



# Washington-Lee High School

Matthew Hoerr | CM | Technical Report 2 | Messner

## Technical Assignment 2 Cost and Methods Analysis





# Washington-Lee High School

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## Executive Summary

The second technical assignment is a more detailed look at the schedule, estimate, and site plan on Washington-Lee High School. It contains a detailed project schedule for the first phase of construction, a site layout for the interior finishes portion of construction, an assemblies estimate for the exterior enclosure, a detailed structural systems estimate, and a general conditions estimate.

The new school is scheduled to be completed in December of 2009. It is going to be completed in three phases. The first phase contains the major part of the building and is going to be constructed from April 2006 to December 2007 and will be occupied by students in January 2008. The second phase contains a new gym, auditorium, and natatorium and is scheduled to be constructed from January 2008 to July 2009. The third and final phase will be the construction of 2 new soccer fields and the remaining site work. It is scheduled to be completed in December of 2009.

The second part of this technical report is a site plan for the interior finishes. After the construction of the structure of the first phase the construction site became very congested. Cars are sometimes triple parked in the parking lot and it is important not to disturb the current school because class is still in session.

The next parts of the assignment dealt with estimating. An assemblies estimate was done on the enclosure of the building and was found to cost about \$4.5 Million. This was done because there are many different exterior features such as large curtain walls and a large amount of brick. A Structural Systems estimate was also done for the building. The building is almost all steel and the total amount found was that the structure would cost about \$9 Million. The final part of this technical report contains a general conditions estimate. It was found that most of the cost from the general conditions comes from personnel. It was also found that the total cost of general conditions is 4.5% of the total cost of the building.



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## A. Detailed Project Schedule

A detailed project schedule can be found in Appendix A

### Introduction

The new Washington-Lee High School is going to be completed in 3 phases. I concentrated most of the schedule on Phase 1 because that is what is currently being done onsite. The first phase consists mainly of new classrooms, offices, and a cafeteria and is going to be completed in December of 2007. The students will move into this building in January and some of the old school will be demolished to make room for the phase 2 part of the building. Phase 2 consists of an auditorium, gym, and natatorium. Phase 3 follows and consists of the creation of 2 new soccer fields and demolishing the remaining parts of the old school.

### Foundation

The foundation used on Washington-Lee High School was concrete. The soil onsite was good, so they used shallow spread footings where there are columns and continuous strip footings around the perimeter walls. They started in the areas closest to the stadium and moved away from it for the first phase of construction. The building was broken up into 5 sections with A and B comprising phase 1 and C, D, and E in phase 2. They basically followed the areas in order. The only areas of the building that needed extra foundation work were the Orchestra pit in phase 2 and the elevator shafts.

### Structure

The structure of the building is a basic steel structure that uses beams typically spanning between 20 and 30 feet. The sequencing was done almost just like that of the foundation except it was split into two sequences in section A and B. Section A in phase 1 was completed first followed by section B in phase 1. Phase 2 has not yet begun but is going to be done in the same manner starting with Area C and working their way to Area E.



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## **Finishes**

The main element in the finishing work on this building is the MEP work. The building is going for a LEED Silver rating so the mechanical and electrical equipment are very large and are highly efficient. Procurement for these items took place as soon as the notice to proceed was given. Coordinating this work was the most important thing when it came to finishing. All of the other items in finishing followed a typical order starting with framing the walls and ending with the new furniture in the building. The building is done in 2 phases so that the students can occupy phase 1 while phase 2 is being completed.



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## **B. Site Layout Planning**

A detailed Site Layout Plan of the Interior Finishes can be found in Appendix B

The construction site at Washington-Lee is very congested and is at its most congested during the interior finishes part of the building. The main entrance to the site is located on the southeast side of the building. It may seem like there is a lot of parking however during a normal construction day people are double and sometimes triple parked. School is still going to be in session when this part of the construction is taking place so there is not a lot of room to the east side of the new building. All of the storage is located away from the building itself and out near the site fence. Some storage is also located in the construction parking area. The dumpsters are located near the other entrances so they can be picked up. One problem I personally witnessed was with the dumpster on the North side of the building. When another one was going to be dropped off and that one was going to be picked up the space was really tight. It took nearly 30 minutes for the driver to get into position to pick up that dumpster. It is also located dangerously close to the building and could cause damage to the exterior in the future. Other than this one dumpster location everything else seemed to be done well with the amount of space that was available to use.



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## C. Assemblies Estimate

Details of the Assemblies estimate can be found in Appendix C

The new Washington-Lee High School is a very large building and its building enclosure contains many different things. The building itself is mainly brick however there are also areas that contain large curtain walls, storefront windows, and metal panels. The estimate was done by averaging prices from RS Means 2007 so that a more accurate estimate could be accomplished. After doing the estimate it was found that the entire enclosure would cost about \$4,462,262. This includes the cost of doors and windows. This estimate did not include the cost of scaffolding and hoists needed to complete the masonry work.

<b>Assemblies Cost Breakdown</b>			
Item	Amount	Cost per	Total Cost
Brick Veneer	86736	29.5	\$2,558,712.00
Windows	329	450	\$148,050.00
Doors	74	8000	\$592,000.00
Curtain Wall	18460	40	\$738,400.00
Storefront	2000	30	\$60,000.00
Metal Panels	18255	20	\$365,100.00
			\$4,462,262.00



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## D. Detailed Structural Estimate

The detailed structural estimate can be found in Appendix D

The new Washington-Lee High School is a steel structure that uses strip and spread footings to support the steel. The way that this estimate was done was by going through all of the structural drawings and measuring the length of each of the different types of beams. RS Means 2007 data was then used to find the total cost per ton of steel and cost per cubic yard of concrete. There were also some very large trusses in phase 2 of construction that a value was assigned to because of the complexity of the beam and because of the size. The cost includes labor and equipment. After doing this estimate it was found that the structure of the building would cost almost \$9,000,000. This number is a little lower than the actual estimate, however this is probably due to the assumption that each beam cost the same amount per ton.

<b>Structural Summary</b>	
Concrete	\$2,113,705.30
Steel Beams	\$6,016,493.31
Steel Columns	\$821,674.99
Total	\$8,951,873.60





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## E. General Conditions Estimate

A detailed general conditions estimate can be found in Appendix E

The general conditions estimate located in appendix E basically shows how much money the general contractor is charging the owner for general conditions. The General Contractor on this project is only performing 3% of the work so some of the items were subcontracted out. The general conditions cost was found to be \$3,825,757. This is 4.5% of the total cost of construction which falls in the normal range of 3-5%. As seen in the general conditions summary below, more than half of the general conditions estimate comes from personnel. This is normal because most of the large items were subcontracted out to others.

<b>General Conditions Summary</b>	
Item	Cost
Personnel	\$1,950,422
General Conditions Items	\$1,875,335
<b>Total</b>	<b>\$3,825,757</b>



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## **Appendix A**

### **Detailed Project Schedule**

ID	Task Name	Duration	Start	Finish	2007												2008				2009				2010															
					1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter																		
					Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
1	Washington-Lee Phase 1	445 days?	Mon 4/3/06	Fri 12/14/07																																				
2	Notice to Proceed	1 day?	Mon 4/3/06	Mon 4/3/06																																				
3	Steel Procurement	40 days?	Mon 4/3/06	Fri 5/26/06																																				
4	MEP Procurement	72 days?	Mon 4/3/06	Tue 7/11/06																																				
5	Locate and Disconnect utilities	5 days?	Mon 4/3/06	Fri 4/7/06																																				
6	Site work	73 days?	Thu 4/13/06	Mon 7/24/06																																				
7	Asbestos Removal	16 days?	Mon 5/1/06	Mon 5/22/06																																				
8	Demo Existing Auditorium	11 days?	Thu 5/11/06	Thu 5/25/06																																				
9	Demo Existing Classroom	6 days?	Fri 5/26/06	Fri 6/2/06																																				
10	Footings Area A	31 days?	Mon 6/5/06	Mon 7/17/06																																				
11	Footings Area B	31 days?	Fri 7/7/06	Fri 8/18/06																																				
12	Mobilize Crane	2 days?	Fri 7/14/06	Mon 7/17/06																																				
13	Sequence 1	71 days?	Tue 7/18/06	Tue 10/24/06																																				
14	Erect Structural Steel	23 days?	Tue 7/18/06	Thu 8/17/06																																				
15	Erect Detailed Steel	11 days?	Fri 8/18/06	Fri 9/1/06																																				
16	Pour Slab on Grade	13 days?	Tue 8/29/06	Thu 9/14/06																																				
17	Shore LV2	1 day?	Mon 9/18/06	Mon 9/18/06																																				
18	Pour and Cure LV2 SOD	6 days?	Tue 9/19/06	Tue 9/26/06																																				
19	Shore LV3	2 days?	Wed 9/20/06	Thu 9/21/06																																				
20	Pour and Cure LV3 SOD	6 days?	Wed 9/27/06	Wed 10/4/06																																				
21	Shore LV4	2 days?	Thu 9/28/06	Fri 9/29/06																																				
22	Pour and Cure LV4 SOD	6 days?	Thu 10/5/06	Thu 10/12/06																																				
23	Shore Roof	2 days?	Fri 10/6/06	Mon 10/9/06																																				
24	Pour and Cure Roof	6 days?	Fri 10/13/06	Fri 10/20/06																																				
25	Remove Shoring	20 days?	Wed 9/27/06	Tue 10/24/06																																				
26	Sequence 2	73 days?	Fri 8/18/06	Tue 11/28/06																																				
27	Erect Structural Steel	25 days?	Fri 8/18/06	Thu 9/21/06																																				
28	Erect Detailed Steel	10 days?	Fri 9/22/06	Thu 10/5/06																																				
29	Pour Slab on Grade	11 days?	Fri 9/22/06	Fri 10/6/06																																				
30	Shore LV2	4 days?	Mon 10/9/06	Thu 10/12/06																																				
31	Pour and Cure LV2 SOD	8 days?	Wed 10/11/06	Fri 10/20/06																																				
32	Shore LV3	4 days?	Thu 10/19/06	Tue 10/24/06																																				
33	Pour and Cure LV3 SOD	6 days?	Wed 10/25/06	Wed 11/1/06																																				
34	Shore LV4	4 days?	Tue 10/31/06	Fri 11/3/06																																				
35	Pour and Cure LV4 SOD	8 days?	Thu 11/2/06	Mon 11/13/06																																				
36	Shore Roof	2 days?	Fri 11/3/06	Mon 11/6/06																																				
37	Pour and Cure Roof	6 days?	Fri 11/10/06	Fri 11/17/06																																				
38	Remove Shoring	24 days?	Thu 10/19/06	Tue 11/21/06																																				
39	Sequence 3	88 days?	Tue 8/29/06	Thu 12/28/06																																				
40	Pour Slab on Grade	13 days?	Tue 8/29/06	Thu 9/14/06																																				
41	Erect Structural Steel	23 days?	Fri 9/22/06	Tue 10/24/06																																				
42	Erect Detail Steel	1 day?	Wed 11/8/06	Wed 11/8/06																																				
43	Shore LV2	1 day?	Fri 11/10/06	Fri 11/10/06																																				
44	Pour and Cure LV2 SOD	6 days?	Mon 11/13/06	Mon 11/20/06																																				

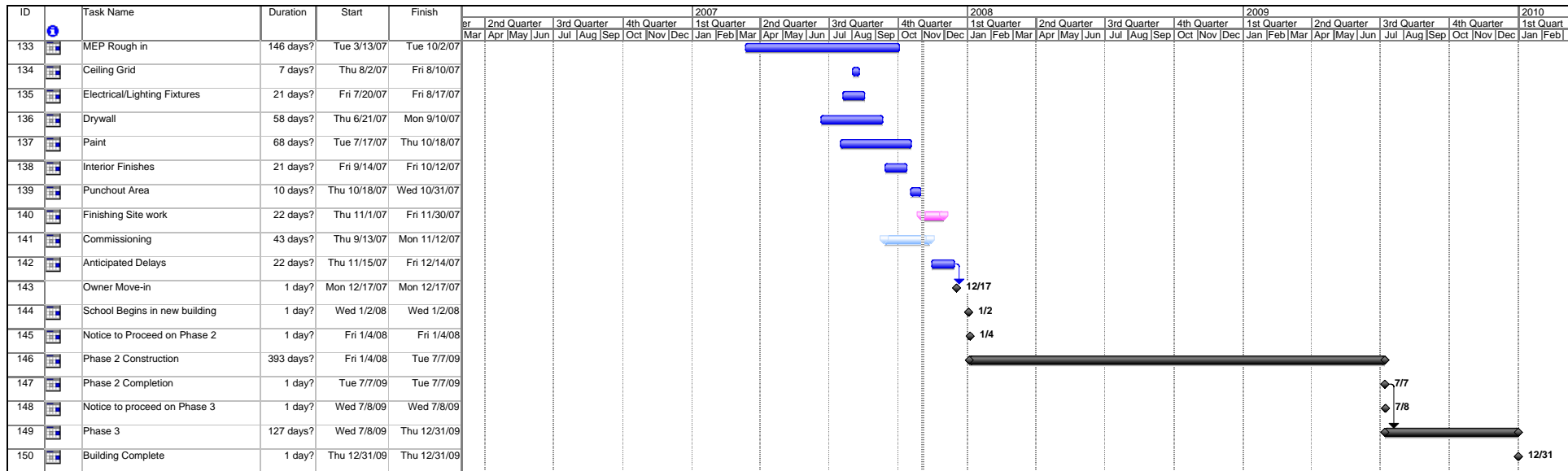
Project: Washington-Lee High School  
Date: 11/2/07

Task Progress Summary External Tasks Deadline

Split Milestone Project Summary External Milestone







Project: Washington-Lee High School  
Date: 11/2/07

Task: [Blue bar] Progress, [Grey bar] Summary, [Black bar with arrow] External Tasks, [Green bar] Deadline, [Green arrow]

Split: [Dotted bar] Milestone, [Diamond] Project Summary, [Grey bar with arrow] External Milestone, [Diamond]



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## Appendix B

### Site Layout Planning







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## Appendix C

### Assemblies Estimate



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## South

South	Total	Cost per	Total Cost
Brick Veneer	17178	29.5	\$506,751.00
Windows	43	450	\$19,350.00
Doors	13	8000	\$104,000.00
Curtain Wall	3080	40	\$123,200.00
Metal Panels	1845	20	\$36,900.00
			<b>\$790,201.00</b>

## West

West	Total	Cost per	Total Cost
Brick Veneer	26002	29.5	\$767,059.00
Windows	88	450	\$39,600.00
Doors	11	8000	\$88,000.00
Curtain Wall	5580	40	\$223,200.00
Metal Panels	6450	20	\$129,000.00
			<b>\$1,246,859.00</b>

## East

East	Total	Cost per	Total Cost
Brick Veneer	17994	29.5	\$530,823.00
Windows	57	450	\$25,650.00
Doors	24	8000	\$192,000.00
Curtain Wall	6120	40	\$244,800.00
Storefront	2000	30	\$60,000.00
Metal Panels	8700	20	\$174,000.00
			<b>\$1,227,273.00</b>

## North

North	Total	Cost per	Total Cost
Brick Veneer	16646	29.5	\$491,057.00
Windows	36	450	\$16,200.00
Doors	18	8000	\$144,000.00
Curtain Wall	3680	40	\$147,200.00
Metal Panels	1260	20	\$25,200.00
			<b>\$823,657.00</b>



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## Courtyard

<b>Courtyard</b>	<b>Total</b>	<b>Cost per</b>	<b>Total Cost</b>
Brick Veneer	8916	29.5	\$263,022.00
Windows	105	450	\$47,250.00
Doors	8	8000	\$64,000.00
			<b>\$374,272.00</b>



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## Appendix D

### Detailed Structural Estimate



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## Area A Floor 2

Size	length	Weight	Total Weight	Total Tons	Cost/ton including labor and equipment	Cost
W 18x40	525.5	40	21020	10.51	3083	\$32,402.33
W 30x116	21.5	116	2494	1.25	3083	\$3,844.50
W 12x16	402	16	6432	3.22	3083	\$9,914.93
W 16x26	1028	26	26728	13.36	3083	\$41,201.21
W 14x22	813	22	17886	8.94	3083	\$27,571.27
W 36x17	21.5	17	365.5	0.18	3083	\$563.42
W 21x50	324	50	16200	8.10	3083	\$24,972.30
W 12x14	384.5	14	5383	2.69	3083	\$8,297.89
W 33x141	103	141	14523	7.26	3083	\$22,387.20
W 16x31	537.5	31	16662.5	8.33	3083	\$25,685.24
W 12x19	76.5	19	1453.5	0.73	3083	\$2,240.57
W 24x55	136.5	55	7507.5	3.75	3083	\$11,572.81
W 24x68	28	68	1904	0.95	3083	\$2,935.02
W 8x10	105	10	1050	0.53	3083	\$1,618.58
W 18x50	149	50	7450	3.73	3083	\$11,484.18
W 18x35	598	35	20930	10.47	3083	\$32,263.60
W 16x45	80	45	3600	1.80	3083	\$5,549.40
W 21x44	361.5	44	15906	7.95	3083	\$24,519.10
W 24x76	75	76	5700	2.85	3083	\$8,786.55
W 24x62	75	62	4650	2.33	3083	\$7,167.98
W 36x280	79.5	280	22260	11.13	3083	\$34,313.79
W 36x210	26.5	210	5565	2.78	3083	\$8,578.45
W 36x245	53	245	12985	6.49	3083	\$20,016.38
W 10x12	36	12	432	0.22	3083	\$665.93
W 21x57	24	57	1368	0.68	3083	\$2,108.77
W 12x22	44	22	968	0.48	3083	\$1,492.17
W 16x36	40	36	1440	0.72	3083	\$2,219.76
					<b>Total</b>	<b>\$374,373.31</b>



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## Area A Floor 3

Size	length	Weight	Total Weight	Total Tons	Cost/ton including labor and equipment	Cost
W 18x40	525.5	40	21020	10.51	3083	\$32,402.33
W 30x116	21.5	116	2494	1.25	3083	\$3,844.50
W 12x16	402	16	6432	3.22	3083	\$9,914.93
W 16x26	1028	26	26728	13.36	3083	\$41,201.21
W 14x22	813	22	17886	8.94	3083	\$27,571.27
W 36x17	21.5	17	365.5	0.18	3083	\$563.42
W 21x50	324	50	16200	8.10	3083	\$24,972.30
W 12x14	384.5	14	5383	2.69	3083	\$8,297.89
W 33x141	103	141	14523	7.26	3083	\$22,387.20
W 16x31	537.5	31	16662.5	8.33	3083	\$25,685.24
W 12x19	76.5	19	1453.5	0.73	3083	\$2,240.57
W 24x55	136.5	55	7507.5	3.75	3083	\$11,572.81
W 24x68	28	68	1904	0.95	3083	\$2,935.02
W 8x10	105	10	1050	0.53	3083	\$1,618.58
W 18x50	149	50	7450	3.73	3083	\$11,484.18
W 18x35	598	35	20930	10.47	3083	\$32,263.60
W 16x45	80	45	3600	1.80	3083	\$5,549.40
W 21x44	361.5	44	15906	7.95	3083	\$24,519.10
W 24x76	75	76	5700	2.85	3083	\$8,786.55
W 24x62	75	62	4650	2.33	3083	\$7,167.98
W 36x280	79.5	280	22260	11.13	3083	\$34,313.79
W 36x210	26.5	210	5565	2.78	3083	\$8,578.45
W 36x245	53	245	12985	6.49	3083	\$20,016.38
W 10x12	36	12	432	0.22	3083	\$665.93
W 21x57	24	57	1368	0.68	3083	\$2,108.77
W 12x22	44	22	968	0.48	3083	\$1,492.17
W 16x36	40	36	1440	0.72	3083	\$2,219.76
					<b>Total</b>	<b>\$374,373.31</b>



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## Area A Floor 4

Size	length	Weight	Total Weight	Total Tons	Cost/ton including labor and equipment	Cost
W 18x40	525.5	40	21020	10.51	3083	\$32,402.33
W 30x116	21.5	116	2494	1.25	3083	\$3,844.50
W 12x16	302	16	4832	2.42	3083	\$7,448.53
W 16x26	1028	26	26728	13.36	3083	\$41,201.21
W 14x22	693	22	15246	7.62	3083	\$23,501.71
W 36x17	21.5	17	365.5	0.18	3083	\$563.42
W 21x50	324	50	16200	8.10	3083	\$24,972.30
W 12x14	284.5	14	3983	1.99	3083	\$6,139.79
W 33x141	103	141	14523	7.26	3083	\$22,387.20
W 16x31	537.5	31	16662.5	8.33	3083	\$25,685.24
W 12x19	76.5	19	1453.5	0.73	3083	\$2,240.57
W 24x55	136.5	55	7507.5	3.75	3083	\$11,572.81
W 24x68	28	68	1904	0.95	3083	\$2,935.02
W 8x10	105	10	1050	0.53	3083	\$1,618.58
W 18x50	149	50	7450	3.73	3083	\$11,484.18
W 18x35	598	35	20930	10.47	3083	\$32,263.60
W 16x45	80	45	3600	1.80	3083	\$5,549.40
W 21x44	361.5	44	15906	7.95	3083	\$24,519.10
W 24x76	75	76	5700	2.85	3083	\$8,786.55
W 24x62	75	62	4650	2.33	3083	\$7,167.98
W 36x280	79.5	280	22260	11.13	3083	\$34,313.79
W 36x210	26.5	210	5565	2.78	3083	\$8,578.45
W 36x245	53	245	12985	6.49	3083	\$20,016.38
W 10x12	36	12	432	0.22	3083	\$665.93
W 21x57	24	57	1368	0.68	3083	\$2,108.77
W 12x22	44	22	968	0.48	3083	\$1,492.17
W 16x36	40	36	1440	0.72	3083	\$2,219.76
					<b>Total</b>	<b>\$365,679.25</b>



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## Area B Floor 2

Size	length	Weight	Total Weight	Total Tons	Cost/ton including labor and equipment	Cost
W 18x40	616	40	24640	12.32	3083	\$37,982.56
W 30x116	21.5	116	2494	1.25	3083	\$3,844.50
W 12x16	216	16	3456	1.73	3083	\$5,327.42
W 16x26	1802	26	46852	23.43	3083	\$72,222.36
W 14x22	688	22	15136	7.57	3083	\$23,332.14
W 21x50	30	50	1500	0.75	3083	\$2,312.25
W 12x14	188	14	2632	1.32	3083	\$4,057.23
W 16x31	787	31	24397	12.20	3083	\$37,607.98
W 12x19	480	19	9120	4.56	3083	\$14,058.48
W 24x55	128	55	7040	3.52	3083	\$10,852.16
W 8x10	309	10	3090	1.55	3083	\$4,763.24
W 18x50	312.5	50	15625	7.81	3083	\$24,085.94
W 18x35	95	35	3325	1.66	3083	\$5,125.49
W 21x44	122	44	5368	2.68	3083	\$8,274.77
W 36x170	21.5	170	3655	1.83	3083	\$5,634.18
W 30x90	21.5	90	1935	0.97	3083	\$2,982.80
W 36x135	21.5	135	2902.5	1.45	3083	\$4,474.20
W 33x130	21.5	130	2795	1.40	3083	\$4,308.49
W 33x118	48	118	5664	2.83	3083	\$8,731.06
W 36x150	21.5	150	3225	1.61	3083	\$4,971.34
W 30x108	21.5	108	2322	1.16	3083	\$3,579.36
					<b>Total</b>	<b>\$288,527.95</b>





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## Area B Floor 3

Size	length	Weight	Total Weight	Total Tons	Cost/ton including labor and equipment	Cost
W 18x40	616	40	24640	12.32	3083	\$37,982.56
W 30x116	21.5	116	2494	1.25	3083	\$3,844.50
W 12x16	216	16	3456	1.73	3083	\$5,327.42
W 16x26	1802	26	46852	23.43	3083	\$72,222.36
W 14x22	688	22	15136	7.57	3083	\$23,332.14
W 21x50	30	50	1500	0.75	3083	\$2,312.25
W 12x14	188	14	2632	1.32	3083	\$4,057.23
W 16x31	787	31	24397	12.20	3083	\$37,607.98
W 12x19	480	19	9120	4.56	3083	\$14,058.48
W 24x55	128	55	7040	3.52	3083	\$10,852.16
W 8x10	309	10	3090	1.55	3083	\$4,763.24
W 18x50	312.5	50	15625	7.81	3083	\$24,085.94
W 18x35	95	35	3325	1.66	3083	\$5,125.49
W 21x44	122	44	5368	2.68	3083	\$8,274.77
W 36x170	21.5	170	3655	1.83	3083	\$5,634.18
W 30x90	21.5	90	1935	0.97	3083	\$2,982.80
W 36x135	21.5	135	2902.5	1.45	3083	\$4,474.20
W 33x130	21.5	130	2795	1.40	3083	\$4,308.49
W 33x118	48	118	5664	2.83	3083	\$8,731.06
W 36x150	21.5	150	3225	1.61	3083	\$4,971.34
W 30x108	21.5	108	2322	1.16	3083	\$3,579.36
					<b>Total</b>	<b>\$288,527.95</b>



**Area B Floor 4**

Size	length	Weight	Total Weight	Total Tons	Cost/ton including labor and equipment	Cost
W 18x40	616	40	24640	12.32	3083	\$37,982.56
W 30x116	21.5	116	2494	1.25	3083	\$3,844.50
W 12x16	116	16	1856	0.93	3083	\$2,861.02
W 16x26	1802	26	46852	23.43	3083	\$72,222.36
W 14x22	588	22	12936	6.47	3083	\$19,940.84
W 21x50	30	50	1500	0.75	3083	\$2,312.25
W 12x14	88	14	1232	0.62	3083	\$1,899.13
W 16x31	787	31	24397	12.20	3083	\$37,607.98
W 12x19	280	19	5320	2.66	3083	\$8,200.78
W 24x55	128	55	7040	3.52	3083	\$10,852.16
W 8x10	309	10	3090	1.55	3083	\$4,763.24
W 18x50	312.5	50	15625	7.81	3083	\$24,085.94
W 18x35	95	35	3325	1.66	3083	\$5,125.49
W 21x44	122	44	5368	2.68	3083	\$8,274.77
W 36x170	21.5	170	3655	1.83	3083	\$5,634.18
W 30x90	21.5	90	1935	0.97	3083	\$2,982.80
W 36x135	21.5	135	2902.5	1.45	3083	\$4,474.20
W 33x130	21.5	130	2795	1.40	3083	\$4,308.49
W 33x118	48	118	5664	2.83	3083	\$8,731.06
W 36x150	21.5	150	3225	1.61	3083	\$4,971.34
W 30x108	21.5	108	2322	1.16	3083	\$3,579.36
					<b>Total</b>	\$274,654.45

**Area C, D, and E floor 2**

Size	LF	WT/ft	lbs	Tons	Cost/ton including labor and equipment	Total Cost
W 8x10	932	10	9320	4.66	3083	\$14,366.78
W 16x26	1393	26	36218	18.109	3083	\$55,830.05
W 24x55	60	55	3300	1.65	3083	\$5,086.95
W 16x31	430	31	13330	6.665	3083	\$20,548.20
W 12x14	100	14	1400	0.7	3083	\$2,158.10
W 12x19	378	19	7182	3.591	3083	\$11,071.05
W 14x22	505	22	11110	5.555	3083	\$17,126.07
					<b>Total</b>	\$126,187.19



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## Roof

Size	length	Weight	Total Weight	tons	Cost/ton including labor and equipment	Total Cost
20K5	661	8.2	5420.2	2.71	3083	\$8,355.24
20K6	112	8.9	996.8	0.50	3083	\$1,536.57
18K3	1795	6.6	11847	5.92	3083	\$18,262.15
18K5	611	7.7	4704.7	2.35	3083	\$7,252.30
30K10	2457	15	36855	18.43	3083	\$56,811.98
28K9	420	13	5460	2.73	3083	\$8,416.59
28K10	240	14.3	3432	1.72	3083	\$5,290.43
16K3	560	6.3	3528	1.76	3083	\$5,438.41
20K3	1264.5	6.7	8472.15	4.24	3083	\$13,059.82
16K2	1284	5.5	7062	3.53	3083	\$10,886.07
22K5	100	8.8	880	0.44	3083	\$1,356.52
26K6	548	10.6	5808.8	2.90	3083	\$8,954.27
30K12	360	17.6	6336	3.17	3083	\$9,766.94
26K7	25	10.9	272.5	0.14	3083	\$420.06
10K1	1448	5	7240	3.62	3083	\$11,160.46
20K4	220	7.6	1672	0.84	3083	\$2,577.39
22K4	1438	8	11504	5.75	3083	\$17,733.42
24K4	1812	8.4	15220.8	7.61	3083	\$23,462.86
14K1	155	5.2	806	0.40	3083	\$1,242.45
22K7	330	9.7	3201	1.60	3083	\$4,934.34
24K6	330	9.7	3201	1.60	3083	\$4,934.34
24K7	90	10.1	909	0.45	3083	\$1,401.22
24K5	690	9.3	6417	3.21	3083	\$9,891.81
12K1	60	5	300	0.15	3083	\$462.45
18K4	22	7.2	158.4	0.08	3083	\$244.17
W12x22	440	22	9680	4.84	3083	\$14,921.72
W 18x40	801.5	40	32060	16.03	3083	\$49,420.49
W 30x116	43	116	4988	2.49	3083	\$7,689.00
W 12x16	418	16	6688	3.34	3083	\$10,309.55
W 16x26	730	26	18980	9.49	3083	\$29,257.67
W 14x22	681	22	14982	7.49	3083	\$23,094.75
W 36x17	21.5	17	365.5	0.18	3083	\$563.42
W 21x50	354	50	17700	8.85	3083	\$27,284.55
W 12x14	2372.5	14	33215	16.61	3083	\$51,200.92
W 33x141	103	141	14523	7.26	3083	\$22,387.20
W 16x31	1324.5	31	41059.5	20.53	3083	\$63,293.22
W 12x19	356.5	19	6773.5	3.39	3083	\$10,441.35
W 24x55	416.5	55	22907.5	11.45	3083	\$35,311.91
W 24x68	28	68	1904	0.95	3083	\$2,935.02



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W 8x10	233	10	2330	1.17	3083	\$3,591.70
W 18x50	258	50	12900	6.45	3083	\$19,885.35
W 18x35	710.5	35	24867.5	12.43	3083	\$38,333.25
W 16x45	80	45	3600	1.80	3083	\$5,549.40
W 21x44	456.5	44	20086	10.04	3083	\$30,962.57
W 24x76	75	76	5700	2.85	3083	\$8,786.55
W 24x62	75	62	4650	2.33	3083	\$7,167.98
W 36x280	79.5	280	22260	11.13	3083	\$34,313.79
W 36x210	26.5	210	5565	2.78	3083	\$8,578.45
W 36x245	53	245	12985	6.49	3083	\$20,016.38
W 10x12	36	12	432	0.22	3083	\$665.93
W 21x57	24	57	1368	0.68	3083	\$2,108.77
W 16x36	40	36	1440	0.72	3083	\$2,219.76
W 36x170	21.5	170	3655	1.83	3083	\$5,634.18
W 30x90	21.5	90	1935	0.97	3083	\$2,982.80
W 36x135	21.5	135	2902.5	1.45	3083	\$4,474.20
W 33x130	21.5	130	2795	1.40	3083	\$4,308.49
W 33x118	48	118	5664	2.83	3083	\$8,731.06
W 36x150	21.5	150	3225	1.61	3083	\$4,971.34
W 30x108	21.5	108	2322	1.16	3083	\$3,579.36
Special Trusses	85	8000	680000	340.00	10000	\$3,400,000.00
					<b>Total</b>	<b>\$4,198,824.34</b>



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## Columns

Column Type	Length	Weight	Tons	Cost/ton including labor and equipment	Cost
HSS6x6x1/4	578	19	5.49	3083	\$16,928.75
HSS6x6x5/16	192	23	2.21	3083	\$6,807.26
HSS10x10x5/8	222	76	8.44	3083	\$26,008.19
HSS10x10x1/2	298	62	9.24	3083	\$28,480.75
HSS10x10x5/16	664	40	13.28	3083	\$40,942.24
HSS8x8x5/8	418	59	12.33	3083	\$38,016.47
HSS8x8x5/16	1208	32	19.33	3083	\$59,588.22
HSS8x8x1/4	2866	26	37.26	3083	\$114,866.41
HSS10x10x3/8	294	48	7.06	3083	\$21,753.65
HSS8x8x1/2	1042	49	25.53	3083	\$78,705.91
HSS8x8x3/8	1194	38	22.69	3083	\$69,940.94
10" Diameter pipe	111	50	2.78	3083	\$8,555.33
HSS10x8x5/8	36	68	1.22	3083	\$3,773.59
HSS6x6x1/2	92	35	1.61	3083	\$4,963.63
HSS10x8x1/2	174	56	4.87	3083	\$15,020.38
HSS10x8x5/16	28	36	0.50	3083	\$1,553.83
HSS6x6x3/16	436	15	3.27	3083	\$10,081.41
HSS8x8x3/16	328	20	3.28	3083	\$10,112.24
12" Diameter pipe	320	60	9.60	3083	\$29,596.80
HSS12x12x3/8	32	58	0.93	3083	\$2,861.02
HSS16x16x1/2	64	103	3.30	3083	\$10,161.57
8" Diameter pipe	32	40	0.64	3083	\$1,973.12
W 10x88	216	88	9.50	3083	\$29,300.83
W 10x49	336	49	8.23	3083	\$25,379.26
W 10x33	126	33	2.08	3083	\$6,409.56
W 12x136	54	136	3.67	3083	\$11,320.78
W 10x112	126	112	7.06	3083	\$21,753.65
W 10x54	56	54	1.51	3083	\$4,661.50
W 8x67	126	67	4.22	3083	\$13,013.34
W 8x40	70	40	1.40	3083	\$4,316.20
W 8x31	154	31	2.39	3083	\$7,359.12
W 12x120	72	120	4.32	3083	\$13,318.56
W 10x100	270	100	13.50	3083	\$41,620.50
W 10x60	60	60	1.80	3083	\$5,549.40
W 10x39	126	39	2.46	3083	\$7,574.93
W 8x48	56	48	1.34	3083	\$4,143.55
W 10x68	74	68	2.52	3083	\$7,756.83
W 10x77	100	77	3.85	3083	\$11,869.55



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W 8x58	36	58	1.04	3083	\$3,218.65
W 8x28	56	28	0.78	3083	\$2,417.07
				<b>Total</b>	<b>\$821,674.99</b>

## Concrete

Concrete	CF	CY	Cost/CY	Total Cost
Column Footings	72708	2693	173.77	\$467,942.02
Footings	96344	3568	173.77	\$620,064.78
Stairs	26554	983	173.77	\$170,899.58
Slab on Grade	60740.17	2250	173.77	\$390,919.21
Slab on Deck	103983	3851	120.45	\$463,879.72
				<b>\$2,113,705.30</b>



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## Appendix E

### General Conditions Estimate



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## General Conditions

General Conditions Items				
Item	Unit	Quantity	Cost per	Total Cost
Temp. Power Usage	MO	44	9500	\$418,000
Temp. Power Installation	LS	1	2500	\$2,500
Telephone and DSL	MO	44	500	\$22,000
Field Office Trailer Rental - GC	MO	44	425	\$18,700
Field Office Trailer Rental - Owner	MO	44	241	\$10,604
Furniture for Field Office - GC	LS	1	1500	\$1,500
Furniture for Field Office - Owner	LS	1	2000	\$2,000
Storage Trailers	MO	38	600	\$22,800
Bottled Water Service	MO	44	200	\$8,800
Temp. Water Service/Usage	MO	44	75	\$3,300
Postage, Overnight, Messenger	MO	44	500	\$22,000
Weather Protection	LS	1	50000	\$50,000
Temporary Heat	MO	4	10000	\$40,000
Cleanup Dumpsters	PULLS	572	525	\$300,300
Cleanup & Miscellaneous Labor	WEEK	447	800	\$357,600
Fine Cleaning	SF	362,000	0.54	\$195,480
Temp. Toilets / Sanitary	MO	38	1200	\$45,600
Scaffolding	LS	1	10000	\$10,000
Pedestrian Covered Walkways	LS	1	75000	\$75,000
Tools / Tools & Equip. Maint.	MO	44	3000	\$132,000
Material/Personnel Hoist - Erect/Dismantle	LS	1	10000	\$10,000
Material/Personnel Hoist -Monthly	MO	8	1000	\$8,000
Road Barricades / Flagman	LS	1	5000	\$5,000
Security / Temp. Fence w/ screen	LF	2,390	8.61	\$20,578
Surveying Contract	LS	1	50000	\$50,000
Photography (monthly)	MO	44	565	\$24,860
Asbuilts / Maint. Manuals	LS	1	5000	\$5,000
Advertising / Promotion - Project Signs	EA	8	100	\$800
Vehicle Costs	MO	44	2000	\$88,000
			<b>Total</b>	<b>\$1,950,422</b>





# Washington-Lee High School

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<b>Personnel</b>				
Position	Unit	Quantity	Cost per	Total Cost
Project Manager (weekly)	WEEK	191	1850	\$353,350
LEEDS Supervisor/QC Manager	WEEK	191	1850	\$353,350
Project Engineer (weekly)	WEEK	191	1125	\$214,875
Project Executive / Sr. PM	WEEK	64	2500	\$160,000
Superintendent (weekly)	WEEK	191	1950	\$372,450
Assistant Superintendent (weekly)	WEEK	130	1700	\$221,000
Safety Director	WEEK	76	1800	\$136,800
Secretarial	WEEK	174	365	\$63,510
<b>Total</b>				<b>\$1,875,335</b>