Appendix 3 – Project Overview References

Specialty Contractor List

SUBCONTRACTORS AND SUPPLIERS
RECREATION CENTER & NATATORIUM
PEARLAND, TX
#5085

PROJ. EST.: LOU ARRIETA
PROJ. MGR.: SCOTT STOLTZ
PROJ. ASST.: MATT LUNA
SUPERINT.: PHILLIP CRISSMAN

JUNE 30, 2009

SUBCTR	CO NAME	CO ADDRESS	CITY STATE ZIP	CONT F NAME	CONT L NAME	PHONE	FAX	SUBCD
0000-1 **OWNER**	City of Pearland							0000-1
0000-2 **ARCHITECT**	PBK Architects							0000-2
0000-3 **STRUCTURAL ENGINEER**								0000-3
0000-4 **MEP ENGINEER**								0000-4
0000-5 **JOBSITE**	EMJ Corporation	4141 Bailey Road	Pearland, TX 77584	Phillip	Crissman			0000-5
5085-0107-030100-00 **CONCRETE**	MCM Commercial Concrete, Inc.	9518 Grant Road	Houston, TX 77070	Matt	Mabry	713-466-7670	713-466-7683	030100-00
5085-0116-034713-00 **CONCRETE DECK**	G.L. Nettles, Inc.	41229 Park 290 Drive	Waller, TX 77484	Bryan	Batchman	936-372-9020	936-372-9032	034713-00
5085-0124-042000-00 **MASONRY**	Easthaven Incorporated	8723 Easthaven Dr.	Houston, TX 77075	Tommy	Grantland	713-944-5361	713-944-2815	042000-00
5085-0101-050000-00 **STRUCTURAL STEEL**	Apel Steel Corporation	2345 Second Avenue N.W.	Cullman, AL 35058	Hank	Apel	256-739-6280	256-739-6304	050000-00
5085-0105-061800-00 **WOOD ROOF DECKING**	R.M. Rodgers, Inc.	6352 Akder Drive	Houston, TX 77081-4404	Max	Rodgers	713-666-2229	713-666-2516	061800-00
5085-0144-062200-00 **MILLWORK**	Victoria Cabinetworks, a subsidiary of Roth Construction, Inc.	2002 Delmar Drive	Victoria, TX 77901	Casey	Roth	361-578-0263	361-578-1271	062200-00
5085-0122-072450-00 **LATH & PLASTER**	Kenyon Plastering of Texas, Inc.	3401 West 11th Street	Houston, TX 77008	Patrick	Troy	832-673-6404	832-673-0406	072450-00
5085-0125-075000-00 **ROOFING**	Admiral Roofing and Sheet Metal, LLC	14521 Old Katy Rd. #224	Houston, TX 77079	E. Eugene	Lauver	281-372-1250	281-372-1252	075000-00
5085-0152-075000-01 **ROOFING**	Threadgill Sheet Metal Works, Inc.	17515A Huffmeister	Cypress, TX 77429	Wayne	Threadgill	281-373-0016	281-373-0010	075000-01

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5085-0150-078100-00 **FIREPROOFING**	Alpha Insulation & Waterproofing, Inc.	787 Bradfield Rd.	Houston, TX 77060	David	Wright	281-999-7000	281-999-7005	078100-00
5085-0147-079200-00 **WATERPROOFING/ SEALANTS**	Century Roofing L.L.C.	4411 Airline	Houston, TX 77022	Mike	Martin	713-697-8288	713-697-8299	079200-00
5085-0111-081100-00 **HOLLOW METAL DOORS/WOOD DOORS/FINISH HARDWARE**	Piper-Weatherford Co. Distributor – Architectural Specialties	165 Tecon Cove	Buda, TX 78610	Tom	Buyers	512-420-0726	512-420-9367	081100-00
5085-0134-083323-00 **OVERHEAD DOORS**	ABC Steel Products Co., Inc. dba ABC Doors	5100 South Willow	Houston, TX 77035	Bob	Casson	713-729-9700	713-729-8611	083323-00
5085-0126-084000-00 **STOREFRONT**	Ranger Specialized Glass, Inc.	19031 Aldine Westfield	Houston, TX 77073	Omar	Maalouf	281-821-3777	281-821-3785	084000-00
5085-0142-090600-00 **DRYWALL/ CARPENTRY**	PC Unlimited, Inc.	211-E Randon Dyer Road	Rosenberg, TX 77471	Josef	Poncik	281-344-1900	281-344-1922	090600-00
5085-0123-093000-00 **CERAMIC TILE**	ASA Carlton, Inc.	5224 Palmero Court, Suite 200	Buford, GA 30518	Scott	Hester	770-945-2195	770-945-5640	093000-00
5085-0118-096433-00 **GYM FLOOR/ RAQUETBALL COURT/ SCOREBOARD SYSTEM**	Jellison Inc., dba Jelco	1109 Regal Row	Austin, TX 78748	Don	Jellison	800-366-8306	512-282-4070	096433-00
5085-0148-096433-01 **EPOXY FLOOR**	Polymer Systems, Inc.	17320 E. State Hwy 29	Buchanan Dam, TX 78609	Carl	Taylor	512-793-6575	512-793-2779	096433-00
5085-0146-096500-00 **TILE/BASE/CARPET**	Marek Brothers Systems, Inc.	2115 Judiway	Houston, TX 77018	Mike	Holland	713-681-2626	713-681-6540	096500-00
5085-0143-099113-00 **PAINTING**	Zaxon Commercial Painting, LLC	2116 Kyle Circle	Heath, TX 75032	Bryan	Jobe	214-538-2911	214-206-1146	099113-00
5085-0149-100610-13 **SIGN WORK**	Atlas Sign Services, Inc.	6411 Airline Drive	Houston, TX 77076	Michael	Johnson	713-699-1121	713-699-2211	100610-13
5085-0112-101100-00 **BULLETIN BOARDS, ACCORDIAN**	Klinger Specialties Direct, Inc.	2611 Couch	Houston, TX 77008	Benny	Castro	713-861-4213	713-861-4471	101100-00

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DOORS, POSTER CASE, SWINSUIT DRYER								
5085-0119-102113-00 **TOILET/DRESSING/ SHOWER COMPARTMENTS**	Victoria Builder Supply Company, Inc.	5301 N. John Stockbauer	Victoria, TX 77904	Dan	Gorfido	361-572-8929	361-572-8992	102113-00
5085-0127-102813-00 **TOILET ACCESSORIES**	Tri-Tech Building Products LLC	4301 Founder's Way Drive, Suite C	Chattanooga, TN 37416	Ted	Wilkes, Jr.	423-892-7307	423-622-4736	102813-00
5085-0138-105100-00 **BENCHES/ LOCKERS/ SHELVING**	Silicon Valley Shelving & Equipment Co., Inc.	18522 Bridoon	Cypress, TX 77433	Michael	Lacey	281-550-9975	281-550-9980	105100-00
5085-0117-107313-00 **FLAGPOLES**	Assoc. Bldrs Specialties, Inc. Dba Kronberg's Flags & Flagpoles	7106 Mapleridge	Houston, TX 77081	Jeff	Gifford-Weaver	713-661-9222	713-661-7022	107313-00
5085-0133-107310-00 **ALUMINUM CANOPIES**	Luebe-Jones, Inc. dba Avadek	9201 Winkler	Houston, TX 77017	Will	Sims	713-944-0988	713-944-5815	107313-00
5085-0132-107313-01 **ALUMINUM SUN SCREENS**	Sign and Awning Services, Inc.	4711 Vermont	Fort Worth, TX 76115	Todd	Price	817-926-7270	817-926-7311	107313-01
5085-0141-114000-00 **STAINLESS STEEL**	Classic Stainless, Inc.	4330 Bronze Way	Dallas, TX 75237	Gus	Macias	214-467-8700	214-467-8705	114000-00
5085-0136-114000-01 **RESIDENTIAL EQUIPMENT**	Manna Distributors, Inc.	8708 West Park	Houston, TX 77063	Alan	Nahman	713-977-3318	713-789-7513	114000-01
5085-0140-114000-02 **KITCHEN EQUIPMENT**	Alliance Food Equipment Corp.	2225 E. Beltline Rd.	Carrollton, TX 75006	Al	Berger	972-820-8352	972-820-6021	114000-02
5085-0113-115213-00 **GYMNASIUM EQUIPMENT**	Game Court Services, Inc.	10901 Circle Drive	Austin, TX 78736	David	Henderson	512-394-0461	512-394-0480	115213-00
5085-0121-115213-00 **PROJECTOR**	Daersed Enterprises dba	3645 Fredricksburg Rd.	San Antonio, TX 78201	G'Anna	Parkey	210-732-9327	210-732-9347	115213-00

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SCREENS	Southwest Décor							
5085-0120-122000-00 **HORIZONTAL BLINDS**	Longhorn Blinds of Austin, LLC	4201 S. Congress Ave., #312	Austin, TX 78745	Ron	Newhouse	512-447-5496	512-707-7315	122000-00
5085-0115-131100-00 **SWIMMING POOL**	Progressive Commercial Aquatics, Inc.	2510 Farrell Road	Houston, TX 77073	Tim	Phelps	281-982-0212	281-443-1524	131100-00
5085-0137-133416-00 **ALUMINUM BLEACHERS**	Southern Bleacher Company, Inc.	801 Fifth Street	Graham, TX 76450	Jim	McCain	800-433-0912	940-549-1365	133416-00
5085-0106-142000-00 **ELEVATOR**	ThyssenKrupp Elevator Corporation	14820 Tomball Pkwy., Suite 190	Houston, TX 77086	Adam	Meyer	713-289-0289	713-896-4660	142000-00
5085-0109-211300-00 **FIRE PROTECTION**	Firecheck of Texas, Inc.	11500 N. 10th Street	McAllen, TX 78504-0222	Hal	Wychopen	956-383-3473	956-380-3473	211300-00
5085-0139-212000-00 **FIRE EXTINGUISHERS/ CABINETS**	PBJ Specialties	7800 Bissonnet Street, Suite 350	Houston, TX 77074	Scott	Harmon	713-774-5701	713-774-5717	212000-00
5085-0110-221000-00 **PLUMBING**	Johnston Commercial Plumbing, LLC	800 Wilcrest Dr., Suite 150	Houston, TX 77042	Michael	Johnston	713-532-4202	713-532-9906	221000-00
5085-0108-230000-00 **HVAC**	Fort Bend Mechanical, LTD	13625 Stafford Road	Stafford, TX 77477	Pete	Medford	281-403-4822	281-403-4823	230000-00
5085-0104-260000-00 **SITE/BUILDING ELECTRIC**	Quinco Electrical of Dallas, Inc.	3016 W. Story Rd.	Irving, TX 75038	Richard	Cavazos	972-258-9105	972-258-9107	260000-00
5085-0129-272000-00 **ALARM/ VIDEO/ SECURITY CAMERA**	NetVersant Solutions, LLC	9750 W. Sam Houston Parkway N., Suite 100	Houston, TX 77064	Steven	Davis	832-487-1973	832-487-1901	272000-00
5085-0131-280000-00 **SOUND SYSTEM**	FireTron, Inc.	10101A Stafford Centre Dr.	Stafford, TX 77477	Richard	Phillips	281-499-1500	281-499-3711	280000-00
5085-0130-283100-00 **FIRE ALARM/ TELEPHONE**	Wilson Fire Equipment & Service Company, Inc.	7303 Empire Central Drive	Houston, TX 77040	Waylan	Gandy	832-310-2469	832-310-2569	283100-00
5085-0102-310600-00	W.T. Byler Co.,	15203 Lillja Road	Houston, TX	Jeremy	Perkins	281-445-2070	281-445-4356	310600-00

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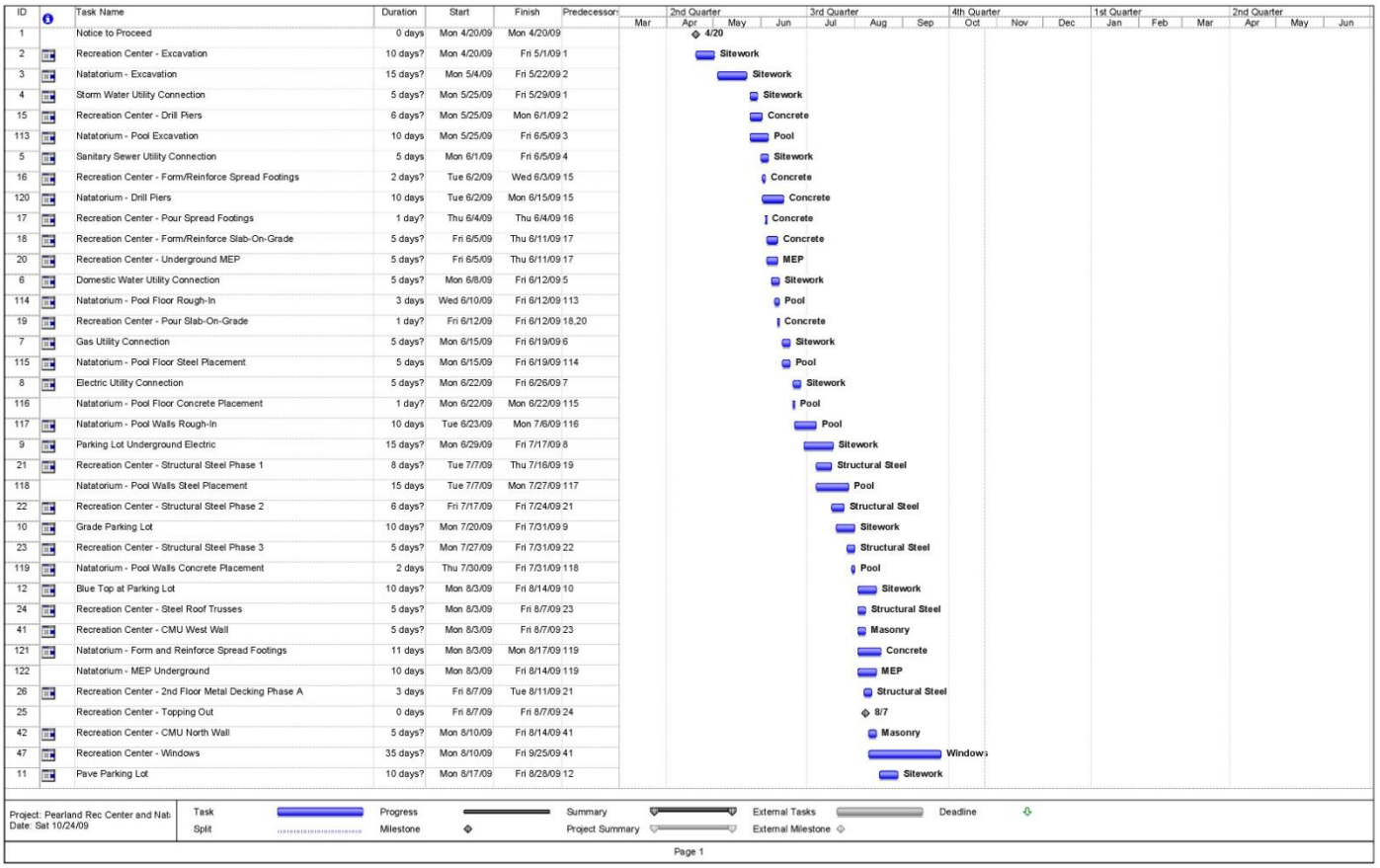
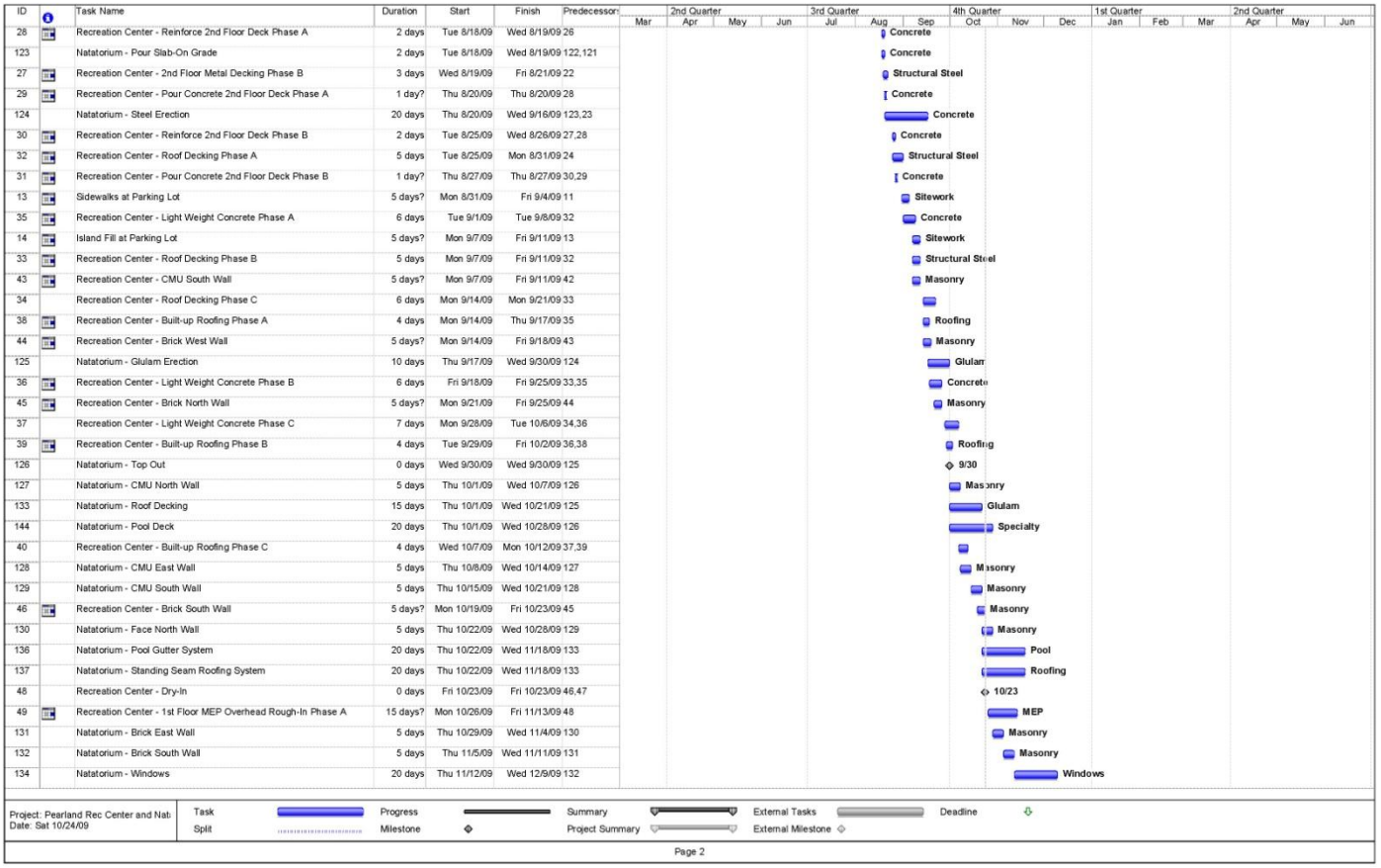
EARTHWORK/ ASPHALT PAVING	L.P.		77060-5299					
5085-0145-313116-00 **SOIL POISONING**	Aroco Pest Management, L.L.C.	4321 Pepperbush	Fort Worth, TX 76137	Ron	Muse	817-920-5950	817-847-5754	313116-00
5085-0135-321723-00 **PAVEMENT MARKINGS**	Arkansas Line Marking, Inc.	10524 Dreher Road	Little Rock, AR 72206	Michael	Griffin	501-888-5052	501-888-1080	321723-00
5085-0151-323100-00 **FENCING**	Foster Fence LTD	16700 Old Hwy 90 East	Houston, TX 77049	Daniel	Greak	281-456-7273	281-456-0221	323100-00
5085-0114-329000-00 **LANDSCAPE & IRRIGATION**	Site Landscape Development LLC	762 E. Business 121	Lewisville, TX 75057	Kirk	Boyd	972-221-2205	972-221-2208	329000-00
5085-0103-334000-00 **WATER/SEWER**	Joslin Construction Company, Inc.	21518 West Wallis	Porter, TX 77365	Ray	Joslin	281-354-5840	281-354-5840	334000-00

Appendix 5 – Project Logistics References

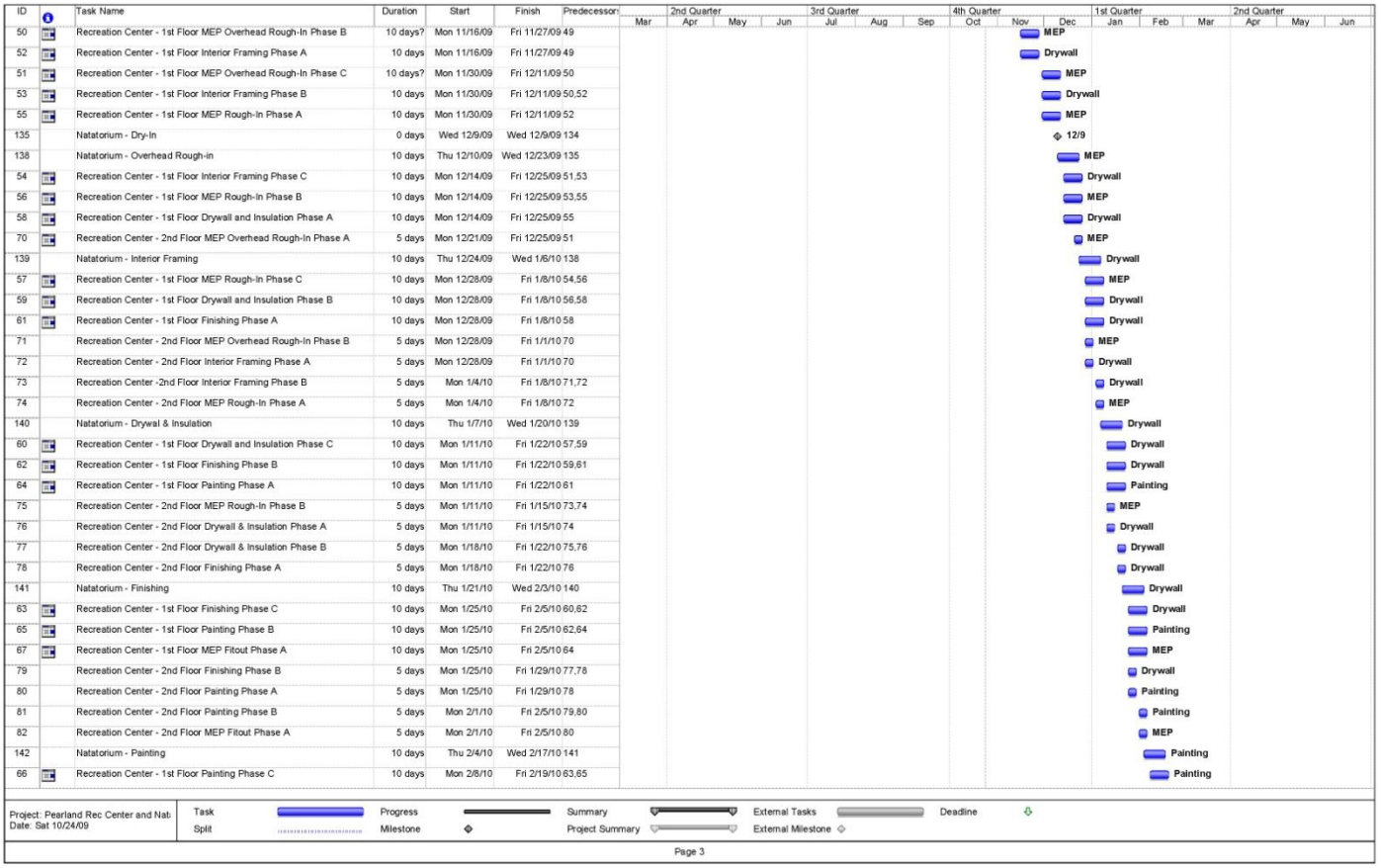
Detailed Project Schedule



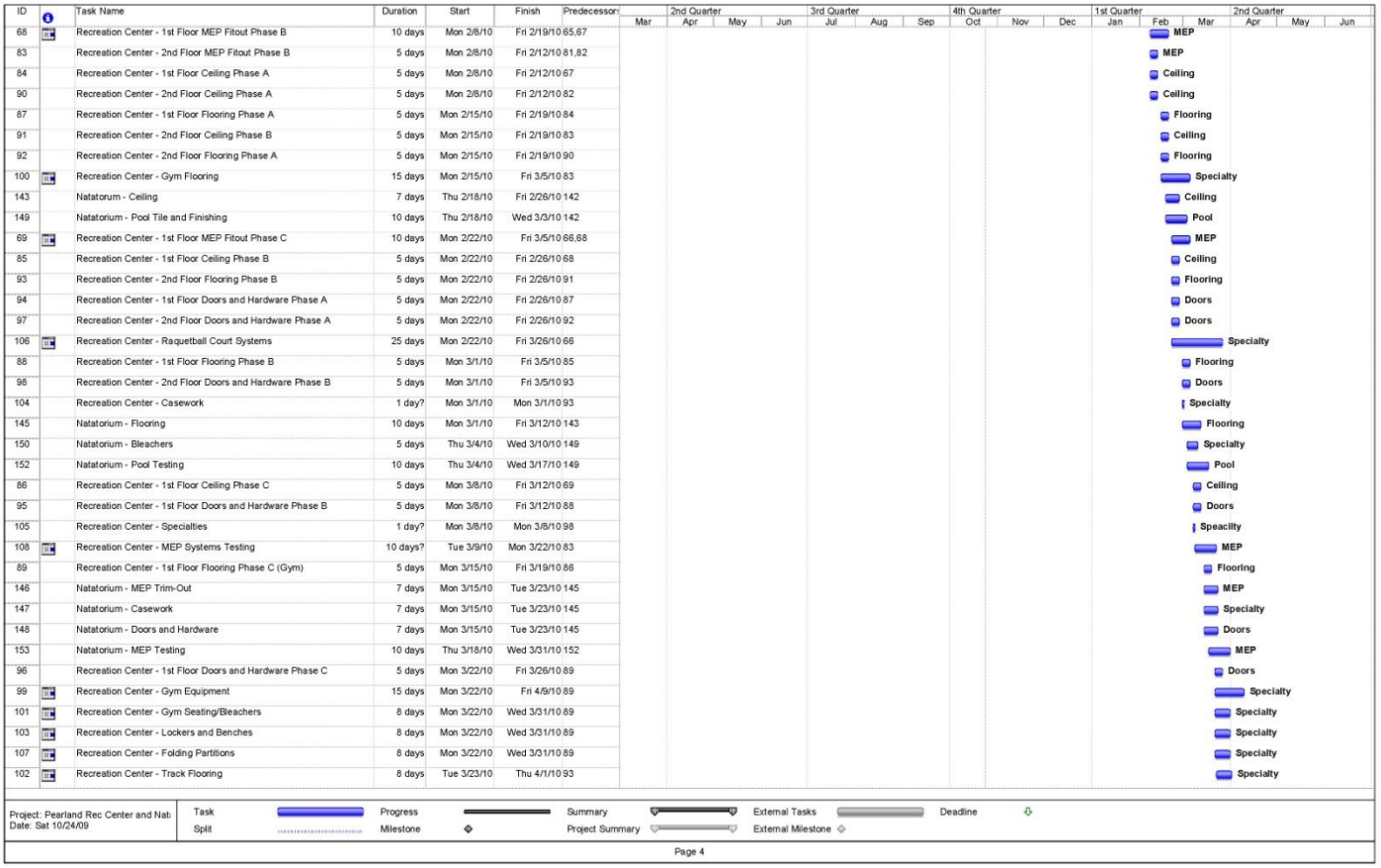
ID	Task Name	Duration	Start	Finish	Predecessors
1	Notice to Proceed	0 days	Mon 4/20/09	Mon 4/20/09	
2	Recreation Center - Excavation	10 days?	Mon 4/20/09	Fri 5/1/09	1
3	Natatorium - Excavation	15 days?	Mon 5/4/09	Fri 5/22/09	2
4	Storm Water Utility Connection	5 days?	Mon 5/25/09	Fri 5/29/09	1
15	Recreation Center - Drill Piers	6 days?	Mon 5/25/09	Mon 6/1/09	2
113	Natatorium - Pool Excavation	10 days	Mon 5/25/09	Fri 6/5/09	3
5	Sanitary Sewer Utility Connection	5 days	Mon 6/1/09	Fri 6/5/09	4
16	Recreation Center - Form/Reinforce Spread Footings	2 days?	Tue 6/2/09	Wed 6/3/09	15
120	Natatorium - Drill Piers	10 days	Tue 6/2/09	Mon 6/15/09	15
17	Recreation Center - Pour Spread Footings	1 day?	Thu 6/4/09	Thu 6/4/09	16
18	Recreation Center - Form/Reinforce Slab-On-Grade	5 days?	Fri 6/5/09	Thu 6/11/09	17
20	Recreation Center - Underground MEP	5 days?	Fri 6/5/09	Thu 6/11/09	17
6	Domestic Water Utility Connection	5 days?	Mon 6/8/09	Fri 6/12/09	5
114	Natatorium - Pool Floor Rough-In	3 days	Wed 6/10/09	Fri 6/12/09	113
19	Recreation Center - Pour Slab-On-Grade	1 day?	Fri 6/12/09	Fri 6/12/09	18,20
7	Gas Utility Connection	5 days?	Mon 6/15/09	Fri 6/19/09	6
115	Natatorium - Pool Floor Steel Placement	5 days	Mon 6/15/09	Fri 6/19/09	114
8	Electric Utility Connection	5 days?	Mon 6/22/09	Fri 6/26/09	7
116	Natatorium - Pool Floor Concrete Placement	1 day?	Mon 6/22/09	Mon 6/22/09	115
117	Natatorium - Pool Walls Rough-In	10 days	Tue 6/23/09	Mon 7/6/09	116
9	Parking Lot Underground Electric	15 days?	Mon 6/29/09	Fri 7/17/09	8
21	Recreation Center - Structural Steel Phase 1	8 days?	Tue 7/7/09	Thu 7/16/09	19
118	Natatorium - Pool Walls Steel Placement	15 days	Tue 7/7/09	Mon 7/27/09	117
22	Recreation Center - Structural Steel Phase 2	6 days?	Fri 7/17/09	Fri 7/24/09	21
10	Grade Parking Lot	10 days?	Mon 7/20/09	Fri 7/31/09	9
23	Recreation Center - Structural Steel Phase 3	5 days?	Mon 7/27/09	Fri 7/31/09	22
119	Natatorium - Pool Walls Concrete Placement	2 days	Thu 7/30/09	Fri 7/31/09	118
12	Blue Top at Parking Lot	10 days?	Mon 8/3/09	Fri 8/14/09	10
24	Recreation Center - Steel Roof Trusses	5 days?	Mon 8/3/09	Fri 8/7/09	23
41	Recreation Center - CMU West Wall	5 days?	Mon 8/3/09	Fri 8/7/09	23
121	Natatorium - Form and Reinforce Spread Footings	11 days	Mon 8/3/09	Mon 8/17/09	119
122	Natatorium - MEP Underground	10 days	Mon 8/3/09	Fri 8/14/09	119
26	Recreation Center - 2nd Floor Metal Decking Phase A	3 days	Fri 8/7/09	Tue 8/11/09	21
25	Recreation Center - Topping Out	0 days	Fri 8/7/09	Fri 8/7/09	24
42	Recreation Center - CMU North Wall	5 days?	Mon 8/10/09	Fri 8/14/09	41
47	Recreation Center - Windows	35 days?	Mon 8/10/09	Fri 9/25/09	41
11	Pave Parking Lot	10 days?	Mon 8/17/09	Fri 8/28/09	12



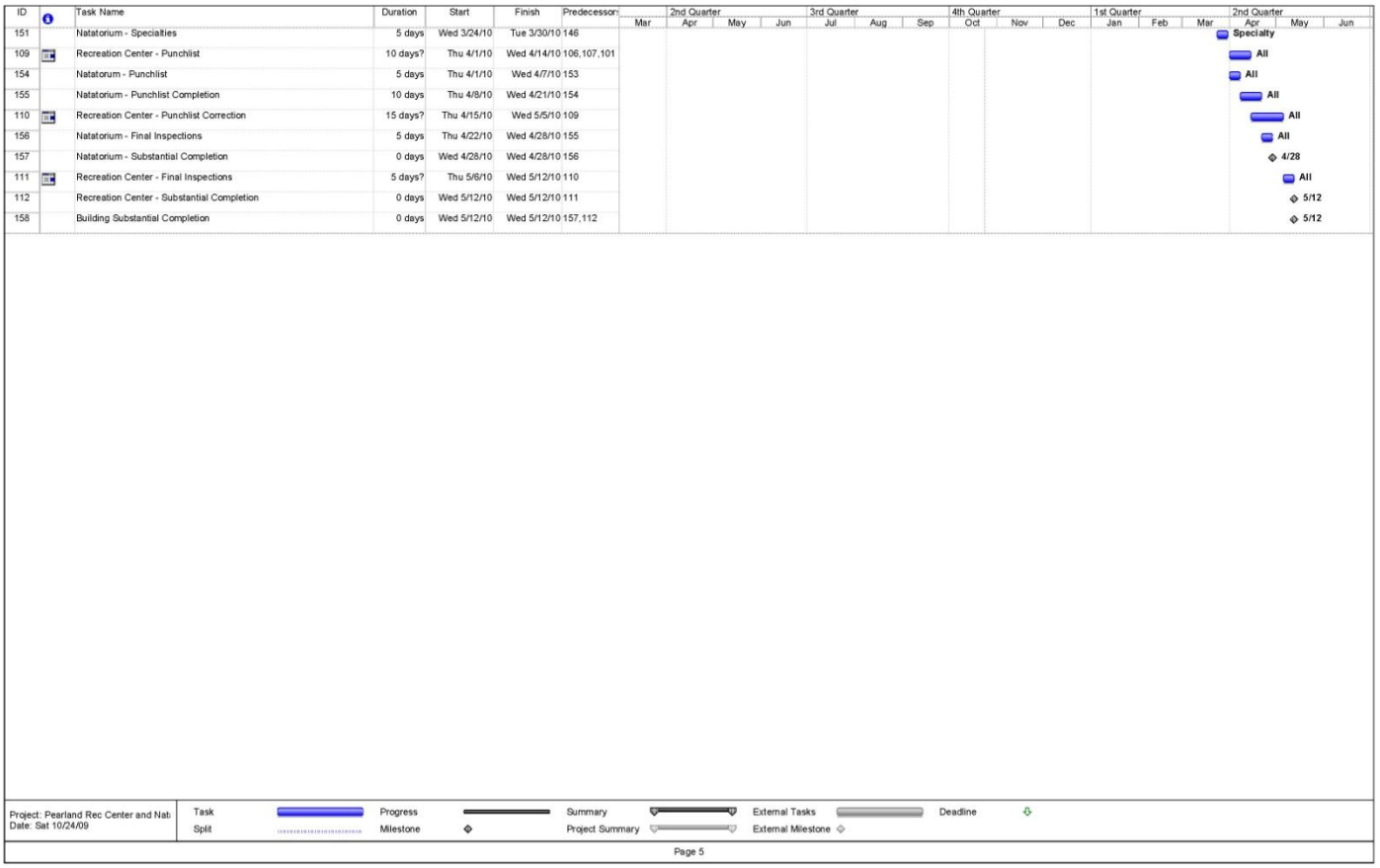
ID	Task Name	Duration	Start	Finish	Predecessors
28	Recreation Center - Reinforce 2nd Floor Deck Phase A	2 days	Tue 8/18/09	Wed 8/19/09	26
123	Natatorium - Pour Slab-On Grade	2 days	Tue 8/18/09	Wed 8/19/09	122,121
27	Recreation Center - 2nd Floor Metal Decking Phase B	3 days	Wed 8/19/09	Fri 8/21/09	22
29	Recreation Center - Pour Concrete 2nd Floor Deck Phase A	1 day?	Thu 8/20/09	Thu 8/20/09	28
124	Natatorium - Steel Erection	20 days	Thu 8/20/09	Wed 9/16/09	123,23
30	Recreation Center - Reinforce 2nd Floor Deck Phase B	2 days	Tue 8/25/09	Wed 8/26/09	27,28
32	Recreation Center - Roof Decking Phase A	5 days	Tue 8/25/09	Mon 8/31/09	24
31	Recreation Center - Pour Concrete 2nd Floor Deck Phase B	1 day?	Thu 8/27/09	Thu 8/27/09	30,29
13	Sidewalks at Parking Lot	5 days?	Mon 8/31/09	Fri 9/4/09	11
35	Recreation Center - Light Weight Concrete Phase A	6 days	Tue 9/1/09	Tue 9/8/09	32
14	Island Fill at Parking Lot	5 days?	Mon 9/7/09	Fri 9/11/09	13
33	Recreation Center - Roof Decking Phase B	5 days	Mon 9/7/09	Fri 9/11/09	32
43	Recreation Center - CMU South Wall	5 days?	Mon 9/7/09	Fri 9/11/09	42
34	Recreation Center - Roof Decking Phase C	6 days	Mon 9/14/09	Mon 9/21/09	33
38	Recreation Center - Built-up Roofing Phase A	4 days	Mon 9/14/09	Thu 9/17/09	35
44	Recreation Center - Brick West Wall	5 days?	Mon 9/14/09	Fri 9/18/09	43
125	Natatorium - Glulam Erection	10 days	Thu 9/17/09	Wed 9/30/09	124
36	Recreation Center - Light Weight Concrete Phase B	6 days	Fri 9/18/09	Fri 9/25/09	33,35
45	Recreation Center - Brick North Wall	5 days?	Mon 9/21/09	Fri 9/25/09	44
37	Recreation Center - Light Weight Concrete Phase C	7 days	Mon 9/28/09	Tue 10/6/09	34,36
39	Recreation Center - Built-up Roofing Phase B	4 days	Tue 9/29/09	Fri 10/2/09	36,38
126	Natatorium - Top Out	0 days	Wed 9/30/09	Wed 9/30/09	125
127	Natatorium - CMU North Wall	5 days	Thu 10/1/09	Wed 10/7/09	126
133	Natatorium - Roof Decking	15 days	Thu 10/1/09	Wed 10/21/09	125
144	Natatorium - Pool Deck	20 days	Thu 10/1/09	Wed 10/28/09	126
40	Recreation Center - Built-up Roofing Phase C	4 days	Wed 10/7/09	Mon 10/12/09	37,39
128	Natatorium - CMU East Wall	5 days	Thu 10/8/09	Wed 10/14/09	127
129	Natatorium - CMU South Wall	5 days	Thu 10/15/09	Wed 10/21/09	128
46	Recreation Center - Brick South Wall	5 days?	Mon 10/19/09	Fri 10/23/09	45
130	Natatorium - Face North Wall	5 days	Thu 10/22/09	Wed 10/28/09	129
136	Natatorium - Pool Gutter System	20 days	Thu 10/22/09	Wed 11/18/09	133
137	Natatorium - Standing Seam Roofing System	20 days	Thu 10/22/09	Wed 11/18/09	133
48	Recreation Center - Dry-In	0 days	Fri 10/23/09	Fri 10/23/09	46,47
49	Recreation Center - 1st Floor MEP Overhead Rough-In Phase A	15 days?	Mon 10/26/09	Fri 11/13/09	48
131	Natatorium - Brick East Wall	5 days	Thu 10/29/09	Wed 11/4/09	130
132	Natatorium - Brick South Wall	5 days	Thu 11/5/09	Wed 11/11/09	131
134	Natatorium - Windows	20 days	Thu 11/12/09	Wed 12/9/09	132



ID	Task Name	Duration	Start	Finish	Predecessors
50	Recreation Center - 1st Floor MEP Overhead Rough-In Phase B	10 days?	Mon 11/16/09	Fri 11/27/09	49
52	Recreation Center - 1st Floor Interior Framing Phase A	10 days	Mon 11/16/09	Fri 11/27/09	49
51	Recreation Center - 1st Floor MEP Overhead Rough-In Phase C	10 days?	Mon 11/30/09	Fri 12/11/09	50
53	Recreation Center - 1st Floor Interior Framing Phase B	10 days	Mon 11/30/09	Fri 12/11/09	50,52
55	Recreation Center - 1st Floor MEP Rough-In Phase A	10 days	Mon 11/30/09	Fri 12/11/09	52
135	Natatorium - Dry-In	0 days	Wed 12/9/09	Wed 12/9/09	134
138	Natatorium - Overhead Rough-in	10 days	Thu 12/10/09	Wed 12/23/09	135
54	Recreation Center - 1st Floor Interior Framing Phase C	10 days	Mon 12/14/09	Fri 12/25/09	51,53
56	Recreation Center - 1st Floor MEP Rough-In Phase B	10 days	Mon 12/14/09	Fri 12/25/09	53,55
58	Recreation Center - 1st Floor Drywall and Insulation Phase A	10 days	Mon 12/14/09	Fri 12/25/09	55
70	Recreation Center - 2nd Floor MEP Overhead Rough-In Phase A	5 days	Mon 12/21/09	Fri 12/25/09	51
139	Natatorium - Interior Framing	10 days	Thu 12/24/09	Wed 1/6/10	138
57	Recreation Center - 1st Floor MEP Rough-In Phase C	10 days	Mon 12/28/09	Fri 1/8/10	54,56
59	Recreation Center - 1st Floor Drywall and Insulation Phase B	10 days	Mon 12/28/09	Fri 1/8/10	56,58
61	Recreation Center - 1st Floor Finishing Phase A	10 days	Mon 12/28/09	Fri 1/8/10	58
71	Recreation Center - 2nd Floor MEP Overhead Rough-In Phase B	5 days	Mon 12/28/09	Fri 1/1/10	70
72	Recreation Center - 2nd Floor Interior Framing Phase A	5 days	Mon 12/28/09	Fri 1/1/10	70
73	Recreation Center -2nd Floor Interior Framing Phase B	5 days	Mon 1/4/10	Fri 1/8/10	71,72
74	Recreation Center - 2nd Floor MEP Rough-In Phase A	5 days	Mon 1/4/10	Fri 1/8/10	72
140	Natatorium - Drywal & Insulation	10 days	Thu 1/7/10	Wed 1/20/10	139
60	Recreation Center - 1st Floor Drywall and Insulation Phase C	10 days	Mon 1/11/10	Fri 1/22/10	57,59
62	Recreation Center - 1st Floor Finishing Phase B	10 days	Mon 1/11/10	Fri 1/22/10	59,61
64	Recreation Center - 1st Floor Painting Phase A	10 days	Mon 1/11/10	Fri 1/22/10	61
75	Recreation Center - 2nd Floor MEP Rough-In Phase B	5 days	Mon 1/11/10	Fri 1/15/10	73,74
76	Recreation Center - 2nd Floor Drywall & Insulation Phase A	5 days	Mon 1/11/10	Fri 1/15/10	74
77	Recreation Center - 2nd Floor Drywall & Insulation Phase B	5 days	Mon 1/18/10	Fri 1/22/10	75,76
78	Recreation Center - 2nd Floor Finishing Phase A	5 days	Mon 1/18/10	Fri 1/22/10	76
141	Natatorium - Finishing	10 days	Thu 1/21/10	Wed 2/3/10	140
63	Recreation Center - 1st Floor Finishing Phase C	10 days	Mon 1/25/10	Fri 2/5/10	60,62
65	Recreation Center - 1st Floor Painting Phase B	10 days	Mon 1/25/10	Fri 2/5/10	62,64
67	Recreation Center - 1st Floor MEP Fitout Phase A	10 days	Mon 1/25/10	Fri 2/5/10	64
79	Recreation Center - 2nd Floor Finishing Phase B	5 days	Mon 1/25/10	Fri 1/29/10	77,78
80	Recreation Center - 2nd Floor Painting Phase A	5 days	Mon 1/25/10	Fri 1/29/10	78
81	Recreation Center - 2nd Floor Painting Phase B	5 days	Mon 2/1/10	Fri 2/5/10	79,80
82	Recreation Center - 2nd Floor MEP Fitout Phase A	5 days	Mon 2/1/10	Fri 2/5/10	80
142	Natatorium - Painting	10 days	Thu 2/4/10	Wed 2/17/10	141
66	Recreation Center - 1st Floor Painting Phase C	10 days	Mon 2/8/10	Fri 2/19/10	63,65



ID	Task Name	Duration	Start	Finish	Predecessors
68	Recreation Center - 1st Floor MEP Fitout Phase B	10 days	Mon 2/8/10	Fri 2/19/10	65,67
83	Recreation Center - 2nd Floor MEP Fitout Phase B	5 days	Mon 2/8/10	Fri 2/12/10	81,82
84	Recreation Center - 1st Floor Ceiling Phase A	5 days	Mon 2/8/10	Fri 2/12/10	67
90	Recreation Center - 2nd Floor Ceiling Phase A	5 days	Mon 2/8/10	Fri 2/12/10	82
87	Recreation Center - 1st Floor Flooring Phase A	5 days	Mon 2/15/10	Fri 2/19/10	84
91	Recreation Center - 2nd Floor Ceiling Phase B	5 days	Mon 2/15/10	Fri 2/19/10	83
92	Recreation Center - 2nd Floor Flooring Phase A	5 days	Mon 2/15/10	Fri 2/19/10	90
100	Recreation Center - Gym Flooring	15 days	Mon 2/15/10	Fri 3/5/10	83
143	Natatorum - Ceiling	7 days	Thu 2/18/10	Fri 2/26/10	142
149	Natatorium - Pool Tile and Finishing	10 days	Thu 2/18/10	Wed 3/3/10	142
69	Recreation Center - 1st Floor MEP Fitout Phase C	10 days	Mon 2/22/10	Fri 3/5/10	66,68
85	Recreation Center - 1st Floor Ceiling Phase B	5 days	Mon 2/22/10	Fri 2/26/10	68
93	Recreation Center - 2nd Floor Flooring Phase B	5 days	Mon 2/22/10	Fri 2/26/10	91
94	Recreation Center - 1st Floor Doors and Hardware Phase A	5 days	Mon 2/22/10	Fri 2/26/10	87
97	Recreation Center - 2nd Floor Doors and Hardware Phase A	5 days	Mon 2/22/10	Fri 2/26/10	92
106	Recreation Center - Raquetball Court Systems	25 days	Mon 2/22/10	Fri 3/26/10	66
88	Recreation Center - 1st Floor Flooring Phase B	5 days	Mon 3/1/10	Fri 3/5/10	85
98	Recreation Center - 2nd Floor Doors and Hardware Phase B	5 days	Mon 3/1/10	Fri 3/5/10	93
104	Recreation Center - Casework	1 day?	Mon 3/1/10	Mon 3/1/10	93
145	Natatorium - Flooring	10 days	Mon 3/1/10	Fri 3/12/10	143
150	Natatorium - Bleachers	5 days	Thu 3/4/10	Wed 3/10/10	149
152	Natatorium - Pool Testing	10 days	Thu 3/4/10	Wed 3/17/10	149
86	Recreation Center - 1st Floor Ceiling Phase C	5 days	Mon 3/8/10	Fri 3/12/10	69
95	Recreation Center - 1st Floor Doors and Hardware Phase B	5 days	Mon 3/8/10	Fri 3/12/10	88
105	Recreation Center - Specialties	1 day?	Mon 3/8/10	Mon 3/8/10	98
108	Recreation Center - MEP Systems Testing	10 days?	Tue 3/9/10	Mon 3/22/10	83
89	Recreation Center - 1st Floor Flooring Phase C (Gym)	5 days	Mon 3/15/10	Fri 3/19/10	86
146	Natatorium - MEP Trim-Out	7 days	Mon 3/15/10	Tue 3/23/10	145
147	Natatorium - Casework	7 days	Mon 3/15/10	Tue 3/23/10	145
148	Natatorium - Doors and Hardware	7 days	Mon 3/15/10	Tue 3/23/10	145
153	Natatorium - MEP Testing	10 days	Thu 3/18/10	Wed 3/31/10	152
96	Recreation Center - 1st Floor Doors and Hardware Phase C	5 days	Mon 3/22/10	Fri 3/26/10	89
99	Recreation Center - Gym Equipment	15 days	Mon 3/22/10	Fri 4/9/10	89
101	Recreation Center - Gym Seating/Bleachers	8 days	Mon 3/22/10	Wed 3/31/10	89
103	Recreation Center - Lockers and Benches	8 days	Mon 3/22/10	Wed 3/31/10	89
107	Recreation Center - Folding Partitions	8 days	Mon 3/22/10	Wed 3/31/10	89
102	Recreation Center - Track Flooring	8 days	Tue 3/23/10	Thu 4/1/10	93



ID	Task Name	Duration	Start	Finish	Predecessors
151	Natatorium - Specialties	5 days	Wed 3/24/10	Tue 3/30/10	146
109	Recreation Center - Punchlist	10 days?	Thu 4/1/10	Wed 4/14/10	106,107,101
154	Natatorum - Punchlist	5 days	Thu 4/1/10	Wed 4/7/10	153
155	Natatorium - Punchlist Completion	10 days	Thu 4/8/10	Wed 4/21/10	154
110	Recreation Center - Punchlist Correction	15 days?	Thu 4/15/10	Wed 5/5/10	109
156	Natatorium - Final Inspections	5 days	Thu 4/22/10	Wed 4/28/10	155
157	Natatorium - Substantial Completion	0 days	Wed 4/28/10	Wed 4/28/10	156
111	Recreation Center - Final Inspections	5 days?	Thu 5/6/10	Wed 5/12/10	110
112	Recreation Center - Substantial Completion	0 days	Wed 5/12/10	Wed 5/12/10	111
158	Building Substantial Completion	0 days	Wed 5/12/10	Wed 5/12/10	157,112

Parametric Cost Estimate – D4Profiler

Wednesday, September 16, 2009

Statement of Probable Cost

Page 1

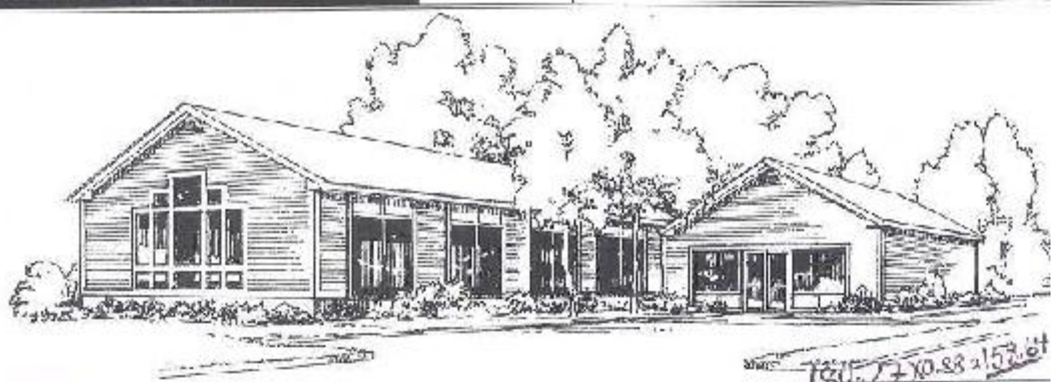
Pearland Natatorium - Aug 2009 - TX - Houston

Prepared By:		Prepared For:	
	Moody/Nolan, Ltd. + HOK 1776 East Broad Street Columbus, OH 43203		
	Fax:		Fax:
Building Sq. Size:	150943	Site Sq. Size:	418176
Bid Date:	6/1/2009	Building use:	Recreational
No. of floors:	2	Foundation:	CON
No. of buildings:	1	Exterior Walls:	MAS
Project Height:	52	Interior Walls:	GYP
1st Floor Height:	16	Roof Type:	MET
1st Floor Size:	90000	Floor Type:	TER
		Project Type:	NEW

Division		Percent	Sq. Cost	Amount
00	**Bidding Requirements**	2.48	2.58	389,439
	Bidding Requirements	2.48	2.58	389,439
03	**Concrete**	5.10	5.30	800,197
	Concrete	5.10	5.30	800,197
04	**Masonry**	17.25	17.95	2,709,962
	Masonry	17.25	17.95	2,709,962
05	**Metals**	15.96	16.60	2,506,241
	Metals	15.96	16.60	2,506,241
06	**Wood & Plastics**	0.60	0.62	93,806
	Wood & Plastics	0.60	0.62	93,806
07	**Thermal & Moisture Protection**	8.21	8.54	1,288,653
	Thermal & Moisture Protection	8.21	8.54	1,288,653
08	**Doors & Windows**	3.03	3.15	475,665
	Doors & Windows	3.03	3.15	475,665
09	**Finishes**	7.29	7.59	1,145,575
	Finishes	7.29	7.59	1,145,575
10	**Specialties**	0.82	0.85	128,865
	Specialties	0.82	0.85	128,865
11	**Equipment**	0.36	0.38	56,852
	Equipment	0.36	0.38	56,852
12	**Furnishings**	0.39	0.41	61,590
	Furnishings	0.39	0.41	61,590
13	**Special Construction**	12.39	12.89	1,945,298
	Special Construction	12.39	12.89	1,945,298
14	**Conveying Systems**	0.36	0.37	55,905
	Elevators	0.36	0.37	55,905
15	**Mechanical**	16.54	17.21	2,598,132
	Mechanical	16.54	17.21	2,598,132
16	**Electrical**	9.23	9.60	1,449,261
	Electrical	9.23	9.60	1,449,261
Total Building Costs		100.00	104.05	15,705,442
02	**Site Work**	100.00	2.59	1,081,100
	Site Work	100.00	2.59	1,081,100
Total Non-Building Costs		100.00	2.59	1,081,100
Total Project Costs		–	–	16,786,542

RS Means Data for Natatorium

COMMERCIAL/INDUSTRIAL/ INSTITUTIONAL	M.650	Swimming Pool, Enclosed



180.27 x0.88 = 158.64

41,817

Costs per square foot of floor area

Exterior Wall	S.F. Area	10000	16000	20000	22000	24000	26000	28000	30000	32000
	L.F. Perimeter	420	510	600	640	660	684	706	740	737
Face Brick with Concrete Block Back-up	Wood Truss	[illegible]	[illegible]	203.70	206.65	203.65	201.25	199.10	193.00	195.[illegible]
	Precast Conc.	271.15	246.25	241.10	233.70	235.00	[illegible]	229.65	223.60	224.5[illegible]
Metal Sandwich Panel	Wood Truss	229.30	[illegible]	210.65	[illegible]	[illegible]	[illegible]	204.45	202.65	[illegible]
Precast Concrete Panel	Precast Conc.	241.[illegible]	[illegible]	219.40	217.65	[illegible]	213.05	211.30	[illegible]	[illegible]
Stucco on Concrete Block	Wood Frame	228.90	210.75	210.35	[illegible]	[illegible]	[illegible]	203.20	[illegible]	[illegible]
	Precast Conc.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	217.25	215.20	[illegible]	[illegible]
Perimeter Adj., Add or Deduct	Per 100 L.F.	[illegible]	[illegible]	[illegible]	7.80	[illegible]	6.45	6.00	5.60	[illegible]
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	2.10	1.50	1.50	1.45	1.55	1.35	[illegible]	1.28	[illegible]

For Basement, add $23.95 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 $103.30 to $303.70 per S.F.

Common additives

Description	Unit	$ Cost
Bleachers, Telescoping, manual		
To 15 tier	Seat	114 - 140
To 20 tier	Seat	238 - 288
21-30 tier	Seat	240 - 300
For power operation, add	Seat	45.30 - 71.50
Emergency lighting, 25 watt, battery operated		
Lead battery	Each	232
Nickel cadmium	Each	825
Lockers, Steel, single tier, 60" or 72"	Opening	191 - 310
2 tier, 60" or 72" total	Opening	104 - 161
5 tier, box lockers	Opening	45 - 81.50
Locker bench, lam. maple top only	L.F.	21
Pedestal, steel pipe	Each	63.50
Pool Equipment		
Diving stand, 3 meter	Each	12,800
1 meter	Each	6400
Diving board, 16' aluminum	Each	3730
Fiberglass	Each	3030
Lifeguard chair, fixed	Each	3875
Portable	Each	3100
Lights, underwater, 12 volt, 300 watt	Each	820

Description	Unit	$ Cost
Sauna, Prefabricated, complete		
6' x 4'	Each	5095
6' x 6'	Each	6850
6' x 9'	Each	8625
8' x 8'	Each	0100
8' x 10'	Each	11,300
10' x 12'	Each	14,000
Sound System		
Amplifier, 250 watts	Each	2050
Speaker, ceiling or wall	Each	51
Trumpet	Each	385
Steam Bath, Complete, to 140 C.F.	Each	2050
To 300 C.F.	Each	2100
To 800 C.F.	Each	6325
To 2500 C.F.	Each	7550

RS Means Data for Recreation Center

COMMERCIAL/INDUSTRIAL/ INSTITUTIONAL | **M.310** | **Gymnasium**

$156.98X0.88 = 132.86

63,300

Costs per square foot of floor area

Exterior Wall	S.F. Area	12000	16000	20000	25000	30000	35000	40000	45000	50000
	L.F. Perimeter	440	520	600	700	758	780	841	910	979
Reinforced Concrete Block	Lam. Wood Arches	154.80	147.75	43.85	140.85	135.00	[illegible]	[illegible]	[illegible]	132.50
	Rigid Steel Frame	[illegible]	157.75	155.75	150.35	[illegible]	141.95	142.80	141.25	140.70
Face Brick with Concrete Block Back-up	Lam. Wood Arches	180.75	[illegible]	[illegible]	[illegible]	152.55	149.95	[illegible]	[illegible]	144.50
	Rigid Steel Frame	[illegible]	[illegible]	174.95	170.20	162.50	[illegible]	[illegible]	155.55	154.20
Metal Sandwich Panel	Lam. Wood Arches	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Rigid Steel Frame	[illegible]	[illegible]	151.90	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Perimeter Adj., Add or Deduct	Per 100 L.F.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	[illegible]	[illegible]	[illegible]	0.70	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Basement—Not Applicable

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 $73.05 to $[illegible] per S.F.

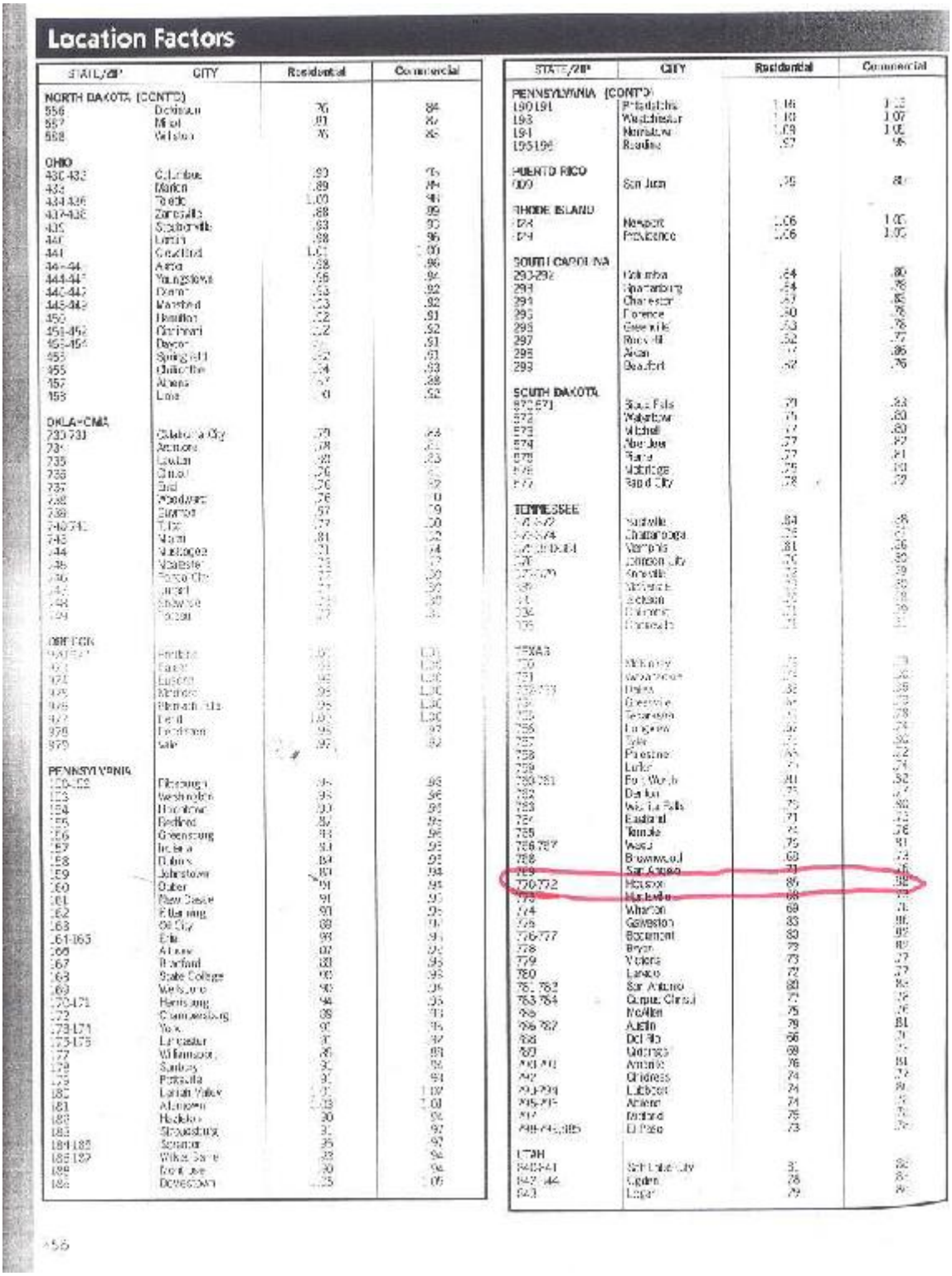
Common additives

Description	Unit	$ Cost
Bleachers, telescoping, manual		
15 tier	Seat	[illegible]
16-20 tier	Seat	[illegible]
21-30 tier	Seat	[illegible]
For power operation, add	Seat	45.50 - 71.50
Gym Divider Curtain, Mesh top		
Manual roll-up	S.F.	11.60
Gym Mats		
2" naugahyde covered	S.F.	[illegible]
2" nylon	S.F.	6.05
1-1/2" wall pads	S.F.	[illegible]
1" wrestling mats	S.F.	[illegible]
Scoreboard		
Basketball, one side	Each	[illegible]
Basketball Backstop		
Wall mtd., 6' extended, fixed	Each	[illegible]
Swing up, wall mtd.	Each	[illegible]

Description	Unit	$ Cost
Lockers, Steel, single tier, 60" or 72"	Opening	[illegible] - 310
2 tier, 60" or 72" total	Opening	107 - 141
5 tier, box lockers	Opening	65 - 83.50
Locker bench, lam. maple top only	L.F.	21
Pedestals, steel pipe	Each	[illegible]
Sound System		
Amplifier, 250 watts	Each	[illegible]
Speaker, ceiling or wall	Each	[illegible]
Trumpet	Each	[illegible]
Emergency lighting, 25 watt, battery operated		
Lead battery	Each	[illegible]
Nickel cadmium	Each	[illegible]

Important: See the Reference Section for Location Factor

Data for Estimate Location Adjustment

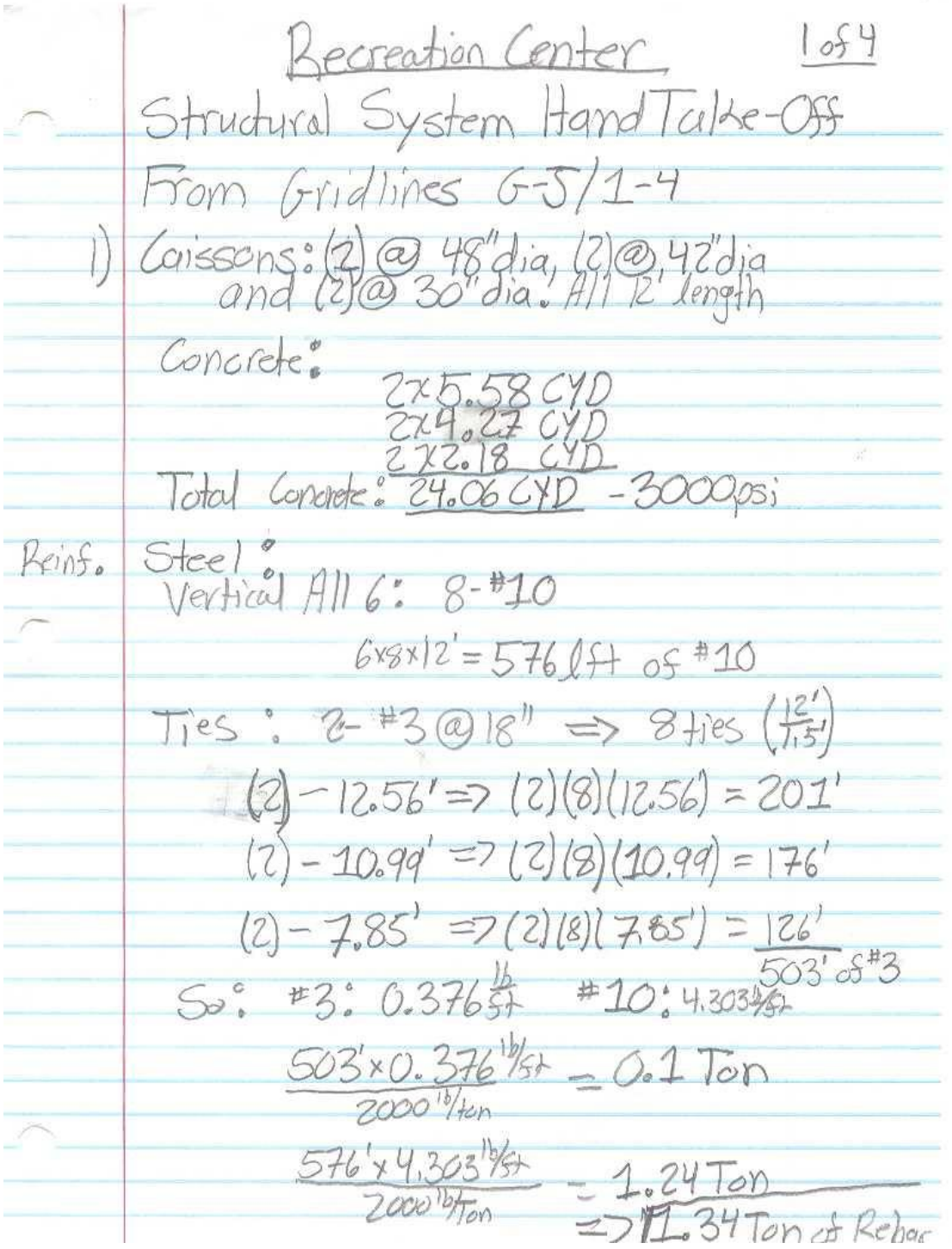


Location Factors

STATE/ZIP	CITY	Residential	Commercial
NORTH DAKOTA (CONT'D)			
556	Devils Lk	.76	.84
557	Minot	.81	.87
558	Williston	.76	.85
OHIO			
430-432	Columbus	.93	.96
433	Marion	.89	.94
434-436	Toledo	1.00	1.01
437-438	Zanesville	.88	.99
439	Steubenville	.93	.95
440	Lorain	.98	.96
441	Cleveland	1.01	1.00
442-44?	Akron	.98	.96
444-447	Youngstown	.96	.94
448-449	Canton	.93	.92
450	Hamilton	.93	.92
451-452	Cincinnati	.92	.92
453-454	Dayton	.92	.91
455	Springfield	.92	.91
456	Chillicothe	.94	.93
457	Athens	.87	.88
458	Lima	.90	.92
OKLA-OMA			
730 731	Oklahoma City	.79	.84
734	Ardmore	.78	.81
735	Lawton	.81	.83
736	Clinton	.76	.79
737	Enid	.76	.79
738	Woodward	.76	.80
739	Guymon	.67	.79
740-741	Tulsa	.77	.80
743	Miami	.81	.82
744	Muskogee	.81	.84
745	McAlester	.77	.82
746	Ponca City	.77	.80
747	Durant	.77	.80
748	Shawnee	.77	.80
749	Poteau	.77	.80
OREGON			
970-972	Portland	.93	1.00
973	Salem	.93	1.00
974	Eugene	.92	1.00
975	Medford	.95	1.00
976	Klamath Falls	.95	1.00
977	Bend	1.00	1.00
978	Pendleton	.95	.97
979	Vale	.97	.92
PENNSYLVANIA			
150-152	Pittsburgh	.96	.96
153	Washington	.96	.96
154	Uniontown	.93	.94
155	Bedford	.89	.95
156	Greensburg	.93	.96
157	Indiana	.93	.95
158	Dubois	.89	.91
159	Johnstown	.89	.94
160	Butler	.91	.95
161	New Castle	.91	.92
162	Kittanning	.93	.95
163	Oil City	.88	.91
164-165	Erie	.99	.94
166	Altoona	.87	.92
167	Bradford	.88	.95
168	State College	.90	.95
169	Wellsboro	.90	.96
170-171	Harrisburg	.94	.95
172	Chambersburg	.98	.93
173-174	York	.97	.96
175-176	Lancaster	.97	.97
177	Williamsport	.86	.89
178	Sunbury	.97	.96
179	Pottsville	.97	.91
180	Lehigh Valley	.97	1.00
181	Allentown	1.03	1.00
182	Hazleton	.90	.96
183	Stroudsburg	.97	.97
184-185	Scranton	.95	.97
186-187	Wilkes-Barre	.93	.96
188	Montrose	.90	.96
189	Doylestown	.105	1.06

STATE/ZIP	CITY	Residential	Commercial
PENNSYLVANIA (CONT'D)			
190-191	Philadelphia	1.16	1.12
193	Westchester	1.03	1.07
194	Norristown	1.09	1.05
195-196	Reading	.97	.96
PUERTO RICO			
009	San Juan	.79	.81
RHODE ISLAND			
028	Newport	1.06	1.05
029	Providence	1.06	1.05
SOUTH CAROLINA			
290-292	Columbia	.84	.80
293	Spartanburg	.84	.78
294	Charleston	.87	.85
295	Florence	.80	.78
296	Greenville	.83	.78
297	Rock Hill	.82	.77
298	Aiken	.77	.86
299	Beaufort	.82	.76
SOUTH DAKOTA			
570-571	Sioux Falls	.77	.83
572	Watertown	.75	.80
573	Mitchell	.77	.80
574	Aberdeen	.77	.82
575	Pierre	.77	.81
576	Watertown	.75	.80
577	Rapid City	.78	.79
TENNESSEE			
370-372	Nashville	.84	.88
373-374	Chattanooga	.79	.81
375 380-381	Memphis	.81	.86
376	Johnson City	.76	.85
377-379	Knoxville	.79	.79
382	McMinnville	.75	.78
383	Jackson	.76	.78
384	Columbia	.77	.79
385	Cookeville	.77	.77
TEXAS			
750	McKinney	.73	.78
751	Waxahachie	.75	.76
752-753	Dallas	.82	.86
754	Greenville	.67	.78
755	Texarkana	.71	.78
756	Longview	.67	.74
757	Tyler	.71	.82
758	Palestine	.65	.72
759	Lufkin	.71	.74
760-761	Fort Worth	.81	.82
762	Denton	.75	.77
763	Wichita Falls	.75	.80
764	Eastland	.71	.73
765	Temple	.74	.76
766-767	Waco	.75	.81
768	Brownwood	.68	.74
769	San Angelo	.71	.75
770-772	Houston	.86	.92
773	Huntsville	.68	.73
774	Wharton	.69	.71
775	Galveston	.83	.88
776-777	Beaumont	.80	.85
778	Bryan	.73	.80
779	Victoria	.73	.77
780	Laredo	.72	.77
781-782	San Antonio	.80	.82
783-784	Corpus Christi	.74	.79
785	McAllen	.75	.79
786-787	Austin	.79	.81
788	Del Rio	.66	.71
789	Giddings	.68	.73
790-791	Amarillo	.76	.81
792	Childress	.74	.79
793-794	Lubbock	.74	.80
795-796	Abilene	.74	.79
797	Midland	.75	.79
798-799,885	El Paso	.73	.79
UTAH			
840-841	Salt Lake City	.81	.82
842-844	Ogden	.78	.81
845	Logan	.79	.80

Detailed Structural System Cost Estimate Hand Take-Offs



Recreation Center 1 of 4

Structural System Hand Take-Off

From Gridlines G-5/1-4

1) Caissons: (2) @ 48" dia, (2) @ 42" dia and (2) @ 30" dia. All 12' length

Concrete:

2 x 5.58 CYD
2 x 4.27 CYD
2 x 2.18 CYD

Total Concrete: 24.06 CYD - 3000psi

Reinf. Steel:

Vertical All 6: 8-#10

6 x 8 x 12' = 576 lft of #10

Ties: 2-#3 @ 18" => 8 ties ($\frac{12'}{1.5'}$)

(2) - 12.56' => (2)(8)(12.56) = 201'

(2) - 10.99' => (2)(8)(10.99) = 176'

(2) - 7.85' => (2)(8)(7.85') = 126'

503' of #3

So: #3: 0.376 lb/ft #10: 4.303 lb/ft

$\frac{503' \times 0.376\ lb/ft}{2000\ lb/ton} = 0.1\ Ton$

$\frac{576' \times 4.303\ lb/ft}{2000\ lb/Ton} = 1.24\ Ton$

=> 1.34 Ton of Rebar

284

2) Footings: (5) 2'x2'x2' FTGs

Concrete: $\frac{40}{27} = 1.48$ CYDs - 3000psi

Forming: 16 SFCA x 5 = 80 SFCA

Steel: 2-#7 T+B

5x(4)(2') = 40 lft of #7

#7: 2.044 lb/ft

$\frac{40 \times 2.044}{2000} = 0.04$ Ton

3) Grade Beam:

Total Length: 73.5'

Concrete: 2' x 1.1' x 73.5' = 161.7 CF

6 CYDs - 3000psi

Forming: 4' x 73.5' = 294 SFCA

Steel: 2-#7 T+B

4 x 73.5' = 294 ft of #7

#3 Stirrups @ 10" o.c. = 88 Stirrups

6.2' x 88 = 546' of #3

$\frac{0.376 \times 546 + 294 \times 2.044}{2000} = 0.403$ Tons

3 of 4

4) Slab-on Grade: Area = 27.25' x 46.25' = 1260 SF

Concrete: 1260 SF x 5/12 = 525/27 = 19.44 CYD -3000psi

Vapor Barrier: 1260 SF

5" Edge Form: 27.25'

Steel: #3 @ 14" o.c EW
↳ 1.17'

27.25/1.17 + 46.25/1.17 = 24 + 40 = 64 lft of #3

(0.376 * 64)/2000 = 0.01 Ton

Finishing: 1260 SF

5) Elevated Slab: 1260 SF

Concrete: 1260 x 3/12 = 11.67 CYD - 3500psi

9/16" Deck: 1260 SF

3" Pour Stop: 27.25 lf

Finishing: 1260 SF

Reinforcing: 1260 SF of 6x6 WWF

*Note: These are for entire bldg. (Rec Center) 4654

*6) Roof Deck: 319' x 181' = 57,739 SF x 1.033 = 59,645 SF (12:3)

7 1/4" Tectum E Roof Deck: 59,645 SF

*7) Wood Trusses: 68 LHSP @ 5' o.c

8) Steel:

Columns: (4) TS 10 x 10 x 3/8" - 27'
(1) TS 8 x 8 x 3/8" - 27'

Beams: (2) W 27 x 84 - 27.25'
(1) W 16 x 26 - 45.5'
(1) W 30 x 90 - 27.25'

Floor Joists: (11) 28LH12 - 45.5'

Detailed Structural System Estimate

Recreation Center: Gridlines G-J and 1/2 (2520 SF)

Item	Units	Quantity	Labor ($/unit)	Material ($/unit)	Equipment ($/unit)	Total ($/unit)	Labor	Material	Equipment	Total	RS Means
Caissons											
9' Bell diameter, 48" shaft	EA	5.00	$975.00	$450.00	$1,100.00	$1,430.00	$4,875.00	$2,250.00	$5,500.00	$12,625.00	Page 592
Footings											
Concrete - 3000 psi	CYD	1.48	$33.50	$101.00	$123.15	$257.65	$49.58	$149.48	$182.26	$381.32	Page 64, 65
Concrete Forming	SFCA	80.00	$2.93	$0.70	$124.15	$127.78	$234.40	$56.00	$9,932.00	$10,222.40	Page 46
Reinforcing Steel	TON	0.04	$680.00	$1,475.00	$125.15	$2,280.15	$27.20	$59.00	$5.01	$91.21	Page 59
Grade Beams											
Concrete - 3000 psi	CYD	6.00	$12.05	$101.00	$4.39	$117.44	$72.30	$606.00	$26.34	$704.64	Page 64, 65
Concrete Forming	SFCA	294.00	$2.93	$0.70	$0.00	$3.63	$861.42	$205.80	$0.00	$1,067.22	Page 46
Reinforcing Steel	TON	0.40	$890.00	$2,440.00	$0.00	$3,330.00	$358.67	$983.32	$0.00	$1,341.99	Page 58
Slab-On-Grade											
Concrete - 3000 psi	CYD	19.44	$16.70	$101.00	$6.10	$123.80	$324.65	$1,963.44	$118.58	$2,406.67	Page 64, 65
Concrete Finishing	SF	1260.00	$0.18	$0.00	$0.00	$0.18	$226.80	$0.00	$0.00	$226.80	Page 66
5" Concrete Edge Form	LF	27.25	$2.02	$0.38	$0.00	$2.40	$55.05	$10.36	$0.00	$65.40	Page 47
Vapor Barrier	SF	1260.00	$1.15	$1.20	$0.00	$2.35	$1,449.00	$1,512.00	$0.00	$2,961.00	Page 192
Reinforcing Steel	TON	0.01	$620.00	$1,475.00	$0.00	$2,095.00	$6.20	$14.75	$0.00	$20.95	Page 59
Elevated Slab											
Concrete - 3500 psi	CYD	11.67	$15.50	$104.00	$5.65	$125.15	$180.89	$1,213.68	$65.94	$1,460.50	Page 64
Concrete Finishing	CYD	1260.00	$0.18	$0.00	$0.00	$0.18	$226.80	$0.00	$0.00	$226.80	Page 66
3" Pour Stop	SF	6.81	$3.33	$1.47	$0.00	$4.80	$22.69	$10.01	$0.00	$32.70	Page 44
6 X 6 WWF Reinforcing	CSF	12.60	$24.50	$32.50	$0.00	$57.00	$308.70	$409.50	$0.00	$718.20	Page 60
9/16" Metal Decking	SF	1260.00	$0.36	$1.72	$0.03	$2.11	$453.60	$2,167.20	$37.80	$2,658.60	Page 124
Steel Columns											
TS 10x10x3/8"x16'	LF	6.75	$51.00	$1,625.00	$36.50	$1,712.50	$344.25	$10,968.75	$246.38	$11,559.38	Page 110
TS 8x8x3/8"x14'	LF	1.93	$49.00	$880.00	$35.00	$964.00	$94.50	$1,697.14	$67.50	$1,859.14	Page 110
Steel Beams											
W 27x84	LF	54.50	$2.96	$139.00	$1.58	$143.54	$161.32	$7,575.50	$86.11	$7,822.93	Page 114
W 16x26	LF	45.50	$2.44	$43.00	$1.74	$47.18	$111.02	$1,956.50	$79.17	$2,146.69	Page 114
W 30x90	LF	27.25	$2.94	$163.00	$1.56	$167.50	$80.12	$4,441.75	$42.51	$4,564.38	Page 114
Floor Joists											
28LH12	LF	500.50	$1.96	$28.00	$1.12	31.08	980.98	14,014.00	560.56	$15,555.54	Page 121
Total Structural System Cost*:										**$80,719.45**	
Total Cost/SF*:										**$32.03**	

Recreation Center Structural System (Except Roof Deck and Trusses)											
Structural System	SF	63300	$32.03							$2,027,499.00	NA
Roof Deck											
7 1/4" Tectum E Roof Deck	SF	59645.00	$3.50	$7.00	$0.00	$10.50	$208,757.50	$417,515.00	$0.00	$626,272.50	NA
Wood Trusses											
130' LHSP Wood Joist Trusses	EA	68	$500.00	$1,500.00	$500.00	$2,500.00	$34,000.00	$102,000.00	$34,000.00	$170,000.00	NA
Total Recreation Center Structural System Cost:										**$2,823,771.50**	

*Note: This cost does not include the Roof Deck and Wood Trusses

Natatorium (2520 SF)

Item	Units	Quantity	Labor ($/unit)	Material ($/unit)	Equipment ($/unit)	Total ($/unit)	Labor	Material	Equipment	Total	RS Means
Caissons											
9' Bell diameter, 48" shaft	EA	5.00	$975.00	$450.00	$1,100.00	$1,430.00	$4,875.00	$2,250.00	$5,500.00	$12,625.00	Page 592
Footings											
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Concrete Forming	SFCA	80.00	$2.93	$0.70	$124.15	$127.78	$234.40	$56.00	$9,932.00	$10,222.40	Page 46
Reinforcing Steel	TON	0.04	$680.00	$1,475.00	$125.15	$2,280.15	$27.20	$59.00	$5.01	$91.21	Page 59
Grade Beams											
Concrete - 3000 psi	CYD	6.00	$12.05	$101.00	$4.39	$117.44	$72.30	$606.00	$26.34	$704.64	Page 64, 65
Concrete Forming	SFCA	294.00	$2.93	$0.70	$0.00	$3.63	$861.42	$205.80	$0.00	$1,067.22	Page 46
Reinforcing Steel	TON	0.40	$890.00	$2,440.00	$0.00	$3,330.00	$358.67	$983.32	$0.00	$1,341.99	Page 58
Slab-On-Grade											
Concrete - 3000 psi	CYD	19.44	$16.70	$101.00	$6.10	$123.80	$324.65	$1,963.44	$118.58	$2,406.67	Page 64, 65
Concrete Finishing	SF	1260.00	$0.18	$0.00	$0.00	$0.18	$226.80	$0.00	$0.00	$226.80	Page 66
5" Concrete Edge Form	LF	27.25	$2.02	$0.38	$0.00	$2.40	$55.05	$10.36	$0.00	$65.40	Page 47
Vapor Barrier	SF	1260.00	$1.15	$1.20	$0.00	$2.35	$1,449.00	$1,512.00	$0.00	$2,961.00	Page 192
Reinforcing Steel	TON	0.01	$620.00	$1,475.00	$0.00	$2,095.00	$6.20	$14.75	$0.00	$20.95	Page 59
Total Structural System Cost*:										**$32,114.60**	
Total Cost/SF*:										**$12.74**	

Natatorium Structural Costs (Except Glulam Materials											
Structural System	SF	41817	$12.74							$532,911.20	NA
Glulam											
Glulam Framing	SF	41230.00	$7.34	$15.90	$0.00	$25.95	$302,485.00	$655,725.00	$0.00	$1,070,000.00	NA
Wood Deck	SF	41230.00		$2.71	$0.00			$111,790.00	$0.00		NA
Total Natatorium Structural System Cost:										**$1,602,911.20**	

*Note: This cost does not include Glulam Products

Total Structural Costs	
Natatorium Structural Cost	$1,602,911.20
Recreation Center Structural Cost	$2,823,771.50
Total Structural Cost	$4,427,368.67
Total Structural Cost/SF	**$42.12**

General Conditions Estimate

General Conditions Estimate

Item	Unit	Unit Cost	Quantity	Total Cost
General Contractor Personnel (RS Means Page 10)				
Admin/Secretary	MTH	$3,200.00	5	$2,555.00
Assistant Superintendant	MTH	$7,600.00	13	$98,800.00
Superintendant	MTH	$8,227.00	13	$106,951.00
Project Engineer	MTH	$7,145.00	13	$92,885.00
Project Manager	MTH	$8,346.00	6.5	$54,249.00
Senior Project Manager	MTH	$8,660.00	1.5	$12,990.00
Temporary Facilities (EMJ Corporation)				
Jobsite Office	MTH	$486.67	15	$7,300.00
Temporary Toilets	MTH	$513.33	15	$7,700.00
Barricades	MTH	$66.67	15	$1,000.00
Construction Signs	MTH	$60.00	15	$900.00
Dumpsters	MTH	$133.33	15	$2,000.00
Temporary Utilities (EMJ Corporation)				
Temporary Electric	MTH	$1,000.00	15	$15,000.00
Temporary Water	MTH	$46.67	15	$700.00
Temporary Telephone	MTH	$646.67	15	$9,700.00
Cleaning (EMJ Corporation)				
Misc. Clean-up	MTH	$233.33	15	$3,500.00
Site Clean-up	LS	$2,500.00	1	$2,500.00
Final Building Clean-up	LS	$37,000.00	1	$37,000.00
Miscellaneous (EMJ Corporation)				
Trash Removal	MTH	$966.67	15	$14,500.00
Blueprints	LS	$3,500.00	1	$3,500.00
Safety (Drug Testing, Equipment, etc.)	LS	$1,500.00	1	$1,500.00
Hand Tools	LS	$6,000.00	1	$6,000.00
Engineering and Layout	LS	$2,000.00	1	$2,000.00
Incidentals	LS	$4,000.00	1	$4,000.00
Insurance	% of Contract	$16,786,542.00	3%	$503,596.26
Bonds	% of Contract	$16,786,542.00	2%	$335,730.84
O&P	% of Contract	$16,786,542.00	4%	$671,461.68
Total				$1,998,018.78

Appendix 6 – Analysis #1 (Natatorium Structure) References

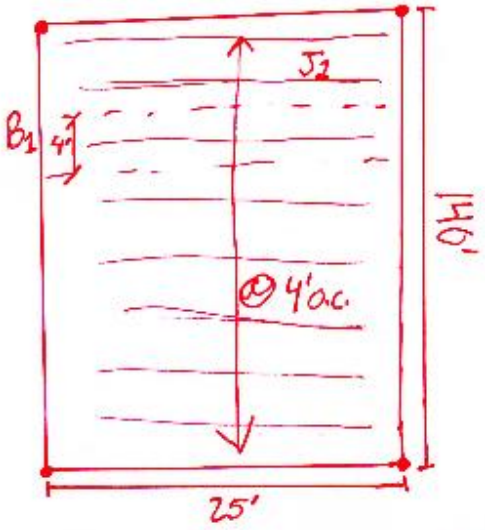
Natatorium Structural System Design Calculations

Natatorium Structural System Calcs

2003 IBC
- Roof: 20 lb/SF
- Dead: 20 lb/SF
- Wind: 120mph for 30 sec gust, exp. C, Imp. Factor of 1.15

Roof Slope = 3:12

Sample Box



J1 | 40 lb/SF x 4' = 160 lb/lf ⇒ Use a 14K1 which can support up to 180 lb/lf @ 25' spans
We will need 36 of these per bay = Total of 468

B1 | Treat joist loads as uniform loads
160 lb/lf x 25' = 4000 lb/4' = 1000 lb/lf ⇒ Use a 104SLH22 which supports 1034 lb/lf @ 141' spans (our span is only 140')
We will need a total of 14 of these.

Concrete Columns:

Axial Load:

$40 lb/SF \times 70' \times 25' = 70{,}000 \frac{lb}{column}$

This would use a 10"x10" square concrete column with 4-#5's.

We would need 28 of these columns

STANDARD ASD LOAD TABLE
OPEN WEB STEEL JOISTS, K-SERIES

Based on a 50 ksi Maximum Yield Strength
Adopted by the Steel Joist Institute November 4, 1985
Revised to November 10, 2003 - Effective March 01, 2005

The black figures in the following table give the TOTAL safe uniformly distributed load-carrying capacities, in pounds per linear foot, of **ASD K-Series** Steel Joists. The weight of DEAD loads, including the joists, must be deducted to determine the LIVE load-carrying capacities of the joists. Sloped parallel-chord joists shall use span as defined by the length along the slope.

The figures shown in **RED** in this load table are the nominal LIVE loads per linear foot of joist which will produce an approximate deflection of 1/360 of the span. LIVE loads which will produce a deflection of 1/240 of the span may be obtained by multiplying the figures in **RED** by 1.5. In no case shall the TOTAL load capacity of the joists be exceeded.

The approximate joist weights per linear foot shown in these tables do not include accessories.

The approximate moment of inertia of the joist, in inches^4 is:

$I = 26.767(W_{LL})(L^2)(10^{-3})$, where W_{LL} = **RED** figure in the Load Table and L = (Span - 0.33) in feet.

For the proper handling of concentrated and/or varying loads, see Section 6.1 in the Code of Standard Practice for Steel Joists and Joist Girders.

Where the joist span exceeds the unshaded area of the Load Table, the row of bridging nearest the mid span shall be diagonal bridging with bolted connections at the chords and intersections.

ASD

STANDARD LOAD TABLE FOR OPEN WEB STEEL JOISTS, K-SERIES
Based on a 50 ksi Maximum Yield Strength - Loads Shown in Pounds per Linear Foot (plf)

Joist Designation	8K1	10K1	12K1	12K3	12K5	14K1	14K3	14K4	14K5	16K3	16K5	16K4	16K6	16K5	18K7	18K6
Depth (in.)	8	10	12	12	12	14	14	14	14	16	16	16	16	16	18	18
Approx. Wt. (lbs./ft.)	5.1	5.0	5.0	5.7	7.1	5.5	6.0	6.7	7.7	5.5	6.3	7.0	7.5	8.1	8.6	10.0
Span (ft.)																
7	550															
8	550															
9	550															
10	550	550														
11	538	550														
12	444	550	550	550	550											
13	377	479	550	550	550											
14	324	412	550	550	550	550	550	550	550							
15	281	358	550	543	550	611	550	550	550							
16	246	313	549	476	550	448	550	550	550	550	550	550	550	550	550	550
17		277	486	420	550	396	495	550	550	512	550	550	550	550	550	550
18		248	434	374	537	352	441	550	550	456	550	550	550	550	550	550
19		221	388	335	481	316	395	475	550	408	495	547	550	550	550	550
20		199	349	302	433	284	355	428	535	368	446	493	550	550	550	550
21			316	273	392	257	322	385	478	333	404	447	508	548	550	550
22			288	249	357	234	293	350	432	303	367	406	461	498	550	550
23			263	227	326	214	268	320	394	277	335	371	421	455	507	550
24			241	208	298	196	245	293	361	254	307	340	386	417	465	503
25			221	191	274	180	225	270	332	234	283	313	356	384	429	464
26						166	208	248	306	216	261	289	328	355	396	429
27						154	193	230	284	200	242	268	304	329	367	398
28						143	179	214	263	186	225	249	283	306	342	371
29										173	210	232	263	285	318	345
30										161	196	216	245	266	297	322
31										151	183	203	230	249	277	302
32										142	172	190	216	234	261	283

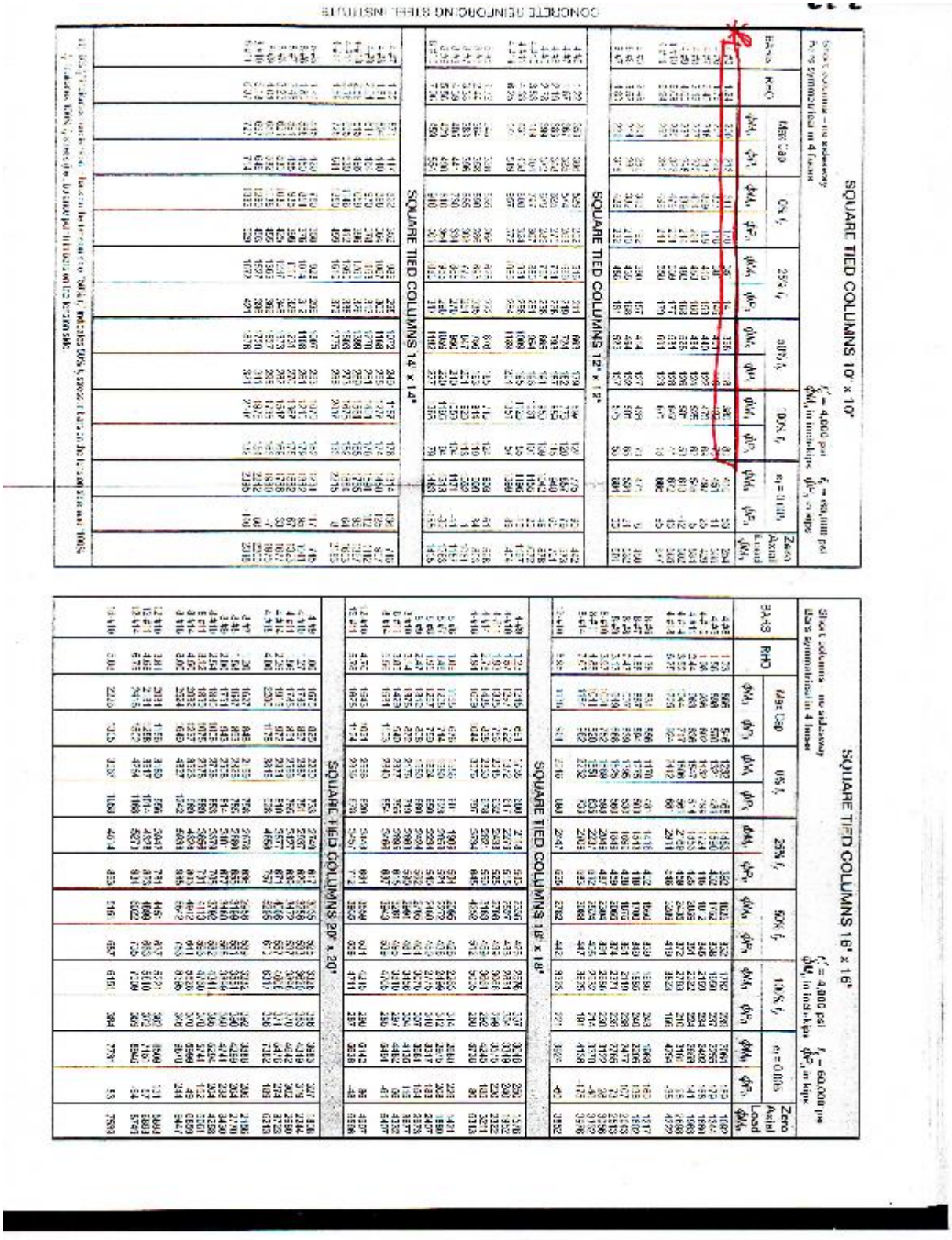
VULCRAFT LOAD TABLE
SUPER LONGSPAN STEEL JOISTS, SLH-SERIES

Based on a 50 ksi Maximum Yield Strength

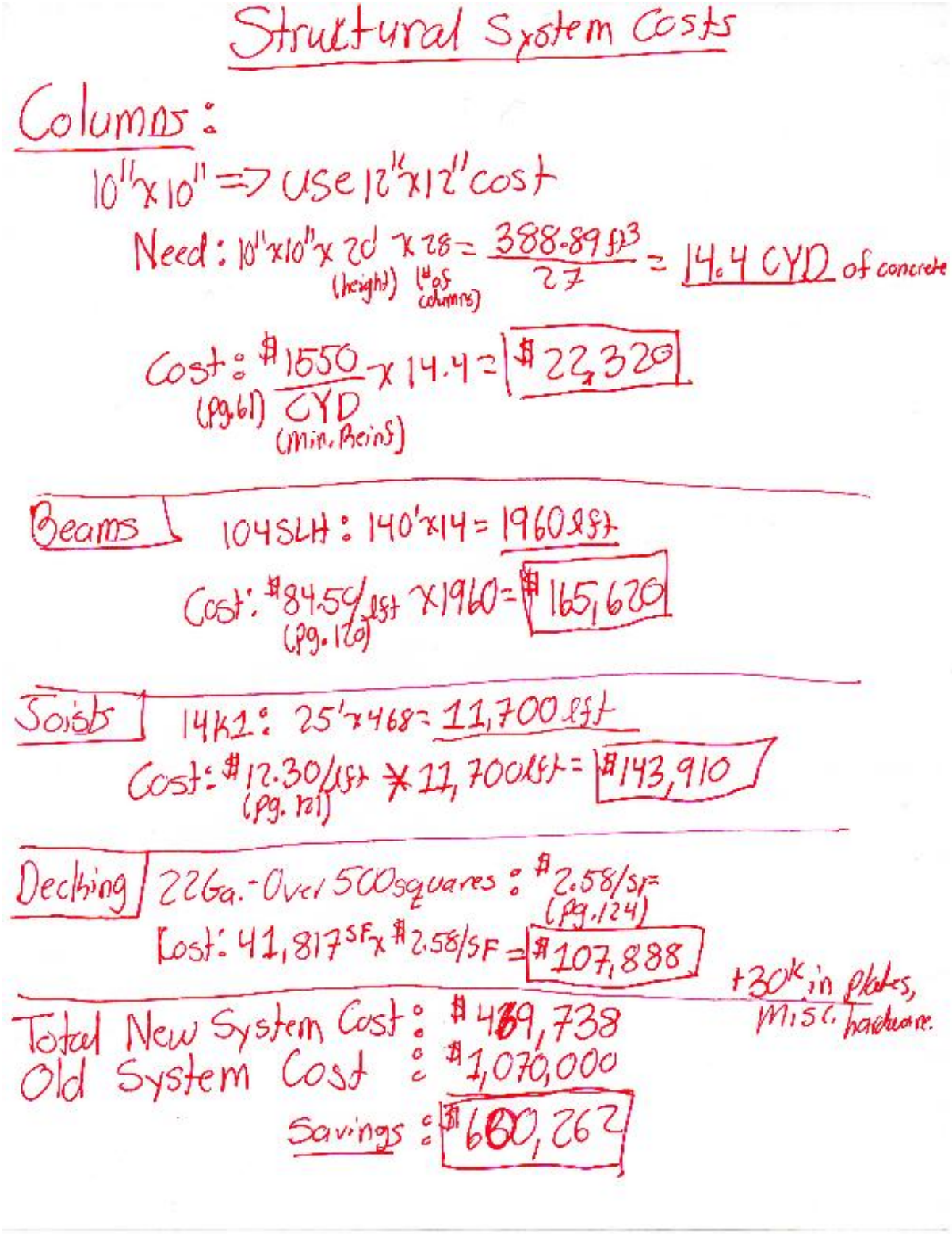
ASD

Joist Designation	Approx. Wt. In Lbs. per Linear Ft. (Joists Only)	Depth In Inches	Safe Load* In Lbs. Between	CLEAR SPAN IN FEET**															
			96-128	129	132	135	138	141	144	147	150	155	160	165	170	175	180	185	190
96SLH17	52	96	70,000	540	517	495	474	456	438	421	405	380	357	335	316	298	281	266	252
				389	363	339	318	298	280	263	247	224	204	186	170	156	143	132	122
96SLH18	59	96	78,800	606	583	559	535	518	493	475	457	430	406	381	360	340	322	305	289
				443	413	385	362	340	319	300	282	256	232	212	194	178	163	150	139
96SLH19	66	96	94,200	727	697	667	639	611	585	561	539	505	474	445	419	396	373	353	334
				502	469	438	410	385	361	340	320	290	264	241	220	202	186	171	158
96SLH20	74	96	106,000	824	789	754	722	691	662	635	610	571	536	504	475	446	423	400	378
				569	531	495	465	436	409	385	362	329	299	272	249	229	210	193	178
96SLH21	90	96	133,000	1027	882	943	900	664	829	797	786	719	675	635	598	564	533	504	477
				696	652	613	571	535	503	473	445	404	367	335	306	281	258	238	220
96SLH22	122	96	149,000	1150	1108	1067	1029	991	957	921	888	832	782	736	694	656	620	587	556
				811	757	708	663	622	584	549	517	469	426	389	355	326	300	276	255
			104-137	138	141	144	147	150	155	160	165	170	175	180	185	190	195	200	205
104SLH18	59	104	76,800	664	532	512	499	472	444	416	398	374	354	335	318	302	287	273	260
				426	400	375	353	332	301	274	250	229	209	192	177	164	152	140	130
104SLH19	67	104	93,400	674	647	622	599	574	538	507	479	452	427	404	383	364	346	325	312
				484	453	425	401	377	342	311	284	260	238	218	201	186	172	160	148
104SLH20	75	104	105,000	764	739	714	688	661	621	583	548	516	487	460	435	413	391	371	353
				546	513	483	453	427	387	352	321	293	269	247	228	210	195	181	167
104SLH21	90	104	132,000	956	917	881	847	613	763	718	677	539	604	571	541	514	488	464	441
				678	[illegible]	593	558	525	476	433	395	361	331	301	280	259	240	222	206
104SLH22	124	104	148,000	1073	1034	999	956	984	883	830	793	738	698	660	626	594	564	536	511
				783	734	689	648	610	553	503	459	420	385	353	326	301	278	258	240
104SLH23	109	104	163,000	1181	1141	1096	1052	1009	945	887	834	785	741	700	662	626	595	565	537
				819	768	721	679	638	578	526	480	439	403	370	341	315	291	270	250
			112-146	147	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
112LSH19	67	112	91,900	623	600	564	530	500	472	446	424	402	382	362	345	329	314	300	286
				466	439	398	362	330	302	276	255	234	216	200	186	172	160	149	140
112SLH20	78	112	104,000	710	688	649	610	575	543	514	488	463	440	417	398	379	361	345	330
				526	497	453	410	374	342	313	288	266	246	227	210	195	181	169	156
112SLH21	91	112	131,000	891	858	805	757	713	673	637	603	572	543	516	491	468	446	426	407
				650	612	555	504	460	421	386	355	327	301	279	259	240	224	208	195
112SLH22	104	112	147,000	999	967	918	871	824	778	736	697	661	628	596	568	541	516	492	470
				756	711	644	586	535	489	449	412	380	350	324	301	279	260	242	226
112SLH23	110	112	162,000	1102	1067	1012	959	901	848	800	756	716	679	644	612	582	554	528	504
				790	744	674	613	560	512	469	431	397	367	340	316	292	272	253	236
112SLH24	131	112	192,000	1304	1263	1199	1139	1074	1014	959	909	862	819	778	741	706	673	642	613
				957	901	817	743	678	620	569	523	481	444	411	381	354	329	307	287
			102-164	165	170	175	180	185	190	195	200	205	210	215	220	230	235	240	
120SLH20	77	120	96,000	597	564	532	505	479	456	434	414	395	376	359	344	329	315	302	290
				430	393	361	332	306	282	261	242	225	209	195	182	170	159	149	140
120SLH21	92	120	123,000	748	706	667	632	599	570	542	516	492	469	449	426	410	392	376	360
				530	485	444	409	376	347	321	298	277	259	243	224	209	196	184	173
120SLH22	104	120	141,000	855	815	770	729	692	658	626	596	568	542	517	495	473	453	434	416
				618	564	516	475	438	404	374	347	322	300	279	261	244	228	214	201
120SLH23	111	120	158,000	943	896	848	804	763	725	690	657	626	596	569	545	519	496	475	456
				644	590	541	497	458	423	391	363	338	313	292	272	255	238	224	210
120SLH24	132	120	185,000	1117	1062	1003	950	902	858	816	777	741	706	675	645	617	591	566	543
				781	715	655	603	555	512	474	440	406	380	351	330	309	289	271	255
120SLH25	152	120	212,000	1281	1218	1152	1092	1036	984	936	891	850	811	775	741	700	678	650	623
				915	837	768	706	650	600	555	515	478	445	415	387	362	339	318	298

NUCOR VULCRAFT GROUP



Natatorium Structural System Costs



03 23 Stressing Tendons

03 23 05 – Prestressing Tendons

03 23 05.50 Prestressing Steel			Crew	Daily Output	Labor-Hours	Unit	Material	Labor (2009 Bare Costs)	Equipment (2009 Bare Costs)	Total (2009 Bare Costs)	Total Incl O&P
1050	42 kip	G	C-3	4200	.015	Lb.	1.12	.62	.02	1.76	2.08
1200	Ungrouted strand, 50' span, 100 kip	G	C-4	1275	.025		.67	1.13	.02	1.77	2.59
1250	300 kip	G		1475	.022		.52	.98	.02	1.52	2.20
1400	100' span, 100 kip	G		1500	.021		.57	.96	.02	1.60	2.27
1450	300 kip	G		1650	.019		.62	.87	.02	1.51	2.13
1600	200' span, 100 kip	G		1500	.021		.62	.96	.02	1.60	2.27
1650	300 kip	G		1700	.019		.62	.85	.02	1.49	2.08
1800	Ungrouted bars, 50' span, 42 kip	G		1400	.023		.78	1.03	.03	1.85	2.55
1850	143 kip	G		1700	.019		.72	.85	.02	1.59	2.20
2000	75' span, 42 kip	G		1800	.018		.78	.80	.02	1.60	2.16
2050	143 kip	G		2200	.015		.78	.65	.02	1.45	1.93
2220	Ungrouted single strand, 100' slab, 25 kip	G		1200	.027		.67	1.20	.02	1.54	2.67
2250	35 kip	G	↓	1475	.022	↓	.62	.98	.02	1.62	2.30

03 24 Fibrous Reinforcing

03 24 05 – Reinforcing Fibers

03 24 05.30 Synthetic Fibers			Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**SYNTHETIC FIBERS**										
0100	Synthetic fibers, add to concrete					Lb.	4.40			4.40	4.84
0110	1-1/2 lb. per C.Y.					C.Y.	6.85			6.85	7.55

03 24 05.70 Steel Fibers			Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**STEEL FIBERS**										
0150	Steel fibers, add to concrete	G				Lb.	.70			.70	.77
0155	25 lb. per C.Y.	G				C.Y.	17.50			17.50	19.25
0160	50 lb. per C.Y.	G					35			35	38.50
0170	75 lb. per C.Y.	G					54			54	59.50
0180	100 lb. per C.Y.	G				↓	70			70	77

03 30 Cast-In-Place Concrete

03 30 53 – Miscellaneous Cast-In-Place Concrete

03 30 53.40 Concrete In Place			Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**CONCRETE IN PLACE**										
0020	Including forms (4 uses), reinforcing steel, concrete, placement,										
0050	and finishing unless otherwise indicated	R033105-[illegible]									
0300	Beams, 5 kip per L.F., 10' span		C-14A	15.62	12.804	C.Y.	400	515	49	964	1,300
0350	25' span			18.55	10.782		430	430	41	901	1,200
0500	Chimney foundations, industrial, minimum		C-14C	32.22	3.476		155	133	.80	288.80	390
0510	Maximum			23.71	4.724		202	181	1.09	385.09	505
0700	Columns, square, 12" x 12", minimum reinforcing		C-14A	11.96	16.722		400	670	64	1,134	1,550
0720	Average reinforcing	R033105-[illegible]		10.13	19.743		720	790	75.50	1,585.50	2,100
0740	Maximum reinforcing			9.03	22.148		1,150	890	84.50	2,124.50	2,750
0800	16" x 16", minimum reinforcing			16.22	12.330		315	495	47	857	1,175
0820	Average reinforcing			12.57	15.911		625	640	61	1,326	1,750
0840	Maximum reinforcing			10.35	19.312		1,025	780	74.50	1,879.50	2,450
0900	24" x 24", minimum reinforcing			28.66	6.978		375	249	23.50	647.50	865
0920	Average reinforcing			17.72	11.287		570	455	43	1,068	1,375
0940	Maximum reinforcing			14.15	14.134		765	565	54	1,384	1,800
1000	36" x 36", minimum reinforcing			33.69	5.936		249	238	22.50	509.50	670
1020	Average reinforcing			23.32	8.576		505	345	33	883	1,125

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05 21 Steel Joist Framing

05 21 16 – Longspan Steel Joist Framing

05 21 16.50 Longspan Joists			Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
							2005 Bare Costs				
2320	28LH06, 16 Lb/LF	G	E-7	1800	.044	L.F.	15.05	1.96	1.12	21.13	24.50
2340	28LH11, 25 Lb/LF	G		1800	.044		25	1.96	1.12	31.08	35.50
2360	32LH08, 17 Lb/LF	G		1800	.044		15.20	1.96	1.12	22.28	25.50
2380	32LH13, 30 Lb/LF	G		1800	.044		34	1.96	1.12	37.08	42
2400	36LH09, 21 Lb/LF	G		1800	.044		25.50	1.96	1.12	36.58	30.50
2420	36LH14, 36 Lb/LF	G		1800	.044		40.30	1.96	1.12	43.58	49
2440	40LH10, 21 Lb/LF	G		2200	.036		23.50	1.60	.91	26.01	30
2460	40LH16, 36 Lb/LF	G		2200	.036		40.50	1.60	.91	43.01	48.50
2480	44LH11, 22 Lb/LF	G		2200	.036		25	1.60	.91	27.51	31.50
2500	44LH16, 42 Lb/LF	G		2200	.036		47.50	1.60	.91	50.01	56
2520	48LH11, 22 Lb/LF	G		2200	.036		25	1.60	.91	27.51	31.50
2540	48LH16, 42 Lb/LF	G		2200	.036		47.50	1.60	.91	50.01	56
2600	For less than 40-ton job lots										
2602	For 30 to 39 tons, add						10%				
2604	20 to 29 tons, add						20%				
2606	10 to 19 tons, add						30%				
2607	5 to 9 tons, add						50%	25%			
2608	1 to 4 tons, add						75%	50%			
2609	Less than 1 ton, add						100%	100%			
4010	For welded cross bridging, add							30%			

05 21 19 – Open Web Steel Joist Framing

05 21 19.10 Open Web Joists			Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**OPEN WEB JOISTS**										
0015	Made from recycled materials										
0020	K series, 40 ton lots, horiz. bridging, spans to 30', shop primer, minimum	G	E-7	15	5.333	Ton	1,525	235	134	2,194	2,250
0050	Average	G		12	6.667		2,050	294	167	2,511	2,950
0080	Maximum	G		9	8.889		2,450	390	223	3,063	3,625
0410	8K1, 5.1 Lb/LF	G		1200	.067	L.F.	5.20	2.94	1.67	9.81	12.55
0440	10K1, 5.0 Lb/LF	G		1200	.067		5.10	2.94	1.67	9.71	12.35
0460	12K3, 5.7 Lb/LF	G		1500	.053		5.80	2.35	1.34	9.49	11.55
0480	14K3, 6.0 Lb/LF	G		1500	.053		6.10	2.35	1.34	9.79	12.30
0500	16K3, 6.3 Lb/LF	G		1800	.044		6.40	1.96	1.12	9.48	11.5[illegible]
0520	16K6, 8.1 Lb/LF	G		1800	.044		8.25	1.96	1.12	11.33	13.70
0540	18K5, 7.7 Lb/LF	G		2000	.040		7.85	1.76	1	10.61	12.85
0560	18K9, 10.2 Lb/LF	G		2000	.040		10.40	1.76	1	13.16	15.60
0600	Span 30' to 50', minimum	G		17	4.706	Ton	1,775	208	118	2,101	2,450
0640	Average	G		17	4.706		2,000	208	118	2,326	2,700
0680	Maximum	G		10	8		2,725	355	201	3,281	3,150
0700	20K5, 8.2 Lb/LF	G		2000	.040	L.F.	8.20	1.76	1	10.96	13.15
0720	20K9, 10.8 Lb/LF	G		2000	.040		10.85	1.76	1	13.56	15.65
0740	22K5, 8.8 Lb/LF	G		2000	.040		8.80	1.76	1	11.56	13.85
0760	22K9, 11.3 Lb/LF	G		2000	.040		11.30	1.76	1	14.06	16.60
0780	24K6, 9.7 Lb/LF	G		2200	.036		9.70	1.60	.91	12.21	14.45
0800	24K10, 13.1 Lb/LF	G		2200	.036		13.10	1.60	.91	15.61	18.20
0820	26K6, 10.6 Lb/LF	G		2200	.036		10.60	1.60	.91	13.11	15.45
0840	26K10, 13.8 Lb/LF	G		2200	.036		13.80	1.60	.91	16.31	19
0860	28K8, 12.7 Lb/LF	G		2400	.033		12.70	1.47	.84	15.01	17.40
0880	28K12, 17.1 Lb/LF	G		2400	.033		17.10	1.47	.84	19.41	22.50
0900	30K8, 13.2 Lb/LF	G		2400	.033		13.20	1.47	.84	15.51	17.95
0920	30K12, 17.6 Lb/LF	G		2400	.033		17.60	1.47	.84	19.91	23
1500	For less than 40-ton job lots										
1502	For 30 to 39 tons, add						10%				

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05 21 Steel Joist Framing

05 21 13 – Deep Longspan Steel Joist Framing

05 21 13.50 Deep Longspan Joists			Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
3280	60DLH17, 29 lb/LF	G	E-7	2000	.040	L.F.	35	1.75	1	37.75	42.50
3300	60DLH17, 57 lb/LF	G		2000	.040		62.50	1.75	1	65.25	72.50
3320	64DLH12, 31 lb/LF	G		2200	.036		37	1.60	.91	39.51	45
3340	64DLH17, 57 lb/LF	G		2200	.036		62.50	1.60	.91	65.01	72.50
3360	68DLH13, 37 lb/LF	G		2200	.036		44.50	1.60	.91	47.01	53
3380	68DLH18, 61 lb/LF	G		2200	.036		73.50	1.60	.91	76.01	84.50
3400	72DLH14, 41 lb/LF	G		2200	.036		49.50	1.60	.91	52.01	58
3420	72DLH19, 70 lb/LF	G		2200	.036		84	1.60	.91	86.51	95.50
3500	For less than 40-ton job lots										
3502	For 30 to 39 tons, add						10%				
3504	20 to 29 tons, add						20%				
3506	10 to 19 tons, add						30%				
3507	5 to 9 tons, add						50%	25%			
3508	1 to 4 tons, add						75%	50%			
3509	Less than 1 ton, add						100%	100%			
4010	SLH series, 40-ton job lots, bolted cross bridging, shop primer										
4020	Spans to 200' (shipped in 3 pieces), minimum	G	E-7	16	5	Ton	2,200	221	126	2,547	2,950
4040	Average	G		13	6.154		2,475	271	155	2,901	3,375
4060	Maximum	G		11	7.273		2,950	320	183	3,453	3,975
4200	80SLH15, 40 lb/LF	G		1500	.053	L.F.	49.50	2.33	1.34	53.17	60
4220	80SLH20, 75 lb/LF	G		1500	.053		92.50	2.33	1.34	96.17	108
4240	88SLH16, 46 lb/LF	G		1500	.053		57	2.33	1.34	60.67	68
4260	88SLH21, 89 lb/LF	G		1500	.053		110	2.33	1.34	113.67	127
4280	96SLH17, 52 lb/LF	G		1500	.053		64	2.33	1.34	67.67	76
4300	96SLH22, 102 lb/LF	G		1500	.053		126	2.33	1.34	129.67	145
4320	104SLH18, 59 lb/LF	G		1800	.044		73	1.96	1.12	76.08	84.50
4340	104SLH23, 109 lb/LF	G		1800	.044		135	1.96	1.12	138.08	153
4360	112SLH19, 67 lb/LF	G		1800	.044		82.50	1.96	1.12	85.58	95.50
4380	112SLH24, 131 lb/LF	G		1800	.044		162	1.96	1.12	165.08	183
4400	120SLH20, 77 lb/LF	G		1800	.044		95	1.96	1.12	98.08	110
4420	120SLH25, 152 lb/LF	G		1800	.044		188	1.96	1.12	191.08	211
6000	For less than 40-ton job lots										
6002	For 30 to 39 tons, add						10%				
6004	20 to 29 tons, add						20%				
6006	10 to 19 tons, add						30%				
6007	5 to 9 tons, add						50%	25%			
6008	1 to 4 tons, add						75%	50%			
6009	Less than 1 ton, add						100%	100%			

05 21 16 – Longspan Steel Joist Framing

05 21 16.50 Longspan Joists			Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**LONGSPAN JOISTS**										
0020	LH series, 40-ton job lots, bolted cross bridging, shop primer										
0015	Made from recycled materials										
2000	Spans to 96', minimum	G	E-7	16	5	Ton	2,050	221	126	2,397	2,825
2040	Average	G		13	6.154		2,250	271	155	2,676	3,125
2050	Maximum	G		11	7.273		2,675	320	183	3,178	3,675
2200	18LH04, 12 lb/LF	G		1400	.057	L.F.	15.55	2.52	1.44	19.51	23
2220	18LH05, 15 lb/LF	G		1400	.057		21.50	2.52	1.44	25.46	29.50
2240	20LH04, 12 lb/LF	G		1400	.057		15.55	2.52	1.44	19.51	23
2260	20LH05, 15 lb/LF	G		1400	.057		21.50	2.52	1.44	25.46	29.50
2280	24LH05, 13 lb/LF	G		1400	.057		16.60	2.52	1.44	20.56	24
2300	24LH06, 23 lb/LF	G		1400	.057		25	2.52	1.44	28.96	33.50

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05 31 Steel Decking

05 31 23 – Steel Roof Decking

CW

05 31 23.50 Roof Decking			Crew	Daily Output	Labor Hours	Unit	Material	Labor (2009 Bare Costs)	Equipment (2009 Bare Costs)	Total (2009 Bare Costs)	Total Incl O&P
2500	50-500 squares	G	E-4	4900	.007	S.F.	[illegible]	.30	.03	2.33	2.75
2600	Over 500 squares	G		5100	.006		1.85	.25	.03	[illegible]	[illegible]
2650	20 gauge, under 50 squares	G		3865	.008		2.05	.37	.03	2.45	[illegible]
2680	50-500 squares	G		4170	.008		2.42	.35	.03	2.80	3.27
2700	Over 500 squares	G		4400	.007		2.18	.34	.03	2.55	3.00
2900	18 gauge, under 50 squares	G		3800	.008		3.51	.38	.04	3.93	5.05
2950	50-500 squares	G		4100	.008		3.13	.35	.03	3.51	4.11
3000	Over 500 squares	G		4300	.007		2.82	.34	.03	3.19	3.73
3050	16 gauge, under 50 squares	G		3600	.009		5.25	.39	.04	5.68	6.53
3080	50-500 squares	G		4000	.008		4.21	.36	.03	4.60	5.30
3100	Over 500 squares	G		4200	.008		3.79	.34	.03	4.16	4.82
3150	For intermediate rib instead of wide rib, deduct	G					.04			.04	.05
3160	For narrow rib instead of wide rib, add	G					.79			.79	.87

05 31 33 – Steel Form Decking

05 31 33.50 Form Decking			Crew	Daily Output	Labor Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**FORM DECKING**										
0015	Made from recycled materials										
6100	Slab form, steel, 28 gauge, 9/16" deep, uncoated	G	E-4	4000	.008	S.F.	1.72	.36	.03	2.11	2.57
6200	Galvanized	G		4000	.008		1.57	.36	.03	1.97	2.35
6220	24 gauge, 1" deep, uncoated	G		3900	.008		1.87	.37	.03	2.27	2.76
6240	Galvanized	G		3900	.008		2.20	.37	.03	2.60	3.12
6300	24 gauge, 1-5/16" deep, uncoated	G		3800	.008		1.95	.38	.04	2.41	2.9[illegible]
6400	Galvanized	G		3800	.008		2.34	.38	.04	2.76	3.29
6500	22 gauge, 1-5/16" deep, uncoated	G		3700	.009		2.50	.39	.04	2.93	3.43
6600	Galvanized	G		3700	.009		2.55	.39	.04	2.98	3.55
6700	22 gauge, 2" deep uncoated	G		3600	.009		3.28	.40	.04	3.72	4.32
6800	Galvanized	G		3600	.009		3.22	.40	.04	3.66	4.30
7000	Sheet metal edge closure form, 12" wide with 2 bends, galv.										
7100	18 gauge	G	E-14	360	.022	L.F.	5.30	1.04	.37	6.71	8.10
7200	16 gauge	G		360	.022		7.20	1.04	.37	8.61	10.15

05 35 Raceway Decking Assemblies

05 35 13 – Steel Cellular Decking

05 35 13.50 Cellular Decking			Crew	Daily Output	Labor Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**CELLULAR DECKING**										
0015	Made from recycled materials										
0200	Cellular units, galv, 2" deep, 20-20 gauge, over 15 squares	G	E-4	1460	.022	S.F.	10.20	.99	.09	11.28	13.10
0250	18-20 gauge	G		1420	.023		11.60	1.02	.09	12.71	14.70
0300	18-18 gauge	G		1390	.023		11.95	1.04	.10	13.09	15.10
0320	16-18 gauge	G		1360	.024		14.20	1.06	.10	15.36	17.50
0340	16-16 gauge	G		1330	.024		15.85	1.09	.10	17.04	19.45
0400	3" deep, galvanized, 20-20 gauge	G		1375	.023		11.25	1.05	.10	12.40	14.35
0500	18-20 gauge	G		1350	.024		13.50	1.07	.10	14.77	16.90
0600	18-18 gauge	G		1290	.025		13.55	1.12	.10	14.77	17.05
0700	16-18 gauge	G		1230	.026		15.25	1.18	.11	16.54	18.95
0800	16-16 gauge	G		1150	.028		16.65	1.26	.12	18.03	20.50
1000	4-1/2" deep, galvanized, 20-18 gauge	G		1100	.029		15.70	1.31	.12	17.13	19.70
1100	18-18 gauge	G		1040	.031		15.60	1.39	.13	17.12	19.65
1200	16-18 gauge	G		980	.033		17.55	1.48	.14	19.17	22
1300	16-16 gauge	G		935	.034		19.15	1.55	.14	20.84	24

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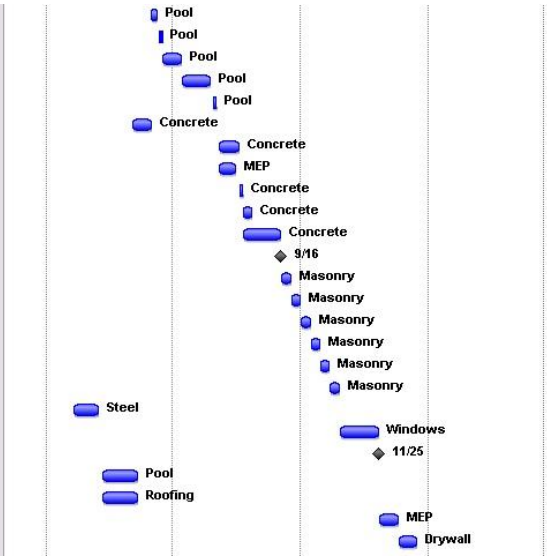
Modified Schedule – Without Glulam in Natatorium

	Natatorium - Pool Floor Steel Placement	5 days	Mon 6/15/09	Fri 6/19/09	114	Pool
	Natatorium - Pool Floor Concrete Placement	1 day?	Mon 6/22/09	Mon 6/22/09	115	Pool
	Natatorium - Pool Walls Rough-In	10 days	Tue 6/23/09	Mon 7/6/09	116	Pool
	Natatorium - Pool Walls Steel Placement	15 days	Tue 7/7/09	Mon 7/27/09	117	Pool
	Natatorium - Pool Walls Concrete Placement	2 days	Thu 7/30/09	Fri 7/31/09	118	Pool
	Natatorium - Drill Piers	10 days	Tue 6/2/09	Mon 6/15/09	15	Concrete
	Natatorium - Form and Reinforce Spread Footings	11 days	Mon 8/3/09	Mon 8/17/09	119	Concrete
	Natatorium - MEP Underground	10 days	Mon 8/3/09	Fri 8/14/09	119	MEP
	Natatorium - Pour Slab-On Grade	2 days	Tue 8/18/09	Wed 8/19/09	122,121	Concrete
	Natatorium - Form, Reinforce, and Pour Columns	5 days	Thu 8/20/09	Wed 8/26/09	123	Concrete
	Natatorium - Steel Erection	20 days	Thu 8/20/09	Wed 9/16/09	23,123	Concrete
	Natatorium - Top Out	0 days	Wed 9/16/09	Wed 9/16/09	125,124	All
	Natatorium - CMU North Wall	5 days	Thu 9/17/09	Wed 9/23/09	126	Masonry
	Natatorium - CMU East Wall	5 days	Thu 9/24/09	Wed 9/30/09	127	Masonry
	Natatorium - CMU South Wall	5 days	Thu 10/1/09	Wed 10/7/09	128	Masonry
	Natatorium - Face North Wall	5 days	Thu 10/8/09	Wed 10/14/09	129	Masonry
	Natatorium - Brick East Wall	5 days	Thu 10/15/09	Wed 10/21/09	130	Masonry
	Natatorium - Brick South Wall	5 days	Thu 10/22/09	Wed 10/28/09	131	Masonry
	Natatorium - Roof Decking	15 days	Mon 4/20/09	Fri 5/8/09		Steel
	Natatorium - Windows	20 days	Thu 10/29/09	Wed 11/25/09	132	Windows
	Natatorium - Dry-In	0 days	Wed 11/25/09	Wed 11/25/09	134	All
	Natatorium - Pool Gutter System	20 days	Mon 5/11/09	Fri 6/5/09	133	Pool
	Natatorium - Standing Seam Roofing System	20 days	Mon 5/11/09	Fri 6/5/09	133	Roofing
	Natatorium - Overhead Rough-in	10 days	Thu 11/26/09	Wed 12/9/09	135	MEP
	Natatorium - Interior Framing	10 days	Thu 12/10/09	Wed 12/23/09	138	Drywall



Appendix 7 – Analysis #2 (Mechanical System) References

Mechanical System Cost Calculations

Mechanical System Pricing

Cooling Tower:

Material: $30,171 (supplier's price)

Labor: $2650 (RS Means 2008, pg. 374)

Additional Pumps + Piping:

Labor + Material: $94.50/Ton x 276 Tons = $26,082 (RS Means 2008, pg. 374)

Chiller (WC):

Material: 276 Tons x $340/Ton = $93,840 (Supplier's Price)

Labor: $11,700 (RS Means 2008, pg. 373)

Add'l Structural Support For Cooling Towers:

Labor + Material: $15,557 (estimate from MEC)

Total Cost for New Design: $180,000

Previous Mechanical System Cost: $228,523 (from Mechanical Contractor)

Initial Savings of: $48,523

23 64 Packaged Water Chillers

23 64 26 – Rotary-Screw Water Chillers

23 64 26.10 Rotary-Screw Type Water Chillers		Crew	Daily Output	Labor-Hours	Unit	Material	2008 Bare Costs Labor	Equipment	Total	Total Incl O&P
0140	320 ton	Q-7	.12	275	Ea.	163,500	2,400		175,900	198,000
0200	Packaged unit, water cooled, not incl. tower									
0210	80 ton	Q-7	.14	223	Ea.	38,500	10,000		48,500	57,500
0220	100 ton		.14	230		45,200	10,300		55,500	65,000
0230	150 ton		.13	240		64,500	10,900		75,300	87,000
0240	200 ton		.13	251		72,500	11,300		83,800	97,000
0250	250 ton		.12	260		81,000	11,700		92,700	107,000
0260	300 ton		.12	266		95,000	12,000		107,000	122,500
0270	350 ton		.12	275		134,500	12,400		146,900	166,500
1450	Water cooled, tower not included									
1500	135 ton cooling, screw compressors	Q-7	.14	235	Ea.	55,000	10,600		65,600	76,500
1550	150 ton cooling, screw compressors		.13	240		63,500	10,800		74,300	86,000
1600	200 ton cooling, screw compressors		.13	250		84,500	11,200		95,700	110,500
1650	291 ton cooling, screw compressors		.12	260		91,500	11,700		103,200	118,500

23 64 33 – Direct Expansion Water Chillers

23 64 33.10 Direct Expansion Type Water Chillers		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**DIRECT EXPANSION TYPE WATER CHILLERS**, With [illegible] controls									
8000	Direct expansion, shell and tube type, for built up systems									
8020	1 ton	Q-5	2	8	Ea.	5,975	340		6,315	7,075
8030	5 ton		1.90	8.421		9,900	355		10,255	11,400
8040	10 ton		1.70	9.412		12,300	400		12,700	14,100
8050	20 ton		1.50	10.667		14,000	450		14,450	16,100
8060	30 ton		1	16		17,900	680		18,580	20,700
8070	50 ton		.90	17.778		28,700	755		29,455	32,700
8080	100 ton	Q-6	.90	26.667		51,000	1,175		52,175	58,000

23 65 Cooling Towers

23 65 13 – Forced-Draft Cooling Towers

23 65 13.10 Forced-Draft Type Cooling Towers		Crew	Daily Output	Labor-Hours	Unit	Material	Labor	Equipment	Total	Total Incl O&P
0010	**FORCED-DRAFT TYPE COOLING TOWERS**, Packaged units D3030-310									
0070	Galvanized steel									
0080	Induced draft, crossflow									
0100	Vertical, belt drive, 61 tons	Q-6	90	.267	TonAC	96	11.75		107.75	123
0150	100 ton		100	.240		76	10.55		86.55	99.50
0200	115 ton		109	.220		74	9.70		83.70	96
0250	131 ton		120	.200		65.50	8.80		74.30	85.50
0260	162 ton		132	.182		55	8		63	72.50
1000	For higher capacities, use multiples									
1500	Induced air, double flow									
1900	Vertical, gear drive, 167 ton	Q-6	126	.190	TonAC	102	8.40		110.40	125
2000	297 ton		129	.186		73	8.20		81.20	92.50
2100	582 ton		132	.182		60.50	8		68.50	78.50
2150	849 ton		142	.169		59.50	7.45		66.95	76.50
2200	1016 ton		150	.160		57	7.05		64.05	73
2500	Blow through, centrifugal type									
2510	50 ton	Q-6	2.28	10.526	Ea.	10,400	465		10,865	12,200
2520	75 ton		1.52	15.789		13,500	695		14,195	15,900
2524	100 ton		1.22	19.672		15,900	865		16,765	18,800
2528	125 ton	Q-7	1.31	24.427		19,600	1,100		20,700	23,300
2532	200 ton		.82	39.216		24,300	1,750		26,050	29,300

23 65 Cooling Towers

23 65 13 – Forced-Draft Cooling Towers

23 65 13.10 Forced-Draft Type Cooling Towers		Crew	Daily Output	Labor-Hours	Unit	Material	2008 Bare Costs Labor	Equipment	Total	Total Incl O&P
2536	250 ton	Q-7	.65	49.231	Ea.	29,000	2,200		31,200	35,300
2540	300 ton		.54	59.259		33,400	2,650		36,050	40,700
2544	350 ton		.47	68.085		37,700	3,050		40,750	46,100
2548	400 ton		.41	78.049		39,300	3,500		42,800	48,500
2552	450 ton		.36	88.154		47,300	3,950		51,250	58,000
2556	500 ton		.32	100		50,500	4,500		55,000	62,500
2560	550 ton		.30	107		54,500	4,825		59,325	67,000
2564	600 ton		.27	117		57,000	5,275		62,275	70,500
2568	650 ton		.25	127		63,500	5,725		69,225	78,000
2572	700 ton		.23	137		74,500	6,175		80,675	91,000
2576	750 ton		.22	145		79,500	6,600		86,100	97,500
2580	800 ton		.21	152		86,500	6,850		93,350	105,500
2584	850 ton		.20	159		91,500	7,050		98,550	111,500
2588	900 ton		.20	164		97,000	7,250		104,250	117,500
2592	950 ton		.19	170		102,500	7,650		110,150	124,000
2596	1000 ton		.18	180		105,500	8,125		113,625	128,000
2700	Axial fan, induced draft									
2710	50 ton	Q-6	2.28	10.526	Ea.	9,000	465		9,465	10,600
2720	75 ton		1.52	15.789		10,600	695		11,295	12,700
2724	100 ton		1.22	19.672		11,200	865		12,065	13,600
2728	125 ton	Q-7	1.31	24.427		13,800	1,100		14,900	16,900
2732	200 ton		.82	39.216		23,400	1,750		25,150	28,400
2736	250 ton		.65	49.231		24,400	2,200		26,600	30,300
2740	300 ton		.54	59.259		30,900	2,650		33,550	37,900
2744	350 ton		.47	68.085		33,000	3,050		36,050	40,900
2748	400 ton		.41	78.049		37,800	3,500		41,300	46,900
2752	450 ton		.36	88.154		42,000	3,950		45,950	52,000
2756	500 ton		.32	100		44,600	4,500		49,100	56,000
2760	550 ton		.30	107		49,800	4,825		54,625	62,500
2764	600 ton		.27	117		52,500	5,275		57,775	65,000
2768	650 ton		.25	127		57,500	5,725		63,225	71,500
2772	700 ton		.23	137		65,500	6,175		71,675	81,500
2776	750 ton		.22	145		68,000	6,600		74,600	84,500
2780	800 ton		.21	152		71,000	6,850		77,850	88,500
2784	850 ton		.20	159		71,500	7,050		78,550	89,000
2788	900 ton		.20	164		74,000	7,250		81,250	92,000
2792	950 ton		.19	170		78,000	7,650		85,650	97,000
2796	1000 ton		.18	180		82,500	8,125		90,625	102,500
3000	For higher capacities, use multiples									
3500	For pumps and piping, add	Q-6	38	.632	ton	48	28		76	94.50
4000	For absorption systems, add					75%	75%			
4100	Cooling water chemical feeder	Q-5	3	5.333	Ea.	292	226		518	665
5000	Fiberglass									
5010	Draw-thru									
5100	60 ton	Q-6	1.50	16	Ea.	3,450	705		4,155	4,850
5120	125 ton		.99	24.242		7,050	1,075		8,125	9,350
5140	300 ton		.43	55.814		16,500	2,450		18,950	21,800
5160	600 ton		.22	109		29,600	4,800		34,400	39,800
5180	1000 ton		.15	160		51,000	7,025		58,025	65,500
6000	Stainless steel									
6010	Induced draft, crossflow, horizontal, belt drive									
6100	57 ton	Q-6	1.50	16	Ea.	9,675	705		10,380	11,700
6120	91 ton		.99	24.242		13,900	1,075		14,975	16,900

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Water Cooled Chiller Spec Sheet

Southland - Houston Chiller Study
RTHD-1

General

Capacity:
276.00 tons

Efficiency:
0.667 kW/ton

NPLV:
0.549 kW/ton

Compressor configuration:
C2

IPLV:
0.512 kW/ton

Evaporator

Evap configuration:
D3

Evap leaving temp:
42.00 F

Evap flow rate:
470.90 gpm

Minimum evap flow rate:
324.00 gpm

Evap entering temp:
56.00 F

Number of evap passes:
3 Pass

Evap pressure drop:
5.50 ft H2O

Evap fouling factor:
0.00010 hr-sq ft-deg F/Btu

Evap fluid concentration:
0.00 %

Evap fluid freeze point:
32.00 F

Evap fluid type:
Water

Condenser

Cond configuration:
E3

Cond entering temp:
85.00 F

Cond flow rate:
792.80 gpm

Cond leaving temp:
95.00 F

Number of cond passes:
2 Pass

Cond pressure drop:
11.10 ft H2O

Cond fouling factor:
0.00025 hr-sq ft-deg F/Btu

Cond fluid concentration:
0.00 %

Cond tube type:
Enhanced Fin - Copper

Cond water side pressure:
150psi/10.5Bar Condenser Water Pressure

Cond fluid type:
Water

Electrical

Unit voltage:
460/60/3

Starter type:
Wye-delta

Unit power:
184.00 kW

Run load amps:
266.50 A

Min circuit ampacity:
333.10 A

Max overcurrent protection:
600.00 A

Starter expected inrush:
469.00 A

Motor locked rotor amps:
1453.00 A

Max RLA (for starter sizing):
364

Miscellaneous

Full load sound pressure (ARI Condition):
83 dBA

Refrigerant charge (HFC-134a):
490.0 lb

Oil cooler:
Without Oil Cooler

ARI certified selection:
Yes

Operating weight:
15044.0 lb

Shipping weight:
14002.0 lb

ARI certification:
ARI certified

Rated capacity (ARI):
307.30 tons

Distribution channel:
United States

Pressure vessel code:
ASME Pressure Vessel Code

Test

Performance test options:
No Performance Test

Factory tolerance test:
No performance test

Cooling Tower Spec Sheet

Chesapeake Systems

7400 Coca-Cola Drive
Hanover, MD 21076
Phone:-443-561-1600 Fax:-443-561-1601
Web Address: www.chesapeakesys.com

Offer of Sale

Reference No. 13643

To: Matt Smiddy
Attn:

Date: 2/19/2010

Business Fax:

Job Name: **Penn State Project**
Job Engineer:

Thank you for requesting a quotation on the following equipment:

Danfoss Variable Frequency Drive(s)
Evapco Cooling Tower(s)

We are pleased to submit our offer based on the conditions indicated.

[CT-1] Quantity (1) Evapco Cooling Tower(s), Model AT-19-99

276 Ton Induced Draft Counterflow Cooling Tower. CTI Certified to Cool 828 GPM of Water from 95 F to 85 F @ 77 F Entering Wet Bulb Temperature - Qty (1) 20 HP Fan (460/3/60)

Base Price Includes:

- "EVAPCOAT" G-235 Galvanized Construction (Casing & Panels & Basin)
- Stainless Steel Strainers
- PVC EVAPAK Fill & Drift Eliminators (Drift Rate Not To Exceed 0.001% of Recirculation Flow)
- "Sight Tight" PVC Air Inlet Louvers & Screen Design (Prevents Light From Entering the Basin)
- 100% Corrosion Free Water Distribution System
- Solid Backed/Multi-Grooved "Power Band" Belt Drive
- Pillow Block Bearings With a Minimum L-10 Life of 75,000 Hours
- Cast Aluminum Drive Sheaves
- External Motor/Belt Drive Adjustment
- Extended Lubrication Lines
- Internal Working Platform for Service of Water Distribution System and Fan/Motor Drive System
- EVAPCO Thermal Performance Guarantee
- CTI Certified
- IBC Compliant
- 5-Year Motor & Drive Parts Warranty

Note: Motors are Shipped Loose for Field Mounting by Others on 8.5'Wide Units
Note: Unless Noted Otherwise All Accessories Ship Loose for Field Installation

Energy Cost Calculations

Cooling Tower/Chiller Energy Cost

W-C Chiller: $0.667 \frac{kW}{Ton}$ (Supplier) $\times 276\ Ton = 184\ kW$

Cooling Tower: Assume COP of 4 $\Rightarrow \frac{kW}{Ton} = \frac{12}{COP \times 3.412} = \frac{12}{4 \times 3.412} = 0.879 \frac{kW}{Ton}$

$0.879 \frac{kW}{Ton} \times 276\ Ton = 243\ kW$

Total Energy Usage of New System: 427 kW

Total Energy Usage of Old System:

2 A-C Chillers @ $1.3 \frac{kW}{Ton}$ ea $= 2.6 \frac{kW}{Ton} \times 276\ Tons = 718\ kW$

Save: 291 kW

Energy Costs: ~10¢/kW·h in Houston, Tx

So each day, $291 \times 24 \times 0.1 =$ $698/Day Savings

Month: $20,707

Year: $248,488

Appendix 8 – Analysis #3 (Delivery Methods) References

Response from General Contractor's Survey

The purpose of this survey is to investigate the interaction of the Pearland Recreation Center and Natatorium project team. This survey has been designed to capture the general contractor's viewpoint.

1) If you were to redo the project, would you change the delivery method? If so, what would you change it to and why? If not, what were the advantages of the Design-Bid-Build delivery method chosen? ***A: The architect & I have spoken often that this should have been a CM @ Risk type contract. That is because of the difficult design features, there have been many small changes to the contract that would be easier to resole if the CM @ Risk method had been used. Typically the CMR anticipates these challenges and has allowances to care for that.***

2) How frequently did you interact with the designers? ***A: We meet a minimum of once a week with the architect, and he often visits the site once or twice more during the week to consult with the superintendents.***

3) How frequently did you interact with the owners? ***A: We meet every other week at a progress meeting.***

4) What was the most common method of communication with designers? ***A: Telephone conversations, with email a close second.***

5) What was the most common method of communication with the owners? ***A: Telephone.***

6) What are the *main* criteria that were used to select the subcontractors and suppliers? Would you modify any of these criteria if you were to do it over again? ***A: As a hard bid, the primary selection criteria were price, with ability to perform the project second. It is hard to modify this criterion when the project is a hard bid. Selection of a better qualified sub, but at a higher cost might make our bid higher, and thus we would not be the low bidder.***

7) What types of contracts were held between the subcontractors/suppliers and general contractor? ***A: I have attached a sample contract.***

8) What language would you add/remove/change in these contracts if you were to do it over again? ***A: We re content with our current contract.***

9) What language was specifically effective? ***A: We find the duration language, and that the days allowed for various work to run concurrent helps the superintendent to push the project.***

10) How frequently were Owner-Architect-Contractor meetings held? Was this frequency adequate? ***A: Meetings are held every other week. This is adequate.***

11) How often would the architect and/or owner representative visit the construction site? ***A: Owner at least once every other week, and sometimes once a week. The architect is on site a minimum of once a week, and the architect has a construction representative on site every day for at least ½ day.***

Response from Owner's Survey

The purpose of this survey is to investigate the interaction of the Pearland Recreation Center and Natatorium project team. This survey has been designed to capture the owner's viewpoint.

1) Why was the Design-Bid-Build delivery method chosen?
This is the typical Method chosen by the City for Complex projects such as this.

2) If you were to redo the project, would you change the delivery method? If so, why? If not, what were the advantages of the Design-Bid-Build delivery method chosen?
No, this method is the best. CMAR & DB would not have served the City well for this type of project. Simple big box stores and office buildings might lend themselves to other methods — see pg 2 #2

3) What *main* criteria were used to select the designer?
-- Familiarity with similar projects
-- Familiarity with key funding, Stakeholder & User
- Understanding of concept of project & working on municipal projects

4) What would you change in these criteria if you were to do it over again?
None

5) What *main* criteria were used to select the general contractor?
Competitive Sealed proposal criteria, as attached, from the Instructions to Bidders (pg 1-3)

6) What would you change in these criteria if you were to do it over again?
None.

7) Did the contract with the contractor and designer contain any specific language requiring interaction between the two parties? If so, what?
There is no contract btwn contractor & designer. The contract is with the owner & specified coordination with the owner on certain items, as well as with other agencies, see attached Sec 0800

8) What language would you add/remove/change in the contract if you were to do it over again? None.

9) How frequently were Owner-Architect-Contractor meetings held? Was this frequency adequate? Meeting once and Every 2 weeks, or more. Frequently if certain & situations required

10) How often would the architect and/or owner representative visit the construction site?
Owner's Rep is on site daily, as specified in the consultant contract (architect also provides construction management oversight.)

#2 The DBB method allows the designer & owner to review all aspects of the proposed facility before construction starts. The user group & stakeholders have more time to provide input at all stages of design.

13. Opening of Bid Proposals

Bid Proposals will be opened and (unless obviously non-responsive) read aloud publicly. An abstract of the amounts of the base Bid Proposals and major alternates (if any) will be made available to Bidders after the opening of Bid Proposals. Bid Proposals, in their entirety, shall be open for public inspection after the contract is awarded, with the exception of any trade secrets or confidential information contained therein, provided Bidder has expressly identified any specific information contained therein as being trade secrets or confidential information.

14. Bid Proposals to Remain Subject to Acceptance

All Bid Proposals will remain subject to acceptance for sixty (60) days after the day of the Bid Proposal opening, but Owner may, in its sole discretion, release any Bid Proposal and return the bid security prior to that date.

15. Award of Contract

15.1 Owner reserves the right to reject any and all Bid Proposals, to waive any and all informalities not involving price, time or changes in the Work and to negotiate contract terms with the Successful Bidder. Owner may reject a bid as non-responsive if: 1) Bidder fails to provide required Bid Security; 2) Bidder improperly or illegibly completes or fails to complete all information required by the Bidding Documents; 3) Bidder fails to sign the Bid Proposal or improperly signs the Bid Proposal; 4) Bidder qualifies its Bid Proposal; 5) Bidder tardily or otherwise improperly submits its Bid Proposal; 6) Bidder fails to submit the Qualifications of Bidder as required under section 3 of these Instructions to Bidders; or 7) Bid Proposal is otherwise non-responsive. In determining the best value for the Owner, and in determining to whom to award a contract, Owner may consider: 1) purchase price; 2) reputation of the Bidder and Bidder's goods or services; 3) quality of Bidder's goods or services; 4) extent to which the goods or services meet the Owner's needs; 5) Bidder's past relationship with the Owner; 6) impact on the ability of Owner to comply with laws and rules relating to contracting with historically underutilized businesses and nonprofit organizations employing persons with disabilities; 7) total long-term cost to Owner to acquire Bidder's goods or services; 8) the Qualifications of Bidder; and 9) any other relevant criteria specifically listed in the Bidding Documents. Discrepancies in the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

15.1.1 **For exact Selection Criteria, Refer to "Exhibit A", Sheet 00200-Exhibit A**

15.2 In evaluating Bid Proposals, Owner will consider the Qualifications of the Bidders, whether or not the Bid Proposals comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Proposal form or prior to the Notice of Award.

pg 2

Exhibit "A"

SELECTION CRITERIA

DETERMINATION OF SUCCESSFUL RESPONDENT AND AWARD OF CONTRACT

A. In determining the Selected Offeror, the Owner will evaluate the information derived from the Offeror's (Contractor's) Qualification Statement required herein, the information submitted on the Proposal Form, and other selection criteria including, but not be limited to the following:

	Criteria	Source	Scoring Procedure	Score	Factor	Total
1.	Base Proposal	Proposal Form	Contractor to submit their Competitive Sealed Proposals on the forms included in the Specification Manual, Alternates proposed and Mark-up for Changes. Low Price – 45 pts. For Subsequent Proposer's, the low Proposed price shall be divided by the Subsequent Proposer's price to get a percentage (factor) that is multiplied by the score to get the total.	45	1	45
2.	Contractor's Reputation	AIA 305	References in Houston Area are asked to rate the contractor. a. Reference responses from Project Owners and A/E's on similar projects. b. Reference questions on budget, schedule, reporting/ communications and responsiveness. c. Record of Claims Incidences and Litigation experiences over the past five years. d. Reputation of Change Orders. Responses are scored as follows: Excellent – 10 pts; Very Good – 8 pts; Average – 5 pts; Fair – 2 pts; Poor – 0 pts Points from multiple references are averaged	10	1	10
3.	Experience	AIA 305 (type and size)	Count number of similar projects in the Houston that fall within a +/- 25% range of the project budget. a. Past experience on projects of similar scope, scale, Complexity and type. b. References in the Houston area if contractor brings appropriate resources (personnel & equipment) to assure project completion by contract target end dates. Contractor earns one point for each project up to a maximum of 10 points.	10	1	10
4.	Maintenance of Schedule	References	References in Houston Area are asked whether or not the schedule was met on their project Responses are scored as follows: Completed ahead of schedule overcoming uncontrollable circumstances = 5 pts; Completed ahead of schedule = 4 pts Completed on schedule = 3 pts; Completed less than two weeks behind schedule = 1 pt; Completed more than two weeks behind schedule = 0 pts Points from multiple references are averaged	5	1	5

00200 – Exhibit A

pg 3

5.	*Project Team*	*Proposal Information* (resumes)	*Resumes for Project Manager and Superintendent* will each be examined and points given to the team for the following: Time in business (for each individual): 10+ yrs – 4 pts; 8-9 yrs – 3 pts; 5-7 yrs – 2 pts; 3-4 yrs – 1 pt, and less than 2 yrs = 0 pts. Number of similar projects completed (for each individual): 4— 4 pts; 3 – 3 pts; 2 – 2 pts; 1 – 1 pt; 0 – 0 pts. Time with the Company (for each individual) 5+ yrs – 5 pts; 4 yrs – 4 pts; 3 yrs – 3 pts; 2 yrs – 2 pts; 1 yr – 1 pt. and less than 1 yrs = 0 pts. Number of projects completed as a team: 5+ = 5 pts; 4 = 4 pts; 3 – 3 pts; 2 – 2 pts; 1 – 1 pt; and less than – 0 pts.	35	0.2778	10
6.	*Approach*	*Proposal Information*	*The Project Plan or Approach proposed.* a. **Quality and clarity of proposer's workplan including** schedule, logistics/phasing plan, understanding of the work and sensitivity to ongoing operations in the Community. Responses are scored as follows: Excellent – 5 pts; Very Good – 4 pts; Average = 3 pts; Fair = 2 pts; Poor – 0 pts.	5	1	5
7.	*Proposed Subcontractors*	*Proposal Information*	*The Major Subcontractors proposed by Contractor.* a. **Quality of Major Subcontractors listed.** b. **Experience of Major Subcontractors with Projects** of similar scope and size. c. **References in Houston ISD Subcontractors bring** appropriate resources (personnel and equipment) to ensure project completion by contract target end dates. Responses are scored as follows: Excellent – 5 pts; Very Good = 4 pts; Average – 3 pts; Fair – 2 pts; Poor = 0 pts. Points from multiple references are averaged.	5	1	5
8.	*Safety Rating*	*AIA 305*	*Contractors to provide the Owner with their* Experience Modifier Rate (EMR). Those with EMR of 0.50 or less = 5 pts; EMR of 0.51 – 0.85 – 4 pts; EMR of 0.86 – 0.99 – 3 pts; EMR greater than 1.00 = 0 pts. A maximum of 5 points.	5	1	5
9.	*Warranty*	*References*	*References in Houston Area are asked to rate the contractor.* Responses are scored as follows: Excellent = 5 pts; Very Good = 4 pts; Average = 3 pts; Fair = 2 pts; Poor = 0 pts. Points from multiple references are averaged.	5	1	5
					Total Possible Score	100

00200 – Exhibit A

#7

Section 00800

SPECIAL CONDITIONS OF AGREEMENT

The following Special Conditions modify the General Conditions, Document 00700. Where a portion of the General Conditions is modified or deleted by these Special Conditions, the unaltered portions of the General Conditions shall remain in effect.

1.01 Add the following paragraph to the end of Article 1.01:

The OWNER'S representative on the project is: Andrea Brinkley, 3501 E. Orange, Phone 281 652-1797.

4.23 Add the following Notes at the end of Article 4.23:

1. Contractor shall note that any work in the roadways (Bailey Road and Veterans Drive) is limited to the hours between 9:00 AM and 2:00 PM.

2. Contractor shall contact and coordinate work in the roadways with the School Hours and Bus times with the Pearland Independent School District.

3. Contractor shall notify BDD #4 (Brazoria Drainage District) prior to any drainage work to be performed in either Springfield Ditch to the North of the property and Cowarts Creek to the south of the property.

4. Contractor shall contact the City of Pearland prior to any work on the new Sanitary Sewer line along Veterans Drive and for any storm sewer outfalls or tie-ins to existing drainage.