

# Technical Assignment 1: Construction Project Management

Monday, September 29, 2008



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Construction Management Option  
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**Constitution Center**

400 7th Street SE, Washington, DC 20024

# NATALIE L. BRYNER

## CONSTRUCTION MANAGEMENT OPTION

# CONSTITUTION CENTER

## 400 7TH STREET SE, WASHINGTON, DC 20024



### BUILDING STATISTICS

- Size: 1,500,000-SF base building and 600,000-SF parking garage
- Number of Stories: Three-level underground parking garage, 10 stories + Pent House
- Occupancy Type: Class A Office Space
- Cost: \$246 Million GMP
- Construction Dates: July 2007 - November 2009
- Delivery Method: Design-Bid-Build
- LEED Gold Project



### MECHANICAL & ELECTRICAL

- Centralized Plant in the Penthouse Housing:
  - Two 800 h.p. Boilers
  - One 350 h.p. Boiler
  - Three 1200 ton Trane Chillers
  - Eight 30,000 CFM Trane Air Handlers
  - Eight 30,000 CFM Semco Energy Recovery Units
  - Four 1200 ton Cooling Towers utilizing 6,700 Active Chilled Beams
- Power distribution system of 13.8 kVA feed from four primary switchgear connected to Pepco feeders
- 10 secondary 4000A transformers within the garage and Pent House levels
- Two 1000 kilowatt generators are roof mounted to provide power back-up to the critical building systems during a power outage
- Two dedicated chiller/purifier drinking water systems that continuously circulate water throughout the building
- Custom made Chilled-Beam System from Germany

### PROJECT TEAM

- Owner/Developer: David Nassif Associates
- General Contractor: James G. Davis Construction Corporation
- Owners Representative: Kramer Consulting
- Architect: SmithGroup, Inc.
- MEP Engineer: SmithGroup, Inc.
- Civil Engineer: Wiles Mensch Corporation
- Structural Engineer: SK&A

### STRUCTURAL

- Precast panels found at all four corners of the building, which frame the spandrel glass
- Blast resistant curtainwall throughout at Streetscape and Courtyard, with floor two being the most resistant including an air barrier system
- Metal panel on the Pent House level to conceal the MEP equipment
- Blast protection in garage tenant space, entrance ramp, internal ramps, electrical rooms, telecom rooms, elevator shafts, egress stairs, and exposed columns
- Two-way waffle slab on all floors except the Pent House

### ARCHITECTURE

- Renovation of an existing building, originally constructed in 1976 and occupied by the Department of Transportation (DOT)
- 4 separate, but integrated quadrants that have their own elevator, stairs ways, bathrooms, electrical closets, communication closets
- One acre of courtyard that is a private, secure green space with fountain, seating areas, sculpture, and 32 Honey Locust Trees that are 11'-15' tall
- White Marble and Jerusalem Limestone are located around the first level of the building, creating a boarder for the spandrel glass located at the storefront entrances
- Built-up roofing system and metal panels used to conceal the MEP equipment on the Pent House level



RENDERINGS PROVIDED BY SMITHGROUP, INC. AND STUDIO CHRISTEN

## EXECUTIVE SUMMARY

Within this technical report, one can find information pertaining to the renovation of Constitution Center which is located in Washington, DC. There is information about the project schedule and how James G. Davis Construction Corporation (DAVIS) planned to start construction in July 2007 and turn the building over in four quadrants starting July 2009 and finishing November 2009. Additionally, one can find information about the building systems that are being installed. Next, there is an evaluation of the cost of the project, followed by a site plan containing information about the existing conditions. Washington, DC's local conditions are outlined, along with information about the client, David Nassif Associations. Finally the project delivery systems and the staffing plan of DAVIS are found at the end of the report.

Constitution Center is a renovation of an existing building, located a few blocks south of the National Mall, originally constructed in 1976. It was formerly occupied by the Department of Transportation (DOT). It is located between 6<sup>th</sup> and 7<sup>th</sup> Street and D and E Street in SW DC. The building takes up an entire city block, with 3 levels of parking below grade, which is approximately 15 acres in size. Additionally, there are 10 levels above grade with a penthouse for MEP equipment. There is an open, landscaped courtyard (approximately 1 acre in size) at the center of the site with a decorative fountain. The building is not yet leased, but is designed as offices for a potential government tenant, with Level IV security rating. Constitution Center is striving to attain LEED Gold Certification.



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**A. PROJECT SCHEDULE SUMMARY**

One of the main concerns of the ownership of Constitution Center is that the project be completed on time; therefore the schedule plays a major part in the construction. Figure 1, summarizes the schedule to make it easy to tell what phases are taking place during a specific month.

*Figure 1: Simple schedule that is used to show when each general phases is being constructed.*

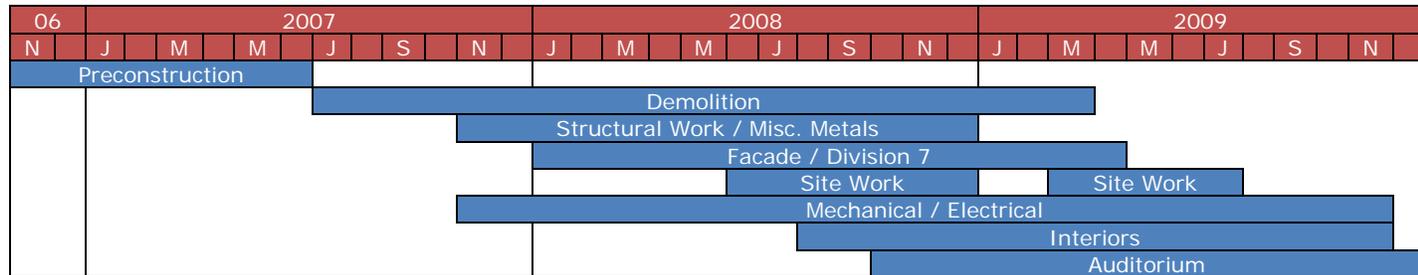


Figure 2 shows a project schedule summary, which includes pre-construction, demolition, and actual construction milestones. Each of these phases is then broken into the key elements that must occur in order for that phase of construction to be completed. The finishes take approximately 206 days to complete, therefore this is a main phase in the construction progress. The first key element for the finish sequence of the garage is the construction of the elevator shaft walls. After this is completed, the erection of the CMU blast walls occur, followed by the hardening of the concrete walls. The next element is the rough-in of the MEP, along with the hardening of the columns. To finish the parking garages, the raised slabs must be constructed, the lights installed, and the finishes applied. For the typical floors, there are five main elements that much occur before the finish sequence. First, the steel columns and beams must be installed. Then the expansion joints need to be removed. Next the slabs need to be in-filled and the MEP rough-in has to take place. Finally the shaft walls need to be constructed then the finishes are applied.

Preconstruction started in November of 2006. This phase includes both mobilization and critical procurement of 7 elements. After the preconstruction, demolition started in July 2007 and last until March 2009. Finally construction started in September 2007 and the building will be turned over in 4 quadrants. The sequence is the northeast on May 1, 2009, the northwest on July 1, 2009, the southwest on September 1, 2009 and the southeast on November 1, 2009. Finally the project close-out will last until December 2009, which includes commissioning.

Figure 2: Project Summary Schedule produced in Microsoft Project

ID	Task Name	Duration	Start	Finish	October 1 0/2	May 1 1/28	November 5/6	June 11 8/12	January 1/1	July 21 2/24	October 4 6/1	January 11 9/7	July 11 2/1	October 11 3/22	January 11 6/28	July 11 10/4
1	<b>Pre-Construction</b>	<b>509 days</b>	<b>Wed 11/1/06</b>	<b>Mon 10/13/08</b>												
2	<b>Mobilization</b>	<b>168 days</b>	<b>Wed 11/1/06</b>	<b>Fri 6/22/07</b>												
3	<b>Critical Procurement</b>	<b>496 days</b>	<b>Mon 11/20/06</b>	<b>Mon 10/13/08</b>												
4	Curtainwall	496 days	Mon 11/20/06	Mon 10/13/08												
5	Precast	198 days	Wed 4/18/07	Fri 1/18/08												
6	Elevator	215 days	Wed 4/18/07	Tue 2/12/08												
7	Blast Elements	125 days	Wed 4/18/07	Tue 10/9/07												
8	Structural Steel	170 days	Wed 4/18/07	Tue 12/11/07												
9	Mechanical	235 days	Wed 4/18/07	Tue 3/11/08												
10	Electrical	235 days	Wed 4/18/07	Tue 3/11/08												
11	<b>Demolition</b>	<b>451 days</b>	<b>Mon 7/2/07</b>	<b>Mon 3/23/09</b>												
12	<b>General</b>	<b>253 days</b>	<b>Mon 7/2/07</b>	<b>Wed 6/18/08</b>												
13	<b>Interior Demolition</b>	<b>215 days</b>	<b>Tue 7/10/07</b>	<b>Mon 5/5/08</b>												
14	<b>Exterior Demolition &amp; Survey Existing</b>	<b>430 days</b>	<b>Tue 7/31/07</b>	<b>Mon 3/23/09</b>												
15	Exterior Façade	220 days	Tue 7/31/07	Mon 6/2/08												
16	Courtyard Façade	161 days	Tue 10/23/07	Tue 6/3/08												
17	Penthouse / Roof	178 days	Thu 7/17/08	Mon 3/23/09												
18	<b>Construction</b>	<b>587 days</b>	<b>Wed 9/26/07</b>	<b>Thu 12/24/09</b>												
19	<b>Façade / Roof</b>	<b>406 days</b>	<b>Mon 10/1/07</b>	<b>Mon 4/20/09</b>												
20	Exterior Façade	355 days	Mon 10/1/07	Fri 2/6/09												
21	Courtyard Façade	325 days	Tue 1/22/08	Mon 4/20/09												
22	Penthouse / Roof	261 days	Thu 10/4/07	Thu 10/2/08												
23	<b>MEP Risers</b>	<b>160 days</b>	<b>Wed 10/3/07</b>	<b>Tue 5/13/08</b>												
24	<b>MEP Rough-ins</b>	<b>497 days</b>	<b>Wed 9/26/07</b>	<b>Thu 8/20/09</b>												
25	<b>Finishes</b>	<b>206 days</b>	<b>Wed 10/1/08</b>	<b>Wed 7/15/09</b>												
26	<b>Elevators</b>	<b>426 days</b>	<b>Fri 11/30/07</b>	<b>Fri 7/17/09</b>												
27	<b>Courtyard</b>	<b>142 days</b>	<b>Wed 10/1/08</b>	<b>Thu 4/16/09</b>												
28	<b>Sitework</b>	<b>174 days</b>	<b>Mon 12/1/08</b>	<b>Thu 7/30/09</b>												
29	<b>Project Close-out</b>	<b>254 days</b>	<b>Mon 1/5/09</b>	<b>Thu 12/24/09</b>												



## B. BUILDING SYSTEMS SUMMARY

Table 1: Summary of the key aspects of the design and construction of Constitution Center

Yes	No	Work Scope	Information
x		Demolition Required?	<p>The demolition subcontractor, Aceco, was responsible for the removal of asbestos, lead based paint, Polychlorinated biphenyls (PCB) &amp; mercury, hazardous chemicals, and biological elements. Some of the asbestos was the cementations surfacing materials, the duct connectors and gaskets, the elevator door packing, exhaust mufflers, etc. Examples of the lead based paint were in the mechanical motor units, the ceramic wall tile, the metal wall flashing, etc. PCB and mercury were in the light ballasts, the fluorescent light tubs, and the mercury contained bulbs and thermostats. Petroleum liquids and glycol coolant are the hazardous chemicals. Finally, the biological elements were the avian and rodent excreta, mold impacted abatement, and surfaces that needed to be disinfected.</p> <p>The building demolition included removing everything from the building, expect for the floor slabs and columns. The picture below shows how much demolition occurred.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>August 29, 2007</p> </div> <div style="text-align: center;">  <p>July 30, 2008</p> </div> </div>
	X	Structural Steel Frame	N/A
x		Cast in Place Concrete	<p>The cast in place concrete included new concrete blast reinforcement, which was installed with items such as blast walls, blast hardening, etc. There were also newly installed topping slabs and raised slabs at some areas that required elevation changes. Formwork was standard stick built on-site by the concrete subcontractor, Brothers Concrete. Concrete placement methods included by tower cranes, boom truck, and buggies.</p>

x		Precast Concrete	<p>Decorative precast concrete was installed at the four corners of the building with welded steel connections. Coordination issues with the building roof overhang occurred therefore the steel was erected from a mobile crane, as opposed to the tower cranes.</p>	
x		Mechanical System		<p>The mechanical rooms are located on the Pent House level. The building mechanical system consists of AHU's, Chillers and Boilers. Ductwork feeds the chilled beam systems that will be installed in the office spaces. The sprinkler system varies from dry to wet, depending on the location of the pipe runs.</p>
x		Electrical System	<p>The power distribution system of 13.8 kVA is feed from four primary switchgears connected to Pepco feeders. It is then distributed to 10 secondary 4000A transformers within the garage and penthouse levels. Two 1000-kilowatt generators are roof mounted to provide power back up to the critical building systems during a power outage.</p>	
x		Masonry	<p>Constitution Center does not have veneer brick, however it does have CMU partition walls and blast walls. The connections are typical for masonry work in all areas of the building. They are utilizing the typical scaffold, which makes the work area fairly straightforward, especially since it is not in hard to access areas.</p>	
x		Curtain Wall		<p>The curtainwall system is composed of composite glass and aluminum panels. These structures are prefabricated offsite and erected a panel at a time. The overhang was an issue; so mobile cranes have been used to set these pieces. The design of the curtainwall, although outlined by the architect, fell mostly into the subcontractor's engineer's responsibility.</p>
	x	Support of Excavation	N/A	

### C. PROJECT COST EVALUATION

The project cost of Constitution Center was evaluated several different ways. First, Table 2 shows the building construction cost, as one can see it is \$211,191,150 or \$140.70/SF. Next the total project cost is outlined in Table 3, showing that the cost is \$244,700,033 or \$163.13/SF. Table 4 shows the major building systems costs and the cost per square foot for each of the systems. After evaluation, it is determined that the mechanical system is the most expensive, being around \$52 million.

*Table 2: Building Construction Cost Breakdown*

<b>Building Construction Cost (CC)</b>	
Construction Cost	\$211,191,150
Cost per Square Foot	\$140.79

*Table 3: Total Project Cost Breakdown*

<b>Total Project Cost (TC)</b>	
Construction Cost	\$244,700,033
Cost per Square Foot	\$163.13

*Table 4: Building Systems Costs*

Division	Title	Cost	Cost/SF
<b>Division 02</b>	<b>Existing Conditions</b>	<b>\$17,717,242</b>	<b>\$11.81</b>
	Selective Demolition	\$12,310,000	\$8.21
	HAZMAT Abatement	\$1,514,316	\$1.01
	Surveying	\$49,900	\$0.03
	Site Utilities: water, san, storm	\$643,040	\$0.43
	Asphalt Paving	\$218,000	\$0.15
	Restriping/Pavement Marking	\$22,900	\$0.02
	Concrete Site Work	\$544,000	\$0.36
	Site Furnishings	\$200,000	\$0.13
	Exterior Plants w/ Irrigation	\$1,253,000	\$0.84
	Retractable Bollards	\$422,141	\$0.28
	Parking Equipment	\$100,000	\$0.07
	Site Development	\$439,945	\$0.29
<b>Division 03</b>	<b>Concrete</b>	<b>\$23,142,494</b>	<b>\$15.43</b>
	Cast-in-Place Concrete	\$9,408,124	\$6.27
	Structural Precast Concrete	\$48,392	\$0.03
	Architectural Precast Concrete	\$1,975,834	\$1.32
	Cementitious Underlayment	\$3,538,710	\$2.36
	Fiber Reinforced Polymer	\$3,768,402	\$2.51
	Concrete Repair & Traffic Coat.	\$4,403,032	\$2.94
<b>Division 04</b>	<b>Masonry</b>	<b>\$5,043,908</b>	<b>\$3.36</b>
	Tuckpointing	\$990	\$0.00
	Masonry	\$1,393,173	\$0.93
	Masonry Coating (Polyurea)	\$183,910	\$0.12
	Stone	\$3,465,835	\$2.31

<b>Division 05</b>	<b>Metals</b>	<b>\$14,521,856</b>	<b>\$9.68</b>
	Structural Steel	\$2,445,660	\$1.63
	Miscellaneous	\$6,481,564	\$4.32
	Curtainwall Anchors	\$2,729,113	\$1.82
	Steel Jackets	\$2,361,538	\$1.57
	Ornamental Metals	\$286,806	\$0.19
	Expansion Joints	\$217,175	\$0.14
<b>Divison 06</b>	<b>Wood, Plastics, and Composites</b>	<b>\$1,590,627</b>	<b>\$1.06</b>
	Carpentry	\$745,609	\$0.50
	Millwork	\$845,018	\$0.56
<b>Division 07</b>	<b>Thermal and Moisture Protection</b>	<b>\$6,757,989</b>	<b>\$4.51</b>
	Hot Fluid Applied Waterproofing	\$770,800	\$0.51
	Cementitious Waterproofing	\$70,000	\$0.05
	Crystalline Waterproofing	\$11,977	\$0.01
	Traffic Coatings	\$180,149	\$0.12
	Metal Wall Panels & Louvers	\$2,783,500	\$1.86
	Roofing, Hot Fl. & Membrane	\$2,234,937	\$1.49
	Applied Fireproofing	\$499,455	\$0.33
	Joint Sealants	\$207,171	\$0.14
<b>Division 08</b>	<b>Openings</b>	<b>\$47,918,829</b>	<b>\$31.95</b>
	Doors, Frames, Hardware	\$630,787	\$0.42
	Coiling Doors	\$80,767	\$0.05
	Exterior Curtainwall	\$46,697,203	\$31.13
	Interior Glass & Glazing	\$510,072	\$0.34
<b>Division 09</b>	<b>Finishes</b>	<b>\$6,350,845</b>	<b>\$4.23</b>
	Drywall	\$4,412,130	\$2.94
	Ceramic Tile	\$528,320	\$0.35
	Carpet and Resilient	\$136,469	\$0.09
	Painting	\$1,273,926	\$0.85
<b>Division 10</b>	<b>Specialties</b>	<b>\$551,329</b>	<b>\$0.37</b>
	Toilet Compartments	\$156,930	\$0.10
	Louvers & Vents	\$93,701	\$0.06
	Exterior & Interior Signage	\$156,023	\$0.10
	Fire Protection Specialties	\$31,675	\$0.02
	Toilet Accessories	\$113,000	\$0.08
<b>Division 11</b>	<b>Equipment</b>	<b>\$212,682</b>	<b>\$0.14</b>
	Window Washing Systems	\$212,682	\$0.14
<b>Division 12</b>	<b>Furnishings</b>	<b>\$519,489</b>	<b>\$0.35</b>
	Foot Grilles	\$160,107	\$0.11
	Horiz. Louver Blinds	\$359,382	\$0.24
<b>Division 13</b>	<b>Special Construction</b>	<b>\$446,862</b>	<b>\$0.30</b>
	Waterfeatures / Fountains	\$446,862	\$0.30
<b>Division 14</b>	<b>Conveying Equipment</b>	<b>\$8,862,503</b>	<b>\$5.91</b>
	Elevators	\$8,862,503	\$5.91
<b>Division 15</b>	<b>Mechanical</b>	<b>\$52,523,331</b>	<b>\$35.02</b>
	HVAC / Plumbing	\$49,517,031	\$33.01
	Sprinkler	\$3,006,300	\$2.00
<b>Division 16</b>	<b>Electrical</b>	<b>\$24,725,667</b>	<b>\$16.48</b>
	Electrical	\$24,725,667	\$16.48

After the above calculations, I used both D4Cost 2002 Estimating Software and R.S. Means. The D4 software gave a parametric estimate. I selected three buildings, Preston Pointe, Blue Cross & Blue Shield, and Ha-La Headquarters. These three buildings were the closest to Constitution Center. After selecting the buildings, I updated the target date and location to July 2007 and Washington, DC and finally adjusted the building size to 1,500,000SF. Table 5 is the D4 output. As one can see, this calculation is about \$50,000,000 over. One reason for this source of error is because D4 is calculating the cost of a new building and Constitution Center is a renovation of an existing building.

*Table 5: D4Cost 2002 Parametric Estimate*

Code	Division Name	%	Sq. Cost	Projected
00	Bidding Requirements	2.84	5.75	\$8,631,950
01	General Requirements	6.50	13.19	\$19,783,954
02	Site Work	6.96	14.12	\$21,177,839
03	Concrete	13.41	27.22	\$40,823,173
04	Masonry	2.84	5.77	\$8,648,921
05	Metals	10.97	22.27	\$33,406,018
06	Wood & Plastics	1.12	2.27	\$3,403,573
07	Thermal & Moisture Protection	2.63	5.34	\$8,014,116
08	Doors & Windows	14.52	29.48	\$44,220,257
09	Finishes	5.99	12.16	\$18,240,859
10	Specialties	2.06	4.17	\$6,262,422
11	Equipment	1.65	1.12	\$1,674,280
12	Furnishings	0.72	1.46	\$2,195,741
14	Conveying Systems	2.65	5.39	\$8,082,977
15	Mechanical	14.46	29.36	\$44,035,820
16	Electrical	10.68	21.68	\$32,523,554
<b>Total Building Costs</b>		<b>100</b>	<b>200.75</b>	<b>\$301,125,454</b>

I also used R.S. Means to do a square foot estimate. The 2007 Square Foot Costs book was utilized in order to determine the correct calculations. I used the 5-10 story office building pages to get the costs per square foot of floor area. Table 6 is an outline of the R.S. Means results. Since Constitution Center is larger than the ones given, I assumed it to be the largest square foot area given. This is one of the main reasons why the estimate is so far off. Additionally, like D4, this is for new construction, while Constitution Center is a renovation, which will make the estimate too high again.

Table 6: Square Foot estimate using R.S. Means<sup>1</sup>

<b>Constitution Center Square Foot Building Estimate</b>			
RS Means Source:	Year: <u>2007</u>	Model # <u>M.470</u>	
Page(s)	<u>178-179</u>	Ext. Wall Type	<u>Curtain Wall and Spandrel Glass</u>
Area:	<u>2,227,500</u>	Frame	<u>Curtain Wall Connections</u>
Perimeter:	<u>1800</u>	Story Height	<u>10.33</u>
The Area fall between: <u>300,000</u> and <u>Above</u>			
			Base Cost per Square Foot: <u>\$121.55</u>
Cost Adjustment Type:	<u>Perimeter Adjustment</u>	Per SF Adj.	<u>\$27.72</u>
Cost Adjustment Type:	<u>Story Height Adjustment</u>	Per SF Adj.	<u>-\$1.98</u>
			Adjusted Base cost Per Square Foot: <u>\$147.29</u>
Base Building Cost:	<u>\$147.29</u>	x	<u>202,500</u> = <u>\$328,081,050.00</u>
Basement Cost:	<u>\$31.95</u>	x	<u>600,000</u> = <u>\$19,170,000.00</u>
			Total Cost: <u>\$347,251,050.00</u>
RS Means Additions:			
Additions:	<u>Clock System (50 rooms)</u>	Amount:	<u>\$36,400.00</u>
Additions:	<u>Closed Circuit Surveillance (10)</u>	Amount:	<u>\$16,750.00</u>
Additions:	<u>Elevators (5000# 10 stops)</u>	Amount:	<u>\$5,414,925.00</u>
Additions:	<u>Intercom System (10)</u>	Amount:	<u>\$29,790.00</u>
Additions:	<u>Smoke Detectors (1530)</u>	Amount:	<u>\$261,630.00</u>
			Total Cost: <u>\$353,010,545.00</u>
Multiplier Type:	<u>Location - D.C.</u>	Value:	<u>0.98</u>
<b>Total Square Foot Estimate for Building:</b>		<b>\$345,950,334.10</b>	

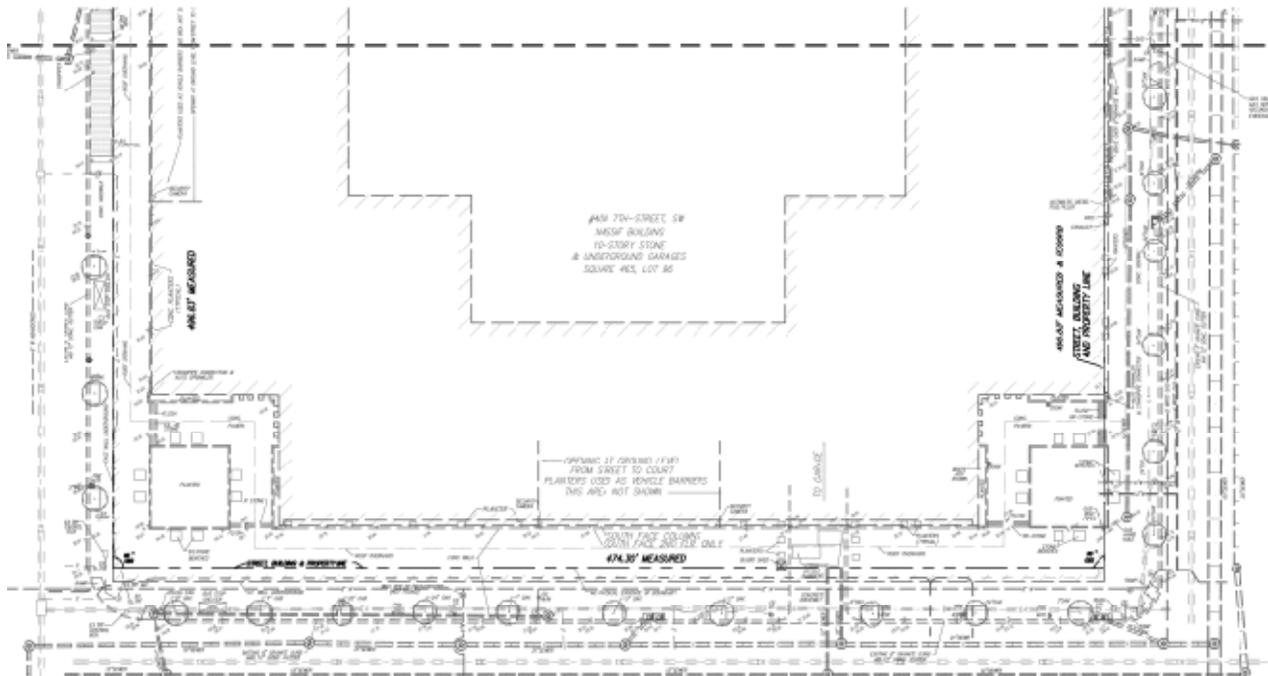
<sup>1</sup> (R.S. Means Square Foot Costs)

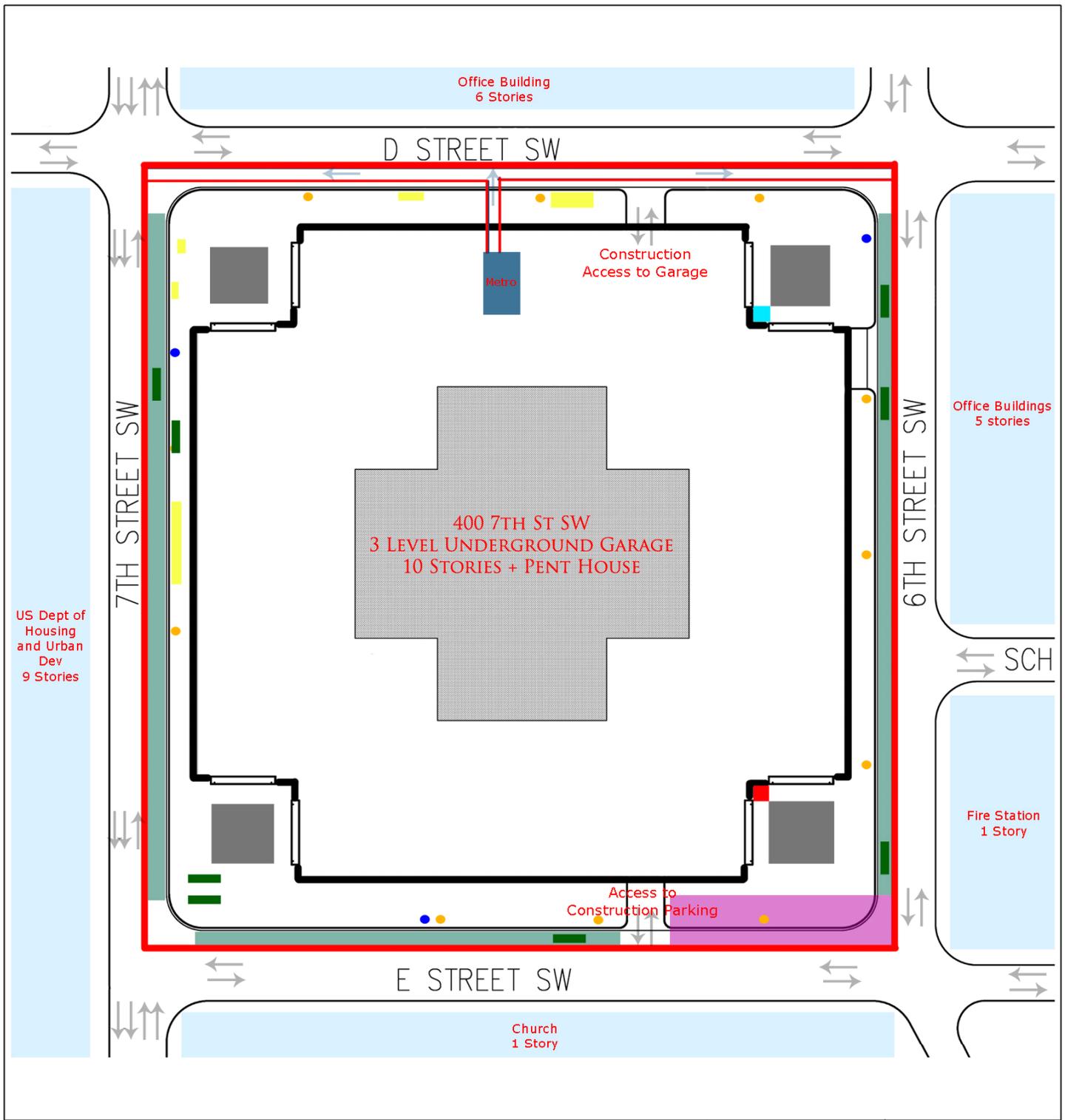
## D. SITE PLAN OF EXISTING CONDITIONS

The site plan of existing conditions can be found on page 13. It includes the footprint of Constitution Center, along with the buildings that surround it. Additionally, it depicts the patterns for both traffic and pedestrians. Fire hydrants and metro grate locations are included on the plan. As one can tell, the north sidewalk is for the L'Enfant Plaza metro entrance, which is open Monday through Friday. Even though the metro entrance is within the site, overhead protection is not necessary, since the north face of the curtain wall was previously installed before the reopening in July 2008. Parking for the workers of Constitution Center can be found on the three levels below the building in the parking garage. There is one access road into the site, which can be found at the south of the building. This road is used to get into the parking garage and where deliveries occur. There is storage found around the site, in the areas between the side-walks and the driving lanes that are temporarily shut down. Additional storage areas are in the parking garage areas. Since the site is so large, the utility locations can be found on a separate drawing, which is figure 3. This drawing depicts where the exiting water, gas, and communication locations were found. The offices of Constitution Center can be found on the south side of the second and third floors. DAVIS' office is located on the second floor; SmithGroup, David Nassif Associates, and Kramer Consulting are all on the third floor; and subcontractors can be found on both floors.



Figure 3: Site Utility Locations





# CONSTITUTION CENTER

400 7TH STREET SE, WASHINGTON, DC 20024

**Legend:**

- Jersey Barriers and Fences, indicating Construction Boundaries
- ← Traffic Flow
- ↔ Pedestrian Flow
- Tower Cranes (Four)
- Metro Grates
- Metro Entrance
- Delivery Area
- Material Storage
- Material Hoist
- Person Hoist
- Dumpsters
- Light Poles
- Fire Hydrants



**NATALIE BRYNER**

TECHNICAL ASSIGNMENT ONE  
SEPTEMBER 29, 2008

SITE PLAN  
EXISTING CONDITIONS

## E. LOCAL CONDITIONS

The preferred method of construction in Washington, DC is the use of concrete. The reason for this method is because there is a height restriction in Washington, DC. "In 1899, Congress passed the Heights of Buildings Act ... but it was amended in 1910 to the width of the adjacent street plus 20 feet."<sup>2</sup> Therefore, when Constitution Center was built in 1976, they used a two-way waffle slab for the floors and concrete columns to create 30' by 30' bays to maximize the floor to floor height, staying within the height restriction.



Figure 4: Sample of the parking arrangements for August 2008 at Constitution Center. The colored blocks indicate parking spaces per subcontractor.



At Constitution Center, there are currently 350 parking spaces available to the workers. The spaces are in the three level controlled access parking garage, which will have 1,500 spaces when construction is complete. DAVIS has given each particular subcontractor a limit to the amount of people that receive parking passes and have a guard on duty throughout the day checking the passes. The spaces alternate between the levels, depending on where work is taking place at the time. Figure 4 shows how the parking spaces are divided on parking level one. If the workers were not provided with parking arrangements, Constitution Center has direct access to four of the five L'Enfant Plaza metro entrances, the Virginia Rail Station, and 14 bus lines. Overall, parking has not been a problem for the workers of Constitution Center.

Since Constitution Center is striving for LEED Gold Certification, the site has a total of eight dumpsters; five belong to DAVIS, two trash, one metal, one block, and one wood while the other three are the responsibility of the subcontractors, ACECO, Brothers, and CRS. The wood and trash dumpsters are emptied every day, while the metal and blocks are removed every three to four days. Additionally, ACECO pulls theirs three times a day and Brothers and CRS empties them every four to six days. The initial cost of the dumpsters was about \$500 and they have a tipping fee of about \$130. Overall, dumpsters play a very large part in the site receiving LEED Certification; therefore DAVIS has an assistant project manager responsible for tracking the percentage of material that is being recycled.



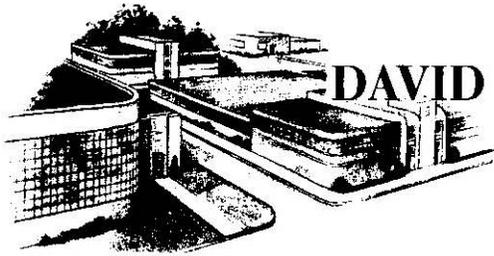
Constitution Center is a renovation of the existing David Nassif Building, therefore soil and subsurface water conditions did not play a large role in the construction. However, since there is a three level parking garage under the building, which is not the same footprint as the building, proper shoring was necessary with the mobile cranes used for the installation of the curtainwall.

<sup>2</sup> (Grunwald)

## **F. CLIENT INFORMATION**

David Nassif Associates are the owners of Constitution Center. They originally built the building back in the 1970's, and have operated and leased the building since then. The company thrives on owning a smaller number of larger buildings, like Constitution Center. This will be the largest privately owned office building in Washington, DC and owning it is one of the goals of the ownership. The building, like many others built in the 1970s, are ready for renovations. Additionally, they saw this moderation as an excellent opportunity to bring a newly updated and renovated LEED building to the DC area.

David Nassif Associates want the best in cost, quality, schedule, and safety for Constitution Center. They expect the highest quality work possible, within the schedule of the project. Additionally, they have extremely high safety expectations, as they have the onsite nursing staff for drug testing and any injuries. One of their strategies with the cost is to "bend but not break."<sup>3</sup> They are willing, unlike most owners, to pay more for items that actually warrant extra money. It is believed that this strategy will help them get a better quality product in the end. David Nassif Associates have provided numerous free things for the subcontractors. Some examples include the parking that is available in the garage and trips with the subcontractors to look at the curtainwall, stone, trees, and chilled beams. As one can tell, they have spent a lot of money on travel to ensure they have the best product.



## **DAVID NASSIF ASSOCIATES**

*Pioneers in Property Development*

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The main sequencing issue that is of interest to the owners is that the building is completed in the correct sequences, so that the appropriate quadrant is released at the projected time. With this, there are no occupancy requirements, other than turning the quadrants over on time. In order for Constitution Center to be completed to the owner's satisfaction, they would like to make sure that the punch lists are done for the majority of the items installed to ensure that they are getting the highest quality they are expecting.

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<sup>3</sup> (Cordek)

## G. PROJECT DELIVERY SYSTEM

Constitution Center is being delivered as a design-bid-build project. This means that the owner holds the contracts for both design and construction. The reason the owner chose this type of contract was because the project is so large that they wanted to manage the contracts for the different phases and be involved throughout the entire renovation. Please see the organizational chart, figure 5, for the other key contracts. There is a guaranteed maximum price (GMP) contract between David Nassif Associates and DAVIS, which states that the owner is not obligated to compensate DAVIS for any amount beyond the contract price. DAVIS holds all of the subcontracts, which are all lump sum contracts, except for the Abatement Subcontractor, Aceco, Inc., which is a unit rate. The reason DAVIS chose to do a unit rate contract with Aceco is because they had to add and deduct rates for different abatement quantities. David Nassif Associates holds lump sum contracts with everyone that is involved in the design phase. These two types of contractors are very common in most construction projects and they are very appropriate for this large job.

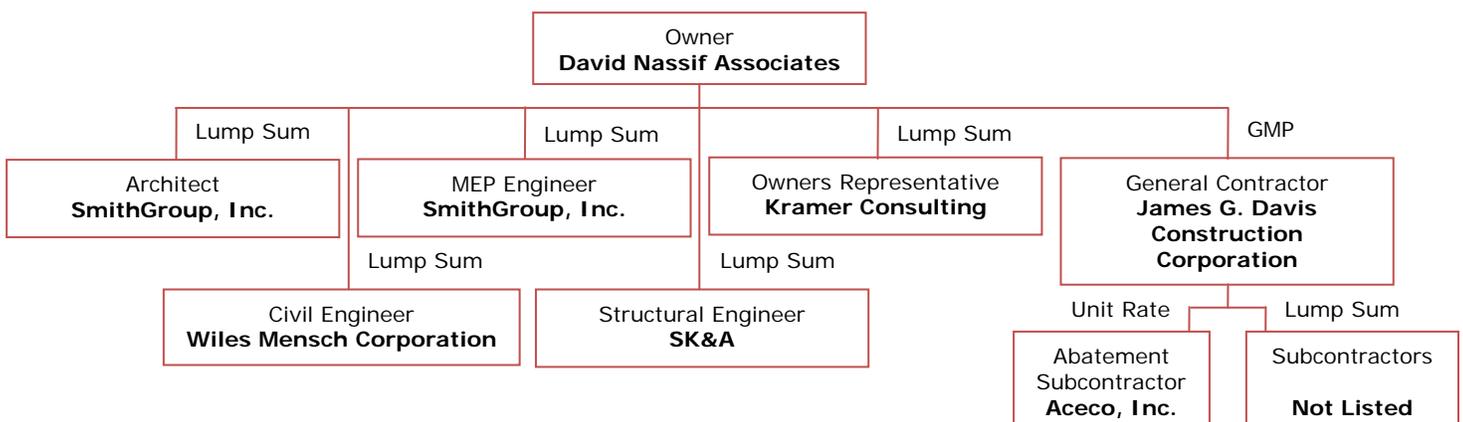
DAVIS selected the subcontractors, which are listed to the right, by weighing the cost proposals against the performance strategies. The primary subcontractor had a meeting with the ownership to discuss their planning strategies, prior to decisions being made. DAVIS was selected in a similar manner; they provided their estimate, along with the planning strategies.

The project requires a Contractor Controlled Insurance Program (CCIP), which provides coverage for all enrolled subcontractors. A typical CCIP provides coverage in the following three areas: Workers' Compensation / Employer's Liability, Commercial General Liability, and Excess Liability.

### Major Subcontractors:

- Government Agency (Power) – Pepco
- Government Agency (Gas) – Washington Gas
- Government Agency (Metro) – Washington Metropolitan Area Transit Authority
- Survey & Layout – William H. Gordon Associates
- Demolition – Aceco, LLC, The Berg Corporation
- Site Concrete – GT Contracting Corporation
- Site Signage – All State Striping & Sealing Co.
- Landscaping – Ruppert Nurseries
- Cast In Place Concrete – Brothers Concrete Construction, Inc.
- Concrete Restoration – Concrete Restoration Services
- Masonry – Genco Masonry Inc, Worcester Eisenbrant
- Stone – Rugo Stone
- Metals – Extreme Steel
- Miscellaneous Metals – Superior Iron Works
- Ornamental Metal – Louis Hoffmann
- Waterproofing – Eastern Waterproofing & Restoration
- Sprayed On Fireproofing – Diamond Engineering
- Manufactured Roof & Wall Panels – A.C. Dellovade
- Roofing – Gordon Contractors
- Doors, Frames & Hardware – C.H. Edwards
- Glass & Glazing – Enclos Corporation
- Drywall & Acoustical Ceiling – C.J. Coakley
- Painting & Wallcovering – Brien Miller Painting Company

Figure 5: Hierarchy of the design-bid-build delivery system, including the major project players

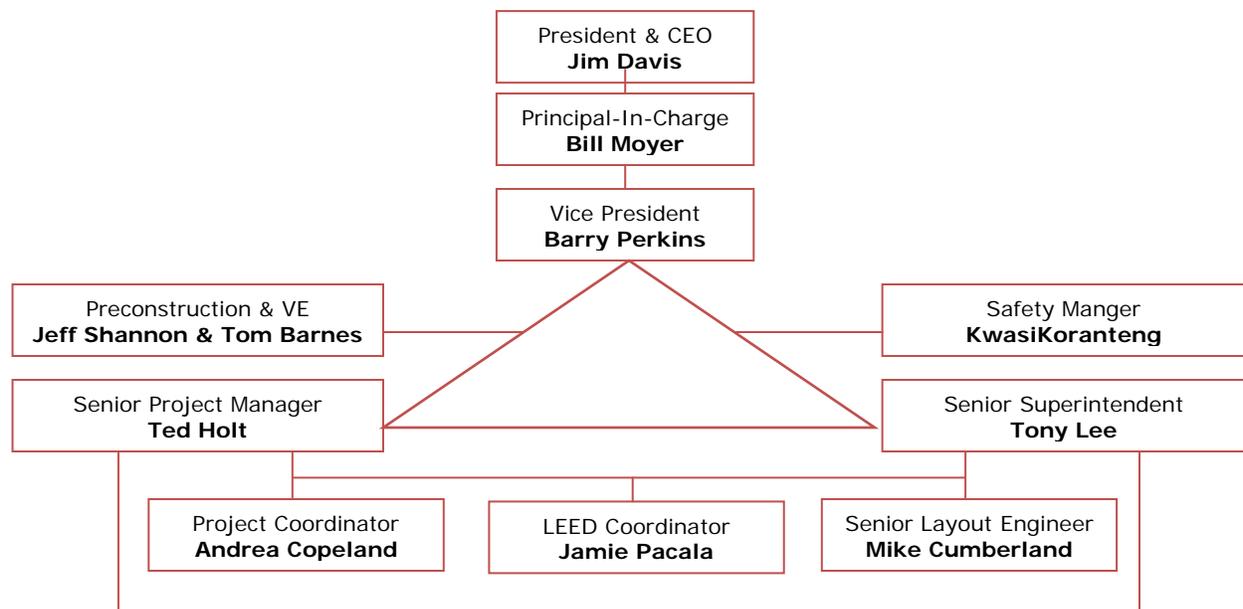


## H. STAFFING PLAN



The structure of the general contractor, DAVIS, on Constitution Center is a typical hierarchy. Please see figure 6 for a visual description of the hierarchy at Constitution Center. Jim Davis, the President and CEO oversees all DAVIS projects. Bill Moyer, Principal-In-Charge, manages multiple projects at DAVIS. The Vice President, Barry Perkins, is responsible for several projects; however he spends most of his time overseeing Constitution Center. Both Ted Holt, Senior Project Manager, and Tony Lee, Senior Superintendent, work onsite of Constitution Center daily and provide guidance to the progress of the project. Under their leadership, the project is divided into five main areas: Site, Demolition, & Plaza Coordination; Structure, Blast & Masonry; Façade & Division 7; MEP & Elevators; and Interiors & Finishes. Each of these areas has a Project Manager, Project Superintendent, Assistant Project Manager, and a summer intern to insure the project is being built it the correct specifications. Please see figure 7 for the staffing plan of DAVIS on Constitution Center. This plan is used to depict how the stuff will manage their time on Constitution Center and other DAVIS projects. The solid colors indicate that the employee is working full-time on Constitution Center, while the dashed color shows that they are only on the project part time.

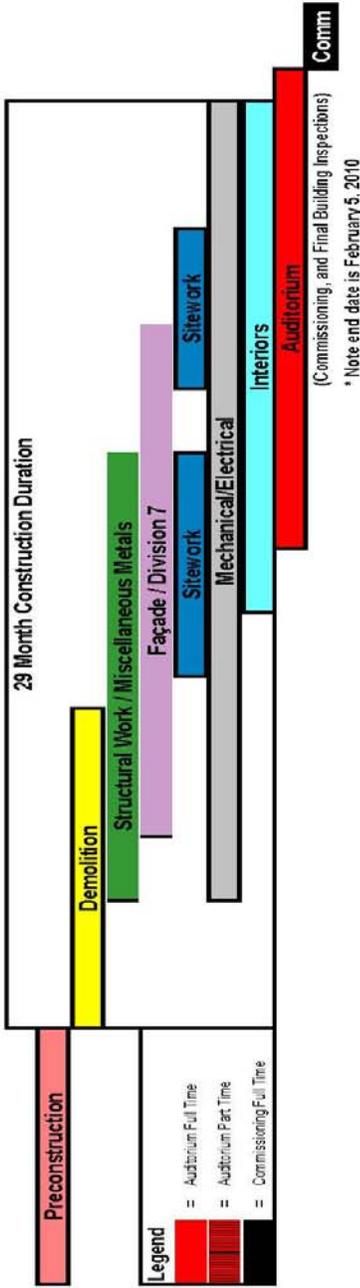
Figure 6: Hierarchy of the general contractor, James G. Davis Construction Corporation



Site, Demolition& Plaza Coordination		Structure, Blast, & Masonry		Façade & Div. 7		MEP& Elevators		Interiors & Finishes	
Project Manager, LEED <b>Brad Cordek</b>	Project Superintendent <b>Tim Swanson</b>	Project Manager, LEED <b>TJ Sterba</b>	Project Superintendent <b>Dan Gowin</b>	Project Manager, LEED <b>Meghan Ulrich</b>	Project Superintendent <b>Doug Bolden</b>	Project Manager <b>Bill Bundens</b>	Project Superintendent <b>Drew Broglie</b>	Project Manager, LEED <b>Greg Ghent</b>	Project Superintendent <b>Tim Swanson</b>
Assistant Project Manager <b>Jamie Pacalla</b>		Assistant Project Manager <b>Frank Lefler</b>		Assistant Project Manager <b>Jesse May</b>		Assistant Project Manager <b>Ihsan Gin, Nestor Santos, Omega Tadesse</b>		Assistant Project Manager <b>Jamie Pacalla</b>	
Intern <b>Natalie Bryner</b>		Intern <b>Natalie Bryner</b>		Intern <b>Desmon Hayden</b>		Intern <b>Natalie Bryner</b>		Intern <b>-</b>	



# CONSTITUTION CENTER AUDITORIUM - STAFFING PLAN



	2006		2007		2008		2009		2010								
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
<b>OVERALL MANAGEMENT</b>																	
Senior Vice President																	
Bill Moyer																	
Vice President																	
Barry Perkins																	
<b>OFFICE MANAGEMENT</b>																	
Senior Project Manager																	
Ted Holt																	
<b>Project Managers</b>																	
Brad Cordek - Demo/Site																	
TJ Sterba - Structure/Blast/Mas																	
Meghan Ulrich - Façade/Div 7																	
Bill Burdons - MEP																	
Greg Ghent - Finishes																	
<b>Assistant PM's/Project Coordinator</b>																	
Andrea Copeland - overall																	
Jamie Pacala - Demo																	
Frank Laffer - Structure/Blast																	
Jesse May - Façade/Div 7																	
Nestor Santos - LEED/Commission																	
Ihsan Gin - MEP																	
Jamie Pacala - Finishes																	
<b>Project Administrator</b>																	
Lori Wyatt/Yolanda Nelson																	
<b>FIELD MANAGEMENT</b>																	
<b>Senior Superintendent</b>																	
Tony Lee																	
<b>Senior Layout Engineer</b>																	
Mike Cumberland																	
<b>Superintendent</b>																	
Tim Swanson - Demo																	
Dan Gowin - Structure/Blast/Site																	
Doug Bolden - Façade/Div 7																	
Drew Broglie - MEP																	
Tim Swanson - interiors																	
<b>Assistant Superintendent</b>																	
Steve Hess - Overall																	
<b>Safety Officer</b>																	
Kwesi Koranteng																	

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Cordek, Bradley. Project Manager Natalie Bryner. 21 September 2008.

Grunwald, Michael. "The Washington Post." 2 July 2006. washingtonpost.com. 27 September 2008 <<http://www.washingtonpost.com/wp-dyn/content/article/2006/06/30/AR2006063001316.html>>.

R.S. Means Square Foot Costs. 29th Annual Edition. Kingston: Reed Construction Data, Inc., 2007.

**APPENDIX A: R.S. MEANS 2007 REFERENCE**

Figure 8: Page 178 of 2007 R.S. Means Square Foot Costs



Exterior Wall		S.F. Area	20000	40000	60000	80000	100000	150000	200000	250000	300000
		L.F. Perimeter	260	360	400	420	460	520	600	640	700
Precast Concrete Panel	Steel Frame	187.20	160.70	146.80	<b>138.65</b>	134.65	128.05	125.30	122.85	121.55	
	R/Conc. Frame	187.50	160.75	146.75	138.60	134.60	128.00	125.20	122.70	121.40	
Face Brick with Concrete Block Back-up	Steel Frame	176.15	152.95	141.05	134.10	130.65	125.05	122.65	120.60	119.50	
	R/Conc. Frame	176.00	152.75	140.85	133.90	130.50	124.90	122.50	120.45	119.30	
Limestone Panel Concrete Block Back-up	Steel Frame	225.35	187.00	166.25	153.95	148.05	138.20	134.00	130.30	128.35	
	R/Conc. Frame	225.20	186.85	166.15	153.75	147.90	138.00	133.85	130.15	128.15	
Perimeter Adj., Add or Deduct	Per 100 L.F.	25.25	12.60	8.45	6.35	5.05	3.40	2.55	2.00	1.70	
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	5.30	3.60	2.65	2.10	1.85	1.45	1.20	1.00	90	

*For Basement, add \$31.95 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 \$65.45 to \$192.35 per S.F.

**Common additives**

Description	Unit	\$ Cost	Description	Unit	\$ Cost
Clock System			Intercom System, 25 station capacity		
20 room	Each	15,000	Master station	Each	2400
50 room	Each	36,400	Intercom outlets	Each	154
Closed Circuit Surveillance, One station			Handset	Each	425
Camera and monitor	Each	1675	Smoke Detectors		
For additional camera stations, add	Each	910	Ceiling type	Each	171
Directory Boards, Plastic, glass covered			Duct type	Each	440
30" x 20"	Each	570	Sound System		
36" x 48"	Each	1375	Amplifier, 250 watts	Each	2125
Aluminum, 24" x 18"	Each	555	Speaker, ceiling or wall	Each	174
36" x 24"	Each	635	Trumpet	Each	335
48" x 32"	Each	885	TV Antenna, Master system, 12 outlet	Outlet	288
48" x 60"	Each	1850	30 outlet	Outlet	185
Elevators, Electric passenger, 5 stops			100 outlet	Outlet	173
2000# capacity	Each	123,800			
3500# capacity	Each	130,800			
5000# capacity	Each	136,300			
Additional stop, add	Each	7675			
Emergency Lighting, 25 watt, battery operated					
Lead battery	Each	265			
Nickel cadmium	Each	770			

Figure 9: Page 179 of 2007 R.S. Means Square Foot Costs

**Model costs calculated for an 8 story building with 12' story height and 80,000 square feet of floor area.**

**Office, 5-10 Story**

			Unit	Unit Cost	Cost Per S.F.	% Of Sub-Total	
<b>A. SUBSTRUCTURE</b>							
1010	Standard Foundations	Poured concrete; strip and spread footings	S.F. Ground	11.04	1.38		
1030	Slab on Grade	4" reinforced concrete with vapor barrier and granular base	S.F. Slab	4.45	.55	2.3%	
2010	Basement Excavation	Site preparation for slab and trench for foundation wall and footing	S.F. Ground	.24	.03		
2020	Basement Walls	4' foundation wall	L.F. Wall	69	.46		
<b>B. SHELL</b>							
<b>B10 Superstructure</b>							
1010	Floor Construction	Concrete slab with metal deck and beams	S.F. Floor	19.93	17.44	17.4%	
1020	Roof Construction	Metal deck, open web steel joists, interior columns	S.F. Roof	5.84	.73		
<b>B20 Exterior Enclosure</b>							
2010	Exterior Walls	Precast concrete panels	S.F. Wall	35	14.31	17.1%	
2020	Exterior Windows	Vertical pivoted steel	Each	503	3.38		
2030	Exterior Doors	Double aluminum and glass doors and entrance with transoms	Each	3298	.21		
<b>B30 Roofing</b>							
3010	Roof Coverings	Built-up tar and gravel with flashing; perlite/EPS composite insulation	S.F. Roof	4.96	.62	0.6%	
3020	Roof Openings	N/A	-	-	-		
<b>C. INTERIORS</b>							
1010	Partitions	Gypsum board on metal studs	S.F. Partition	8.37	2.79	19.5%	
1020	Interior Doors	Single leaf hollow metal	Each	815	2.04		
1030	Fittings	Toilet Partitions	S.F. Floor	.70	.70		
2010	Stair Construction	Concrete filled metal pan	Flight	11,550	2.46		
3010	Wall Finishes	60% vinyl wall covering, 40% paint	S.F. Surface	1.26	.84		
3020	Floor Finishes	60% carpet, 30% vinyl composition tile, 10% ceramic tile	S.F. Floor	6.81	6.81		
3030	Ceiling Finishes	Mineral fiber tile on concealed zee bars	S.F. Ceiling	4.71	4.71		
<b>D. SERVICES</b>							
<b>D10 Conveying</b>							
1010	Elevators & Lifts	Four geared passenger elevators	Each	198,200	9.91	9.5%	
1020	Escalators & Moving Walks	N/A	-	-	-		
<b>D20 Plumbing</b>							
2010	Plumbing Fixtures	Toilet and service fixtures, supply and drainage	Each	2329	1.70	2.0%	
2020	Domestic Water Distribution	Gas fired water heater	S.F. Floor	.24	.24		
2040	Rain Water Drainage	Roof drains	S.F. Roof	1.12	.14		
<b>D30 HVAC</b>							
3010	Energy Supply	N/A	-	-	-	15.0%	
3020	Heat Generating Systems	Included in D3050	-	-	-		
3030	Cooling Generating Systems	N/A	-	-	-		
3050	Terminal & Package Units	Multizone unit gas heating, electric cooling	S.F. Floor	15.65	15.65		
3090	Other HVAC Sys. & Equipment	N/A	-	-	-		
<b>D40 Fire Protection</b>							
4010	Sprinklers	N/A	-	-	-	0.2%	
4020	Standpipes	Standpipes and hose systems	S.F. Floor	.24	.24		
<b>D50 Electrical</b>							
5010	Electrical Service/Distribution	1600 ampere service, panel board and feeders	S.F. Floor	1.62	1.62	16.5%	
5020	Lighting & Branch Wiring	Fluorescent fixtures, receptacles, switches, A.C. and misc. power	S.F. Floor	10.23	10.23		
5030	Communications & Security	Alarm systems, internet and phone wiring, emergency lighting	S.F. Floor	4.49	4.49		
5090	Other Electrical Systems	Emergency generator, 100 kW, uninterruptible power supply	S.F. Floor	.94	.94		
<b>E. EQUIPMENT &amp; FURNISHINGS</b>							
1010	Commercial Equipment	N/A	-	-	-	0.0%	
1020	Institutional Equipment	N/A	-	-	-		
1030	Vehicular Equipment	N/A	-	-	-		
1090	Other Equipment	N/A	-	-	-		
<b>F. SPECIAL CONSTRUCTION</b>							
1020	Integrated Construction	N/A	-	-	-	0.0%	
1040	Special Facilities	N/A	-	-	-		
<b>G. BUILDING SITEWORK</b> N/A							
					<b>Sub-Total</b>	104.62	100%
CONTRACTOR FEES (General Requirements: 10%, Overhead: 5%, Profit: 10%)					25%	26.18	
ARCHITECT FEES					6%	7.85	
<b>Total Building Cost</b>					<b>138.65</b>		

Figure 10: Page 453 of 2007 R.S. Means Square Foot Costs

## 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
<b>ALABAMA</b>			
350-352	Birmingham	.86	.86
354	Tuscaloosa	.73	.78
355	Jasper	.71	.76
356	Decatur	.76	.78
357-358	Huntsville	.84	.85
359	Gadsden	.73	.79
360-361	Montgomery	.75	.79
362	Anniston	.68	.74
363	Dothan	.74	.75
364	Evergreen	.70	.75
365-366	Mobile	.79	.81
367	Selma	.72	.76
368	Phenix City	.73	.78
369	Butler	.71	.75
<b>ALASKA</b>			
995-996	Anchorage	1.27	1.24
997	Fairbanks	1.29	1.24
998	Juneau	1.27	1.23
999	Ketchikan	1.29	1.29
<b>ARIZONA</b>			
850,853	Phoenix	.86	.89
852	Mesa/Tempe	.83	.86
855	Globe	.79	.85
856-857	Tucson	.84	.87
859	Show Low	.81	.86
860	Flagstaff	.86	.88
863	Prescott	.81	.84
864	Kingman	.83	.85
865	Chambers	.80	.84
<b>ARKANSAS</b>			
716	Pine Bluff	.81	.85
717	Camden	.70	.73
718	Texarkana	.75	.76
719	Hot Springs	.70	.74
720-722	Little Rock	.87	.86
723	West Memphis	.81	.82
724	Jonesboro	.79	.82
725	Batesville	.76	.78
726	Harrison	.78	.79
727	Fayetteville	.72	.77
728	Russellville	.77	.79
729	Fort Smith	.79	.82
<b>CALIFORNIA</b>			
900-902	Los Angeles	1.06	1.07
903-905	Inglewood	1.05	1.04
906-908	Long Beach	1.04	1.05
910-912	Pasadena	1.05	1.05
913-916	Van Nuys	1.08	1.07
917-918	Alhambra	1.09	1.06
919-921	San Diego	1.04	1.04
922	Palm Springs	1.04	1.04
923-924	San Bernardino	1.05	1.03
925	Riverside	1.05	1.05
926-927	Santa Ana	1.06	1.04
928	Anaheim	1.05	1.06
930	Oxnard	1.07	1.06
931	Santa Barbara	1.06	1.06
932-933	Bakersfield	1.03	1.05
934	San Luis Obispo	1.08	1.06
935	Mojave	1.06	1.03
936-938	Fresno	1.09	1.07
939	Salinas	1.12	1.10
940-941	San Francisco	1.23	1.22
942,956-958	Sacramento	1.11	1.09
943	Palo Alto	1.18	1.15
944	San Mateo	1.22	1.17
945	Vallejo	1.15	1.13
946	Oakland	1.21	1.18
947	Berkeley	1.24	1.18
948	Richmond	1.24	1.17
949	San Rafael	1.22	1.18
950	Santa Cruz	1.15	1.13
951	San Jose	1.19	1.16
952	Stockton	1.09	1.08
953	Modesto	1.08	1.08
954	Santa Rosa	1.16	1.14

STATE/ZIP	CITY	Residential	Commercial
955	Eureka	1.12	1.08
959	Marysville	1.10	1.09
960	Redding	1.10	1.09
961	Susanville	1.09	1.08
<b>COLORADO</b>			
800-802	Denver	.94	.95
803	Boulder	.93	.92
804	Golden	.91	.93
805	Fort Collins	.90	.93
806	Greeley	.80	.86
807	Fort Morgan	.93	.93
808-809	Colorado Springs	.90	.93
810	Pueblo	.91	.93
811	Alamosa	.88	.92
812	Salida	.90	.93
813	Durango	.91	.93
814	Montrose	.87	.91
815	Grand Junction	.92	.92
816	Glenwood Springs	.90	.93
<b>CONNECTICUT</b>			
060	New Britain	1.08	1.07
061	Hartford	1.08	1.07
062	Willimantic	1.08	1.07
063	New London	1.08	1.05
064	Meriden	1.08	1.07
065	New Haven	1.08	1.08
066	Bridgeport	1.09	1.08
067	Waterbury	1.09	1.07
068	Norwalk	1.09	1.08
069	Stamford	1.10	1.10
00-205	Washington	.95	.98
<b>DELAWARE</b>			
197	Newark	.99	1.01
198	Wilmington	1.00	1.01
199	Dover	.99	1.01
<b>FLORIDA</b>			
320,322	Jacksonville	.77	.81
321	Daytona Beach	.84	.86
323	Tallahassee	.73	.76
324	Panama City	.67	.72
325	Pensacola	.78	.82
326,344	Gainesville	.77	.82
327-328,347	Orlando	.84	.85
329	Melbourne	.86	.90
330-332,340	Miami	.85	.87
333	Fort Lauderdale	.84	.86
334,349	West Palm Beach	.84	.83
335-336,346	Tampa	.86	.87
337	St. Petersburg	.76	.80
338	Lakeland	.83	.86
339,341	Fort Myers	.80	.82
342	Sarasota	.84	.84
<b>GEORGIA</b>			
300-303,399	Atlanta	.90	.89
304	Statesboro	.71	.76
305	Gainesville	.79	.83
306	Athens	.79	.84
307	Dalton	.75	.79
308-309	Augusta	.81	.83
310-312	Macon	.82	.83
313-314	Savannah	.82	.82
315	Waycross	.76	.81
316	Valdosta	.73	.77
317,398	Albany	.79	.82
318-319	Columbus	.83	.85
<b>HAWAII</b>			
967	Hilo	1.21	1.19
968	Honolulu	1.23	1.21
<b>STATES &amp; POSS.</b>			
969	Guam	.89	.99