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Adviser: Dr. Messner
Nov. 2, 2007

The Kennedy Krieger Institute
Outpatient Medical Center
Baltimore, Maryland

Technical Assignment #2

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Construction Cost and Method Analysis

Executive Summary

Technical assignment 2 demonstrates the procedure of cost and schedule analysis of the Kennedy Krieger Institute Outpatient Medical Center. A detailed project schedule is created and used to show specific major tasks that could impact the overall project if a change was to occur. The site plan is used to show the entire site and every item on it at a give phase of construction. For this project the superstructure is the phase and utilizes most of the site and is best to illustrate the lack to space.

The assemblies estimate for this project is of the architectural precast panels, curtain wall, and the E.I.F.S. This breaks down each item to compare its costs and is broken down by location on building. This analysis is great for scheduling installation accordingly. The estimated structural system illustrates the cost of the building compared to the actual or bid cost of the building. This analysis provides some feedback on what may have been double counted or not counted at all. It also creates opportunities to understand the building structure.

The general conditions estimate is the items that the contractor utilizes during construction. Items such as site trailer and miscellaneous supplies, site tools, and dumpsters are just a few examples of general condition items. Another general condition item is the staffing which shows who all is a part of the project and how much of his or her time are they working on the specific project.

All these items make up the construction cost and method analysis and are explained in detail per topic in the following technical assignment.

Detailed Project Schedule

The detailed project schedule which can be found in **Appendix A** is a summary of the main construction activities. The project schedule is set up by major activities such as foundation, concrete floor slabs and concrete columns, structural steel, as well as a summary breakdown of each floor rough in and finishes. A majority of the items in the schedule have more than one activity per line. This is because several important of the trade tasks happen at the same time and therefore have been scheduled together. Multiple tasks per line item may not be of the same trade, this is good because it shows where different trades are working respectively beside another trade. This will also show the areas of the schedule where trade coordination will be needed. Once the concrete is placed and cured, mechanical, electrical, and plumbing rough-ins being. These critical activities being in the basement, where the mechanical equipment room is located and where the power enters the building, and continues upward from floor to floor until terminating at the penthouse where the AHU's and HVAC equipment is located. The schedule also divides each floor up into its own group of items. This illustrates the major tasks and their durations throughout the project time period. This division of floors does not happen for the third and fourth floor because they are very similar and therefore the critical items occur at the same time.

To see understand more about the Detailed Project Schedule, go to **Appendix A**.

Site Layout Planning

The site plan depicts the superstructure phase of the project. This is the best phase to illustrate the size of the site with the limitations on available space. A tower crane is located at the center of the site. This works best because of its size and capabilities. It is able to reach most of the site and is used for lifting and moving all items on site. Although the crane is owned and operated by the concrete contractor they, signed a contract allowing other trades to use it when the concrete workers were not using it. The site plan shows a lot going on but one of the most important items is the access to the site. There is only one access to the site and it is located at the north end. Delivery trucks had to be scheduled very closely when materials where to be delivered because of the lack of space and because of the concrete trucks coming and going every twenty to thirty minutes.

Formwork and steel lay down area takes up about fifty percent of the available area. This creates little room to move large equipment around and does not permit construction workers space to park. Parking must be found among the local streets. Site utilities are hard to show on the site plan, because the temporary power was coming directly from the Kennedy Krieger Parking Garage which is located right beside the construction site. This powered the entire site including all site trailers. Temporary water was the only utility needed from the city, because sewer waste was pumped out of the trailer every week. Telecommunications was in the WT trailers only.

For public safety a chain linked fence surround the entire perimeter of the site and around the WT trailer, which is locate on median, and a fire hydrate was located at the corner of North Broadway and Ashland. For more site information, please see the site plan on **Appendix B**, note that the site scale is 1” = 40’.

Assemblies Estimate

The assemblies estimate is of the exterior facade which consists of the architectural precast concrete, curtain wall, and exterior insulation finishes system (E.I.F.S.). The table below illustrates a summary of the façade estimate. Estimate factors are from R.S. Means 2007.

Some general assumptions about the estimate were the types of materials being used. This was done for a better overall assemblies estimate. The assumptions are as follow:

- For metal wall panels: a corrugated aluminum panel with a thickness of 0.024" thick was used. Color was a natural color that blended with the precast panels.
- For the E.I.F.S.: a cement stucco with a thickness of 5/8" thickness, being placed on with two coats on standard CMU Blocks, *' x 16" x 8".

Assemblies Estimate	Amount
Metal Wall Panels	$35,788.80
Architectural Precast Concrete Type 1	$38,410.24
Architectural Precast Concrete Type 2	$28,078.08
Curtain Wall	$76,503.04
E.I.F.S.	$86,923.00
Total Cost	$265,703.16

To view a more detailed breakdown of the assemblies estimate, go to **Appendix C**.

Here are some photos to show the being stage of installation of the architectural precast concrete panels and the curtain wall.

North face of the Outpatient Medical Center

South face of the Outpatient Medical Center

Detailed Structural Systems Estimate

The detailed structural system estimate is an estimate containing the cast in placed concrete, reinforcing, and structural steel. The cast in placed concrete makes up the main superstructure of the building and the steel on the penthouse level. The values used to estimate the concrete, reinforcing, and steel were obtained from the R.S. Means 2007. The table below shows the total cost per structural item. A more detailed estimate can be found in **Appendix D**.

The concrete total estimate that can be seen in the table below shows that the cost for concrete is $5,141,184. This is $959,484 more that the actual cost. Reasons for such a difference could be due to rounding off errors, or over estimating the foundation system.

The structural steel total estimate is $144,614 which is $296,686 less than the original project estimate. This could be because only the building structural steel is being taken in to account and not the total amount of steel used on the entire site. The front landscaped/garden area for the Outpatient Medical Center property has some ornate features and a large canopy. The canopy is constructed using structural steel, glazing, and other materials.

Concrete Estimate			
Area	Total CY	Cost/CY	Total Cost of Concrete
Footings	1054	117	$123,318
Foundation Wall	604	117	$70,668
Basement	3475	117	$406,575
First Floor	6036	117	$706,182
Second Floor	7111	117	$831,987
Third Floor	7286	117	$852,462
Fourth Floor	4627	117	$541,359
Fifth Floor	6893	117	$806,481
Sixth Floor	6856	117	$802,152
Total	43941.74		$5,141,184
Reinforcing Estimate			
Area	Total Tons	Cost/Ton	Total Cost of Reinforcing
Reinforcing Total	323	$1,440	$507,080
Structural Steel Estimate			
Area	Quantity	Cost	Total Cost of Steel
Steel Members	121	Varies	$144,614.00

General Conditions Estimate

The General Conditions estimate summary is in the following table.

General Conditions Estimate	
Personnel	$1,802,824.00
On-Site Office Trailer	$8,580.00
Field Trailer	$2,860.00
Site Miscellaneous	$3,198,277.00
Total	$5,012,541.00

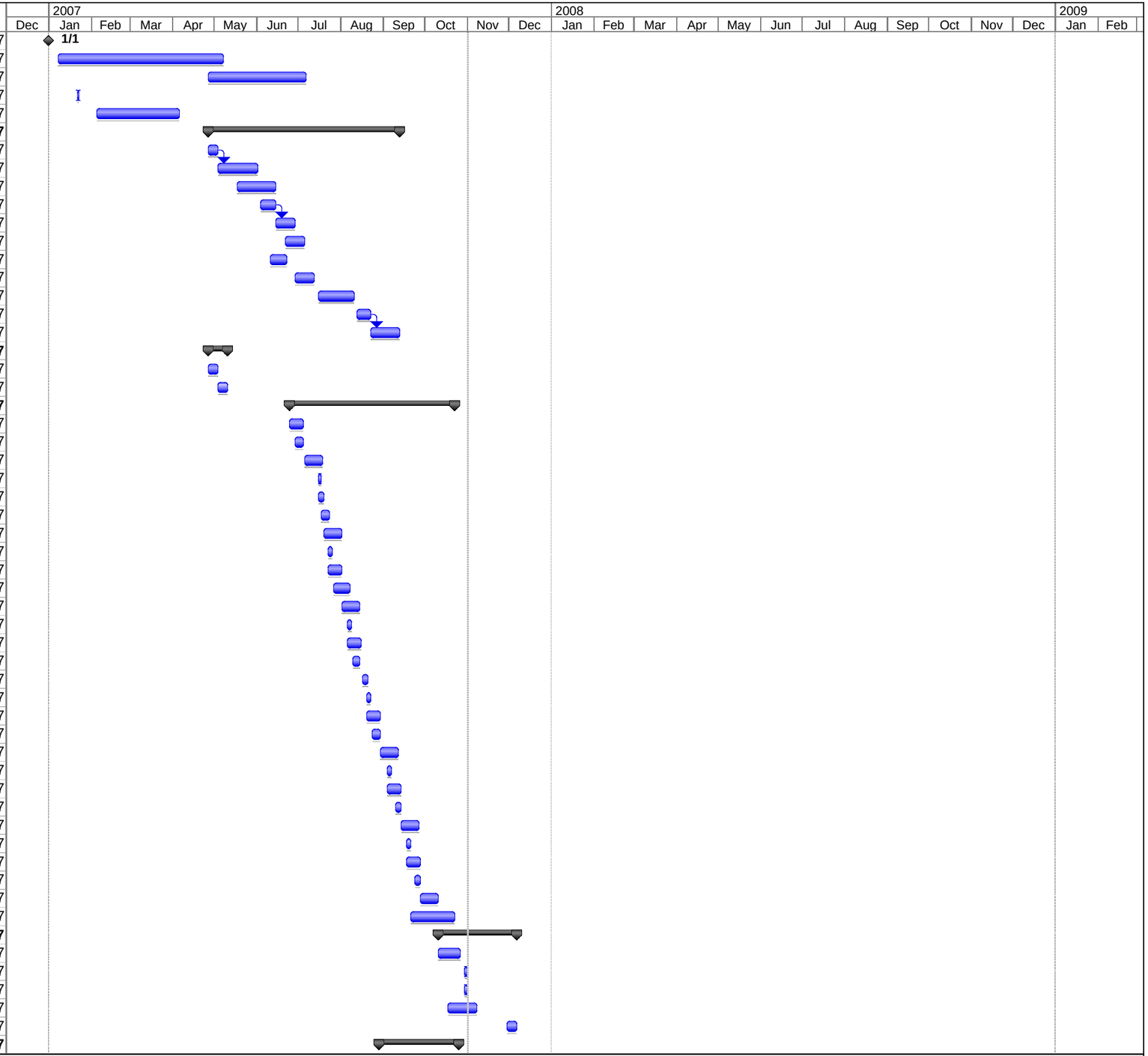
The GC estimate summary is broke up into four categories: the personnel/staff, the main site trailer, the file trailer, and the rest of the site items. The general conditions cost is about $5 million with a $1.8 million for the staff, which is one reason why the general conditions is $5 million. The site miscellaneous items included are construction tools, safety items, dumpsters demobilizing trailers and so on. For a look at the break down of the general conditions, go to **Appendix E**. For a breakdown of the staffing cost, see table below.

Calender Year	2006		2007		2008		Labor Total
	$	MH	$	MH	$	MH	Cost
VP (124)	$1,984	16	$23,560	190	$23,560	190	$49,104
Sr, PM (100)	$16,000	160	$190,000	1900	$190,000	1900	$396,000
PM(80)	$12,800	160	$152,000	1900	$152,000	1900	$316,800
PE (49)	$7,840	160	$93,100	1900	$93,100	1900	$194,040
PE(49)	$7,840	160	$93,100	1900	$93,100	1900	$194,040
PE(49)	$7,840	160	$93,100	1900	$93,100	1900	$194,040
Super. (75)	$0	0	$135,000	1800	$142,500	1900	$277,500
Asst Super(49)	$0	0	$88,200	1800	$93,100	1900	$181,300
					Total		**$1,802,824**

Appendix A

Detailed Project Schedule

ID	Task Name	Duration	Start	Finish
1	Notice to Proceed	0 days	Mon 1/1/07	Mon 1/1/07
2	Procurement of Construction	86 days	Mon 1/8/07	Mon 5/7/07
3	Procurment of Accessories	51 days	Fri 4/27/07	Fri 7/6/07
4	Site Preparation	1 day	Mon 1/22/07	Mon 1/22/07
5	Excavation	44 days	Mon 2/5/07	Thu 4/5/07
6	**Foundation/SOG/Backfill**	**99 days**	**Fri 4/27/07**	**Wed 9/12/07**
7	Foundation Mobilize Concrete Operation	5 days	Fri 4/27/07	Thu 5/3/07
8	Basement Footing	21 days	Fri 5/4/07	Fri 6/1/07
9	1st Lift Basement Walls & Coulmns	20 days	Fri 5/18/07	Thu 6/14/07
10	Brace, Waterproof, Backfill Int Bsmt Walls	9 days	Mon 6/4/07	Thu 6/14/07
11	Footings 1st Level	10 days	Fri 6/15/07	Thu 6/28/07
12	Walls & Columns 1st Level 2nd Lift	10 days	Fri 6/22/07	Thu 7/5/07
13	Basement Slab	10 days	Mon 6/11/07	Fri 6/22/07
14	First floor slab on grade	10 days	Fri 6/29/07	Thu 7/12/07
15	Waterproof Exterior Foundation Walls	20 days	Mon 7/16/07	Fri 8/10/07
16	Permieter Foundation Drains	8 days	Mon 8/13/07	Wed 8/22/07
17	Backfill Foundation	15 days	Thu 8/23/07	Wed 9/12/07
18	**Tower Cane**	**10 days**	**Fri 4/27/07**	**Thu 5/10/07**
19	Tower Crane Foundation	5 days	Fri 4/27/07	Thu 5/3/07
20	Mobilize Tower Crane	5 days	Fri 5/4/07	Thu 5/10/07
21	**Concrete Floor Slabs/Columns (Floors 1-6)**	**86 days**	**Mon 6/25/07**	**Mon 10/22/07**
22	1st Floor Shore & Frame Slab	8 days	Mon 6/25/07	Wed 7/4/07
23	1st Floor Plumbing & Electrical Rough-In	4 days	Fri 6/29/07	Wed 7/4/07
24	1st FL. Place Concrete - Cure/Strip Reshore	9 days	Fri 7/6/07	Wed 7/18/07
25	2nd FL Prep/Pour#1 Columns	2 days	Mon 7/16/07	Tue 7/17/07
26	2nd Fl. Shore & Frame Slab	4 days	Mon 7/16/07	Thu 7/19/07
27	2nd FL Plumbing & Electrical Rough-In	4 days	Wed 7/18/07	Mon 7/23/07
28	2nd Fl Place Concrete - Cure/Strip Reshore	9 days	Fri 7/20/07	Wed 8/1/07
29	2nd Fl Prep/Pour #2	3 days	Mon 7/23/07	Wed 7/25/07
30	2nd Fl. Shore & Frame Slab	8 days	Mon 7/23/07	Wed 8/1/07
31	2nd FL Plumbing & Electrical Rough-In	8 days	Fri 7/27/07	Tue 8/7/07
32	2nd Fl Place Concrete - Cure/Strip Reshore	9 days	Thu 8/2/07	Tue 8/14/07
33	3rd Fl Prep/Pour Columns	3 days	Mon 8/6/07	Wed 8/8/07
34	3rd Fl Shore & Frame Slab	8 days	Mon 8/6/07	Wed 8/15/07
35	3rd Fl Plumbing & Electrical Rough-In	3 days	Fri 8/10/07	Tue 8/14/07
36	3rd Fl Place Concrete - Cure/Strip Reshore	2 days	Fri 8/17/07	Mon 8/20/07
37	4th Fl Prep/Pour Columns	3 days	Mon 8/20/07	Wed 8/22/07
38	4thFl Shore & Frame Slab	8 days	Mon 8/20/07	Wed 8/29/07
39	4thFl Plumbing & Electrical Rough-In	4 days	Fri 8/24/07	Wed 8/29/07
40	4thFl Place Concrete - Cure/Strip Reshore	9 days	Thu 8/30/07	Tue 9/11/07
41	5th Fl Prep/Pour Columns	3 days	Tue 9/4/07	Thu 9/6/07
42	5thFl Shore & Frame Slab	8 days	Tue 9/4/07	Thu 9/13/07
43	5thFl Plumbing & Electrical Rough-In	4 days	Mon 9/10/07	Thu 9/13/07
44	5thFl Place Concrete - Cure/Strip Reshore	9 days	Fri 9/14/07	Wed 9/26/07
45	6th Fl Prep/Pour Columns	3 days	Tue 9/18/07	Thu 9/20/07
46	6thFl Shore & Frame Slab	8 days	Tue 9/18/07	Thu 9/27/07
47	6thFl Plumbing & Electrical Rough-In	4 days	Mon 9/24/07	Thu 9/27/07
48	6thFl Place Concrete - Cure/Strip Reshore	9 days	Fri 9/28/07	Wed 10/10/07
49	6th Fl form/Pour Pool structure & Cure/Strip	22 days	Fri 9/21/07	Mon 10/22/07
50	**Structural Steel**	**41 days**	**Thu 10/11/07**	**Thu 12/6/07**
51	Mobilize & Erect Structural Steel Level 6	12 days	Thu 10/11/07	Fri 10/26/07
52	Set Cooling Towers, AHU's, & Set Pools/Protect	2 days	Tue 10/30/07	Wed 10/31/07
53	Set Elevator Machines/Protect	2 days	Tue 10/30/07	Wed 10/31/07
54	Deck Plumbing and Bolt Level 6	15 days	Thu 10/18/07	Wed 11/7/07
55	Spray on Fireproofing	5 days	Fri 11/30/07	Thu 12/6/07
56	**Stairs A & B**	**42 days**	**Wed 8/29/07**	**Thu 10/25/07**



Project: Tech2 -Project Schedule
Date: Thu 11/1/07

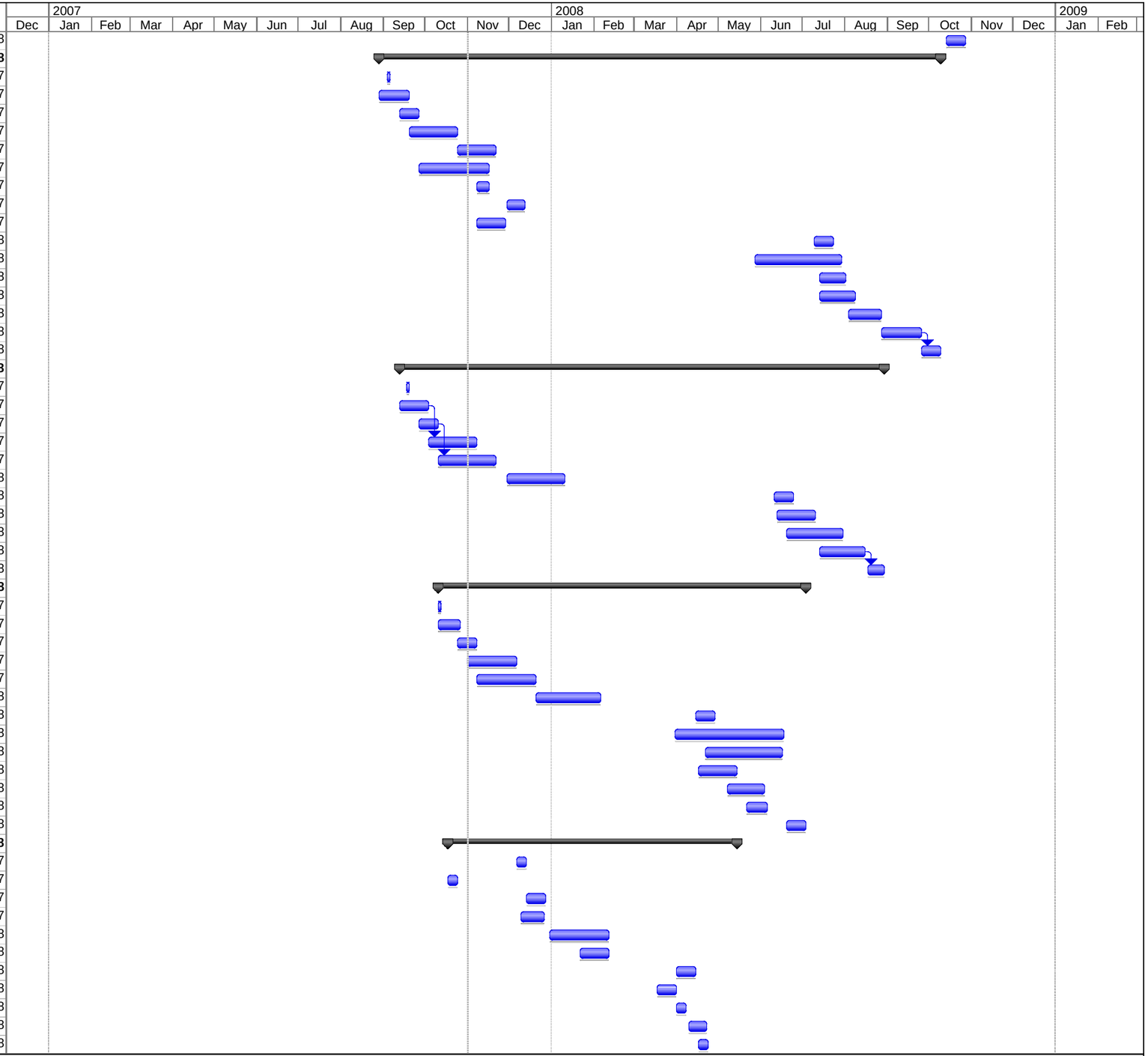
Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

ID	Task Name	Duration	Start	Finish
57	Stairs A & B, Levels 1 thru 6.	42 days	Wed 8/29/07	Thu 10/25/07
58	**Roofing**	**26 days**	**Thu 11/8/07**	**Thu 12/13/07**
59	Main Roof Curbs, Blocking, & Drains	5 days	Thu 11/8/07	Wed 11/14/07
60	Main Roof Accessories, Coping & Flashing	15 days	Thu 11/15/07	Wed 12/5/07
61	Low Roof & Drains	5 days	Thu 11/15/07	Wed 11/21/07
62	Low Roof Accessories, Coping & Flashing	10 days	Fri 11/30/07	Thu 12/13/07
63	**Building Enclosure**	**64 days**	**Thu 10/11/07**	**Tue 1/8/08**
64	Precast - North	18 days	Thu 10/11/07	Mon 11/5/07
65	Precast - South	25 days	Tue 10/23/07	Mon 11/26/07
66	Precast - West	17 days	Tue 11/13/07	Wed 12/5/07
67	Precast - Caulking/Sealant	15 days	Wed 12/12/07	Tue 1/1/08
68	Curtain Wall - North	50 days	Thu 10/11/07	Wed 12/19/07
69	Curtain Wall - West	20 days	Thu 11/15/07	Wed 12/12/07
70	Curtain Wall - Stair A	5 days	Wed 11/28/07	Tue 12/4/07
71	Strip Wondows - South	5 days	Tue 11/13/07	Mon 11/19/07
72	Curtain Wall - Caulking/Sealant	30 days	Wed 11/28/07	Tue 1/8/08
73	Doors, Windows, and Accessories	27 days	Wed 11/14/07	Thu 12/20/07
74	**Tower Crane**	**10 days**	**Thu 10/25/07**	**Wed 11/7/07**
75	Demobilize Tower Crane	5 days	Thu 10/25/07	Wed 10/31/07
76	Reconfigure Temp Power for Freight Elevator	5 days	Thu 11/1/07	Wed 11/7/07
77	**Frieght Elevator**	**137 days**	**Wed 8/15/07**	**Thu 2/21/08**
78	Shaft - Masonry	10 days	Wed 8/15/07	Tue 8/28/07
79	Shaft - Drywall	10 days	Fri 11/30/07	Thu 12/13/07
80	Install Elevator	50 days	Fri 12/14/07	Thu 2/21/08
81	**Passenger Elevators**	**121 days**	**Fri 11/30/07**	**Fri 5/16/08**
82	Drywall shaft	20 days	Fri 11/30/07	Thu 12/27/07
83	Install Elevators	100 days	Mon 12/31/07	Fri 5/16/08
84	**Basement**	**286 days**	**Mon 9/10/07**	**Mon 10/13/08**
85	MEP Rough-In	43 days	Mon 9/10/07	Wed 11/7/07
86	Electrical Power Service	5 days	Mon 9/17/07	Fri 9/21/07
87	Fire Alarm Rough-In	5 days	Mon 9/24/07	Fri 9/28/07
88	CMU Partitions	10 days	Thu 10/11/07	Wed 10/24/07
89	Electrical Hook Up to HVAC Equipment	10 days	Thu 10/25/07	Wed 11/7/07
90	Studs/Drywall Partitions	5 days	Thu 10/25/07	Wed 10/31/07
91	Perment Power Available	0 days	Mon 1/21/08	Mon 1/21/08
92	Sprinkler Mains & Branches	8 days	Thu 11/8/07	Mon 11/19/07
93	HVAC Start Up and Commissioning	10 days	Tue 1/22/08	Mon 2/4/08
94	Ceiling-Grid, HVAC drops, Sprinkler heads/Test, Lighting	25 days	Thu 8/28/08	Wed 10/1/08
95	Ceiling Tile, Finish paint, Flooring, & Doors/Hardware	10 days	Tue 9/16/08	Mon 9/29/08
96	Electircal System Devices	5 days	Fri 9/19/08	Thu 9/25/08
97	HVAC Test & Balancing	5 days	Tue 9/23/08	Mon 9/29/08
98	Clean up and Punchlist	10 days	Tue 9/30/08	Mon 10/13/08
99	**First Floor**	**320 days**	**Tue 8/7/07**	**Mon 10/27/08**
100	Pull Reshoring	2 days	Tue 8/7/07	Wed 8/8/07
101	Sprinkler, HVAC, Storm Risers	13 days	Wed 8/29/07	Fri 9/14/07
102	Electrical Power Service	10 days	Wed 8/29/07	Tue 9/11/07
103	Sanitary Waste & HVAC - Sprinkler Mains	28 days	Thu 9/27/07	Mon 11/5/07
104	Overhead Plumbing & Med/Gas Distribution	15 days	Thu 10/11/07	Wed 10/31/07
105	Electrical Wiring & Fire Alarm Rough In	22 days	Thu 9/13/07	Fri 10/12/07
106	Electrical Hook Up to HVAC & HVAC Termination	20 days	Thu 10/18/07	Wed 11/14/07
107	HVAC Start up & Commissioning	10 days	Thu 8/7/08	Wed 8/20/08
108	Wall Finishes (Drywall, Paint, Ceiling, Tile..)	42 days	Tue 6/24/08	Wed 8/20/08
109	HVAC Drops, Sprinklers Heads, Light Fixtures	13 days	Thu 9/11/08	Mon 9/29/08
110	Electrical System Wiring	20 days	Mon 8/11/08	Fri 9/5/08
111	Toilet Access., Doors & Harware & Flooring	20 days	Tue 9/2/08	Mon 9/29/08
112	Equipment Installation & Electrical & Plumbing Hook Ups	30 days	Tue 9/16/08	Mon 10/27/08

Project: Tech2 -Project Schedule
Date: Thu 11/1/07

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

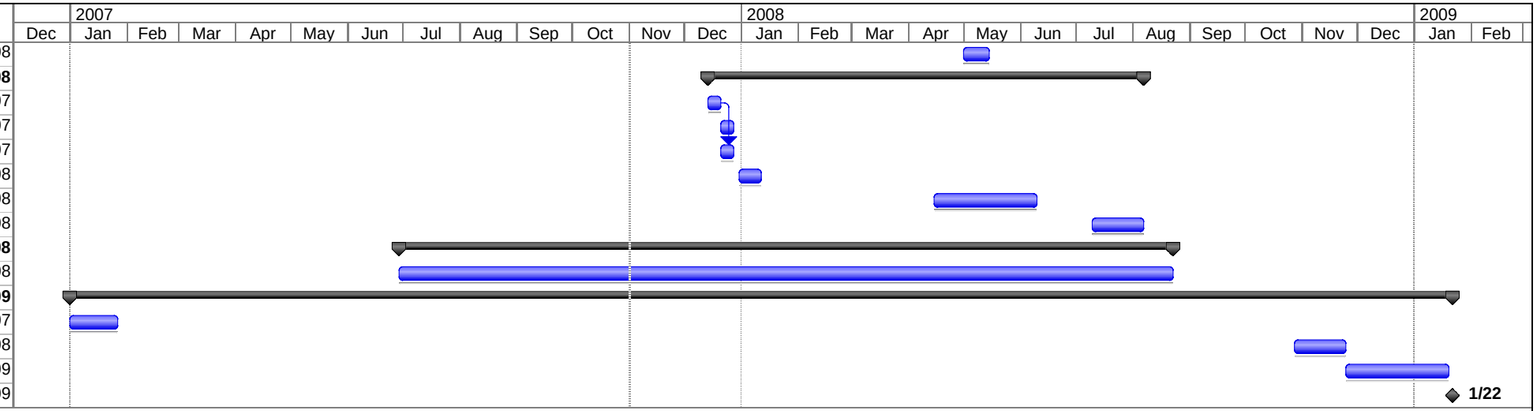
ID	Task Name	Duration	Start	Finish
113	Clean up and Punch list	10 days	Tue 10/14/08	Mon 10/27/08
114	**Second Floor**	**292 days**	**Wed 8/29/07**	**Thu 10/9/08**
115	Pull Reshoring	2 days	Tue 9/4/07	Wed 9/5/07
116	Sprinkler, HVAC, Storm Risers	16 days	Wed 8/29/07	Wed 9/19/07
117	Electrical Power Service	10 days	Thu 9/13/07	Wed 9/26/07
118	Sanitary Waste & HVAC - Sprinkler Mains	25 days	Thu 9/20/07	Wed 10/24/07
119	Overhead Plumbing & Med/Gas Distribution	20 days	Thu 10/25/07	Wed 11/21/07
120	Electrical Wiring & Fire Alarm R-I	37 days	Thu 9/27/07	Fri 11/16/07
121	In floor Heat Cable & Loading Dock Topping Slab	7 days	Thu 11/8/07	Fri 11/16/07
122	Loading Dock Doors	9 days	Fri 11/30/07	Wed 12/12/07
123	Electrical Hook Up to HVAC & HVAC Termination	15 days	Thu 11/8/07	Wed 11/28/07
124	HVAC Start up & Commissioning	10 days	Thu 7/10/08	Wed 7/23/08
125	Wall Finishes (Drywall, Paint, Ceiling, Tile..)	45 days	Wed 5/28/08	Tue 7/29/08
126	HVAC Drops, Sprinklers Heads, Light Fixtures	15 days	Mon 7/14/08	Fri 8/1/08
127	Electrical System Wiring	20 days	Mon 7/14/08	Fri 8/8/08
128	Toilet Access., Doors & Harware & Flooring	18 days	Mon 8/4/08	Wed 8/27/08
129	Equipment Installation & Electrical & Plumbing Hook Ups	21 days	Thu 8/28/08	Thu 9/25/08
130	Clean up and Punch list	10 days	Fri 9/26/08	Thu 10/9/08
131	**Third & Fourth Floor**	**252 days**	**Thu 9/13/07**	**Fri 8/29/08**
132	Pull Reshoring	2 days	Tue 9/18/07	Wed 9/19/07
133	Sprinkler, HVAC, Storm Risers	15 days	Thu 9/13/07	Wed 10/3/07
134	Electrical Power Service	10 days	Thu 9/27/07	Wed 10/10/07
135	Sanitary Waste & HVAC - Sprinkler Mains	25 days	Thu 10/4/07	Wed 11/7/07
136	Electrical Wiring & Fire Alarm R-I	30 days	Thu 10/11/07	Wed 11/21/07
137	Electrical Hook Up to HVAC & HVAC Termination	30 days	Fri 11/30/07	Thu 1/10/08
138	HVAC Start up & Commissioning	10 days	Wed 6/11/08	Tue 6/24/08
139	Electrical System Wiring	20 days	Fri 6/13/08	Thu 7/10/08
140	Toilet Access., Doors & Harware & Flooring	29 days	Fri 6/20/08	Wed 7/30/08
141	Equipment Installation & Electrical & Plumbing Hook Ups	25 days	Mon 7/14/08	Fri 8/15/08
142	Clean up and Punch list	10 days	Mon 8/18/08	Fri 8/29/08
143	**Fifth Floor**	**191 days**	**Thu 10/11/07**	**Thu 7/3/08**
144	Pull Reshoring	2 days	Thu 10/11/07	Fri 10/12/07
145	Sprinkler, HVAC, Storm Risers	12 days	Thu 10/11/07	Fri 10/26/07
146	Electrical Power Service	10 days	Thu 10/25/07	Wed 11/7/07
147	Sanitary Waste & HVAC - Sprinkler Mains	26 days	Thu 11/1/07	Thu 12/6/07
148	Electrical Wiring & Fire Alarm R-I	31 days	Thu 11/8/07	Thu 12/20/07
149	Electrical Hook Up to HVAC & HVAC Termination	33 days	Fri 12/21/07	Tue 2/5/08
150	HVAC Start up & Commissioning	10 days	Tue 4/15/08	Mon 4/28/08
151	Wall Finishes (Drywall, Paint, Ceiling, Tile..)	57 days	Mon 3/31/08	Tue 6/17/08
152	Fit Out Pool Equipment	40 days	Tue 4/22/08	Mon 6/16/08
153	Electrical System Wiring	20 days	Thu 4/17/08	Wed 5/14/08
154	Toilet Access., Doors & Harware & Flooring	19 days	Thu 5/8/08	Tue 6/3/08
155	Equipment Installation & Electrical & Plumbing Hook Ups	11 days	Thu 5/22/08	Thu 6/5/08
156	Clean up and Punch list	10 days	Fri 6/20/08	Thu 7/3/08
157	**Sixth Floor**	**150 days**	**Thu 10/18/07**	**Wed 5/14/08**
158	Layout Top Track	5 days	Fri 12/7/07	Thu 12/13/07
159	Storm Risers	5 days	Thu 10/18/07	Wed 10/24/07
160	Electrical Power Service	10 days	Fri 12/14/07	Thu 12/27/07
161	Sanitary Waste & HVAC - Sprinkler Mains	13 days	Mon 12/10/07	Wed 12/26/07
162	Electrical Wiring & Fire Alarm R-I	31 days	Mon 12/31/07	Mon 2/11/08
163	Electrical Hook Up to HVAC & HVAC Termination	15 days	Tue 1/22/08	Mon 2/11/08
164	HVAC Start up & Commissioning	10 days	Tue 4/1/08	Mon 4/14/08
165	Wall Finishes (Drywall, Paint, Ceiling, Tile..)	10 days	Tue 3/18/08	Mon 3/31/08
166	Electrical System Wiring	5 days	Tue 4/1/08	Mon 4/7/08
167	Toilet Access., Doors & Harware & Flooring	9 days	Thu 4/10/08	Tue 4/22/08
168	Electrical Systems Devices/Trim	5 days	Thu 4/17/08	Wed 4/23/08



Project: Tech2 -Project Schedule
Date: Thu 11/1/07

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

ID	Task Name	Duration	Start	Finish
169	Clean Up and Punch List	10 days	Thu 5/1/08	Wed 5/14/08
170	**Penthouse**	**169 days**	**Fri 12/14/07**	**Wed 8/6/08**
171	Equipment Pads	5 days	Fri 12/14/07	Thu 12/20/07
172	Install Chillers and Boilers	5 days	Fri 12/21/07	Thu 12/27/07
173	Set AHU's and Cooling Towers	5 days	Fri 12/21/07	Thu 12/27/07
174	Install HVAC Pumps	10 days	Mon 12/31/07	Fri 1/11/08
175	Electrical Hook Up Of Equipment	40 days	Tue 4/15/08	Mon 6/9/08
176	Start Up testing and Commissioning HVAC	20 days	Thu 7/10/08	Wed 8/6/08
177	**Site Work**	**301 days**	**Fri 6/29/07**	**Fri 8/22/08**
178	Landscaping, Canopy, Foundation, Garden	301 days	Fri 6/29/07	Fri 8/22/08
179	**Close Out/Completion**	**538 days**	**Mon 1/1/07**	**Thu 1/22/09**
180	Punchlist	20 days	Mon 1/1/07	Fri 1/26/07
181	Final HVAC Testing & Commissioning	20 days	Tue 10/28/08	Mon 11/24/08
182	Project Close out	40 days	Tue 11/25/08	Mon 1/19/09
183	Project Complete	0 days	Thu 1/22/09	Thu 1/22/09

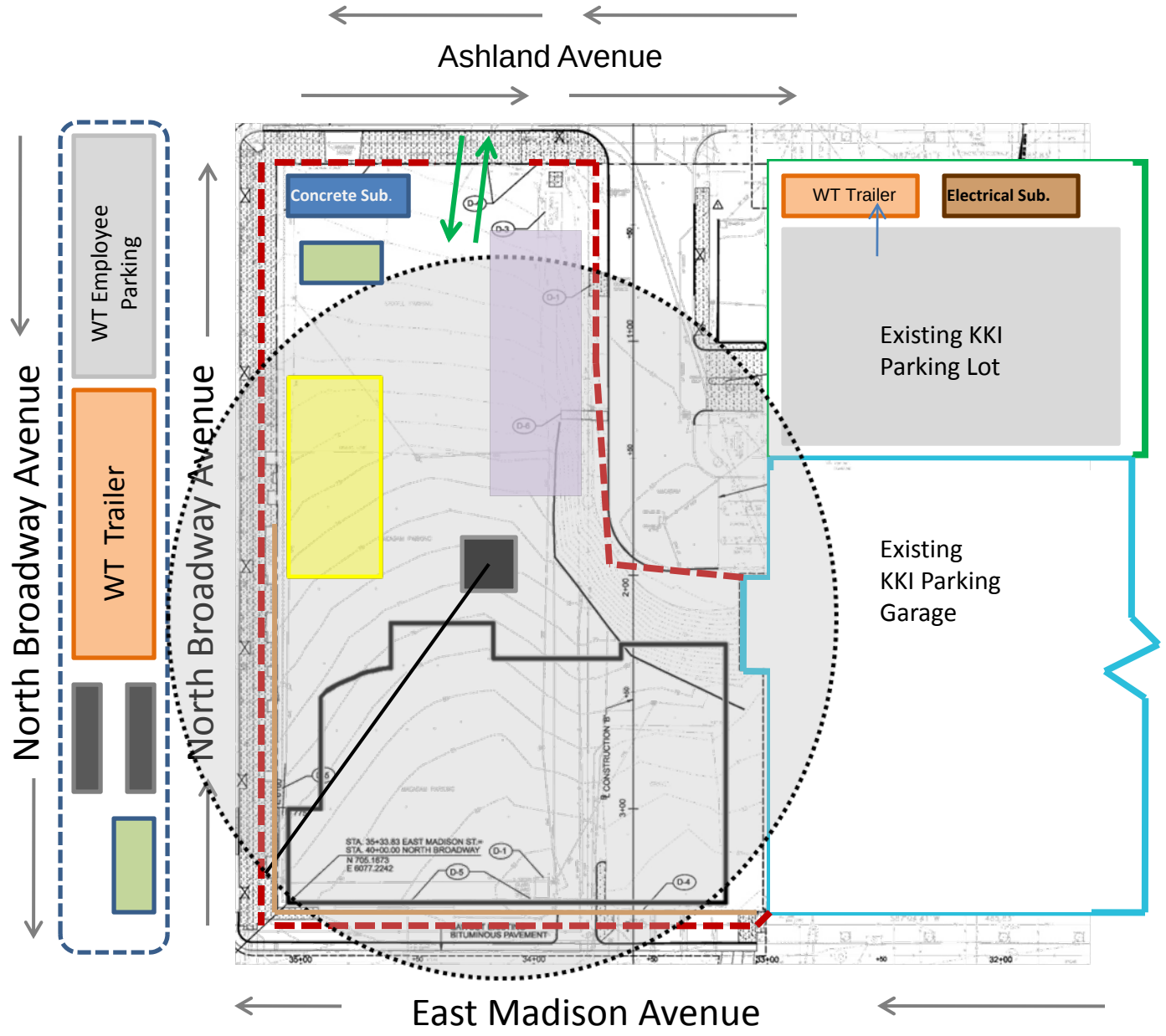


Project: Tech2 -Project Schedule
Date: Thu 11/1/07

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

Appendix B

Site Layout Planning



Kennedy Krieger Institute

STANLEY BEAMAN & SEARS
ARCHITECTURE AND INTERIORS

RK+K
Civil Engineering

Mahan Rykiel Associates Inc.
Landscape Consultant

RMF Engineering, Inc.
Structural Engineer
Mechanical, Electrical, Plumbing & Fire Protection Engineers

Pool Consultant
Counsilman Hunsaker & Associates

Phase:
Superstructure

4C1

Appendix C

Assemblies Estimate

Location	Description	Square Foot	Unit Price	Amount
North				
	Metal Wall Panels	3480	5.12	$17,817.60
	Architectural Precast Concrete Type 1	4525	29.5	$23,168.00
	Architectural Precast Concrete Type 2	572	29.5	$2,928.64
	Curtain Wall	7699	51.3	$39,418.88
South				
	Metal Wall Panels	2262	5.12	$11,581.44
	Architectural Precast Concrete Type 1	1885	29.5	$9,651.20
	Architectural Precast Concrete Type 2	4064	29.5	$20,807.68
	Curtain Wall	3343	51.3	$17,116.16
West				
	Metal Wall Panels	1248	5.12	$6,389.76
	Architectural Precast Concrete Type 1	1092	29.5	$5,591.04
	Architectural Precast Concrete Type 2	848	29.5	$4,341.76
	Curtain Wall	3900	51.3	$19,968.00
East				
	E.I.F.S	6240	13.93	$86,923.00
			Total Cost	$265,703.16

Appendix D

Detailed Structural Systems Estimate

Concrete Estimate

Area	Total CY	Cost/CY	Total Cost of Concrete
Footings	1054	117	$123,318
Foundation Wall	604	117	$70,668
Basement	3475	117	$406,575
First Floor	6036	117	$706,182
Second Floor	7111	117	$831,987
Third Floor	7286	117	$852,462
Fourth Floor	4627	117	$541,359
Fifth Floor	6893	117	$806,481
Sixth Floor	6856	117	$802,152
Total	43941.74		$5,141,184

	CY	Lbs	Tons Reinf. per CY
Footings	1054	56	19
Foundation Wall	604	200	3
Basement	3475	50	70
First Floor			
SOG	225	113	2
Elevator Grade Beams	180	200	1
Pan Joist Flooring	264	180	1
Joists	635	145	4
Beams	1087	145	7
Columns	3645	185	20
Second Floor			
Slab	2283	113	20
Joist	632	180	4
Beams	934	145	6
Columns	3262	185	18
Third Floor			
Slab	1590	113	14
Joist	613	180	3
Beams	1821	145	13
Columns	3262	185	18
Fourth Floor			
Slab	1431	113	13
Joist	641	145	4
Beams	1838	145	13
Columns	3262	185	18
Fifth Floor			
Slab	1721	113	15
Joist	682	180	4
Beams	1238	145	9
Columns	3252	185	18
Sixth Floor			
Slab	1768	113	16
Joist	683	165	4
Beams	1143	120	10
Columns	3262	185	18
		Total Tons. Of Reinf.	362.20

Structural Steel Estimate			
Quantity	Length (ft)	Cost/LF	Amount
11	24	$50.50	$13,332.00
9	24	$51.00	$11,016.00
14	29	$50.50	$20,503.00
4	29	$69.00	$8,004.00
3	21	$50.50	$3,181.50
7	21	$50.50	$7,423.50
10	22	$50.50	$11,110.00
3	22	$69.00	$4,554.00
11	30	$44.50	$14,685.00
1	30	$191.00	$5,730.00
9	29	$69.00	$18,009.00
3	29	$71.00	$6,177.00
3	25	$69.00	$5,175.00
12	14	$61.50	$10,332.00
18	14	$67.50	$945.00
		Total Cost	$140,177.00

Reinf. Estimate
Total CY of Concrete = 43941.74
Total Tons of Reinf. = 362.20
Cost for Material and Labor of Reinf = $1400 / Ton
Total Cost of Reinf. = $ 507,080

Appendix E

General Conditions

Description	Unit	Price	Amount
Personnel	MO	$69,339	$1,802,824
Site Trailer	MO	$330.00	$8,580
Field Trailer	MO	$110.00	$2,860
Building Demolition	MO	$480.77	$12,500
Overhead Protection	MO	$1,421.38	$36,956
Shoring & Underpinning	MO	$23,967.31	$623,150
Site Development	MO	$56,097.31	$1,458,530
Temporary Electric	MO	$1,539.00	$40,000
Electric Usage	MO	$6,923.00	$180,000
Temporary Water	MO	$385.00	$10,000
Utilities	MO	$14,769.23	$384,000
Foundation Drain - Site	MO	$454.04	$11,805
Parking Equipment	MO	$384.62	$10,000
Landscaping - Base	MO	$3,716.35	$96,625
Landscaping - Garden	MO	$0.00	$0
Construction Fence	MO	$214.62	$5,580
Construction Fence	MO	$1,153.85	$30,000
Pest Control	MO	$196.96	$5,121
Dumpster	MO	$3,699.23	$96,180
Demobilize Trailers	MO	$1,153.85	$30,000
Layouts and Grades	MO	$1,230.77	$32,000
Site Maintenance	MO	$1,538.46	$40,000
Site Maintenance	MO	$293.46	$7,630
Trash Chutes	MO	$484.62	$12,600
Hoisting/Access	MO	$2,076.92	$54,000
Misc. Supplies	YR	$10,000	$21,600
		Total	$5,012,541