

# Granby Tower

515 Granby Street  
Norfolk Virginia



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Construction Management  
Technical Assignment #2  
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November 2, 2007

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## Executive Summary

This technical report is an overview of the cost and methods analysis for the Granby Tower project in Norfolk, Virginia. The first item that was looked at was a detailed schedule for the project. This schedule was used to determine which phases of the project last the longest and have the largest effect on the rest of the project.

The next item that was looked into was a site layout plan for the superstructure of the building. The site layout shows the location of cranes as well as the concrete trucks that will be needed to place the concrete for the superstructure of the project, since the majority of the structural element consists of cast in place concrete.

The remaining items included in this technical report deal with the cost of the project. First an assemblies estimate for the fire protection system for the building was performed. This estimate came to \$3,032,535. After this a detailed estimate for the structural systems of the building was performed. The structure of the building consists mostly of cast in place concrete and masonry. The estimate for the structural elements came to \$5,104,664. Finally a general conditions estimate was performed and the estimate came to \$3,538,094.

## Detailed Project Schedule

(Please refer to Appendix A for detailed project schedule)

The project schedule for the construction of the Granby Tower project is broken down by area of construction. Each area is then broken down by trade. Since the construction for the main towers are similar, only the construction of one tower level is shown in detail. Each tower is started approximately two weeks after the previous tower.

First the towers are framed out; once the framing is completed the MEP risers are installed. After this is complete the tower levels are enclosed. Once a level is enclosed, the finishes can be applied. This process is similar for each floor in the tower.

### Key Project Dates:

- Notice to Proceed: July 2, 2007
- Obtain Permits: July 2, 2007
- Substantial Completion: November 12, 2009

## Site Layout Plan

(Please refer to Appendix B for site layout plan)

The site layout plan developed for this project is for the construction of the superstructure system. Since the building footprint almost extends completely to the extents of the property, the site is very congested. Due to the congestion there is no room for parking on site, there is also very little room for a lay down area once the construction of the superstructure has begun. This plan shows areas where the concrete trucks can enter and exit the site. It also shows the locations of the cranes.

## Assemblies Estimate: Fireproofing System

(Please refer to Appendix C for the takeoff for this estimate)

RS Means Assemblies Estimate 2007 was used to determine the cost of the fireproofing system for the Granby Tower project. The main assumption that was made for this estimate was that the sprinkler systems were all dry pipe systems. A class 1, 8 inch standpipe is used for this system. The total cost of this estimate is \$3,538,094.

D4010 310 Dry Pipe Sprinkler Systems			
Type	Square Foot	Cost/SF	Total
Dry	72279	3.8	280204.4
Dry	72279	2.63	190093.8
Dry	72279	2.63	190093.8
Dry	72279	2.63	190093.8
Dry	72279	2.63	190093.8
Dry	72279	2.63	190093.8
Dry	72279	2.63	190093.8
Dry	20855	2.63	54848.65
Dry	20855	2.63	54848.65
Dry	20855	2.63	54848.65
Dry	20855	2.63	54848.65
Dry	20855	2.63	54848.65
Dry	20508	2.63	53930.78
Dry	20508	2.63	53930.78
Dry	20508	2.63	53930.78
Dry	20508	2.63	53930.78
Dry	20508	2.63	53930.78
Dry	20508	2.63	53930.78
Dry	20508	2.63	53930.78
Dry	20508	2.63	53930.78
Dry	20508	2.63	53930.78
Dry	18717	2.63	49225.71
Dry	17690	2.63	46524.7
Dry	17690	2.63	46524.7
Dry	17690	2.63	46524.7
Dry	17690	2.63	46524.7
Dry	17690	2.63	46524.7
Dry	13940	2.63	36662.2
Dry	7832	2.63	20598.16
Dry	3136	2.63	8247.68
Dry	3136	2.63	8247.68

Total Sprinkler Cost = \$2677785

Figure 1: Sprinkler Estimate Summary

D4020 330 Standpipe			
No. per floor	Cost per floor		Total
7	10850		75950
8	3400		27200
7	3400		23800
7	3400		23800
5	3400		17000
6	3400		20400
4	3400		13600
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
2	3400		6800
1	3400		3400
1	3400		3400
1	3400		3400

Total Standpipe Cost = \$354750

Figure 2: Standpipe Estimate Summary

## Detailed Structural Systems Estimate

(Refer to Appendix D for takeoff calculations)

The structural systems estimate was performed using RS Means Building Construction Costs 2008. The structure of the project mainly consists of elements of cast in place concrete; however there are some masonry elements as well. The cast in place concrete consists of elevated slabs, beams, footings, slab on grade, shear walls, pile caps, and columns. The masonry pertains to the CMU walls used for the structure of the town homes. The cost of the labor and materials was calculated and then the total cost of each system was multiplied by a location factor of 0.874. The cost of the cast in place concrete was \$5,100,744 and the cost of the masonry was \$3,920.

### Assumptions made:

- All columns are 24"x24"
- The pricing includes formwork of four uses, reinforcing, placing, and finishing
- All beams have a 25 ft span
- All strip footings are considered to be 4'-0" cont.
- The pricing for the slab on grade does not include formwork, reinforcing, placement, or finishing
- All elevated slabs are 10 inches thick
- All pile caps are either square or rectangular
- Reinforcing was considered to be average for all cast in place concrete elements
- All CMU walls are exterior walls
- No vertical reinforcing in CMU walls

03 30 Cast In Place Concrete Estimate							
Type	Units	Quantity	Unit Labor Cost	Unit Material Cost	Equipment Cost	Total Cost	Total
Columns	CY	3873	435	410	42.5	887.5	3437288
Beams	CY	158	415	325	40.5	780.5	123319
Grade Beams	CY	1065	447.5	320.67	43.97	812.14	864929.1
Strip Footings	CY	100	51.5	123	0.42	132.5	13250
Spread Footings	CY	9	54.5	176	0.33	230.83	2077.47
Slab on Grade	SF	71786	0.74	1.67	0.01	2.42	173722.1
Reinf. and formwork for slab	SF	71786	4.83	6.65	0.46	11.94	857124.8
Shear Walls	CY	100	203.67	194	23.82	421.49	42149
Elevated Slabs	SF	59211	0.73	2.16	0.28	3.17	187698.9
Pile Caps	CY	732	48.5	135	0.29	183.79	134534.3
						Total Concrete Cost = \$5,836,092	
						Location factor = 0.874	
						Concrete Cost with Location Factor = \$5100744	
04 22 Masonry							
Type	Units	Quantity	Unit Labor Cost	Unit Material Cost	Equipment Cost	Total Cost	Total
8" CMU Wall	SF	226	3.36	2.61		5.56	1256.56
12" CMU Wall	SF	349	5.6	3.65		9.25	3228.25
						Total Masonry Cost = \$4485	
						Location Factor = 0.874	
						Masonry Cost with Location Factor = \$3920	

Figure 3: Structural Estimate Summary



## General Conditions Estimate

This estimate establishes the general conditions for the project. It is broken down into two areas, staffing, and miscellaneous costs. These costs were determined for the duration of construction which is approximately thirty-one months. The estimate for staffing is approximately \$2,634,380 while the estimate for the miscellaneous items is \$903,714, for a total general conditions cost of \$3,538,094.

### Assumptions made:

- Security guard is on site for the duration of the project and is on site for 12 hrs a day
- 1500 lf feet is needed
- 6 ft high chain link fence is used
- total square footage for signage is 100
- 1-13 ton dumpster will be used with one dump per week
- 19,656 sf/flr for temporary utilities
- For staffing the average salaries were used
- Equipment such as cranes, concrete trucks, etc. will be provided by the contractor and are not included in this estimate

Staffing Costs					
Job Title	Quantity	Percentage of time on site	Unit	Labor	Total
Project Executive	62	30%	Wk	2300	42780
Senior Project Manager	124	100%	Wk	2100	260400
Project Manager	124	100%	Wk	1900	235600
Project Manager	124	100%	Wk	1900	235600
Superintendent	124	100%	Wk	1700	210800
Superintendent	124	100%	Wk	1700	210800
Superintendent	124	100%	Wk	1700	210800
Superintendent	124	100%	Wk	1700	210800
Superintendent	124	100%	Wk	1700	210800
Superintendent	124	100%	Wk	1700	210800
Field Engineer	124	100%	Wk	1200	148800
Field Engineer	124	100%	Wk	1200	148800
Field Engineer	124	100%	Wk	1200	148800
Field Engineer	124	100%	Wk	1200	148800

Misc. Costs				
Type of cost	Quantity	Unit	Unit cost	Total
Security Guard	10356	Hrs	25	258900
Temporary Fencing	1500	LF	3.85	5775
Signage	100	SF	17.9	1790
Dumpsters	124	Wk	1160	143840
Temporary Power	196.56	CSF FL	47	314102.9
Temporary Lighting	196.56	CSF FL	13.33	89084.92
Temporary Heat	196.56	CSF FL	13.5	90221.04

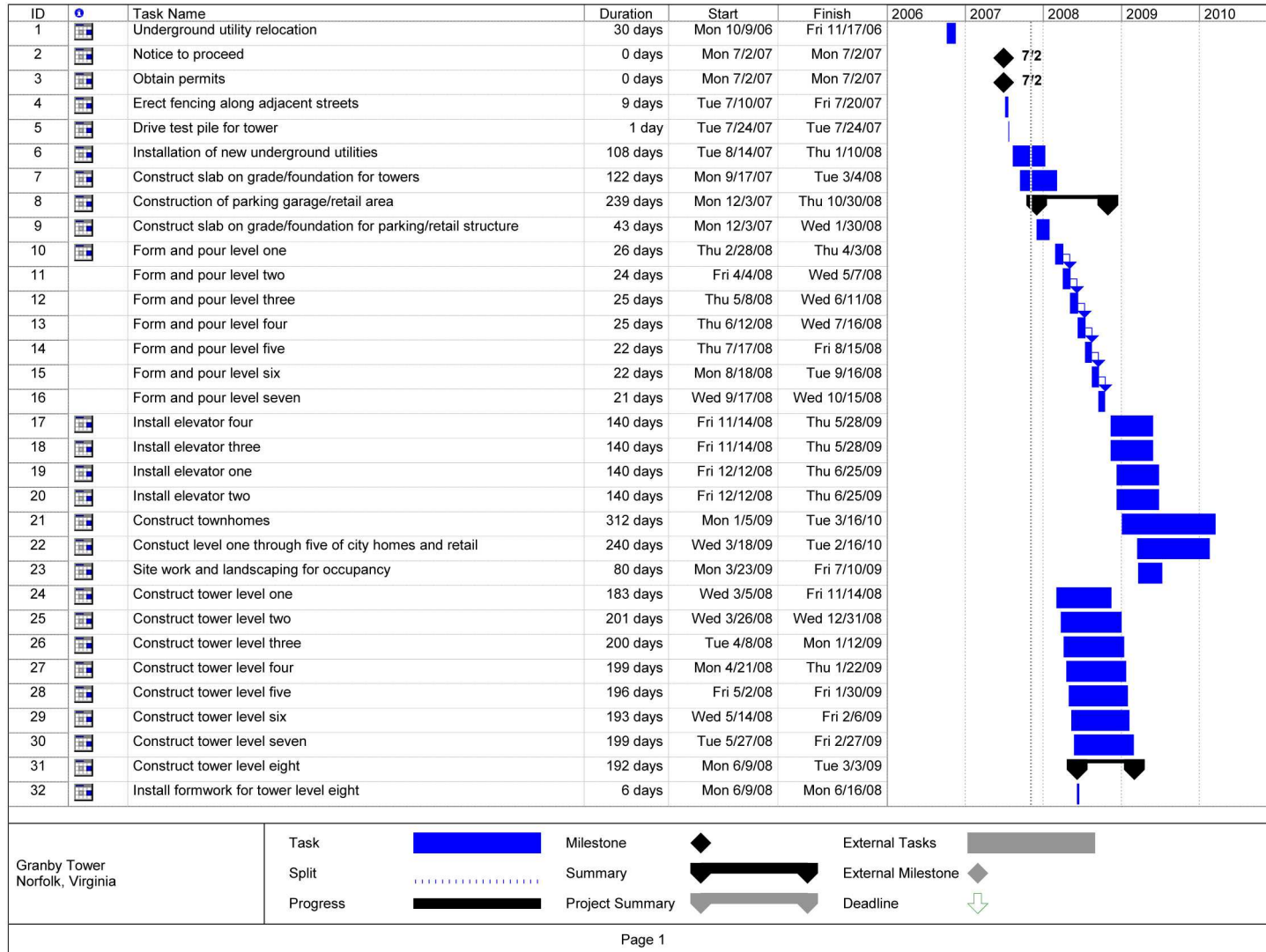
Total General Conditions Costs = \$3538094

Figure 4: General Conditions Estimate Summary

## Appendix A (Detailed Project Schedule)

Granby Tower  
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ID	Task Name	Duration	Start	Finish	2006	2007	2008	2009	2010
33	Pour concrete	2 days	Tue 6/17/08	Wed 6/18/08					
34	Strip forms and set up re-shoring	2 days	Fri 6/20/08	Mon 6/23/08					
35	Remove reshoring	2 days	Thu 8/21/08	Fri 8/22/08					
36	Install television sleeves	2 days	Mon 8/25/08	Tue 8/26/08					
37	Layout of partitions	3 days	Mon 8/25/08	Wed 8/27/08					
38	Install mep risers	16 days	Mon 8/25/08	Mon 9/15/08					
39	Install electrical bus duct	3 days	Thu 8/28/08	Mon 9/1/08					
40	Inspect electrical work	1 day	Tue 9/2/08	Tue 9/2/08					
41	Install mechanical duct taps into the housing units	2 days	Thu 9/11/08	Fri 9/12/08					
42	Frame level core	5 days	Mon 9/15/08	Fri 9/19/08					
43	Inspect plumbing	1 day	Tue 9/16/08	Tue 9/16/08					
44	Install fire sprinkles - main loop	5 days	Tue 9/23/08	Mon 9/29/08					
45	Inspect mechanical rough in	1 day	Tue 9/23/08	Tue 9/23/08					
46	Inspect framing	1 day	Wed 9/24/08	Wed 9/24/08					
47	Frame balcony	3 days	Tue 8/26/08	Thu 8/28/08					
48	Install sliding doors	5 days	Tue 8/26/08	Mon 9/1/08					
49	Install clips	6 days	Tue 8/26/08	Tue 9/2/08					
50	Set balcony glazing	5 days	Fri 8/29/08	Thu 9/4/08					
51	Install swinging doors	1 day	Tue 9/2/08	Tue 9/2/08					
52	Install unitwall panels	3 days	Wed 9/3/08	Fri 9/5/08					
53	Install balcony frame stops	1 day	Fri 9/5/08	Fri 9/5/08					
54	Level eight enclosed	0 days	Fri 9/5/08	Fri 9/5/08					
55	Unit finishes	101 days	Mon 9/8/08	Mon 1/26/09					
56	Layout track	5 days	Mon 9/8/08	Fri 9/12/08					
57	HVAC rough-in overhead	7 days	Tue 9/16/08	Wed 9/24/08					
58	Unit framing	10 days	Fri 9/19/08	Thu 10/2/08					
59	Electrical rough-in overhead	7 days	Mon 9/29/08	Tue 10/7/08					
60	Plumbing rough-in overhead	7 days	Mon 9/29/08	Tue 10/7/08					
61	Finish HVAC rough-ins	7 days	Mon 9/29/08	Tue 10/7/08					
62	Fire protect rough-in	7 days	Mon 9/29/08	Tue 10/7/08					
63	Mechanical rough-in inspection	1 day	Wed 10/8/08	Wed 10/8/08					
64	Plumbing rough-in inspection	1 day	Wed 10/8/08	Wed 10/8/08					

Granby Tower Norfolk, Virginia	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

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ID	Task Name	Duration	Start	Finish	2006	2007	2008	2009	2010
65	Electrical rough-in inspection	1 day	Wed 10/8/08	Wed 10/8/08					
66	Framing inspection	1 day	Thu 10/9/08	Thu 10/9/08					
67	Insulation	5 days	Fri 10/10/08	Thu 10/16/08					
68	Insulation inspection	1 day	Fri 10/17/08	Fri 10/17/08					
69	Hang drywall	15 days	Mon 10/20/08	Fri 11/7/08					
70	Tape/finish drywall	5 days	Mon 11/10/08	Fri 11/14/08					
71	Prime and paint	3 days	Mon 11/17/08	Wed 11/19/08					
72	Install ceramic tile in kitchen and baths	15 days	Mon 11/17/08	Fri 12/5/08					
73	Hang doors	5 days	Tue 11/18/08	Mon 11/24/08					
74	Set cabinets, vanities, and tops	15 days	Mon 12/8/08	Fri 12/26/08					
75	Finish paint	5 days	Thu 12/25/08	Wed 12/31/08					
76	Plumbing trim out	5 days	Tue 12/30/08	Mon 1/5/09					
77	HVAC trim out	5 days	Tue 12/30/08	Mon 1/5/09					
78	Electrical trim out	5 days	Tue 12/30/08	Mon 1/5/09					
79	Install appliances	5 days	Fri 1/2/09	Thu 1/8/09					
80	Install carpet	5 days	Wed 1/7/09	Tue 1/13/09					
81	Post construction clean	5 days	Mon 1/12/09	Fri 1/16/09					
82	Punchlist	5 days	Mon 1/19/09	Fri 1/23/09					
83	Final inspection	1 day	Mon 1/26/09	Mon 1/26/09					
84	Units complete	0 days	Mon 1/26/09	Mon 1/26/09					
85	Public space finishes	31 days	Tue 1/20/09	Tue 3/3/09					
86	Framing of public spaces	5 days	Tue 1/20/09	Mon 1/26/09					
87	Electrical rough-in	5 days	Fri 1/23/09	Thu 1/29/09					
88	Plumbing rough-in	5 days	Fri 1/23/09	Thu 1/29/09					
89	Fire protection rough-in	5 days	Fri 1/23/09	Thu 1/29/09					
90	HVAC rough-in	5 days	Fri 1/23/09	Thu 1/29/09					
91	Mechanical rough-in inspection	1 day	Fri 1/30/09	Fri 1/30/09					
92	Plumbing rough-in inspection	1 day	Fri 1/30/09	Fri 1/30/09					
93	Electrical rough-in inspection	1 day	Fri 1/30/09	Fri 1/30/09					
94	Framing inspection	1 day	Mon 2/2/09	Mon 2/2/09					
95	Install insulation	2 days	Tue 2/3/09	Wed 2/4/09					
96	insulation inspection	1 day	Thu 2/5/09	Thu 2/5/09					

Granby Tower Norfolk, Virginia	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

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ID	Task Name	Duration	Start	Finish	2006	2007	2008	2009	2010
97	Hang drywall	3 days	Fri 2/6/09	Tue 2/10/09					
98	Tape/finish drywall	3 days	Wed 2/11/09	Fri 2/13/09					
99	Prime paint	2 days	Mon 2/16/09	Tue 2/17/09					
100	Hang doors	2 days	Thu 2/19/09	Fri 2/20/09					
101	Finish paint	3 days	Mon 2/23/09	Wed 2/25/09					
102	Install carpet	2 days	Thu 2/26/09	Fri 2/27/09					
103	Electrical trim out	2 days	Fri 2/27/09	Mon 3/2/09					
104	Plumbing trim out	2 days	Fri 2/27/09	Mon 3/2/09					
105	HVAC trim out	2 days	Fri 2/27/09	Mon 3/2/09					
106	Post construction clean	1 day	Mon 3/2/09	Mon 3/2/09					
107	Final inspection	1 day	Tue 3/3/09	Tue 3/3/09					
108	Level eight complete	0 days	Tue 3/3/09	Tue 3/3/09				◆ 3/3	
109	Construct tower level nine	191 days	Wed 6/18/08	Wed 3/11/09				■	
110	Construct tower level ten	191 days	Fri 6/27/08	Fri 3/20/09				■	
111	Construct tower level eleven	193 days	Fri 7/4/08	Tue 3/31/09				■	
112	Construct tower level twelve	202 days	Mon 7/14/08	Tue 4/21/09				■	
113	Construct tower lever thirteen	195 days	Wed 7/23/08	Tue 4/21/09				■	
114	Construct tower level fourteen	193 days	Fri 8/1/08	Tue 4/28/09				■	
115	Construct tower level fifteen	193 days	Tue 8/12/08	Thu 5/7/09				■	
116	Construct tower level sixteen	192 days	Thu 8/21/08	Fri 5/15/09				■	
117	Construct tower level seventeen	191 days	Mon 9/1/08	Mon 5/25/09				■	
118	Construct tower level eighteen	193 days	Wed 9/10/08	Fri 6/5/09				■	
119	Construct tower level nineteen	188 days	Fri 9/19/08	Tue 6/9/09				■	
120	Construct tower level twenty	187 days	Tue 9/30/08	Wed 6/17/09				■	
121	Construct tower level twenty-one	187 days	Thu 10/9/08	Fri 6/26/09				■	
122	Construct tower level twenty-two	188 days	Fri 10/17/08	Tue 7/7/09				■	
123	Construct tower level twenty-three	189 days	Mon 10/27/08	Thu 7/16/09				■	
124	Construct tower level twenty-four	190 days	Tue 11/4/08	Mon 7/27/09				■	
125	Construct tower level twenty-five	192 days	Wed 11/12/08	Thu 8/6/09				■	
126	Construct tower level twenty-six	192 days	Thu 11/20/08	Fri 8/14/09				■	
127	Construct tower level twenty-seven	192 days	Mon 12/1/08	Tue 8/25/09				■	
128	Construct tower level twenty-eight	198 days	Wed 12/10/08	Fri 9/11/09				■	

Granby Tower Norfolk, Virginia	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

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Granby Tower  
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ID	Task Name	Duration	Start	Finish	2006	2007	2008	2009	2010
129	Construct tower level twenty-nine	188 days	Fri 12/19/08	Tue 9/8/09					
130	Construct tower level thirty	202 days	Tue 12/30/08	Wed 10/7/09					
131	Construct tower level thirty-one	201 days	Thu 1/8/09	Thu 10/15/09					
132	Construct tower level thirty-two	162 days	Mon 1/19/09	Tue 9/1/09					
133	Install formwork	6 days	Mon 1/19/09	Mon 1/26/09					
134	Pour concrete	3 days	Tue 1/27/09	Thu 1/29/09					
135	Strip formwork/set re-shoring	2 days	Tue 2/3/09	Wed 2/4/09					
136	Remove re-shoring	2 days	Mon 4/6/09	Tue 4/7/09					
137	Core electrical rough-in	15 days	Wed 4/8/09	Tue 4/28/09					
138	Core HVAC/mechanical rough-in	15 days	Wed 4/8/09	Tue 4/28/09					
139	Core plumbing rough-in	15 days	Wed 4/8/09	Tue 4/28/09					
140	Core fire protection rough-in	15 days	Wed 4/8/09	Tue 4/28/09					
141	HVAC completion	5 days	Wed 4/15/09	Tue 4/21/09					
142	Plumbing completion	5 days	Wed 4/15/09	Tue 4/21/09					
143	Fire protection completeion	45 days	Wed 4/15/09	Tue 6/16/09					
144	Interior framing	10 days	Wed 4/22/09	Tue 5/5/09					
145	Electrical completion	45 days	Wed 6/10/09	Tue 8/11/09					
146	Startup/commissioning	15 days	Wed 8/12/09	Tue 9/1/09					
147	Apply roofing system	10 days	Thu 2/5/09	Wed 2/18/09					
148	Install clips	6 days	Thu 4/9/09	Thu 4/16/09					
149	Install unitwall panels	3 days	Fri 4/17/09	Tue 4/21/09					
150	Complete piping in upper levels	25 days	Mon 4/6/09	Fri 5/8/09					
151	Set cooling tower	5 days	Tue 4/14/09	Mon 4/20/09					
152	Set boilers	5 days	Tue 4/14/09	Mon 4/20/09					
153	Rig pumps	5 days	Tue 4/14/09	Mon 4/20/09					
154	Set elevator passenger cars 1,2,3,4	40 days	Fri 5/1/09	Thu 6/25/09					
155	Flush, test, commision loops	25 days	Mon 5/11/09	Fri 6/12/09					
156	Construct tower level thirty-three	160 days	Wed 1/28/09	Tue 9/8/09					
157	Construct tower level thirty-four	93 days	Fri 2/6/09	Tue 6/16/09					
158	Erect frame	41 days	Fri 2/6/09	Fri 4/3/09					
159	Erect spire	40 days	Wed 4/22/09	Tue 6/16/09					
160	Substantial completion	0 days	Thu 11/12/09	Thu 11/12/09					

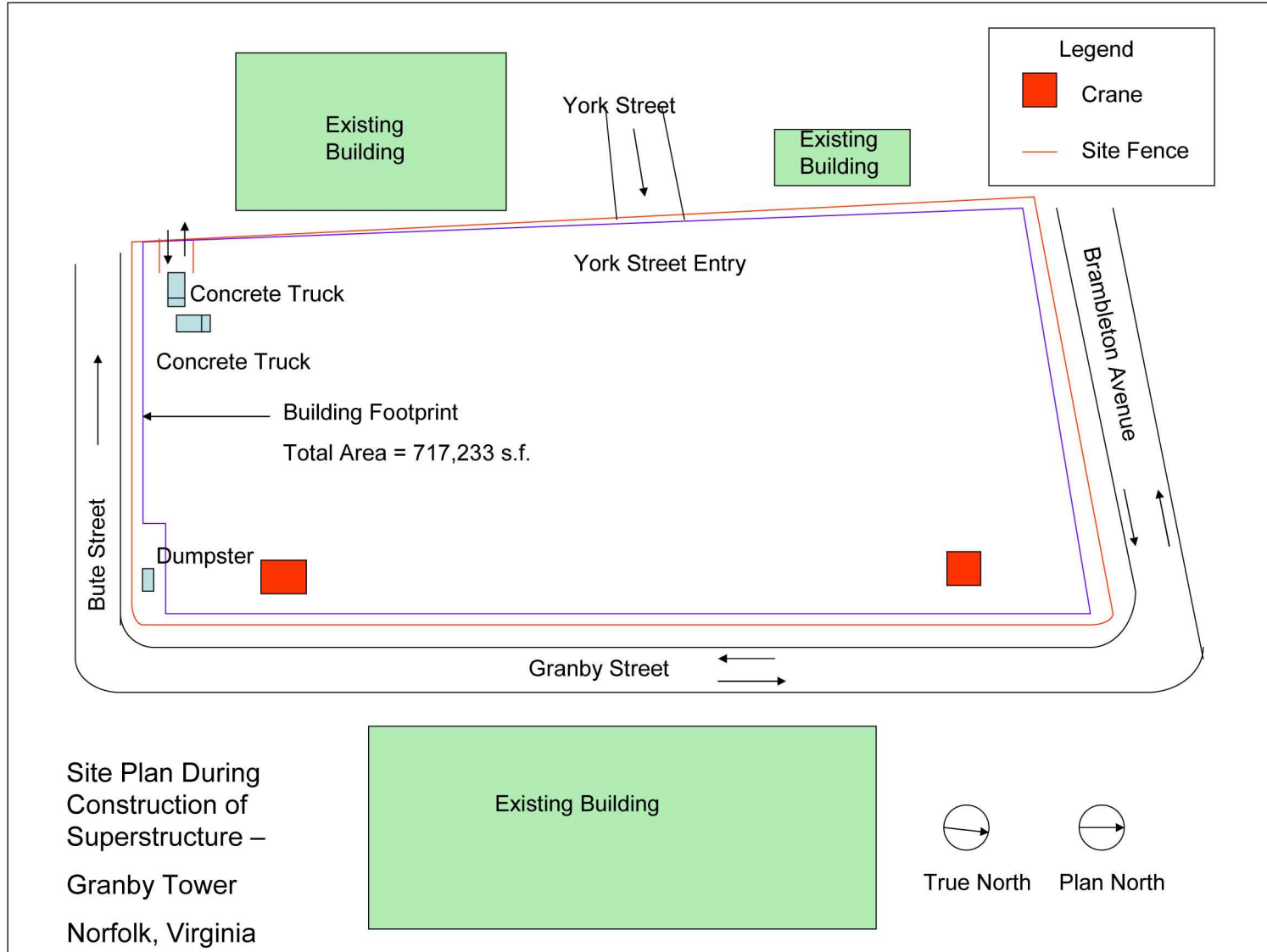
  

Granby Tower Norfolk, Virginia	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

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## Appendix B (Site Layout Plan)





## Appendix C (Assemblies Estimate Takeoff)

Sprinkler Estimate			
Level	Square Footage	Type	Amount of Standpipes
One	72279	Dry	7
Two	72279	Dry	8
Three	72279	Dry	7
Four	72279	Dry	7
Five	72279	Dry	5
Six	72279	Dry	6
Seven	72279	Dry	4
Eight	20855	Dry	2
Nine	20855	Dry	2
Ten	20855	Dry	2
Eleven	20855	Dry	2
Twelve	20855	Dry	2
Thirteen	20506	Dry	0
Fourteen	20506	Dry	2
Fifteen	20506	Dry	2
Sixteen	20506	Dry	2
Seventeen	20506	Dry	2
Eighteen	20506	Dry	2
Nineteen	20506	Dry	0
Twenty	20506	Dry	0
Twenty-one	20506	Dry	2
Twenty-two	20506	Dry	2
Twenty-three	20506	Dry	2
Twenty-four	20506	Dry	2
Twenty-five	18717	Dry	2
Twenty-six	17690	Dry	2
Twenty-seven	17690	Dry	2
Twenty-eight	17690	Dry	2
Twenty-nine	17690	Dry	2
Thirty	17690	Dry	2
Thirty-one	13940	Dry	2
Thirty-two	7832	Dry	1
Thirty-three	3136	Dry	1
Thirty-four	3136	Dry	1

## Appendix D (Structural Estimate Takeoff)

Column Size (inxin)	Columns Quantity	Height (ft.)	Total CY
30x30	340	10.25	806.712963
30x30	136	10.25	322.6851852
36x36	204	10.25	697
18x18	136	10.25	116.1666667
18x18	34	10.25	29.04166667
48x27	204	10.25	697
48x18	204	10.25	464.6666667
30x18	54	10.25	76.875
18x18	432	10.25	369
24x18	81	10.25	92.25
18x18	120	10.25	102.5
18x18	4	10.25	3.416666667
18x18	8	10.25	6.833333333
18x18	92	10.25	78.58333333
18x18	8	10.25	6.833333333
18x18	4	10.25	3.416666667
Total Conc.			3872.981481

Footings				
Footing width	Footing depth	Length (ft)	Quantity	Total CY
4'-0" cont	1'-0"	8.33	14	17.27703704
4'-0" cont	1'-0"	106.1665	2	31.45674074
4'-0" cont	1'-0"	30	11	48.88888889
2'-0" cont	1'-0"	29.5	1	2.185185185
2'-0" cont	1'-0"	2.4167	2	0.35802963
4'-0"x4'-0"	1'-0"	4	15	8.888888889
Total Conc.				109.0547704

Grade Beams				
Quantity	Width (in)	Depth (in)	Length (ft)	Total CY
19	26	30	18.5	70.51697531
69	16	24	18.5	126.0740741
26	20	28	18.5	69.27983539
27	24	30	18.5	92.5
5	36	30	18.5	693.75
2	44	30	18.5	12.5617284
Total Conc.				1064.682613

Beams				
Quantity	Width (in)	Depth (in)	Length (ft)	Total CY
128	8	16	16.1667	68.12634074
27	8	16	27	24
8	12	24	21.25	12.59259259
4	12	42	21.25	11.01851852
4	18	24	34.1667	15.1852
12	18	24	20.583	27.444
Total Conc.				158.3666519

Shear Walls

Quantity	Thickness (in)	Width (ft)	Length (ft)	Total CY
1	10	10	29.083	10.25
1	10	10	16	10.25
1	10	10	16	10.25
1	10	10	14.33	10.25
1	10	10	14.125	10.25
1	10	10	21.583	10.25
1	10	10	112	10.25
2	8	8	8.917	10.25
1	10	10	16.25	10.25
1	10	10	15.167	10.25
1	10	10	12.33	10.25
1	10	10	19	10.25
1	10	10	16.417	10.25
Total Conc.				100.1438287

Slab on Grade

Quantity	Thickness (in)	Area (ft^2)	Total CY
1	5	71786	1107.808642

Elevated Slabs

Quantity	Thickness (in)	Area (ft^2)	Total CY
34	4	19240	8076.049383
9	8	18415	4092.222222
4	14	8840	1527.901235
4	12	12716	1883.851852
Total Conc.			15580.02469

Pile Caps

Quantity	Size	Type	Depth (ft)	Total CY
17	2'-6"x5'-6"	Rectangular	2.5	21.64351852
71	6'-6"x6'-1.5"	Triangular	2.5	130.865162
23	6'-6"x6'-6"	Square	2.5	89.97685185
5	7'-9"x7'-9"	Square	2.5	27.80671296
2	6'-6"x7'5"	Rectangular	2.5	8.927509259
2	5'-9"x9'-6"	Rectangular	2.5	9.52937963
2	8'-9"x9'-6"	Rectangular	2.5	14.80715741
16	10'-6"x10'-6"	Square	2.5	163.3333333
6	10'-6"x14'-0"	Rectangular	2.5	81.66666667
6	10'-6"x17'-6"	Rectangular	2.5	102.0833333
2	21'-0"x21'-0"	Square	2.5	81.66666667
Total Conc.				732.3062917

Masonry

Quantity	Thickness (in)	Length (ft)	Height (ft)	Total SF
10	8	22.083	10.25	226.35075
12	12	34	10.25	348.5