

Technical Assignment 1

Construction Project Management

Oct 5th, 2009



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Construction Management
Dr. Magent

700 6th Street
Washington, DC

Table of Contents

1.	Executive Summary.....	3
2.	Project Schedule Summary.....	4
3.	Building Systems Summary.....	5
4.	Project Cost Evaluation	
	a. Building Systems Cost (Actual Building Construction Cost, and Total Project Costs).....	16
	b. D4 Cost Estimate.....	19
	c. Square Foot Estimate.....	20
	d. Summary.....	21
5.	Site Plan of Existing Conditions	
	a. Site Map.....	22
6.	Local Conditions.....	24
7.	Client Information.....	25
8.	Project Delivery System.....	26
9.	Staffing Plan.....	28
	Appendix	30
	Project Schedule.....	31
	Site Plan.....	32
	R.S. Means References.....	33

1. Executive Summary

At the center of downtown Washington 700 Sixth Street is a classically-designed, modern office structure with all the attributes and amenities demanded by businesses today. 700 6th has over 300,000 square feet of office space with efficient floor layouts to maximize the user's needs. There is a 4 level parking garage directly below the building accommodating commuters that do not use the Metro. The main lobby has marble flooring, glass bridges, and metal walls. This is a LEED Platinum rated building with the largest Commercial Office Building Green Roof in DC.

The project schedule is not very tight; there is room to expand the schedule. There was a large change in the project schedule and that was to put a green roof on mid-construction. This delayed the schedule but did not affect the owner and his clients.

700 6th Streets building façade is a very complex system and consist of 6 different materials. Having all those different materials means more coordination for the CM. After talking the Project Manager about the façade system, he said it was a headache and would not use EIFS on this building. EIFS is a good system but it had to be torn down 4 times because it wasn't installed right.

700 6th Streets construction cost is \$41,049,000.00, which does not include general conditions. This total would have been a lot more but Balfour Beatty is only responsible for the frame of the building and had minimal finishes to complete, because of this the R.S. Means estimate was higher than the construction cost.

700 6th Street is located in the heart of downtown DC; it is right next to the Verizon Center and attached to the Gallery Place. This is a very difficult site to manage because of it being located in the city.

Design-Bid-Build was the chosen delivery system for this project because the owner has used this delivery system before and feels comfortable with it. This traditional delivery system was chosen because time was not a huge factor. Balfour Beatty was chosen because they offered the lowest competitive bid.

This project is almost complete so obtaining information will not be a problem because it is readily available.

2. Project Schedule Summary

The concrete foundation consists of spread footings at all columns, mat slab, and slab on grade at all other locations. The foundation is a driver to keep the schedule on time. Nothing can start till the foundation is done. Half of the concrete work was done during warm weather and the other was done during the colder months. Special care had to be taken to adjust the admixtures during the hot and cold months to ensure the concrete cures to its designed strength.

Once the foundation is complete the concrete superstructure starts construction. The estimated amount of days to complete all the levels is 115 days. Once a few floors are completed precast concrete will start to be hung. A tower crane will handle the concrete superstructure and mobile cranes will hang the precast on the lower levels.

Balfour Beatty is only responsible for lobby, and central core finishes. The owner is responsible for finishing the rest of the building. Finishing the lobby is in the back end the construction schedule. The main reason for this is the finishes cannot start till that floor is sealed from the environment. That means that none of the finishing trades can start till the precast, windows, and EIFS are complete. Once the lobby is finished the trades will go from floor to floor, finishing only the core area. Once testing and finishes come to a close the project team will check their punch list items and turn over the building to the owner.

Refer to Appendix for Project Schedule

3. Building Systems Summary

Yes	No	Work Scope
X		Demolition Required
	X	Structural Steel Frame
X		Cast in Place Concrete
X		Precast Concrete
X		Mechanical System
X		Electrical System
X		Masonry
X		Curtain Wall System
x		Support of Excavation

Demolition Required

- The 5 story building shown below needed to be removed in its entirety.
- Below the building is a 3 level parking garage that needed to be demolished
- The 1 level red building needed to be demolished.
- Asbestos and Lead paint was not found in this building

Existing Building to be removed



3 Level Parking Garage



Cast in Place Concrete

- Cast –in-place concrete was used for building footings, foundation walls, grade beams, slabs-on-grade, suspended slabs, concrete toppings, and columns.
- All the above used normal weight concrete.
- All the formwork used typical wood framing. The formwork is removed, cleaned, and reused.
- A pump truck and crane bucket was used for all major pours.

Column Formwork



Suspended Slab Formwork



Precast Concrete

- 2 types of precast on this job
 - Pre-cast with Alabama Limestone casted into pre-cast. Goes from 4th to 12th floor.
 - Precast that has similar color to match Alabama limestone
- The stone to precast anchoring needs a minimum of 2 anchors per casted section.
- The precast units are bolted to the building structural frame. Clips and hangers are used to attach the precast units to the structural frame.
- Precast was used on all elevations
- The crane that was used to erect the precast pieces was a mobile crane.
- Refer to the attached map below for crane locations when erecting precast.



Precast Pieces



Precast Being Hung



Mechanical System

- The main mechanical is located on the penthouse floor plan.
- The penthouse has floor plan has 3 cooling towers and an emergency generator. Also located on that floor are a Mechanical Engineers room and a mechanical room.
- Each individual floor has its own mechanical room located in the core of the building.
- The HVAC is a variable air volume system. The AHU's distribute through galvanized sheet metal duct and supplied to rooms through registers and grilles.
- Wet pipe sprinkler system

Electric System

- Electric power – 2.5 watts per square foot for lighting
- 6.0 watts per square foot for power receptacles
- 480 V/3 Phase/4 Wire
- 400A/3 Phase main feeder breaker

Masonry

- The exterior cladding is made of Indiana Limestone.
- The main lobby/elevator car floors are made of Italian marble and Limestone.
- All thresholds are made out of granite.
- All the exterior paving is made out of honed granite.
- All stone countertops are made out of honed marble
- CMU's were used for interior masonry walls

Main Lobby



Curtain Wall

- The curtain wall is glazed aluminum
- The curtain wall is hung off the edge of a slab using metal brackets that are cast into the slab.
- The space between the slab and the curtain wall is filled with a fire caulking compound.

Curtain Wall



Support of Excavation

- Sheet piles and lagging were used for excavation support.

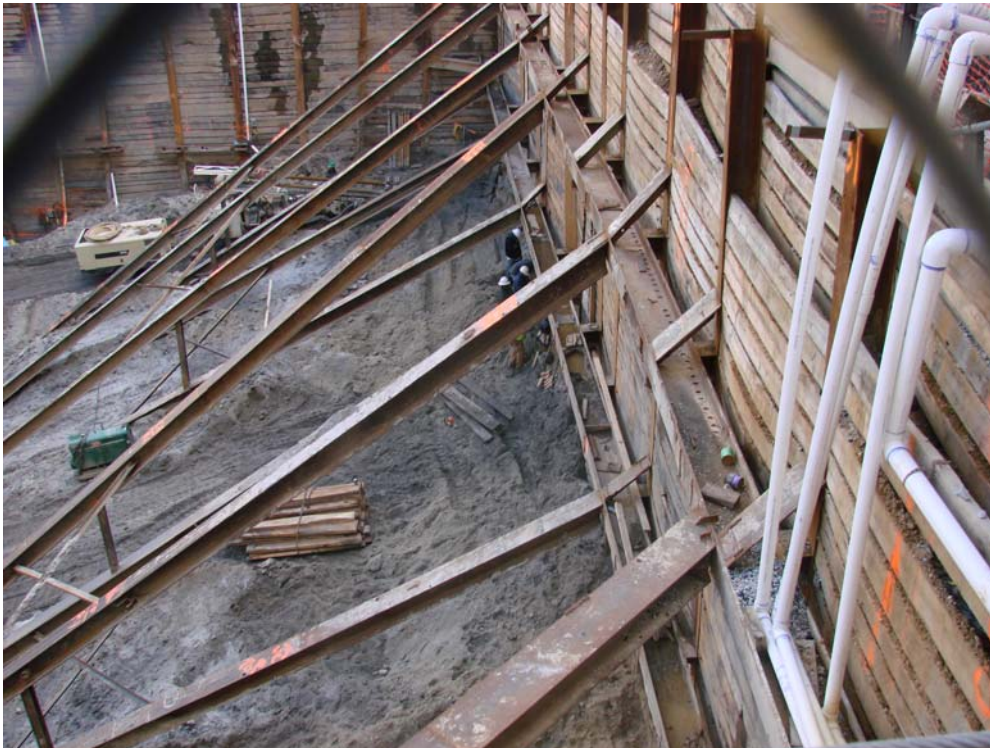
Pile Driver



Sheeting and Shoring



Bracing



Tiebacks



Green Building Features

- LEED Platinum rated building
- Green Roof
 - Largest Commercial Office Building Green Roof in DC
- Water Conserving Fixtures
 - Low flush urinals,
 - Aerated faucets and showerheads (lower flow with air providing the pressure)
 - Dual flush valve toilets
 - Dual flush valves give users the option of using a full or half flush by pushing the lever up or down
- 700 Sixth Street uses no CFCs or HCFCs, thereby preventing ozone depletion
- Over 75 percent of all construction and demolition debris is being recycled, salvaged for reuse, or otherwise diverted from landfill.
- Recycled content will comprise over 10 to 20 percent of building materials
- Regional materials will comprise more than 10 to 20 percent of all building materials
- Certified Wood

4. Project Cost Evaluation

a. Building Systems Cost (Actual Building Construction Cost, and Total Project Costs)

Building Systems Cost			
Trade	Description	Price Breakdown	Price/318,000 SF
Div.2 - Sitework Subcontractor			
	Excavation	NA	0
	Other Earthwork	\$459,017.00	\$1.44
	Pepco Vaults	\$217,400.00	\$0.68
	Site Pavers/Curb and Gutter	\$207,543.00	\$0.65
	Road Paving Repair	\$33,960.00	\$0.11
	Landscaping/Hardscaping	\$16,075.00	\$0.05
Div. 3-Concrete			
	Concrete	\$9,540,000.00	\$30.00
	Precast Concrete	\$1,564,980.00	\$4.92
Div. 4-Masonry			
	Masonry	\$387,750.00	\$1.22
	Stone	\$1,519,800.00	\$4.78
Div. 5-Metals			
	Miscellaneous/Ornamental Metals	\$1,392,251.00	\$4.38
	Glass Floor Assembly	\$900,000.00	\$2.83
Div. 6-Woods and Plastics			
	Carpentry	\$23,500.00	\$0.07
	Millwork	\$131,266.00	\$0.41

Div. 7-Thermal and Moisture Protection			
	Waterproofing and Roofing	\$800,000.00	\$2.52
	Caulking	\$190,000.00	\$0.60
	EIFS	\$170,000.00	\$0.53
	Fire-Proofing	\$16,111.00	\$0.05
Div. 8-Doors and Windows			
	Doors, Frames, and Hardware	\$188,000.00	\$0.59
	Access Doors	\$609.00	\$0.00
	Overhead Doors	NA	\$0.00
	Glass and Glazing (Incl Spandrel Panels)	\$7,250,000.00	\$22.80
Div. 9-Finishes			
	Drywall	\$1,650,000.00	\$5.19
	Tile	\$254,278.00	\$0.80
	Carpet and Resilient Flooring	\$150,000.00	\$0.47
	Painting	\$225,000.00	\$0.71
Div. 10-Specialities			
	Toilet Partitions	\$147,375.00	\$0.46
	Louvers	\$37,711.00	\$0.12
	Signage	\$30,438.00	\$0.10
	Lockers	\$11,700.00	\$0.04
	Fire Extinguishers	\$2,263.00	\$0.01
	Postal Specialties	\$5,347.00	\$0.02
	Toilet Accessories	In Toilet Partitions	\$0.00
	Other	\$10,515.00	\$0.03
Div. 11-Equipment			
	Building Maintenance Equipment	\$17,505.00	\$0.06
	Key Box	NA	\$0.00
	Loading Dock Equipment	\$39,340.00	\$0.12

Div. 12- Furnishings	Entrance Mats	\$1,037.00	\$0.003
	Blinds/Shades	\$49,935.00	\$0.16
Div. 14- Conveying Systems	Elevators	\$2,595,000.00	\$8.16
Div. 15- Mechanical/Fir e Protection	Sprinkler Mechanical	\$600,000.00 \$6,554,600.00	\$1.89 \$20.61
Div. 16- Electrical	Electrical	\$3,659,000.00	\$11.51
	Total Project Cost:	\$41,049,306	
	Total Project Cost/SF:		\$129.09
	Actual Building Construction Cost (Excludes Site Work):	\$40,115,311	
	Actual Building Construction Cost/SF (Excludes Site Work):		\$126.15

b. D4 Cost Estimate

Statement of Probable Cost

700 6th Street - Jan 2007 - District of Columbia

Prepared By: **Shane Flynn**
Shane Flynn
755 South Preston Rd
Lakewood, PA 18439
Fax:
 Building Sq. Size: **318000**
 Bid Date: **1/1/2007**
 No. of floors: **12**
 No. of buildings: **1**
 Project Height: **168**
 1st Floor Height: **10.5**
 1st Floor Size: **26000**

Prepared For:
 Site Sq. Size: **26136**
 Building use: **Office**
 Foundation: **CON**
 Exterior Walls: **PAN**
 Interior Walls: **GYP**
 Roof Type: **MEM**
 Floor Type: **CON**
 Project Type: **NEW**

Division		Percent	Sq. Cost	Amount
00	Bidding Requirements	4.38	5.82	1,849,305
	Bonds/Fees	4.38	5.82	1,849,305
01	General Requirements	3.30	4.39	1,396,105
	General Conditions	3.30	4.39	1,396,105
03	Concrete	20.23	26.88	8,547,000
	Concrete	20.23	26.88	8,547,000
04	Masonry	4.50	5.97	1,900,000
	Masonry	0.95	1.26	400,000
	Stone	3.55	4.72	1,500,000
05	Metals	7.10	9.43	3,000,000
	Architectural Metal	7.10	9.43	3,000,000
06	Wood & Plastics	1.52	2.01	640,203
	Rough Carpentry	1.52	2.01	640,203
07	Thermal & Moisture Protection	4.83	6.42	2,040,725
	Fireproofing	1.01	1.34	424,857
	Membrane Roofing	2.96	3.94	1,251,873
	Waterproofing	0.86	1.14	363,995
08	Doors & Windows	10.40	13.82	4,393,305
	Doors	0.93	1.24	393,305
	Glass & Glazing	9.47	12.58	4,000,000
09	Finishes	10.23	13.60	4,323,678
	Acoustical Ceilings	0.10	0.13	41,214
	Drywall	9.70	12.89	4,097,750
	Paint	0.44	0.58	184,715
10	Specialties	0.60	0.80	253,317
	Postal	0.04	0.05	17,060
	Signage	0.22	0.29	91,899
	Toilet Accessories	0.34	0.45	144,358
12	Furnishings	0.29	0.38	121,792
	Blinds	0.29	0.38	121,792
14	Conveying Systems	7.10	9.43	3,000,000
	Elevators	7.10	9.43	3,000,000
15	Mechanical	16.06	21.33	6,784,152
	Fire Protection	1.86	2.47	784,152
	Mech/Plumbing	14.20	18.87	6,000,000
16	Electrical	9.47	12.58	4,000,000
	Electrical	9.47	12.58	4,000,000
Total Building Costs		100.00	132.86	42,249,581

c. Square Foot Estimate

SQUARE FOOTAGE ESTIMATE															
RS Means Source		Model													
Year	<u>2009</u>	#	<u>M.480</u>												
Pages	<u>180-181, 453</u>	Exterior Wall Type	<u>Precast Concrete Panel with Exposed Aggregate</u>												
Area	<u>318,000</u>	Frame	<u>R/ Conc. Frame</u>												
The Area falls between: <u>260000 SF</u> and <u>400000 SF</u>															
Base Cost per Square Foot is:			<u>136.9</u>												
<table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">Cost Adjustment Type: (Story Height)</td> <td style="width: 20%; text-align: center;"><u>0.688</u></td> <td style="width: 20%;">Per SF Adjustment:</td> <td style="width: 30%; text-align: center;"><u>-0.69</u></td> </tr> <tr> <td>Cost Adjustment Type: (Perimeter)</td> <td style="text-align: center;"><u>13.76</u></td> <td>Per SF Adjustment:</td> <td style="text-align: center;"><u>13.76</u></td> </tr> <tr> <td colspan="3" style="text-align: right;">Adjusted Base Cost Per Square Foot:</td> <td style="text-align: center;"><u>149.97</u></td> </tr> </table>				Cost Adjustment Type: (Story Height)	<u>0.688</u>	Per SF Adjustment:	<u>-0.69</u>	Cost Adjustment Type: (Perimeter)	<u>13.76</u>	Per SF Adjustment:	<u>13.76</u>	Adjusted Base Cost Per Square Foot:			<u>149.97</u>
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Adjusted Base Cost Per Square Foot:			<u>149.97</u>												
<table style="width: 100%; border: none;"> <tr> <td style="width: 25%;">Base Building Cost:</td> <td style="width: 10%; text-align: center;"><u>149.97</u></td> <td style="width: 5%; text-align: center;">x</td> <td style="width: 20%; text-align: center;"><u>318000</u></td> <td style="width: 5%; text-align: center;">=</td> <td style="width: 35%; text-align: center;"><u>47690460</u></td> </tr> <tr> <td>Basement Cost:</td> <td style="text-align: center;"><u>36.4</u></td> <td style="text-align: center;">x</td> <td style="text-align: center;"><u>27430</u></td> <td style="text-align: center;">=</td> <td style="text-align: center;"><u>998452</u></td> </tr> </table>				Base Building Cost:	<u>149.97</u>	x	<u>318000</u>	=	<u>47690460</u>	Basement Cost:	<u>36.4</u>	x	<u>27430</u>	=	<u>998452</u>
Base Building Cost:	<u>149.97</u>	x	<u>318000</u>	=	<u>47690460</u>										
Basement Cost:	<u>36.4</u>	x	<u>27430</u>	=	<u>998452</u>										
RS Means Additions:															
Addition:	<u>Elevators (4) 3000# Capacity</u>	Amount:	<u>1722000</u>												
<table style="width: 100%; border: none;"> <tr> <td style="width: 20%;">Multiplier Type</td> <td style="width: 40%; text-align: center;"><u>Location</u></td> <td style="width: 20%;">Value:</td> <td style="width: 20%; text-align: center;"><u>1</u></td> </tr> <tr> <td>Multiplier Type</td> <td style="text-align: center;"><u>Time</u></td> <td>Value:</td> <td style="text-align: center;"><u>-</u></td> </tr> </table>				Multiplier Type	<u>Location</u>	Value:	<u>1</u>	Multiplier Type	<u>Time</u>	Value:	<u>-</u>				
Multiplier Type	<u>Location</u>	Value:	<u>1</u>												
Multiplier Type	<u>Time</u>	Value:	<u>-</u>												
Total SF Estimate for Building:			<u>\$50,410,912.00</u>												

d. Summary

Estimate Type	Cost	Cost/SF
Actual Building Construction Costs (CC)	40,115,311.00	126.15
Total Project Costs (TC)	41,049,306.00	129.09
D4 Cost Estimate	42,249,581.00	132.86
R.S. Means Square Foot Estimate	50,410,912.00	158.52

The highest value came from the R.S. Means Square Foot Estimate. I believe this was higher than the Actual building cost because the GC was only responsible for the construction of the building with finishes left for the owner to complete. R.S. Means accounts for a completely finished building. Another unnecessary increase in cost could of came from the of the additional basement square footage. I included 4 extra floors in the estimate. The 4 extra floors are for parking so the square foot estimate for parking would be a lot less than a normal basement square foot. The D4 estimate got me a lot closer to the Actual Building Cost. I believe this worked better because I got to compare my existing to building to a building with similar features. I was able to modify the building systems to mimic my own. The building I chose to compare with 700 6th Street is an Office Building that has 8 floors.

Case No.	Use	Project Name	Size	Floors	Bldg. Cost
OF050918	Office	Preston Pointe Office/Retail/Condo	105786	8	\$8,242,378.00

5. Site Plan of Existing Conditions

a. Site Map



700 6th Street is located in the heart of downtown DC; it is right next to the Verizon Center and attached to the Gallery Place. This is a very difficult site to manage because of it being located in the city. This site is a nightmare for any project manager to manage. Next to the building there's a parking garage that has to be open for use at all times. This is a problem because the entrance to the garage is in the swing of the crane. Thousand pound precast pieces have to be erected while cars are driving underneath them. There is a high volume of pedestrians on this site, there is pedestrian walkway to handle this, but there is always the risk of someone not using the walkway and hurting themselves. Traffic in DC is always a nightmare which makes it hard to bring materials in and get wastes out. This site has no room for material or equipment storage. All the materials need to be shipped in when they are needed. This aspect increases the coordination of the project. The site trailer is a neighboring building because there is no room on site.

Refer to the Appendix for Site Plan

6. Local Conditions

Washington, DC

The project is located in downtown DC on 6th street. The preferred method of construction in DC is moving towards building Green.

Most structures in DC are masonry, cast-in-place concrete and light steel. There is not a lot of construction parking on this site, because of it being located in the heart of DC.

There is a parking garage located next door to the building and 700 6th street will have its own 4 story below grade garage. Parking on the street is very limited and all parking is metered. Recycling of materials from the old building was very important on this project because the building is going for LEED Platinum. To remove waste that can't be recycled it will cost \$690.00 for a 6 ton construction dumpster. The soil consists of sands and silts which is not a great soil to build on.



7. Client Information

Akridge employs about 200 professionals in the D.C. metropolitan area. They were founded in 1974; Akridge is a full-service commercial real estate firm in the Washington, D.C. area. Their projects total over 12 million square feet of office, industrial/flex, residential, retail, and entertainment space at a value of over \$2.0 billion. Akridge is uniquely positioned to meet today's real estate market challenges. They excel in every aspect of commercial real estate development, construction, leasing, and management.

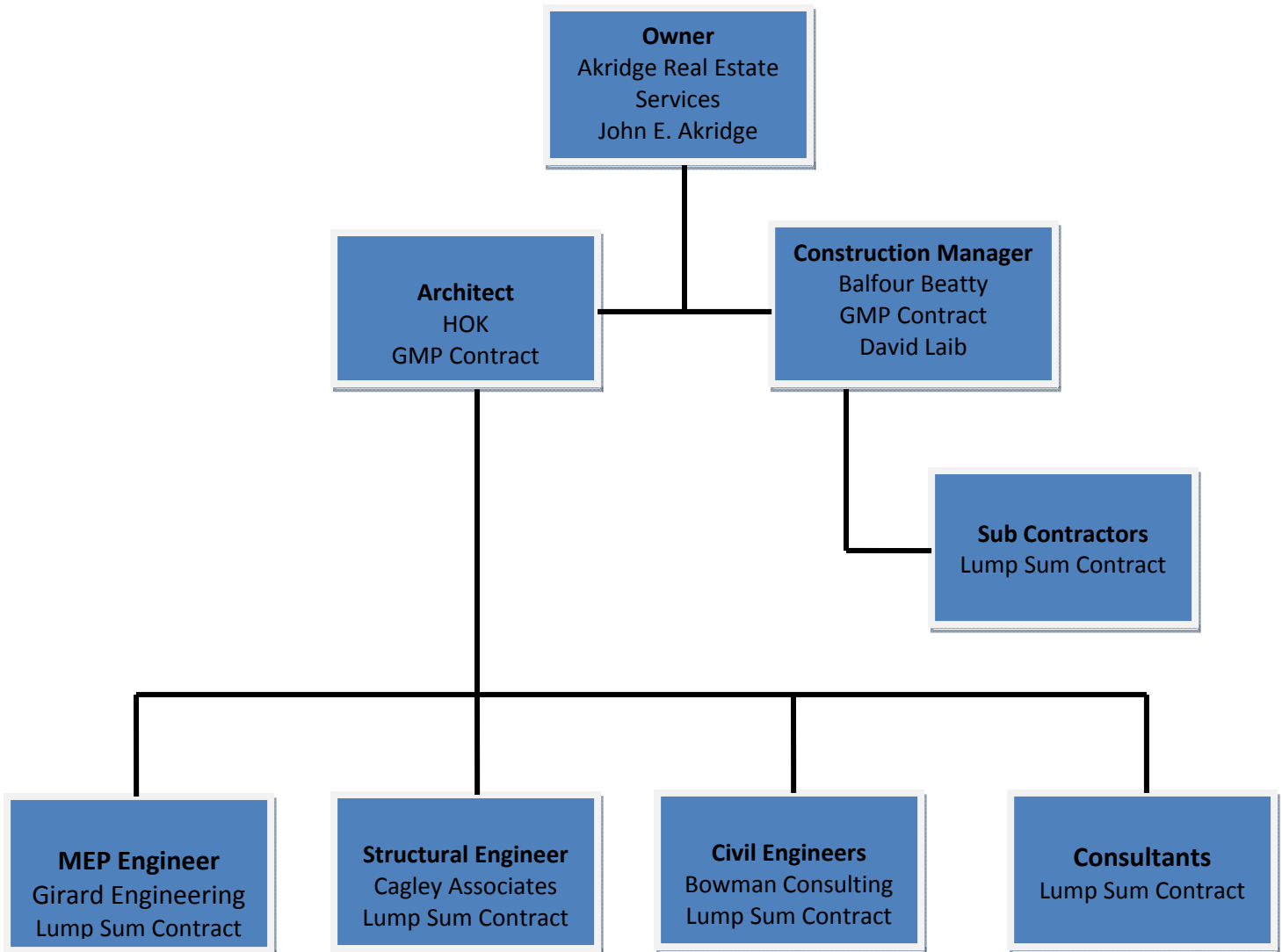


Akridge is building this facility to offer a world class LEED Platinum rated office space to their clients. Akridge wants to set the standard for buildings in DC and help make more buildings Green; 700 6th Street has the largest commercial green roof in DC.

The funding for this project comes directly from Akridge. It is important to note that it is very important for the contractor to keep the project within budget and to update the owner regularly on the projects financial status.

The project needed to be done summer of 09 to allow clients finish their space and move in. But because of a large change order i.e. Green Roof the move in of clients was delayed. The owner decided to up the LEED rating of the building three quarters of the way through the project. This shows that quality is more important than the bottom line. The safety expectations for this project and every project that Akridge develops are the highest. A successful project not only involves completing the project to the highest standards but having no injuries and more importantly no fatalities.

8. Project Delivery System



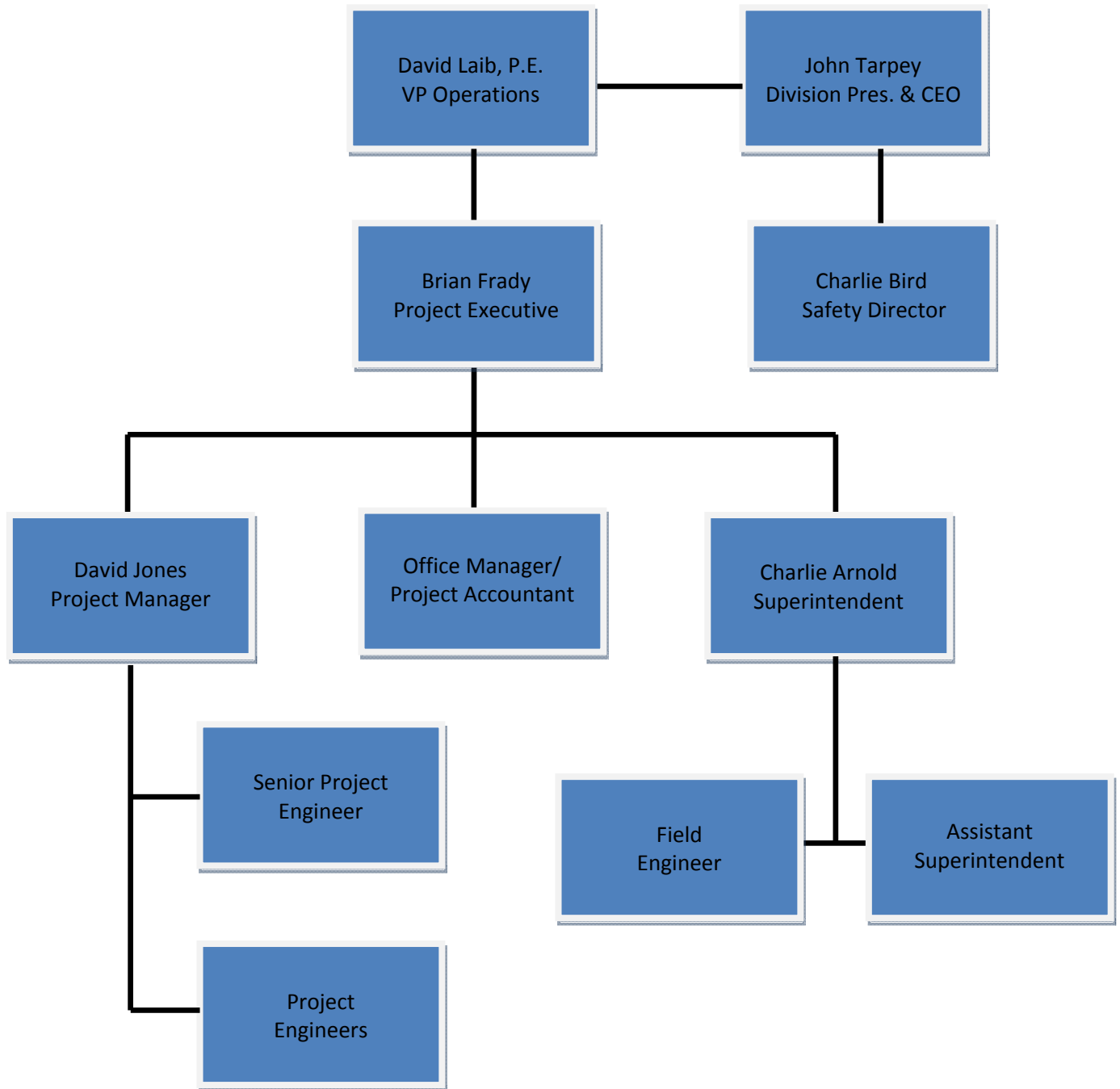
Balfour Beatty was chosen by Akridge to provide construction services to build 700 6th Street. Balfour Beatty was chosen because they had the lowest competitive bid. The owner also has done work with Balfour Beatty in the past and liked the work they provided. Design-Bid-Build was the chosen delivery system for this project because the owner has used this delivery system before and feels comfortable with it. This

traditional delivery system was chosen because time was not a huge factor. The contract between Balfour Beatty and the owner was a GMP of \$46,500,000 and schedule duration of 2.2 years. The Architect and Construction Manager have GMP contracts with the owner. All the sub contractors have Lump Sum contracts with Balfour Beatty. The architect's consultants have lump sum contracts as well.

The sub contractors were chosen through a competitive bid. All subs had to show qualifications to perform the work. There are a total of 42 subs given contracts to perform work. All sub contractors are required to be bonded and insured to work on this project.

The GMP contract for the Construction Manager is a good contract for the owner because the CM will be acting in the owner's interest. The lump sum bids held between the subs and the CM allow for easy payment requests as well as cost reimbursement for possible change orders. I think the delivery system is appropriate for this job because time is not a factor and this design system will give the architects more time to design the building. This is a LEED rated building and in order to get a LEED Platinum rating extra time will be needed in the design side.

9. Staffing Plan



The project executive is the head of the construction team; he works out of the office and reports to the site once a week. The project manager and superintendent both report to the project engineer and are in charge of onsite construction. They update the schedule and mediate between different subcontractors. Each building system for this project is assigned a senior project engineer and they are responsible for the coordination between subs. The project engineers all report to the project manager daily for progress reports. The superintendent is in charge of the field engineers and assistant superintendents. This project was fairly large and required a lot of construction managers. Towards the end of the project Balfour Beatty had companywide layoffs and a few project engineers were laid off. To help with the workload interns were assigned to the project to assist the project engineers and to do file management.










It's time to expect more.

Balfour Beatty
Construction

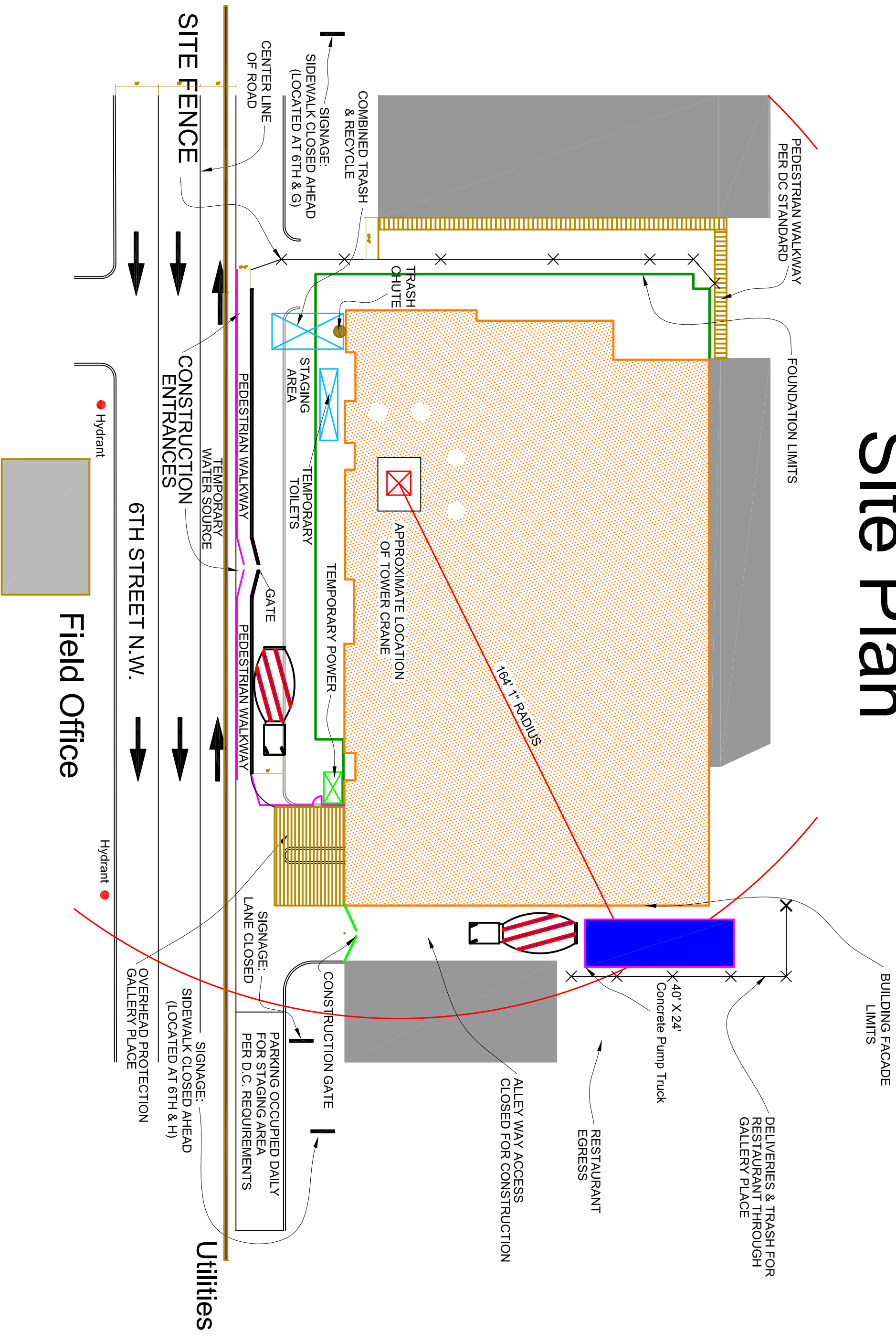
Appendix

- 1. Project Schedule**
- 2. Site Plan**
- 3. R.S. Means References**

ID	Task Name	Duration	Start	Finish	tober	March 21	Septemb	February	July 21	January	June 11	Novembe	May 1	October					
					12/4	2/19	5/7	7/23	10/8	2/2	3/11	5/27	8/12	0/2	1/13	3/30	6/15	8/31	1/1
1	DESIGN DOCUMENTS	170 days	Mon 4/10/06	Fri 12/1/06															
2	BID	55 days	Mon 12/4/06	Fri 2/16/07															
3	AWARD	1 day	Wed 2/21/07	Wed 2/21/07															
4	PROCUREMENT	30 days	Tue 2/27/07	Mon 4/9/07															
5	NOTICE TO PROCEED	1 day	Tue 4/10/07	Tue 4/10/07															
6	NTP/MOBILIZATION	10 days	Wed 4/11/07	Tue 4/24/07															
7	SITE DEMOLITION	5 days	Wed 4/25/07	Tue 5/1/07															
8	EXCAVATION/S&S	120 days	Wed 4/25/07	Tue 10/9/07															
9	INSTALL DEWATERING	20 days	Mon 4/30/07	Fri 5/25/07															
10	CONCRETE FOUNDATIONS TO GRADE	110 days	Mon 8/20/07	Fri 1/18/08															
11	CONCRETE SUPERSTRUCRURE LEVELS 1 TO PENTHOUSE	115 days	Mon 1/7/08	Fri 6/13/08															
12	PRECAST LEVELS 1-12	60 days	Mon 3/31/08	Fri 6/20/08															
13	EXTERIOR CMU/HANDSET STONE	60 days	Mon 5/26/08	Fri 8/15/08															
14	EXTERIOR STUDS	25 days	Mon 8/4/08	Fri 9/5/08															
15	PUNCH WINDOWS	40 days	Mon 8/11/08	Fri 10/3/08															
16	EIFS	20 days	Mon 10/6/08	Fri 10/31/08															
17	ROOFING	60 days	Mon 11/3/08	Fri 1/23/09															
18	INTERIOR CMU	30 days	Mon 2/4/08	Fri 3/14/08															
19	MEP ROUGH IN	100 days	Mon 3/17/08	Fri 8/1/08															
20	CORE CONSTRUCTION AND ROUGH INS LEVELS 1-12	80 days	Tue 7/1/08	Mon 10/20/08															
21	SWITCH GEAR ROOM FIT OUT	30 days	Mon 9/22/08	Fri 10/31/08															
22	ROOF TOP EQUIPMENT AND PENTHOUSE MEP	80 days	Mon 11/3/08	Fri 2/20/09															
23	MECHANICAL ROOMS	80 days	Tue 1/20/09	Mon 5/11/09															
24	LOBBY FINISHES	80 days	Mon 4/13/09	Fri 7/31/09															
25	CORE/BATHROOM FINISHES	60 days	Mon 6/1/09	Fri 8/21/09															
26	PARKING GARAGE FINISHES	30 days	Mon 7/6/09	Fri 8/14/09															
27	ELECTRICAL VAULTS AND SITE UTILITIES	60 days	Mon 1/21/08	Fri 4/11/08															
28	MEP TRIM OUT	50 days	Fri 8/1/08	Thu 10/9/08															
29	TESTING AND BALANCING	56 days	Tue 7/14/09	Tue 9/29/09															
30	PROJECT CLOSEOUT	40 days	Wed 9/30/09	Tue 11/24/09															

Project: Milestone.mpp Date: Thu 10/1/09	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

Site Plan





Costs per square foot of floor area

Exterior Wall	S.F. Area	120000	145000	170000	200000	230000	260000	400000	600000	800000
	L.F. Perimeter	420	450	470	490	510	530	600	730	820
Double Glazed Heat Absorbing Tinted Plate Glass Panels	Steel Frame	173.85	167.95	163.20	158.85	155.65	153.20	145.95	142.00	139.50
	R/Conc. Frame	161.85	156.15	151.55	147.35	144.25	141.85	134.75	130.95	128.55
Face Brick with Concrete Block Back-up	Steel Frame	168.15	162.95	158.65	154.85	152.05	149.85	143.50	140.05	137.85
	R/Conc. Frame	177.25	172.25	168.15	164.45	161.70	159.60	153.45	150.10	147.95
Precast Concrete Panel With Exposed Aggregate	Steel Frame	169.95	164.55	160.15	156.15	153.20	150.95	144.30	140.65	138.35
	R/Conc. Frame	157.90	152.75	148.45	144.60	141.75	139.55	133.15	129.60	127.40
Perimeter Adj., Add or Deduct	Per 100 L.F.	3.35	3.95	5.85	5.00	4.40	3.85	2.50	1.70	1.30
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	3.00	2.95	2.50	2.30	2.15	1.95	1.40	1.20	0.95

For Basement, add \$36.40 per square foot of basement area

The above costs were calculated using the basic specifications shown on the facing page. These costs should be adjusted where necessary for design alternatives and owner's requirements. Reported completed project costs, for this type of structure, range from \$93.60 to \$228.35 per S.F.

Common additives

Description	Unit	\$ Cost	Description	Unit	\$ Cost
Clock System			Escalators, Metal		
20 room	Each	16,000	32" wide, 10' story height	Each	143,000
50 room	Each	39,100	20' story height	Each	172,000
Directory Boards, Plastic, glass covered			48" wide, 10' story height	Each	152,000
30" x 20"	Each	595	20' story height	Each	180,500
36" x 48"	Each	1450	Glass		
Aluminum, 24" x 18"	Each	600	32" wide, 10' story height	Each	137,000
36" x 24"	Each	675	20' story height	Each	165,000
48" x 32"	Each	980	48" wide, 10' story height	Each	48,300
48" x 60"	Each	2025	20' story height	Each	175,000
Elevators, Electric passenger, 10 stops			Smoke Detectors		
3000# capacity	Each	430,500	Ceiling type	Each	187
4000# capacity	Each	433,000	Duct type	Each	480
5000# capacity	Each	437,000	Sound System		
Additional stop, add	Each	13,600	Amplifier, 250 watts	Each	2350
Emergency Lighting, 25 watt, battery operated			Speaker, ceiling or wall	Each	191
Lead battery	Each	282	Trumpet	Each	365
Nickel cadmium	Each	805	TV Antenna, Master system, 12 outlet	Outlet	315
			30 outlet	Outlet	203
			100 outlet	Outlet	194

Model costs calculated for a 16 story building with 10' story height and 260,000 square feet of floor area

Office, 11-20 Story

			Unit	Unit Cost	Cost Per S.F.	% Of Sub-Total
A. SUBSTRUCTURE						
1010	Standard Foundations	CIP concrete pile caps	S.F. Ground	9.92	.62	4.5%
1020	Special Foundations	Steel H-piles, concrete grade beams	S.F. Ground	62	3.86	
1030	Slab on Grade	4" reinforced concrete with vapor barrier and granular base	S.F. Slab	4.74	.30	
2010	Basement Excavation	Site preparation for slab, piles and grade beams	S.F. Ground	.26	.02	
2020	Basement Walls	4' foundation wall	L.F. Wall	78	.38	
B. SHELL						
B10 Superstructure						
1010	Floor Construction	Concrete slab, metal deck, beams	S.F. Floor	29.90	28.03	24.8%
1020	Roof Construction	Metal deck, open web steel joists, beams, columns	S.F. Roof	9.76	.61	
B20 Exterior Enclosure						
2010	Exterior Walls	N/A	—	—	—	12.2 %
2020	Exterior Windows	Double glazed heat absorbing, tinted plate glass wall panels	Each	41.45	13.52	
2030	Exterior Doors	Double aluminum & glass doors	Each	5571	.60	
B30 Roofing						
3010	Roof Coverings	Single ply membrane, fully adhered; perlite/EPS composite insulation	S.F. Roof	5.60	.35	0.3%
3020	Roof Openings	N/A	—	—	—	
C. INTERIORS						
1010	Partitions	Gypsum board on metal studs	S.F. Partition	10.20	2.72	17.1%
1020	Interior Doors	Single leaf hollow metal	Each	875	2.19	
1030	Fittings	Toilet partitions	S.F. Floor	.42	.42	
2010	Stair Construction	Concrete filled metal pan	Flight	18,950	2.55	
3010	Wall Finishes	60% vinyl wall covering, 40% paint	S.F. Surface	1.33	.71	
3020	Floor Finishes	60% carpet tile, 30% vinyl composition tile, 10% ceramic tile	S.F. Floor	4.81	4.81	
3030	Ceiling Finishes	Mineral fiber tile on concealed zee bars	S.F. Ceiling	6.38	6.38	
D. SERVICES						
D10 Conveying						
1010	Elevators & Lifts	Four geared passenger elevators	Each	479,050	7.37	6.4%
1020	Escalators & Moving Walks	N/A	—	—	—	
D20 Plumbing						
2010	Plumbing Fixtures	Toilet and service fixtures, supply and drainage	Each	4022	2.99	2.9%
2020	Domestic Water Distribution	Oil fired water heater	S.F. Floor	.25	.25	
2040	Rain Water Drainage	Roof drains	S.F. Roof	2.08	.13	
D30 HVAC						
3010	Energy Supply	N/A	—	—	—	13.5 %
3020	Heat Generating Systems	Boiler, heat exchanger and fans	Each	388,485	2.04	
3030	Cooling Generating Systems	Chilled water, fan coil units	S.F. Floor	13.59	13.59	
3050	Terminal & Package Units	N/A	—	—	—	
3090	Other HVAC Sys. & Equipment	N/A	—	—	—	
D40 Fire Protection						
4010	Sprinklers	Sprinkler system, light hazard	S.F. Floor	2.25	2.25	2.4%
4020	Standpipes	Standpipes and hose systems	S.F. Floor	.51	.51	
D50 Electrical						
5010	Electrical Service/Distribution	2400 ampere service, panel board and feeders	S.F. Floor	1.10	1.10	15.9%
5020	Lighting & Branch Wiring	High efficiency fluorescent fixtures, receptacles, switches, A.C. and misc. power	S.F. Floor	10.99	10.99	
5030	Communications & Security	Addressable alarm systems, internet and phone wiring, emergency lighting	S.F. Floor	5.81	5.81	
5090	Other Electrical Systems	Emergency generator, 200 kW, uninterruptible power supply	S.F. Floor	.51	.51	
E. EQUIPMENT & FURNISHINGS						
1010	Commercial Equipment	N/A	—	—	—	0.0 %
1020	Institutional Equipment	N/A	—	—	—	
1030	Vehicular Equipment	N/A	—	—	—	
1090	Other Equipment	N/A	—	—	—	
F. SPECIAL CONSTRUCTION						
1020	Integrated Construction	N/A	—	—	—	0.0 %
1040	Special Facilities	N/A	—	—	—	
G. BUILDING SITEWORK N/A						
Sub-Total					115.61	100%
CONTRACTOR FEES (General Requirements: 10%, Overhead: 5%, Profit: 10%)				25%	28.92	
ARCHITECT FEES				6%	8.67	
Total Building Cost					153.20	

Location Factors

Costs shown in *RSMeans Square Foot Costs* are based on national averages for materials and installation. To adjust these costs to a specific location, simply multiply the base cost by the factor for that city.

The data is arranged alphabetically by state and postal zip code numbers. For a city not listed, use the factor for a nearby city with similar economic characteristics.

STATE/ZIP	CITY	Residential	Commercial
ALABAMA			
350-352	Birmingham	.87	.89
354	Tuscaloosa	.78	.82
355	Jasper	.72	.79
356	Decatur	.78	.81
357-358	Huntsville	.84	.86
359	Gadsden	.75	.81
360-361	Montgomery	.77	.82
362	Anniston	.73	.78
363	Dothan	.76	.78
364	Evergreen	.74	.80
365-366	Mobile	.82	.85
367	Selma	.74	.79
368	Phenix City	.75	.81
369	Butler	.75	.80
ALASKA			
995-996	Anchorage	1.25	1.21
997	Fairbanks	1.28	1.21
998	Juneau	1.24	1.19
999	Ketchikan	1.28	1.26
ARIZONA			
850,853	Phoenix	.85	.89
852	Mesa/Tempe	.82	.86
855	Globe	.78	.84
856-857	Tucson	.83	.87
859	Show Low	.80	.85
860	Flagstaff	.85	.89
863	Prescott	.79	.84
864	Kingman	.83	.86
865	Chambers	.79	.84
ARKANSAS			
716	Pine Bluff	.80	.84
717	Camden	.68	.74
718	Texarkana	.73	.76
719	Hot Springs	.69	.75
720-722	Little Rock	.84	.86
723	West Memphis	.79	.81
724	Jonesboro	.77	.82
725	Batesville	.74	.78
726	Harrison	.76	.79
727	Fayetteville	.71	.77
728	Russellville	.76	.79
729	Fort Smith	.77	.82
CALIFORNIA			
900-902	Los Angeles	1.08	1.08
903-905	Inglewood	1.03	1.02
906-908	Long Beach	1.02	1.03
910-912	Pasadena	1.02	1.02
913-916	Van Nuys	1.05	1.04
917-918	Alhambra	1.06	1.03
919-921	San Diego	1.04	1.05
922	Palm Springs	1.02	1.02
923-924	San Bernardino	1.03	1.01
925	Riverside	1.07	1.06
926-927	Santa Ana	1.04	1.03
928	Anaheim	1.07	1.07
930	Oxnard	1.08	1.07
931	Santa Barbara	1.07	1.07
932-933	Bakersfield	1.06	1.06
934	San Luis Obispo	1.05	1.04
935	Mojave	1.03	1.02
936-938	Fresno	1.09	1.07
939	Salinas	1.11	1.09
940-941	San Francisco	1.26	1.24
942,956-958	Sacramento	1.12	1.09
943	Palo Alto	1.16	1.12
944	San Mateo	1.23	1.16
945	Vallejo	1.15	1.11
946	Oakland	1.22	1.18
947	Berkeley	1.22	1.15
948	Richmond	1.24	1.14
949	San Rafael	1.22	1.15
950	Santa Cruz	1.14	1.12
951	San Jose	1.21	1.17
952	Stockton	1.08	1.07
953	Modesto	1.08	1.07

STATE/ZIP	CITY	Residential	Commercial
CALIFORNIA (CONTD)			
954	Santa Rosa	1.16	1.13
955	Eureka	1.11	1.07
959	Marysville	1.09	1.07
960	Redding	1.09	1.08
961	Susanville	1.09	1.07
COLORADO			
800-802	Denver	.93	.95
803	Boulder	.92	.92
804	Golden	.90	.92
805	Fort Collins	.88	.92
806	Greeley	.78	.86
807	Fort Morgan	.91	.91
808-809	Colorado Springs	.89	.93
810	Pueblo	.90	.92
811	Alamosa	.86	.91
812	Salida	.89	.91
813	Durango	.89	.92
814	Montrose	.86	.90
815	Grand Junction	.90	.91
816	Glenwood Springs	.88	.92
CONNECTICUT			
060	New Britain	1.09	1.07
061	Hartford	1.09	1.08
062	Willimantic	1.10	1.07
063	New London	1.09	1.05
064	Meriden	1.09	1.07
065	New Haven	1.10	1.08
066	Bridgeport	1.10	1.08
067	Waterbury	1.10	1.08
068	Norwalk	1.10	1.08
069	Stamford	1.11	1.11
D.C.			
200-205	Washington	.96	1.00
DELAWARE			
197	Newark	1.02	1.03
198	Wilmington	1.03	1.03
199	Dover	1.02	1.03
FLORIDA			
320,322	Jacksonville	.80	.84
321	Daytona Beach	.89	.90
323	Tallahassee	.77	.80
324	Panama City	.74	.79
325	Pensacola	.81	.85
326,344	Gainesville	.80	.86
327-328,347	Orlando	.89	.90
329	Melbourne	.90	.93
330-332,340	Miami	.86	.90
333	Fort Lauderdale	.84	.88
334,349	West Palm Beach	.84	.86
335-336,346	Tampa	.91	.91
337	St. Petersburg	.78	.84
338	Lakeland	.88	.90
339,341	Fort Myers	.86	.87
342	Sarasota	.89	.88
GEORGIA			
300-303,399	Atlanta	.90	.90
304	Statesboro	.71	.77
305	Gainesville	.78	.83
306	Athens	.78	.84
307	Dalton	.74	.79
308-309	Augusta	.80	.83
310-312	Macon	.81	.84
313-314	Savannah	.81	.83
315	Waycross	.74	.81
316	Valdosta	.72	.78
317,398	Albany	.77	.83
318-319	Columbus	.82	.85
HAWAII			
967	Hilo	1.19	1.16
968	Honolulu	1.21	1.19