

Technical
Report 2

State College, PA

320 W. Beaver Ave. Student Apartments

January 12,
2008

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Construction Management

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Executive Summary

320 W. Beaver Avenue is a multi-use building created on the edge of the downtown area in State College, Pennsylvania. The building will be used for commercial and residential purposes, two blocks away from the Pennsylvania State University. This is a prime location for this type of building, meaning there will be no trouble renting all of the apartments when the building opens. This area is also a good location for the commercial side of the building, due to the amount of stores in the area and will hopefully bring in an ample amount of revenue.

320 W. Beaver Ave. is a \$15,000,000.00, 7 story building containing: 3 levels of parking (2 of which are below grade), a small commercial space for rent that can accommodate 2-3 small stores, and the rest of the building, floors 2-7, are student apartments, 10 one bedroom and 55 two bedroom apartments. The project is constructed with cast in place concrete, for the parking garage and the first floor, and then switches to CMU walls. All the floors are constructed of pre-manufactured planks, which allows for a shorter construction process. This is a very simple building except for the excavation process due to a certain issues, which are discussed in the local conditions and the building systems sections.

Included in Technical Report #2 is the following schedules, plans and estimates. A detailed project schedule and sips schedule. Site layout planning drawings are shown for three stages in the project, excavation, superstructure, and finishes. The three estimates included are as a mechanical estimate, a detailed structural estimate, and a general conditions estimate.

Detailed Project Schedule

The schedule for 320 W. Beaver Ave. is made of several major sections throughout construction. The first is the design phase which a great deal of time. The second major part was excavation, which was one of the most intensive parts of the project, due to an average depth of 19' below grade and soil conditions being mostly rock. The third section we get to construction of the parking garage, which consists of cast in place footers, an exterior wall, interior walls and columns and a slab on grade for the lowest level. The levels above that have a floor structure of prefabricated floor planks. After the completion of the parking garage below grade the commercial space is constructed at the same time as the on grade part of the parking garage. After these areas are complete, the apartment floors get built. These floors use a flow of trades that go through the building on a weekly schedule. This sequence is shown in Appendix B: Sips Schedule, Typical Floor Plan on page 12.

Refer to Appendix A: Detailed Project Schedule on page 11 for the overall schedule.

Site Layout Planning

Throughout the construction process there are three phases that require site planning. Due to the limited amount of space on site, planning becomes extremely important. Most of this needs to be done through deliveries, since there is not much storage space, especially in the beginning of the project. Later into construction items can be stored in the parking garage and on site. The items that are stored on site are crammed into the south side of the site.

Throughout the entire construction process the temporary offices are located in the basement of the church next door. It is accessed on the south west corner of the building. The parking for the workers and managers is right at the back of the church which can hold approximately 15 cars when they are squeezed together, however many of the workers drive trucks, so less than 15 vehicles can fit. The bathroom facilities are located right next to the parking, along with the dumpster.

Excavation

During this phase the most notable things to consider is the depth of the excavation. The excavation started at the ramp area and then worked its way down. Trucks drove through the back of the site at this point in the project.

Superstructure

The major issues to be considered during this phase of construction are the deliveries and the crane. The deliveries will shut down one lane of traffic, using cones and road signs. These signs and cones are moved after construction hours and on the weekends. The area shut down can hold about two large trucks, which means that the crane has to pick the materials directly from the truck into place, this process must flow smoothly or things can be delayed significantly.

The crane seems to be very large when first seeing it on site, due to the amount it sticks out into the street and over the neighboring buildings. The operator has to be extremely careful of pedestrians and traffic around the site.

Finishes

During this stage, there will be many workers on site and a great deal of coordination will need to take place. Due to the flow of trades throughout the building material storage for each trade can be stored in the parking garage until the materials are needed. At this point they can be taken to the floor where they are needed. At this stage parking should not be an issue; workers could potentially park in a section of the parking garage saving outdoor storage space.

Structural Estimate

The structural Estimate was split into floors. The two levels below grade were lumped together. The commercial section was done separately from the parking behind it. Then the 2nd floor was calculated, the 3rd – 6th floors were lumped together, then last the 7th floor.

Structural Estimate	
Parking Garage	\$1,165,469.26
Commercial	\$151,962.43
2nd Floor	\$287,756.23
3rd - 6th Floors	\$713,187.78
7th Floor	\$217,006.19
Total	\$2,535,381.89

This number is almost 2 million less than a ballpark number received from the project engineer. The exact estimate was confidential. This could be due to the estimate assumptions and not as much of a clarification between all the beams above the cast in place concrete. The complexity of the below grade parking could have a major impact on this number. The last large difference is that every piece needs to be pulled off of the delivery truck which can slow production, increasing the labor costs.

For further breakdown of each section of the building, refer to Appendix D: Detailed Structural Estimate on page 15.

Listed below are assumptions made during the estimate.

Parking Garage, assumed all walls at angles were 11'-4" which would be the same volume, but would definitely cost more to construct at an angle which could increase the cost of labor. Assumed both underground parking levels were identical except the floor structure and the mechanical room. For the exterior walls, a 14' high grade wall was assumed, which is incorrect, but the cost should be relatively similar. For the cast in place estimates, numbers were used that included rebar, concrete, and formwork. The formwork had an estimated use of 4 times, which is not the case on the project. Strip Footings that were 5' X 1'8" were assumed to be 5' X 1'4" which is a big difference, however the calculation is done in cubic yards, so the only effect this would have is on the

Mechanical Estimate

This estimate focuses on the heating and cooling systems only. The major part that was looked into in detail was the systems for each apartment. This estimate is split into sections depending on the different spaces and type of equipment. The one and two bedroom apartments were the two spaces chosen to be done as a system. This helped simplify the process due to the apartments being identical when looking at the mechanical systems. The rest of the mechanical estimate was arranged by type of material, due to the fact that they were scattered all around the building.

Listed below are assumptions made during the estimate.

Interpolation was used for the following, bathroom exhaust fan, 14” flex ductwork, the one bedroom heat pump, rooftop air conditioning unit, condensing unit, make up air handling unit. Wall heating were estimated off of the smaller unit and a oil based wall heater from RSMean. The cost was adjusted, by comparing the difference between other oil and oil units that preformed the same function.

General Conditions Estimate

The numbers used for the general conditions estimate, were drawn from numbers used in previous classes were general estimates were used. Some of the numbers were given by the Project Engineer, from Poole Anderson Construction.

Table 1 General Conditions Estimate	
Staff	\$314,850.00
General Site Work	\$19,515.00
Temporary Utilities	\$55,820.00
Temporary Facilities	\$5,154.00
Total	\$395,339.00

The numbers used for the general conditions estimate, were drawn from numbers used in previous classes were general estimates were used. Some of the numbers were given by the Project Engineer, from Poole Anderson Construction.

One major cost that was not needed for 320 W. Beaver Ave. was the cost of a job trailer. This was not, thanks to the church next door letting Poole Anderson Construction using their basement. The major cost was then the staff wages, which shows how important time and productivity are in the workforce of today.

Refer to Appendix F: General Conditions Estimate, on page 11, for a more detailed cost break down.

ID	Task Name	Duration	Start	Finish	Predecessors	Half 1, 2005					Half 2, 2005					Half 1, 2006					Half 2, 2006					Half 1, 2007					Half 2, 2007					Half 1, 2008																																															
						J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
1	Design Phase	400 days	Mon 2/28/05	Fri 9/8/06																																																																															
2	Schematic Design	200 days	Tue 3/1/05	Mon 12/5/05																																																																															
3	Design Development	200 days	Tue 7/5/05	Mon 4/10/06																																																																															
4	Construction Documents	200 days	Mon 12/5/05	Fri 9/8/06																																																																															
5	Bidding	50 days	Mon 9/11/06	Fri 11/17/06	4																																																																														
6	Procurement of construction services	300 days	Mon 11/20/06	Fri 1/11/08	5																																																																														
7	Demolition	24 days	Mon 12/4/06	Thu 1/4/07	5FS+10 days																																																																														
8	Temporary Electrical Connection	3 days	Fri 1/5/07	Tue 1/9/07	7																																																																														
9	Excavation	100 days	Fri 1/5/07	Thu 5/24/07	7																																																																														
10	Shoring Pipes	30 days	Fri 1/5/07	Thu 2/15/07	7																																																																														
11	Pour Shoring Pipes	3 days	Fri 2/16/07	Tue 2/20/07	10																																																																														
12	Drill Pre-Split holes	40 days	Fri 1/5/07	Thu 3/1/07	7																																																																														
13	Blasting	30 days	Fri 3/2/07	Thu 4/12/07	12																																																																														
14	Soil and Rock Removal	30 days	Fri 4/13/07	Thu 5/24/07	13																																																																														
15	Contaminated Soil Removal	35 days	Fri 5/25/07	Thu 7/12/07	9																																																																														
16	Construction Phase	262 days	Fri 5/25/07	Mon 5/26/08	9																																																																														
17	Foundations	17 days	Fri 5/25/07	Mon 6/18/07	9																																																																														
18	Elevator Slab	4 days	Fri 5/25/07	Wed 5/30/07	9																																																																														
19	Exterior Footers	10 days	Tue 6/19/07	Mon 7/2/07	9,17																																																																														
20	Interior Footers	10 days	Tue 6/19/07	Mon 7/2/07	9,17																																																																														
21	Crane Setup	12 days	Thu 5/31/07	Fri 6/15/07	18																																																																														
22	Parking Garage Structure	70 days	Tue 7/3/07	Mon 10/8/07	19,21																																																																														
23	Exterior Wall	16 days	Tue 7/3/07	Tue 7/24/07	19,21																																																																														
24	Columns and Interior Walls 1st Level	8 days	Tue 7/3/07	Thu 7/12/07	20,21																																																																														
25	Lay Stone for Basement Slab	1 day	Tue 7/3/07	Tue 7/3/07	19,20																																																																														
26	Install Vapor Barrier	2 days	Wed 7/4/07	Thu 7/5/07	25																																																																														
27	Instal WWF for Basement Slab	2 days	Fri 7/6/07	Mon 7/9/07	26																																																																														
28	Beams First Level	3 days	Mon 7/30/07	Wed 8/1/07	23FS+3 days, 24FS+3 days																																																																														
29	Ground Floor CMU Walls	5 days	Mon 7/30/07	Fri 8/3/07	23FS+3 days, 24FS+3 days																																																																														

Project: 320 Beaver Ave 2
Date: Sat 1/12/08

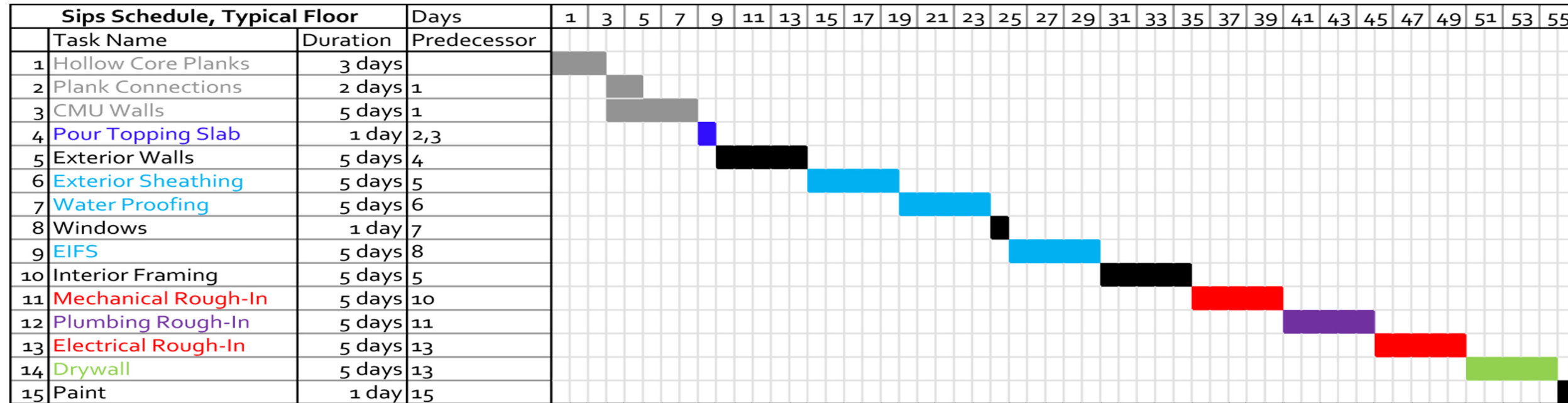
Task: General Contractor: Poole Anderson Construction

Smaller Summary: Site Work: Glen O. Hawbaker

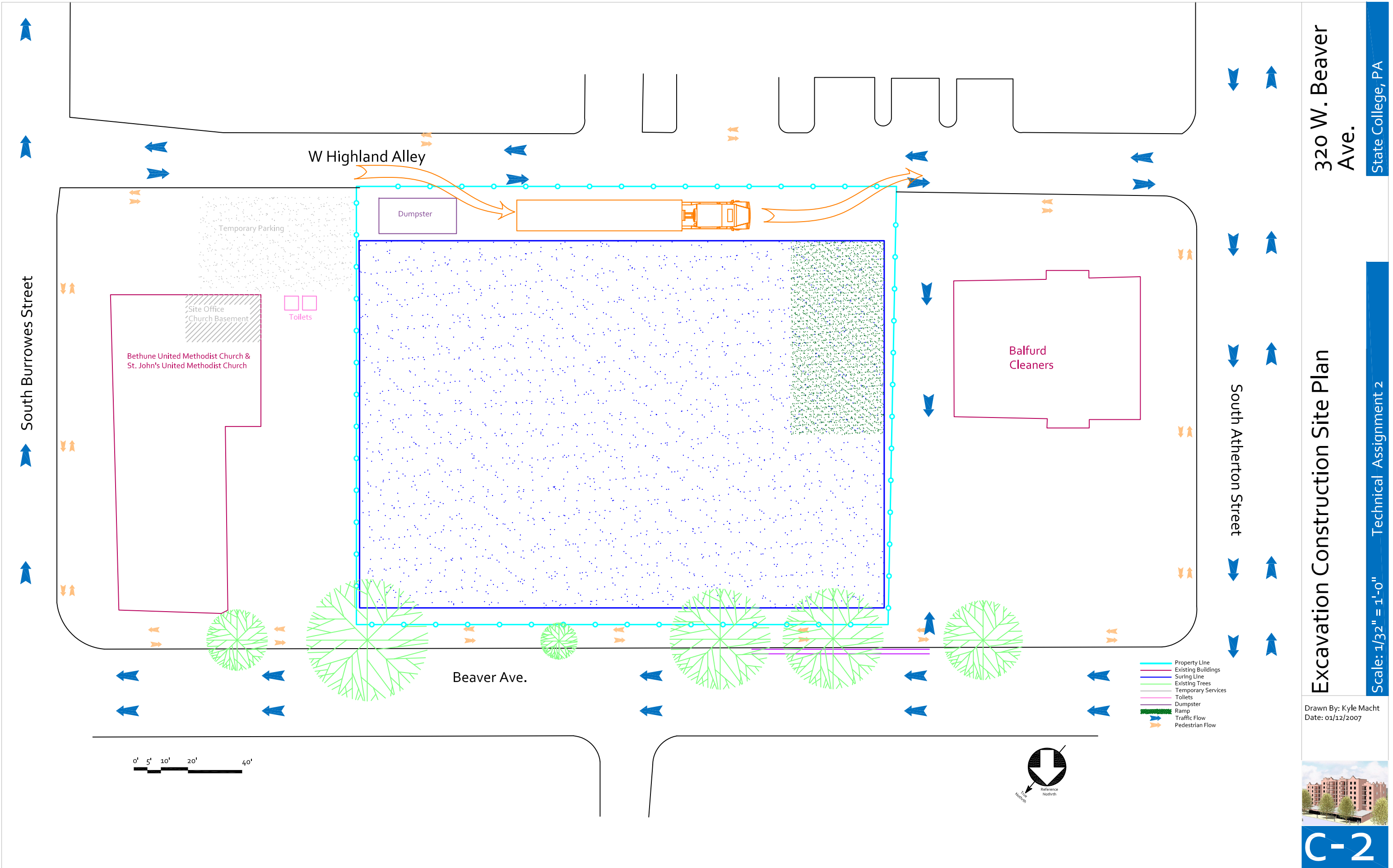
Overview Summary: Concrete: Lorne G. Seifert

Milestone: Masonry Work & Plank Setting: Harris Masonry

Appendix B: Sips Schedule, Typical Floor Plan



Legend	
Harris Masonry	█
Lorne G. Seifert	█
Poole Anderson Construction	█
Macron Roofing	█
Allied Mechanical and Electrical	█
R&R Plaster	█



320 W. Beaver Ave.

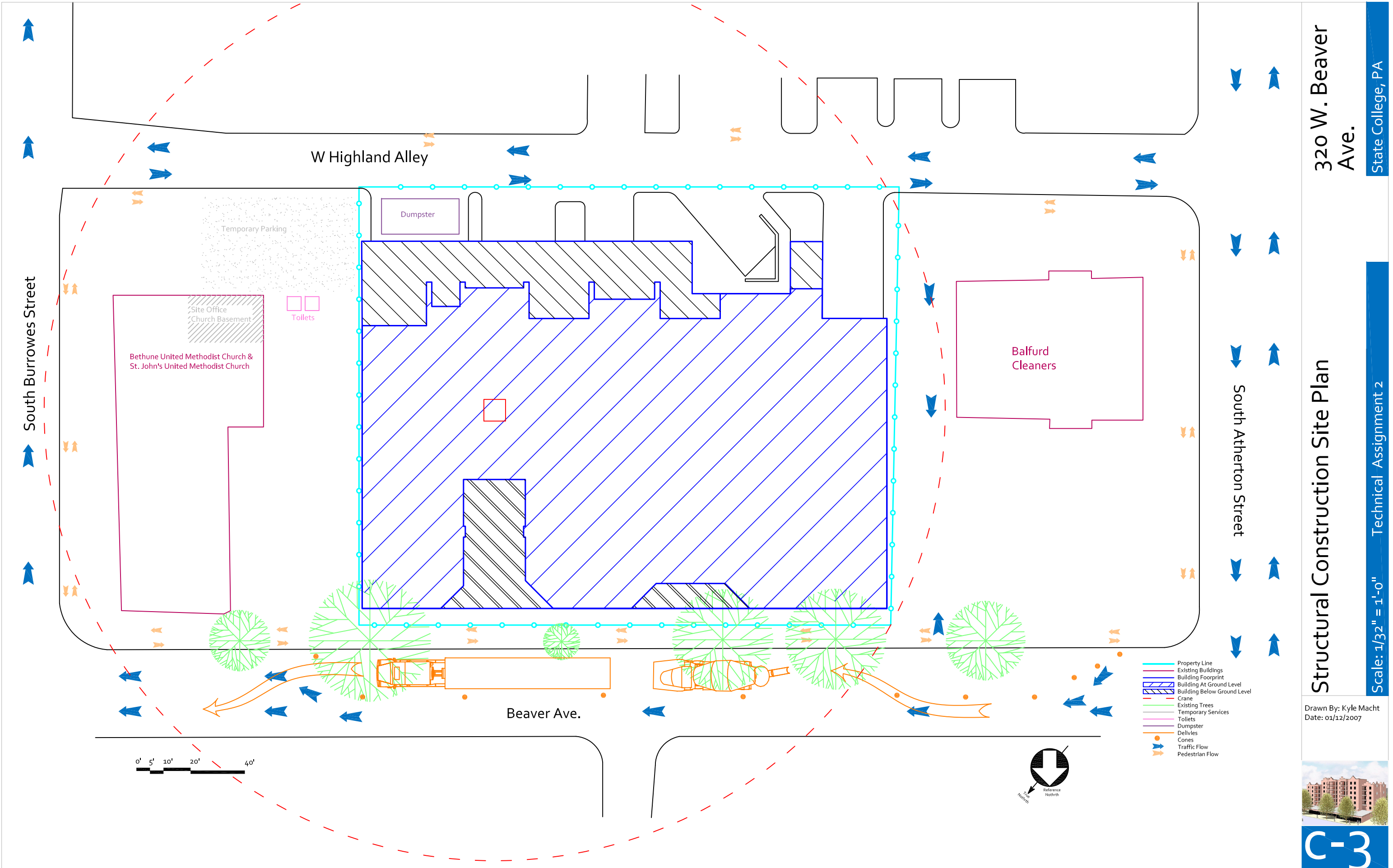
State College, PA

Excavation Construction Site Plan

Technical Assignment 2

Drawn By: Kyle Macht
Date: 01/12/2007





- Property Line
- Existing Buildings
- Building Footprint
- Building At Ground Level
- Building Below Ground Level
- Crane
- Existing Trees
- Temporary Services
- Toilets
- Dumpster
- Dellvies
- Cones
- Traffic Flow
- Pedestrian Flow

320 W. Beaver Ave.

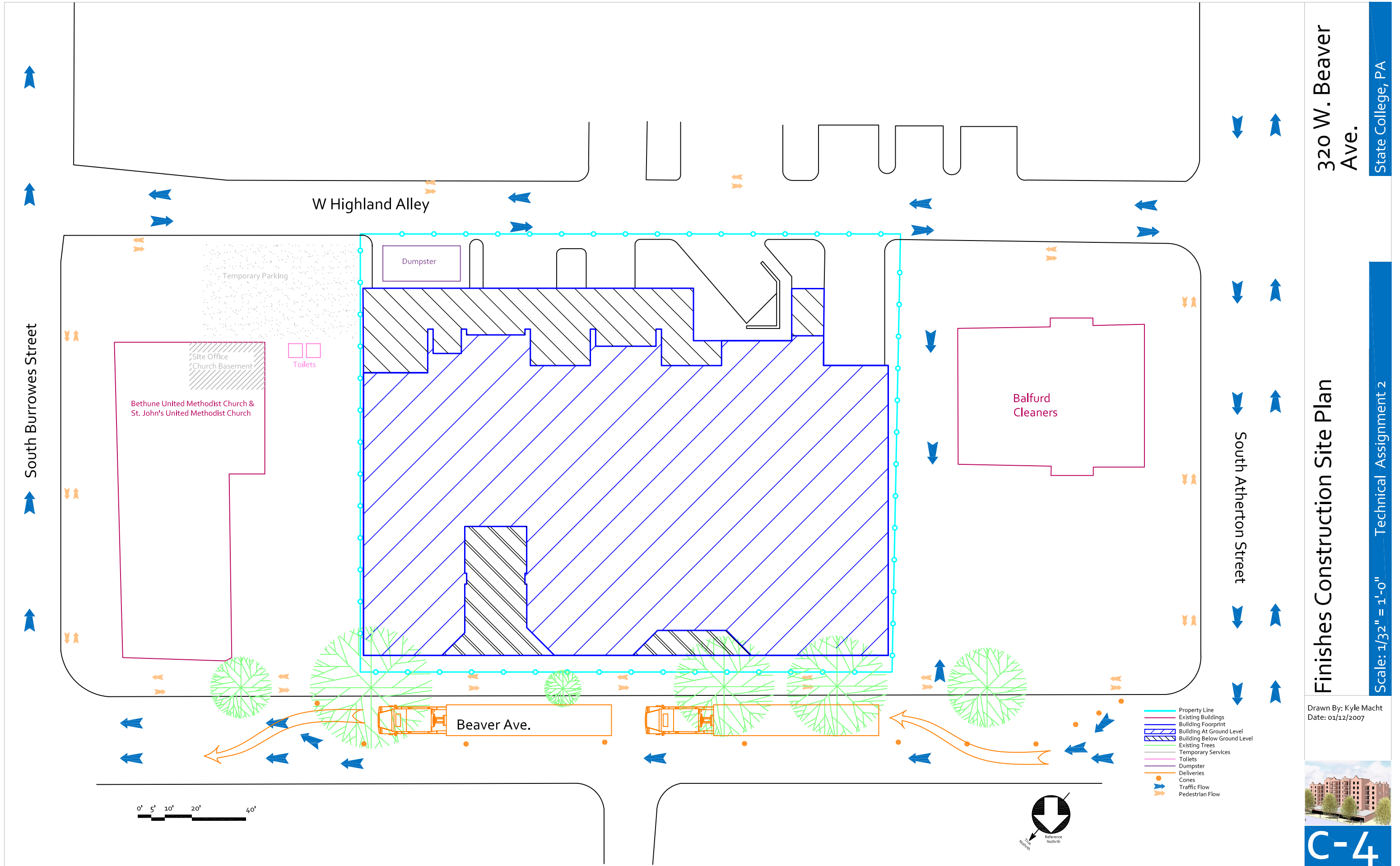
State College, PA

Structural Construction Site Plan

Scale: 1/32" = 1'-0" Technical Assignment 2

Drawn By: Kyle Macht
Date: 01/12/2007





320 W. Beaver Ave.

State College, PA

Finishes Construction Site Plan

Scale: 1/32" = 1'-0" Technical Assignment 2

Drawn By: Kyle Macht
Date: 01/12/2007



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Appendix D: Mechanical Assemblies Estimate							
			Unit Cost		Total Cost		
	#	Units	Material Unit Cost	Labor Unit Cost	Material Cost	Labor Cost	Total
2 BR Apartment							
Heat Pump	1	Each	\$2,350.00	\$1,050.00	\$2,350.00	\$1,050.00	\$3,400.00
14" Flex Duct	6	Feet	\$3.30	\$6.49	\$19.80	\$38.94	\$58.74
Ductwork	245	Lb	\$0.46	\$3.21	\$112.70	\$786.45	\$899.15
Diffuser	3	Each	\$37.50	\$21.50	\$112.50	\$64.50	\$177.00
6" EXH Duct	63	Feet	\$3.16	\$2.67	\$199.08	\$168.21	\$367.29
Exhaust Fan	2	Each	\$55.17	\$31.17	\$110.34	\$62.34	\$172.68
Wall Heater	2	Each	\$100.00	\$32.00	\$200.00	\$64.00	\$264.00
Total					\$2,904.42	\$2,170.44	\$5,074.86
Total	55				\$159,743.10	\$119,374.20	\$279,117.30
1 BR Apartment							
Heat Pump	1	Each	\$1,746.00	\$704.00	\$1,746.00	\$704.00	\$2,450.00
14" Flex Duct	4	Feet	\$3.30	\$6.49	\$13.20	\$25.96	\$39.16
Ductwork	80	Lb	\$0.46	\$3.21	\$36.80	\$256.80	\$293.60
Diffuser	2	Each	\$37.50	\$21.50	\$75.00	\$43.00	\$118.00
6" EXH Duct	30	Feet	\$3.16	\$2.67	\$94.80	\$80.10	\$174.90
Exhaust Fan	1	Each	\$55.17	\$31.17	\$55.17	\$31.17	\$86.34
Wall Heater	1	Each	\$100.00	\$32.00	\$100.00	\$32.00	\$132.00
Total					\$2,120.97	\$1,173.03	\$3,294.00
Total	10				\$21,209.70	\$11,730.30	\$32,940.00
Roof Top AC	3	Each	\$4,855.00	\$830.00	\$14,565.00	\$2,490.00	\$17,055.00
Condensing Unit	1	Each	\$3,250.00	\$533.00	\$3,250.00	\$533.00	\$3,783.00
Make Up AHU	1	Each	\$5,983.00	\$270.00	\$5,983.00	\$270.00	\$6,253.00
Electric Wall Heaters	7	Each	\$267.00	\$82.67	\$1,869.00	\$578.69	\$2,447.69
	3	Each	\$400.00	\$124.00	\$1,200.00	\$372.00	\$1,572.00
	1	Each	\$400.00	\$124.00	\$400.00	\$124.00	\$524.00
	2	Each	\$667.00	\$206.67	\$1,334.00	\$413.34	\$1,747.34
Total					\$17,815.00	\$3,023.00	\$33,382.03
Total			Location		0.96		\$437,740.72
			Time		1.32		

Typical Floor (3-6) Structural Cost				Unit Cost			
Type	Quantity	Units	Total SF	Material	Labor	Equipment	Total Cost
8" CMU		SF		\$1.56	\$2.81	\$0.00	\$4.37
	2	505.55	1011.10	\$1,577.32	\$2,841.20	\$0.00	\$4,418.53
	2	259.72	519.44	\$810.32	\$1,459.62	\$0.00	\$2,269.94
	4	61.11	244.46	\$381.36	\$686.93	\$0.00	\$1,068.28
	2	194.45	388.90	\$606.68	\$1,092.80	\$0.00	\$1,699.47
	2	148.61	297.23	\$463.68	\$835.21	\$0.00	\$1,298.89
	1	134.98	134.98	\$210.57	\$379.29	\$0.00	\$589.86
	1	15.97	15.97	\$24.91	\$44.87	\$0.00	\$69.78
	1	61.80	61.80	\$96.41	\$173.66	\$0.00	\$270.08
	1	145.83	145.83	\$227.50	\$409.79	\$0.00	\$637.29
	2	287.16	574.31	\$895.93	\$1,613.82	\$0.00	\$2,509.75
	4	250.70	1002.79	\$1,564.36	\$2,817.84	\$0.00	\$4,382.20
	2	306.59	613.19	\$956.57	\$1,723.06	\$0.00	\$2,679.63
	2	616.67	1233.33	\$1,924.00	\$3,465.67	\$0.00	\$5,389.67
	2	399.05	798.11	\$1,245.05	\$2,242.68	\$0.00	\$3,487.73
	4	250.70	1002.79	\$1,564.36	\$2,817.84	\$0.00	\$4,382.20
	2	297.22	594.44	\$927.32	\$1,670.37	\$0.00	\$2,597.69
	1	157.99	157.99	\$246.46	\$443.95	\$0.00	\$690.41
	2	125.70	251.40	\$392.18	\$706.42	\$0.00	\$1,098.60
	1	79.51	79.51	\$124.04	\$223.42	\$0.00	\$347.46
	1	28.47	28.47	\$44.41	\$80.00	\$0.00	\$124.41
	1	78.47	78.47	\$122.41	\$220.50	\$0.00	\$342.91
	2	258.33	516.67	\$806.00	\$1,451.83	\$0.00	\$2,257.83
	2	116.67	233.33	\$364.00	\$655.67	\$0.00	\$1,019.67
	1	42.36	42.36	\$66.09	\$119.04	\$0.00	\$185.13
Doors RO	2	20.56	41.12	\$64.15	\$115.55	\$0.00	\$179.69
	15	22.22	333.30	\$519.95	\$936.57	\$0.00	\$1,456.52
	6	26.67	160.02	\$249.63	\$449.66	\$0.00	\$699.29
Window RO	1	7.75	7.75	\$12.09	\$21.78	\$0.00	\$33.87
Total			9484.68	\$14,796.10	\$26,651.95	\$0.00	\$41,448.05
10" CMU		SF		\$2.18	\$3.46	\$0.00	\$5.64
Total	1	140.00	140.00	\$305.20	\$484.40	\$0.00	\$789.60
8" Hollow Core Plank		SF		\$5.00	\$0.75	\$0.53	\$6.28
Total		13971.10	13971.10	\$69,855.50	\$10,478.33	\$7,404.68	\$87,738.51
Topping Slab		CY		\$74.00	\$10.15	\$4.70	
Total		91.00	91.00	\$6,734.00	\$923.65	\$427.70	\$8,085.35
Steel		LF		\$12.13	\$3.10	\$2.37	\$17.60
W 8X18	10	8.67	86.67	\$1,051.27	\$268.67	\$205.40	\$1,525.33
W 8X18	10	6.33	63.33	\$768.23	\$196.33	\$150.10	\$1,114.67
Total			150.00	\$1,819.50	\$465.00	\$355.50	\$2,640.00
Total	All 4 Floors			\$98,968.80	\$40,398.32	\$9,254.38	\$562,806.02

Floor 7 Structural Cost				Unit Cost			
Type	Quantity	Units	Total SF	Material	Labor	Equipment	Total Cost
8" CMU		SF		\$1.56	\$2.81	\$0.00	\$4.37
	2	185.33	370.66	\$578.23	\$1,041.55	\$0.00	\$1,619.78
	1	129.58	129.58	\$202.14	\$364.12	\$0.00	\$566.26
	1	15.33	15.33	\$23.91	\$43.08	\$0.00	\$66.99
	1	59.33	59.33	\$92.55	\$166.72	\$0.00	\$259.27
	1	134.67	134.67	\$210.09	\$378.42	\$0.00	\$588.51
	2	275.67	551.34	\$860.09	\$1,549.27	\$0.00	\$2,409.36
	2	592.00	1184.00	\$1,847.04	\$3,327.04	\$0.00	\$5,174.08
	4	240.67	962.68	\$1,501.78	\$2,705.13	\$0.00	\$4,206.91
	2	383.09	766.18	\$1,195.24	\$2,152.97	\$0.00	\$3,348.21
	2	240.67	481.34	\$750.89	\$1,352.57	\$0.00	\$2,103.46
	1	285.33	285.33	\$445.11	\$801.78	\$0.00	\$1,246.89
	1	151.67	151.67	\$236.61	\$426.19	\$0.00	\$662.80
	3	120.67	362.01	\$564.74	\$1,017.25	\$0.00	\$1,581.98
	1	40.33	40.33	\$62.91	\$113.33	\$0.00	\$176.24
	1	71.00	71.00	\$110.76	\$199.51	\$0.00	\$310.27
Doors RO	2	20.56	41.12	\$64.15	\$115.55	\$0.00	\$179.69
	15	22.22	333.30	\$519.95	\$936.57	\$0.00	\$1,456.52
	6	26.67	160.02	\$249.63	\$449.66	\$0.00	\$699.29
Window RO	1	7.75	7.75	\$12.09	\$21.78	\$0.00	\$33.87
Total			5023.26	\$7,836.29	\$14,115.36	\$0.00	\$21,951.65
10" CMU		SF		\$2.18	\$3.46	\$0.00	\$5.64
Total	1	140.00	140.00	\$305.20	\$484.40	\$0.00	\$789.60
8" Hollow Core Plank		SF		\$5.00	\$0.75	\$0.53	\$6.28
	1	13971.10	13971.10	\$69,855.50	\$10,478.33	\$7,404.68	\$87,738.51
	1	7522.00	7522.00	\$37,610.00	\$5,641.50	\$3,986.66	\$47,238.16
Total			21493.10	\$107,465.50	\$16,119.83	\$11,391.34	\$134,976.67
Topping Slab		CY		\$74.00	\$10.15	\$4.70	\$88.85
	1	91.00	91.00	\$6,734.00	\$923.65	\$427.70	\$8,085.35
	1	46.43	46.43	\$3,435.82	\$471.26	\$218.22	\$4,125.31
Total			137.43	\$10,169.82	\$1,394.91	\$645.92	\$12,210.66
Steel		LF		\$12.13	\$3.10	\$2.37	\$17.60
W 8X18	5	8.67	43.33	\$525.63	\$134.33	\$102.70	\$762.67
W 8X18	5	6.33	31.67	\$384.12	\$98.17	\$75.05	\$557.33
Total			75.00	\$909.75	\$232.50	\$177.75	\$1,320.00
Total				\$126,686.56	\$32,347.00	\$12,215.01	\$171,248.57

Floor 2 Structural Cost				Unit Cost			
Type	Quantity	Units	Total SF	Material	Labor	Equipment	Total Cost
Cast in Place		CY		\$134.09	\$97.73	\$12.46	\$244.28
	2	14.30	28.61	\$3,835.85	\$2,795.62	\$356.50	\$6,987.97
	2	7.35	14.70	\$1,970.60	\$1,436.20	\$183.14	\$3,589.95
	4	1.73	6.92	\$927.41	\$675.91	\$86.19	\$1,689.51
	2	5.50	11.00	\$1,475.36	\$1,075.26	\$137.12	\$2,687.75
	2	4.20	8.41	\$1,127.61	\$821.81	\$104.80	\$2,054.22
	1	3.82	3.82	\$512.07	\$373.21	\$47.59	\$932.87
	1	0.45	0.45	\$60.58	\$44.15	\$5.63	\$110.36
	1	1.75	1.75	\$234.46	\$170.88	\$21.79	\$427.13
	1	4.13	4.13	\$553.25	\$403.22	\$51.42	\$1,007.89
	2	8.12	16.25	\$2,178.78	\$1,587.93	\$202.49	\$3,969.20
	4	7.09	28.37	\$3,804.32	\$2,772.64	\$353.56	\$6,930.52
	2	8.67	17.35	\$2,326.26	\$1,695.41	\$216.20	\$4,237.88
	2	17.45	34.89	\$4,678.93	\$3,410.07	\$434.85	\$8,523.84
	2	11.29	22.58	\$3,027.80	\$2,206.70	\$281.40	\$5,515.90
	4	7.09	28.37	\$3,804.32	\$2,772.64	\$353.56	\$6,930.52
	2	8.41	16.82	\$2,255.13	\$1,643.57	\$209.59	\$4,108.29
	1	4.47	4.47	\$599.37	\$436.83	\$55.70	\$1,091.90
	2	3.56	7.11	\$953.73	\$695.09	\$88.64	\$1,737.45
	1	2.25	2.25	\$301.64	\$219.84	\$28.03	\$549.51
	1	0.81	0.81	\$108.00	\$78.71	\$10.04	\$196.75
	1	2.22	2.22	\$297.69	\$216.96	\$27.67	\$542.31
	2	7.31	14.62	\$1,960.09	\$1,428.54	\$182.17	\$3,570.80
	2	3.30	6.60	\$885.20	\$645.15	\$82.27	\$1,612.62
	1	1.20	1.20	\$160.72	\$117.13	\$14.94	\$292.79
Doors RO	2	0.58	1.16	\$156.00	\$113.69	\$14.50	\$284.19
	15	0.63	9.43	\$1,264.45	\$921.55	\$117.52	\$2,303.51
	6	0.75	4.53	\$607.07	\$442.44	\$56.42	\$1,105.93
Window RO	1	0.22	0.22	\$29.40	\$21.43	\$2.73	\$53.56
Total			268.34	\$35,982.26	\$26,224.36	\$3,344.11	\$65,550.73
10" CMU		SF		\$2.18	\$3.46	\$0.00	\$5.64
Total	1	140.00	140.00	\$305.20	\$484.40	\$0.00	\$789.60
8" Precast Planks		SF		\$5.00	\$0.75	\$0.53	\$6.28
Total		13971.10	13971.10	\$69,855.50	\$52,391.63	\$27,767.56	\$150,014.69
Topping Slab		CY		\$74.00	\$10.15	\$4.70	
Total		91.00	91.00	\$6,734.00	\$923.65	\$427.70	\$8,085.35
Steel		LF		\$12.13	\$3.10	\$2.37	\$17.60
W 8X18	10	8.67	86.67	\$1,051.27	\$268.67	\$205.40	\$1,525.33
W 8X18	10	6.33	63.33	\$768.23	\$196.33	\$150.10	\$1,114.67
Total			150.00	\$1,819.50	\$465.00	\$355.50	\$2,640.00
Total				\$114,696.46	\$80,489.03	\$31,894.87	\$227,080.36

Footers				Unit Cost			
Spread	CY			\$92.00	\$40.00	\$0.44	\$132.44
	32	7.88	252.16	\$23,198.72	\$708.57	\$0.00	\$23,907.29
Strip Edge	CY			\$92.50	\$52.50	\$0.58	\$145.58
Footer	1	237.00	237.00	\$21,922.50	\$12,442.50	\$137.46	\$34,502.46
Strip Interior	CY			\$29.78	\$25.74	\$0.00	\$55.52
Footer 5'X1'8"	1	92.00	92.00	\$2,739.76	\$2,368.08	\$0.00	\$5,107.84
Strip Interior	CY			\$11.26	\$14.54	\$0.00	\$25.80
Footer 2'X1'	1	9.00	9.00	\$9,461.40	\$2,418.00	\$1,848.60	\$13,728.00
Strip Interior	CY			\$92.50	\$52.50	\$0.58	\$145.58
Footer 3'X1'	1	16.50	16.50	\$1,526.25	\$866.25	\$9.57	\$2,402.07
Total				\$58,848.63	\$18,803.40	\$1,995.63	\$79,647.66
Parking Garage							
Exterior Wall	CY			\$149.00	\$219.00	\$26.50	\$394.50
	1	481.00	481.00	\$71,669.00	\$105,339.00	\$12,746.50	\$189,754.50
Slab on Grade	SF			\$1.15	\$0.55	\$0.01	\$1.71
	1	25711.00	25711.00	\$29,567.65	\$14,141.05	\$257.11	\$43,965.81
Precast Panels				\$5.00	\$0.75	\$0.53	\$6.28
	1	26730.00	26730.00	\$133,650.00	\$20,047.50	\$14,166.90	\$167,864.40
1st Level							
Interior Walls							
1'-4"	CY			\$139.00	\$54.00	\$6.95	\$199.95
	8	22.76	182.08	\$25,309.12	\$9,832.32	\$1,265.46	\$36,406.90
1'-0"	CY			\$158.00	\$91.50	\$11.70	\$261.20
	1	0.46	0.46	\$72.68	\$42.09	\$5.38	\$120.15
	1	3.88	3.88	\$613.04	\$355.02	\$45.40	\$1,013.46
	1	0.08	0.08	\$12.64	\$7.32	\$0.94	\$20.90
	1	1.51	1.51	\$238.58	\$138.17	\$17.67	\$394.41
	2	0.44	0.88	\$139.04	\$80.52	\$10.30	\$229.86
	2	0.93	1.86	\$293.88	\$170.19	\$21.76	\$485.83
	1	0.94	0.94	\$148.52	\$86.01	\$11.00	\$245.53
Total	2.80			\$1,518.38	\$879.32	\$112.44	\$2,510.13
Columns	CY			\$139.00	\$91.50	\$11.70	\$242.20
1'-4"	16	2.46	39.36	\$5,471.04	\$3,601.44	\$460.51	\$9,532.99
CMU Walls 8"	CY			\$1.56	\$2.81	\$0.00	\$4.37
	3	9.56	28.68	\$44.74	\$80.59	\$0.00	\$125.33
	1	14.21	14.21	\$22.17	\$39.93	\$0.00	\$62.10
	1	19.00	19.00	\$29.64	\$53.39	\$0.00	\$83.03
	1	20.00	20.00	\$31.20	\$56.20	\$0.00	\$87.40
	1	5.83	5.83	\$9.09	\$16.38	\$0.00	\$25.48
	1	13.11	13.11	\$20.45	\$36.84	\$0.00	\$57.29
Total	18.94			\$157.29	\$283.33	\$0.00	\$440.63

T Beams	LF			\$147.80	\$11.47	\$0.00	\$159.27
	1	1348.19	1348.19	\$199,262.48	\$15,463.74	\$0.00	\$214,726.22
1'-0"	CY			\$158.00	\$91.50	\$11.70	\$261.20
	1	484.00	484.00	\$76,472.00	\$44,286.00	\$5,662.80	\$126,420.80
Total				\$86.13	\$13.25	\$7.07	\$840,072.40
Commercial				Unit Cost			
Precast Panels	SF			\$5.00	\$0.75	\$0.53	\$6.28
	1	6980.00	6980.00	\$34,900.00	\$5,235.00	\$3,699.40	\$43,834.40
	1	6365.86	6365.86	\$31,829.30	\$4,774.40	\$3,373.91	\$39,977.60
Total		13345.86		\$343,038.46	\$70,196.28	\$7,073.31	\$83,812.00
Slab on Grade	CY			\$84.50	\$43.00	\$0.58	\$128.08
	1	18.00	18.00	\$1,521.00	\$774.00	\$10.44	\$2,305.44
Columns	CY			\$139.00	\$54.00	\$6.95	\$199.95
1'-4"	2	2.28	4.56	\$633.84	\$246.24	\$31.69	\$911.77
Strip Footer	CY			\$92.50	\$52.50	\$0.58	\$145.58
3'X1'	1	16.50	16.50	\$1,526.25	\$866.25	\$9.57	\$2,402.07
Spread Footings	CY			\$92.00	\$40.00	\$0.44	\$132.44
	8	12.77	102.16	\$9,398.72	\$4,086.40	\$44.95	\$13,530.07
Strip Footer	CY			\$11.26	\$14.50	\$0.00	\$25.76
2'X1'	1	18.00	18.00	\$202.68	\$261.00	\$0.00	\$463.68
Footers	CY			\$84.50	\$43.00	\$0.58	\$128.08
	1	18.00	18.00	\$1,521.00	\$774.00	\$10.44	\$2,305.44
CMU Walls	SF			\$1.56	\$2.81	\$0.00	\$4.37
	1	927.00	927.00	\$1,446.12	\$2,604.87	\$0.00	\$4,050.99
Steel	LF			\$23.50	\$2.29	\$1.75	\$27.54
W12X35	1	20.00	20.00	\$470.00	\$45.80	\$35.00	\$550.80
Steel	Each			\$660.00	\$38.50	\$29.50	\$728.00
HSS 12X8X5/8	1	8.00	8.00	\$5,280.00	\$308.00	\$236.00	\$5,824.00
Steel	Lb			\$0.43	\$0.38	\$0.00	\$0.81
L6X6X5/8	1	4646.40	4646.40	\$1,997.95	\$1,765.63	\$0.00	\$3,763.58
Total				\$49,703.49	\$12,242.89	\$3,806.49	\$119,919.85

Total	Time Factor	\$0.96	\$2,535,381.89
	Location Factor	\$1.32	

Appendix F: General Conditions Estimate					
Item	Quantity	Amount	Unit Cost	Units	Total
Staff					
VP of Operations	1	10.00	\$1,950.00	/wk	\$19,500.00
General Superintendent	1	5.00	\$1,910.00	/wk	\$9,550.00
Project Manager	1	70.00	\$1,620.00	/wk	\$113,400.00
Project Engineer	1	70.00	\$1,125.00	/wk	\$78,750.00
Superintendent	1	60.00	\$1,300.00	/wk	\$78,000.00
Estimator	1	5.00	\$1,430.00	/wk	\$7,150.00
Field Engineer	1	10.00	\$850.00	/wk	\$8,500.00
Total					\$314,850.00
General Site Work					
Dumpster	1	20.00	\$425.00	each	\$8,500.00
Final Cleanup	1	13300.00	\$0.10	SF	\$1,330.00
Safety Rails	6	384.00	\$2.50	LF	\$5,760.00
Fire Extinguisher	5	1.00	\$65.00	each	\$325.00
Site Fence	1	720.00	\$5.00	LF	\$3,600.00
Total					\$19,515.00
Temporary Utilities					
Electrical Connection	1	1.00	\$3,000.00	each	\$3,000.00
Electrical Monthly Rate	1	76.00	\$400.00	/wk	\$30,400.00
Telephone Service	1	76.00	\$45.00	/wk	\$3,420.00
Cell Phone	3	76.00	\$60.00	/wk	\$13,680.00
Water	1	76.00	\$10.00	/wk	\$760.00
Sanitary Facilities	2	76.00	\$30.00	/mo	\$4,560.00
Total					\$55,820.00
Temporary Facilities					
Computer	2	76.00	\$17.00	/wk	\$2,584.00
Internet	1	17.00	\$50.00	/mo	\$850.00
Printer / Scanner / Fax	1	1.00	\$100.00	each	\$100.00
Walkie Talkies	4	1.00	\$25.00	each	\$100.00
Office Expenses	1	76.00	\$20.00	/wk	\$1,520.00
Total					\$5,154.00
Total					\$395,339.00