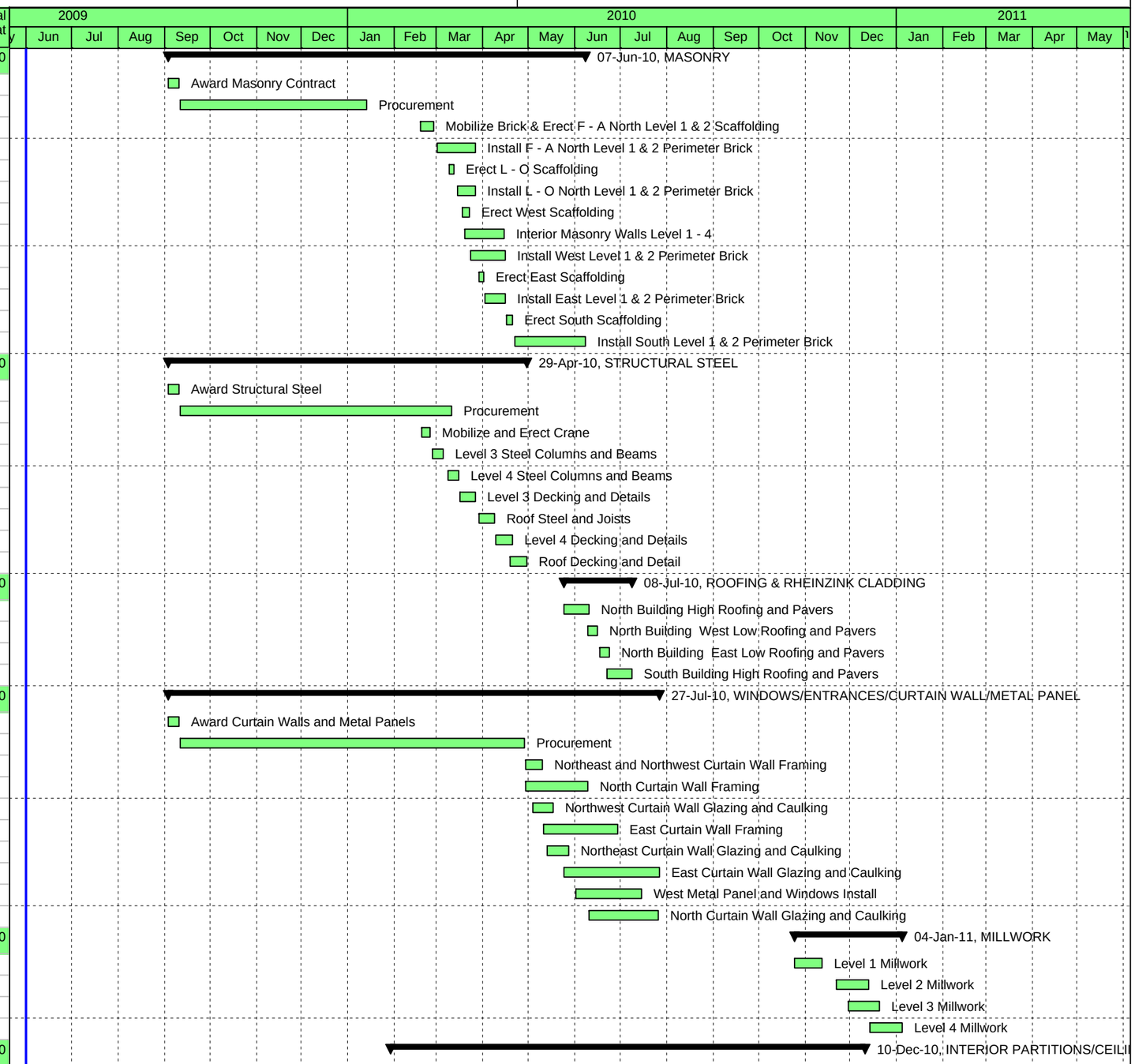
Activity ID	Activity Name	Original Duration	Remaining Duration	Schedule % Complete	Start	Finish	Total Float
TWVC Detailed Schedule		522	522	0%	01-Jun-09	31-May-11	414
EXCV/EARTH RET/SITE ...		171	171	0%	01-Jun-09	25-Jan-10	417
A1120	Award Site Excavation/U...	0	0	0%	01-Jun-09		490
A1000	Procurement of Sheating...	62	62	0%	02-Jun-09	26-Aug-09	428
A1010	Sediment Control/Protec...	14	14	0%	22-Jun-09	09-Jul-09	414
A1020	Sheeting and Shoring N...	18	18	0%	10-Jul-09	04-Aug-09	414
A1030	Excavation North Buildin...	16	16	0%	14-Jul-09	04-Aug-09	414
A1040	Sheeting and Shoring N...	22	22	0%	05-Aug-09	03-Sep-09	434
A1050	Excavation North Buildin...	22	22	0%	05-Aug-09	03-Sep-09	414
A1060	Sheeting and Shoring S...	17	17	0%	04-Sep-09	28-Sep-09	417
A1070	Excavation South Building	17	17	0%	14-Sep-09	06-Oct-09	417
A1080	North Building Basement...	4	4	0%	22-Oct-09	27-Oct-09	486
A1090	North Building Level 1 B...	7	7	0%	23-Nov-09	01-Dec-09	483
A1100	Connect Site Utilities	35	35	0%	23-Nov-09	08-Jan-10	455
A1110	South Building Backfill@...	11	11	0%	11-Jan-10	25-Jan-10	481
A1130	Complete Excavation/Sh...	0	0	0%		25-Jan-10	490
DEEP FOUNDATIONS		91	91	0%	01-Jun-09	05-Oct-09	414
A1140	Award Geo Piers Contract	6	6	0%	01-Jun-09	08-Jun-09	490
A1150	Procurement of Deep Fo...	33	33	0%	09-Jun-09	23-Jul-09	457
A1160	Mobilize Geo Piers	4	4	0%	04-Sep-09	09-Sep-09	414
A1170	Geo Piers Constructed	16	16	0%	14-Sep-09	05-Oct-09	414
A1180	Complete Deep Foundat...	0	0	0%		05-Oct-09	414
CIP CONCRETE/WATER...		193	193	0%	01-Jun-09	24-Feb-10	0
A1190	Award CIP Concrete Co...	6	6	0%	01-Jun-09	08-Jun-09	
A1200	Procurement of CIP Con...	41	41	0%	09-Jun-09	04-Aug-09	
A1210	Mobilize Concrete	3	3	0%	31-Jul-09	04-Aug-09	
A1220	FRP Basement Footings...	11	11	0%	05-Aug-09	19-Aug-09	
A1230	FRP Basement Retainin...	11	11	0%	20-Aug-09	03-Sep-09	
A1240	Cure Basement Walls a...	10	10	0%	04-Sep-09	17-Sep-09	
A1290	E-N Level 1 FRP/Cure F...	40	40	0%	04-Sep-09	29-Oct-09	
A1250	Basement SOG	5	5	0%	15-Oct-09	21-Oct-09	
A1270	Basement Waterproofin...	4	4	0%	15-Oct-09	20-Oct-09	
A1280	Level 1 Waterproofing ...	4	4	0%	21-Oct-09	26-Oct-09	
A1260	A-E Level 1 FRP Elevat...	7	7	0%	22-Oct-09	30-Oct-09	
A1310	A-N Level 1 to 2 FRP W...	4	4	0%	02-Nov-09	05-Nov-09	
A1320	A-N Level 2 Prep/Pour E...	32	32	0%	06-Nov-09	21-Dec-09	
A1390	South Building Foundati...	29	29	0%	20-Nov-09	30-Dec-09	
A1300	E-N Level 1 Prep/Pour S...	9	9	0%	24-Nov-09	04-Dec-09	
A1330	A-N Level 2 to 3 FRP W...	11	11	0%	17-Dec-09	31-Dec-09	
A1340	A-N Level 3 Prep/Pour E...	15	15	0%	24-Dec-09	13-Jan-10	
A1400	South Building Prep/Pou...	4	4	0%	31-Dec-09	05-Jan-10	
A1350	C-M Level 3 to 4 FRP W...	6	6	0%	15-Jan-10	22-Jan-10	
A1360	C-M Level 4 Prep/Pour ...	7	7	0%	25-Jan-10	02-Feb-10	
A1370	C-M Level 4 to Roof FR...	7	7	0%	04-Feb-10	12-Feb-10	
A1380	C-M Roof Prep/Pour Ele...	8	8	0%	15-Feb-10	24-Feb-10	
A1410	Concrete Top Out	0	0	0%		24-Feb-10	



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

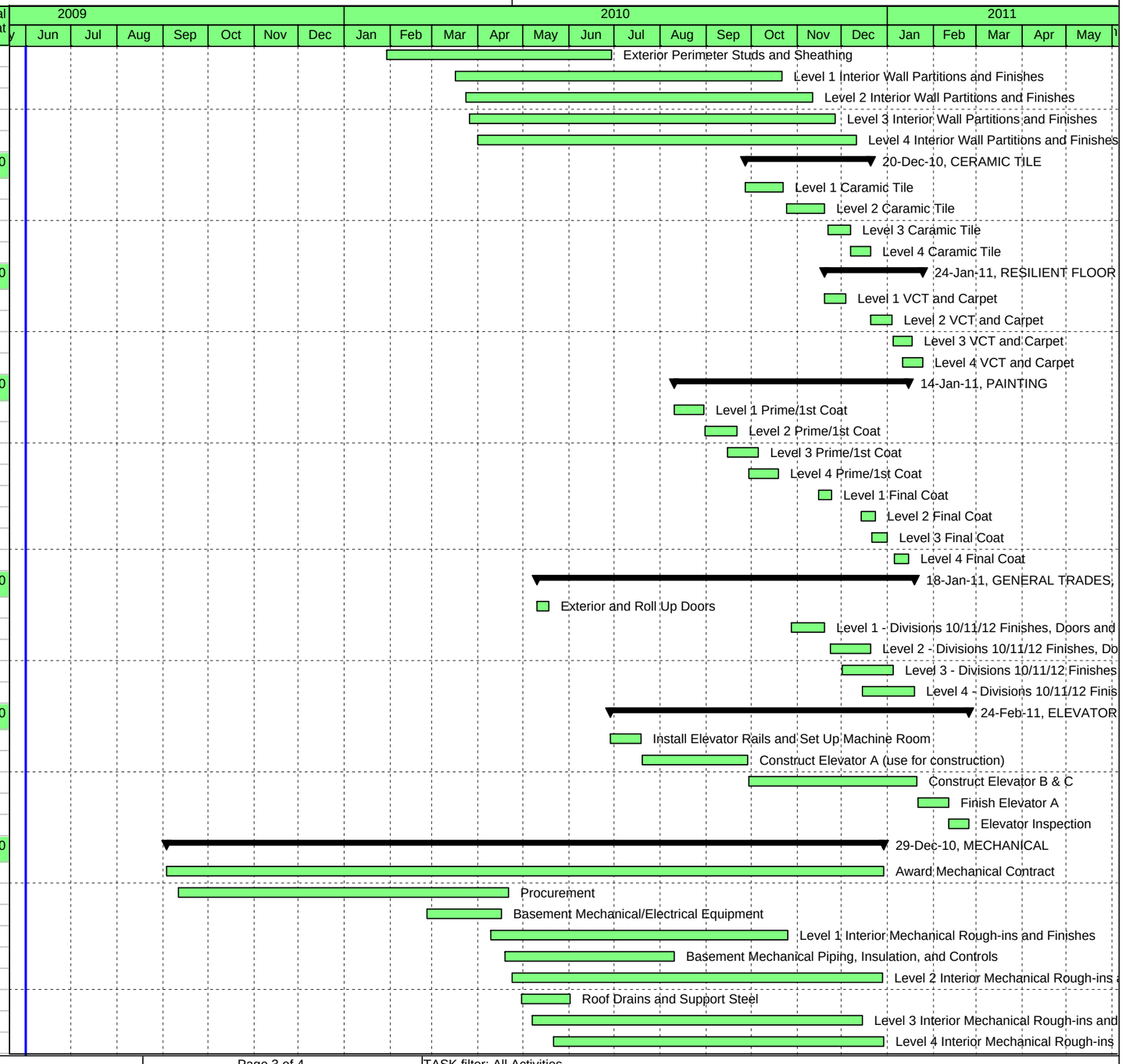
Activity ID	Activity Name	Original Duration	Remaining Duration	Schedule % Complete	Start	Finish	Total Float
MASONRY		198	198	0%	03-Sep-09	07-Jun-10	0
A1420	Award Masonry Contract	6	6	0%	03-Sep-09	10-Sep-09	
A1430	Procurement	89	89	0%	11-Sep-09	13-Jan-10	
A1440	Mobilize Brick & Erect F ...	7	7	0%	18-Feb-10	26-Feb-10	
A1450	Install F - A North Level ...	20	20	0%	01-Mar-10	26-Mar-10	
A1470	Erect L - O Scaffolding	4	4	0%	09-Mar-10	12-Mar-10	
A1480	Install L - O North Level ...	10	10	0%	15-Mar-10	26-Mar-10	
A1460	Erect West Scaffolding	3	3	0%	18-Mar-10	22-Mar-10	
A1540	Interior Masonry Walls L...	19	19	0%	19-Mar-10	14-Apr-10	
A1490	Install West Level 1 & 2 ...	18	18	0%	23-Mar-10	15-Apr-10	
A1500	Erect East Scaffolding	4	4	0%	29-Mar-10	01-Apr-10	
A1510	Install East Level 1 & 2 ...	10	10	0%	02-Apr-10	15-Apr-10	
A1520	Erect South Scaffolding	3	3	0%	16-Apr-10	20-Apr-10	
A1530	Install South Level 1 & 2...	33	33	0%	22-Apr-10	07-Jun-10	
STRUCTURAL STEEL		171	171	0%	03-Sep-09	29-Apr-10	0
A1550	Award Structural Steel	6	6	0%	03-Sep-09*	10-Sep-09	
A1560	Procurement	129	129	0%	11-Sep-09	10-Mar-10	
A1570	Mobilize and Erect Crane	4	4	0%	19-Feb-10	24-Feb-10	
A1580	Level 3 Steel Columns a...	6	6	0%	26-Feb-10	05-Mar-10	
A1590	Level 4 Steel Columns a...	6	6	0%	08-Mar-10	15-Mar-10	
A1600	Level 3 Decking and Det...	9	9	0%	16-Mar-10	26-Mar-10	
A1610	Roof Steel and Joists	9	9	0%	29-Mar-10	08-Apr-10	
A1620	Level 4 Decking and Det...	8	8	0%	09-Apr-10	20-Apr-10	
A1630	Roof Decking and Detail	9	9	0%	19-Apr-10	29-Apr-10	
ROOFING & RHEINZINK...		34	34	0%	24-May-10	08-Jul-10	0
A1640	North Building High Roof...	14	14	0%	24-May-10*	10-Jun-10	
A1650	North Building West Lo...	5	5	0%	09-Jun-10*	15-Jun-10	
A1670	North Building East Low...	5	5	0%	17-Jun-10*	23-Jun-10	
A1660	South Building High Roo...	13	13	0%	22-Jun-10*	08-Jul-10	
WINDOWS/ENTRANCES...		234	234	0%	03-Sep-09	27-Jul-10	0
A1680	Award Curtain Walls and...	6	6	0%	03-Sep-09*	10-Sep-09	
A1690	Procurement	164	164	0%	11-Sep-09*	28-Apr-10	
A1700	Northeast and Northwest...	8	8	0%	29-Apr-10*	10-May-10	
A1760	North Curtain Wall Frami...	30	30	0%	29-Apr-10*	09-Jun-10	
A1730	Northwest Curtain Wall ...	10	10	0%	04-May-10*	17-May-10	
A1710	East Curtain Wall Framing	36	36	0%	11-May-10*	29-Jun-10	
A1740	Northeast Curtain Wall ...	11	11	0%	13-May-10*	27-May-10	
A1750	East Curtain Wall Glazin...	47	47	0%	24-May-10*	27-Jul-10	
A1720	West Metal Panel and ...	33	33	0%	01-Jun-10*	15-Jul-10	
A1770	North Curtain Wall Glazi...	33	33	0%	10-Jun-10*	26-Jul-10	
MILLWORK		52	52	0%	25-Oct-10	04-Jan-11	0
A1780	Level 1 Millwork	15	15	0%	25-Oct-10*	12-Nov-10	
A1790	Level 2 Millwork	16	16	0%	22-Nov-10*	13-Dec-10	
A1800	Level 3 Millwork	15	15	0%	30-Nov-10*	20-Dec-10	
A1810	Level 4 Millwork	16	16	0%	14-Dec-10*	04-Jan-11	
INTERIOR PARTITIONS/...		226	226	0%	29-Jan-10	10-Dec-10	0



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

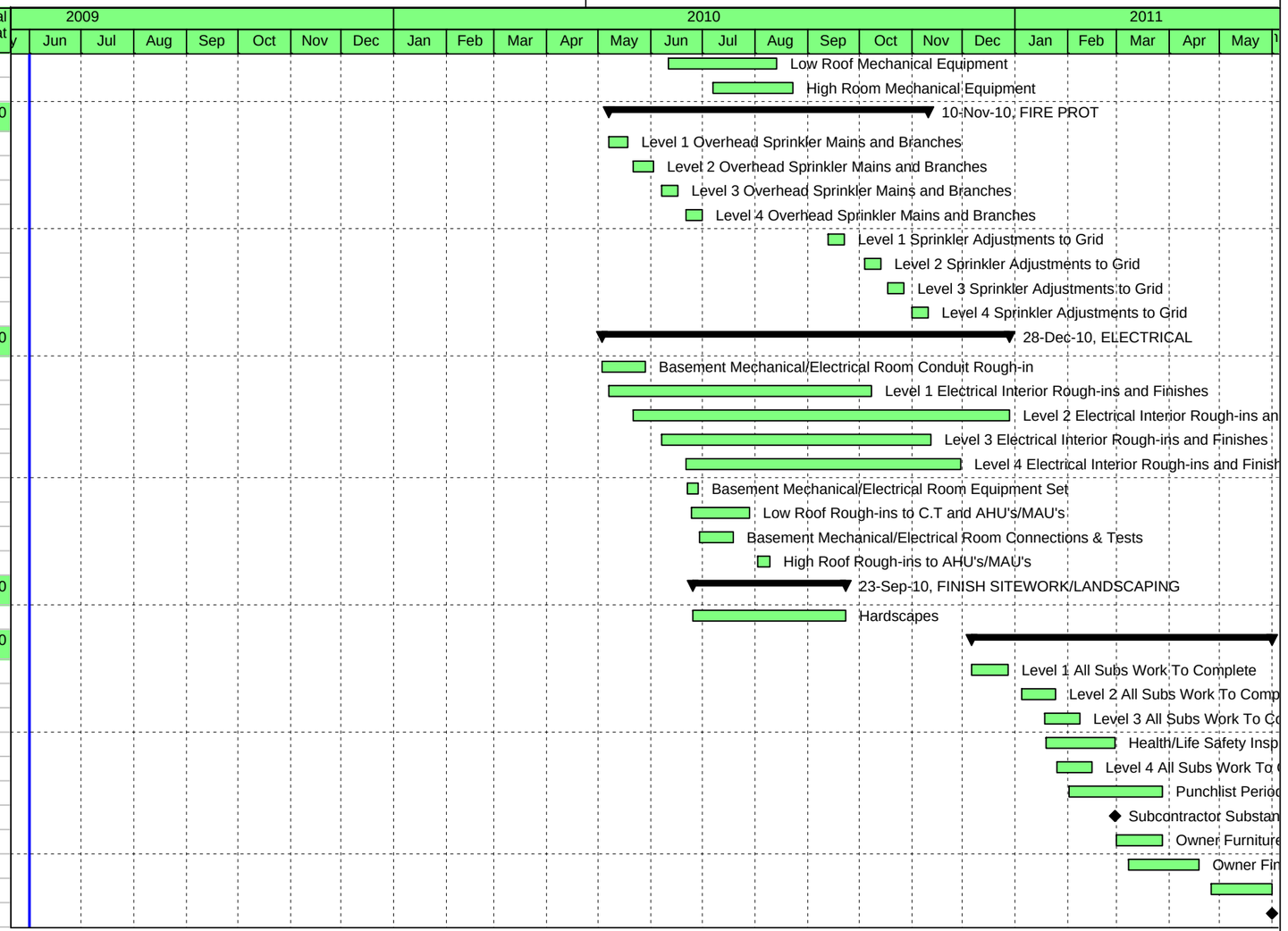
Activity ID	Activity Name	Original Duration	Remaining Duration	Schedule % Complete	Start	Finish	Total Float
A1820	Exterior Perimeter Studs...	108	108	0%	29-Jan-10*	29-Jun-10	
A1830	Level 1 Interior Wall Part...	158	158	0%	16-Mar-10*	21-Oct-10	
A1840	Level 2 Interior Wall Part...	168	168	0%	23-Mar-10*	11-Nov-10	
A1850	Level 3 Interior Wall Part...	176	176	0%	26-Mar-10*	26-Nov-10	
A1860	Level 4 Interior Wall Part...	183	183	0%	31-Mar-10*	10-Dec-10	
CERAMIC TILE		61	61	0%	27-Sep-10	20-Dec-10	0
A1870	Level 1 Caramic Tile	20	20	0%	27-Sep-10*	22-Oct-10	
A1880	Level 2 Caramic Tile	20	20	0%	25-Oct-10*	19-Nov-10	
A1890	Level 3 Caramic Tile	11	11	0%	22-Nov-10*	06-Dec-10	
A1900	Level 4 Caramic Tile	10	10	0%	07-Dec-10*	20-Dec-10	
RESILIENT FLOOR AND...		47	47	0%	19-Nov-10	24-Jan-11	0
A1910	Level 1 VCT and Carpet	11	11	0%	19-Nov-10*	03-Dec-10	
A1920	Level 2 VCT and Carpet	11	11	0%	20-Dec-10*	03-Jan-11	
A1930	Level 3 VCT and Carpet	10	10	0%	04-Jan-11*	17-Jan-11	
A1940	Level 4 VCT and Carpet	10	10	0%	11-Jan-11*	24-Jan-11	
PAINTING		114	114	0%	10-Aug-10	14-Jan-11	0
A1950	Level 1 Prime/1st Coat	15	15	0%	10-Aug-10*	30-Aug-10	
A1960	Level 2 Prime/1st Coat	16	16	0%	31-Aug-10*	21-Sep-10	
A1970	Level 3 Prime/1st Coat	15	15	0%	15-Sep-10*	05-Oct-10	
A1980	Level 4 Prime/1st Coat	15	15	0%	29-Sep-10*	19-Oct-10	
A1990	Level 1 Final Coat	8	8	0%	15-Nov-10*	24-Nov-10	
A2000	Level 2 Final Coat	8	8	0%	14-Dec-10*	23-Dec-10	
A2010	Level 3 Final Coat	9	9	0%	21-Dec-10*	31-Dec-10	
A2020	Level 4 Final Coat	8	8	0%	05-Jan-11*	14-Jan-11	
GENERAL TRADES, DO...		182	182	0%	10-May-10	18-Jan-11	0
A2030	Exterior and Roll Up Doors	7	7	0%	10-May-10*	18-May-10	
A2040	Level 1 - Divisions 10/11...	17	17	0%	28-Oct-10*	19-Nov-10	
A2050	Level 2 - Divisions 10/11...	20	20	0%	23-Nov-10*	20-Dec-10	
A2060	Level 3 - Divisions 10/11...	25	25	0%	01-Dec-10*	04-Jan-11	
A2070	Level 4 - Divisions 10/11...	25	25	0%	15-Dec-10*	18-Jan-11	
ELEVATORS		174	174	0%	28-Jun-10	24-Feb-11	0
A2080	Install Elevator Rails and...	16	16	0%	28-Jun-10*	19-Jul-10	
A2090	Construct Elevator A (us...	51	51	0%	20-Jul-10*	28-Sep-10	
A2100	Construct Elevator B & C	82	82	0%	29-Sep-10*	20-Jan-11	
A2110	Finish Elevator A	15	15	0%	21-Jan-11*	10-Feb-11	
A2120	Elevator Inspection	10	10	0%	11-Feb-11*	24-Feb-11	
MECHANICAL		345	345	0%	03-Sep-09	29-Dec-10	0
A2220	Award Mechanical Contr...	345	345	0%	03-Sep-09*	29-Dec-10	
A2130	Procurement	159	159	0%	11-Sep-09*	21-Apr-10	
A2150	Basement Mechanical/El...	37	37	0%	25-Feb-10*	16-Apr-10	
A2180	Level 1 Interior Mechani...	142	142	0%	09-Apr-10*	25-Oct-10	
A2230	Basement Mechanical Pi...	82	82	0%	19-Apr-10*	10-Aug-10	
A2190	Level 2 Interior Mechani...	178	178	0%	23-Apr-10*	28-Dec-10	
A2140	Roof Drains and Support...	23	23	0%	30-Apr-10*	01-Jun-10	
A2200	Level 3 Interior Mechani...	158	158	0%	07-May-10*	14-Dec-10	
A2210	Level 4 Interior Mechani...	159	159	0%	21-May-10*	29-Dec-10	



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

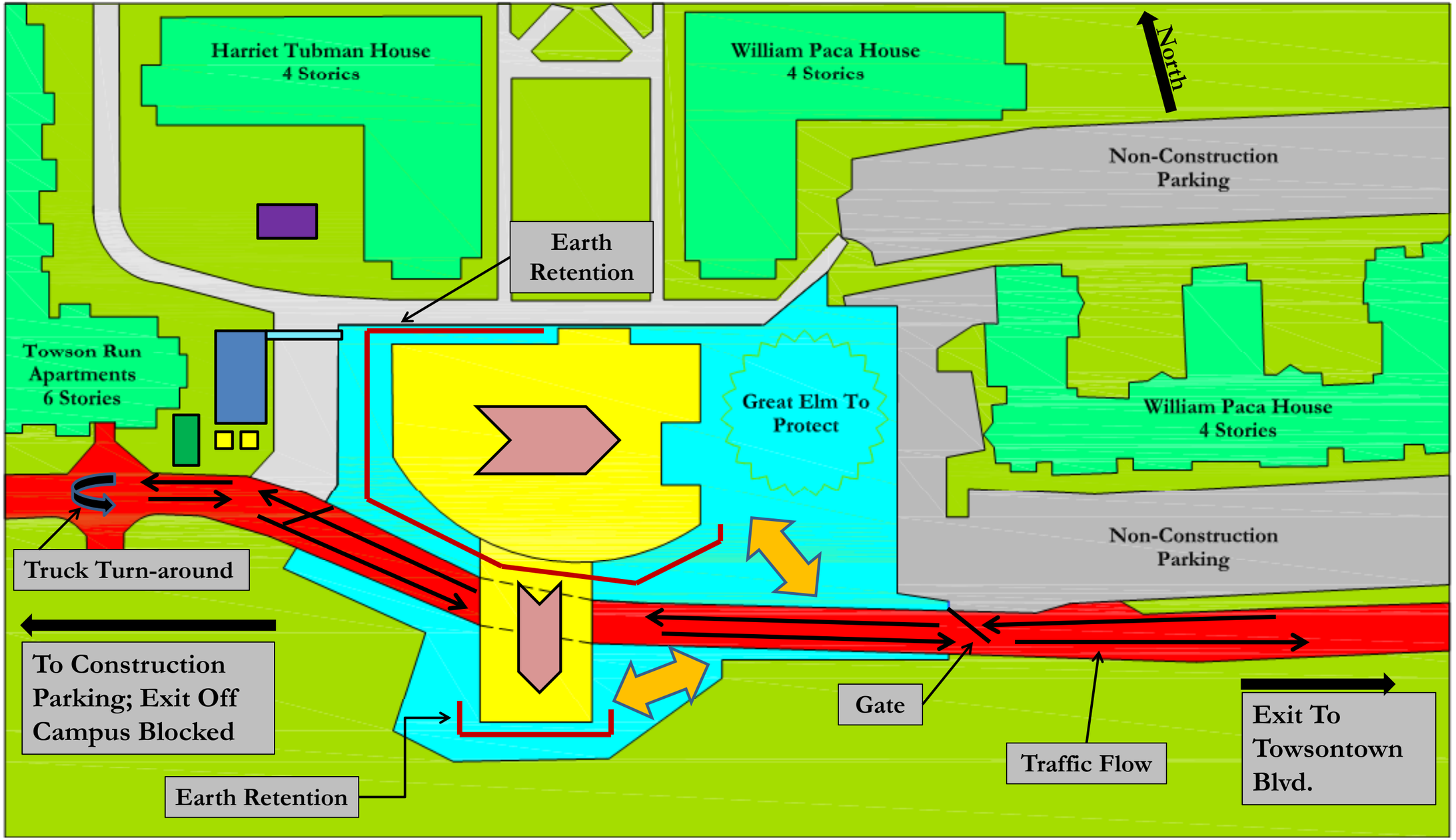
TASK filter: All Activities

Activity ID	Activity Name	Original Duration	Remaining Duration	Schedule % Complete	Start	Finish	Total Float
A2160	Low Roof Mechanical Eq...	46	46	0%	11-Jun-10*	13-Aug-10	
A2170	High Room Mechanical ...	34	34	0%	07-Jul-10*	23-Aug-10	
FIRE PROT		134	134	0%	07-May-10	10-Nov-10	0
A2240	Level 1 Overhead Sprink...	8	8	0%	07-May-10*	18-May-10	
A2250	Level 2 Overhead Sprink...	9	9	0%	21-May-10*	02-Jun-10	
A2260	Level 3 Overhead Sprink...	8	8	0%	07-Jun-10*	16-Jun-10	
A2270	Level 4 Overhead Sprink...	8	8	0%	21-Jun-10*	30-Jun-10	
A2280	Level 1 Sprinkler Adjust...	8	8	0%	13-Sep-10*	22-Sep-10	
A2290	Level 2 Sprinkler Adjust...	8	8	0%	04-Oct-10*	13-Oct-10	
A2300	Level 3 Sprinkler Adjust...	8	8	0%	18-Oct-10*	27-Oct-10	
A2310	Level 4 Sprinkler Adjust...	8	8	0%	01-Nov-10*	10-Nov-10	
ELECTRICAL		172	172	0%	03-May-10	28-Dec-10	0
A2320	Basement Mechanical/El...	20	20	0%	03-May-10*	28-May-10	
A2350	Level 1 Electrical Interior...	111	111	0%	07-May-10*	08-Oct-10	
A2360	Level 2 Electrical Interior...	158	158	0%	21-May-10*	28-Dec-10	
A2370	Level 3 Electrical Interior...	115	115	0%	07-Jun-10*	12-Nov-10	
A2380	Level 4 Electrical Interior...	116	116	0%	21-Jun-10*	29-Nov-10	
A2390	Basement Mechanical/El...	5	5	0%	22-Jun-10*	28-Jun-10	
A2410	Low Roof Rough-ins to ...	25	25	0%	24-Jun-10*	28-Jul-10	
A2400	Basement Mechanical/El...	15	15	0%	29-Jun-10*	19-Jul-10	
A2420	High Roof Rough-ins to ...	6	6	0%	02-Aug-10*	09-Aug-10	
FINISH SITEWORK/LAN...		65	65	0%	25-Jun-10	23-Sep-10	0
A2430	Hardscapes	65	65	0%	25-Jun-10*	23-Sep-10	
INSPECTIONS/COMMIS...		127	127	0%	06-Dec-10	31-May-11	0
A2440	Level 1 All Subs Work T...	16	16	0%	06-Dec-10*	27-Dec-10	
A2450	Level 2 All Subs Work T...	15	15	0%	04-Jan-11*	24-Jan-11	
A2460	Level 3 All Subs Work T...	15	15	0%	18-Jan-11*	07-Feb-11	
A2540	Health/Life Safety Inspe...	29	29	0%	19-Jan-11*	28-Feb-11	
A2470	Level 4 All Subs Work T...	15	15	0%	25-Jan-11*	14-Feb-11	
A2480	Punchlist Period	40	40	0%	01-Feb-11*	28-Mar-11	
A2530	Subcontractor Substanti...	0	0	0%		28-Feb-11	
A2490	Owner Furniture Installat...	20	20	0%	01-Mar-11*	28-Mar-11	
A2500	Owner Final Commissio...	30	30	0%	08-Mar-11*	18-Apr-11	
A2510	Air Flush-Out Period	26	26	0%	26-Apr-11*	31-May-11	
A2520	Final Project Completion	0	0	0%		31-May-11	



-Appendix B-

Construction Site Plans



West Village Commons

Towson University

Nicholas Umosella

-- Site Access

-- Portable Toilets

-- Temporary Power Transformer

-- Site Fence Enclosure

-- Dumpster

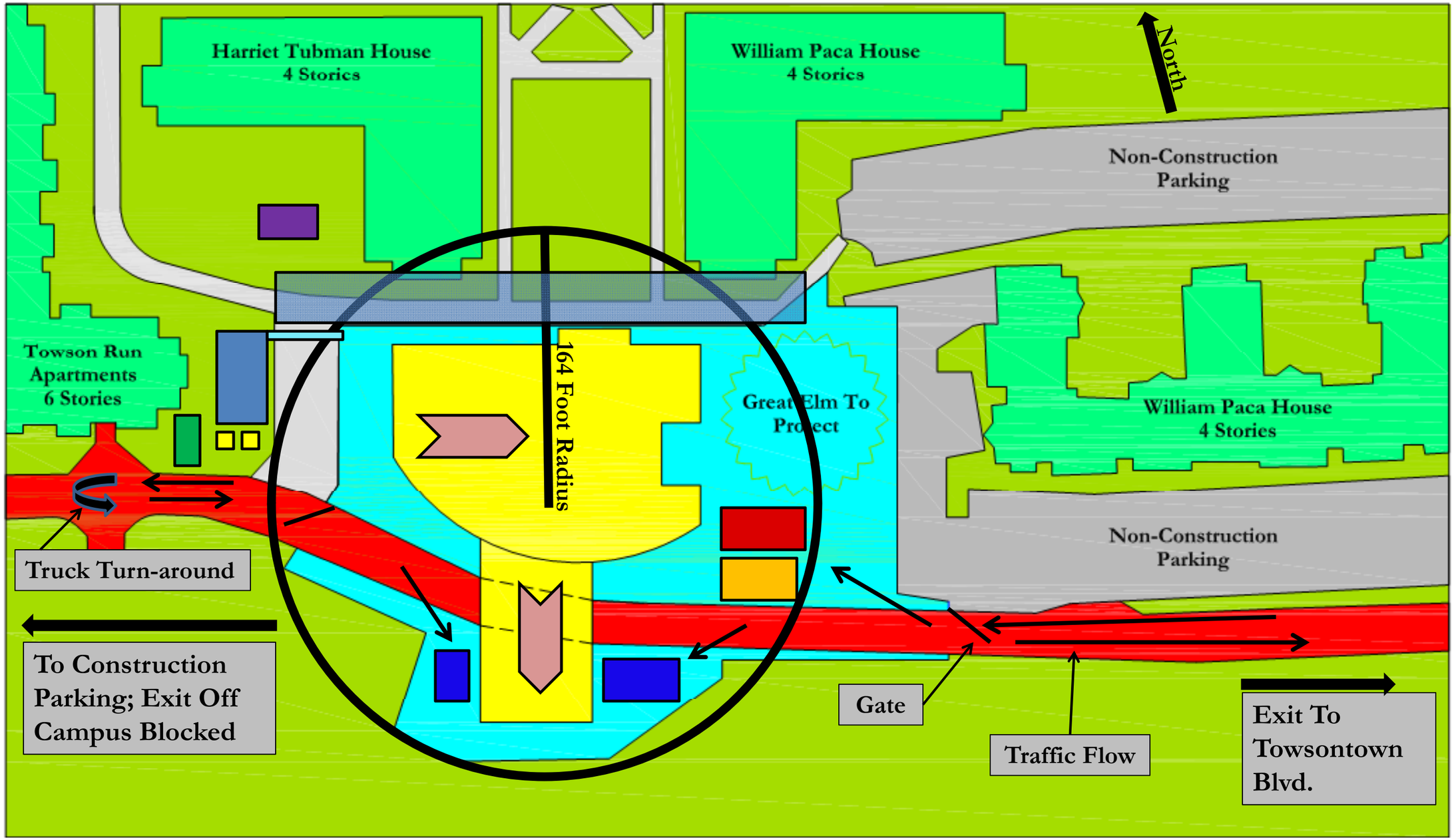
-- Contractor Trailer

-- Emerson Dr.

-- Work Flow

Excavation and Foundations

Scale: NOT TO SCALE



West Village Commons

Towson University

Nicholas Umosella

-- Tower Crane

-- Overhead Protection

-- Portable Toilets

-- Contractor Trailer

-- Rebar Staging

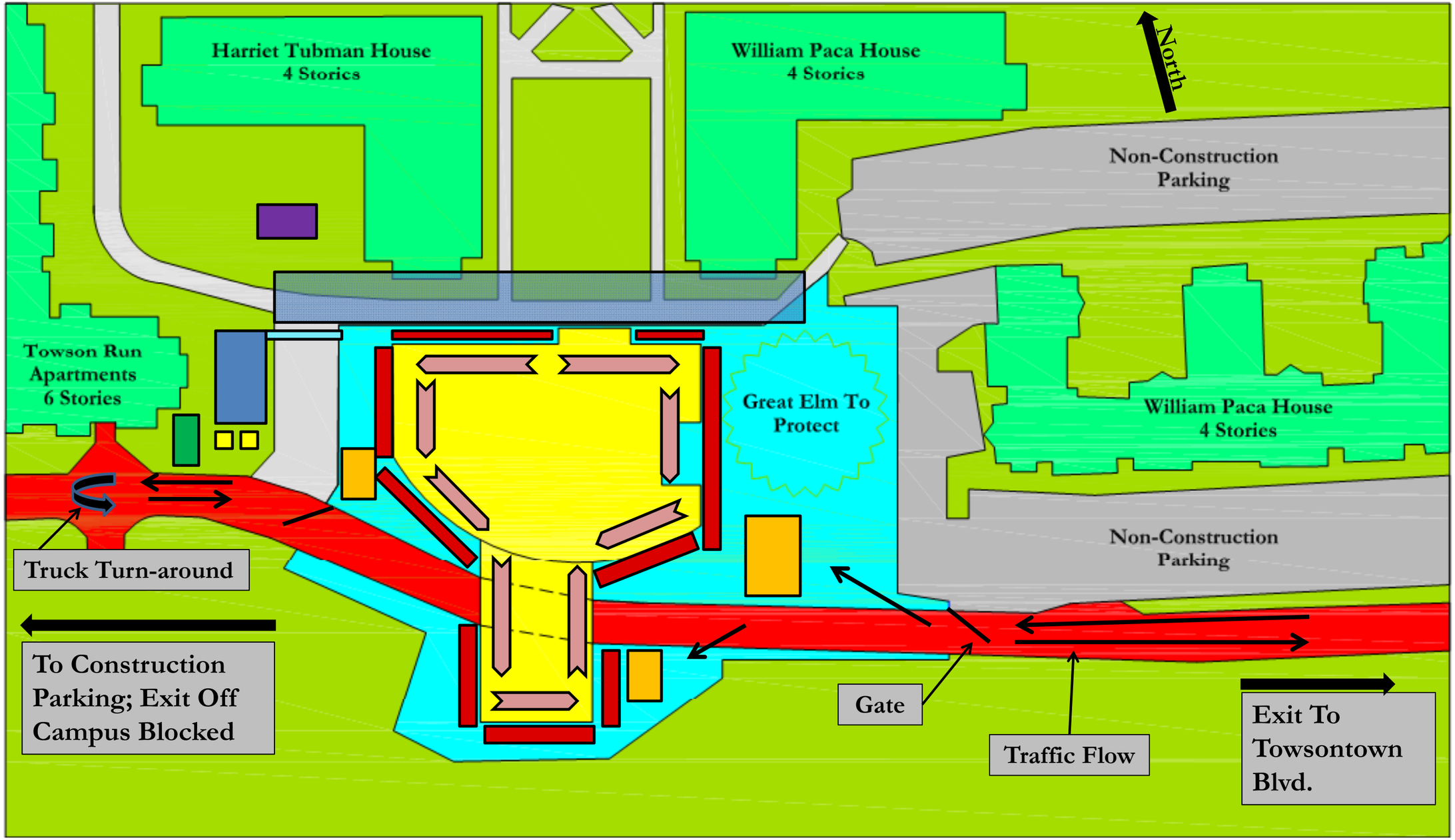
-- Steel Shakeout

-- Concrete Staging

-- Work Flow

Superstructure

Scale: NOT TO SCALE



-- Overhead Protection

-- Portable Toilets

-- Enclosure Staging

-- Contractor Trailer

-- Work Flow

-- Elevated Scaffolds

West Village Commons

Towson University

Nicholas Umosella

Enclosures

Scale: NOT TO SCALE

-Appendix C-

Detailed Structural Estimate

Concrete Detailed Estimate

Concrete

MasterFormat Division	Description	Type	Qty	Unit	Unit Cost	Total Price
33105.35.0200	5" Foundation slab	3500 PSI	412.28	CY	$118.87	$49,007.72
				Total Price 3500 PSI Concrete(+5% waste Factor)		**$51,458.11**
33105.35.0300	12" Concrete Wall	4000 PSI	1,087.85	CY	$144.60	$157,304.56
	Footing - F5	4000 PSI	4.63	CY	$125.70	$581.99
	Footing - F6	4000 PSI	13.33	CY	$125.70	$1,675.58
	Footing - F7	4000 PSI	21.17	CY	$125.70	$2,661.07
	Footing - F7-A	4000 PSI	7.26	CY	$125.70	$912.58
	Footing - F8	4000 PSI	6.32	CY	$125.70	$794.42
	Footing - F8-A	4000 PSI	27.65	CY	$125.70	$3,475.61
	Footing - F8B	4000 PSI	49.28	CY	$125.70	$6,194.50
	Footing - F9	4000 PSI	54.00	CY	$125.70	$6,787.80
	Footing - F9-A	4000 PSI	18.00	CY	$125.70	$2,262.60
	Footing - F10	4000 PSI	11.72	CY	$125.70	$1,473.20
	Footing - F11-A	4000 PSI	40.33	CY	$125.70	$5,069.48
	Footing - F12-A	4000 PSI	71.11	CY	$125.70	$8,938.53
	Footing - F13-A	4000 PSI	760.03	CY	$125.70	$95,535.77
	Grade Beam 24 x 24	4000 PSI	71.10	CY	$122.44	$8,705.48
	Grade Beam 38 x 18	4000 PSI	32.18	CY	$122.44	$3,940.12
	Grade Beam 48 x 24	4000 PSI	91.81	CY	$122.44	$11,241.22
	Grade Beam 50 x 30	4000 PSI	65.13	CY	$122.44	$7,974.52
	Grade Beam 74 x 18"	4000 PSI	37.76	CY	$122.44	$4,623.33
	LW Concrete on Metal Deck	4000 PSI	328.87	CY	$184.60	$60,709.40
	LW Concrete on Metal Deck	4000 PSI	328.87	CY	$184.60	$60,709.40
				Total Price 4000 PSI Concrete(+5% waste Factor)		**$474,149.72**
033105.35.0100	Concrete Rect. 12 x 48	5000 PSI	15.96	CY	$147.45	$2,353.30
	Concrete Square, 24 x 24	5000 PSI	90.47	CY	$147.45	$13,339.80
	Concrete W/ Drop Panels 24 x 24	5000 PSI	133.22	CY	$147.45	$19,643.29
	Concrete Rect. 24 x 48	5000 PSI	8.30	CY	$147.45	$1,223.84
	Concrete Rect. W/ Drop panels 24 x 48	5000 PSI	19.11	CY	$147.45	$2,817.77
	Concrete Round W/ Drop Panels 24"	5000 PSI	71.63	CY	$147.45	$10,561.84
	Concrete Round W/ Drop Panels 30"	5000 PSI	26.18	CY	$147.45	$3,860.24
	9" Elevated Slab	5000 PSI	1,539.36	CY	$144.40	$222,283.58
				Total Price 5000 PSI Concrete(+5% waste Factor)		**$289,887.85**

Reinforcing

MasterFormat Division	Description	Type	Qty	Unit	Unit Cost	Total Price

MasterFormat Division	Description	Type	Qty	Unit	Unit Cost	Total Price
032205.50.0300	5" Foundation slab	6x6 W2.9 x W2.9 WWF	22,263.08	CSF	$57.00	$12,689.96
032110.60.0700	12" Concrete Wall	#5	12.67	Tons	$2,500.00	$31,674.03
032110.60.0500	Footings	#6	0.14	Tons	$15,430.00	$2,160.20
	Footings	#7	1.98	Tons	$15,430.00	$30,551.40
032110.60.0550	Footings	#8	2.16	Tons	$17,950.00	$38,772.00
	Footings	#9	0.24	Tons	$17,950.00	$4,308.00
032110.60.0100	Grade Beams	#4	2.04	Tons	$2,440.00	$4,977.60
	Grade Beams	#5	1.40	Tons	$2,080.00	$2,916.49
032110.60.0150	Grade Beams	#9	19.44	Tons	$2,080.00	$40,435.20
032110.60.0400	Floor Slabs	#4	74.04	Tons	$2,030.00	$150,301.20
	Floor Slabs	#7	113.27	Tons	$2,030.00	$229,938.10
032110.60.0250	Concrete Columns	#8	36.87	Tons	$2,170.00	$80,007.90
	Concrete Columns	#9	1.54	Tons	$2,170.00	$3,341.80
					Total Reinforcing(+10% Waste Factor)	**$695,281.26**

Formwork

MasterFormat Division	Description	Type	Qty	Unit	Unit Cost	Total Price
031113.85.2500	Concrete Wall	3 Uses	13,783.24	SFCA	$5.94	$81,872.45
031113.45.3100	Footings	3 Uses	4,141.33	SFCA	$4.26	$17,642.07
031113.50.0100	Grade Beams	3 Uses	17,182.42	SFCA	$4.39	$75,430.82
031113.35.1100	Elevated Slabs	3 Uses	55,416.77	SFCA	$5.42	$300,358.89
031113.25.6600	Columns	3 Uses	14,931.23	SFCA	$6.15	$91,827.06
					Total Formwork(+10% Waste Factor)	**$623,844.42**

Tower Crane

MasterFormat Division	Description	Type	Qty	Unit	Unit Cost	Total Price
015419.60.0100	Static Tower Crane Cost	N/A	9.00	Month	$30,030.00	$270,270.00
					Grand Total Concrete	**$2,404,891.36**

Structural Steel Estimate

Steel Framing

MasterFormat Division	Count	Description	Qty	Unit	Unit Cost	Total Price
052113.50	20	52DLH16	1511.67	LF	$56.76	$85,798.42
051223.40	4	C6X10.5	21.67	LF	$39.17	$848.77
	48	C6X13	266.3	LF	$44.58	$11,871.65
051223.17	21	HSS5X5X3/8 (x-bracing)	1008.3	LF	$40.17	$40,503.41
051223.75	82	W8X10	690.04	LF	$23.46	$16,186.46
	3	W8X18	30.7	LF	$36.96	$1,134.67
	18	W10X12	285.85	LF	$26.76	$7,648.28
	29	W12X14	534.14	LF	$27.75	$14,822.66
	20	W12X19	435.9	LF	$36.75	$16,019.33
	1	W12X22	17.08	LF	$41.25	$704.55
	1	W12X26	7.62	LF	$47.75	$363.86
	3	W12X30	37.93	LF	$54.76	$2,077.22
	3	W12X35	41.67	LF	$63.16	$2,631.88
	40	W14X22	1025	LF	$40.30	$41,307.90
	3	W16X26	59.42	LF	$47.18	$2,803.44
	5	W16X31	81.88	LF	$55.64	$4,555.80
	3	W16X36	81.83	LF	$63.97	$5,234.67
	15	W18X15	109.7	LF	$31.61	$3,468.08
	5	W18X35	177.66	LF	$63.62	$11,302.73
	1	W18X40	17.08	LF	$71.62	$1,223.27
	5	W21X44	198.4	LF	$77.58	$15,392.65
	2	W21X50	42.33	LF	$87.60	$3,708.14
	15	W24X55	600.72	LF	$95.87	$57,590.07
	2	W24X62	48	LF	$106.87	$5,129.76
	3	W24X68	93.42	LF	$116.87	$10,918.00
	3	W24X76	90.08	LF	$129.87	$11,698.69
	1	W27X84	16.56	LF	$143.54	$2,377.02
	1	W27X94	41.25	LF	$159.54	$6,581.03
	2	W30X90	83.03	LF	$152.91	$12,695.86
	4	W30X99	184.43	LF	$167.51	$30,893.70
	2	W30X108	82.75	LF	$182.52	$15,103.70
	1	W30X116	33.04	LF	$195.66	$6,464.61
	1	W33X130	48.26	LF	$219.76	$10,605.62

	4	W36X135	76.14	LF	$227.62	$17,330.99
	1	W36X170	47.98	LF	$285.70	$13,707.89
	2	W36X231	65.82	LF	$384.81	$25,328.19
	1	W36X256	49.23	LF	$425.14	$20,929.64
					Total Steel Framing	**$536,962.57**

Steel Columns

MasterFormat Division	Count	Description	Qty	Unit	Unit Cost	Total Price
051223.17	6	HSS5X5X3/8	106.50	LF	$40.17	$4,278.11
	2	W10X49	63.50	LF	$89.60	$5,689.60
	2	W10X68	28.00	LF	$116.75	$3,269.00
	1	W10X88	14.00	LF	$149.29	$2,090.06
	2	W10X112	63.50	LF	$189.35	$12,023.73
	15	W12X40	355.75	LF	$71.30	$25,364.98
	2	W12X45	45.75	LF	$79.43	$3,633.92
	5	W12X50	127.00	LF	$88.07	$11,184.89
	3	W12X53	59.75	LF	$92.57	$5,531.06
	4	W12X58	113.25	LF	$101.07	$11,446.18
	5	W12X65	90.00	LF	$112.57	$10,131.30
	1	W12X79	18.00	LF	$136.53	$2,457.54
	2	W12X96	36.00	LF	$165.53	$5,959.08
	1	W12X152	18.00	LF	$258.42	$4,651.56
					Total Steel Columns	**$107,710.99**

Metal Decking

MasterFormat Division	Type	Qty	Unit	Unit Cost	Total Price
053113.50	2" Deep, 20 Gauge, Composite	20,295.75	SF	$3.15	$63,931.61
	1.5" Deep, 20 Gauge Roof Deck	11,361.13	SF	$2.80	$31,811.16
				Total Metal Decking	**$95,742.78**

Mobile Crane

MasterFormat Division	Type	Qty	Unit	Unit Cost	Total Price
015419.50	Static Tower Crane Cost	3	Days	$30,030.00	$90,090.00
			Grand Total Structural Steel		**$830,506.34**

-Appendix D-

General Conditions Estimate

Detailed General Conditions Estimate

Personnel		Notes/Source	Qty	Unit	Unit Price	Amount
	Project Director	BMC	14	WK	$4,000.00	$54,600.00
	Project Manager	BMC	98	WK	$3,375.00	$329,062.50
	General Superintendent	BMC	96	WK	$3,125.00	$301,302.08
	Senior Project Engineer	BMC	100	WK	$2,100.00	$209,300.00
	Project Engineer	BMC	104	WK	$1,800.00	$187,200.00
	Lead Coordinator	RSMeans	82	WK	$1,040.00	$85,626.67
	Field Accountant	BMC	16	WK	$1,800.00	$28,080.00
	Safety Engineer	BMC	21	WK	$1,800.00	$37,800.00
					Subtotal	**$1,232,971.25**
Field Office Support		**Notes/Source**	**Qty**	**Unit**	**Unit Price**	**Amount**
	Office Trailers	2 rentals w/ AC @ $410 (BMC)	24	MO	$820.00	$19,680.00
	Trailer Setup	BMC	1	LS	$250.00	$250.00
	Cell Phones	$80 per Person (BMC)	24	MO	$560.00	$13,440.00
	Telephone/Network Setup	BMC	1	LS	$16,000.00	$16,000.00
	Telephone Usage	BMC	24	MO	$1,000.00	$24,000.00
	Trailer Maintenance	BMC	24	MO	$300.00	$7,200.00
	Trailer Cleaning	BMC	24	MO	$500.00	$12,000.00
	Trailer Furniture	BMC	1	LS	$2,500.00	$2,500.00
	Fax Machine/Copier Rental	BMC	24	MO	$500.00	$12,000.00
	Office Supplies	BMC	24	MO	$500.00	$12,000.00
	Drawing Reproduction (Maryland Repro)	BMC	1	LS	$6,000.00	$6,000.00
	IT, Software, Hardware	BMC	1	LS	$22,000.00	$22,000.00
	Postage/Overnight Express	BMC	24	MO	$800.00	$19,200.00
	Drinking Water	BMC	24	MO	$150.00	$3,600.00
	Engineering Supplies	BMC	1	LS	$2,500.00	$2,500.00
					Subtotal	**$172,370.00**
Weather Protection		**Notes/Source**	**Qty**	**Unit**	**Unit Price**	**Amount**
	Snow Removal	BMC	1	LS	$10,000.00	$10,000.00
	Weather Protection	BMC	1	LS	$40,000.00	$40,000.00
	Erosion Control	BMC	24	MO	$700.00	$16,800.00
	Dewatering	BMC	1	LS	$12,000.00	$12,000.00
					Subtotal	**$78,800.00**
Safety		**Notes/Sources**	**Qty**	**Unit**	**Unit Price**	**Amount**
	Safety Supplies	BMC	1	LS	$8,000.00	$8,000.00
	Site Security	Security Supplies, locks, etc. (BMC)	1	LS	$3,000.00	$3,000.00
	Hard Hats and Rain Gear	BMC	1	LS	$3,000.00	$3,000.00
	Fire Extinguishers	BMC	1	LS	$5,000.00	$5,000.00
					Subtotal	**$19,000.00**

Detailed General Conditions Estimate

Relocation, Travel, Meals		Notes/Sources	Qty	Unit	Unit Price	Amount
	Superintendent Truck	BMC	24	MO	$500.00	$12,000.00
	Meals/Entertainment	BMC	1	LS	$2,700.00	$2,700.00
	Out of Town Travel	BMC	1	LS	$10,000.00	$10,000.00
					Subtotal	**$24,700.00**
Temporary Utilities		**Notes/Sources**	**Qty**	**Unit**	**Unit Price**	**Amount**
	Temporary Electrical/Lighting Setup	BMC	1	LS	$2,500.00	$2,500.00
	Temporary Electricity Usage	BMC	24	MO	$200.00	$4,800.00
	Sewer Hook-up	BMC	1	LS	$15,000.00	$15,000.00
	Water Usage	BMC	24	MO	$75.00	$1,800.00
					Subtotal	**$24,100.00**
Temporary Facilities, Fences, and Barricades		**Notes/Sources**	**Qty**	**Unit**	**Unit Price**	**Amount**
	Temporary Toilets	BMC	24	MO	$1,300.00	$31,200.00
	Temporary Fences	BMC	1	LS	$30,000.00	$30,000.00
	Barricades	BMC	1	LS	$20,000.00	$20,000.00
	Temporary Rails	BMC	1	LS	$15,000.00	$15,000.00
	Job Signs	BMC	1	LS	$5,000.00	$5,000.00
	Temporary Ladder and Stairs	BMC	1	LS	$5,000.00	$5,000.00
	Access Road/Maintenance	BMC	1	LS	$35,000.00	$35,000.00
					Subtotal	**$141,200.00**
Clean-up		**Notes/Sources**	**Qty**	**Unit**	**Unit Price**	**Amount**
	Periodic Clean-up	BMC	24	MO	$2,500.00	$60,000.00
	Final Clean up	BMC	1	LS	$30,000.00	$30,000.00
	Dumpster + Removal	BMC	24	LS	$1,500.00	$36,000.00
	Trash Chutes-install and maintain	BMC	1	LS	$30,000.00	$30,000.00
	Dump Carts	BMC	1	LS	$1,500.00	$1,500.00
					Subtotal	**$157,500.00**
Protection of Finished Work		**Notes/Sources**	**Qty**	**Unit**	**Unit Price**	**Amount**
	Protect Finished Work	Bought out in subcontracts	n/a	n/a	n/a	n/a
					Subtotal	**$0.00**
Tools and Equipment		**Notes/Sources**	**Qty**	**Unit**	**Unit Price**	**Amount**
	Small Tools Allowance	BMC	1	LS	$1,000.00	$1,000.00
					Subtotal	**$1,000.00**
Material Handling and Hoists		**Notes/Sources**	**Qty**	**Unit**	**Unit Price**	**Amount**
	Perm. Elevators Serve as Hoists	No Cost	n/a	n/a	n/a	n/a
	Elevated Scaffolds	Bought out in subcontracts	n/a	n/a	n/a	n/a
					Subtotal	**$0.00**
Consultants		**Notes/Sources**	**Qty**	**Unit**	**Unit Price**	**Amount**
	Surveyors	BMC	1	LS	$50,000.00	$50,000.00

Detailed General Conditions Estimate

					Subtotal	$50,000.00
Permits		**Notes/Sources**	**Qty**	**Unit**	**Unit Price**	**Amount**
	Misc. Permits	BMC	1	LS	$50,000.00	$50,000.00
					Subtotal	$50,000.00
				Grand Total	**$1,951,641.25**	

-Appendix E-

Staffing Monitor

Staffing Monitor (% Time Spent on Job/Month of Construction)

	2009							2010												2011						
	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total %	Weeks
Project Director	15%	15%	10%	10%	10%	10%	10%	20%	20%	20%	20%	20%	10%	10%	15%	15%	15%	10%	10%	10%	10%	10%	10%	10%	13.1%	14
Project Manager	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	50%	50%	94%	98
General Superintendent	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	25%	25%	92.7%	96
Sr. Project Engineer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	75%	50%	96%	100
Project Engineer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	100%	104
Lead Coordinator	0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	79%	82
Field Accountant	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	16
Safety Coordinator	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	21