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Construction Management
Dr. Horman
American Speech-Language Hearing Association National Headquarters
Rockville, MD
October 6, 2006
Existing Construction Conditions

Index:

Executive Summary

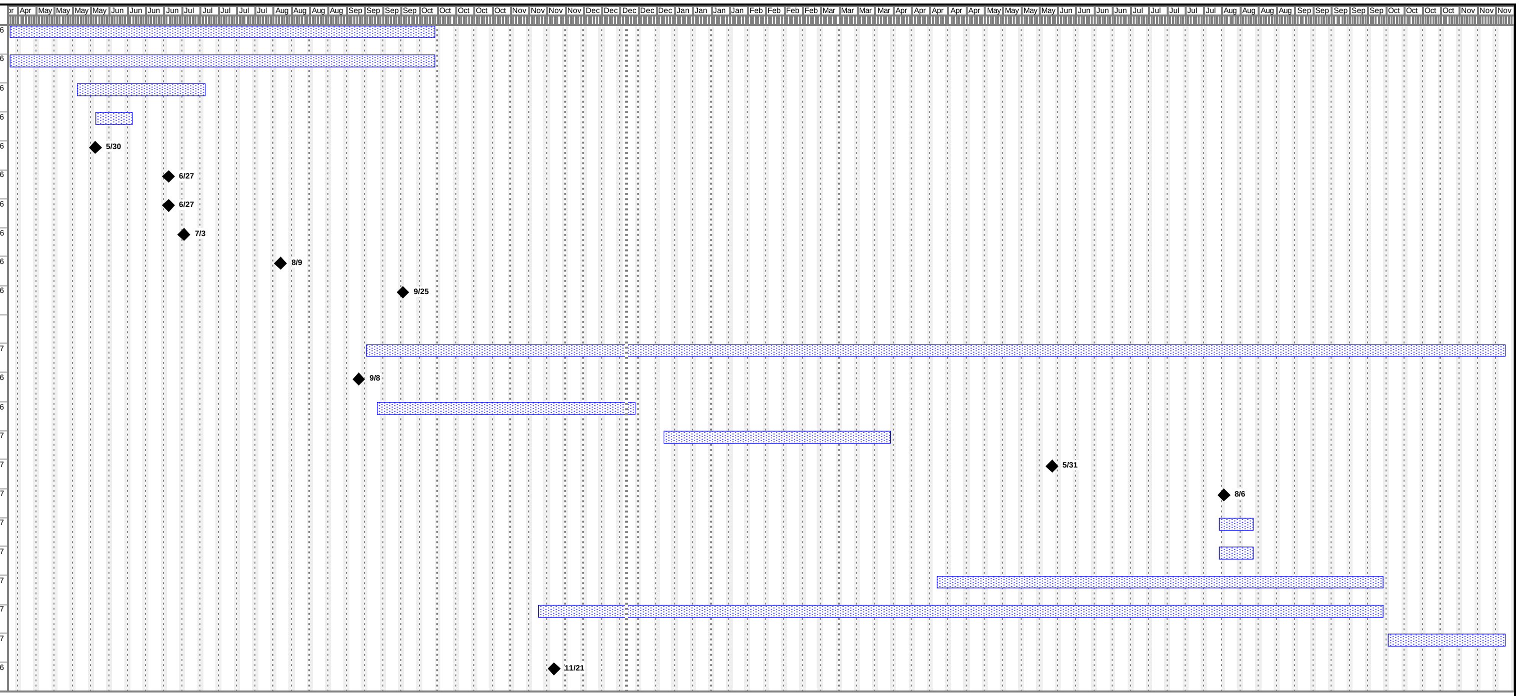
The American Speech-Language Hearing Association Nation Headquarters is a highly interesting building. Not only for its interesting construction and façade, but also for the restrictions that present themselves to the overall project. These restrictions are not necessarily due to the restrictions of local buildings or zones but more due to the restrictions of schedule, cost, bids, and ground conditions, as well as the LEED rating attempted to be reached.

The contractual arrangements are very straight forward beginning with a design-bid-build with a guaranteed max price and subcontractors requiring lump sum bids. These were done do to the cost restrictions. The ASHA is a non-profit organization that therefore does not have a lot of money to spend on this project. Therefore the cost of the building is essential and the LEED rating may slightly affect that cost. Not only that but the ASHA has already sold their previous headquarters and is now back renting meaning that the schedule is vastly important. If the schedule goes over its date not only will the ASHA be paying for the extra construction but also for the extended period of paying rent. To prevent this, the ASHA did have a GMP contract however they are bidding the exterior and interior of the building separately. This could cost the ASHA money however if the first part of the project comes in high and they are unable to pay for the completion of the interior of the building and have to sacrifice quality.

Not only are the schedule and cost highly important but so are the ground conditions. The foundations are being built just inside of wetlands, and just underneath the ground consist mostly of clay with silt and sand underneath until the bedrock is finally reached which can lead to settlement and future difficulties if not done correctly. The LEED rating is also highly important. The ASHA wants this to be the face of their organization and are very interested in gaining the LEED rating. This is important and could affect the schedule or cost if something was not analyzed properly.

The project is highly interesting with many twists and turns that make it not only interesting but exciting. The importance of schedule and cost are primary while also having to attempt to gain a silver LEED rating and dealing with water and soil concerns. The ASHA promises to be an interesting building with many possible answers to multiple questions.

ID		Task Name	Duration	Start	Finish
1		Preconstruction	117 days?	Thu 4/27/06	Fri 10/6/06
2		Temporary Power	117 days?	Thu 4/27/06	Fri 10/6/06
3		MD Tree Permit Issued	35 days?	Tue 5/23/06	Mon 7/10/06
4		Stakeout Property Corners	10 days?	Tue 5/30/06	Mon 6/12/06
5		Start Project	0 days	Tue 5/30/06	Tue 5/30/06
6		Sediment Permit Issued	0 days	Tue 6/27/06	Tue 6/27/06
7		Stormwater Management Permit Issued	0 days	Tue 6/27/06	Tue 6/27/06
8		Forest Conservation Plans Issued	0 days	Mon 7/3/06	Mon 7/3/06
9		Foundation Permit Issued	0 days	Wed 8/9/06	Wed 8/9/06
10		Water/Sewer Permits Issued and Easmonts	0 days	Mon 9/25/06	Mon 9/25/06
11					
12		Milestones	314 days?	Mon 9/11/06	Wed 11/21/07
13		Building Permits	0 days	Fri 9/8/06	Fri 9/8/06
14		Complete Concrete Garage	71 days?	Fri 9/15/06	Fri 12/22/06
15		Steel Completion	63 days?	Wed 1/3/07	Fri 3/30/07
16		Owner Permanent Power	0 days	Thu 5/31/07	Thu 5/31/07
17		Interior Contract Start	0 days	Mon 8/6/07	Mon 8/6/07
18		Complete Façade Installation	10 days?	Sat 8/4/07	Thu 8/16/07
19		Watertight	10 days?	Sat 8/4/07	Thu 8/16/07
20		Complete All Finishes and Perimeter	124 days?	Wed 4/18/07	Fri 10/5/07
21		Complete MEP Risers and Equip Start	233 days?	Thu 11/16/06	Fri 10/5/07
22		Complete Inspections	33 days?	Mon 10/8/07	Wed 11/21/07
23		Current Completion Date	0 days	Tue 11/21/06	Tue 11/21/06



Project Schedule Summary

The Schedule on the following page contains the schedule of all major milestones of the project as well as the important concerns for Davis Construction during pre-construction. The foundations are very simple but contain a few key elements during construction. The under slab piping must be laid not only on time in order to maintain the schedule but also properly. If there is a problem with the piping and it is not discovered until after the first pour. Either certain pipes and utilities will have to be above the slab or certain areas of the slab may be torn up so that the piping can be corrected. This could and would have a serious impact on a schedule that is crucial to this project. Obtaining the building permit is also essential because the job will be forced to wait until the building permit is obtained which is scheduled to be obtained just before the first pour which again could lead to schedule difficulties. Also the slab will be completed in four pours while walls and other pours occur in-between. If the slab pours are delayed or are not poured properly so that they mesh together re-pours may need to occur again greatly affecting the schedule.

The steel is also a key element. It is important that the steel be erected on time. Not only is obtaining the steel on time important due to its lead time but erecting it quickly is essential. As multiple levels of steel are erected at once such as the second and third floor the concrete for those floors will be waiting until the erection is complete. Meanwhile while pours are occurring the upper floors of steel will be erected keeping the schedule concise and time dependent.

The sequencing of this job is very straight forward. The project will begin with the basic site work and then continue out of the ground. Once the floors begin to be poured and the steel is placed the mechanical systems will be installed. Since there are no real concerns with interior delays due to the lack of an electrical system the overall enclosure of the building is what is considered most important. Therefore, the project will place the steel and pour all of the floors. Once this is complete the curtain wall and enclosure will begin. While enclosure begins the mechanical systems will begin to be placed at the same time, that way time can be saved in the schedule.

Yes	*No*	*Work Scope*
	x	Demolition
x		Structural Steel Frame
x		C.I.P.
x		Pre-cast Concrete
x		Mechanical System
x		Electrical System
	x	Masonry
x		Curtain Wall
x		Support of Excavation

Building Systems Summary

Questions/Concerns

Structural Steel Frame:

The Building consists of an integrated steel frame. Each of the columns used will be tied into the cast in place concrete columns. The steel will begin and continue through the above grade floors. It is a very simple and repetitive frame consisting primarily of 14x53 and 12x40 beams. Each floor with then be poured onto a 2in 18 gage steel deck. The steel system is very simple and repeatable throughout the entire building.

C.I.P.:

The project begins as a C.I.P. project. After excavation is completed concrete will be poured as a S.O.G. Once the S.O.G. is poured concrete columns will be poured in the lower two levels for the parking deck area. All of these columns will be tied into the slab and be reinforced with rebar. The decks above will also be poured. The steel will then be tied into these base columns. Also all of the decks will be poured on site using a mobile crane and bucket. Two time use forms were used for the columns since they only occur on the lowest level and are not continued throughout the project.

Precast Concrete:

The precast concrete on the ASHA site acts as the façade of the building on three sides. Each precast panel will be its own color. One acting as a white, another as a grey, and the third set of panels a slightly darker grey, each of the panels will be erected using a tower crane. Each panel was cast a different color at the request of the architect, to help with an aesthetically pleasing design. Each section of panel will be cast in North Carolina and then shipped to the site for erection. All three types of panel will exist on three sides of the façade with the fourth façade being a glass curtain wall. All of the concrete will be maintained using steel ties and steel on the exterior of the building that will run the height of the building which all of the panels will be tied into.

Mechanical System:

The mechanical system in the ASHA headquarters consists of two 200 ton chillers with condenser and evaporator, two cooling towers on the roof, a heat recovery unit, and air handling units. The mechanical room is located in the penthouse on the top floor as well as the roof for the open cell cooling towers. The heat recovery unit is located in the penthouse and serves for ventilated air. There is one air handling unit per floor each of a slightly different size due to the size of the floor and its primary purpose. The first floor contains a 25000cfm, the basement has a 8000cfm air handling unit, and the second, third, and fourth floors all contain 22000cfm air handling units while the fifth floor has a 23000cfm unit.   There are two open cell cooling towers on the roof of the building. Each acts as a condenser and is an induced draft counterflow cooling tower. The two water chillers are centrifugal. The pumps that are contained in the chiller plant are composed of three primary chilled water pumps and three condenser water pumps. Each floor also consists of a set of diffusers and the fire suppression system is simply the sprinkling of the entire building.

Electrical System:

The electrical system has not been completely determined due to the fact that the space is not being built out yet. The electrical will come in the next awarded bid. However in the lobby lighting has been determined. The only thing determined for the lighting in the lobby is the lighting fixture schedule. The size of the lighting for the requirements as well as redundancy will not be determined until the next bid is awarded.

Curtain Wall:

The curtain wall consists of the front façade of the building facing Research Boulevard.   The curtain wall consists of three types of vision glass, two types of spandrel glass, and a clear storefront glass both tempered and non-tempered. Metal panels will then be placed between each piece of glass running the height of the building to keep each panel in place. In order to place the glass each piece of glass will be lifted into position by the tower crane and then rested and attached to the metal panels that will run between each sheet of glass. These panels will allow each panel to remain in place and adds a aesthetic front to the building.

Roof:

The roof is a very simple thermoplastic membrane, which rests on insulation with metal decking underneath. It is a very simple roof that can be placed easily and will help with the LEED rating of the building.

Support of Excavation:

The support system will consist of typical tiebacks to allow the walls from caving in. After the tiebacks are placed there will be pumps placed to dewater the system until the footer can actually be poured. The dewatering will only be temporary until the footing is ready and the majority of the water has been removed from the site. The project is a highly populated with forest on the edges where some excavation will need to occur near to the woods. Therefore, rather than slope the excavation back and ruin the area to help with the green aspect of the project tiebacks were placed in order to prevent the ruining of the scenic view. Also a dewatering pool system was required to go into the project immediately. There is a piping system that draws water from the higher portion of the ground and down through the project. This piping system then delivers the water further down the site where very little construction is occurring to a pool where the water is collected and can run off.

Project Cost Evaluation

Construction Cost: $23 Million
Construction Cost/Square Foot: $168

Total Cost: $23 Million (owner restriceted)
Total Cost/Square Foot: $168

Building System Costs:

Mechanical: $2.8 Million
Electrical: $1.8 Million
Structural: $3.8 Million (concrete), $1.4 Million (steel)
Skin: $1.15 Million (pre-cast), $300K (roof)
$2.43 Million (windows/curtain wall/metal panels

D4:

The D4 estimate used consisted of a simple parametric estimate. The building use of office was simply imputed and then buildings were sorted by square footage and number of floors. Four specific buildings were selected based on their similarities to the ASHA National Headquarters. Each building was a headquarters and had a minimum of three floors as well as a minimum of 130000 sq. ft. a true estimate was then calculated for Rockville, MD in September of 2006. The final value was approximately 28 million which is close to the original project cost.

CostWorks:

A CostWorks estimate was then calculated. A five to ten story level commercial building was selected under the commercial building option. The structural system of precast concrete was then selected to narrow the search even further. Then College Park, MD was selected due to the lack of the option of Rockville, MD. The s.f. quantity of 137000 was then entered and a total value was calculated. The final value calculated was approximate 13 million. Which is low primarily do to the fact of certain costs not being considered such as green design and the location factor was College park not Rockville.

Comparison:

The D4 estimate was actually close to the estimated total building cost of $23Million. D4 estimated approximately $28 Million. This proximity in the calculation is more than likely do to the similarity between all the jobs selected. All of the jobs that were selected were between three and seven stories and varied from 130000s.f. to 190000s.f. and all were national headquarter office buildings. Due to this range and similarity the D4 estimate was able to make a somewhat accurate estimation.

. The CostWorks calculation on the other hand was no where near the actual value of the project. This is more than likely due to the limited information entered into the program. All the CostWorks program was calculating off of was the type of building, its location, exterior wall and structural system, as well as the total square footage. There is no way for the program to know the complexity of the structure such as a glass curtain wall, or the number of stories as well as other variables that are not entered on a square foot estimate such as elevators and emergency lighting which would only drive the cost up.

Tuesday, December 19, 2006

Estimate of Probable Cost

ASHA - Sep 2006 - MD - Rockville

Prepared By:		Prepared For:	
	, **Fax:**		, **Fax:**
Building Sq. Size:	**138666**	Site Sq. Size:	**6190311**
Bid Date:		Building use:	
No. of floors:	**3**	Foundation:	
No. of buildings:		Exterior Walls:	
Project Height:		Interior Walls:	
1st Floor Height:		Roof Type:	
1st Floor Size:		Floor Type:	
		Project Type:	

Division		Percent	Sq. Cost	Amount
00	**Bidding Requirements**	**5.49**	**11.41**	**1,582,409**
	Bidding Requirements	5.49	11.41	1,582,409
01	**General Requirements**	**3.76**	**7.81**	**1,082,578**
	General Requirements	3.76	7.81	1,082,578
02	**Site Work**	**6.86**	**14.26**	**1,977,161**
	Site Work	6.86	14.26	1,977,161
03	**Concrete**	**5.27**	**10.94**	**1,517,168**
	Concrete	5.27	10.94	1,517,168
04	**Masonry**	**3.68**	**7.65**	**1,060,128**
	Masonry	3.68	7.65	1,060,128
05	**Metals**	**10.50**	**21.82**	**3,025,672**
	Metals	10.50	21.82	3,025,672
06	**Wood & Plastics**	**1.16**	**2.40**	**333,480**
	Wood & Plastics	1.16	2.40	333,480
07	**Thermal & Moisture Protection**	**2.86**	**5.95**	**824,983**
	Thermal & Moisture Protection	2.86	5.95	824,983
08	**Doors & Windows**	**6.39**	**13.28**	**1,840,953**
	Doors & Windows	6.39	13.28	1,840,953
09	**Finishes**	**10.09**	**20.96**	**2,906,488**
	Finishes	10.09	20.96	2,906,488
10	**Specialties**	**3.58**	**7.44**	**1,031,943**
	Specialties	3.58	7.44	1,031,943
11	**Equipment**	**0.14**	**0.29**	**40,796**
	Equipment	0.14	0.29	40,796
12	**Furnishings**	**6.72**	**13.96**	**1,935,728**
	Furnishings	6.72	13.96	1,935,728
13	**Special Construction**	**0.00**	**0.00**	**0**
	Special Construction	0.00	0.00	0
14	**Conveying Systems**	**0.81**	**1.69**	**234,553**
	Conveying Systems	0.81	1.69	234,553
15	**Mechanical**	**16.18**	**33.60**	**4,659,685**
	Mechanical	16.18	33.60	4,659,685
16	**Electrical**	**16.49**	**34.26**	**4,750,153**
	Electrical	16.49	34.26	4,750,153
Total Building Costs		**100.00**	**207.72**	**28,803,879**

Commercial | 2005 Costs for College Park, MD (207)

Office, 5-10 Story | Union

Costs in $ per Square Foot of gross floor area calculated for a 8 story building with 12' story height.

Precast Concrete Panel

Steel Frame

Exterior Wall Type	S.F. Area	20000	40000	60000	80000	100000	150000	200000	250000	300000
Structural System	L.F. Perimeter	260	360	400	420	460	520	600	640	700
recast Concrete	Steel Frame	137.81	118.80	108.84	102.98	100.19	95.46	93.43	91.72	90.78
anel	R/Conc. Frame	138.26	119.07	109.11	103.12	100.33	95.60	93.57	91.86	90.82
ace Brick with	Steel Frame	134.43	116.36	107.04	101.50	98.93	94.51	92.62	91.05	90.10
oncrete Block Back-up	R/Conc. Frame	134.47	116.45	107.13	101.63	98.97	94.56	92.71	91.09	90.15
imestone Panel	Steel Frame	162.81	136.05	121.59	112.99	108.93	102.08	99.16	96.59	95.19
oncrete Block Back-up	R/Conc. Frame	162.95	136.10	121.68	113.12	109.02	102.17	99.25	96.72	95.28

Common Additives

Note: Totals include Overhead and Profit Fees of 25% and Architectural Fees of 6%.

Common Additives			$ Total	
Description	Qty	Unit	$ Cost	Totals
Clock System				
20 room	0.00	Each	12800.00	
50 room	0.00	Each	31200.00	
Closed Circuit Surveillance, One station				
Camera and monitor	0.00	Each	1375.00	
For additional camera stations, add	0.00	Each	740.00	
Directory Boards, Plastic, glass covered				
30" x 20"	0.00	Each	520.00	
36" x 48"	0.00	Each	1150.00	
Aluminum, 24" x 18"	0.00	Each	475.00	
36" x 24"	0.00	Each	540.00	

Settings | Estimator | Unit Costs | Assembly Costs | Project Costs | Square Foot Models | Residential Models

Costs are derived from a building model with basic components. Scope differences and local market conditions can cause costs to vary significantly.

Additives | Clear Additives

Precast Concrete Panel / Steel Frame

S.F. Qty	137000	To List	Matl/S.F.	64.93	Inst/S.F.	31.76
Total/S.F.	96.69					
Material	8,895,410	Installation	4,351,120	Total	13,246,530	