Project X
NYC, NY

Luke Gray

Construction Management

Technical Report 2

Consultant: Dr. Rob Leicht

October 31, 2010

LUKE GRAY
CONSTRUCTION MANAGEMENT

PROJECT X

NEW YORK

MECHANICAL, ELECTRICAL, LIGHTING

MECHANICAL-AHU'S RANGING FROM 8650-6300CFM ON EACH FLOOR, SUPPLEMENTARY HYDRONIC FIN TUBE BASEBOARD RADIATION ALONG THE PERIMETER

ELECTRICAL-POWER IS DISTRIBUTED WITH 208/120V, 3-PHASE , 4 WIRE PANELS ON EACH FLOOR; DRY TYPE TRANSFORMER

LIGHTING-THERE ARE MANY TYPES LAMPS USED WITHIN THE BUILDING INCLUDING FLUORESCENT, INCANDESCENT, METAL HALIDE, H.I.D. FIXTURES. THE EMERGENCY LIGHTING FOR THE BUILDING IS SUPPLIED BY FLUORESCENT FIXTURES WITH A 90 MINUTE EMERGENCY BATTERY PACK.

ARCHITECTURAL & STRUCTURAL

FOUNDATION-REINFORCED MAT SLAB
10" DEEP TWO-WAY FLOOR SLAB
COLUMN LAYOUT 24' X 24'
THE EXTERIOR WALLS NATURAL BRICK WITH THREE CURTAIN WALL SLOTS TO BREAK UP THE BRICK FACADE THAT BLENDS SEAMLESSLY INTO THE SURROUNDING HISTORICALLY RICH TOWN-HOUSES
THERE ARE THREE LEVELS OF 12" INTENSIVE GREEN ROOFS

CM-SKANSKA
ARCHITECT-MA ARCHITECTS
STRUCTURAL-ROBERT SILMAN
MECHANICAL-FMC ASSOCIATES
LIGHTING-RS LIGHTING DESIGN
DURATION-AUGUST 2008-JULY 2010
SIZE-54,640SF
BUILDING USE-OFFICES & THEATRE

HTTP://WWW.ENGR.PSU.EDU/AE/THESIS/PORTFOLIOS/2011/LAG290/INDEX.HTML

Executive Summary

Technical report two consists of an extensive schedule and structural cost analysis of Project X. This report includes a detailed project schedule, a site logistic plan, a structural estimate, and general conditions estimate.

The detailed schedule was organized by trade in order to identify gaps in the schedule that can be eliminated in the individual trades to decrease the schedule.

The site logistics identifies the congestion of working in a city location. The site does not offer the subcontractors potential for material storage. Thus, each contractor had to coordinate each delivery to arrive precisely on the day the material was required. Another important lesson learned was the obstacles of getting Department of Transportation approval to close down one of the traffic lanes in order to provide adequate room for material delivery, dumpsters, and crane space.

A Revit Structures three dimensional model was constructed to quantify the concrete needed for the structure. The Revit model does not take into account the concrete in monolithic columns passing through slabs and foundation walls. This is a very important point when considering using Revit for material takeoff. Special attention must be paid to how the model was constructed by the estimator. Further research is needed to discover other materials that might have similar exclusions when doing material takeoffs from Revit. This can prove to be a vital consideration when constructing an estimate for a hard bid project.

The total structural steel and concrete estimate is $2,595,265. The total general conditions estimate is $1,704,019 and $77,455 per month based on a 22 week construction schedule. The general conditions estimate includes the staffing and general condition items. RS Means 2008 Cost works was used for the structural and general conditions estimate.

The new building will serve the community as a playhouse, office support space, as well as university office space. The site rests in a community with rich historical brick building. At the playhouse many special measures were taken to restore the historical features of the building the entrance doors, entrance canopy, masonry facade, signage, and lighting. Understanding the historical requirements upheld by the Greenwich District community was vital to ensuring successful project completion.

The existing four story 33,000SF building consists of four separate townhouses that were merged together during the 1940’s. The building has historical and cultural significance in that it houses a 4,400SF playhouse on the ground and basement levels which is scheduled to remain. As part of the project, the interior of the theater will be demolished and rebuilt. Collaboration between the construction manager, architect, surveyor, and engineers was very important to the conservation of the existing walls.

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A. Detailed Project Schedule

The procurement phase consists of a variety of activities. Since design decisions were madeduring the construction process, the procurement phase of construction was extended, because the project is a fast-track project. The procurement stages includes: prepare bidders list, review of bid documents, owner review, finalize bidders, bid period, evaluation of bidder, owner approval of bidders, and awarding subcontractor.

Throughout the construction process there were many complicated hurdles to overcome, for example, the demolition phase which lasted 31 weeks. This phase was extensive, because there were many requirements by New York City Department of Building, Department of Transportation, protective measures taken to protect adjacent structures, a protective walkway, and scaffolding for the alley. The demolition progressed linearly from the Roof Parapet to the 1st floor with duration of 60 days. The longest phase was the demolition of the 2nd floor, which lasted 26 days. This was needed to allow the tradesmen time to demo around theatres walls by hand demolition, which remained in place. In addition, the south and north adjacent buildings needed to be braced.

Excavation and foundations were a great engineering feat. Underpinning and footing heel blocks were needed to ensure there was no settlement of the playhouse's existing brick walls. Other measures included: sheeting and tie backs, addition underpinning of adjacent structures, and installation of a dewatering system. The primary new foundation system is a mat slab. From the foundation stage the project progressed into the building frame and exterior frame.

A Cast-in-place concrete frame supports the 10" two-way concrete slab. The concrete columns and concrete slab were constructed with duration of 5 days per floor. The masonry perimeter walls were laid at a rate of eight days per floor. The concrete superstructure is on the critical path to completion. Since, the superstructure was poured from October to February 24/7 temporary heat was needed to ensure a timely curing of the concrete. Temporary heat was also needed for the building finishes. Following the superstructure on the critical path to completion is the MEP and interior fit out.

The Cellar, Basement and First Floor all have the same square footage. The only difference is there is a telephone closet consisting of Backer Boards, panel boxes for electrical room, and electrical closet for distribution panels on the Cellar Floor. The Second Floor had very similar workflow and durations; therefore only a detailed Second Floor schedule is shown in the detailed schedule. The trades are separated in the schedule to show gaps in the trades that can be clearly identified thereby allowing for compression of the schedule.

B. Site Logistic Plan

The Project was divided into three primary phases. These three phases are illustrated in Figure 1

Stage 1: 5/15/09-9/1/09 this phase include the below grade activities of the demolition, excavation, and foundations.

Stage 2: 9/1/09-5/1/10 this phase includes the building frame, exterior façade, site preparation, site finishes, and interior fit-out.

Stage 3: 10/14/09-10/16/09 this phase is when the domestic water tie was made.

5/12/10-5/15/10 during this time period new sidewalks were poured, trees were planted,

Stage 2 was chosen because it had the most activities due to the numerous trades involved. The building height required trash chutes to be utilized; these were maintained by Skanska throughout the construction. The building consists of 4 segments of brick walls which were laid on the two segments on the outer most north and south first. In order to accommodate the loading of material for the interior fit-out, this is shown in Figure3.

1. The material loading was between columns 6-8 shown on Figure 3 in blue from 11/1/09 to 2/1/10.
2. The material loading was between columns 5-6 shown on Figure 3 in green from 2/1/10 to 2/15/10.
3. The material loading was between columns 6-8 using selected windows only shown on Figure 3 in orange from 2/15/10 to4/1/10.

One of the lanes on a two way street was closed during the construction to allow for deliveries to be made on a daily basis. Throughout the duration of the construction a crawler crane was used extensively. This crawler crane was placed on the closed traffic lane. The crawler crane was used from the start of construction until the interior finishes activities started. This required a construction barricade to be constructed to allow for construction deliveries and a path for the crane to move. During nonworking hours a pedestrian walk with overhead protection passed in between the barricade and the building footprint.

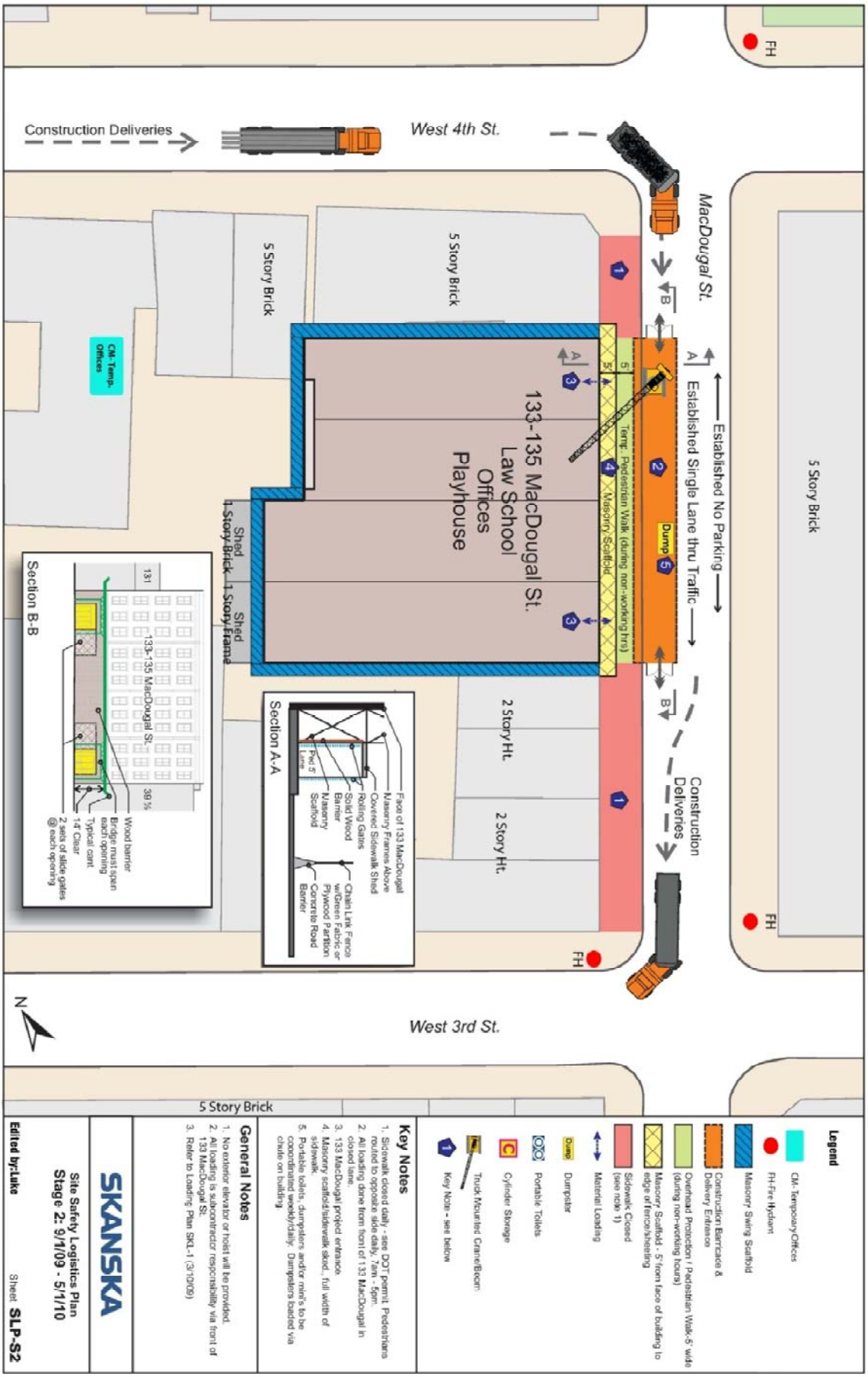


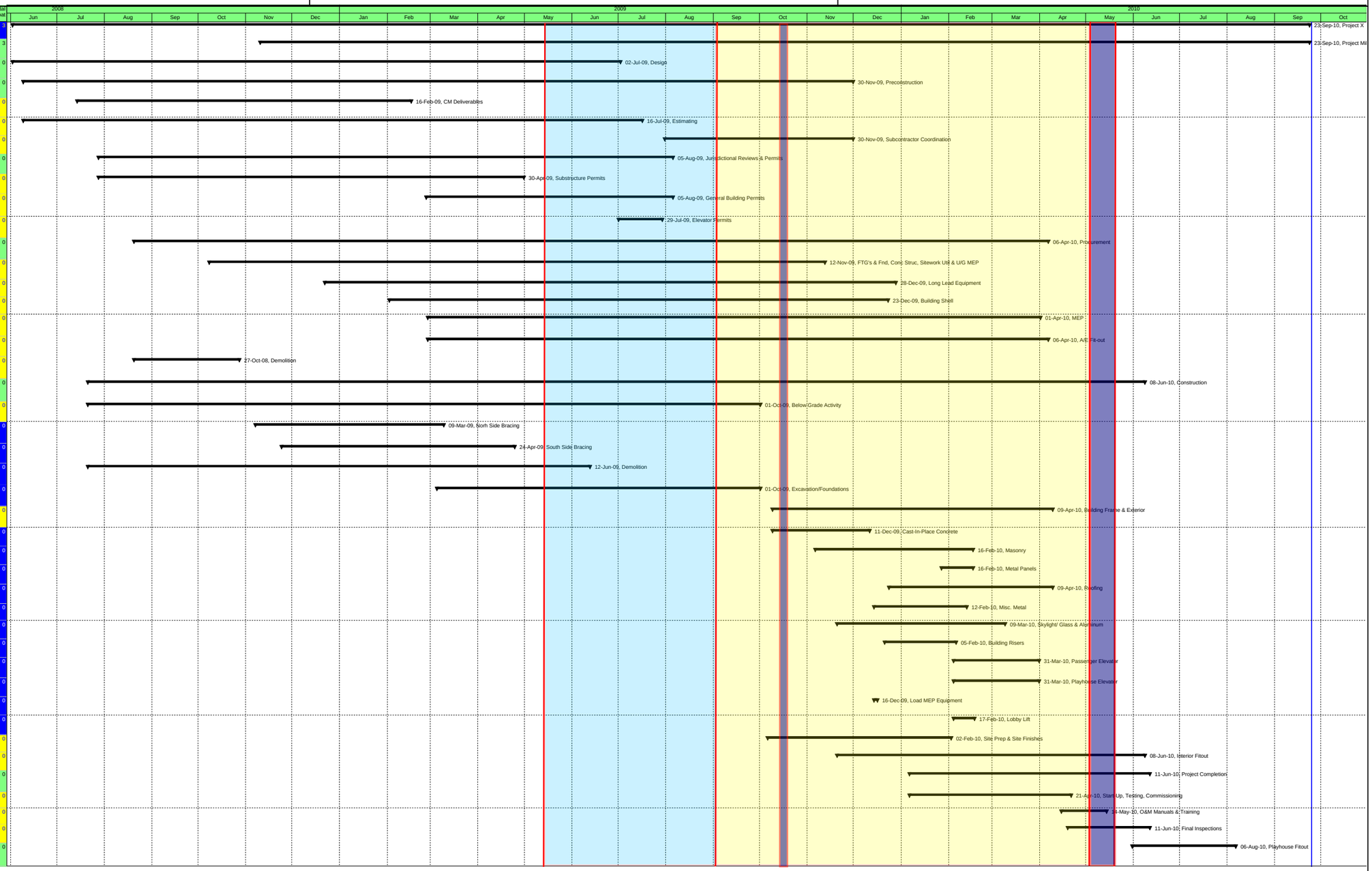
Figure 1: Shows the Site Logistic Plan for Stage 2

Figure 2: Shows the Site Logistic Plan for the East Elevation

Figure 4: Illustrates the Material Loading Entrance of the building

Project X | Classic WBS Layout | 27-Sep-10 14:36

Activity ID	Activity Name	Remaining Duration	Start	Finish	Total Float
Project X		604	02-Jun-08	23-Sep-10	3
Project Milestones		489	10-Nov-08	23-Sep-10	3
Design		284	02-Jun-08	02-Jul-09	0
Preconstruction		386	09-Jun-08	30-Nov-09	0
CM Deliverables		156	14-Jul-08	16-Feb-09	0
Estimating		289	09-Jun-08	16-Jul-09	0
Subcontractor Coordination		87	31-Jul-09	30-Nov-09	0
Jurisdictional Reviews &...		268	28-Jul-08	05-Aug-09	0
Substructure Permits		199	28-Jul-08	30-Apr-09	0
General Building Permits		115	26-Feb-09	05-Aug-09	0
Elevator Permits		21	01-Jul-09	29-Jul-09	0
Procurement		425	20-Aug-08	06-Apr-10	0
FTG's & Fnd, Conc Struc, Sit...		287	06-Oct-08	12-Nov-09	0
Long Lead Equipment		266	22-Dec-08	28-Dec-09	0
Building Shell		233	02-Feb-09	23-Dec-09	0
MEP		285	27-Feb-09	01-Apr-10	0
A/E Fit-out		288	27-Feb-09	06-Apr-10	0
Demolition		49	20-Aug-08	27-Oct-08	0
Construction		492	21-Jul-08	08-Jun-10	0
Below Grade Activity		314	21-Jul-08	01-Oct-09	0
North Side Bracing		87	07-Nov-08	09-Mar-09	0
South Side Bracing		110	24-Nov-08	24-Apr-09	0
Demolition		235	21-Jul-08	12-Jun-09	0
Excavation/Foundations		151	05-Mar-09	01-Oct-09	0
Building Frame & Exterior		131	09-Oct-09	09-Apr-10	0
Cast-In-Place Concrete		46	09-Oct-09	11-Dec-09	0
Masonry		73	06-Nov-09	16-Feb-10	0
Metal Panels		15	27-Jan-10	16-Feb-10	0
Roofing		77	24-Dec-09	09-Apr-10	0
Misc. Metal		45	14-Dec-09	12-Feb-10	0
Skylight/ Glass & Aluminum		78	20-Nov-09	09-Mar-10	0
Building Risers		35	21-Dec-09	05-Feb-10	0
Passenger Elevator		40	04-Feb-10	31-Mar-10	0
Playhouse Elevator		40	04-Feb-10	31-Mar-10	0
Load MEP Equipment		3	14-Dec-09	16-Dec-09	0
Lobby Lift		10	04-Feb-10	17-Feb-10	0
Site Prep & Site Finishes		86	06-Oct-09	02-Feb-10	0
Interior Fitout		143	20-Nov-09	08-Jun-10	0
Project Completion		113	06-Jan-10	11-Jun-10	0
Start-Up, Testing, Commissi...		76	06-Jan-10	21-Apr-10	0
O&M Manuals & Training		22	15-Apr-10	14-May-10	0
Final Inspections		40	19-Apr-10	11-Jun-10	0
Playhouse Fitout		50	31-May-10	06-Aug-10	0



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

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TASK filter: All Activities

C. Detailed Structural Systems Estimate

Summary of Detailed Structural Estimate	
BEAMS	$ 45,754.77
STRUCTURAL STEEL	$ 50,650.78
COLUMNS	$ 309,425.00
COLUMNS (For BUTRICES TO EXISTING MASONRY WALL	$ 3,891.60
ELEVATED SLABS	$ 1,445,630.97
SLAB ON GRADE	$ 10,596.01
FOUNDATION MAT SLAB	$ 474,486.75
FOUNDATION WALLS	$ 205,286.79
FOUNDATION FOOTINGS	$ 30,129.12
FOUNDATIONS GRADE BEAMS	$ 19,414.15
Total	$ 2,595,265.94

Table 1: Shows the Summary of the Detailed Structural Estimate

A Revit Structures model was constructed to provide the quantity takeoffs. The model can give the construction team a very clear idea of the three dimensional properties of the structure. The columns takeoff of concrete does not include the quantity of concrete that pass through the slabs in monolithic columns. Also the concrete columns that pass through the foundation walls is included in the foundation walls' quantity of concrete and is not included in the columns' quantities; this is shown visually in Figure 6 the column schedule produced by Revit.

Exclusions and Assumptions:

- Stud rails
- Mechanical Shaft openings
- Underpinning with tiebacks of Adjacent and Existing Structure
- Tie backs
- Structural steel required to temporary brace existing masonry walls during construction
- Retaining walls
- Excavation costs
- Waterproofing membrane
- Concrete Stairwells
- Sleeves for conduct and water holes

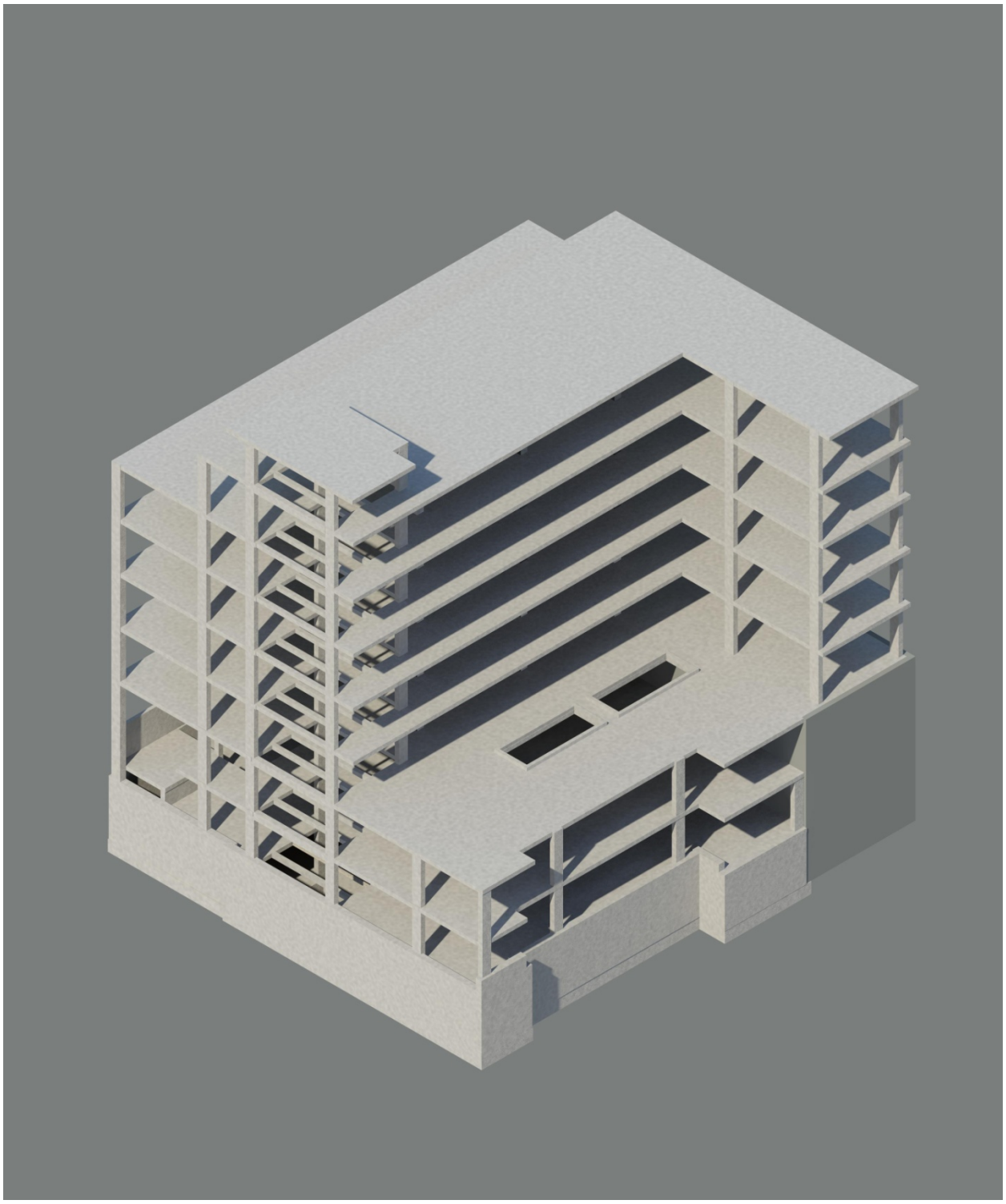


Figure 4: Shows the Three Dimensional Model of the Revit Structures Model

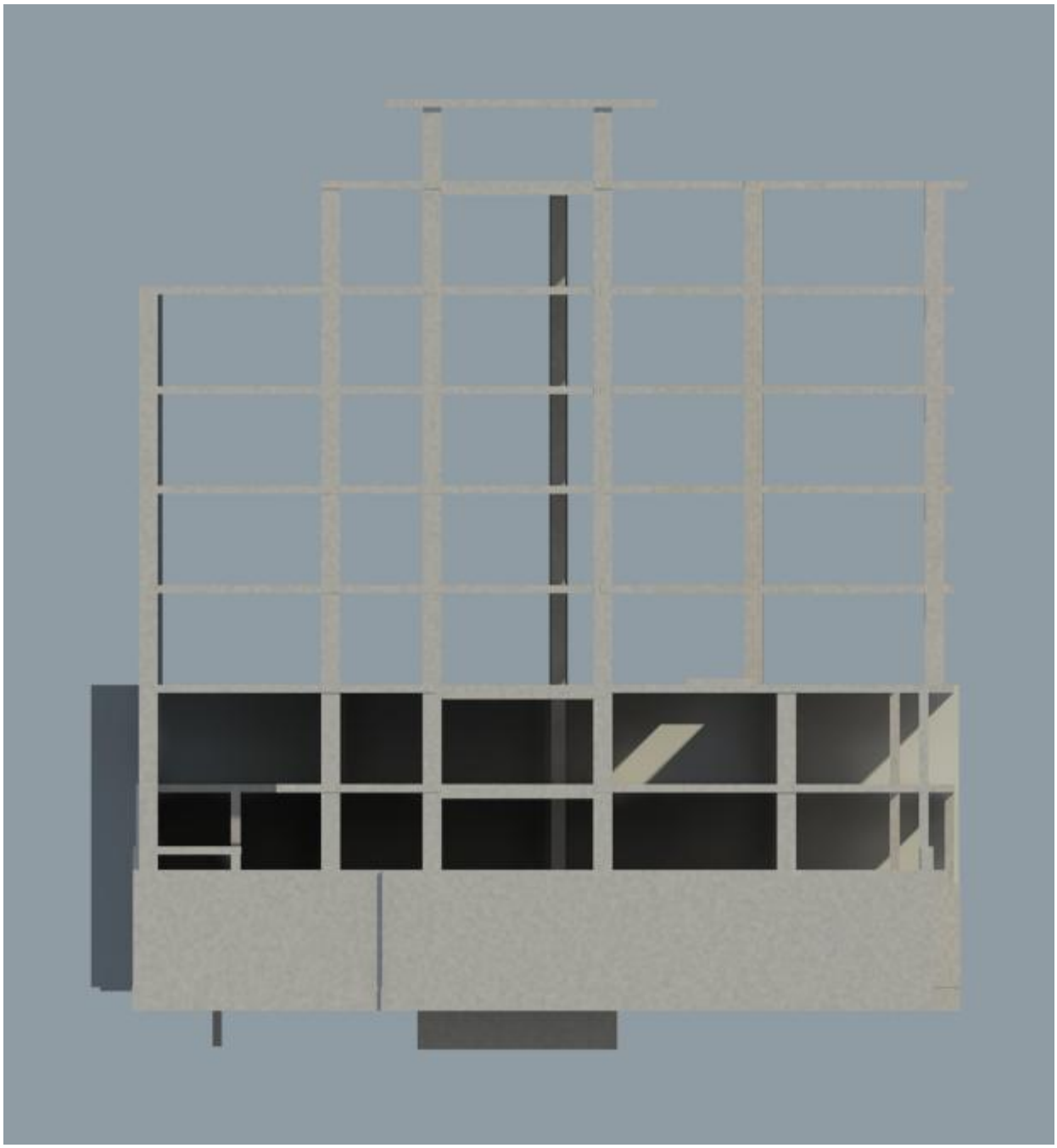


Figure 5: Shows the East Elevation of the Revit Structures Model

Luke Gray
NYC **New York** **10012**
Data Release : Year 2008 Quarter 1
Labor Type: Standard Union

Unit Cost Estimate

Quantity	LineNumber	Source	SubContra	Description	Crew	Daily Output	Labor Hours	Unit	Mat. O&P	Labor O&P	Equip. O&P	Total O&P	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
BEAMS				**$ 45,754.77**												
1126	031113202050			C.I.P. concrete forms, beams and girders, interior, plywood, 12" wide, 2 use, includes shoring, erecting, bracing, stripping and cleaning	C2	340	0.14	SFCA	$ 2.52	$ 15.68	$ -	$ 18.20	$ 2,837.52	$ 17,655.68	$ -	$ 20,493.20
335.2	031113202550			C.I.P. concrete forms, beams and girders, interior, plywood, 24" wide, 2 use, includes shoring, erecting, bracing, stripping and cleaning	C2	365	0.132	SFCA	$ 1.88	$ 14.62	$ -	$ 16.50	$ 630.18	$ 4,900.62	$ -	$ 5,530.80
26.922	033105700050			Structural concrete, placing, beam, small, elevated, pumped, includes vibrating, excludes material	C20	60	1.067	C.Y.	$ -	$ 93.95	$ 16.54	$ 110.49	$ -	$ 2,529.32	$ 445.29	$ 2,974.61
26.922	33105350400			Structural concrete, ready mix, normal weight, 5000 psi, includes local aggregate, sand, portland cement and water, delivered, excludes all additives and treatments				C.Y.	$ 129.72	$ -	$ -	$ 129.72	$ 3,492.32	$ -	$ -	$ 3,492.32
2.514044	032110600100			Reinforcing steel, in place, beams and girders, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4 Rodm	1.6	20	Ton	$ 1,164.40	$ 2,770.60	$ -	$ 3,935.00	$ 2,927.35	$ 6,965.41	$ -	$ 9,892.76
1.196748	032110600150			Reinforcing steel, in place, beams and girders, #8 to # 18, A615, grade 60, incl labor for accessories, excl material for accessories	4 Rodm	2.7	11.852	Ton	$ 1,164.40	$ 1,652.47	$ -	$ 2,816.87	$ 1,393.49	$ 1,977.59	$ -	$ 3,371.08
STRUCTURAL STEEL				**$ 50,650.78**												
870.8	051223400600			Channel framing, structural steel, 8" and larger, field fabricated, incl cutting & welding	E3	500	0.048	Lb.	$ 0.80	$ 5.69	$ 0.34	$ 6.83	$ 696.64	$ 4,954.85	$ 296.07	$ 5,947.56
5422	051223400400			Angle framing, structural steel, 4" and larger, field fabricated, incl cutting & welding	E3	440	0.055	Lb.	$ 0.77	$ 6.47	$ 0.38	$ 7.62	$ 4,174.94	$ 35,080.34	$ 2,060.36	$ 41,315.64
17.5	051223750300			Structural steel member, 100-ton project, 1 to 2 story building, W8x10, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	600	0.093	L.F.	$ 14.64	$ 10.15	$ 3.33	$ 28.12	$ 256.20	$ 177.63	$ 58.28	$ 492.10
63	051223750700			Structural steel member, 100-ton project, 1 to 2 story building, W10x22, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	600	0.093	L.F.	$ 32.48	$ 10.15	$ 3.33	$ 45.96	$ 2,046.24	$ 639.45	$ 209.79	$ 2,895.48
COLUMNS				$ 309,425.00												
158.5	033053400920			Structural concrete, in place, column, square, avg reinforcing, 24" x 24", includes forms(4 uses), reinforcing steel, and finishing	C14A	17.71	11.293	C.Y.	$ 486.45	$ 1,194.08	$ 54.57	$ 1,735.10	$ 77,102.33	$ 189,261.68	$ 8,649.35	$ 275,013.35
15	033053400820			Structural concrete, in place, column, square, avg reinforcing, 16" x 16", includes forms(4 uses), reinforcing steel, and finishing	C14A	12.57	15.911	C.Y.	$ 540.50	$ 1,676.98	$ 76.63	$ 2,294.11	$ 8,107.50	$ 25,154.70	$ 1,149.45	$ 34,411.65
COLUMNS (For BUTRICES TO EXISTING MASONRY WALL				$ 3,891.60												
120	036305101530			Chemical anchoring, for fastener 3/4" diam x 6" embedment, incl epoxy cartridge, excl layout, drilling & fastener	2 Skwk	72	0.222	Ea.	$ 7.20	$ 25.23	$ -	$ 32.43	$ 864.00	$ 3,027.60	$ -	$ 3,891.60
ELEVATED SLABS				$ 1,445,630.97												

1420	033105350400			Structural concrete, ready mix, normal weight, 5000 psi, includes local aggregate, sand, portland cement and water, delivered, excludes all additives and treatments				C.Y.	$ 129.72	$ -	$ -	$ 129.72	$ 184,202.40	$ -	$ -	$ 184,202.40
1420	033105701500			Structural concrete, placing, elevated slab, pumped, 6" to 10" thick, includes vibrating, excludes material	C20	160	0.4	C.Y.	$ -	$ 35.12	$ 6.21	$ 41.33	$ -	$ 49,870.40	$ 8,818.20	$ 58,688.60
46004	031113351150			C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	C2	560	0.09	S.F.	$ 1.73	$ 9.52	$ -	$ 11.25	$ 79,586.92	$ 437,958.08	$ -	$ 517,545.00
2904	031113357080			C.I.P. concrete forms, elevated slab, edge forms, 7" to 12" high, 2 use, includes shoring, erecting, bracing, stripping and cleaning	C1	198	0.162	SFCA	$ 0.65	$ 17.51	$ -	$ 18.16	$ 1,887.71	$ 50,851.96	$ -	$ 52,739.67
3485	031113358000			C.I.P. concrete forms, elevated slab, perimeter deck and rail, straight, includes shoring, erecting, bracing, stripping and cleaning	C1	90	0.36	L.F.	$ 16.29	$ 38.48	$ -	$ 54.77	$ 56,770.65	$ 134,102.80	$ -	$ 190,873.45
46004	033529300350			Concrete finishing, floors, power screed, bull float, machine float & steel trowel (ride-on)	C10E	4000	0.006	S.F.	$ -	$ 0.54	$ 0.07	$ 0.61	$ -	$ 24,842.16	$ 3,220.28	$ 28,062.44
134.538	032110600400			Reinforcing steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4 Rodm	2.9	11.034	Ton	$ 1,249.60	$ 1,543.62	$ -	$ 2,793.22	$ 168,118.93	$ 207,675.86	$ -	$ 375,794.79
134.538	032110602200			Reinforcing steel, crane cost for handling, minimum, add	C5	135	0.415	Ton	$ -	$ 55.41	$ 7.43	$ 62.84	$ -	$ 7,454.76	$ 999.62	$ 8,454.38
134.538	032110602000			Reinforcing steel, unload and sort, add to base	C5	100	0.56	Ton	$ -	$ 74.21	$ 10.04	$ 84.25	$ -	$ 9,984.08	$ 1,350.76	$ 11,334.84
460	033923230200			Curing, burlap/poly blanket, 2 ply	2 Clab	70	0.229	C.S.F.	$ 20.11	$ 18.88	$ -	$ 38.99	$ 9,250.60	$ 8,684.80	$ -	$ 17,935.40
SLAB ON GRADE				$ 10,596.01												
32	033105350400			Structural concrete, ready mix, normal weight, 5000 psi, includes local aggregate, sand, portland cement and water, delivered, excludes all additives and treatments				C.Y.	$ 129.72	$ -	$ -	$ 129.72	$ 4,151.04	$ -	$ -	$ 4,151.04
32	033105701500			Structural concrete, placing, elevated slab, pumped, 6" to 10" thick, includes vibrating, excludes material	C20	160	0.4	C.Y.	$ -	$ 35.12	$ 6.21	$ 41.33	$ -	$ 1,123.84	$ 198.72	$ 1,322.56
109.2	031113653060			C.I.P. concrete forms, slab on grade, edge, wood, over 12", 4 use, includes erecting, bracing, stripping and cleaning	C1	350	0.09	SFCA	$ 0.88	$ 9.91	$ -	$ 10.79	$ 96.07	$ 1,081.84	$ -	$ 1,177.91
20.57	032205500200			Welded wire fabric, sheets, 6 x 6 - W2.1 x W2.1 (8 x 8) 30 lb. per C.S.F., A185	2 Rodm	31	0.516	C.S.F.	$ 19.54	$ 72.23	$ -	$ 91.77	$ 401.94	$ 1,485.77	$ -	$ 1,887.71
2057	033529300350			Concrete finishing, floors, power screed, bull float, machine float & steel trowel (ride-on)	C10E	4000	0.006	S.F.	$ -	$ 0.54	$ 0.07	$ 0.61	$ -	$ 1,110.78	$ 143.99	$ 1,254.77
20.57	033923230200			Curing, burlap/poly blanket, 2 ply	2 Clab	70	0.229	C.S.F.	$ 20.11	$ 18.88	$ -	$ 38.99	$ 413.66	$ 388.36	$ -	$ 802.02
FOUNDATION MAT SLAB				$ 474,486.75												
1172.5	031113550050			C.I.P. concrete forms, mat foundation, plywood, 2 use, includes erecting, bracing, stripping and cleaning	C2	310	0.15	SFCA	$ 1.31	$ 17.22	$ -	$ 18.53	$ 1,535.98	$ 20,190.45	$ -	$ 21,726.43
581	033105702950			Structural concrete, placing, foundation mat, pumped, over 20 C.Y., includes vibrating, excludes material	C20	400	0.16	C.Y.	$ -	$ 14.05	$ 2.48	$ 16.53	$ -	$ 8,163.05	$ 1,440.88	$ 9,603.93

581	033105350400			Structural concrete, ready mix, normal weight, 5000 psi, includes local aggregate, sand, portland cement and water, delivered, excludes all additives and treatments				C.Y.	$ 129.72	$ -	$ -	$ 129.72	$ 75,367.32	$ -	$ -	$ 75,367.32
63.08	033923230200			Curing, burlap/poly blanket, 2 ply	2 Clab	70	0.229	C.S.F.	$ 20.11	$ 18.88	$ -	$ 38.99	$ 1,268.54	$ 1,190.95	$ -	$ 2,459.49
62	032110601100			Reinforcing steel, in place, typical, average, 50 to 100 ton job, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4 Rodm	2.2	14.545	Ton	$ 1,164.40	$ 2,028.48	$ -	$ 3,192.88	$ 72,192.80	$ 125,765.76	$ -	$ 197,958.56
62	032110601110			Reinforcing steel, in place, typical, average, 50 to 100 ton job, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	4 Rodm	3.1	10.323	Ton	$ 1,192.80	$ 1,444.67	$ -	$ 2,637.47	$ 73,953.60	$ 89,569.54	$ -	$ 163,523.14
6308	033529300350			Concrete finishing, floors, power screed, bull float, machine float & steel trowel (ride-on)	C10E	4000	0.006	S.F.	$ -	$ 0.54	$ 0.07	$ 0.61	$ -	$ 3,406.32	$ 441.56	$ 3,847.88
FOUNDATION WALLS				$ 205,286.79												
100	031505953050			Form oil, coverage varies greatly, maximum, includes material only				Gal.	$ 12.30	$ -	$ -	$ 12.30	$ 1,230.00	$ -	$ -	$ 1,230.00
3.134	033105704950			Structural concrete, placing, walls, pumped, 8" thick, includes vibrating, excludes material	C20	100	0.64	C.Y.	$ -	$ 56.19	$ 9.93	$ 66.12	$ -	$ 176.10	$ 31.12	$ 207.22
11.4	033105705100			Structural concrete, placing, walls, pumped, 12" thick, includes vibrating, excludes material	C20	110	0.582	C.Y.	$ -	$ 50.92	$ 9.06	$ 59.98	$ -	$ 580.49	$ 103.28	$ 683.77
171	033105705350			Structural concrete, placing, walls, pumped, 15" thick, includes vibrating, excludes material	C20	120	0.533	C.Y.	$ -	$ 46.53	$ 8.30	$ 54.83	$ -	$ 7,956.63	$ 1,419.30	$ 9,375.93
8396	031113859260			C.I.P. concrete forms, walls, steel framed plywood, over 8' to 16' high, based on 100 uses of purchased forms, 4 uses of bracing lumber, includes erecting, bracing, stripping and cleaning	C2	450	0.107	SFCA	$ 0.44	$ 11.83	$ -	$ 12.27	$ 3,694.24	$ 99,324.68	$ -	$ 103,018.92
186	033105350400			Structural concrete, ready mix, normal weight, 5000 psi, includes local aggregate, sand, portland cement and water, delivered, excludes all additives and treatments				C.Y.	$ 129.72	$ -	$ -	$ 129.72	$ 24,127.92	$ -	$ -	$ 24,127.92
8396	033529600020			Concrete finishing, walls, includes breaking ties and patching voids	1 Cefi	540	0.015	S.F.	$ 0.03	$ 1.40	$ -	$ 1.43	$ 251.88	$ 11,754.40	$ -	$ 12,006.28
21	032110600700			Reinforcing steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4 Rodm	3	10.667	Ton	$ 1,107.60	$ 1,494.15	$ -	$ 2,601.75	$ 23,259.60	$ 31,377.15	$ -	$ 54,636.75
FOUNDATION FOOTINGS				$ 30,129.12												
1130	031113450050			C.I.P. concrete forms, footing, continuous wall, plywood, 2 use, includes erecting, bracing, stripping and cleaning	C1	440	0.07	SFCA	$ 3.52	$ 7.87	$ -	$ 11.39	$ 3,977.60	$ 8,893.10	$ -	$ 12,870.70
69	031113451500			C.I.P. concrete forms, footing, keyway, tapered wood, 2" x 4", 4 use, includes erecting, bracing, stripping and cleaning	CARP	530	0.02	L.F.	$ 0.23	$ 1.71	$ -	$ 1.94	$ 15.87	$ 117.99	$ -	$ 133.86
71	033105350400			Structural concrete, ready mix, normal weight, 5000 psi, includes local aggregate, sand, portland cement and water, delivered, excludes all additives and treatments				C.Y.	$ 129.72	$ -	$ -	$ 129.72	$ 9,210.12	$ -	$ -	$ 9,210.12

0.479	032110600500			Reinforcing steel, in place, footings, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4 Rodm	2.1	15.238	Ton	$ 1,107.60	$ 2,127.43	$ -	$ 3,235.03	$ 530.61	$ 1,019.17	$ -	$ 1,549.77
2.782	032110600550			Reinforcing steel, in place, footings, #8 to #18, A615, grade 60, incl labor for accessories, excl material for accessories	4 Rodm	3.6	8.889	Ton	$ 1,050.80	$ 1,236.88	$ -	$ 2,287.68	$ 2,923.48	$ 3,441.19	$ -	$ 6,364.67
FOUNDATIONS GRADE BEAMS				$ 19,414.15												
504	031113500050			C.I.P. concrete forms, grade beam, plywood, 2 use, includes erecting, bracing, stripping and cleaning	C2	580	0.08	SFCA	$ 1.70	$ 9.20	$ -	$ 10.90	$ 856.80	$ 4,636.80	$ -	$ 5,493.60
36.5	033105703250			Structural concrete, placing, grade beam, pumped, includes vibrating, excludes material	C20	180	0.356	C.Y.	$ -	$ 31.17	$ 5.51	$ 36.68	$ -	$ 1,137.71	$ 201.12	$ 1,338.82
36.5	033105350400			Structural concrete, ready mix, normal weight, 5000 psi, includes local aggregate, sand, portland cement and water, delivered, excludes all additives and treatments				C.Y.	$ 129.72	$ -	$ -	$ 129.72	$ 4,734.78	$ -	$ -	$ 4,734.78
2.7857	032110600150			Reinforcing steel, in place, beams and girders, #8 to # 18, A615, grade 60, incl labor for accessories, excl material for accessories	4 Rodm	2.7	11.852	Ton	$ 1,164.40	$ 1,652.47	$ -	$ 2,816.87	$ 3,243.67	$ 4,603.29	$ -	$ 7,846.95
Total													**$ 911,783.44**	**$ 1,652,245.13**	**$ 31,237.42**	**$ 2,595,265.94**

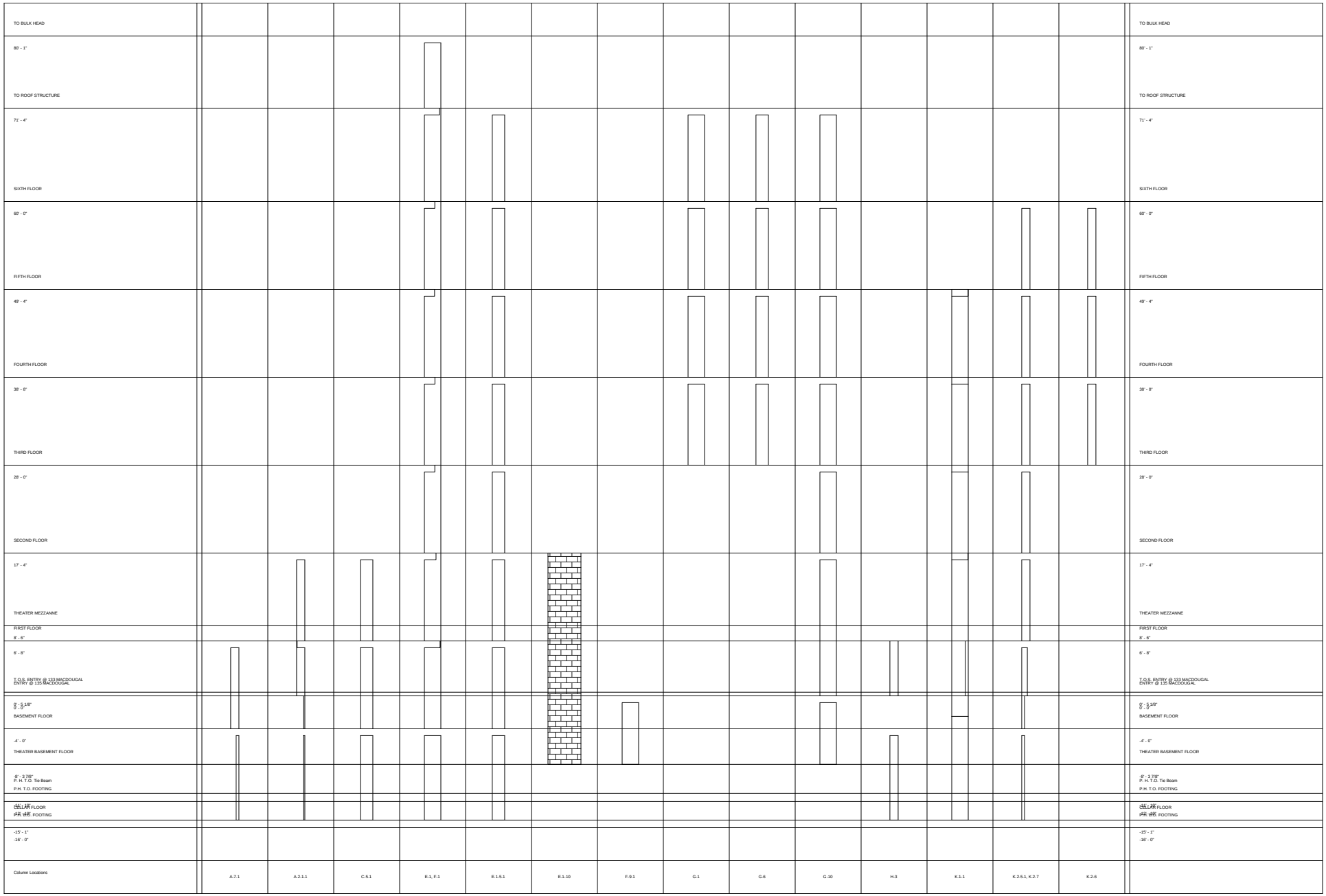


Figure 6: Illustrates the Column Schedule

D. General Conditions Estimate

Many of the typical trade requirements were excluded from the construction managers general conditions cost; these include maintenance of fence, roof protection at adjacent building to south of law school, crane, D.O.B./DOT Regulations, temporary heat, permit expediter, surveying, erosion control, temporary toilets, dumpsters, fire extinguishers, final cleaning, and trash chutes. RS Means was used for the billing rate of the project team. Some of the job descriptions were not found in RS Means, so the following assumptions were made.

Assumptions:

- The project executive is paid the same amount as a project manager
- The estimator is paid the same as the MEP superintendent
- The safety director is paid the same as the scheduler

PRECONSTRCUTION & CONSTRCUTION

PROJECT MANAGEMENT MANPOWER/FORECAST

		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Aug	Sep	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug					
		2008	2008	2008	2008	2008	2008	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2010	2010	2010	2010	2010	2010	2010	2010	2010			Bare Labor	Total O&P	
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL	Weeks	BILLING	BILLING	STAFF
PROJECT MANAGEMENT																												HOURS		RATE	RATE	COST
1	PROJECT EXECUTIVE	0	4	4	4	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	4	4	4		312	7.8	$2,100	$3,275	$25,545
2	PROJECT MANAGER	0	16	24	24	120	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	40	3344	83.6	$2,100	$3,275	$273,790
3	PROJECT ENGINEER			40	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	120	80	3600	90	$1,300	$2,025	$182,250
4	GENERAL SUPERINTENDENT			40	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	140	40	0	3420	85.5	$1,700	$2,650	$226,575
5	MEP SUPERINTENDENT															80	160	160	160	160	160	80						960	24	$1,950	$3,025	$72,600
6	ESTIMATING	0	40	40	100	140	40	8	8	8	160	40																584	14.6	$1,950	$3,025	$44,165
7	FIELD ADMINISTRATOR			0	0	20	20	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	80	3160	79	$1,300	$2,025	$159,975
8	SCHEDULING SERVICES			8	8	8	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	0	0	0	312	7.8	$1,600	$2,500	$19,500
9	SAFETY DIRECTOR				16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	8	0	0	328	8.2	$1,600	$2,500	$20,500
10	ACCOUNTING/IT SERVICES				16	16	16	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	10	666	16.65	$1,125	$1,750	$29,138
ESTIMATED MAN-HOURS PER MONTH		0	60	156	488	656	604	728	728	728	880	760	720	720	720	800	880	880	880	880	880	800	720	708	664	436	210					
																														Preconstruction & CM Services:		$1,054,038
																														General Conditions:		$649,981
																														Total CM Services:		$1,704,019
																														Total Cost per Month:		$77,455

Building Skanska Job No. Construction Cleaning					
All NJ local 593	Manhours	# Months	Total Hrs.	Rates	Cost
Labor foreman cost	160	8	1280	$87.00	$111,360.00
Labor Shop steward cost	160	8	1280	$85.00	$108,800.00
Laborer (3 men)	320	8	2260	$78.00	$176,280.00
				10% mark up	$40,000.00
				Total:	$436,440.00

General Conditions

Item	Unit Cost	Units month	Quantity	Units	Total	Total cost per mo.	Comments
Trailer Cost	$0	lump sum	1	# months	$0	$0	Used Owner Facility adjacent Building
Trailer Infrastructure	$0	lump sum	1	# months	$0	$0	Used Owner Facility adjacent Building
Temporary Power	$1,657	lump sum	1	# months	$1,657	$75	200 Amp Underground feed
Computer Hardware	$35,000	lump sum	1	# months	$35,000	$1,591	Server/Computers/Printer/Scanner
Temporary Heat	$408,800	allow	0	# months	$0	$0	In Trades Budget for Masonry
Temporary Heat	$98,500	allow	0	# months	$0	$0	In Trades Budget for Building Finishes
Temporary toilets	$0		22	# months	$0	$0	In Trades Budget
Temporary Fence	$33.49	lf	100	lf	$3,349	$152	Plywood, painted 4"x4" frame, 8' high
Teporary Fence	$5.30	lf	120	lf	$636	$29	Rented Chain Link, 6ft high
Sidewalk bridge	$201.02	lf	100	lf	$20,102	$914	Heavy duty steel posts & beams, including parapet protection & waterproofing
Small tools	$125	month	22		$2,750	$125	
Telephone Services	$245	month	22	# months	$5,397	$245	Telephone Bill; avg.bill/month incl. longdist.
Telephone Equipment	$0	month	22	# months	$0	$0	By Owner
Field Office Furniture	$650	month	22	# months	$14,300	$650	Furniture for 6 people
Computer Software	$750	month	22	# months	$16,500	$750	Software(P3, Prolog, Suretrack)
T1 Conductivity	$1,000	month	22	# months	$22,000	$1,000	Internet capability
Copy/Fax Machine	$555	month	22	# months	$12,210	$555	Rental
Business Expense	$125	month	22	# months	$2,750	$125	Misc. Business expense
Field Office Misc.	$150	month	22	# months	$3,300	$150	
Clerical Supplies	$470	month	22	# months	$10,340	$470	
Printing/Drawings Repro	$800	month	22	# months	$17,600	$800	
Mail and Fedex	$1,000	month	22	# months	$22,000	$1,000	
OSHA prot. Supplies	$175	month	22	# months	$3,850	$175	
Dumpsters(field office)	$0	month	22	# months	$0	$0	In Trades Budget
Progress Photos	$0	month	22	# months	$0	$0	By Owner
Project Signs	$250	month	22	# months	$5,500	$250	
EDP	$650	month	22	# months	$14,300	$650	
Trade labor	$0	month	22	# months	$0	$0	In Trades Budget
Teamster	$0	month	22	# months	$0	$0	In Trades Budget
Operating Engineer	$0	month	10	# months	$0	$0	In Trades Budget
Traffic Control	$0	month	16	# months	$0	$0	In Trades Budget
Dumpsters	$4,000	month	0	# months	$0	$0	In Trades Budget
Construction Cleaning	$13,638.75	month	32	# months	$436,440.00	$13,638.75	Includes Foreman and 3 Labors
				Total:	**$649,981**		
				Cost per month:	**$21,679**		

E. Critical Industry Issues

The 19th annual PACE conference began with the Architectural Engineer Department discussing the research topics of the 2010 and 2011 year. The first topic talk about was The BIM Project Execution Plan, which was developed to provide a practical manual that can be used by the project teams for designing their BIM strategy and developing a BIM Project Plan. The BIM usages were introduced briefly including: building maintenance scheduling, building system analysis, asset management, space management and tracking, disaster planning, record modeling, site utilization planning, construction system design, digital fabrication, 3D control and planning, 3D coordination, field / materials tracking, design authoring, engineering analysis (structural, lighting, energy, mechanical), sustainability (LEED) evaluation, code validation, design reviews, programming, site analysis, phase planning, cost estimation, existing conditions modeling. Dr. Leicht discussed the issues that arise during the BIM implementation of the project. Dr. Leicht highlighted the fact that while utilizing BIM on the project. Surprisingly, 50 percent of the teams' time is spent on developing the process and 50% of the time implementing the BIM technology. This is a significant amount of time spent. To minimize this time the BIM Execution Plan provides the project team with a guide that has potential to efficiently implement building information modeling in construction. The following topics were discussed by Dr. Messner and Dr Riley: AHIQ information flow for patient care to hospital facilities, virtual construction simulation, GPIC-Greater Philadelphia Innovation Cluster for energy efficient building, and BIM standards. Following the kick-off meeting the attendees went to break- out sessions I and II.

A. Sustainability / Green Building	B. Technology Applications	C. Process Innovation
Session 1A: Educating a future workforce for delivering high performance buildings	**Session 1B:** Transformation: What are the innovations that will transform our industry	**Session 1C:** IPD: Exploring the drivers behind highly integrated delivery of projects
Session 2A: The Smart Grid: Energy impacts in the building industry	**Session 2B:** Carrying BIM to the field – new responsibilities, roles, & competencies	**Session 2C:** Operations & Maintenance process integration in new and retrofit projects

Table 2|Shows the Main Discussion Topics, identified by the PACE Advisory Board

At the PACE Roundtable break-out session I attended the "Transformation" topic break out session. The question proposed at the discussion was: **What are the innovations that will transform our industry?** During the break out session many topics were discussed including: robots used in the field for layout, prefabrication of precast and MEP systems, prefabrication of patient restrooms, development of BIM model for maintenance department to organize data, commissioning models for project closeout, educating the owner with Revit models, Latista

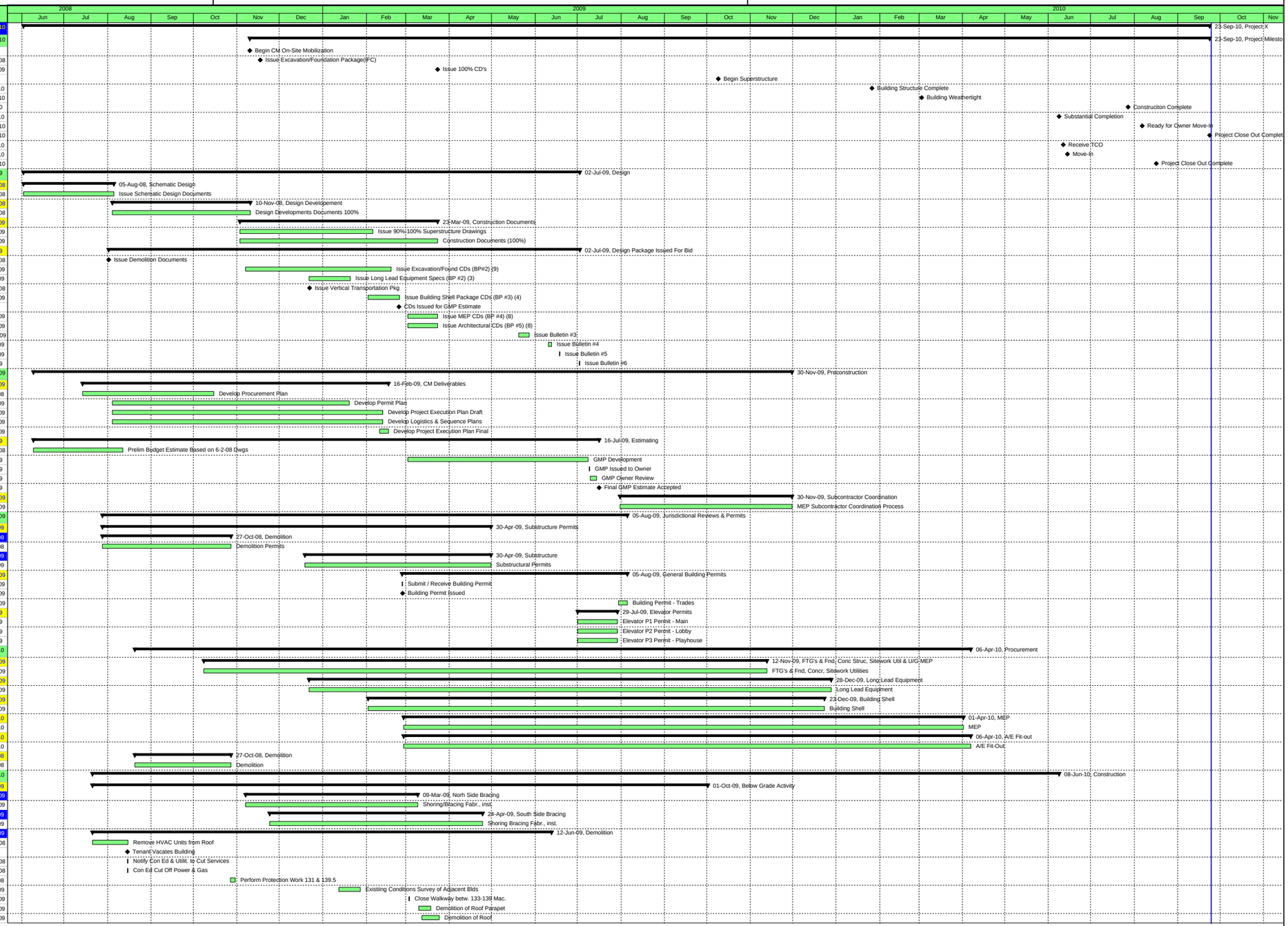
management for RFI's, developing models to meet the client's needs, developing a data base of case studies that could be used by the industry, interaction of users with model other than designers, meeting the client's needs by virtual simulation of the process, rapid prototype, utilizing BIM for estimates, and ship building prefab concept.

The first subject of interest from the PACE roundtable event was the paperless jobsite. Jim Salvino from Clark Construction Group initiated this topic. Clark is currently using the Vela system for their projects. Vela Field management suite is a web-based platform for all Vela Systems field and management users. Contractors, trades, owners, architects, and engineers access all documents, field activities and reports in one easy-to-use website. Jobsites going paperless through the use of tablet pc. Construction companies can save hundreds of dollars from not reprinting drawings. In addition, the companies will save the trouble of having to track the current working set of drawings through the use of a central online storage site that contains the current drawings. Clark Construction is currently working on testing a large screen monitor that can be used on by the subcontractors attached to their job box. Data can be exchange among contractors, engineers and fabricators through the use of BIM. Subcontractors and Construction Manger Estimators' can use the BIM model for quantity takeoffs. For instance, Skanska used the BIM from Thorton Tomasetti for the New Meadowlands Stadium steel estimate in East Ruthorford, NJ. This approach was very beneficial for the company due to the fact that they were able to accelerate the schedule by four months.

The second relevant topics regarding my senior project is the development of the BIM model for the owner's maintenance department to organize data. Thus far there is not a Building Management System that is integrated into the BIM. To integrate these two into one system would require collaboration between programmers, construction professionals, and owners to develop a prototype for this software. A key factor in order to accomplish this is to identify the projects goals. Mr. John Bechtel from Office of the Physical Plant could potential provide assistance in compiling a list of project goals. Penn State has a history of leadership in commissioning and continuous commissioning. The Pennsylvania State University has updated their buildings into AutoCad and they are considering updating the plans into BIM form. Penn State, like many other owners, is inquiring uses for the BIM model after construction. Currently, Penn State is implementing BIM Execution Plan and requiring subcontractors and vendors to utilize BIM technologies for new construction buildings. In addition, Chris Magent of Alexander Building Construction uses the BIM Execution Plan for their BIM projects.

Break-out session II 's topic was "Carrying BIM to the field – new responsibilities, roles, & competencies". This session addressed the following: rework cost savings, portable targets for using laser scanning, total stations for project controls and layout, document management collaborative systems, and photogrammetry. The third topic of interest to me was field verification of the three-dimensional model. Three-dimensional coordination is very helpful in preventing clashes in the field. However field verification is not as easy. Yet, there is not an easy way of generating documents for the subcontractors and construction managers for installation and field verification. There must be an easier way than manually dimensioning the plan drawings and elevations. This was the main obstacle in implementing the BIM technology for the BIM coordinator and field superintendents from Skanska that worked on the New Meadowlands Stadium in East Rutherford, NJ. Adapting an interface that could potentially dimension and produce field drawings for the project team would be a valuable tool.

Original Duration	Activity ID	Activity Name	Remaining Duration	Start	Finish
Project X			604	02-Jun-08	23-Sep-10
Project Milestones			489	10-Nov-08	23-Sep-10
	A1000	Begin CM On-Site Mobilization	0	10-Nov-08	
	A1010	Issue Excavation/Foundation Package(IFC)	0		17-Nov-08
	A1011	Issue 100% CD's	0		23-Mar-09
	A1020	Begin Superstructure	0	09-Oct-09	
	A1021	Building Structure Complete	0		26-Jan-10
	A1030	Building Weathertight	0		02-Mar-10
	A1040	Construciton Complete	0		27-Jul-10
	A1049	Substantial Completion	0		08-Jun-10
	A1050	Ready for Owner Move-In	0		06-Aug-10
	A1060	Project Close Out Complete	0		23-Sep-10
	A1063	Receive TCO	0		11-Jun-10
	A1064	Move-In	0		14-Jun-10
	A1065	Project Close Out Complete	0		16-Aug-10
Design			284	02-Jun-08	02-Jul-09
Schematic Design			47	02-Jun-08	05-Aug-08
	A1490	Issue Schematic Design Documents	47	02-Jun-08	05-Aug-08
Design Developement			71	04-Aug-08	10-Nov-08
	A1500	Design Developments Documents 100%	71	04-Aug-08	10-Nov-08
Construction Documents			101	03-Nov-08	23-Mar-09
	A1510	Issue 90%-100% Superstructure Drawings	69	03-Nov-08	05-Feb-09
	A1520	Construction Documents (100%)	101	03-Nov-08	23-Mar-09
Design Package Issued For Bid			239	01-Aug-08	02-Jul-09
	A1530	Issue Demolition Documents	0		01-Aug-08
	A1540	Issue Excavation/Found CDs (BP#2) (9)	74	07-Nov-08	18-Feb-09
	A1550	Issue Long Lead Equipment Specs (BP #2) (3)	22	22-Dec-08	20-Jan-09
	A1560	Issue Vertical Transportation Pkg	0		22-Dec-08
	A1570	Issue Building Shell Package CDs (BP #3) (4)	17	02-Feb-09	24-Feb-09
	A1580	CDs Issued for GMP Estimate	0	24-Feb-09	
	A1590	Issue MEP CDs (BP #4) (8)	16	02-Mar-09	23-Mar-09
	A1600	Issue Architectural CDs (BP #5) (8)	16	02-Mar-09	23-Mar-09
	A1610	Issue Bulletin #3	6	20-May-09	27-May-09
	A1620	Issue Bulletin #4	3	10-Jun-09	12-Jun-09
	A1630	Issue Bulletin #5	1	18-Jun-09	18-Jun-09
	A1640	Issue Bulletin #6	1	02-Jul-09	02-Jul-09
Preconstruction			386	09-Jun-08	30-Nov-09
CM Deliverables			156	14-Jul-08	16-Feb-09
	A1300	Develop Procurement Plan	68	14-Jul-08	15-Oct-08
	A1310	Develop Permit Plan	121	04-Aug-08	19-Jan-09
	A1320	Develop Project Execution Plan Draft	139	04-Aug-08	12-Feb-09
	A1330	Develop Logistics & Sequence Plans	139	04-Aug-08	12-Feb-09
	A1340	Develop Project Execution Plan Final	5	10-Feb-09	16-Feb-09
Estimating			289	09-Jun-08	16-Jul-09
	A1350	Prelim Budget Estimate Based on 6-2-08 Dwgs	46	09-Jun-08	11-Aug-08
	A1360	GMP Development	93	02-Mar-09	08-Jul-09
	A1370	GMP Issued to Owner	1	09-Jul-09	09-Jul-09
	A1380	GMP Owner Review	3	10-Jul-09	14-Jul-09
	A1390	Final GMP Estimate Accepted	0		16-Jul-09
Subcontractor Coordination			87	31-Jul-09	30-Nov-09
	A1400	MEP Subcontractor Coordination Process	87	31-Jul-09	30-Nov-09
Jurisdictional Reviews & Permits			268	28-Jul-08	05-Aug-09
Substructure Permits			199	28-Jul-08	30-Apr-09
Demolition			66	28-Jul-08	27-Oct-08
	A1410	Demolition Permits	66	28-Jul-08	27-Oct-08
Substructure			96	19-Dec-08	30-Apr-09
	A1420	Substructural Permits	95	19-Dec-08	30-Apr-09
General Building Permits			115	26-Feb-09	05-Aug-09
	A1430	Submit / Receive Building Permit	1	26-Feb-09	26-Feb-09
	A1440	Building Permit Issued	0		26-Feb-09
	A1450	Building Permit - Trades	5	30-Jul-09	05-Aug-09
Elevator Permits			21	01-Jul-09	29-Jul-09
	A1460	Elevator P1 Permit - Main	21	01-Jul-09	29-Jul-09
	A1470	Elevator P2 Permit - Lobby	21	01-Jul-09	29-Jul-09
	A1480	Elevator P3 Permit - Playhouse	21	01-Jul-09	29-Jul-09
Procurement			425	20-Aug-08	06-Apr-10
FTG's & Fnd, Conc Struc, Sitework Util & U/G MEP			287	08-Oct-08	12-Nov-09
	A1650	FTG's & Fnd, Concr, Sitework Utilities	287	08-Oct-08	12-Nov-09
Long Lead Equipment			266	22-Dec-08	28-Dec-09
	A1660	Long Lead Equipment	266	22-Dec-08	28-Dec-09
Building Shell			233	02-Feb-09	23-Dec-09
	A1670	Building Shell	233	02-Feb-09	23-Dec-09
MEP			285	27-Feb-09	01-Apr-10
	A1680	MEP	285	27-Feb-09	01-Apr-10
A/E Fit-out			288	27-Feb-09	06-Apr-10
	A1690	A/E Fit-Out	288	27-Feb-09	06-Apr-10
Demolition			49	20-Aug-08	27-Oct-08
	A1700	Demolition	49	20-Aug-08	27-Oct-08
Construction			492	21-Jul-08	08-Jun-10
Below Grade Activity			314	21-Jul-08	01-Oct-09
Norh Side Bracing			87	07-Nov-08	09-Mar-09
	A1720	Shoring/Bracing Fabr., inst.	87	07-Nov-08	09-Mar-09
South Side Bracing			110	24-Nov-08	24-Apr-09
	A1730	Shoring Bracing Fabr., inst.	110	24-Nov-08	24-Apr-09
Demolition			235	21-Jul-08	12-Jun-09
	A1740	Remove HVAC Units from Roof	20	21-Jul-08	15-Aug-08
	A2010	Tenant Vacates Building	0	15-Aug-08	
	A2020	Notify Con Ed & Utilit. to Cut Services	1	15-Aug-08	15-Aug-08
	A2030	Con Ed Cut Off Power & Gas	1	15-Aug-08	15-Aug-08
	A2040	Perform Protection Work 131 & 139.5	4	27-Oct-08	30-Oct-08
	A2041	Existing Conditions Survey of Adjacent Blds	12	12-Jan-09	27-Jan-09
	A2050	Close Walkway betw. 133-139 Mac.	1	03-Mar-09	03-Mar-09
	A2060	Demolition of Roof Parapet	7	10-Mar-09	18-Mar-09
	A2070	Demolition of Roof	9	12-Mar-09	24-Mar-09

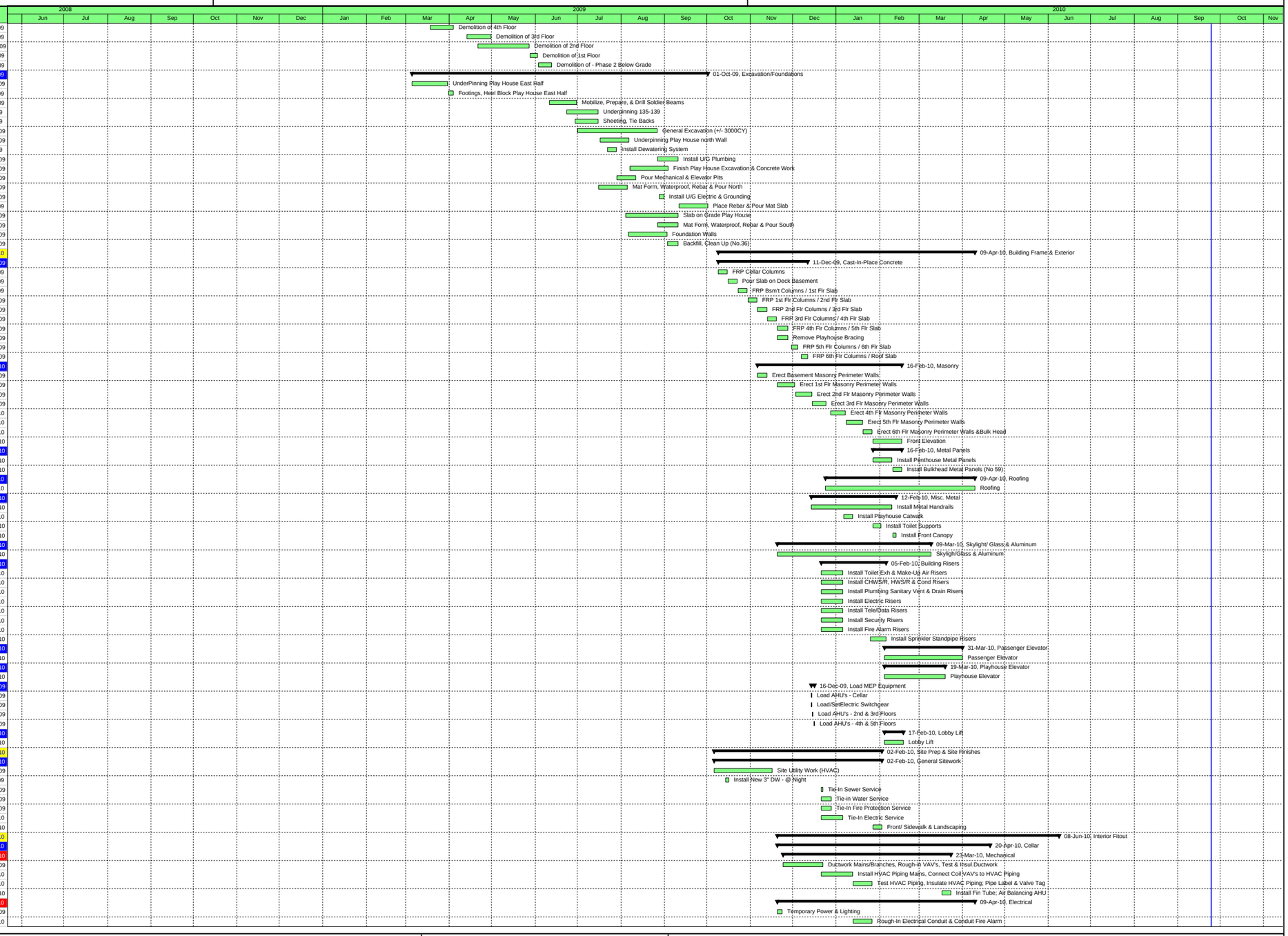


Actual Work | Remaining Work | Critical Remaining Work | Milestone | Summary

TASK filter: All Activities

Project X | Classic WBS Layout | 31-Oct-10 00:46

Original Duration	Activity ID	Activity Name	Remaining Duration	Start	Finish
	A2080	Demolition of 4th Floor	13	18-Mar-09	03-Apr-09
	A2090	Demolition of 3rd Floor	14	13-Apr-09	30-Apr-09
	A2100	Demolition of 2nd Floor	27	21-Apr-09	27-May-09
	A2110	Demolition of 1st Floor	4	28-May-09	02-Jun-09
	A2120	Demolition of - Phase 2 Below Grade	8	03-Jun-09	12-Jun-09
		Excavation/Foundations	151	05-Mar-09	01-Oct-09
	A1750	UnderPinning Play House East Half	18	05-Mar-09	30-Mar-09
	A2130	Footings, Heel Block Play House East Half	4	31-Mar-09	03-Apr-09
	A2140	Mobilize, Prepare, & Drill Soldier Beams	14	11-Jun-09	30-Jun-09
	A2150	Underpinning 135-139	17	23-Jun-09	15-Jul-09
	A2160	Sheeting, Tie Backs	13	29-Jun-09	15-Jul-09
	A2170	General Excavation (+/- 3000CY)	41	01-Jul-09	26-Aug-09
	A2180	Underpinning Play House north Wall	15	17-Jul-09	06-Aug-09
	A2190	Install Dewatering System	5	22-Jul-09	28-Jul-09
	A2200	Install U/G Plumbing	11	27-Aug-09	10-Sep-09
	A2210	Finish Play House Excavation & Concrete Work	20	07-Aug-09	03-Sep-09
	A2220	Pour Mechanical & Elevator Pits	10	29-Jul-09	11-Aug-09
	A2230	Mat Form, Waterproof, Rebar & Pour North	15	16-Jul-09	05-Aug-09
	A2240	Install U/G Electric & Grounding	2	28-Aug-09	31-Aug-09
	A2250	Place Rebar & Pour Mat Slab	15	11-Sep-09	01-Oct-09
	A2260	Slab on Grade Play House	28	04-Aug-09	10-Sep-09
	A2270	Mat Form, Waterproof, Rebar & Pour South	11	27-Aug-09	10-Sep-09
	A2280	Foundation Walls	20	06-Aug-09	02-Sep-09
	A2290	Backfill, Clean Up (No.36)	6	03-Sep-09	10-Sep-09
		Building Frame & Exterior	131	09-Oct-09	09-Apr-10
		Cast-In-Place Concrete	46	09-Oct-09	11-Dec-09
	A2300	FRP Cellar Columns	5	09-Oct-09	15-Oct-09
	A2310	Pour Slab on Deck Basement	5	16-Oct-09	22-Oct-09
	A2320	FRP Bsm't Columns / 1st Flr Slab	5	23-Oct-09	29-Oct-09
	A2330	FRP 1st Flr Columns / 2nd Flr Slab	5	30-Oct-09	05-Nov-09
	A2340	FRP 2nd Flr Columns / 3rd Flr Slab	5	06-Nov-09	12-Nov-09
	A2350	FRP 3rd Flr Columns / 4th Flr Slab	5	13-Nov-09	19-Nov-09
	A2360	FRP 4th Flr Columns / 5th Flr Slab	6	20-Nov-09	27-Nov-09
	A2370	Remove Playhouse Bracing	6	20-Nov-09	27-Nov-09
	A2380	FRP 5th Flr Columns / 6th Flr Slab	5	30-Nov-09	04-Dec-09
	A2390	FRP 6th Flr Columns / Roof Slab	5	07-Dec-09	11-Dec-09
		Masonry	73	06-Nov-09	16-Feb-10
	A1770	Erect Basement Masonry Perimeter Walls	5	06-Nov-09	12-Nov-09
	A2400	Erect 1st Flr Masonry Perimeter Walls	9	20-Nov-09	02-Dec-09
	A2410	Erect 2nd Flr Masonry Perimeter Walls	8	03-Dec-09	14-Dec-09
	A2420	Erect 3rd Flr Masonry Perimeter Walls	8	15-Dec-09	24-Dec-09
	A2430	Erect 4th Flr Masonry Perimeter Walls	9	28-Dec-09	07-Jan-10
	A2440	Erect 5th Flr Masonry Perimeter Walls	8	08-Jan-10	19-Jan-10
	A2450	Erect 6th Flr Masonry Perimeter Walls &Bulk Head	5	20-Jan-10	26-Jan-10
	A2460	Front Elevation	15	27-Jan-10	16-Feb-10
		Metal Panels	15	27-Jan-10	16-Feb-10
	A1780	Install Penthouse Metal Panels	10	27-Jan-10	09-Feb-10
	A2470	Install Bulkhead Metal Panels (No 59)	5	10-Feb-10	16-Feb-10
		Roofing	77	24-Dec-09	09-Apr-10
	A1790	Roofing	77	24-Dec-09	09-Apr-10
		Misc. Metal	45	14-Dec-09	12-Feb-10
	A1800	Install Metal Handrails	42	14-Dec-09	09-Feb-10
	A2480	Install Playhouse Catwalk	5	06-Jan-10	12-Jan-10
	A2490	Install Toilet Supports	4	27-Jan-10	01-Feb-10
	A2500	Install Front Canopy	3	10-Feb-10	12-Feb-10
		Skylight/ Glass & Aluminum	78	20-Nov-09	09-Mar-10
	A1810	Skyligh/Glass & Aluminum	78	20-Nov-09	09-Mar-10
		Building Risers	35	21-Dec-09	05-Feb-10
	A1820	Install Toilet Exh & Make-Up Air Risers	12	21-Dec-09	05-Jan-10
	A2510	Install CHWS/R, HWS/R & Cond Risers	12	21-Dec-09	05-Jan-10
	A2520	Install Plumbing Sanitary Vent & Drain Risers	12	21-Dec-09	05-Jan-10
	A2530	Install Electric Risers	12	21-Dec-09	05-Jan-10
	A2540	Install Tele/Data Risers	12	21-Dec-09	05-Jan-10
	A2550	Install Security Risers	12	21-Dec-09	05-Jan-10
	A2560	Install Fire Alarm Risers	12	21-Dec-09	05-Jan-10
	A2570	Install Sprinkler Standpipe Risers	10	25-Jan-10	05-Feb-10
		Passenger Elevator	40	04-Feb-10	31-Mar-10
	A1830	Passenger Elevator	40	04-Feb-10	31-Mar-10
		Playhouse Elevator	32	04-Feb-10	19-Mar-10
	A1840	Playhouse Elevator	32	04-Feb-10	19-Mar-10
		Load MEP Equipment	3	14-Dec-09	16-Dec-09
	A1850	Load AHU's - Cellar	1	14-Dec-09	14-Dec-09
	A2580	Load/SetElectric Switchgear	1	14-Dec-09	14-Dec-09
	A2590	Load AHU's - 2nd & 3rd Floors	1	15-Dec-09	15-Dec-09
	A2600	Load AHU's - 4th & 5th Floors	1	16-Dec-09	16-Dec-09
		Lobby Lift	10	04-Feb-10	17-Feb-10
	A1860	Lobby Lift	10	04-Feb-10	17-Feb-10
		Site Prep & Site Finishes	86	06-Oct-09	02-Feb-10
		General Sitework	86	06-Oct-09	02-Feb-10
	A1870	Site Utility Work (HVAC)	30	06-Oct-09	16-Nov-09
	A2610	Install New 3" DW - @ Night	3	14-Oct-09	16-Oct-09
	A2620	Tie-In Sewer Service	2	21-Dec-09	22-Dec-09
	A2621	Tie-in Water Service	6	21-Dec-09	28-Dec-09
	A2630	Tie-In Fire Protection Service	6	21-Dec-09	28-Dec-09
	A2640	Tie-In Electric Service	12	21-Dec-09	05-Jan-10
	A2650	Front/ Sidewalk & Landscaping	5	27-Jan-10	02-Feb-10
		Interior Fitout	143	20-Nov-09	08-Jun-10
		Cellar	108	20-Nov-09	20-Apr-10
		Mechanical	86	24-Nov-09	23-Mar-10
	A3140	Ductwork Mains/Branches, Rough-in VAV's, Test & Insul.Ductwork	21	24-Nov-09	22-Dec-09
	A3200	Install HVAC Piping Mains, Connect Coil VAV's to HVAC Piping	17	21-Dec-09	12-Jan-10
	A3210	Test HVAC Piping, Insulate HVAC Piping; Pipe Label & Valve Tag	10	13-Jan-10	26-Jan-10
	A3370	Install Fin Tube; Air Balancing AHU	5	17-Mar-10	23-Mar-10
		Electrical	101	20-Nov-09	09-Apr-10
	A3120	Temporary Power & Lighting	2	20-Nov-09	23-Nov-09
	A3220	Rough-In Electrical Conduit & Conduit Fire Alarm	10	13-Jan-10	26-Jan-10



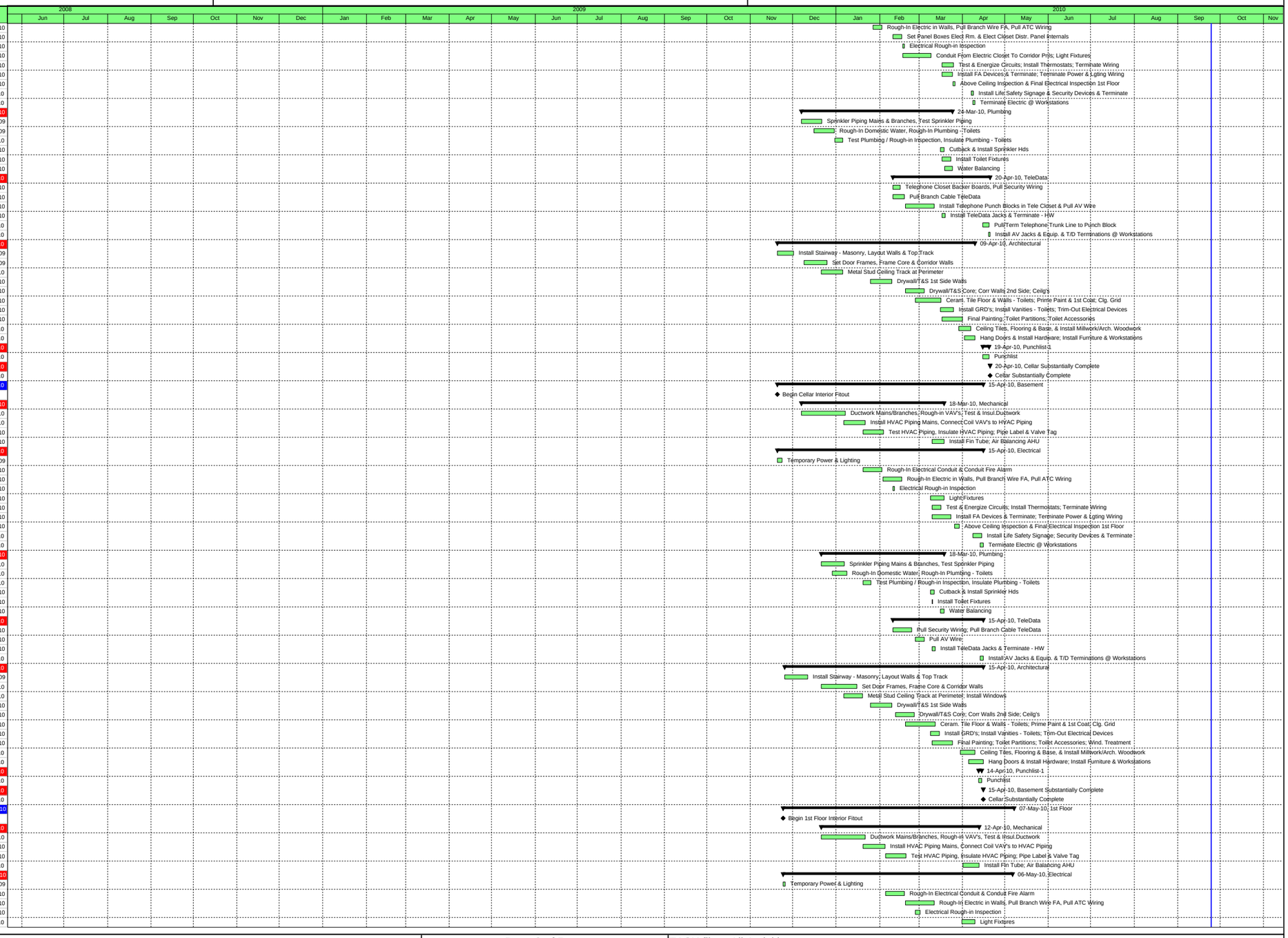
Actual Work | Critical Remaining Work | Summary

Remaining Work | Milestone

TASK filter: All Activities

Project X | Classic WBS Layout | 31-Oct-10 00:46

Original Duration	Activity ID	Activity Name	Remaining Duration	Start	Finish
	A3240	Rough-In Electric in Walls, Pull Branch Wire FA, Pull ATC Wiring	5	27-Jan-10	02-Feb-10
	A3260	Set Panel Boxes Elect Rm. & Elect Closet Distr. Panel Internals	5	10-Feb-10	16-Feb-10
	A3280	Electrical Rough-in Inspection	2	17-Feb-10	18-Feb-10
	A3290	Conduit From Electric Closet To Corridor Pnls; Light Fixtures	15	17-Feb-10	09-Mar-10
	A3360	Test & Energize Circuits; Install Thermostats; Terminate Wiring	7	17-Mar-10	25-Mar-10
	A3410	Install FA Devices & Terminate; Terminate Power & Lgting Wiring	6	17-Mar-10	24-Mar-10
	A3450	Above Ceiling Inspection & Final Electrical Inspection 1st Floor	2	25-Mar-10	26-Mar-10
	A3490	Install Life Safety Signage & Security Devices & Terminate	2	07-Apr-10	08-Apr-10
	A4170	Terminate Electric @ Workstations	2	08-Apr-10	09-Apr-10
	Plumbing		76	07-Dec-09	24-Mar-10
	A3150	Sprinkler Piping Mains & Branches, Test Sprinkler Piping	11	07-Dec-09	21-Dec-09
	A3170	Rough-In Domestic Water, Rough-In Plumbing - Toilets	11	16-Dec-09	30-Dec-09
	A3180	Test Plumbing / Rough-in Inspection, Insulate Plumbing - Toilets	4	31-Dec-09	05-Jan-10
	A3330	Cutback & Install Sprinkler Hds	3	16-Mar-10	18-Mar-10
	A3400	Install Toilet Fixtures	5	17-Mar-10	23-Mar-10
	A3430	Water Balancing	4	19-Mar-10	24-Mar-10
	TeleData		50	10-Feb-10	20-Apr-10
	A3250	Telephone Closet Backer Boards, Pull Security Wiring	4	10-Feb-10	15-Feb-10
	A3270	Pull Branch Cable TeleData	7	10-Feb-10	18-Feb-10
	A3300	Install Telephone Punch Blocks in Tele Closet & Pull AV Wire	15	19-Feb-10	11-Mar-10
	A3380	Install TeleData Jacks & Terminate - HW	3	17-Mar-10	19-Mar-10
	A3500	Pull/Term Telephone Trunk Line to Punch Block	3	15-Apr-10	19-Apr-10
	A3510	Install AV Jacks & Equip. & T/D Terminations @ Workstations	2	19-Apr-10	20-Apr-10
	Architectural		101	20-Nov-09	09-Apr-10
	A3130	Install Stairway - Masonry, Layout Walls & Top Track	8	20-Nov-09	01-Dec-09
	A3160	Set Door Frames, Frame Core & Corridor Walls	13	09-Dec-09	25-Dec-09
	A3190	Metal Stud Ceiling Track at Perimeter	12	21-Dec-09	05-Jan-10
	A3230	Drywall/T&S 1st Side Walls	12	25-Jan-10	09-Feb-10
	A3310	Drywall/T&S Core; Corr Walls 2nd Side; Ceilg's	10	19-Feb-10	04-Mar-10
	A3320	Ceram. Tile Floor & Walls - Toilets; Prime Paint & 1st Coat; Clg. Grid	13	26-Feb-10	16-Mar-10
	A3350	Install GRD's; Install Vanities - Toilets; Trim-Out Electrical Devices	8	16-Mar-10	25-Mar-10
	A3420	Final Painting; Toilet Partitions; Toilet Accessories	11	17-Mar-10	31-Mar-10
	A3460	Ceiling Tiles, Flooring & Base, & Install Millwork/Arch. Woodwork	7	29-Mar-10	06-Apr-10
	A3480	Hang Doors & Install Hardware; Install Furniture & Workstations	6	02-Apr-10	09-Apr-10
	Punchlist-1		3	15-Apr-10	19-Apr-10
	A3520	Punchlist	3	15-Apr-10	19-Apr-10
	Cellar Substantially Complete		0	20-Apr-10	20-Apr-10
	A3530	Cellar Substantially Complete	0		20-Apr-10
	Basement		105	20-Nov-09	15-Apr-10
	A4160	Begin Cellar Interior Fitout	0	20-Nov-09	
	Mechanical		74	07-Dec-09	18-Mar-10
	A3540	Ductwork Mains/Branches, Rough-in VAV's, Test & Insul.Ductwork	24	07-Dec-09	07-Jan-10
	A3550	Install HVAC Piping Mains, Connect Coil VAV's to HVAC Piping	12	06-Jan-10	21-Jan-10
	A3560	Test HVAC Piping, Insulate HVAC Piping; Pipe Label & Valve Tag	11	20-Jan-10	03-Feb-10
	A3570	Install Fin Tube; Air Balancing AHU	7	10-Mar-10	18-Mar-10
	Electrical		105	20-Nov-09	15-Apr-10
	A3960	Temporary Power & Lighting	2	20-Nov-09	23-Nov-09
	A3970	Rough-In Electrical Conduit & Conduit Fire Alarm	10	20-Jan-10	02-Feb-10
	A3980	Rough-In Electric in Walls, Pull Branch Wire FA, Pull ATC Wiring	10	03-Feb-10	16-Feb-10
	A4000	Electrical Rough-in Inspection	2	10-Feb-10	11-Feb-10
	A4010	Light Fixtures	8	09-Mar-10	18-Mar-10
	A4020	Test & Energize Circuits; Install Thermostats; Terminate Wiring	5	10-Mar-10	16-Mar-10
	A4030	Install FA Devices & Terminate; Terminate Power & Lgting Wiring	10	10-Mar-10	23-Mar-10
	A4040	Above Ceiling Inspection & Final Electrical Inspection 1st Floor	2	26-Mar-10	29-Mar-10
	A4050	Install Life Safety Signage; Security Devices & Terminate	5	08-Apr-10	14-Apr-10
	A4180	Terminate Electric @ Workstations	3	13-Apr-10	15-Apr-10
	Plumbing		64	21-Dec-09	18-Mar-10
	A3710	Sprinkler Piping Mains & Branches, Test Sprinkler Piping	13	21-Dec-09	06-Jan-10
	A3720	Rough-In Domestic Water, Rough-In Plumbing - Toilets	9	29-Dec-09	08-Jan-10
	A3730	Test Plumbing / Rough-in Inspection, Insulate Plumbing - Toilets	4	20-Jan-10	25-Jan-10
	A3740	Cutback & Install Sprinkler Hds	3	09-Mar-10	11-Mar-10
	A3750	Install Toilet Fixtures	1	10-Mar-10	10-Mar-10
	A3760	Water Balancing	3	16-Mar-10	18-Mar-10
	TeleData		47	10-Feb-10	15-Apr-10
	A3770	Pull Security Wiring; Pull Branch Cable TeleData	10	10-Feb-10	23-Feb-10
	A3790	Pull AV Wire	5	26-Feb-10	04-Mar-10
	A3800	Install TeleData Jacks & Terminate - HW	3	10-Mar-10	12-Mar-10
	A3820	Install AV Jacks & Equip. & T/D Terminations @ Workstations	3	13-Apr-10	15-Apr-10
	Architectural		102	25-Nov-09	15-Apr-10
	A4060	Install Stairway - Masonry, Layout Walls & Top Track	13	25-Nov-09	11-Dec-09
	A4070	Set Door Frames, Frame Core & Corridor Walls	20	21-Dec-09	15-Jan-10
	A4080	Metal Stud Ceiling Track at Perimeter; Install Windows	10	06-Jan-10	19-Jan-10
	A4090	Drywall/T&S 1st Side Walls	12	25-Jan-10	09-Feb-10
	A4100	Drywall/T&S Core; Corr Walls 2nd Side; Ceilg's	10	12-Feb-10	25-Feb-10
	A4110	Ceram. Tile Floor & Walls - Toilets; Prime Paint & 1st Coat; Clg. Grid	16	19-Feb-10	12-Mar-10
	A4120	Install GRD's; Install Vanities - Toilets; Trim-Out Electrical Devices	5	09-Mar-10	15-Mar-10
	A4130	Final Painting; Toilet Partitions; Toilet Accessories; Wind. Treatment	11	10-Mar-10	24-Mar-10
	A4140	Ceiling Tiles, Flooring & Base, & Install Millwork/Arch. Woodwork	9	30-Mar-10	09-Apr-10
	A4150	Hang Doors & Install Hardware; Install Furniture & Workstations	9	05-Apr-10	15-Apr-10
	Punchlist-1		3	12-Apr-10	14-Apr-10
	A3940	Punchlist	3	12-Apr-10	14-Apr-10
	Basement Substantially Complete		0	15-Apr-10	15-Apr-10
	A3950	Cellar Substantially Complete	0		15-Apr-10
	1st Floor		119	24-Nov-09	07-May-10
	A1900	Begin 1st Floor Interior Fitout	0	24-Nov-09	
	Mechanical		81	21-Dec-09	12-Apr-10
	A4190	Ductwork Mains/Branches, Rough-in VAV's, Test & Insul.Ductwork	24	21-Dec-09	21-Jan-10
	A4200	Install HVAC Piping Mains, Connect Coil VAV's to HVAC Piping	12	20-Jan-10	04-Feb-10
	A4210	Test HVAC Piping, Insulate HVAC Piping; Pipe Label & Valve Tag	11	05-Feb-10	19-Feb-10
	A4220	Install Fin Tube; Air Balancing AHU	8	01-Apr-10	12-Apr-10
	Electrical		118	24-Nov-09	06-May-10
	A4360	Temporary Power & Lighting	2	24-Nov-09	25-Nov-09
	A4370	Rough-In Electrical Conduit & Conduit Fire Alarm	10	05-Feb-10	18-Feb-10
	A4380	Rough-In Electric in Walls, Pull Branch Wire FA, Pull ATC Wiring	15	19-Feb-10	11-Mar-10
	A4390	Electrical Rough-in Inspection	2	26-Feb-10	01-Mar-10
	A4400	Light Fixtures	8	31-Mar-10	09-Apr-10

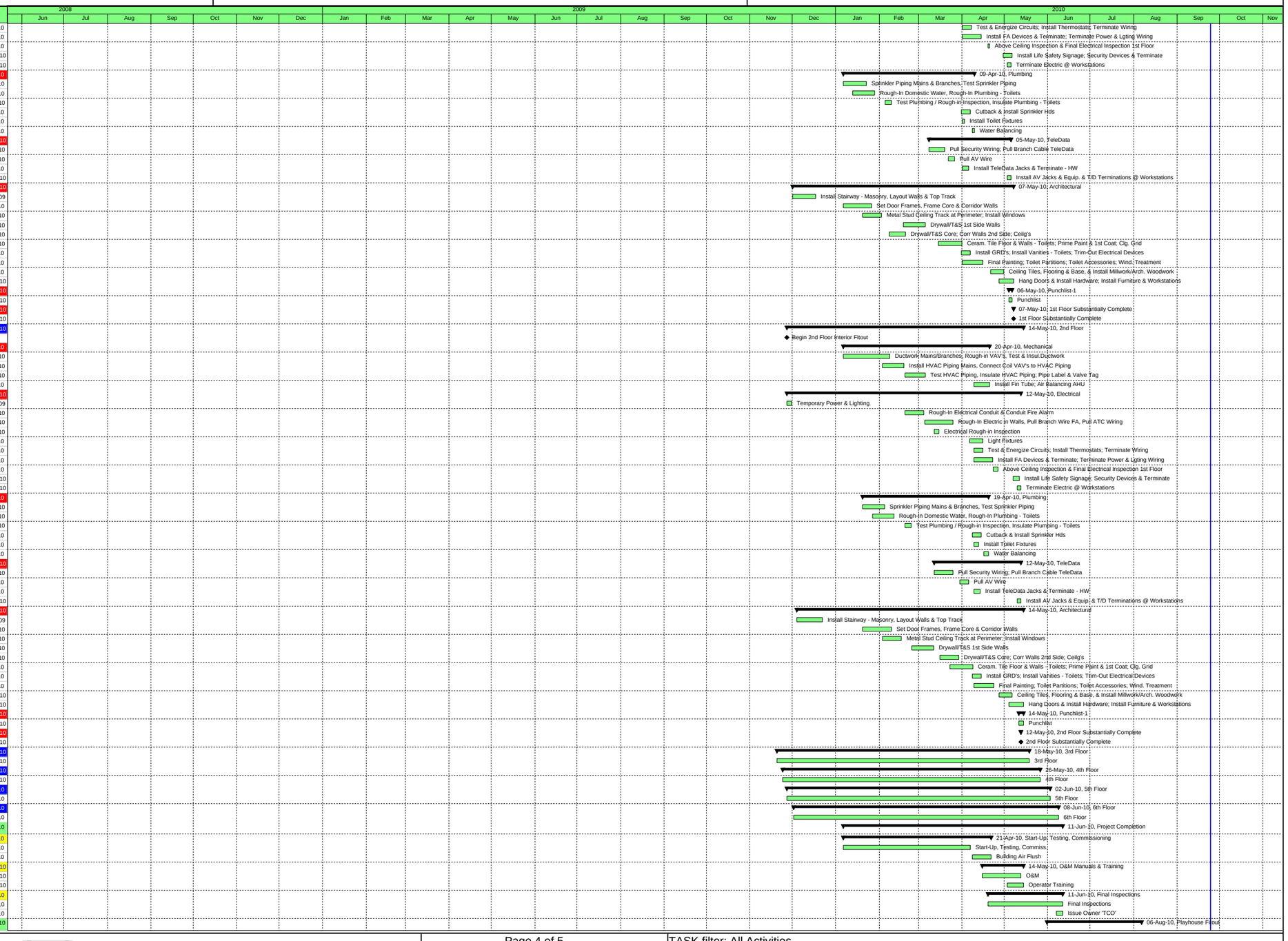


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

Project X | Classic WBS Layout | 31-Oct-10 00:46

Original Duration	Activity ID	Activity Name	Remaining Duration	Start	Finish
	A4410	Test & Energize Circuits; Install Thermostats; Terminate Wiring	5	01-Apr-10	07-Apr-10
	A4420	Install FA Devices & Terminate; Terminate Power & Lgting Wiring	10	01-Apr-10	14-Apr-10
	A4430	Above Ceiling Inspection & Final Electrical Inspection 1st Floor	2	19-Apr-10	20-Apr-10
	A4440	Install Life Safety Signage; Security Devices & Terminate	5	30-Apr-10	06-May-10
	A4550	Terminate Electric @ Workstations	3	03-May-10	05-May-10
	Plumbing		68	06-Jan-10	09-Apr-10
	A4230	Sprinkler Piping Mains & Branches, Test Sprinkler Piping	13	06-Jan-10	22-Jan-10
	A4240	Rough-In Domestic Water, Rough-In Plumbing - Toilets	12	13-Jan-10	28-Jan-10
	A4250	Test Plumbing / Rough-in Inspection, Insulate Plumbing - Toilets	3	05-Feb-10	09-Feb-10
	A4260	Cutback & Install Sprinkler Hds	5	31-Mar-10	06-Apr-10
	A4270	Install Toilet Fixtures	2	01-Apr-10	02-Apr-10
	A4280	Water Balancing	2	08-Apr-10	09-Apr-10
	TeleData		43	08-Mar-10	05-May-10
	A4290	Pull Security Wiring; Pull Branch Cable TeleData	10	08-Mar-10	19-Mar-10
	A4300	Pull AV Wire	5	22-Mar-10	26-Mar-10
	A4310	Install TeleData Jacks & Terminate - HW	3	01-Apr-10	05-Apr-10
	A4330	Install AV Jacks & Equip. & T/D Terminations @ Workstations	3	03-May-10	05-May-10
	Architectural		114	01-Dec-09	07-May-10
	A4450	Install Stairway - Masonry, Layout Walls & Top Track	13	01-Dec-09	17-Dec-09
	A4460	Set Door Frames, Frame Core & Corridor Walls	15	06-Jan-10	26-Jan-10
	A4470	Metal Stud Ceiling Track at Perimeter; Install Windows	10	20-Jan-10	02-Feb-10
	A4480	Drywall/T&S 1st Side Walls	12	18-Feb-10	05-Mar-10
	A4490	Drywall/T&S Core; Corr Walls 2nd Side; Ceilg's	10	08-Feb-10	19-Feb-10
	A4500	Ceram. Tile Floor & Walls - Toilets; Prime Paint & 1st Coat; Clg. Grid	13	15-Mar-10	31-Mar-10
	A4510	Install GRD's; Install Vanities - Toilets; Trim-Out Electrical Devices	5	31-Mar-10	06-Apr-10
	A4520	Final Painting; Toilet Partitions; Toilet Accessories; Wind. Treatment	11	01-Apr-10	15-Apr-10
	A4530	Ceiling Tiles, Flooring & Base, & Install Millwork/Arch. Woodwork	8	21-Apr-10	30-Apr-10
	A4540	Hang Doors & Install Hardware; Install Furniture & Workstations	9	27-Apr-10	07-May-10
	Punchlist-1		3	04-May-10	06-May-10
	A4340	Punchlist	3	04-May-10	06-May-10
	1st Floor Substantially Complete		0	07-May-10	07-May-10
	A4350	1st Floor Substantially Complete	0		07-May-10
	2nd Floor		121	27-Nov-09	14-May-10
	A1910	Begin 2nd Floor Interior Fitout	0	27-Nov-09	
	Mechanical		75	06-Jan-10	20-Apr-10
	A4560	Ductwork Mains/Branches, Rough-in VAV's, Test & Insul.Ductwork	24	06-Jan-10	08-Feb-10
	A4570	Install HVAC Piping Mains, Connect Coil VAV's to HVAC Piping	12	03-Feb-10	18-Feb-10
	A4580	Test HVAC Piping, Insulate HVAC Piping; Pipe Label & Valve Tag	11	19-Feb-10	05-Mar-10
	A4590	Install Fin Tube; Air Balancing AHU	8	09-Apr-10	20-Apr-10
	Electrical		119	27-Nov-09	12-May-10
	A4720	Temporary Power & Lighting	2	27-Nov-09	30-Nov-09
	A4730	Rough-In Electrical Conduit & Conduit Fire Alarm	10	19-Feb-10	04-Mar-10
	A4740	Rough-In Electric in Walls, Pull Branch Wire FA, Pull ATC Wiring	15	05-Mar-10	25-Mar-10
	A4750	Electrical Rough-in Inspection	2	12-Mar-10	15-Mar-10
	A4760	Light Fixtures	8	06-Apr-10	15-Apr-10
	A4770	Test & Energize Circuits; Install Thermostats; Terminate Wiring	5	09-Apr-10	15-Apr-10
	A4780	Install FA Devices & Terminate; Terminate Power & Lgting Wiring	10	09-Apr-10	22-Apr-10
	A4790	Above Ceiling Inspection & Final Electrical Inspection 1st Floor	2	23-Apr-10	26-Apr-10
	A4800	Install Life Safety Signage; Security Devices & Terminate	3	07-May-10	11-May-10
	A4910	Terminate Electric @ Workstations	3	10-May-10	12-May-10
	Plumbing		64	20-Jan-10	19-Apr-10
	A4600	Sprinkler Piping Mains & Branches, Test Sprinkler Piping	12	20-Jan-10	04-Feb-10
	A4610	Rough-In Domestic Water, Rough-In Plumbing - Toilets	12	27-Jan-10	11-Feb-10
	A4620	Test Plumbing / Rough-in Inspection, Insulate Plumbing - Toilets	3	19-Feb-10	23-Feb-10
	A4630	Cutback & Install Sprinkler Hds	5	08-Apr-10	14-Apr-10
	A4640	Install Toilet Fixtures	2	09-Apr-10	12-Apr-10
	A4650	Water Balancing	2	16-Apr-10	19-Apr-10
	TeleData		44	12-Mar-10	12-May-10
	A4660	Pull Security Wiring; Pull Branch Cable TeleData	10	12-Mar-10	25-Mar-10
	A4670	Pull AV Wire	5	30-Mar-10	05-Apr-10
	A4680	Install TeleData Jacks & Terminate - HW	3	09-Apr-10	13-Apr-10
	A4690	Install AV Jacks & Equip. & T/D Terminations @ Workstations	3	10-May-10	12-May-10
	Architectural		116	04-Dec-09	14-May-10
	A4810	Install Stairway - Masonry, Layout Walls & Top Track	13	04-Dec-09	22-Dec-09
	A4820	Set Door Frames, Frame Core & Corridor Walls	15	20-Jan-10	09-Feb-10
	A4830	Metal Stud Ceiling Track at Perimeter; Install Windows	10	03-Feb-10	16-Feb-10
	A4840	Drywall/T&S 1st Side Walls	12	24-Feb-10	11-Mar-10
	A4850	Drywall/T&S Core; Corr Walls 2nd Side; Ceilg's	10	16-Mar-10	29-Mar-10
	A4860	Ceram. Tile Floor & Walls - Toilets; Prime Paint & 1st Coat; Clg. Grid	13	23-Mar-10	08-Apr-10
	A4870	Install GRD's; Install Vanities - Toilets; Trim-Out Electrical Devices	5	08-Apr-10	14-Apr-10
	A4880	Final Painting; Toilet Partitions; Toilet Accessories; Wind. Treatment	11	09-Apr-10	23-Apr-10
	A4890	Ceiling Tiles, Flooring & Base, & Install Millwork/Arch. Woodwork	8	27-Apr-10	06-May-10
	A4900	Hang Doors & Install Hardware; Install Furniture & Workstations	9	04-May-10	14-May-10
	Punchlist-1		4	11-May-10	14-May-10
	A4700	Punchlist	4	11-May-10	14-May-10
	2nd Floor Substantially Complete		0	12-May-10	12-May-10
	A4710	2nd Floor Substantially Complete	0		12-May-10
	3rd Floor		128	20-Nov-09	18-May-10
	A1920	3rd Floor	128	20-Nov-09	18-May-10
	4th Floor		132	24-Nov-09	26-May-10
	A1930	4th Floor	132	24-Nov-09	26-May-10
	5th Floor		134	27-Nov-09	02-Jun-10
	A1940	5th Floor	134	27-Nov-09	02-Jun-10
	6th Floor		135	02-Dec-09	08-Jun-10
	A1950	6th Floor	135	02-Dec-09	08-Jun-10
Project Completion			113	06-Jan-10	11-Jun-10
	Start-Up, Testing, Commissioning		76	06-Jan-10	21-Apr-10
	A1960	Start-Up, Testing, Commiss.	65	06-Jan-10	06-Apr-10
	A1990	Building Air Flush	10	08-Apr-10	21-Apr-10
	O&M Manuals & Training		22	15-Apr-10	14-May-10
	A1970	O&M	20	15-Apr-10	12-May-10
	A3340	Operator Training	10	03-May-10	14-May-10
	Final Inspections		40	19-Apr-10	11-Jun-10
	A1980	Final Inspections	40	19-Apr-10	11-Jun-10
	A2000	Issue Owner 'TCO'	5	07-Jun-10	11-Jun-10
Playhouse Fitout			50	31-May-10	06-Aug-10



Actual Work | Critical Remaining Work | Summary

Remaining Work | Milestone

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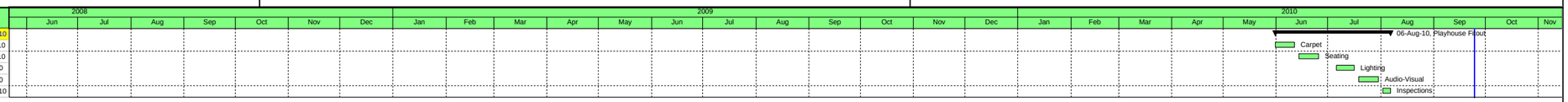
TASK filter: All Activities

Project X	Classic WBS Layout	31-Oct-10 00:46

Original Duration	Activity ID	Activity Name	Remaining Duration	Start	Finish
		Playhouse Fitout	50	31-May-10	06-Aug-10
	A2710	Carpet	10	31-May-10	11-Jun-10
	A2780	Seating	10	14-Jun-10	25-Jun-10
	A2781	Lighting	9	06-Jul-10	16-Jul-10
	A2890	Audio-Visual	10	19-Jul-10	30-Jul-10
	A2940	Inspections	5	02-Aug-10	06-Aug-10



Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

TASK filter: All Activities

Appendix II: Detailed Structural Systems Estimate

Matt Slab, SOG, Elevated Floor Material Takeoff									
Depth (in)	Type	Level	Perimeter ft	Area sf	Volume cy	Volume cy	Reinforcing	ton/cy	ton
5	SOG	CELLAR FLOOR	42.60	65	27.28	1.01	6x6-W2.0xW2.0W.W.F.	N/A	N/A
30	Mat Slab	CELLAR FLOOR	63.82	225	562.11	20.82	#9 @ 8" Each Way (Top & Bottom)	0.107	2.222
30	Mat Slab	CELLAR FLOOR	376.25	6033	15082.25	558.60	#9 @ 8" Each Way (Top & Bottom)	0.107	59.631
8	Mat Slab	THEATER BASEMENT FLOOR	28.38	50.00	33.33	1.23	#5 @12" (Top & Bottom)	0.109	0.134
5	SOG	THEATER BASEMENT FLOOR	218.83	1992	830.08	30.74	6x6-W2.0xW2.0W.W.F.	0.095	0.117
10	Elevated	BASEMENT FLOOR	391.59	5629	4691.20	173.75	#6 @ 12" OC Each Way (Top & Bottom)	N/A	N/A
10	Elevated	ENTRY @ 135 MACDOUGAL	49.67	153	127.90	4.74	#6 @ 12" OC Each Way (Top & Bottom)	0.095	0.449
10	Elevated	ENTRY @ 135 MACDOUGAL	112.48	765	637.71	23.62	#6 @ 12" OC Each Way (Top & Bottom)	0.095	2.238
10	Elevated	FIRST FLOOR	374.98	5198	4331.75	160.44	#6 @ 12" OC Each Way (Top & Bottom)	0.095	15.201
10	Elevated	SECOND FLOOR	496.61	7481	6234.58	230.91	#6 @ 12" OC Each Way (Top & Bottom)	0.095	21.879
10	Elevated	THIRD FLOOR	399.95	5617	4680.85	173.36	#6 @ 12" OC Each Way (Top & Bottom)	0.095	16.426
10	Elevated	FOURTH FLOOR	399.95	5617	4680.85	173.36	#6 @ 12" OC Each Way (Top & Bottom)	0.095	16.426
10	Elevated	FIFTH FLOOR	399.95	5617	4680.85	173.36	#6 @ 12" OC Each Way (Top & Bottom)	0.095	16.426
10	Elevated	SIXTH FLOOR	399.95	5617	4680.85	173.36	#6 @ 12" OC Each Way (Top & Bottom)	0.095	16.426
10	Elevated	TO ROOF STRUCTURE	365.04	3818	3181.54	117.83	#6 @ 12" OC Each Way (Top & Bottom)	0.095	11.165
10	Elevated	TO BULK HEAD	94.5	492	409.99	15.18	#6 @ 12" OC Each Way (Top & Bottom)	0.095	1.439
		TOTAL SLAB CONCRETE:		54369	54873	2032			180.180

Table 2: Shows the Mat Slab, Slab on Grade, and Elevated Floor Material Takeoff

Concrete Structural Framing Schedule					
Type	Size	Length ft	Volume cf	Volume cy	Forming sfca
Concrete-Rectangular Beam	10 x 10	16.32	11.34	0.42	40.80
Concrete-Rectangular Beam	10 x 10	16.32	11.34	0.42	40.80
Concrete-Rectangular Beam	10 x 10	16.32	11.34	0.42	40.80
Concrete-Rectangular Beam	10 x 10	16.32	11.34	0.42	40.80
Concrete-Rectangular Beam	10 x 10	16.51	11.47	0.42	41.28
Concrete-Rectangular Beam	10 x 10	16.51	11.47	0.42	41.28
Concrete-Rectangular Beam	10 x 10	16.55	11.50	0.43	41.38
Concrete-Rectangular Beam	10 x 10	16.55	11.50	0.43	41.38
Concrete-Rectangular Beam	10 x 10	16.55	11.50	0.43	41.38
Concrete-Rectangular Beam	10 x 10	16.55	11.50	0.43	41.38
Concrete-Rectangular Beam	10 x 10	17.29	11.49	0.43	43.23
Concrete-Rectangular Beam	10 x 10	17.29	11.49	0.43	43.23
Concrete-Rectangular Beam	10 x 10	17.38	12.07	0.45	43.45
Concrete-Rectangular Beam	10 x 10	17.38	12.07	0.45	43.45
Concrete-Rectangular Beam	10 x 10	17.41	12.09	0.45	43.53
Concrete-Rectangular Beam	12 x 16	15.82	21.09	0.78	58.01
Concrete-Rectangular Beam	12 x 16	15.82	21.09	0.78	58.01
Concrete-Rectangular Beam	12 x 16	15.82	21.09	0.78	58.01
Concrete-Rectangular Beam	12 x 16	15.82	21.09	0.78	58.01
Concrete-Rectangular Beam	12 x 18	16.29	24.44	0.91	65.16
Concrete-Rectangular Beam	12 x 18	16.29	24.44	0.91	65.16
Concrete-Rectangular Beam	12 x 18	16.42	24.45	0.91	65.68
Concrete-Rectangular Beam	12 x 18	17.46	26.19	0.97	69.84
Concrete-Rectangular Beam	36 x 32	21.22	169.76	6.29	176.83
Concrete-Rectangular Beam	42 x 32	21.4	199.7333	7.40	178.33
		Concrete Framing Member:	26.922 cy		

Table 3: Shows the Concrete Beam Schedule

CONCRETE FRAMING BEAM REINFORCING										
Type Footing	Type Rein.	Length (ft)	Quantity Bar/beam	Quantity Beams	Wt./lf lbs/ft	Wt. lbs.	Wt. Ton	Total wt. Ton	Volume Concr.(cy)	ton/cy
BM-1 (10"x10")	#5	17	3	6	1.043	319.158	0.159579			
BM-1 (10"x10")	#5	17	3	6	1.043	319.158	0.159579			
BM-1 (10"x10")	#4	2	17	6	0.668	136.272	0.068136	0.387294	2.623457	0.147627
BM-1 (10"x10")	#5	16	3	13	1.043	650.832	0.325416			
BM-1 (10"x10")	#5	16	3	13	1.043	650.832	0.325416			
BM-1 (10"x10")	#4	2	16	13	0.668	277.888	0.138944	0.789776	5.349794	0.147627
BM-1 (10"x10")	#5	15	3	4	1.043	187.74	0.09387			
BM-1 (10"x10")	#5	15	3	4	1.043	187.74	0.09387			
BM-1 (10"x10")	#4	2	15	4	0.668	80.16	0.04008	0.22782	1.54321	0.147627
BM-1 (10"x10")	#5	21	3	2	1.043	131.418	0.065709			
BM-1 (10"x10")	#5	21	3	2	1.043	131.418	0.065709			
BM-1 (10"x10")	#4	2	21	2	0.668	56.112	0.028056	0.159474	1.080247	0.147627
BM-2 (12"x16")	#7	15	3	4	2.044	367.92	0.18396			
BM-2 (12"x16")	#7	15	3	4	2.044	367.92	0.18396			
BM-2 (12"x16")	#4	4	15	4	0.688	165.12	0.08256	0.45048	3.124889	0.144159
BM-3 (12"x18")	#7	16	3	3	2.044	294.336	0.147168			
BM-3 (12"x18")	#7	16	3	3	2.044	294.336	0.147168			
BM-3 (12"x18")	#4	4.5	16	3	0.688	148.608	0.074304	0.36864	2.715556	0.135751
BM-3 (12"x18")	#7	17	3	1	2.044	104.244	0.052122			
BM-3 (12"x18")	#7	17	3	1	2.044	104.244	0.052122			
BM-3 (12"x18")	#4	4.5	17.00	1	0.688	52.632	0.026316	0.13056	0.97	0.134598
BM-4(36"x32")	#8	21	10	1	2.044	429.24	0.21462			
BM-4(36"x32")	#6	21	8	1	2.044	343.392	0.171696			
BM-4(36"x32")	#4	11	42	1	0.688	317.856	0.158928	0.545244	6.287407	0.08672
BM-5(42"x32")	#9	21	10	1	3.4	714	0.357			
BM-5(42"x32")	#6	21	8	1	1.502	252.336	0.126168			
BM-5(42"x32")	#4	12	42	1	0.668	336.672	0.168336	0.651504	7.407407	0.087953
TOTAL CONCRETE FRAME BEAM REINFORCING:						**7421.584**	**3.71079**			

Table 4: Shows the Concrete Beam Reinforcement

Steel Structural Framing Schedule					
Type	**Size**	**Length ft**	**Weight lbs./lf**	**Weight lbs.**	**Weight ton**
C-Channel	C10X20	21.77	20.00	435.40	0.2177
C-Channel	C10X20	21.77	20.00	435.40	0.2177
L-Angle	L6X4X5/16	21.77	10.30	224.23	0.11
L-Angle	L6X4X5/16	21.77	10.30	224.23	0.11
L-Angle	L6X6X5/16	24.79	12.50	309.88	0.15
L-Angle	L6X6X5/16	7.07	12.50	88.38	0.04
L-Angle	L6X6X5/16	15.08	12.50	188.50	0.09
L-Angle	L6X6X5/16	16.67	12.50	208.38	0.10
L-Angle	L6X6X5/16	11.99	12.50	149.88	0.07
LL-Double Angle	2L6X6X5/8	9.21	48.60	447.61	0.22
LL-Double Angle	2L6X6X5/8	9.21	48.60	447.61	0.22
LL-Double Angle	2L6X6X5/8	9.21	48.60	447.61	0.22
LL-Double Angle	2L6X6X5/8	9.21	48.60	447.61	0.22
LL-Double Angle	2L6X6X5/8	9.21	48.60	447.61	0.22
LL-Double Angle	2L6X6X5/8	9.21	48.60	447.61	0.22
LL-Double Angle	2L6X6X5/8	9.21	48.60	447.61	0.22
LL-Double Angle	2L6X6X5/8	9.21	48.60	447.61	0.22
LL-Double Angle	2L6X6X5/8	9.21	48.60	447.61	0.22
W-Wide Flange	W8X10	17.41	10.00	174.10	0.09
W-Wide Flange	W10X19	6.72	19.00	127.68	0.06
W-Wide Flange	W10X19	6.6	19.00	125.40	0.06
W-Wide Flange	W10X19	7.07	19.00	134.33	0.07
W-Wide Flange	W10X19	7.05	19.00	133.95	0.07
W-Wide Flange	W10X19	7.14	19.00	135.66	0.07
W-Wide Flange	W10X19	7.14	19.00	135.66	0.07
W-Wide Flange	W10X19	7.14	19.00	135.66	0.07
W-Wide Flange	W10X19	7.14	19.00	135.66	0.07
W-Wide Flange	W10X19	6.97	19.00	132.43	0.07
Steel Framing Members:			**3.831623 ton**		

Table 5: Shows the Concrete Structural Framing Schedule

CONCRETE COLUMNS					
Type	Size	Length	Surface Area	Material: Volume	Volume
	in	ft	sf	cf	cy
Concrete-Rectangular-Column	12" x 12"	21.75	72	16.92	0.63
Concrete-Rectangular-Column	12" x 24"	21.75	112.00	26.50	0.98
Concrete-Rectangular-Column	12" x 24"	32.42	154.00	35.38	1.31
Concrete-Rectangular-Column	12" x 24"	32.42	179.00	46.58	1.73
Concrete-Rectangular-Column	12" x 24"	32.42	180.00	47.48	1.76
Concrete-Rectangular-Column	12" x 24"	32.42	178.00	48.54	1.80
Concrete-Rectangular-Column	12" x 24"	43.08	229.00	57.39	2.13
Concrete-Rectangular-Column	12" x 24"	43.08	229.00	57.39	2.13
Concrete-Rectangular-Column	12" x 24"	43.08	229.00	57.39	2.13
Concrete-Rectangular-Column	12" x 24"	43.08	229.00	57.39	2.13
Concrete-Rectangular-Column	12" x 24"	8.32	49.00	14.97	0.55
Concrete-Rectangular-Column	12" x 24"	8.32	49.00	14.97	0.55
Concrete-Rectangular-Column	12" x 24"	43.08	180.00	56.00	2.07
Concrete-Rectangular-Column	12" x 24"	8.32	49.00	14.97	0.55
Concrete-Rectangular-Column	12" x 24"	36.32	215.00	67.64	2.51
Concrete-Rectangular-Column	12" x 24"	36.32	215.00	67.64	2.51
Concrete-Rectangular-Column	12" x 24"	43.08	229.00	57.39	2.13
Concrete-Rectangular-Column	12" x 24"	43.08	229.00	57.39	2.13
Concrete-Rectangular-Column	12" x 24"	43.08	229.00	57.39	2.13
Concrete-Rectangular-Column	12" x 24"	54.00	332.00	99.89	3.70
Concrete-Rectangular-Column	12" x 24"	54.00	319.00	99.67	3.69
Concrete-Rectangular-Column	12" x 24"	54.00	332.00	99.89	3.70
Concrete-Rectangular-Column	12" x 24"	54.00	319.00	99.67	3.69
Concrete-Rectangular-Column	12" x 24"	54.00	319.00	99.67	3.69
Concrete-Rectangular-Column	12" x 24"	42.67	266.00	79.30	2.94
Concrete-Rectangular-Column	12" x 24"	52.08	313.00	97.80	3.62
Concrete-Rectangular-Column	12" x 24"	52.08	309.00	95.88	3.55
Concrete-Rectangular-Column	12" x 24"	52.08	313.00	95.96	3.55
Concrete-Rectangular-Column	12" x 24"	52.08	308.00	95.83	3.55
Concrete-Rectangular-Column	12" x 24"	43.33	256.00	80.00	2.96
Concrete-Rectangular-Column	12" x 24"	43.33	256.00	80.00	2.96
Concrete-Rectangular-Column	12" x 24"	32.00	189.00	59.00	2.19
Concrete-Rectangular-Column	12" x 24"	32.00	189.00	59.00	2.19
Concrete-Rectangular-Column	12" x 24"	32.00	189.00	59.00	2.19
Concrete-Rectangular-Column	12" x 24"	32.00	189.00	59.00	2.19
Concrete-Rectangular-Column	16" x 24"	64.42	414	129.55	4.80
Concrete-Rectangular-Column	16" x 48"	25.65	273.6	136.80	5.07
Concrete-Rectangular-Column	16" x 48"	25.65	273.6	136.80	5.07

Table 6: Shows the Concrete Column Schedule

CONCRETE COLUMNS					
Type	Size in	Length ft	Surface Area sf	Material: Volume cf	Volume cy
Concrete-Rectangular-Column	18" x 18"	32.42	193	67.31	2.49
Concrete-Rectangular-Column	18" x 18"	32.42	193	67.31	2.49
Concrete-Rectangular-Column	18" x 18"	43.08	257	89.44	3.31
Concrete-Rectangular-Column	18" x 18"	43.08	257	89.44	3.31
Concrete-Rectangular-Column	18" x 18"	43.08	257	89.44	3.31
Concrete-Rectangular-Column	18" x 18"	43.33	258	90.00	3.33
Concrete-Rectangular-Column	18" x 18"	43.33	258	90.00	3.33
Concrete-Rectangular-Column	18" x 18"	54	322	112.13	4.15
Concrete-Rectangular-Column	18" x 18"	43.08	257	89.44	3.31
Concrete-Rectangular-Column	18" x 18"	43.33	258	90.00	3.33
Concrete-Rectangular-Column	18" x 18"	43.33	258	90.00	3.33
Concrete-Rectangular-Column	18" x 18"	54	322	112.13	4.15
Concrete-Rectangular-Column	18" x 36"	25.65	232	111.69	4.14
Concrete-Rectangular-Column	18" x 36"	25.65	232	111.69	4.14
Concrete-Rectangular-Column	18" x 36"	25.65	232	111.69	4.14
Concrete-Rectangular-Column	18" x 36"	32.42	296	134.63	4.99
Concrete-Rectangular-Column	18" x 36"	25.65	232	111.69	4.14
Concrete-Rectangular-Column	18" x 36"	25.65	232	111.69	4.14
Concrete-Rectangular-Column	18" x 36"	32.42	296	134.63	4.99
Concrete-Rectangular-Column	18" x 36"	32.42	296	134.63	4.99
TOTAL CONCRETE COLUMNS:			**172.63 cy**		
TOTAL CONCRETE COLUMNS:			**13732.2 sf**		

Table 7: Shows the Concrete Column Schedule

FOUNDATION WALL CONCRETE								
Type of Wall	Type of Concrete	Length (ft)	Width (ft)	Area (sf)	Volume (cf)	Volume (cy)	ton/cy	ton
Exterior - 8" Concrete	CIP	17.67	0.67	12	8.15	0.30	0.107	0.032
Exterior - 8" Concrete	CIP	6.85	0.67	5	3.05	0.11	0.107	0.012
Exterior - 8" Concrete	CIP	17.67	0.67	12	7.85	0.29	0.107	0.031
Exterior - 8" Concrete	CIP	6.85	0.67	4	2.75	0.10	0.107	0.011
Exterior - 8" Concrete	CIP	6.83	0.67	5	3.33	0.12	0.107	0.013
Exterior - 8" Concrete	CIP	17.67	0.67	12	7.85	0.29	0.107	0.031
Exterior - 8" Concrete	CIP	6.83	0.67	5	3.04	0.11	0.107	0.012
Exterior - 8" Concrete	CIP	17.67	0.67	11	7.56	0.28	0.107	0.030
Foundation - 8" Concrete	CIP	70.63	0.67	438	311.74	11.55	0.107	1.235
Foundation - 1-'4" Concrete	CIP	18.03	1.33	201	267.94	9.92	0.107	1.062
Foundation - 1-'4" Concrete	CIP	6.67	1.33	76	100.67	3.73	0.107	0.399
Foundation - 1-'4" Concrete	CIP	2.87	1.33	53	70.54	2.61	0.107	0.280
Foundation - 1-'4" Concrete	CIP	10.28	1.33	155	206.67	7.65	0.107	0.819
Foundation - 1-'4" Concrete	CIP	57.71	1.33	709	945.85	35.03	0.107	3.748
Foundation - 1-'4" Concrete	CIP	0.58	1.33	24	32.16	1.19	0.107	0.127
Foundation - 1-'4" Concrete	CIP	26.71	1.33	336	448.11	16.60	0.107	1.776
Foundation - 1-'4" Concrete	CIP	42.37	1.33	516	688.50	25.50	0.107	2.729
Foundation - 1-'4" Concrete	CIP	70.63	1.33	1048	1397.20	51.75	0.107	5.537
Foundation - 2' Concrete	CIP	19.41	2.00	68	135.62	5.02	0.107	0.537
Foundation - 2' Concrete	CIP	8.50	2.00	27	53.83	1.99	0.107	0.213
Foundation - 2' Concrete	CIP	19.41	2.00	61	122.95	4.55	0.107	0.487
Foundation - 2' Concrete	CIP	8.50	2.00	21	41.17	1.52	0.107	0.163
Interior - 12" Concrete	CIP	7.31	1.00	127	127.37	4.72	0.107	0.505
Interior - 12" Concrete	CIP	16.50	1.00	91	90.37	3.35	0.107	0.358
Interior - 12" Concrete	CIP	13.44	1.00	53	53.10	1.97	0.107	0.210
Interior - 12" Concrete	CIP	10.33	1.00	37	36.66	1.36	0.107	0.145
Interior- 14" Concrete	CIP	16.50	1.17	91	106.13	3.93	0.107	0.421
	TOTAL FOUNDATION WALL CONCRETE:			4198	5280.16	195.5615		20.92508

Table 8: Shows the Foundation Wall Schedule

FOOTING CONCRETE								
Type	Width (ft)	Depth (ft)	Length (ft)	Quantity (Each)	Volume (cf)	Volume (cy)	Perimeter Form (ft)	Forms SFCA
F4.0	4	1	4	1	16.00	0.59	8	32.00
F6.5	6.5	2.33	6.5	1	98.58	3.65	13.00	84.50
F9.5	9.5	3.17	9.5	2	571.58	21.17	19	180.50
F7.5'x 24.5'	7.5	2.67	24.5	1	490.00	18.15	15	367.50
F9.5'x24.5'	9.5	3.17	24.5	1	737.04	27.30	19	465.50
TOTAL FOOTING CONCRETE:					**1913.21**	**70.86**		

Table 9: Shows the Concrete Footing Schedule

FOOTING REINFORCING						
Type Footing	Type Rein.	Length (ft)	Quantity (Each)	Wt./lf lbs/ft	Wt. lbs.	Wt. Ton
F4.0	#5	4	4	1.043	16.688	0.00834
	#5	4	4	1.043	16.688	0.00834
F6.5	#6	6.5	8	1.502	78.104	0.03905
	#6	6.5	8	1.502	78.104	0.03905
F9.5	#9	9.5	18	3.4	581.4	0.29070
	#9	9.5	18	3.4	581.4	0.29070
F7.5'x 24.5'	#10	10	24.5	4.303	1054.235	0.52712
	#7	8	24.5	2.044	400.624	0.20031
	#7	24	7.5	2.044	367.92	0.18396
F9.5'x24.5'	#11	14	24.5	5.313	1822.359	0.91118
	#9	9	24.5	3.4	749.7	0.37485
	#9	24	9.5	3.4	775.2	0.38760
TOTAL FOOTING REINFORCING:					**6522.422**	**3.26121**

Table 10: Shows the Concrete Footing Reinforcement

TIE BEAM CONCRETE								
Type	Width (ft)	Depth (ft)	Length (ft)	Quantity (Each)	Volume (cf)	Volume (cy)	Perimeter Form (ft)	Forms SFCA
TB-1	3	3	15.75	2	283.50	10.50	6.00	94.50
TB-2	2	2	8.33	1	33.33	1.23	4.00	33.33
TB-3	2.5	2.67	24.00	2	320.00	11.85	5.33	128.00
TB-4	2.5	2	17.50	1	87.50	3.24	4.00	70.00
TB-5	2	1.5	17.50	1	52.50	1.94	3.00	52.50
TB-6	3.33	2.5	25.00	1	208.33	7.72	5.00	125.00
TOTAL TIE BEAM CONCRETE:					**985.17**	**36.49**		

Table 9: Shows the Concrete Tie Beam Schedule

TIE BEAM REINFORCING						
Type Footing	**Type Rein.**	**Length (ft)**	**Quantity (Each)**	**Wt./lf lbs/ft**	**Wt. lbs.**	**Wt. Ton**
TB-1	#10	15.75	14	4.303	948.8115	0.47441
	#6	15.75	8	1.502	189.252	0.09463
	# 4	5.5	16	0.668	58.784	0.02939
TB-2	#10	8.33	6	4.303	215.0639	0.10753
	#6	8.33	6	1.502	75.06996	0.03753
	# 4	1.67	9	0.668	10.02	0.00501
TB-3	#10	24	8	4.303	826.176	0.41309
	#6	24	8	1.502	288.384	0.14419
	# 4	4.75	24	0.668	76.152	0.03808
TB-4	#10	17.5	7	4.303	527.1175	0.26356
	#6	17.5	5	1.502	131.425	0.06571
	# 4	4.75	24	0.668	76.152	0.03808
TB-5	#6	17.5	4	1.502	105.14	0.05257
	#6	17.5	4	1.502	105.14	0.05257
	# 4	2.92	24	0.668	46.76	0.02338
TB-6	#10	25	14	4.303	1506.05	0.75303
	#6	25	8	1.502	300.4	0.15020
	# 4	5.33	24	0.668	85.504	0.04275
TOTAL TIE BEAM REINFORCING:					**5571.402**	**2.78570**

Table 10: Shows the Concrete Tie Beam Reinforcement