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Columbia Heights Community Center
1480 Girard St. NW
Washington, DC 20009
10-31-2005

North Elevation

Technical Assignment 2

Table of Contents

Executive Summary

In Technical Assignment 2, you will find a Detailed Project Schedule, Site Layout Plans, an Assemblies Estimate, a Detailed Structural Systems Estimate, and a General Conditions Estimate. At the end of this report, a Summary Estimate was included for the purpose of comparison between systems. This report is intended to give the reader a quantified view of the make up of the Columbia Heights Community Center.

The detailed project schedule allows the reader to see the exact breakdown of activities for the Columbia Heights Community Center. A key aspect of this schedule is the sequencing of the installation of the building skin, which can be seen on the Detailed Project Schedule under the "Skin" activities. The brick exterior is constructed by face so that the north and east walls are completed first to allow the curtainwall contractor to begin work as soon as possible.

In the assemblies estimate, the material quantities and prices can be seen for the building skin of the Columbia Heights Community Center. The method of takeoff for this system was by square-foot for the brick face and curtainwall and by each unit for the windows. When accessing cost data for the windows, it was found that the community center contains some uniquely sized windows and assumptions had to be made to account for this.

The detailed structural systems estimate included the takeoff and pricing of all structural concrete and steel. The cost of the foundations, slab on grade, steel frame, and slabs on deck can be seen in the Detailed Structural Systems Estimate section. Upon review of the total concrete cost, it was found that the price was significantly lower than the reported actual cost. The possible causes of this will be discussed further in the report.

The general conditions estimate for the community center was based on project staffing and projected costs of the General Contractor. These costs add up to be 6.64% of the entire building construction costs, which is lower than the average of 10%.

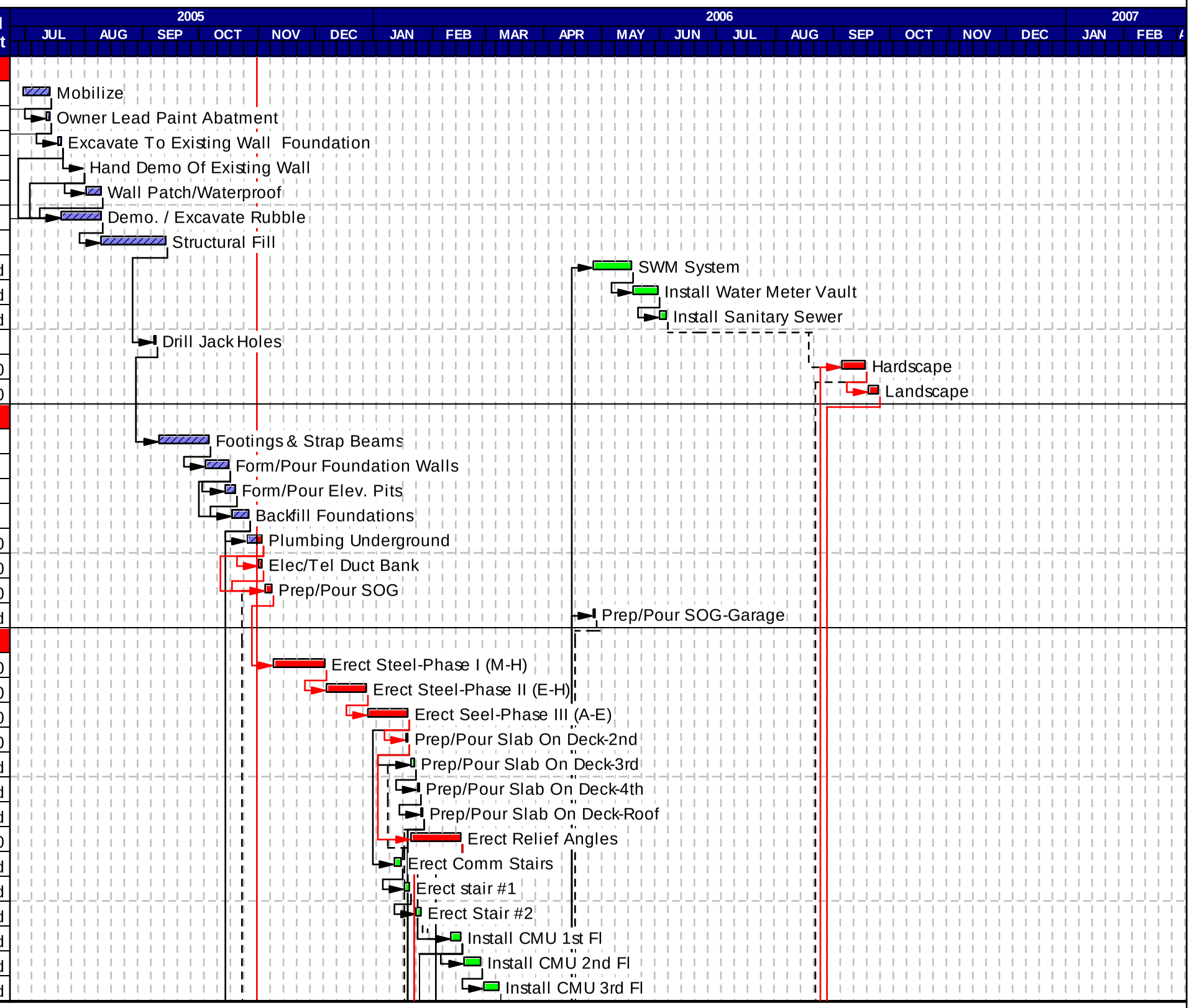
The estimate summary includes all total costs of the systems mentioned in this report and shows the percentage of the total building cost associated with each system. The total costs include all location modifiers, waste factors, and connections allowances.

Detailed Project Schedule

The Columbia Heights Community Center schedule consists of 188 activities, which are broken into 13 major phases. If you reference the detailed schedule, you will see that at the current date of October 31st, foundations will be finished and backfilled, work will be ongoing with underground plumbing, and the electrical / telecommunications duct bank will be started on the following day. The detailed project schedule can be found on the pages following this section.

Detailed Project Schedule

Phase	Act ID	Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float
Sitework							
SITE	1000	Mobilize	10d	0	30JUN05 A	14JUL05 A	
SITE	1001	Owner Lead Paint	5d	0	12JUL05 A	14JUL05 A	
SITE	1002	Excavate To Existing Wall	2d	0	18JUL05 A	20JUL05 A	
SITE	1003	Hand Demo Of Existing	5d	0	01AUG05	01AUG05	
SITE	1004	Wall Patch/Waterproof	14d	0	02AUG05	10AUG05	
SITE	1010	Demo. / Excavate Rubble	10d	0	20JUL05 A	10AUG05	
SITE	1020	Structural Fill	10d	0 *	10AUG05	13SEP05	
SITE	1030	SWM System	15d	15d	27APR06	17MAY06	64d
SITE	1040	Install Water Meter Vault	10d	10d	18MAY06	31MAY06	64d
SITE	1050	Install Sanitary Sewer	3d	3d	01JUN06	05JUN06	64d
SITE	1060	Drill Jack Holes	3d	0	07SEP05	08SEP05	
SITE	1065	Hardscape	10d	10d	05SEP06	18SEP06	0
SITE	1067	Landscape	5d	5d	19SEP06	25SEP06	0
Foundations							
FDN	1070	Footings & Strap Beams	20d	0	09SEP05	06OCT05	
FDN	1080	Form/Pour Foundation	10d	0	04OCT05	17OCT05	
FDN	1090	Form/Pour Elev. Pits	5d	0	14OCT05	20OCT05	
FDN	1100	Backfill Foundations	8d	0	18OCT05	27OCT05	
FDN	1110	Plumbing Underground	7d	4d	26OCT05	03NOV05	0
FDN	1120	Elec/Tel Duct Bank	3d	3d	01NOV05	03NOV05	0
FDN	1130	Prep/Pour SOG	3d	3d	04NOV05	08NOV05	0
FDN	1135	Prep/Pour SOG-Garage	2d	2d	27APR06	28APR06	20d
Structure							
STR	1140	Erect Steel-Phase I (M-H)	18d	18d	09NOV05	06DEC05	0
STR	1150	Erect Steel-Phase II (E-H)	15d	15d	07DEC05	28DEC05	0
STR	1160	Erect Seel-Phase III (A-E)	15d	15d	29DEC05	19JAN06	0
STR	1170	Prep/Pour Slab On	2d	2d	18JAN06	19JAN06	0
STR	1180	Prep/Pour Slab On	2d	2d	20JAN06	23JAN06	4d
STR	1190	Prep/Pour Slab On	2d	2d	24JAN06	25JAN06	4d
STR	1200	Prep/Pour Slab On	2d	2d	26JAN06	27JAN06	4d
STR	1210	Erect Relief Angles	20d	20d	20JAN06	16FEB06	0
STR	1220	Erect Comm Stairs	3d	3d	12JAN06	16JAN06	7d
STR	1230	Erect stair #1	4d	4d	17JAN06	20JAN06	30d
STR	1240	Erect Stair #2	4d	4d	23JAN06	26JAN06	30d
STR	1250	Install CMU 1st Fl	5d	5d	10FEB06	16FEB06	20d
STR	1260	Install CMU 2nd Fl	7d	7d	17FEB06	27FEB06	20d
STR	1270	Install CMU 3rd Fl	7d	7d	28FEB06	08MAR06	20d



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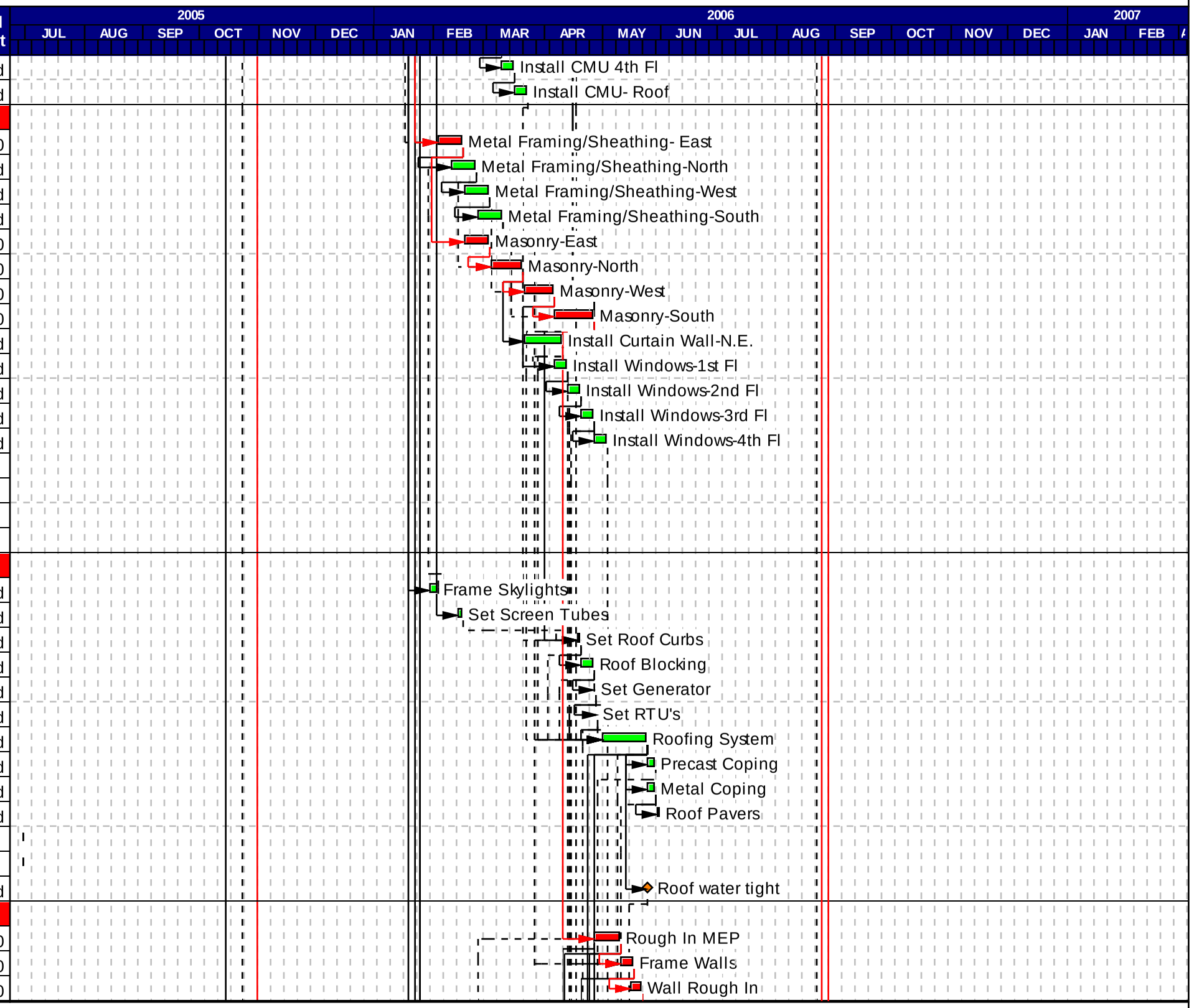
Detailed Project Schedule

Phase	Act ID	Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float
STR	1280	Install CMU 4th Fl	5d	5d	09MAR06	15MAR06	20d
STR	1290	Install CMU- Roof	5d	5d	16MAR06	22MAR06	20d
skin							
SKIN	1300	Metal Framing/Sheathing-	10d	10d	03FEB06	16FEB06	0
SKIN	1310	Metal	10d	10d	10FEB06	23FEB06	5d
SKIN	1320	Metal	10d	10d	17FEB06	02MAR06	12d
SKIN	1330	Metal	10d	10d	24FEB06	09MAR06	19d
SKIN	1340	Masonry-East	10d	10d	17FEB06	02MAR06	0
SKIN	1350	Masonry-North	12d	12d	03MAR06	20MAR06	0
SKIN	1360	Masonry-West	12d	12d	21MAR06	05APR06	0
SKIN	1370	Masonry-South	15d	15d	06APR06	26APR06	0
SKIN	1380	Install Curtain Wall-N.E.	15d	15d	21MAR06	10APR06	16d
SKIN	1390	Install Windows-1st Fl	5d	5d	06APR06	12APR06	20d
SKIN	1400	Install Windows-2nd Fl	5d	5d	13APR06	19APR06	25d
SKIN	1410	Install Windows-3rd Fl	5d	5d	20APR06	26APR06	25d
SKIN	1420	Install Windows-4th Fl	5d	5d	27APR06	03MAY06	25d
SKIN	1430		0	0	30JUN05 A	29JUN05 A	
SKIN	1440		0	0	30JUN05 A	29JUN05 A	
SKIN	1450		0	0	30JUN05 A	29JUN05 A	
SKIN	1460		0	0	30JUN05 A	29JUN05 A	
roof							
ROOF	1470	Frame Skylights	5d	5d	30JAN06	03FEB06	9d
ROOF	1480	Set Screen Tubes	3d	3d	14FEB06	16FEB06	44d
ROOF	1490	Set Roof Curbs	2d	2d	18APR06	19APR06	2d
ROOF	1500	Roof Blocking	5d	5d	20APR06	26APR06	2d
ROOF	1510	Set Generator	1d	1d	27APR06	27APR06	2d
ROOF	1520	Set RTU's	1d	1d	28APR06	28APR06	2d
ROOF	1530	Roofing System	18d	18d	01MAY06	24MAY06	2d
ROOF	1540	Precast Coping	3d	3d	25MAY06	29MAY06	24d
ROOF	1550	Metal Coping	3d	3d	25MAY06	29MAY06	24d
ROOF	1560	Roof Pavers	2d	2d	30MAY06	31MAY06	97d
ROOF	1570		1d	0	30JUN05 A	30JUN05 A	
ROOF	1580		1d	0	30JUN05 A	30JUN05 A	
ROOF	2580	Roof water tight	0	0		24MAY06	5d
1st Floor Finishes							
1ST	1590	Rough In MEP	10d	10d	27APR06	10MAY06	0
1ST	1600	Frame Walls	5d	5d	11MAY06	17MAY06	0
1ST	1610	Wall Rough In	5d	5d	16MAY06	22MAY06	0



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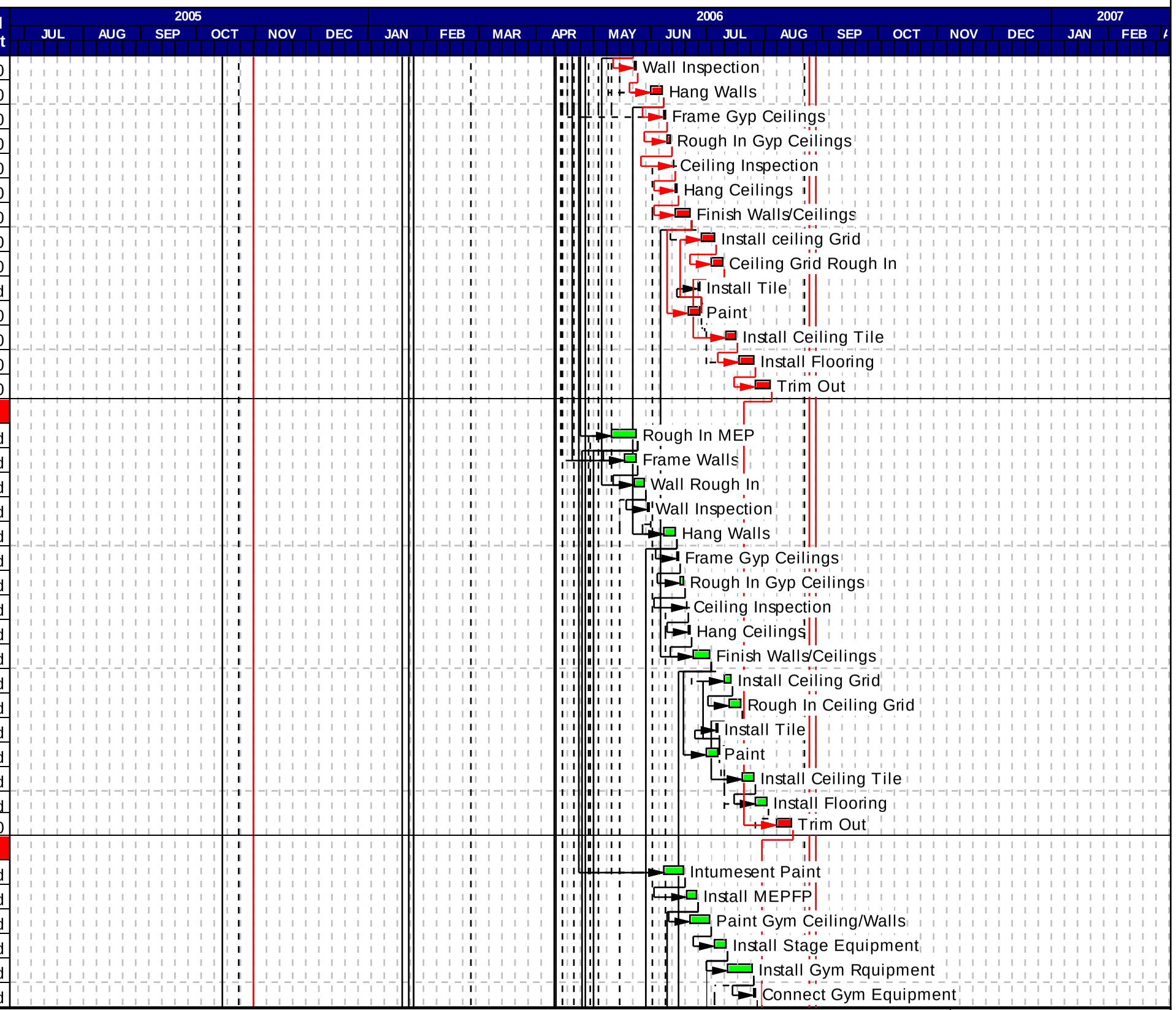
Detailed Project Schedule

Phase	Act ID	Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float
1ST	1620	Wall Inspection	2d	2d	23MAY06	24MAY06	0
1ST	1630	Hang Walls	5d	5d	01JUN06	07JUN06	0
1ST	1640	Frame Gyp Ceilings	2d	2d	08JUN06	09JUN06	0
1ST	1650	Rough In Gyp Ceilings	2d	2d	09JUN06	12JUN06	0
1ST	1660	Ceiling Inspection	1d	1d	13JUN06	13JUN06	0
1ST	1670	Hang Ceilings	2d	2d	14JUN06	15JUN06	0
1ST	1680	Finish Walls/Ceilings	7d	7d	14JUN06	22JUN06	0
1ST	1681	Install ceiling Grid	5d	5d	28JUN06	05JUL06	0
1ST	1682	Ceiling Grid Rough In	5d	5d	03JUL06	10JUL06	0
1ST	1690	Install Tile	2d	2d	26JUN06	27JUN06	13d
1ST	1700	Paint	5d	5d	21JUN06	27JUN06	0
1ST	1710	Install Ceiling Tile	5d	5d	11JUL06	17JUL06	0
1ST	1720	Install Flooring	7d	7d	18JUL06	26JUL06	0
1ST	1730	Trim Out	7d	7d	27JUL06	04AUG06	0
2nd Floor Finishes							
2ND	1740	Rough In MEP	10d	10d	11MAY06	24MAY06	5d
2ND	1750	Frame Walls	5d	5d	18MAY06	24MAY06	7d
2ND	1760	Wall Rough In	5d	5d	23MAY06	29MAY06	7d
2ND	1770	Wall Inspection	2d	2d	30MAY06	31MAY06	7d
2ND	1780	Hang Walls	5d	5d	08JUN06	14JUN06	2d
2ND	1790	Frame Gyp Ceilings	2d	2d	15JUN06	16JUN06	2d
2ND	1800	Rough In Gyp Ceilings	2d	2d	16JUN06	19JUN06	2d
2ND	1810	Ceiling Inspection	1d	1d	20JUN06	20JUN06	2d
2ND	1820	Hang Ceilings	2d	2d	21JUN06	22JUN06	2d
2ND	1830	Finish Walls/Ceilings	7d	7d	23JUN06	03JUL06	2d
2ND	1831	Install Ceiling Grid	5d	5d	10JUL06	14JUL06	2d
2ND	1832	Rough In Ceiling Grid	5d	5d	13JUL06	19JUL06	2d
2ND	1840	Install Tile	2d	2d	06JUL06	07JUL06	15d
2ND	1850	Paint	5d	5d	30JUN06	07JUL06	2d
2ND	1860	Install Ceiling Tile	5d	5d	20JUL06	26JUL06	2d
2ND	1870	Install Flooring	5d	5d	27JUL06	02AUG06	2d
2ND	1875	Trim Out	7d	7d	07AUG06	15AUG06	0
Gymnasium							
GYM	2160	Intumesent Paint	8d	8d	08JUN06	19JUN06	17d
GYM	2170	Install MEPFP	5d	5d	20JUN06	26JUN06	17d
GYM	2180	Paint Gym Ceiling/Walls	8d	8d	22JUN06	03JUL06	17d
GYM	2190	Install Stage Equipment	5d	5d	05JUL06	11JUL06	17d
GYM	2200	Install Gym Rquipment	10d	10d	12JUL06	25JUL06	17d
GYM	2210	Connect Gym Equipment	2d	2d	26JUL06	27JUL06	17d



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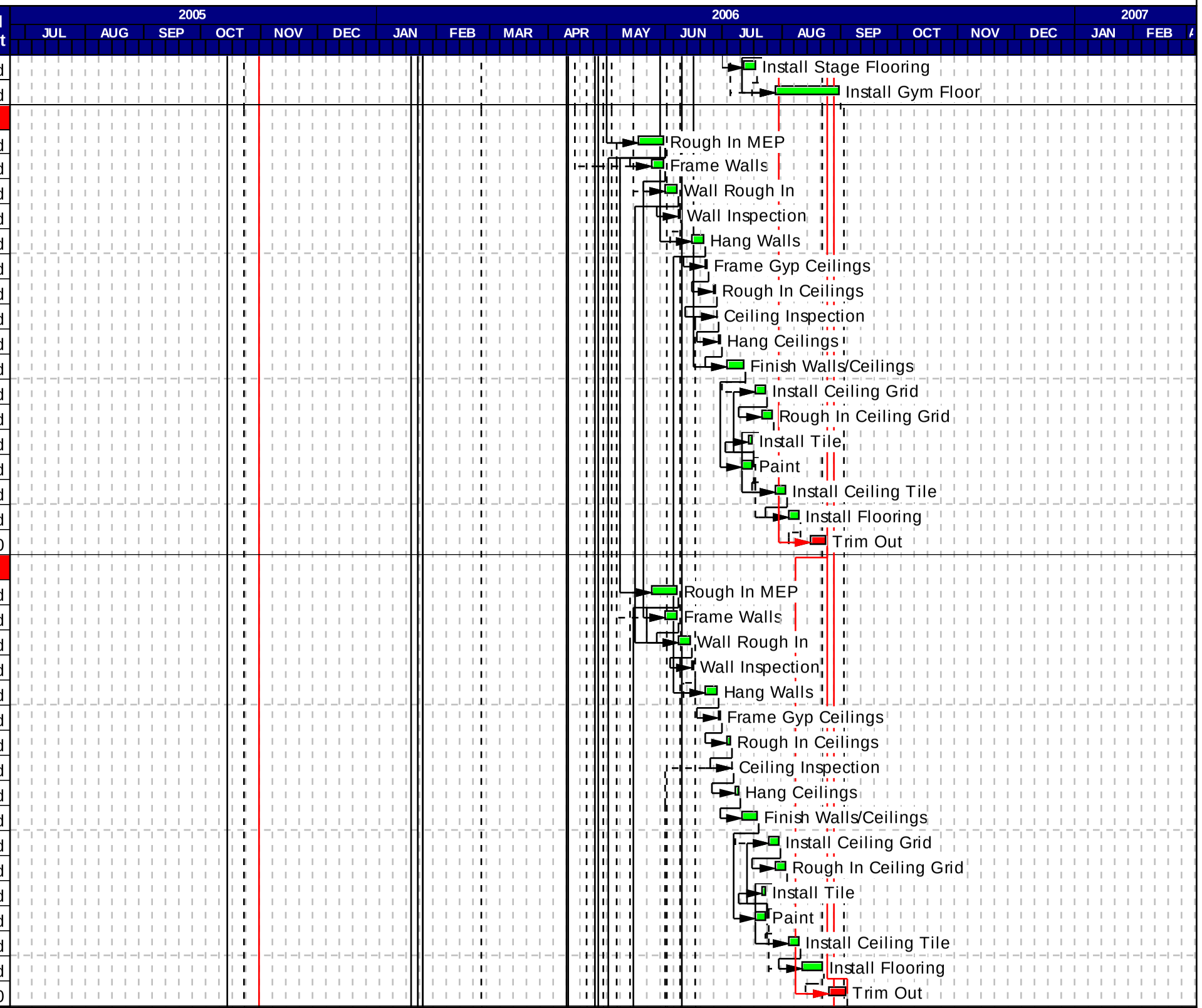
Phase	Act ID	Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float
GYM	2220	Install Stage Flooring	5d	5d	12JUL06	18JUL06	24d
GYM	2230	Install Gym Floor	25d	25d	28JUL06	31AUG06	17d
3rd Floor Finishes							
3RD	1880	Rough In MEP	10d	10d	18MAY06	31MAY06	5d
3RD	1890	Frame Walls	5d	5d	25MAY06	31MAY06	5d
3RD	1900	Wall Rough In	5d	5d	01JUN06	07JUN06	5d
3RD	1910	Wall Inspection	2d	2d	08JUN06	09JUN06	5d
3RD	1920	Hang Walls	5d	5d	15JUN06	21JUN06	2d
3RD	1930	Frame Gyp Ceilings	2d	2d	22JUN06	23JUN06	3d
3RD	1940	Rough In Ceilings	2d	2d	26JUN06	27JUN06	3d
3RD	1950	Ceiling Inspection	1d	1d	28JUN06	28JUN06	3d
3RD	1960	Hang Ceilings	2d	2d	29JUN06	30JUN06	3d
3RD	1970	Finish Walls/Ceilings	7d	7d	03JUL06	12JUL06	3d
3RD	1971	Install Ceiling Grid	5d	5d	18JUL06	24JUL06	3d
3RD	1972	Rough In Ceiling Grid	5d	5d	21JUL06	27JUL06	3d
3RD	1980	Install Tile	2d	2d	14JUL06	17JUL06	16d
3RD	1990	Paint	5d	5d	11JUL06	17JUL06	3d
3RD	2000	Install Ceiling Tile	5d	5d	28JUL06	03AUG06	3d
3RD	2010	Install Flooring	5d	5d	04AUG06	10AUG06	3d
3RD	2015	Trim Out	7d	7d	16AUG06	24AUG06	0
4th Floor Finishes							
4TH	2020	Rough In MEP	10d	10d	25MAY06	07JUN06	5d
4TH	2030	Frame Walls	5d	5d	01JUN06	07JUN06	5d
4TH	2040	Wall Rough In	5d	5d	08JUN06	14JUN06	5d
4TH	2050	Wall Inspection	2d	2d	15JUN06	16JUN06	5d
4TH	2060	Hang Walls	5d	5d	22JUN06	28JUN06	2d
4TH	2070	Frame Gyp Ceilings	2d	2d	29JUN06	30JUN06	2d
4TH	2080	Rough In Ceilings	2d	2d	03JUL06	05JUL06	2d
4TH	2090	Ceiling Inspection	1d	1d	06JUL06	06JUL06	2d
4TH	2100	Hang Ceilings	2d	2d	07JUL06	10JUL06	2d
4TH	2110	Finish Walls/Ceilings	7d	7d	11JUL06	19JUL06	2d
4TH	2111	Install Ceiling Grid	5d	5d	25JUL06	31JUL06	2d
4TH	2112	Rough In Ceiling Grid	5d	5d	28JUL06	03AUG06	2d
4TH	2120	Install Tile	2d	2d	21JUL06	24JUL06	15d
4TH	2130	Paint	5d	5d	18JUL06	24JUL06	2d
4TH	2140	Install Ceiling Tile	5d	5d	04AUG06	10AUG06	2d
4TH	2150	Install Flooring	8d	8d	11AUG06	22AUG06	2d
4TH	2240	Trim Out	7d	7d	25AUG06	04SEP06	0



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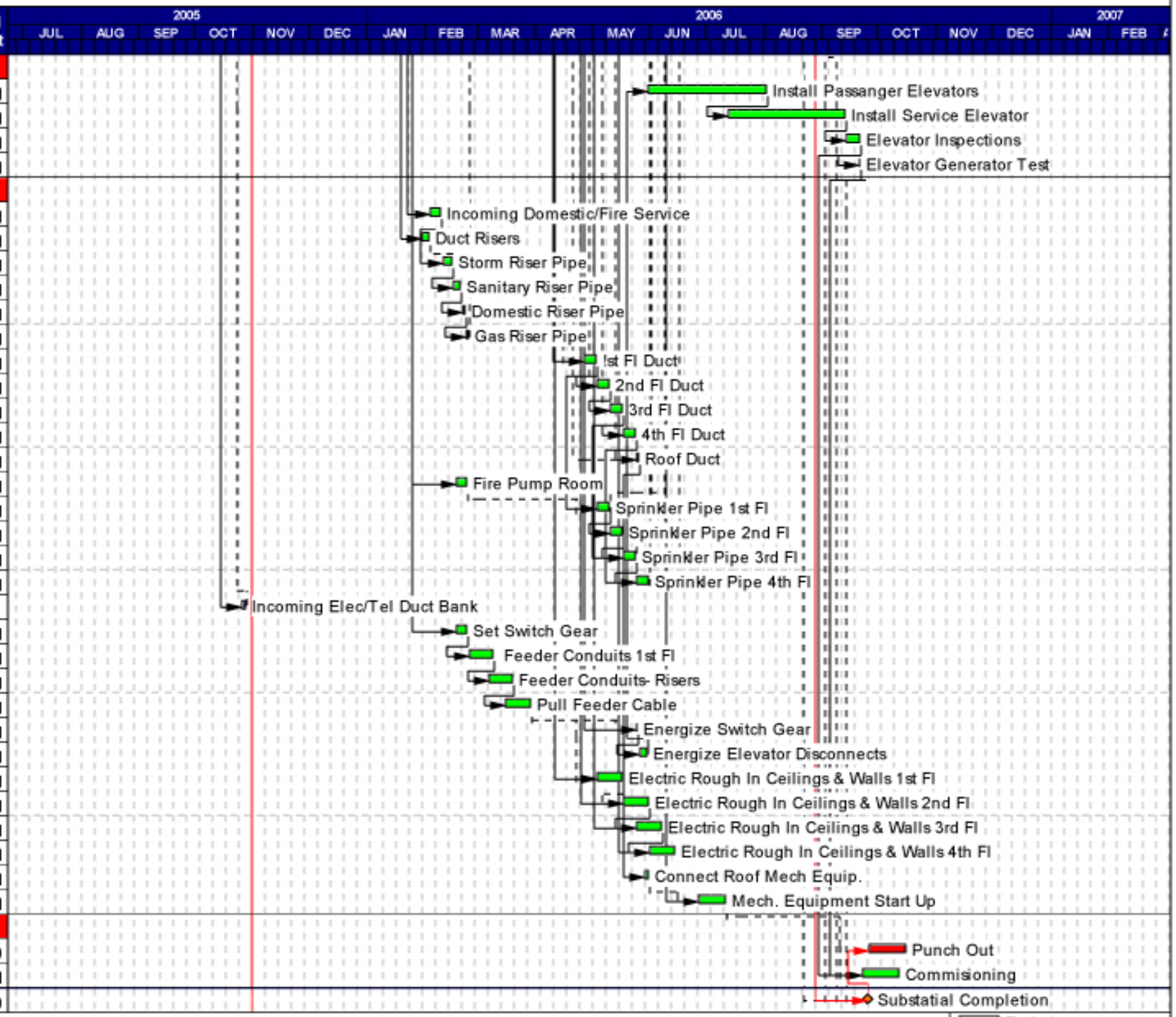
Detailed Project Schedule

Phase	Act ID	Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float
Elevators							
ELEV	2250	Install Passanger Elevators	45d	45d	31MAY06	02AUG06	2d
ELEV	2260	Install Service Elevator	45d	45d	13JUL06	13SEP06	2d
ELEV	2270	Elevator Inspections	6d	6d	14SEP06	21SEP06	2d
ELEV	2280	Elevator Generator Test	1d	1d	21SEP06	21SEP06	2d
MEP							
MEP	2300	Incoming Domestic/Fire	5d	5d	03FEB06	09FEB06	43d
MEP	2310	Duct Risers	5d	5d	30JAN06	03FEB06	68d
MEP	2320	Storm Riser Pipe	4d	4d	10FEB06	15FEB06	43d
MEP	2330	Sanitary Riser Pipe	3d	3d	16FEB06	20FEB06	43d
MEP	2340	Domestic Riser Pipe	2d	2d	21FEB06	22FEB06	43d
MEP	2350	Gas Riser Pipe	2d	2d	23FEB06	24FEB06	43d
MEP	2360	!st Fl Duct	5d	5d	27APR06	03MAY06	10d
MEP	2370	2nd Fl Duct	5d	5d	04MAY06	10MAY06	10d
MEP	2380	3rd Fl Duct	5d	5d	11MAY06	17MAY06	10d
MEP	2390	4th Fl Duct	5d	5d	18MAY06	24MAY06	10d
MEP	2400	Roof Duct	2d	2d	25MAY06	26MAY06	72d
MEP	2410	Fire Pump Room	5d	5d	17FEB06	23FEB06	72d
MEP	2420	Sprinkler Pipe 1st Fl	5d	5d	04MAY06	10MAY06	23d
MEP	2430	Sprinkler Pipe 2nd Fl	5d	5d	11MAY06	17MAY06	25d
MEP	2440	Sprinkler Pipe 3rd Fl	5d	5d	18MAY06	24MAY06	26d
MEP	2450	Sprinkler Pipe 4th Fl	5d	5d	25MAY06	31MAY06	26d
MEP	2460	Incoming Elec/Tel Duct	3d	0	26OCT05	28OCT05	
MEP	2470	Set Switch Gear	5d	5d	17FEB06	23FEB06	42d
MEP	2480	Feeder Conduits 1st Fl	10d	10d	24FEB06	09MAR06	42d
MEP	2490	Feeder Conduits- Risers	10d	10d	07MAR06	20MAR06	42d
MEP	2500	Pull Feeder Cable	10d	10d	16MAR06	29MAR06	42d
MEP	2510	Energize Switch Gear	1d	1d	25MAY06	25MAY06	2d
MEP	2520	Energize Elevator	3d	3d	26MAY06	30MAY06	2d
MEP	2530	Electric Rough In Ceilings	10d	10d	04MAY06	17MAY06	92d
MEP	2540	Electric Rough In Ceilings	10d	10d	18MAY06	31MAY06	87d
MEP	2550	Electric Rough In Ceilings	10d	10d	25MAY06	07JUN06	87d
MEP	2560	Electric Rough In Ceilings	10d	10d	01JUN06	14JUN06	87d
MEP	2570	Connect Roof Mech Equip.	3d	3d	29MAY06	31MAY06	72d
MEP	25800	Mech. Equipment Start Up	10d	10d	27JUN06	11JUL06	54d
Punchlist / Commisioning							
PNCH	2590	Punch Out	15d	15d	26SEP06	16OCT06	0
PNCH	2600	Commisioning	15d	15d	22SEP06	12OCT06	2d
PNCH	2610	Substatial Completion	0	0		25SEP06	0



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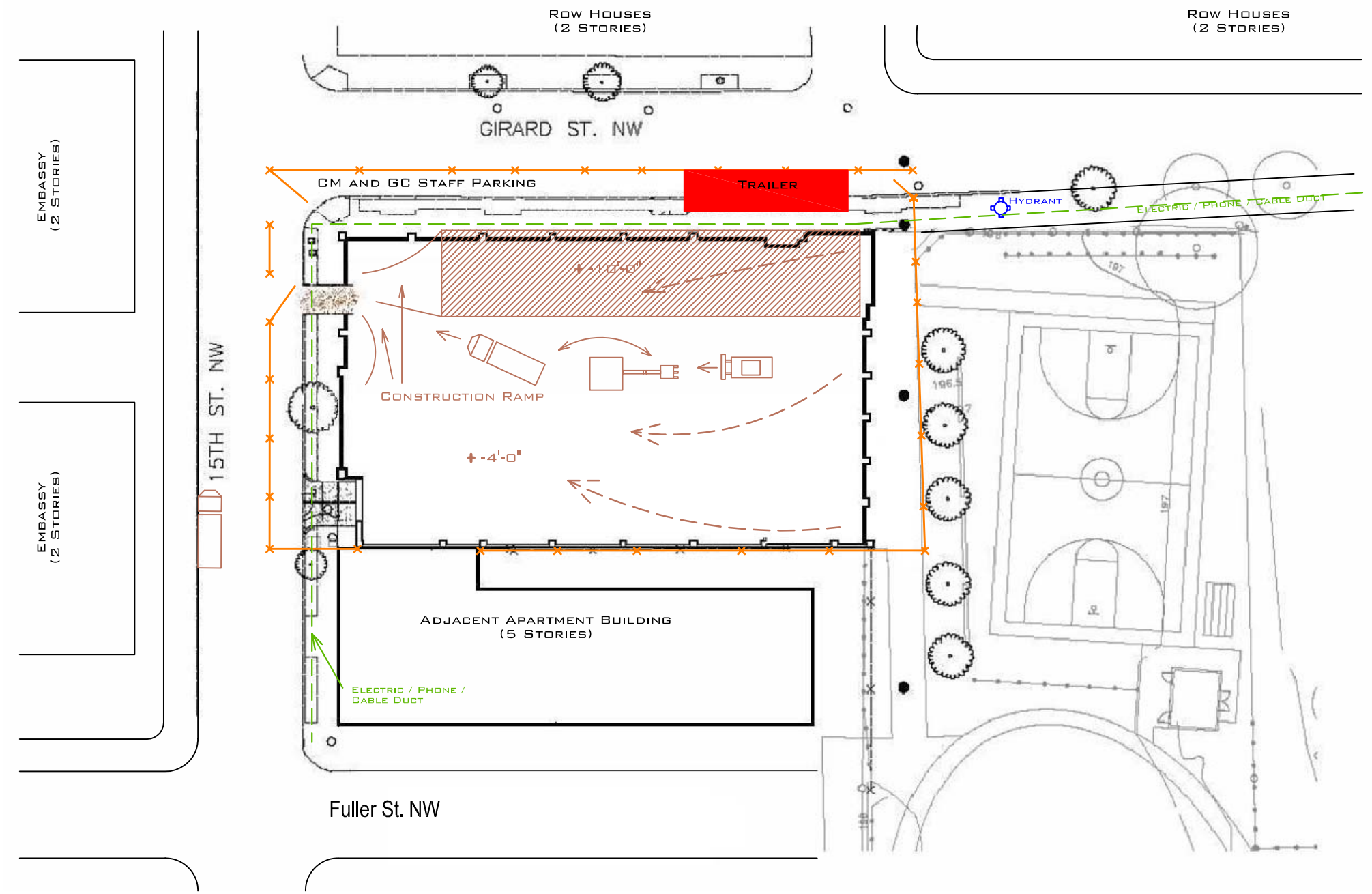
Site Layout Planning

As you can see on the site plans on the following pages, the site for Columbia Heights Community Center is extremely congested. Critical phases of construction are highlighted and the site plans illustrate how work will flow during those phases. Below is a list of three major phases and a brief description outlining a few key points:

- **Excavation**
  - There are two levels of excavation. The 10’ deep section is in the area where the footing steps down to meet the water meter vault. The remainder of the site will be excavated 4’ below datum to prepare for the rest of the foundation. The fleet will be balanced to minimize wait time for dump trucks before loading. All early trucks will park on the other side of 15th Street as seen on the Excavation Plan.
- **Steel Erection**
  - Steel is to be erected by bays (using multi-story columns) in three phases. Each phase is displayed on a separate drawing. The steel erection phases are as follows:
    1. Column Line (M-H)
    2. Column Line (H-E)
    3. Column Line (E-A)
       - The last piece of steel is to be erected from the street, closing a lane on 15th Street. This work will be performed on a weekend during off-peak hours so that impact to traffic is minimized.
- **Concrete Work**
  - Concrete work will follow shortly behind the steel erection. Upon completion of a steel phase, concrete will be poured in the decks of that finished area. The concrete operation will chase the steel erection until completion of the entire steel frame, and then the slab on grade will be poured.



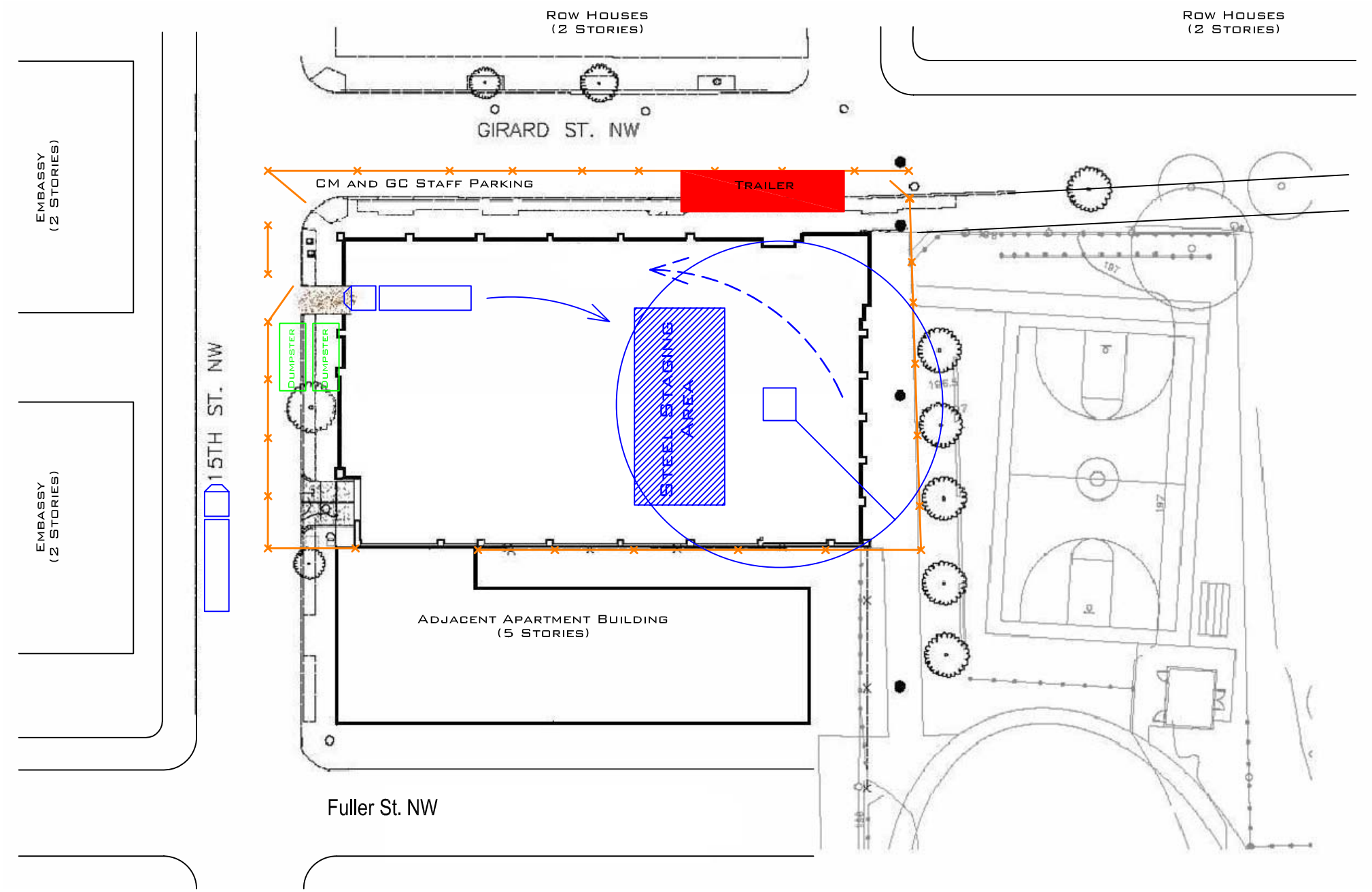
Notes:

All Elevations from Datum 195.80'

Legend:

- Excavator
- Dozer
- Dump Truck
- Path of Excavation
- Construction Fence

EXCAVATION PLAN		
Scale: 1/32" = 1'-0"	Approved By:	Revised:
Date: 10/31/2005		
For: Columbia Heights Community Center		
Drawn By: Christopher Glinski		Drawing Number: C-3



Legend:

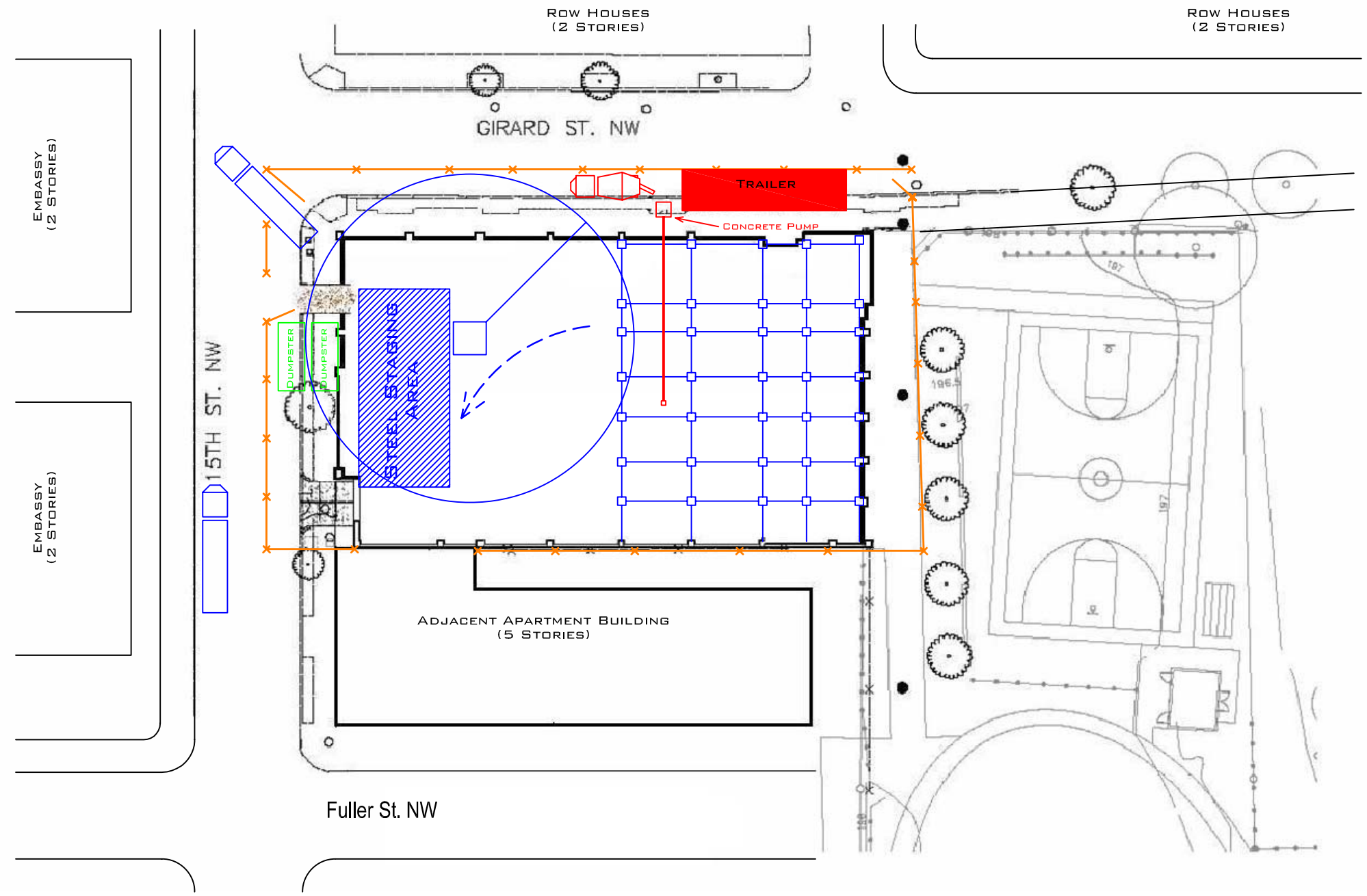
Crawler Crane

Steel Delivery Truck

Path of Steel Erection

Construction Fence

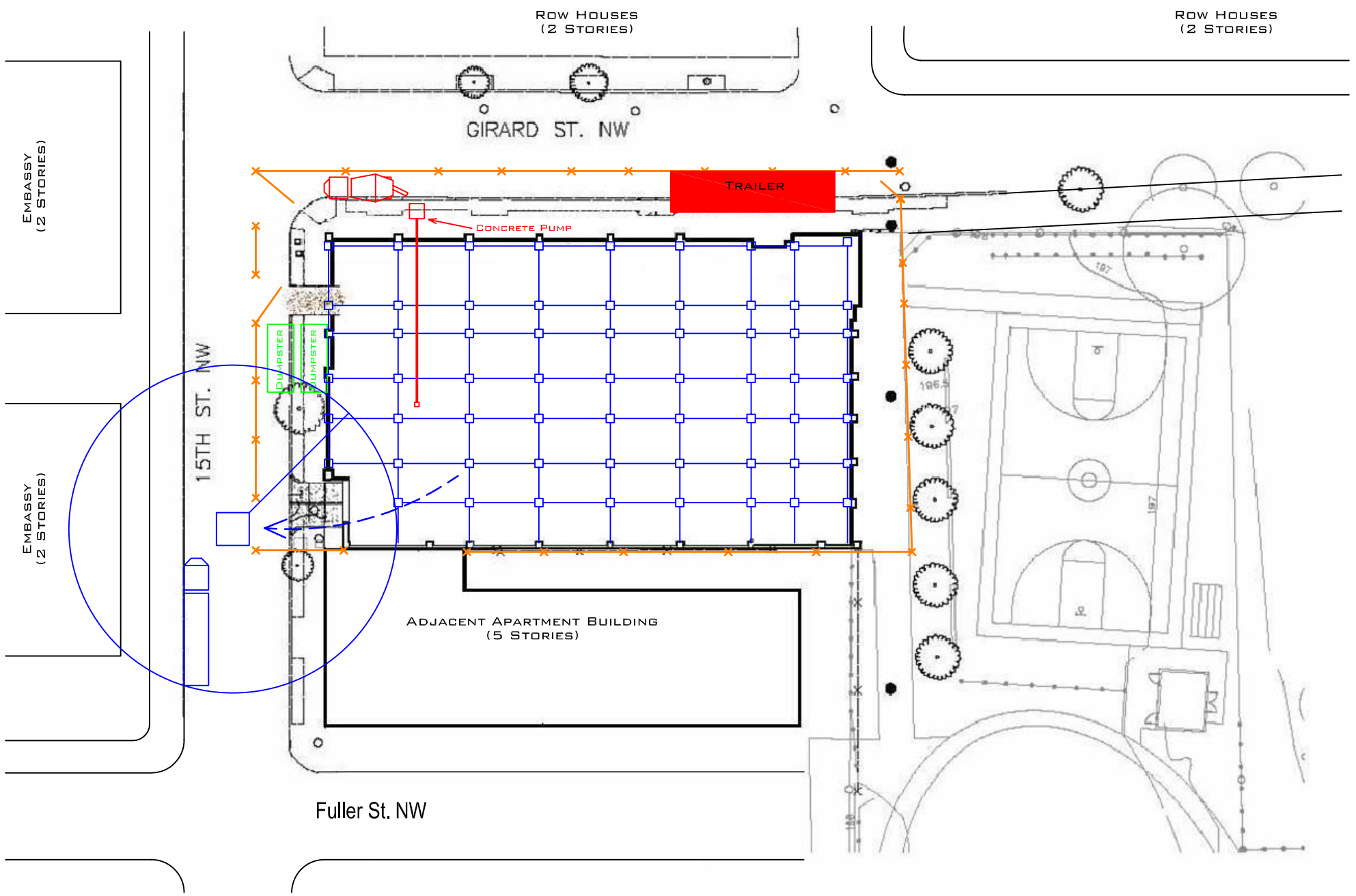
STEEL ERECTION PHASE 1		
Scale: 1/32" = 1'-0"	Approved By:	Revised:
Date: 10/31/2005		
For: Columbia Heights Community Center		
Drawn By: Christopher Glinski		Drawing Number: C-4



Legend:

- Crawler Crane
- Steel Delivery Truck
- Concrete Truck
- Path of Steel Erection
- Construction Fence

STEEL ERECTION PHASE 2		
Scale: 1/32" = 1'-0"	Approved By:	Revised:
Date: 10/31/2005		
For: Columbia Heights Community Center		
Drawn By: Christopher Glinski		Drawing Number: C-5



Note:

One lane of 15th St. NW to be temporarily closed while last piece erected

Legend:

- Crawler Crane
- Steel Delivery Truck
- Concrete Truck
- Path of Steel Erection
- Construction Fence

STEEL ERECTION PHASE 3		
Scale: 1/32" = 1'-0"	Approved By:	Revised:
Date: 10/31/2005		
For: Columbia Heights Community Center		
Drawn By: Christopher Glinski		Drawing Number: C-6

Assemblies Estimate

An Assemblies Estimate was used to determine the cost of the building skin for the Columbia Heights Community Center. The source of all cost data was *Means Cost Works 2005*. The building exterior is composed mainly of Norman face brick and has a curtainwall system on the Northeast corner. Material quantities and costs can be found on the next page in the following table, *Table 1 - Building Skin Assembly Estimate.* Columbia Heights Community Center has a few unique window sizes. Certain windows (as noted on the table) had to be approximated using modular sizes.

Division	Item	Quantity/Size	Unit	Material $ / Unit	Total Material $	Labor $ / Unit	Total Labor $	Total Cost
04000	Norman Facebrick (8" CMU backup / styrofoam insulated)							
	North	5,500	SF	7.65	$42,075	13.6	$74,800	$116,875
	East	2,100	SF	7.65	$16,065	13.6	$28,560	$44,625
	South	5,800	SF	7.65	$44,370	13.6	$78,880	$123,250
	West	3,500	SF	7.65	$26,775	13.6	$47,600	$74,375
08000	Curtainwall	2,800	SF	22	$61,600	9.4	$26,320	$87,920
	Single Punch Windows (56)	2'-8" x 6'-8"	ea.	375	$21,000	247	$13,832	$34,832
	Double Punch Windows (6)	(2) 3'-0" x 5'-4"	ea.	545	$6,540	109	$1,308	$7,848
	Type Q Tall Windows (5)	4'-6" x 13'-10"	ea.	1245	$6,225	357	$1,785	$8,010
	Terrace Windows (7)	10'-4" x 10'-3"	ea.	3870	$27,090	654	$4,578	$31,668
	Skylight Strip Windows		ea.	415	$26,975	119	$7,735	$34,710
	- Composed of (65) 3'-0" x 4'-0" panes							
			Total		**$278,715**		**$285,398**	**$592,319**

*All prices taken from *Means Cost Works 2005* .

**All glass low-e, tinted

***All windows aluminum

**** All measurements given in LxH

*****CMU backup and insulation not part of building skin and are not included in estimate

TABLE 1 - BUILDING SKIN ASSEMBLY ESTIMATE

Detailed Structural Systems Estimate

A detailed estimate was performed on the entire structural system for the Columbia Heights Community Center, which included the foundations, slab on grade, steel frame, and slabs on metal deck. The results of the detailed estimate can be viewed in *Table 2* and *Table 3* on the following pages. If you reference the project cost evaluation section of my Technical Assignment 1, the actual costs for the structural system are as follows:

- Structural Steel - $1,100,000
- Structural Concrete - $600,000

When viewing the results from the detailed estimate, it can be seen that the cost of the steel frame is slightly higher, totaling approximately $1,400,000. This can be partly due to using round numbers for lengths and the assumption of 10% for connections. The cost of concrete from the detailed estimate was found to be significantly lower at approximately $151,000. Part of this variance could be due to rising material costs as well as material storage due to the initial delay in construction from permitting complications. Another possible cause for the difference could be the assumption that all slabs on deck are similar in size.

Please see the following tables for all material quantities and cost data:

- *Table 2 - Division 03000 Takeoff / Estimate*
- *Table 3 - Division 05000 Takeoff / Estimate*

Division	Item	Length (ft.)	Quantity	Volume (CY)	Material $ / Unit	Total Material $	Labor $ / Unit	Total Labor $	Equipment $ / Unit	Total Equipment $	Total Cost
03000	Column Footings/ Grade Beams										
	6' W x 2' Thick	169	1.00	75.11	84.00	$6,309	12.25	$920	5.00	$376	$7,605
	6' W x 2' Thick	150	1.00	66.67	84.00	$5,600	12.25	$817	5.00	$333	$6,750
	10' x 10' x 2' Thick		5.00	37.04	84.00	$3,111	28.50	$1,056	11.50	$426	$4,593
	6' W x 2' Thick	84	1.00	37.33	84.00	$3,136	12.25	$457	5.00	$187	$3,780
	6' W x 2' Thick	56	1.00	24.89	84.00	$2,091	12.25	$305	5.00	$124	$2,520
	9' x 9' x 2.5' Thick		1.00	7.50	84.00	$630	28.50	$214	11.50	$86	$930
	9' x 9' x 1.5' Thick		1.00	4.50	84.00	$378	28.50	$128	11.50	$52	$558
	5' x 5' x 2.5' Thick		4.00	9.26	84.00	$778	28.50	$264	11.50	$106	$1,148
	11' x 11' x 2' Thick		1.00	8.96	84.00	$753	28.50	$255	11.50	$103	$1,111
	6' x 6' x 1.5' Thick		5.00	10.00	84.00	$840	28.50	$285	11.50	$115	$1,240
	10' x 10' x 1.5' Thick		1.00	5.56	84.00	$467	28.50	$158	11.50	$64	$689
	Strap Beams										
	4' W x 1.5' D	360	1	80.00	84.00	$6,720	10.20	$816	4.18	$334	$7,870
	Tie Beams										
	4' W x 2.5' D	68	1	25.19	84.00	$2,116	10.20	$257	4.18	$105	$2,478
	1.5' W x 1.5' D	16	1	1.33	84.00	$112	10.20	$14	4.18	$6	$131
	Foundation Wall										
	2' H x 1.25' W	375	1	34.72	84.00	$2,917	12.25	$425	5.00	$174	$3,516
	SOG - 5" thick w/ vapor, WWF, stone		13,200 SF	203.70	84.00	$17,111	14.15	$2,882	5.80	$1,181	$21,175
	2nd Fl. Deck - 3.5" Lightweight		11,000 SF	118.83	84.00	$9,982	13.10	$1,557	5.35	$636	$12,174
	3rd Fl. Deck - 3.5" Lightweight		11,000 SF	118.83	84.00	$9,982	13.10	$1,557	5.35	$636	$12,174
	4th Fl. Deck - 3.5" Lightweight		11,000 SF	118.83	84.00	$9,982	13.10	$1,557	5.35	$636	$12,174
	Roof Deck - 3.5" Lightweight		11,000 SF	118.83	84.00	$9,982	13.10	$1,557	5.35	$636	$12,174
	Deck Pour - Stage - 3.5" Lightweight		750 SF	8.10	84.00	$680	13.10	$106	5.35	$43	$830
			TOTAL CY	**1,115.17**							
	Forming	**Thickness**	**Contact Area (SF)**								
	Slab on Grade	5"	(P) * (5"/12") =	201.88	0.48	$97	4.60	$929			$1,026
	2nd Fl. Deck - 3.5" Lightweight	3.5"	(P) * (3.5"/12") =	141.31	0.48	$68	4.60	$650			$718
	3rd Fl. Deck - 3.5" Lightweight	3.5"	(P) * (3.5"/12") =	141.31	0.48	$68	4.60	$650			$718
	4th Fl. Deck - 3.5" Lightweight	3.5"	(P) * (3.5"/12") =	141.31	0.48	$68	4.60	$650			$718
	Roof Deck - 3.5" Lightweight	3.5"	(P) * (3.5"/12") =	141.31	0.48	$68	4.60	$650			$718
	Perimeter (P) = 2(152.25' + 90') =		484.5'								
	Column Footings / Grade Beams	Varies		3004.00	2.31	$6,939	2.76	$8,291			$15,230
	Strap Beams	1.5'		1092.00	1.56	$1,704	3.02	$3,298			$5,001
	Tie Beams	Varies		360.00	1.56	$562	3.02	$1,087			$1,649
	Foundation Wall	2'		1505.00	2.31	$3,477	2.76	$4,154			$7,630
	(single use forms)										
					Totals	**$106,723**		**$35,945**		**$6,359**	**$149,027**
	* All concrete 4000psi and pumped										
	** Assume all slabs on metal deck are similar in size and shape										
										x DC Location Factor (.97)	
										+ 5% waste factor	
											$151,784

Table 2 - Division 03000 Takeoff / Estimate

Division	Item	Length (ft.)	Quantity	Tons	Material $ / Unit	Total Material $	Labor $ / Unit	Total Labor $	Equipment $ / Unit	Total Equipment $	Total Cost
05000	Columns										
	W 10x30	52	1	0.78	2550.00	$1,989	360.00	$281	169.00	$132	$2,402
	W 10x49	26	5	3.185	2550.00	$8,122	360.00	$1,147	169.00	$538	$9,807
	W 10x39	26	3	1.521	2550.00	$3,879	360.00	$548	169.00	$257	$4,683
	W 10x54	26	4	2.808	2550.00	$7,160	360.00	$1,011	169.00	$475	$8,646
	W 10x33	14	10	2.31	2550.00	$5,891	360.00	$832	169.00	$390	$7,112
	W 12x58	52	1	1.51	2550.00	$3,851	360.00	$544	169.00	$255	$4,649
	W 10x49	52	2	2.55	2550.00	$6,503	360.00	$918	169.00	$431	$7,851
	W 10x33	2	2	1.72	2550.00	$4,386	360.00	$619	169.00	$291	$5,296
	W 14x90	2	1	2.34	2550.00	$5,967	360.00	$842	169.00	$395	$7,205
	W 14x108	52	9	25.27	2550.00	$64,439	360.00	$9,097	169.00	$4,271	$77,806
	W 14x145	52	1	3.77	2550.00	$9,614	360.00	$1,357	169.00	$637	$11,608
	W 14x120	52	16	49.92	2550.00	$127,296	360.00	$17,971	169.00	$8,436	$153,704
	W 10x33	11	14	2.54	2550.00	$6,477	360.00	$914	169.00	$429	$7,821
	TS 6x6x3/8	26	4	1.46	2550.00	$3,723	360.00	$526	169.00	$247	$4,495
	Beams	**Total Length (ft.)**		**Tons**							
	TS 8x4x3/8 at Canopy	18		0.31	2550.00	$791	360.00	$112	169.00	$52	$954
	W 8x10	760		3.80	2550.00	$9,690	360.00	$1,368	169.00	$642	$11,700
	W 10x12	326		1.96	2550.00	$4,998	360.00	$706	169.00	$331	$6,035
	W 12x14	1120		7.84	2550.00	$19,992	360.00	$2,822	169.00	$1,325	$24,139
	W 12x16	296		2.37	2550.00	$6,044	360.00	$853	169.00	$401	$7,297
	W 12x19	64		0.61	2550.00	$1,556	360.00	$220	169.00	$103	$1,878
	W 12x22	380		4.18	2550.00	$10,659	360.00	$1,505	169.00	$706	$12,870
	W 12x26	260		3.38	2550.00	$8,619	360.00	$1,217	169.00	$571	$10,407
	W 12x30	250		3.75	2550.00	$9,563	360.00	$1,350	169.00	$634	$11,546
	W 14x22	1510		16.61	2550.00	$42,356	360.00	$5,980	169.00	$2,807	$51,142
	W 14x68	60		2.04	2550.00	$5,202	360.00	$734	169.00	$345	$6,281
	W 16x26	192		2.50	2550.00	$6,375	360.00	$900	169.00	$423	$7,698
	W 16x31	92		1.43	2550.00	$3,647	360.00	$515	169.00	$242	$4,403
	W 18x119	146		8.69	2550.00	$22,160	360.00	$3,128	169.00	$1,469	$26,757
	W 18x35	980		17.15	2550.00	$43,733	360.00	$6,174	169.00	$2,898	$52,805
	W 18x40	120		2.40	2550.00	$6,120	360.00	$864	169.00	$406	$7,390
	W 18x48	80		1.92	2550.00	$4,896	360.00	$691	169.00	$324	$5,912
	W 18x55	1325		36.44	2550.00	$92,922	360.00	$13,118	169.00	$6,158	$112,199
	W 18x65	40		1.30	2550.00	$3,315	360.00	$468	169.00	$220	$4,003
	W 18x71	128		4.54	2550.00	$11,577	360.00	$1,634	169.00	$767	$13,979
	W 18x76	274		10.41	2550.00	$26,546	360.00	$3,748	169.00	$1,759	$32,052
	W 21x44	888		19.54	2550.00	$49,827	360.00	$7,034	169.00	$3,302	$60,164
	W 24x55	200		5.50	2550.00	$14,025	360.00	$1,980	169.00	$930	$16,935
	W 24x62	864		26.78	2550.00	$68,289	360.00	$9,641	169.00	$4,526	$82,456
	W 36x135	40		2.70	2550.00	$6,885	360.00	$972	169.00	$456	$8,313
	W 36x182	108		9.83	2550.00	$25,067	360.00	$3,539	169.00	$1,661	$30,267
	W 40x183	60		5.49	2550.00	$14,000	360.00	$1,976	169.00	$928	$16,904
	W 40x199	120		11.94	2550.00	$30,447	360.00	$4,298	169.00	$2,018	$36,763
	W 40x215	120		12.90	2550.00	$32,895	360.00	$4,644	169.00	$2,180	$39,719
		Total Steel		**329.99**		**$841,485**		**$118,798**		**$55,769**	**$1,016,052**

Item	Quantity	Unit	Material $ / Unit	Total Material $	Labor $ / Unit	Total Labor $	Equipment $ / Unit	Total Equipment $	Total Cost
2" Galvanized Floor Decking	44,000.00	SF	$5.85	**$257,400**	$0.85	**$37,400**	$0.06	**$2,640**	**$297,440**
					Total Price =		**$1,016,052 + $297,440 =**		**$1,313,491.53**
								+ connections (10%)	
									$1,444,840.68
								x DC Location Factor (.97)	
									$1,401,495

TABLE 3 - DIVISION 05000 TAKEOFF / ESTIMATE

General Conditions Estimate

An estimate of the General Conditions (GC) for the Columbia Heights Community Center can be seen on *Table 4 – General Conditions*. The total GC cost of roughly $651,000 accounts for 6.64% of the entire building construction costs. This percentage is slightly lower than the average cost of 10%. This can be due to the exclusion of any winter protection and material storage because they are included in the Subcontractors' scope of work. Also, this estimate was taken from the point of view of the General Contractor and does not include the Program Manager's fee. Please see the following page for *Table 4.*

Category	Item	Quantity	Unit	Time (Months)	Unit Cost	Cost / Month ($)	Total Cost ($)
Fee							
	GC Fee	2.50%	Job	14	$245,000	$17,500	$245,000
Bonds / Insurance							
	Bonds (Performance)	0.60%	Job	14	$58,800	$4,200	$58,800
	Insurance (Builder's Risk)	0.24%	Job	14	$23,520	$1,680	$23,520
Staffing							
	Project Executive	1	Ea.	5		$10,000	$50,000
	Project Manager	1	Ea.	15	-	$7,400	$111,000
	Senior Superintendent	1	Ea.	15	-	$6,900	$103,500
	Intern / Field Engineer	1	Ea.	6	-	$3,060	$18,360
Temp Utilities							
	Temp Water (Hydrant)	1	Ea.	6	$750	-	$750
	Temp Power	1	Ea.	14	-	$250.00	$3,500
	Temp Lighting	1	Ea.	10	-	$18	$180
	Temp Heating	1	Ea.	3	-	$36	$108
	Toilets (Portable Chemical)	2	Ea.	14		$159	$4,452
Office Support							
	Trailer (10'x40')	1	Ea.	14	-	$254	$3,556
	Office Supplies	1	Ea.	14	-	$85	$1,190
	Telephone / Internet	1	Ea.	14	-	$204	$2,856
	Trailer Lights / HVAC	1	Ea.	14	-	$98	$1,372
	Copy Machine	1	Ea.	14	$250.00	-	$250.00
Other:							
	Dumpsters (Pulled Weekly)	2	Ea.	14	-	$665	$18,620
	Temporary Fencing - 8' High	520	LF	14	-	$19	$9,854
	Trash Chutes (4-12' stories)	2	Ea.	14	$7,272	-	$7,272
	Jersey Barriers	250	LF	14	$6,988	-	$6,988

Total	**$42,528**	**$671,128**
	x DC Location Factor (.97)	
		$650,994

* All prices were taken from R.S. Means 2005

** If min and max prices listed, the average of the two was used

Table 4 - General Conditions

Technical Assignment 2 Estimate Summary

The following estimate summary was not required for this assignment and is included for the purposes of comparison between system costs. All costs displayed are taken from the totals of the previous estimates. All total costs include location modifiers and the percentages are based against the reported total construction cost of $9,800,000. Please see *Table 5 – Tech 2 Estimate Summary* for the total costs of the building skin, structural system, and general conditions.

Code	Division Name	% of total Cost	Projected Cost
01000	General Requirements	6.64%	$650,994
03000	Concrete		
	Foundation	0.76%	$74,430
	Slab on Grade	0.23%	$22,200
	Decks	0.55%	$53,422
04000	Masonary		
	Face Brick	3.85%	$377,081
05000	Metals		
	Structural Steel	14.30%	$1,401,495
08000	Doors and Windows		
	Curtainwall	0.94%	$92,316
	Windows	1.25%	$122,921
	Total Building Costs	100%	$9,800,000

Table 5 - Tech 2 Estimate Summary