APPENDIX F

MHP PRELIMINARY DRAFT – EXAMPLE CALCULATIONS

This appendix presents the example calculations for the following.

1. Draft Calculation for the Entire Pier

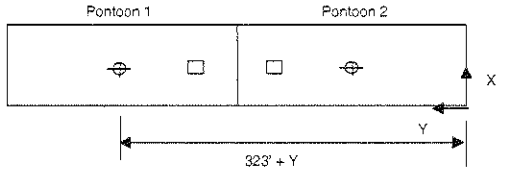
2. Sample Draft Calculation for the Single Pontoon (Pontoon 4 spreadsheet included)

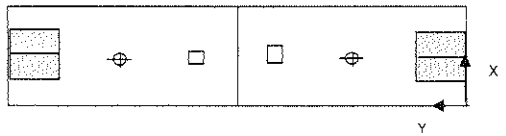
PROJECT: NFESC FRP Concrete Composite Pier
SUBJECT: Total Draft (For Full Length - 1300 feet)
DATE: April 12, 2001

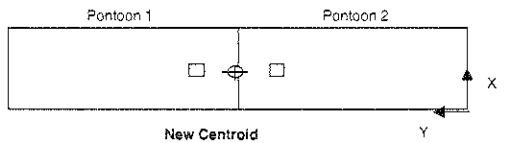
[PUTTING ALL PONTOONS TOGETHER]

PONTOON LENGTH USED: 323'-0"

TOTAL WEIGHT AND CENTER OF GRAVITY		WEIGHT (kips)	DRAFT (ft)	Xo (feet)	Yo (feet)	Zo (feet)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
STEP 1 : Connecting Pontoon 1 and Pontoon 2. * Make sure to ADD 323' * WT on Wy									
Pontoon 1	Weights and Moments (pg 2 & pg 4)	20486.04	0.00	0.00	0.00	0.00	901372.2	9925539.37	323268.3
	Center of Gravity	0	11.26	44.00	484.50	15.78	0	0	0
Pontoon 2	Weights and Moments (pg 2 & pg 4)	20486.04	0.00	0.00	0.00	0.00	901399.2	3308442.63	323279.9
	Center of Gravity	0	11.26	44.00	161.50	15.78	0	0	0
STEP 2: De-Ballast them (Subtract them = -1)									
Pontoon 1	BALLAST SUBTOTAL	-409.34	0.00	0.00	0.00	0.00	-18010.74	-257387.27	-1330.34
	BALLAST CENTER OF GRAVITY	0.00	-0.23	44.00	628.79	3.25	0.00	0.00	0.00
Pontoon 2	BALLAST SUBTOTAL	-409.34	0.00	0.00	0.00	0.00	-18010.74	-7044.07	-1330.34
	BALLAST CENTER OF GRAVITY	0.00	-0.23	44.00	17.21	3.25	0.00	0.00	0.00
STEP 3: New Draft of Pontoon 1 and 2 together									
Pontoon 1&2	Weights and Moments	40153.41					1766750	12969550.7	643887.5
	Center of Gravity		11.04	**44.00**	**323.00**	16.04			



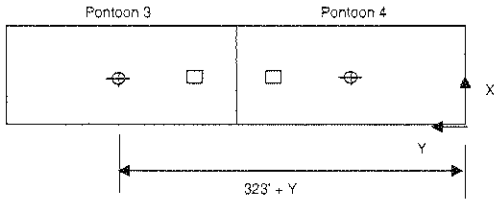




Water Density =	64	pcf
New Length of Pontoon =	646	ft
Width of Pontoon =	88	ft
Load to Sink Pontoon 1" =	303.1893	

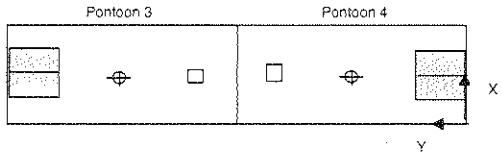
STEP 4: **Connecting Pontoon 3 and Pontoon 4**

*** Make sure to ADD 323' * WT on Wy**



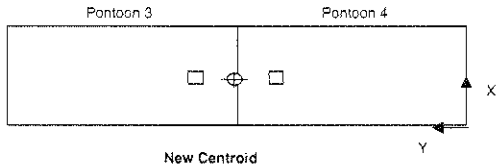
Pontoon 3	Weights and Moments (pg 2 & pg 4)	20486.04	0	0	0	0	901372.2	9925539.37	323268.3
	Center of Gravity	0	11.26	44.00	484.50	15.78	0	0	0
Pontoon 4	Weights and Moments (pg 2 & pg 4)	20492.86	0.00	0.00	0.00	0.00	901699.3	3309544.37	326108.7
	Center of Gravity	0	11.27	44.00	161.50	15.91	0	0	0

STEP 5: **De-Ballast them** Subtract them = -1



Pontoon 3	BALLAST SUBTOTAL	-409.34	0.00	0.00	0.00	0.00	-18010.74	-257387.27	-1330.34
	BALLAST CENTER OF GRAVITY	0.00	-0.23	44.00	628.79	3.25	0.00	0.00	0.00
Pontoon 4	BALLAST SUBTOTAL	-272.01	0.00	0.00	0.00	0.00	-11968.43	-92540.34	-648.29
	BALLAST CENTER OF GRAVITY	0.00	-0.15	44.00	340.21	2.38	0.00	0.00	0.00

STEP 6: **New Draft of Pontoon 3 and 4 together**



New Centroid

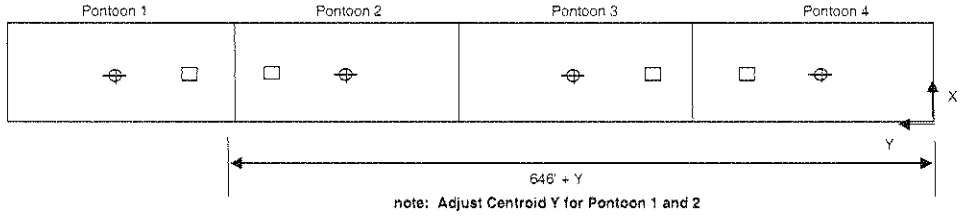
Pontoon 3&4	Weights and Moments	40297.55					1773092	12885156.1	647398.4
	Center of Gravity		11.08	**44.00**	**319.75**	**16.07**			

Water Density =	64	pcf
New Length of Pontoon =	646	ft
Width of Pontoon =	88	ft
Load to Sink Pontoon 1" =	303.1893	

STEP 7: **Add Pontoon 1,2,3 and 4 together**

Water Density =	64	pcf
New Length of Pontoon =	646	ft
Width of Pontoon =	88	ft

Load to Sink Pontoon 1" = 303.1893



note: Adjust Centroid Y for Pontoon 1 and 2

A) Ballast Pontoon 3 &4

Recall:

		WEIGHT (kips)	DRAFT (ft)	Xo (feet)	Yo (feet)	Zo (feet)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
Pontoon 3&4	Weights and Moments	40297.55	0.00	0.00	0.00	0.00	1773092	12885156.1	647398.4
	Center of Gravity	0	**11.08**	**44.00**	**319.75**	16.07	0	0	0

ELEMENT	# UNITS	THICK (in)	LENGTH (ft)	WIDTH (ft)	VOLUME (ft^3)	UNIT WT (pcf)	WEIGHT (kips)	DRAFT (ft)	X (ft)	Y (ft)	Z (ft)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
Ballast - Cell 1	0	0	32.42	23.00	0.00	62.4	0.00	0.00	12.33	17.21	0.667	0.00	0.00	0.00
Ballast - Cell 2	0	0	32.42	19.58	0.00	62.4	0.00	0.00	33.54	17.21	0.667	0.00	0.00	0.00
Ballast - Cell 3	0	0	32.42	19.58	0.00	62.4	0.00	0.00	54.46	17.21	0.667	0.00	0.00	0.00
Ballast - Cell 4	0	0	63.63	23.00	0.00	62.4	0.00	0.00	12.33	65.32	0.667	0.00	0.00	0.00
Ballast - Cell 5	0	0	32.42	23.00	0.00	62.4	0.00	0.00	12.33	628.79	0.667	0.00	0.00	0.00
Ballast - Cell 6	1	65	32.42	19.58	3438.67	62.4	214.57	0.06	33.54	628.79	3.375	7197.15	134921.78	724.18
Ballast - Cell 7	1	65	32.42	19.58	3438.62	62.4	214.57	0.06	54.46	628.79	3.375	11685.08	134919.71	724.17
Ballast - Cell 8	0	0	63.63	23.00	0.00	62.4	0.00	0.00	12.33	580.68	0.667	0.00	0.00	0.00

BALLAST SUBTOTAL	6877.29	429.143					18882.23	269841.49	1448.36
BALLAST CENTER OF GRAVITY	51442.15 gal		0.12	44.00	628.79	3.375			

Pontoon 3&4	Weights and Moments	40726.69					1791974	13154997.6	648846.8
	Center of Gravity		**11.19**	**44.00**	**323.01**	15.93			

B) Ballast Pontoon 1 & 2 *** Make Sure to add 646*Wt for Wy**

Recall:

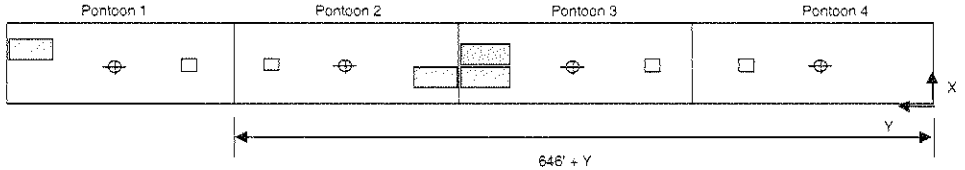
Pontoon 1&2	Weights and Moments	40153.41	0.00	0.00	0.00	0.00	1766750	38908652	643887.5
	Center of Gravity	0	**11.04**	**44.00**	**969.00**	16.04	0	0	0

ELEMENT	# UNITS	THICK (in)	LENGTH (ft)	WIDTH (ft)	VOLUME (ft^3)	UNIT WT (pcf)	WEIGHT (kips)	DRAFT (ft)	X (ft)	Y (ft)	Z (ft)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
Ballast - Cell 1	0	0	32.42	23.00	0.00	62.4	0.00	0.00	12.33	663.21	0.667	0.00	0.00	0.00
Ballast - Cell 2	1	65	32.42	19.58	4496.73	62.4	280.60	0.93	33.54	663.21	4.208	9,411.65	186,093.43	1,180.84
Ballast - Cell 3	0	0	32.42	19.58	0.00	62.4	0.00	0.00	54.46	663.21	0.667	0.00	0.00	0.00
Ballast - Cell 4	0	0	63.63	23.00	0.00	62.4	0.00	0.00	12.33	711.32	0.667	0.00	0.00	0.00
Ballast - Cell 5	0	0	32.42	23.00	0.00	62.4	0.00	0.00	12.33	1,274.79	0.667	0.00	0.00	0.00
Ballast - Cell 6	0	0	32.42	19.58	0.00	62.4	0.00	0.00	33.54	1,274.79	0.667	0.00	0.00	0.00
Ballast - Cell 7	1	65	32.42	19.58	4496.66	62.4	280.59	0.93	54.46	1,274.79	4.208	15,280.49	357,695.50	1,180.82
Ballast - Cell 8	0	0	63.63	23.00	0.00	62.4	0.00	0.00	12.33	1,226.68	0.667	0.00	0.00	0.00

BALLAST SUBTOTAL	8993.38	561.19					24692.14	543788.93	2361.66
BALLAST CENTER OF GRAVITY	67270.50 gal		**0.15**	44.00	969.00	4.208333			

Pontoon 1&2	Weights and Moments	40714.59					1791442	39452440.9	646249.2
	Center of Gravity		**11.19**	**44.00**	**969.00**	15.87			

Step 8: **De-Ballast**

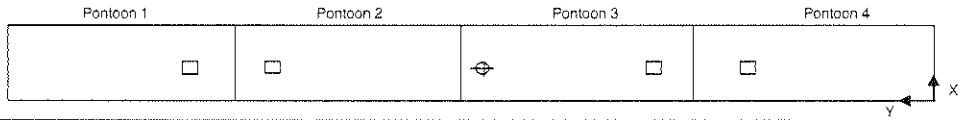


		WEIGHT (kips)	DRAFT (ft)	Xo (feet)	Yo (feet)	Zo (feet)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
Pontoon 3&4	Weights and Moments	40726.69	**0.00**	**0.00**	**0.00**	0.00	1791974	13154997.6	648846.8
	Center of Gravity	0	**11.19**	**44.00**	**323.01**	15.93	0	0	0
Pontoon 1&2	Weights and Moments	40714.59	**0.00**	**0.00**	**0.00**	0.00	1791442	39452440.9	646249.2
	Center of Gravity	0	**11.19**	**44.00**	**969.00**	15.87	0	0	0

Subtract them = -1

Pontoon 3&4	BALLAST SUBTOTAL	-429.143					-18882.23	-269841.49	-1448.36
	BALLAST CENTER OF GRAVITY		-0.12	-44.00	-628.79	-3.375			
Pontoon 1&2	BALLAST SUBTOTAL	-561.19					-24692.14	-543788.93	-2361.66
	BALLAST CENTER OF GRAVITY		**-0.15**	-44.00	-969.00	-4.20833			

Step 9: **NEW DRAFT FOR 4 PONTOON**



Pontoon 1,2,3&4	Weights and Moments	80450.96					3539842	51793808.1	1291286
	Center of Gravity		**11.06**	**44.00**	**643.79**	**16.05**			

Water Density = 64 pcf
New Length of Pontoon = 1292 ft
Width of Pontoon = 88 ft

Load to Sink Pontoon 1' = 606.3787

Step 10: **Add Misc Items** (Service Br, Utility Br, Fenders, Sufce Plate, Cover Plates, and shims)

MISC. ITEMS	Units #	Unit Wt (kips)	WEIGHT (kips)	DRAFT (ft)	Xo (feet)	Yo (feet)	Zo (feet)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
Service Bridge	1	40	40	0.005	70.417	2.00	16.35	2816.68	80	654
Utility Bridge	1	70	70	0.010	44	2.00	28.88	3080	140	2021.6
T. Fenders_(for 2 - mooring system)	2	20	40	0.005	44	646	16	1760	25840	640
L. Fenders	1	10	10	0.001	44	263.5	16	440	2635	160
T. Panels (for 2 mooring system)	2	5	10	0.001	44	646	16	440	6460	160
L. Panels	1	5	5	0.001	44	263.5	16	220	1317.5	80
Steel Cover Plates	4	21	84	0.012	44	646	16.5	3696	54264	1386
shims	2	50	100	0.014	44	646	16	4400	64600	1600
Long Shims	1	50	50	0.007	44	263.5	16	2200	13175	800

MISC. ITEMS	Weights and Moments			**409**					19052.68	168511.5	7501.6
	Center of Gravity				**0.056**	**46.58**	**412.01**	**18.34**			

TOTAL	Weights and Moments			**80859.96**					3558895	51962319.6	1298787
	Center of Gravity				**11.11**	**44.01**	**642.62**	**16.06**			

LET'S SAY LIGHT DRAFT = 11.25 feet

Note: Draft was calculated based on Pontoon Length of 323'-0". Due to Eliminating Wet Joint, Pontoon Length will be 325'-0".
Draft calculation was not updated to reflect the 325'-0", because we are not expencting to see much change of draft.

PROJECT: NFESC FRP Concrete Composite Pier
SUBJECT: SINGLE PONTOON CALCUALTION EXAMPLE
DATE: ########

EXAMPLE CALCULATION

POTOON 4

ASSUMPTIONS:

1. Office Area (Composite Slab) was included in the calculation

2. Service load = approximately 500 kips
   Since we didn't receive electrical weight (we only received the mechanical wt), service load was estimated to be 500kips.

3. For Pontoon 4:
   * Operation Deck Bridge Corbel
   * Service Deck Bridge Corbel
   * Substation Platform @ Pontoon Ends
     (Location of Substation Platform was changed after the draft calcaution. Draft Calculation was not updated.)

PROJECT: NFESC FRP Concrete Composite Pier
SUBJECT: Weight and Center of Gravity Calculation
DESIGNER: KAP
DATE: 9-Nov-94
REVISED: 25-Jun-01 THIN WALLS AND SLABS !!!
LTWT CONCRETE (120 pcf)+ REINF

PONTOON 4 - DELIVERY VOYAGE - TRANSPORT 1
Without Building and Equipment

Note: Assumption is that Platform and Ramp Corbel wt is very similar

GROSS PARAMETERS:

SUMMARY

Water Density:	64	pcf
LTWT Concrete Density :	120	pcf
Keel Slab Concrete Density:	130	pcf
Top Slab Concrete Density:	130	pcf
Intermediate Slab Concrete Density:	130	pcf
Interior Walls Concrete Density:	130	pcf
Exterior Walls Concrete Density:	130	pcf
Haunch (Slab and Wall) Density:	130	pcf
Avg Reinforced Concrete Density - A:	124.9	pcf
Volume Concrete:	5,776	cyd
Weight Steel Reinf:	382	tons

Length:	323	ft (y)
Width:	88	ft (x)
Pontoon Depth:	28.88	ft (z) - depth at centre of pier
Pontoon Depth:	28	ft (z) - depth at edge of pier
Service Deck Height:	16.88	ft (z) - depth at centre of pier
Service Deck Height:	16	ft (z) - depth at edge of pier
Ext Cell Width:	23.75	ft (x) from the edge
Interior Cell Width:	20.25	ft (x)
Slope:	0.02	

WEIGHT AND CG - PONTOON

	ELEMENT	# UNITS	THICK (in)	LENGTH (ft)	WIDTH (ft)	VOLUME (ft^3)	UNIT WT (pcf)	WEIGHT (kips)	INCR DRAFT (ft)	X (ft)	Y (ft)	Z (ft)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
	PONTOON KEEL SLAB														
y	CIP	1	8.00	323.00	88.330	18,590	130	2,417	1.328	44.00	161.50	0.33	106,333	390,291	806
y	Exter Trans. Haunch	4	12.00	317.67	1.551	1,971	130	256	0.141	44.00	161.50	0.81	11,272	41,373	206
y	Inter Transv. Haunch Longit	4	12.00	319.00	1.337	1,706	130	222	0.122	44.00	161.50	0.81	9,757	35,813	179
									1.591						
	PONTOON SERVICE SLAB														
y	service slab	2	12.00	323.00	24.083	15,558	130	2,022	1.112	44.00	161.50	16.74	88,990	326,632	31,836
y	curb	2	8.00	323.00	1.000	431	130	56	0.031	44.00	161.50	16.74	2,468	9,042	937
									1.142						
	PONTOON DECK SLAB														
y	Precast Panels (top deck)	1	15.00	323.00	88.000	35,530	130	4,619	2.539	44.00	161.50	27.82	203,232	745,952	128,475
y	Ext. Haunch1	2	12.00	254.66	1.758	895	130	116	0.064	44.00	161.50	26.63	5120	18793	3099
y	Ext. Haunch2	2	12.00	254.66	1.778	905	130	118	0.065	44.00	161.50	27.00	5179	19010	3178
y	Int. Haunch	4	12.00	256.00	1.604	1,643	130	214	0.117	44.00	161.50	27.26	9,397	34,490	5,622
									2.765						
	LONG. PONTOON WALLS														
y	Ext. Long Wall Bottom	2	10.00	323.00	15.000	8,075	130	1,050	0.577	44.00	161.50	7.50	46,189	169,535	7,873
y	Ext. Long Wall Top	2	14.00	323.00	10.750	8,102	130	1,053	0.579	44.00	161.50	21.38	46,343	170,100	22,513
y	Int Long Wall Bottom	2	8.00	323.00	14.608	6,377	130	829	0.456	44.00	161.50	8.67	36,478	133,892	6,691
y	Int. Long Wall Full ht	1	8.00	258.00	26.958	4,638	130	603	0.331	44.00	161.50	14.15	26,527	97,367	8,530
y	Int. Long Wall Top	2	12.00	258.00	10.750	5,547	130	721	0.396	44.00	161.50	21.85	31,729	116,459	15,756
y	Ext. Long Haunch Bottom	2	12.00	317.67	0.677	430	130	56	0.031	44.00	161.50	2.47	2,461	9,032	138
y	Ext. Long Haunch Top	2	12.00	317.67	0.625	397	130	52	0.028	44.00	161.50	13.33	2,271	8,337	688
y	EXT/Int Long Wall Haunch	2	12.00	317.67	0.451	287	130	37	0.020	44.00	161.50	2.47	1,641	6,021	92
y	Int Long Wall Haunch (bottom)	4	12.00	319.000	0.451	576	130	75	0.041	44.00	161.50	2.47	3,295	12,093	185
y	Windows to subtract	-24	14.00	72.180	1.000	(2,021)	130	(263)	-0.144	44.00	161.50	23.75	(11,560)	(42,432)	(5,977)
									2.316						
	TRANSV. PONTOON WALLS														
y	Ext. Transv. Wall 1	10	8.00	22.583	14.333	2,158	130	281	0.154	44.00	161.50	7.83	12,343	45,305	2,197
y	Ext. Transv. Wall 2	10	12.00	22.583	0.151	34	130	4	0.002	44.00	161.50	15.15	195	714	67
y	Int. Tranv. Wall 1	6	8.00	19.583	26.065	2,042	130	265	0.145	44.00	161.50	13.70	11,679	42,867	3,636
y	Int. Tranv. Wall 2	6	12.00	19.583	0.131	15	130	2	0.001	44.00	161.50	26.66	88	322	54
y	Ext. Haunch @ slab 1	24	12.00	7.778	1.076	291	130	26	0.014	44.00	161.50	0.81	1,149	4,219	21
y	Ext Haunch @ slab 2	48	12.00	7.286	0.718	251	130	33	0.018	44.00	161.50	0.94	1,434	5,265	31
y	Int Haunch @ slab 1	16	12.00	8.750	1.076	118	130	15	0.008	44.00	161.50	0.81	665	2,441	12
y	Int Haunch @ slab 2	32	12.00	6.250	0.718	144	130	19	0.010	44.00	161.50	0.94	821	3,013	18
y	Int Haunch @ wall 1	12	12.00	19.250	0.452	104	130	14	0.007	44.00	161.50	2.47	597	2,191	34
y	Int Haunch @ wall 2	24	12.00	0.167	0.301	1	130	0	0.000	44.00	161.50	2.47	7	25	0
y	Ext. Haunch @ wall 1	20	12.00	22.167	0.451	200	130	26	0.014	44.00	161.50	2.47	1,145	4,202	64
y	Ext. Haunch @ wall 2	40	12.00	0.167	0.376	3	130	0	0.000	44.00	161.50	2.47	14	53	1
									0.277						

	Corner RTW T&L walls														
y	Main Corner Piece_A	16	12.00	21.000	0.125	42	130	5	0.000	44.00	191.50	16.63	240	1,047	91
y	Bottom Corner Piece_B	16	12.00	5.000	0.083	7	130	1	0.000	44.00	191.50	4.42	38	166	4
									0.003						
	SLAB THICKENING														
y	24" TO 21" EXT (A end)	2	12.00	21.920	0.486	21	130	3	0.002	44.00	38.48	26.41	122	96	73
y	24"to 21" EXT (B end)	2	12.00	21.920	0.486	21	130	3	0.002	44.00	286.54	26.41	122	800	73
y	24"to21" INT (A end)	2	12.00	19.583	0.423	17	130	2	0.001	44.00	34.25	26.84	95	74	58
y	24"to21" INT (B end)	2	12.00	19.583	0.423	17	130	2	0.001	44.00	288.71	26.84	95	621	57
y	21" to15" EXT_middle (A end)	2	12.00	7.780	1.945	30	130	4	0.002	44.00	39.65	25.82	173	156	106
y	21" to15" EXT_middle (B end)	2	12.00	7.780	1.945	30	130	4	0.002	44.00	283.35	25.82	173	1,115	106
y	21" to15" EXT_ends (A end)	4	12.00	7.780	1.945	61	130	8	0.004	44.00	39.65	25.66	346	312	210
y	21" to15" EXT_ends (B end)	4	12.00	7.780	1.945	61	130	8	0.004	44.00	283.35	25.66	346	2,230	210
y	21" to15" int_middle (A end)	2	12.00	6.750	1.688	23	130	3	0.002	44.00	38.80	27.26	130	115	81
y	21" to15" int_middle (B end)	2	12.00	6.750	1.688	23	130	3	0.002	44.00	284.20	27.26	130	842	81
y	21" to15" int_ends (A end)	4	12.00	6.750	1.688	46	130	6	0.003	44.00	38.80	27.09	261	230	160
y	21" to15" int_middle (B end)	4	12.00	6.750	1.688	46	130	6	0.003	44.00	284.20	27.09	261	1,683	160
									0.028						
	END THICKENING														
y	Top Deck	2	9.00	27.500	85.667	3,534	130	459	0.253	44.00	161.50	26.82	20,213	74,191	12,319
y	Middle Long Wall	2	3.00	32.500	16.213	703	130	91	0.050	44.00	161.50	8.77	4,019	14,750	801
y	Service Slab @ Cross Over	2	12.00	32.500	39.833	2,589	130	337	0.185	44.00	161.50	16.18	14,810	54,359	5,445
									0.488						
	ANCHORAGE AREA (Last 5ft)														
y	keel slab	2	12.00	4.000	53.000	664	130	86	0.047	44.00	161.50	1.30	3,798	13,941	112
y	service slab	2	12.00	4.000	83.900	671	130	87	0.048	44.00	161.50	14.94	3,839	14,092	1,304
y	Top Deck	2	21.00	5.000	85.667	1,499	130	195	0.107	44.00	161.50	26.32	8,575	31,475	5,129
y	Boss @ Bottom	4	12.00	4.000	11.916	191	130	25	0.014	44.00	161.50	5.00	1,091	4,003	198
y	Boss @ top	4	12.00	5.000	9.000	180	130	23	0.013	44.00	161.50	20.50	1,030	3,779	430
y	End Wall @ top	2	24.00	41.833	9.000	1,506	130	196	0.108	44.00	161.50	21.17	8,614	31,616	4,145
y	Ext. Tansv. Wall 1	4	12.00	22.583	14.333	1,295	130	168	0.093	44.00	161.50	7.83	7,406	27,183	1,318
y	Ext. Tansv. Wall 2	4	12.00	22.583	0.226	20	130	3	0.001	44.00	161.50	15.15	117	429	40
y	Int. Tranv. Wall 1	4	12.00	19.583	25.065	2,042	130	265	0.146	44.00	161.50	13.70	11,679	42,867	3,636
y	Int. Tranv. Wall 2	4	12.00	19.583	0.196	15	130	2	0.001	44.00	161.50	26.86	88	322	54
y	Haunch for End Wall @ top	2	12.00	41.833	0.500	42	130	5	0.003	44.00	161.50	25.34	239	878	138
y	Haunch for End Ext Wall @ top	4	12.00	21.250	1.000	85	130	11	0.006	44.00	161.50	13.57	486	1,785	150
y	Haunch for End Ext Wall @ bot	4	12.00	21.250	1.000	85	130	11	0.006	44.00	161.50	2.58	486	1,785	29
y	Haunch for End Int Wall @ top	4	12.00	19.250	1.000	77	130	10	0.006	44.00	161.50	14.01	441	1,619	140
y	Haunch for End Int Wall @ bot	4	12.00	19.250	1.000	77	130	10	0.006	44.00	161.50	2.38	441	1,619	26
y	Haunch to Boss & Long Wall (middle)	16	12.00	8.356	0.500	67	130	9	0.005	44.00	161.50	6.26	382	1,403	54
y	Haunch to Boss & Long Wall (end_top)	16	12.00	2.000	0.333	11	130	1	0.001	44.00	161.50	13.11	61	224	18
y	Haunch to Boss & Long Wall (end_bot)	16	12.00	2.000	0.333	11	130	1	0.001	44.00	161.50	3.42	61	224	5
									0.616						
	ADDITIONAL CONCRETE (Stair)														
y	Operation Deck Removal sect 1	-1	16.92	10.000	4.660	(63)	130	(8)	-0.005	41.50	284.50	28.15	(342)	(2,344)	(292)
y	Operation Deck Removal sect 2	-1	15.00	10.000	9.000	(113)	130	(15)	-0.008	48.50	284.50	28.17	(709)	(4,161)	(412)
y	Operation Deck Removal sect 3	-1	12.00	10.000	0.975	(10)	130	(1)	-0.001	42.33	284.50	27.36	(54)	(361)	(35)
y	Operation Deck Removal sect 4	-1	12.00	10.000	1.605	(16)	130	(2)	-0.001	46.14	284.50	27.42	(96)	(594)	(57)
y	Mid Long Wall Removal	-1	8.00	10.000	13.000	(87)	130	(11)	-0.006	44.00	284.50	22.38	(496)	(3,205)	(252)
y	Side Long Wall Removal	-1	12.00	10.000	10.250	(103)	130	(13)	-0.007	23.58	284.50	21.60	(314)	(3,791)	(288)
y	Long Wall Added (Serv to Opera)	1	12.00	11.330	10.750	122	130	16	0.009	44.00	284.50	22.07	697	4,505	349
y	Long Wall Added (Bottom)	2	12.00	11.330	15.020	340	130	44	0.024	44.00	284.50	8.18	1,947	12,588	362
y	Mid Long Wall Added (Bottom)	1	4.00	11.330	14.130	53	130	7	0.004	44.00	284.50	8.15	305	1,974	57
y	Transv Wall Added	1	12.00	28.917	10.560	305	130	40	0.022	39.54	279.00	22.07	1,570	11,076	876
y	Transv. Wall Added 2	1	4.00	28.917	10.560	102	130	13	0.007	39.54	291.67	22.07	523	3,859	292
y	Stair added	2	12.00	11.660	5.000	117	130	15	0.008	44.00	284.50	22.38	667	4,312	347
y	Stair Landing Slab added	1	3.00	10.000	4.000	27	130	3	0.002	51.00	284.50	22.55	177	986	78
y	Stair Tower Long Wall	2	12.00	10.000	7.000	140	130	18	0.010	44.00	284.50	22.16	801	5,178	586
y	Stair TowerTrans Wall	2	12.00	20.000	7.000	280	130	36	0.020	44.00	284.50	32.18	1,602	10,356	1,171
y	Stair Tower Ceiling	1	6.00	20.000	12.000	120	130	16	0.009	44.00	284.50	35.93	685	4,438	561
									0.067						

y	***ADDITIONAL CONCRETE (Mooring)***													
y	Operatiaon Deck removal A	-1	15.00	18.000	18.000	(405)	130	(53)	-0.029	44.00	263.50	28.17	(2,317)	(13,873)	(1,483)
y	Operation Deck Removal B	-2	12.00	18.000	1.504	(53)	130	(8)	-0.004	44.00	263.50	27.46	(330)	(1,978)	(206)
y	Keel Slab Removal A	-1	8.00	13.000	13.000	(113)	130	(15)	-0.008	44.00	263.50	0.33	(644)	(3,859)	(5)
y	Keel Slab Removal B	-2	12.00	13.000	1.337	(35)	130	(5)	-0.002	44.00	263.50	0.81	(199)	(1,190)	(4)
y	Long wall Removal_Upper	-1	8.00	25.000	26.963	(449)	130	(58)	-0.032	44.00	266.00	14.15	(2,570)	(15,540)	(827)
y	Long Wall Removal_Haunch	-2	12.00	25.000	0.451	(23)	130	(3)	-0.002	44.00	266.00	2.47	(129)	(780)	(7)
y	Long Wall Added_Upper	2	12.00	25.000	26.770	1,339	130	174	0.096	44.00	266.00	14.15	7,656	46,285	2,462
y	Long Wall Added_Seat	2	24.00	18.000	2.500	150	130	23	0.013	44.00	263.50	11.50	1,030	6,166	269
y	Transv. Wall _Upper	2	12.00	18.000	26.870	967	130	126	0.069	44.00	263.50	14.10	5,593	33,135	1,773
y	Tranv. Wall_Seat	2	24.00	13.000	2.500	130	130	17	0.009	44.00	263.50	11.50	744	4,453	194
y	Service deck addition	1	12.00	42.333	39.833	1,686	130	219	0.121	44.00	268.67	16.18	9,645	58,896	3,545
y	Remove Serv. Deck for opening	-1	12.00	18.000	18.000	(324)	130	(42)	-0.023	44.00	263.50	16.29	(1,853)	(11,099)	(686)
y	Short Log Wall Btw Mooring/Stair	1	12.00	5.000	26.963	135	130	18	0.010	44.00	276.00	14.15	771	4,837	248
y	Local Thickening For Fenders (T)	2	6.00	4.330	9.500	41	130	5	0.003	44.00	263.50	16.38	235	1,409	88
y	Local Thickening For Fenders (L)	2	6.00	7.667	9.500	73	130	9	0.005	44.00	263.50	16.18	417	2,495	153
									0.235						

WEIGHT AND CG - PONTOON

ELEMENT	# UNITS	THICK (in)	LENGTH (ft)	WIDTH (ft)	VOLUME (ft^3)	UNIT WT (pcf)	WEIGHT (kips)	INCR DRAFT (ft)	X (ft)	Y (ft)	Z (ft)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
Additional Transverse Walls														
Remove Ext Long Haunch	-2	12.00	2.67	0.68	(4)	130	(0)	0.000	44.00	161.50	2.47	(21)	(76)	(1)
Remove Ext Long Haunch top	-2	12.00	2.67	0.63	(3)	130	(0)	0.000	44.00	161.50	13.33	(19)	(70)	(6)
Remove Ext/Int Long Haunch	-2	12.00	2.67	0.45	(2)	130	(0)	0.000	44.00	161.50	2.47	(14)	(51)	(1)
Add Ext T. Wall Part 1	8	8.00	22.58	14.33	1,726	130	224	0.123	44.00	161.50	7.83	9,874	36,244	1,758
Add Ext. T. Wall Part 2	8	12.00	22.58	0.13	27	130	4	0.002	44.00	161.50	15.15	156	571	54
Add Ext Haunch @ Slab 1	16	12.00	6.75	1.08	116	130	15	0.008	44.00	161.50	0.94	665	2,441	14
Add Ext Haunch @ Slab 2	32	12.00	6.25	0.72	144	130	19	0.010	44.00	161.50	0.81	821	3,013	15
Add Exit Huanch @ Wall 1	16	12.00	22.17	0.45	160	130	21	0.011	44.00	161.50	2.47	916	3,361	51
Add Exit Huanch @ Wall 2	32	12.00	0.17	0.38	2	130	0	0.000	44.00	161.50	2.47	11	42	1
								0.155						
Potential Office Area														
Comp. Slab	1	12.00	214.333	40.500	8,680	40	347	0.191	44.00	140.00	16.68	15,278	48,611	5,791
	0						0	0.000	44.00	161.50	0.00	0	0	0
	0						0	0.000	44.00	161.50	0.00	0	0	0
	0						0	0.000	44.00	161.50	0.00	0	0	0
	0						0	0.000						
								0.191						
MISC ATTACHMENTS AT FLOAT OUT														
Typical Bollards	18					3.57	64	0.035	44.00	161.50	26.50	2,827	10,378	1,703
Optional Amphibs Bollards	6					3.57	21	0.012	44.00	161.50	26.50	942	3,459	568
Bow Spoon	0						0	0.000				0	0	0
Skeg	0							0.000	44.00	161.50	0.00	0	0	0
								0.047						
PONTOON / FOUNDATION INTERFACE														
Keel Thickening	0				0	120	0		44.00	161.50	0.00	0	0	0
Wall Thickening	0				0	120	0		44.00	161.50	0.00	0	0	0
								0.000						
					VOLUME (ft^3)		WEIGHT (kips)		Xo (feet)	Yo (feet)	Zo (feet)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
BARE PONTOON SUBTOTAL					145,916		18274					804,049	3,006,545	293,036
BARE PONTOON CENTER OF GRAVITY								10.0462	44.00	164.53	16.04			
CONTINGENCIES														
% Wt Inc-Conc Toler	5				7,539	120	905	0.497	44.00	164.53	16.04	39,805	148,843	14,507
Inc Top'g Toler top slab (in)	1	0.25	323.000	88.000	592	120	71	0.039	44.00	164.53	16.04	3,127	11,691	615
Inc Top'g Toler base slab (in)	1	0.25	323.000	88.000	592	120	71	0.039	44.00	164.53	16.04	3,127	11,691	1,140
Inc Top'g Toler intermediate sla (in)	1	0.25	323.000	47.500	320	120	38	0.021	44.00	164.53	16.04	1,688	6,311	615
Inc Top'g Toler long walls Full HT (in)	1	0.25	323.000	79.000	532	120	64	0.035	44.00	164.53	16.04	2,807	10,496	1,023
Inc Top'g Toler long walls HALF HT (in)	1	0.25	323.000	32.000	215	120	26	0.014	44.00	164.53	16.04	1,137	4,251	414
Inc Top'g Toler Transv walls (in)	1	0.25	528.000	16.500	182	120	22	0.012	44.00	164.53	16.04	958	3,583	349
Inc Top'g Toler Transv walls (in)	1	0.25	220.000	12.000	55	120	7	0.004	44.00	164.53	16.04	290	1,086	106
								0.9614						
					VOLUME (ft^3)		WEIGHT (kips)		Xo (feet)	Yo (feet)	Zo (feet)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
BARE PONTOON + CONTINGENCIES -- TOTALS					**155,943**		**19,477**					**856,988**	**3,204,499**	**311,806**
BARE PONTOON CENTER OF GRAVITY								**10.7077**	**44.00**	**164.53**	**16.01**			

MISCELLANEOUS STRUCTURES & EQUIPMENT ALLOWANCE
**** BY OTHERS ****

WEIGHT AND CG - MISCELLANEOUS STRUCTURES AND EQUIPMENT

ELEMENT	# UNITS	THICK (in.)	LGTH (ft)	WIDTH (ft)	VOLUME (ft^3)	UNIT WT (pcf)	WEIGHT (kips)	INCR DRAFT (ft)	X (ft)	Y (ft)	Z (ft)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
EQUIPMENT - DRY WEIGHT														
SERVICES												0	0	0
GROSS AMOUNT FOR SERVICES (ALLOWANCE)							500	0.275	44.00	181.50	17.00	22,000	80,750	8,500
PRINCIPAL UTILITIES MECHANICAL							0					0	0	0
Hose cabinets and reels							0					0	0	0
Oily waste waste oil (OWWO)							0					0	0	0
Pipe and Hoses							0					0	0	0
Lift station/Oil Water separator							0					0	0	0
Valves and risers							0					0	0	0
Potable water (PW)							0					0	0	0
Pipe and Hoses							0					0	0	0
Sectionalizing valves							0					0	0	0
Back flow preventers							0					0	0	0
Hydrants							0					0	0	0
Metering							0					0	0	0
Sanitary Sewer (CHT)							0					0	0	0
Pipe and Hoses							0					0	0	0
Sanitary lift station							0					0	0	0
Valves and risers							0					0	0	0
Steam (STM)							0					0	0	0
Pipe and Hoses							0					0	0	0
Valves							0					0	0	0
Expansion loops							0					0	0	0
Condensate return line							0					0	0	0
Compressed Air							0					0	0	0
Rigid pipes and flexible hoses							0					0	0	0
Valves and risers							0					0	0	0
JP-5 - Aviation fuel							0					0	0	0
Rigid pipe and flexible hoses							0					0	0	0
Valves and risers							0					0	0	0
Diesel or light fuel (DFM)							0					0	0	0
Rigid pipe and flexible hoses							0					0	0	0
Valves and risers							0					0	0	0
OTHER UTILITIES MECHANICAL							0					0	0	0
high pressure compressed air							0					0	0	0
Oxygen							0					0	0	0
Fire Protection							0					0	0	0
Salt water							0					0	0	0
Chilled Water							0					0	0	0
Pure Water							0					0	0	0
Feedwater							0					0	0	0
Ventilation							0					0	0	0
PRINCIPAL UTILITIES ELECTRICAL							0					0	0	0
Shore power							0					0	0	0
Conduit and receptacle housing							0					0	0	0
Metering							0					0	0	0
Flexible cabling							0					0	0	0
Cable lockers/reels							0					0	0	0
Substation transformers							0					0	0	0
Industrial power							0					0	0	0
Conduit, lighting							0					0	0	0
Metering							0					0	0	0
Substation transformers							0					0	0	0
Ventilation							0					0	0	0
Switchgear							0					0	0	0

WEIGHT AND CG - MISCELLANEOUS STRUCYURES AND EQUIPMENT

ELEMENT	# UNITS	THICK (in)	LGTH (ft)	WIDTH (ft)	VOLUME (ft^3)	UNIT WT (pcf)	WEIGHT (kips)	INCR DRAFT (ft)	X (ft)	Y (ft)	Z (ft)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
Cable trays							0					0	0	0
Lighting fixtures							0					0	0	0
Communications							0					0	0	0
Utilities separation							0					0	0	0
Spill containment and control							0					0	0	0
MISCELLANEOUS														
Ramps Corbel (Operation Level)	1	42.00	4	18	252	130	33	0.019	44	-2.00	28.79	1,441	(66)	943
Ramps Corbel (Utility Level)	1	42.00	4	24.0	336	130	44	0.024	76	-2.00	16.24	3,320	(87)	709
Platform for Substation	1	14	12	24	336	130	44	0.024	12	-6.00	23.75	524	(262)	1,037
Bollards							0					0	0	0
Stairways							0					0	0	0
Fendering	0	0.00	0.00	0.000	0	0	0	0.000	0.00	0.00	0.00	0	0	0
Allowance	0						0					0	0	0
							WEIGHT (kips)		Xo (feet)	Yo (feet)	Zo (feet)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
EQUIPMENT SUBTOTAL							620					27,255	80,335	11,190
EQUIPMENT CENTER OF GRAVITY								0.3438	44.00	129.55	18.04			

WEIGHT AND CG -MISCELLANEOUS STRUCTURES AND EQUIPMENT

ELEMENT	# UNITS	THICK (in)	LGTH (ft)	WIDTH (ft)	VOLUME (ft^3)	UNIT WT (pcf)	WEIGHT (kips)	INCR DRAFT (ft)	X (ft)	Y (ft)	Z (ft)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
EQUIPMENT - DRY WEIGHT - cont'd														
CONTINGENCIES														
% Equipment Weight	20						124	0.068	44.00	161.50	19.83	5,457	20,030	2,455
								0.068						
							WEIGHT (kips)		Xo (feet)	Yo (feet)	Zo (feet)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
EQUIPMENT + CONTINGENCIES -- TOTALS							744					32,742	100,365	13,645
EQUIPMENT CENTER OF GRAVIGY								0.4068	44.00	134.87	18.35			
BALLAST														
Ballast - Cell 1	0	0.00	32.417	23.000	0	62.4	0	0.000	12.333	17.208	0.667	0	0	0
Ballast - Cell 2	1	41.20	32.417	19.583	2,180	62.4	136	0.075	33.542	17.209	2.383	4,562	2,340	324
Ballast - Cell 3	1	41.20	32.417	19.583	2,180	62.4	136	0.075	54.458	17.209	2.383	7,407	2,340	324
Ballast - Cell 4	0	0.00	63.633	23.000	0	62.4	0	0.000	12.333	65.316	0.667	0	0	0
Ballast - Cell 5	0	0.00	32.417	23.000	0	62.4	0	0.000	12.333	305.792	0.667	0	0	0
Ballast - Cell 6	0	0.00	32.417	19.583	0	62.4	0	0.000	33.542	305.792	0.667	0	0	0
Ballast - Cell 7	0	0.00	32.417	19.583	0	62.4	0	0.000	54.458	305.792	0.667	0	0	0
Ballast - Cell 8	0	0.00	63.633	23.000	0	62.4	0	0.000	12.333	257.684	0.667	0	0	0
								0.150						
					VOLUME (ft^3)/gals		WEIGHT (kips)		Xo (feet)	Yo (feet)	Zo (feet)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
BALLAST SUBTOTAL					4,359		272					11,968	4,681	648
BALLAST CENTER OF GRAVITY					32,606			0.150	44.00	17.21	2.38			
							WEIGHT (kips)		Xo (feet)	Yo (feet)	Zo (feet)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
MISCELLANEOUS STRUCTURES, EQUIPMENT AND BALLAST WEIGHT AND MOMENTS							**1,016**					**44,711**	**105,046**	**14,303**
MISCELLANEOUS STRUCTURES, EQUIPMENT AND BALLAST CENTER OF GRAVITY								0.559	**44.00**	**103.38**	**14.08**			

NORTH

CELL 7									CELL 3
CELL 6									CELL 2
CELL 5	CELL 8							CELL 4	CELL 1

Plan - Pontoon Ballast Cells

PONTOON - DELIVERY VOYAGE - TRANSPORT 2

TOTAL WEIGHT AND CENTER OF GRAVITY	WEIGHT (kips)	DRAFT (ft)	Xo (feet)	Yo (feet)	Zo (feet)	Wx (kip-ft)	Wy (kip-ft)	Wz (kip-ft)
Weights and Moments (pg 2 & pg 4)	20,493					931,699	3,309,544	326,109
Center of Gravity		11.3268	44.00	161.50	15.91			

HYDROSTATIC PROPERTIES

Pontoon Weight =	19,477	kips	Ave. Draft due to Pontoon Wt. =	10.71	ft	Displacement =	304,323	cu ft
Misc Structures and Equipment Weight =	744	kips	Ave. Draft from Misc St. & Equ Wt.=	0.41	ft	Displacement =	11,627	cu ft
Ballast =	272	kips	Ave. Draft due to Ballast =	0.15	ft	Displacement =	4,250	cu ft
Total Weight =	**20,493**	**kips**	**Average Total Draft =**	**11.27**	**ft**	**Displacement =**	**320,201**	**cu ft**

Load To Sink Pontoon 1" = 151.59 kips per inch

Freeboard at Delivery Voyage = 17.61 ft

METACENTRIC HEIGHT CALCULATION - UNBALLASTED

X-AXIS (Weak Dir)

KB =	5.56	ft	(Center of Buoyancy to Keel)
BM =	58.05	ft	(Center of Buoyancy to Metacenter)
KM =	63.61	ft	(Keel to Metacenter)
KG =	16.10	ft	(Keel to Center of Gravity)
GM =	47.52	ft	(METACENTRIC HEIGHT)

Moment to Heel 1" = 910 kip-ft

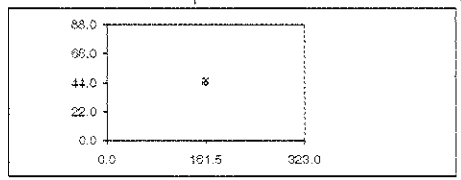
Mx =	13	kip-ft
Trim X =	0.01	in
Theta X =	0.00	degrees

Y-AXIS (Strong Dir)

KB =	5.56	ft	(Center of Buoyancy to Keel)
BM =	782.15	ft	(Center of Buoyancy to Metacenter)
KM =	787.71	ft	(Keel to Metacenter)
KG =	16.10	ft	(Keel to Center of Gravity)
GM =	771.61	ft	(METACENTRIC HEIGHT)

Moment to Trim 1" = 4,025 kip-ft

My =	(52)	kip-ft
Trim Y =	-0.01	in
Theta Y =	0.00	degrees



STATICS CHECK