A000 7958

MAY 1973

LAKE PONTCHARTRAIN, LA. AND VICINITY
LAKE PONTCHARTRAIN BARRIER PLAN

BACKUP COMPUTATIONS FOR

DETAILED DESIGN MEMORANDUM NO. 8
RIGOLETS LOCK
VOLUME 2

PREPARED FOR
U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
NEW ORLEANS, LOUISIANA

PREPARED BY

A JOINT VENTURE

STANLEY CONSULTANTS, INC.
STANLEY BUILDING
MUSCATINE, IOWA, 52761

AND

B. M. DORNBLATT AND ASSOCIATES, INC.
SUITE 300, 816 HOWARD AVENUE
NEW ORLEANS, LOUISIANA, 70113

MAY 1973

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General Index

Section IV — Structural

SECTION IV - 3 GATE BAYS

PART A - WALLS

PART B - BASESLAB

SECTION IV-3 GATE BAYS

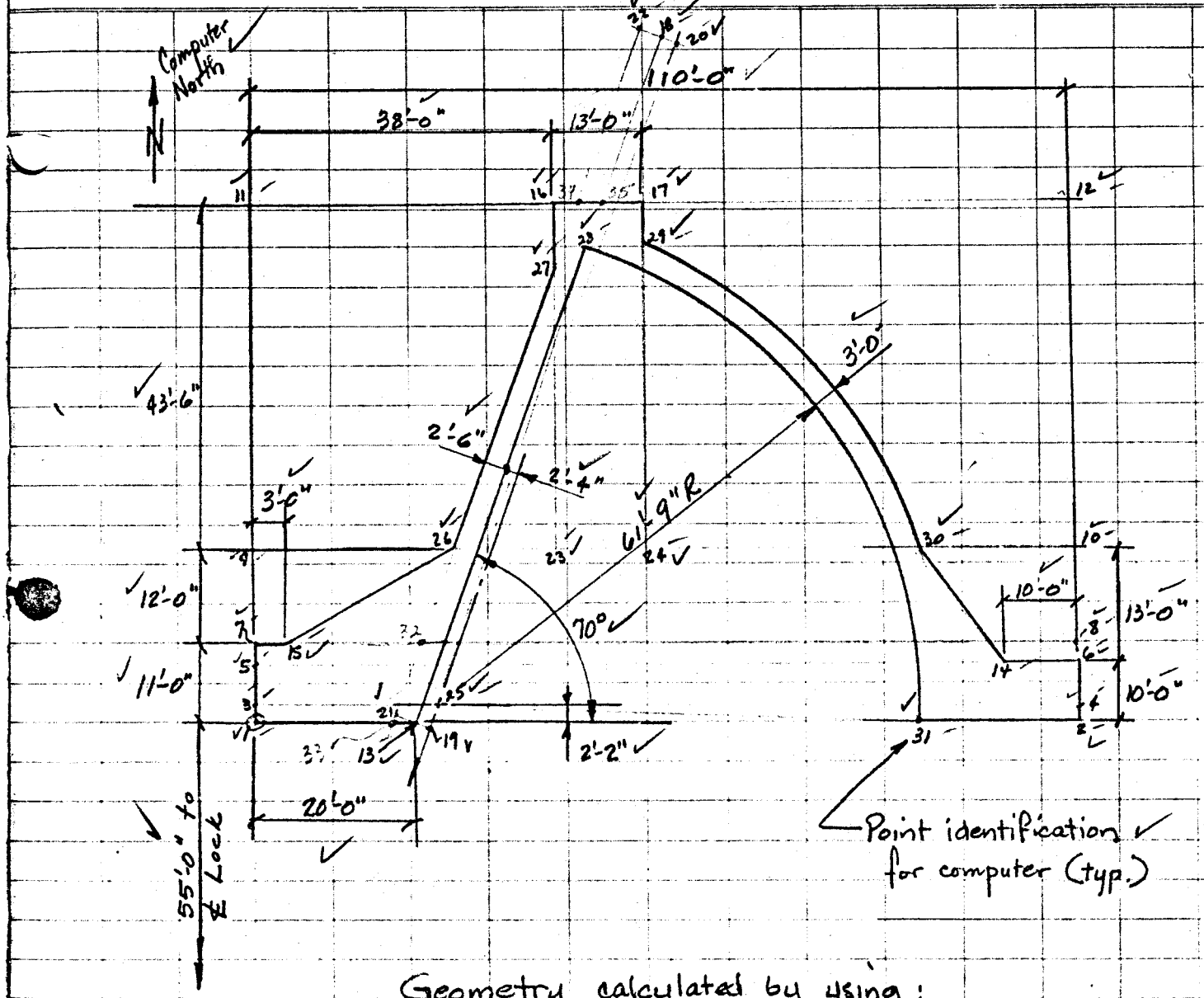
PART A - WALLS

Job No. 4671 Page No. 3A-1

Computed by R.J. Bechler Date 2/13/73
Checked by W.A.Z. Date 2/13/73
Reviewed by R.C.P. Date 3-2-73
Approved by R.C.P. Date 3-2-73

Subject GATE BAY WALL - GEOMETRY

Sheet No. of



Geometry calculated by using:
C.O.G.O. Program
1130 IBM Computer

```
*          RIGOLETS NAVIGATION LOCK  GATE BAY WALLS JOB 4671
CLEAR      1 999
STORE      1 0.0 0.0
     1                0.0000              0.0000

LOCATE/BEA 1 2 110.0 1 90 0 0.0
     2                0.0000            110.0000

PARALLEL/L 1 2 -2.1667 3 4
     3                2.1667              0.0000

     4                2.1667            110.0000

           1 2 -10.0 5 6
     5               10.0000              0.0000

     6               10.0000            110.0000

           1 2 -11.0 7 8
     7               11.0000              0.0000

     8               11.0000            110.0000

           1 2 -23.0 9 10
     9               23.0000              0.0000

    10               23.0000            110.0000

           1 2 -66.5 11 12
    11               66.5000              0.0000

    12               66.5000            110.0000

LOCATE/LIN 1 2 13 20.0
    13                0.0000             20.0000

           6 5 14 10.0
    14               10.0000            100.0000

           7 8 15  3.0
    15               11.0000              3.0000

LOCATE/ANG 1 13 18 90.0 110 0 0.0
    18               84.5723             50.7818

PARALLEL/L 13 18 2.3333 19 20
    19               -0.7980             22.1926

    20               83.7743             52.9743

           13 18 -2.5 21 22
    21                0.8550             17.6507

    22               85.4274             48.4325

            9 11 38.0 23 16
    23               23.0000             38.0000

    16               66.5000             38.0000
```

```
                23 16 13.0 24 17
      24              23.0000                 51.0000

      17              66.5000                 51.0000

POINTS/INT 25  3  4 19 20
      25               2.1667                 23.2717

                26  9 10 21 22
      26              23.0000                 25.7108

                27 23 16 21 22
      27              56.7642                 38.0000

ARC/LINE/P 28 25 61.75 13 18 16
      28              60.9493                 42.1837

                29 25 64.75 24 17 16
      29              60.6791                 51.0000

                30 25 64.75 9 10  6
      30              23.0000                 84.5786

                31 25 61.75 1  2  6
      31               0.0000                 84.9836

AREA            1 13 28 31 2 6 14 30 29 17 16 27
                26 15 7 1
        AREA=     1552.7132 SQ.FT..          0.035645 ACRES

SEGMENT/PL 29 30 64.75
        CHORD=      50.4701  ARC=            51.8439  SEG AREA=      173.6767 SQ.F
                                                                    0.003987 ACRE

        AREA=     1726.3900SQ.FT.           0.039632ACRES

SEGMENT/MI 28 31 61.75
        CHORD=      74.4758  ARC=            79.9429  SEG AREA=      633.9530 SQ.F
                                                                    0.014553 ACRE

        AREA=     1092.4369SQ.FT.           0.025078ACRES

POINTS/INT 32 7 8 21 22
      32              11.0000                 21.3432

                33 1 2 21 22
      33               0.0000                 17.3395

                34 11 12 21 22
      34              66.5000                 41.5435

                35 11 12 13 18
      35              66.5000                 44.2040

DUMP            1 999
      1               0.0000                  0.0000

      2               0.0000                110.0000
```

3	2.1667	0.0000
4	2.1667	110.0000
5	10.0000	0.0000
6	10.0000	110.0000
7	11.0000	0.0000
8	11.0000	110.0000
9	23.0000	0.0000
10	23.0000	110.0000
11	66.5000	0.0000
12	66.5000	110.0000
13	0.0000	20.0000
14	10.0000	100.0000
15	11.0000	3.0000
16	66.5000	38.0000
17	66.5000	51.0000
18	84.5723	50.7818
19	-0.7980	22.1926
20	83.7743	52.9744
21	0.8550	17.6508
22	85.4274	48.4325
23	23.0000	38.0000
24	23.0000	51.0000
25	2.1667	23.2717
26	23.0000	25.7109
27	56.7642	38.0000
28	60.9493	42.1837
29	60.6791	51.0000
30	23.0000 Z	84.5786 Y
31	0.0000	84.9836
32	11.0000	21.3432

33	0.0000	17.3395
34	66.5000	41.5435
35	66.5000	44.2040

END/OF/RUN

Job No. 4671 Page No. 3A-6

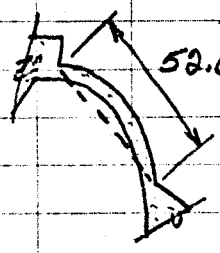
Computed by RGP Date 1-3-73
Checked by [illegible] Date 1/3/73
Reviewed by [illegible] Date 2/7/73
Approved by [illegible] Date 2-7-73

Subject STRUCTURAL
GULFSIDE & LAKESIDE GATES
RECESS WALLS

Sheet No. 1 of

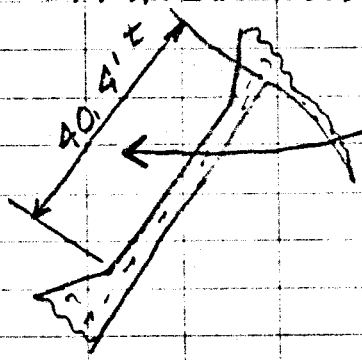
From gate bay geometry

LENGTH OF ARC WALL IS



Use design length = 55' ✓

LENGTH OF STRAIGHT WALL IS



Use design length = 42' ✓

Check design by PCA for triangular load and by USDA for rectangular load for Gulfside wall (External pressure)

Use PCA for triangular load for all other loads.

Job No. 4671 Page No. 3A-7

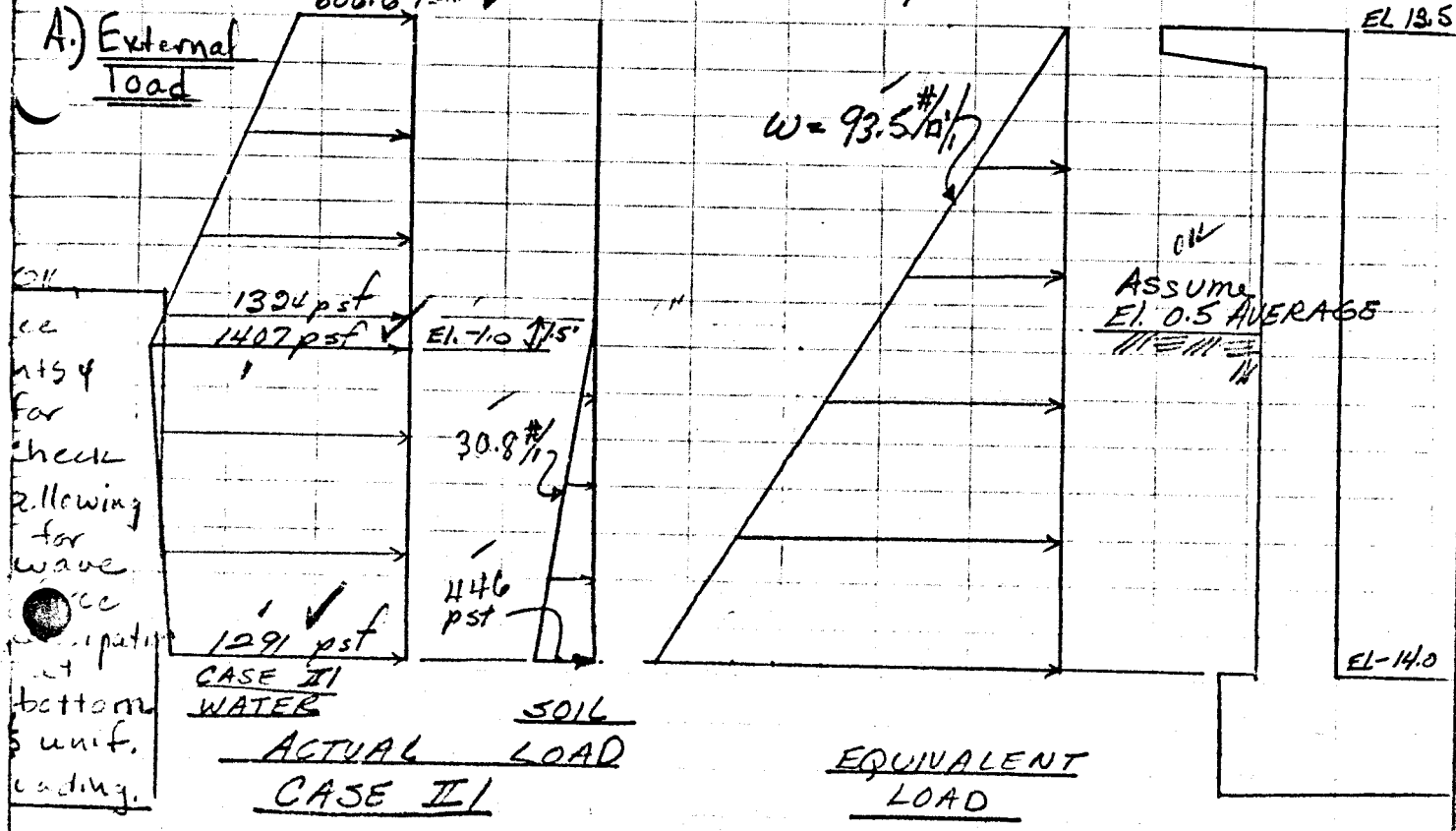
Computed by RGP Date 1-3-73
Checked by GAS Date 1/2/73
Reviewed by RJS Date 2/7/73
Approved by _____ Date _____

Subject STRUCTURAL
GULFSIDE GATE BAY
RECESS WALLS

Sheet No. 2 of _____

GULFSIDE WALL (55' x 27.5' high)

A.) External Load



Area of actual load diagrams and equivalent load

	Force	ARM	MOMENT @ El. -14.0
606.6 (14.5) =	8800 #/	13.75	121,000 ft#
800.4 (14.5)(1/2) =	5800	13.83+	103,500
1291 (13) =	16800	6.5	109,200
116 (13)(1/2) =	755	8.67	6500
446 (14.5)(1/2) =	3240	4.83	15700
SH =	35395 #	N = 10.04'	355900

$= \frac{wh^2}{2}$; $w = \frac{35395(2)}{(27.5)^2} = 93.5$ #/'

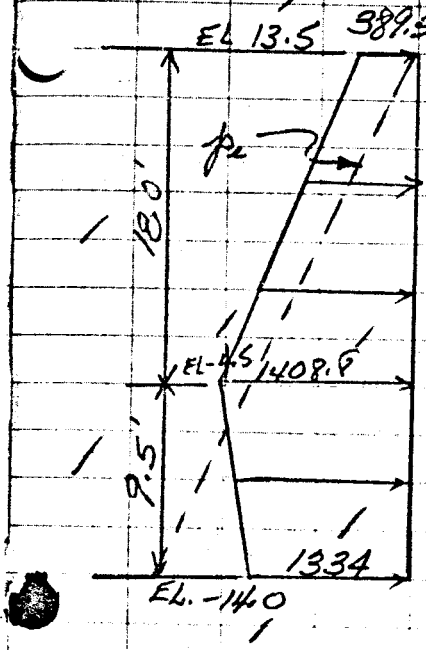
a = 27.5' b/a = 2.0
b = 55'

Design by Portland Cement Association bulletin no. ST63, "Rectangular Concrete Tanks".

$M = wa^3 \times C = 93.5(27.5)^3 C = 1940000 \cdot C$ ft# $= 1940 \cdot C$ ft k
$V = wa^2 \times C = 93.5(27.5)^2 C = 70800 \cdot C$ # $= 70.8 \cdot C$ k

Computed by RGP Date 1-3-73
Checked by GAS Date 1/3/73
Reviewed by RJE Date 2/7/73
Approved by [illegible] Date [illegible]

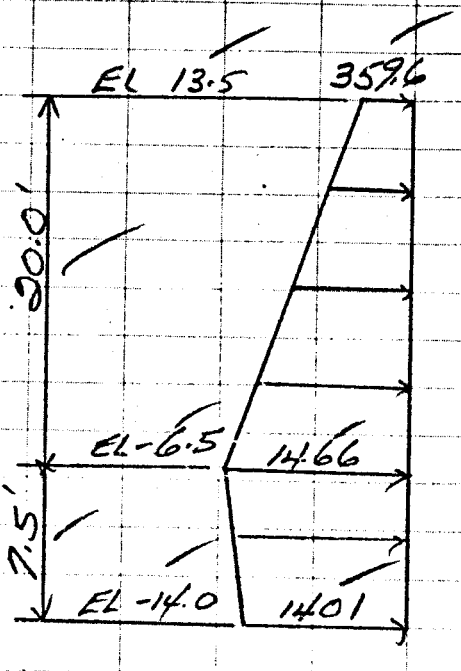
Job No. 4671 Page No. 3A-8
Subject STRUCTURAL
GULFSIDE GATE BAY
RECESS WALL
Sheet No. 2a of



CASE II 2

389.5 (18) = 7000
1019.3 (18) (½) = 9160
1334 (9.5) = 12690
74.8 (9.5) (½) = 350
29,200

$p_e = \frac{2(29200)}{(925)^2} = 77.2$ psf/ft



CASE II 3

359.6 (20) = 7190
1106.4 (10) = 11060
1401 (7.5) = 10500
65 (7.5) (½) = 250
29000

p_e = 76.8 psf/ft.

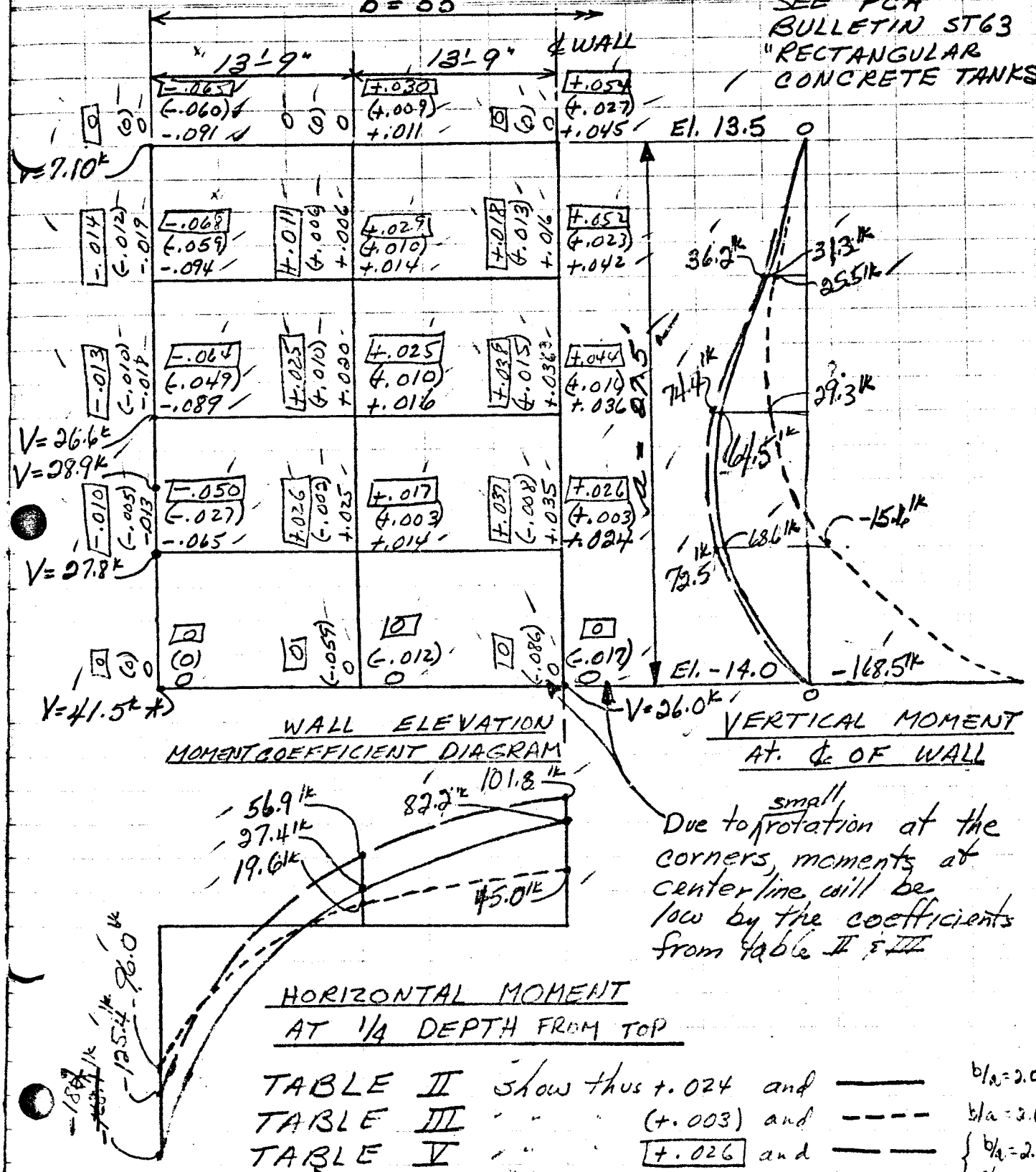
THESE LOADS DO NOT CONTROL WALL DESIGN

Job No. 4011 Page No. 3

Computed by RGP Date 1-3-73
Checked by GAF Date 1/3/73
Reviewed by [illegible] Date 1/7/73
Approved by RGP Date 1/7/73

Subject STRUCTURAL
GULFSIDE GATE BAY
RECESS WALLS

Sheet No. 3 of

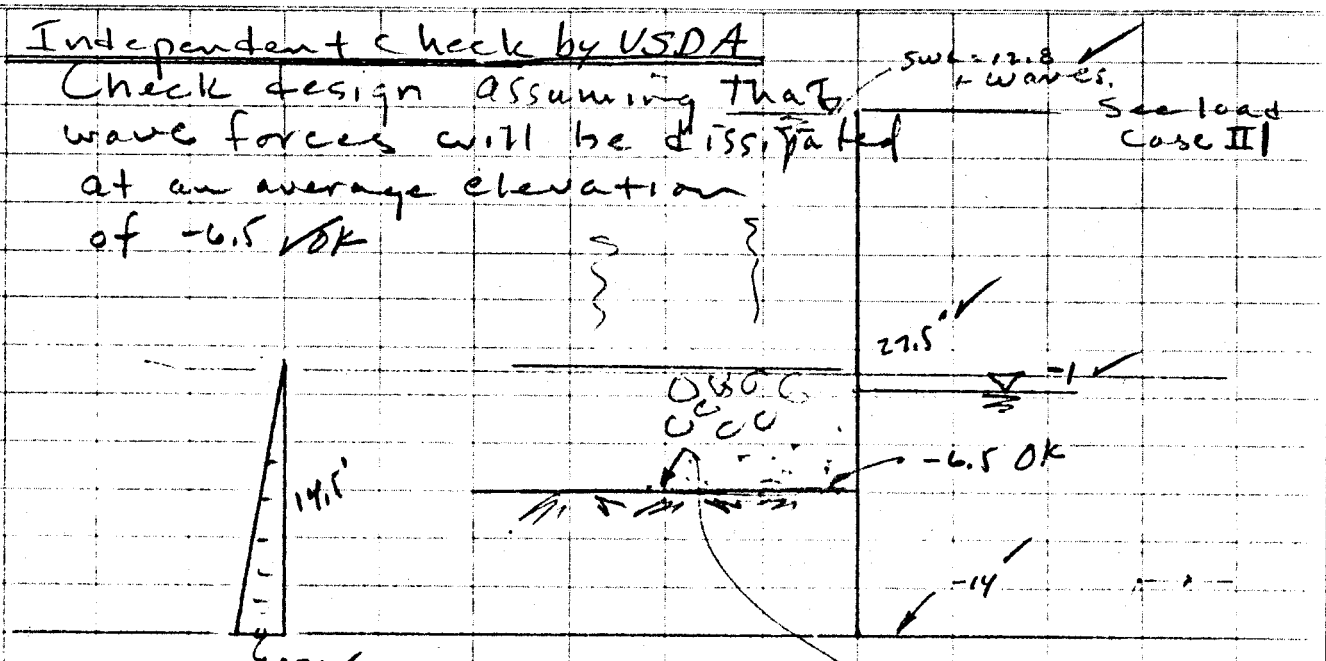


Computed by GAS Date 1/3/73
Checked by RGP Date 1-25-73
Reviewed by RAB Date 3-17-73
Approved by AGP Date 3-19-73

Job No. 4671 Page No. 3A-10
Subject Struct. Gulfsite Gate Bay Recess Walls
Sheet No. 4 of

Independent check by USDA

Check design assuming that wave forces will be dissipated at an average elevation of -6.5 ok



EH 34.12

less 7.5 x 0.46 = 3.45 ✓

30.67 k ✓

① assuming a wholly triang. diagram

$w = \frac{2 \times 30.67}{27.5^2} = 0.081$ ksf ✓

use 0.0902 ksf ✓ per PCA

② assuming a wholly rectang. diagr.

$w = \frac{30.67}{27.5} = 1.11$ ksf

By inspection this load diagram fits better than the triangular — i.e. check design using USDA criteria with an equivalent unif. w = 1.1 ksf ✓

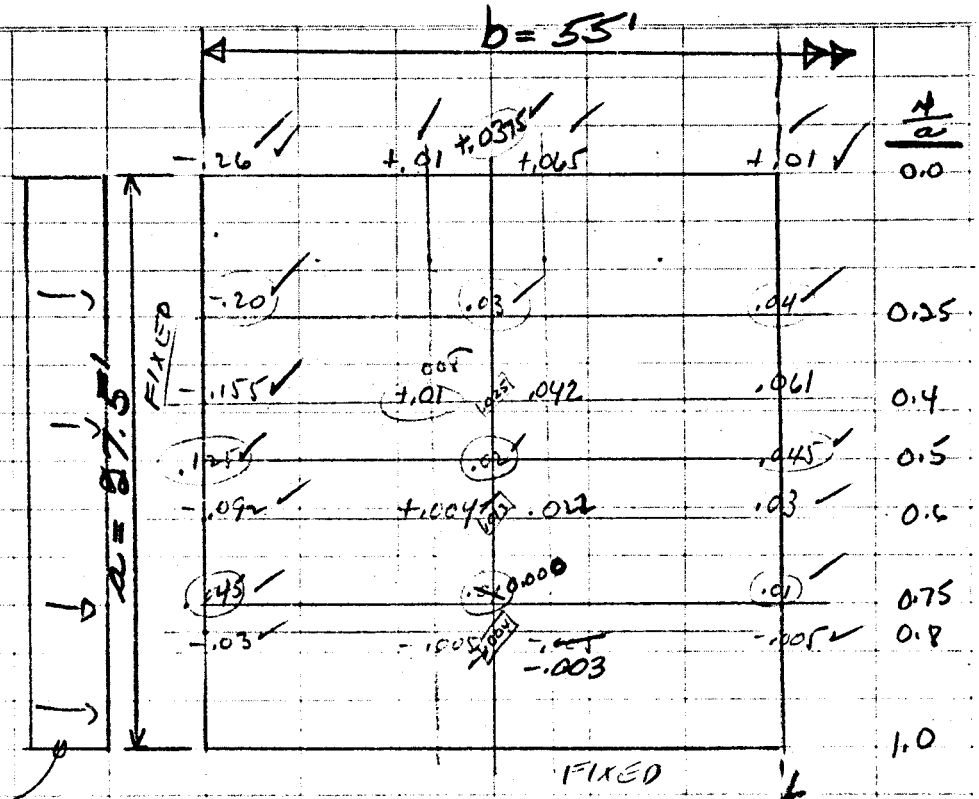
Job No. 4671 Page No. 3A-11

Computed by GAS Date 1/11/73
Checked by RGP Date 1-26-73
Reviewed by [illegible] Date 2-17-73
Approved by RGP Date 5-73

Subject STRUCTURAL
GULFSIDE GATE BAY
RECESS WALLS

Sheet No. 5 of

USDA Coefs



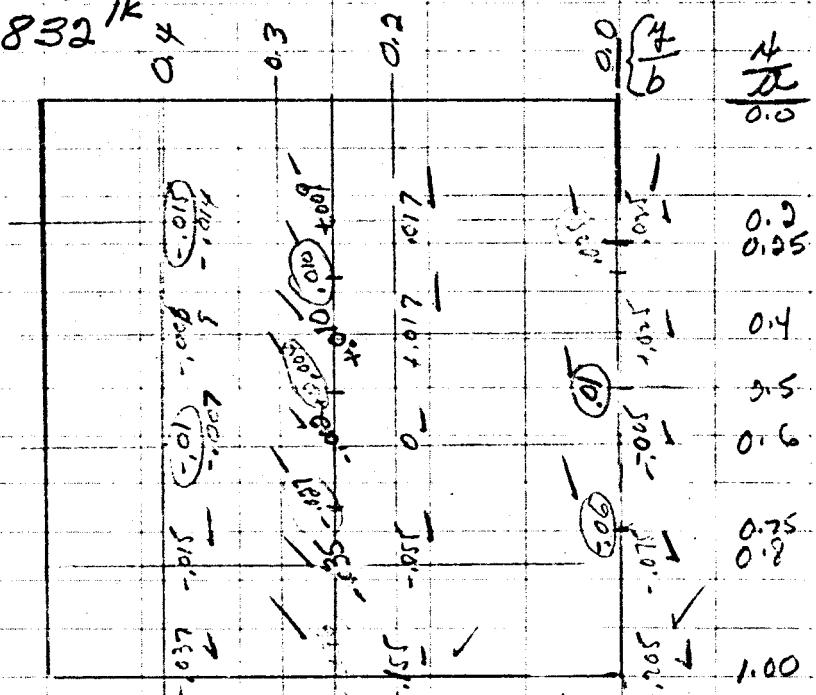
Horiz MOMENT COEFFICIENTS

p = 1.1 K/Ft.

$Pa^2 = 1.1 \times (27.5)^2 = 832^{1K}$

$M = 832 C^{1K}$

$b/a = 2.0$



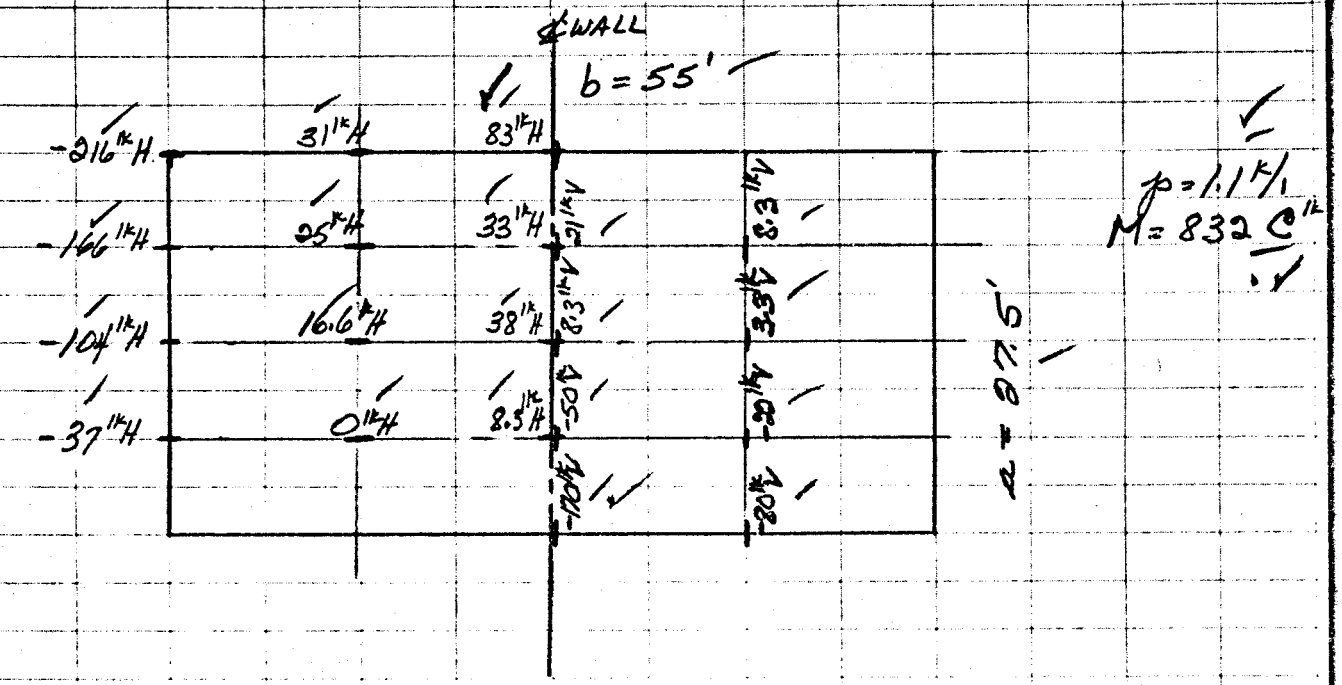
Vert. Moment

Job No. 4671 Page No. 3A-12

Computed by RGP Date 1-25-73
Checked by GAS Date 1/26/73
Reviewed by KJB Date 2/7/73
Approved by KGP Date 5-73

Subject STRUCTURAL
GULFSIDE GATE BAY
RECESS WALL

Sheet No. 6 of



DESIGN MOMENTS FOR COEFFICIENTS ON SHEET 5

Job No. 4671 Page No. 3A-13

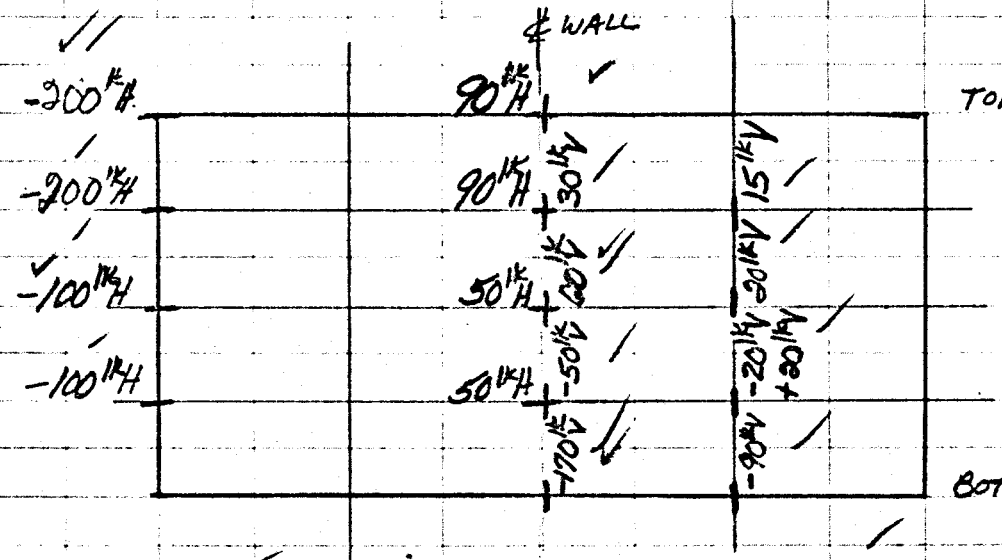
Computed by RGP Date 1-25-73
Checked by GAS Date 1/25/73
Reviewed by KJC Date 2/7/73
Approved by [illegible] Date 4-2-73

Subject STRUCTURAL
GULFSIDE GATE BAY
RECESS WALLS

Sheet No. 7 of

Since actual loads are not triangular or rectangular, judgement of actual moments is required. Moments are also different from theoretical computation because of rotations in construction joints and at fixed edges.

USE FOR DESIGN MOMENTS



Allow 133% for O.S.

$f_c' = 3000$ psi
$f_c = 1050$
$f_s = 20000$
$n = 9$

$A_s = \frac{M}{f_s j d_e} = \frac{12M}{80(7/8)d_e} = \frac{M}{1.46 d_e}$

$V = 70.8(0.407) = 28.8^k$

$v = 110(1.33)$ psi allowable $= \frac{V}{bd_e} = \frac{28800}{12 d_e}$

d_e reqd = 16.4" for shear

For concrete stress, d_e reqd $= \sqrt{\frac{200(2)}{1.05(7/8)(7/8)(1)(45/35)}} = 30.4"$
(No negative reinf.)

Job No. 4671 Page No. 3A-14

Computed by RGP Date 1-25-73
Checked by GAS Date 1/25/73
Reviewed by KJP Date 2/7/73
Approved by [illegible] Date [illegible]

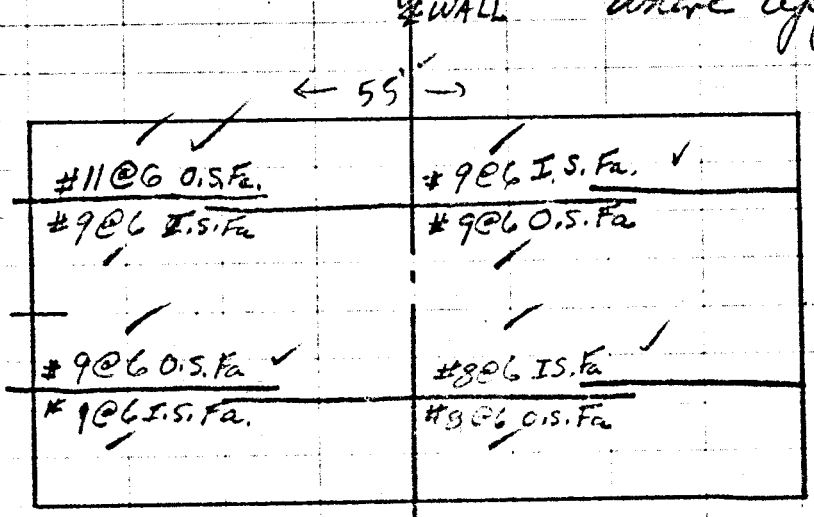
Subject STRUCTURAL
GULFSIDE GATE BAY
RECESS WALL

Sheet No. 8 of

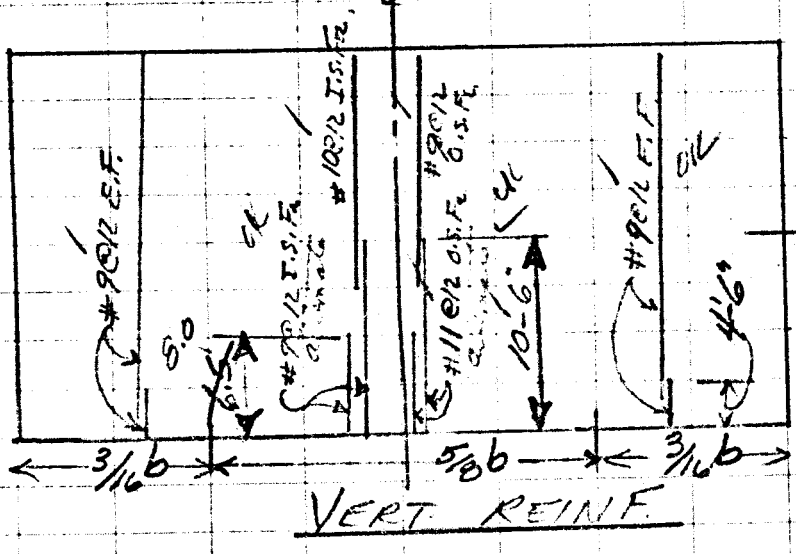
Use $t = 36"$
$d = 31.5"$ horizontal
$30.5"$ vertical

MIN. $A_s = 0.0025\,bt$
$= 1.08\ \square"/'$ (2 faces)
or
$A_s = 0.004\,bt$
$= 1.73\ \square"/'$ (2 faces)

Total A_s considers bending, shrinkage and distrib. of moment due to joints and direct tensile load where applicable.



HORIZ. REINF



VERT. REINF.

Job No. 4671 Page No. 3A-15

Computed by GAS Date 1/3/73
Checked by RGP Date 1-25-73
Reviewed by RJF Date 2/7/73
Approved by RGP Date 2-7-73

Subject Struct. Gulfside Gate Bay Recess Walls

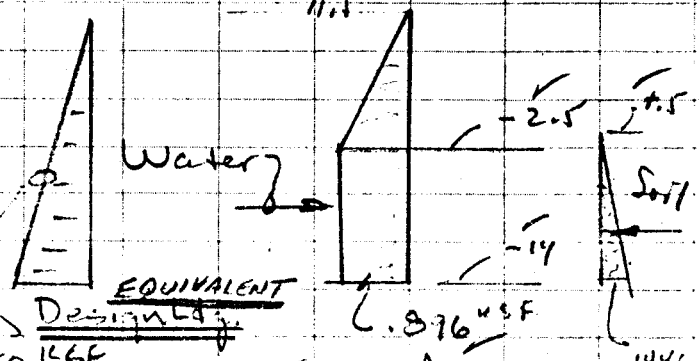
Sheet No. 9 of

Gulfside wall

B.) Head from inside (Reverse Head) (CASE I + II) ←

11.5

11.5' x .896 =	10.30
½ x 14 x .896 =	6.27
- ½ x 14.5 x .445 =	- 3.24
	13.33 k



Equiv. W = $\frac{13.33 \times 2}{27.5^2}$ = 0.0352 KSF (Does not control, See Sht 10)

Wall Steel - Int. loads

Co use 0.408 ✓ x External PCA MOMENTS ✓

See sht 10 ✓

Horiz.	Use DESIGN M	As Req'd	S.F.	Total As	
Top of wall					
Corner -80"	1.14	0.54	2.28	I.F.	✓
Center -43"	0.94	0.54	1.48	O.F.	
Midhgt.					
Corner -47"	1.02	.54	1.56	I.F.	
Center -43"	0.94	.54	1.48	O.F.	

Vert.

Bot of Wall
Corner nil
Center -80" - 1.79 ⅜" I.F.
Midhgt.
Corner 29" - .50 I.F.
Center 28" + .60 O.F.

Computed by GAS Date 1/3/73
Checked by RGP Date 1-25-73
Reviewed by RJB Date 2/7/73
Approved by RGP Date 2-7-73

Job No. 9671 Page No. 3A-16
Subject Struct. Gulfside Gate Bay Recess Walls
Sheet No. 10 of

Gulfside Wall

Load I + II 9

Soil $-\frac{1}{2} \times 14.5 \times$ [illegible] $= -3.24$

$\frac{1}{2} \times 13.5 \times .064 = 5.83^{k}$

$9.5 \times .064 = 0.21$

10.80^{k}

-4.5

-14

+9

13.5'

9.5'

.864 k.c.f.

eq u.d. $w_{\Delta} = \frac{10.80 \times 2}{27.5^{2}} = 0.0286$ k.f. @ Normal stresses

or use $\frac{.0286 \times 1.33}{.0935} \times$ Ext Δ Load Moment

$= \underline{0.408} \times$ " " "

- Controls - REVERSE HEAD

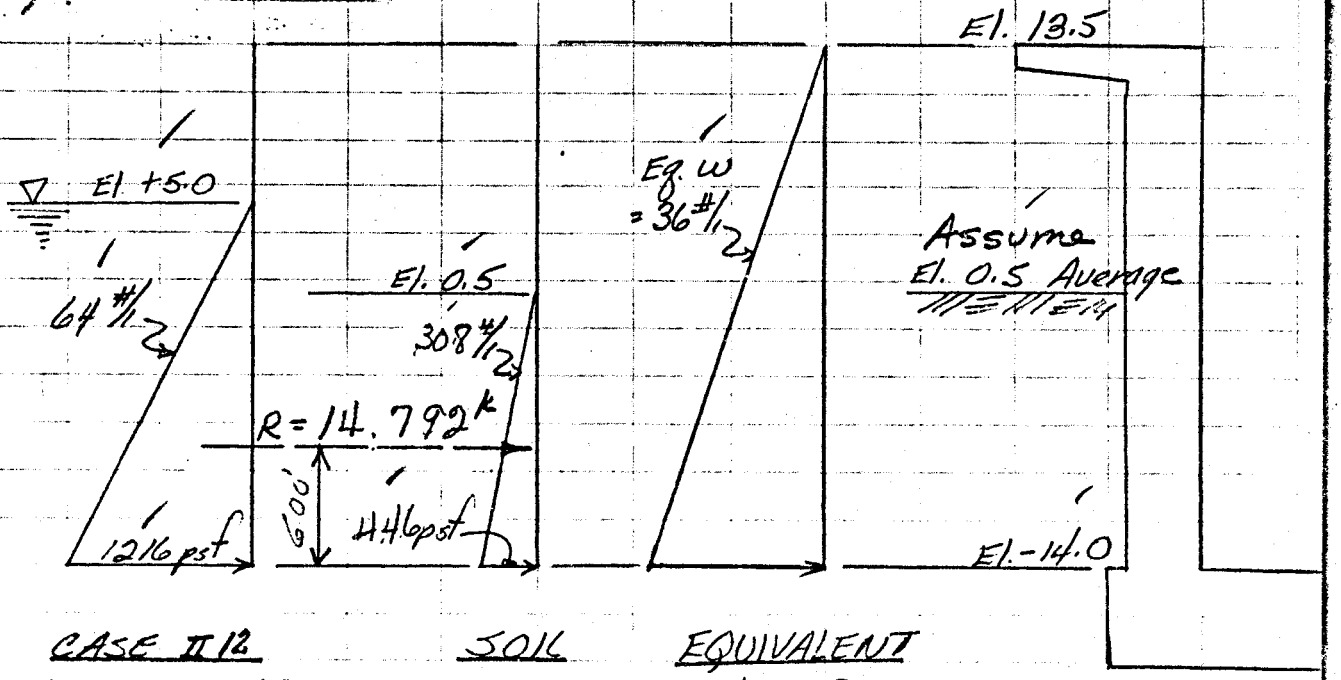
Job No. 4671 Page No. 3A-17

Computed by RGP Date 1-3-73
Checked by GAN Date 1/3/73
Reviewed by RJC Date 2/17/73
Approved by KC Date 5-7-73

Subject STRUCTURAL
GULFSIDE GATE BAY
RECESS WALLS

Sheet No. 11 of

LOCKSIDE WALL (42' x 27.5' High)



CASE II 12 WATER LOAD | SOIL LOAD | EQUIVALENT LOAD

Area of actual load diagrams and equivalent load

	Force	Arm	Moment
$64(19)^2(\frac{1}{2})$ =	11 552 #/	19/3	73 200
$30.8(14.5)^2(\frac{1}{2})$ =	3240	14.5/3	15 600
	14792	$\bar{x}$ = 6.00'	88 800

Equivalent $\frac{wh^2}{2}$ = 14,792 ; w = 39 #/ft ✓

a = 27.5' b = 42' b/a = 1.5 ✓

Design by Portland Cement Association bulletin No. ST63, "Rectangular Concrete Tanks:" ✓

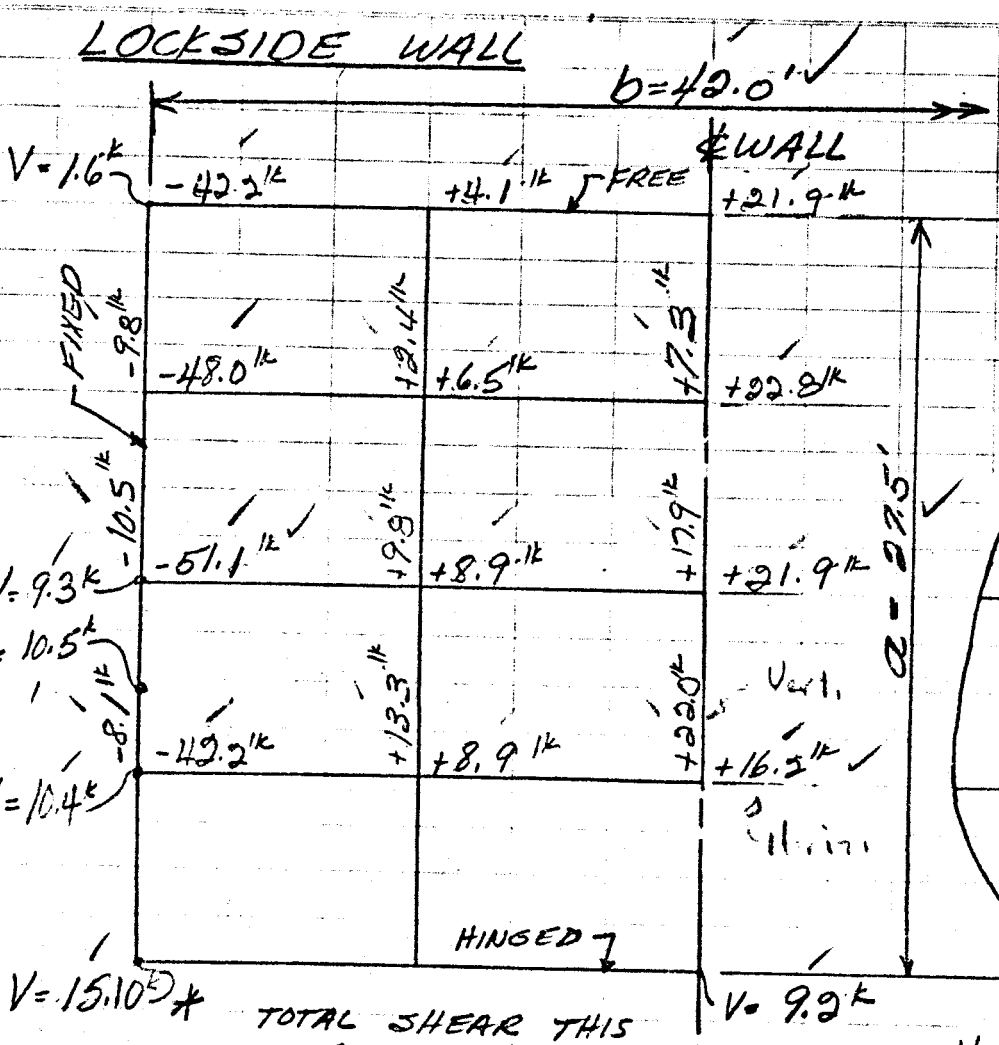
$M = wa^3 \times C = 39(27.5)^3 C = 810{,}000\,C^{\#} = 810\,C^{k}$ ✓

$V = wa^2 \times C = 39(27.5)^2 C = 29{,}500\,C^{\#} = 29.5\,C^{k}$ ✓

Computed by RGP Date 1-3-73
Checked by [illegible] Date 1/3/73
Reviewed by [illegible] Date 1/7/73
Approved by [illegible] Date 5-7-73

Job No. 4611 Page No. 3A-18
Subject STRUCTURAL GULFSIDE GATE BAY RECESS WALLS
Sheet No. 12 of

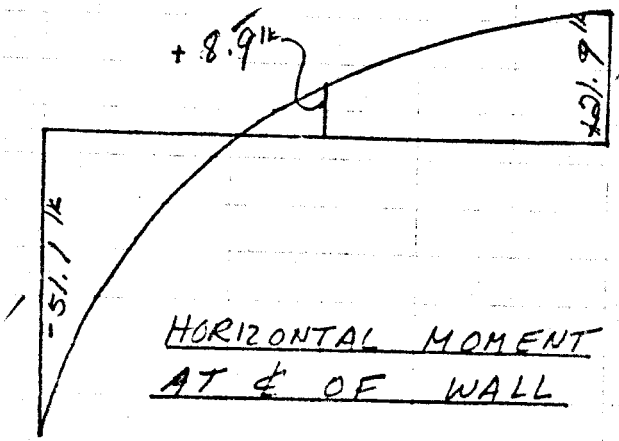
LOCKSIDE WALL



TOTAL SHEAR THIS EDGE = 186.0k

WALL ELEVATION

VERTICAL MOMENT AT ℄ OF WALL



HORIZONTAL MOMENT AT ℄ OF WALL

TABLE II

* Nearest shear at corner of bottom edge

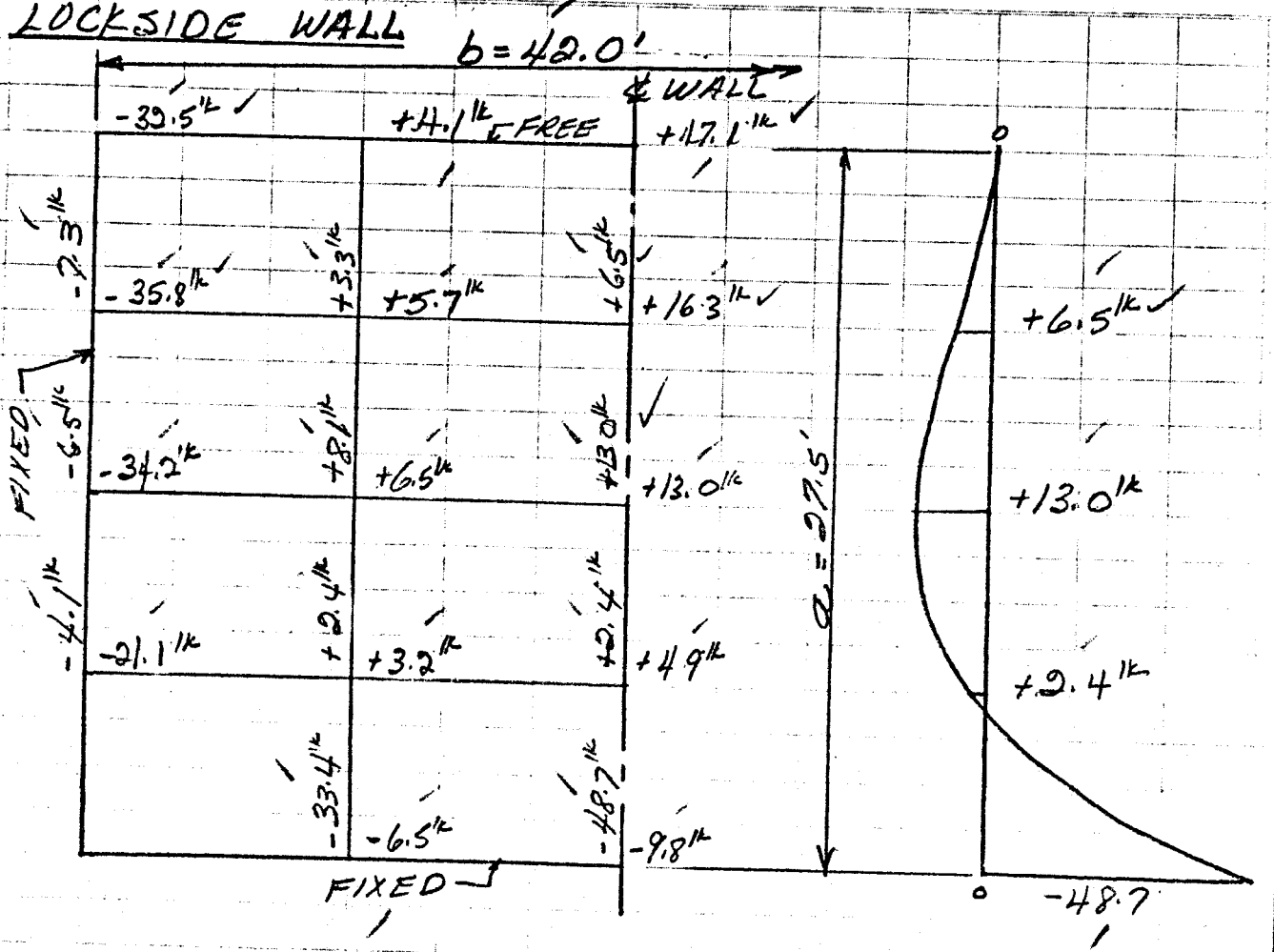
Job No. 4611 Page No. 34-19

Computed by RGP Date 1-3-73
Checked by [illegible] Date 1/5/73
Reviewed by [illegible] Date 2/7/73
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GULFSIDE GATE BAY
RECESS WALLS

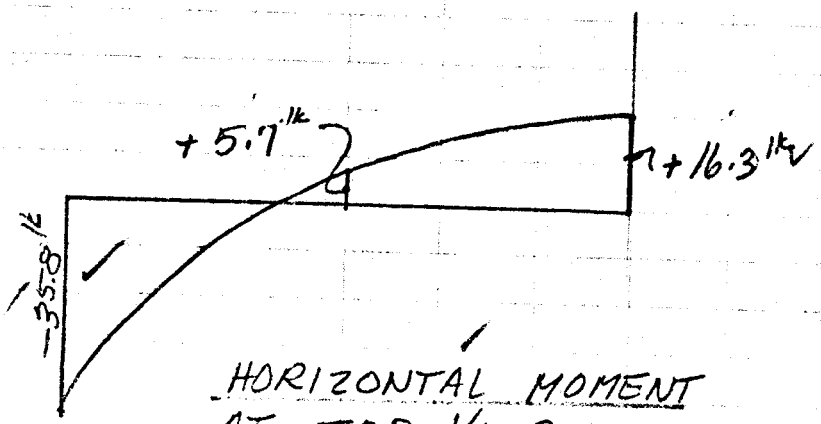
Sheet No. 13 of

LOCKSIDE WALL



WALL ELEVATION

VERTICAL MOMENT AT ℄ OF WALL



HORIZONTAL MOMENT AT TOP 1/4 POINT OF WALL

TABLE III

Job No. 4671 Page No. 3A-20

Computed by RGP Date 1-3-73
Checked by GA Date 1/5/73
Reviewed by RUF Date 2/7/73
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GULFSIDE GATE BAY
RECESS WALLS

Sheet No. 14 of

Use the following design values $t = 30"$ ✓
$d_e = 25.5"$ Horz. ✓
$= 34.5"$ Vert. ✓

HORIZONTAL REINF. $A_s = \frac{M}{1.46 d_e}$ ✓

	CORNER					CENTER			
$\frac{y}{a}$	M	d_e	A_s bending	Use		M	d_e	A_s bending	Use
Upper 2/3	-50 k	25.5"	1.34 □"	#9@6 O.S. Face #9@6 I.S. Faces + V extra for T-force from gate support block.		+20 k	25.5"	0.54 □"	#9@12 E.F.
Lower 1/3	-40 k	25.5"	1.07 □"	#8@6 E.F.		+15 k	25.5"	0.40 □"	#8@12 E.F.

Min $A_s = 12(30)(.0025) = 0.90$ □"/' (½ ea Face)
or $(.0034) = 1.44$ □"/' (½ ea Face)

$v = \frac{10500}{12(25.5)} = 34.3$ psi. O.K.

VERTICAL REINF.

	CENTER					CORNER			
$\frac{x}{a}$	M	d_e	A_s bending	Use		M	d_e	A_s bending	Use
Bottom	-45 k	24.5"	1.26	#8@6		-8.0 k	24.5"	0.23	#8@12
Mid-Height	+20 k	24.5"	0.56	#8@12		-8.0 k	24.5"	0.23	#8@12

Job No. 4671 Page No. 3A-21

Computed by RGP Date 1-9-73
Checked by [illegible] Date 1/10/73
Reviewed by [illegible] Date 1/15/73
Approved by [illegible] Date 5-1-73

Subject STRUCTURAL GULFSIDE GATE BAY RECESS WALLS

Sheet No. 15 of

GULFSIDE WALL

Beam @ Top of Wall - Horizontal

$b/a = 2$ ✓ FROM PCA

Total = $0.0538 w a^2 b = 0.0538 (70.8) b$

$= 3.81 b = 3.81^{k}/_{l}$

FROM ACI METHOD 3 - 1963 $A/B = 0.5$ ✓

Case 6 gives max. value

$w = 1.1$ ksf

$Load = 0.97(1.1)(27.5)(3/8) = 11.^{k}/_{l}$ ✓

Case 8

$Load = 0.89(1.1)(27.5)(3/8) = 10.2^{k}/_{l}$ ✓

Use $10^{k}/_{l}$ ✓

Beam Design (Horizontal)

$\pm M = \frac{10(52.5)^2}{10} = 2760^{\prime k}$; $A_s = \frac{M}{1.66d(1.33)} = 25.9^{\square''}$ (d = 55")

$V = \frac{10(52.5)}{2} = 263^{k}$; $v = \frac{V}{bd(1.33)} = 54.7^{psi}$ OK

Use Bm 3.5' x 5'-0"

Shear area = 36(36) + (42)(55) = 3610 in² OK

$f_c = \frac{2(2760)(12)}{0.9(87)(42)(55)^2} = 1.5$ ksi Use, Compression reinforcing = $7^{\square''}$ OK

Job No. 4671 Page No. 3A-22

Computed by RGP Date 1-9-73

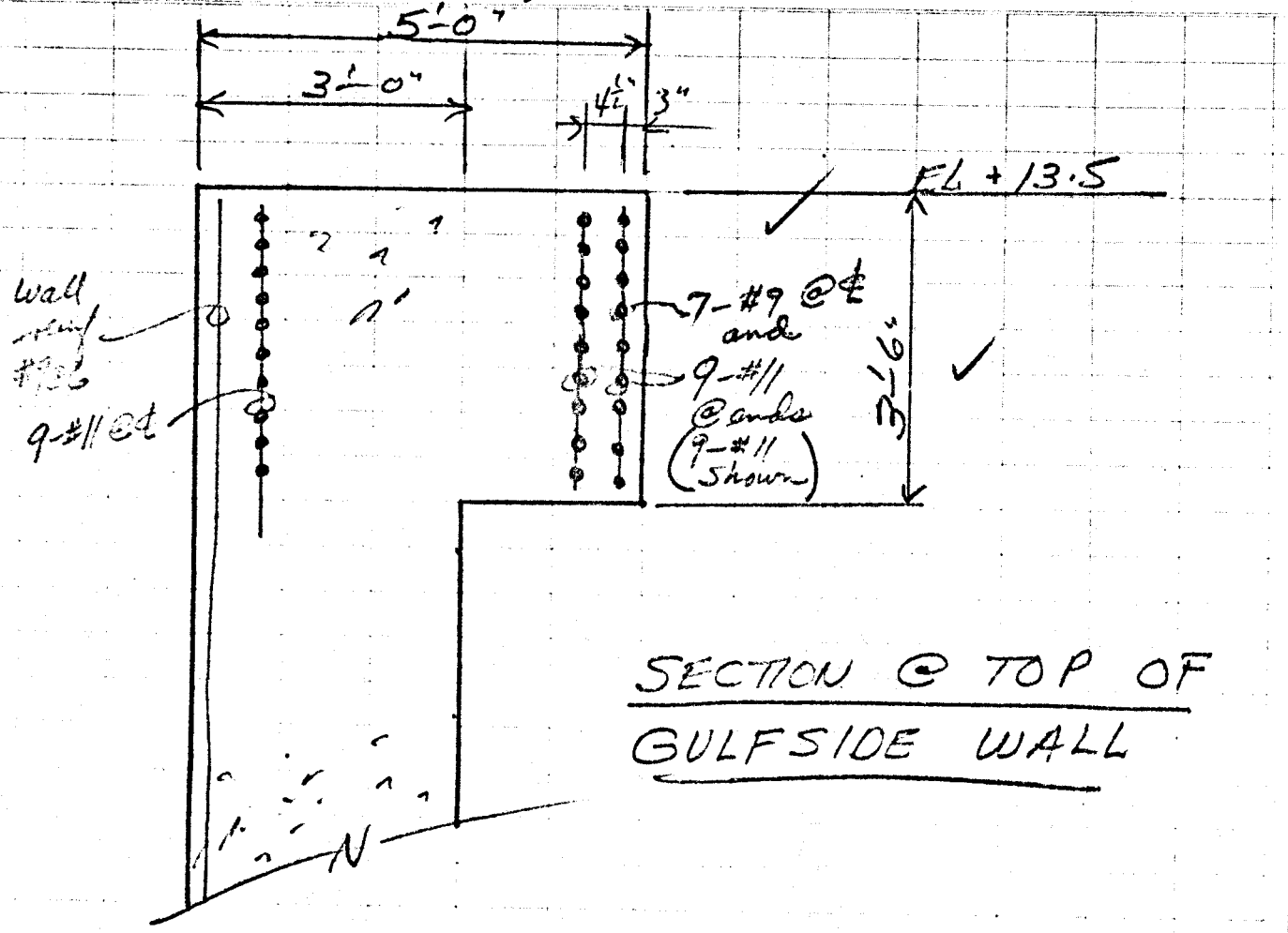
Checked by [illegible] Date 1/11/73

Reviewed by [illegible] Date 1/15/73

Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GULFSIDE GATE BAY
ACCESS WALLS

Sheet No. 16 of



SECTION @ TOP OF GULFSIDE WALL

Job No. 4671 Page No. 3A-23

Computed by RGP Date 1-9-73
Checked by RJR Date 1/10/73
Reviewed by AS Date 2/5/73
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
LAKESIDE GATE BAY
RECESS WALLS

Sheet No. 17 of

LOCKSIDE WALL

Beam @ TOP OF WALL - HORIZONTAL

$b/a = 1.5$ ✓ Total $= 0.0295$ (one) $(29.5)\,b = 0.87\,b$ ✓

$= 0.87\,k/l$ ✓

PCA.

Beam Design

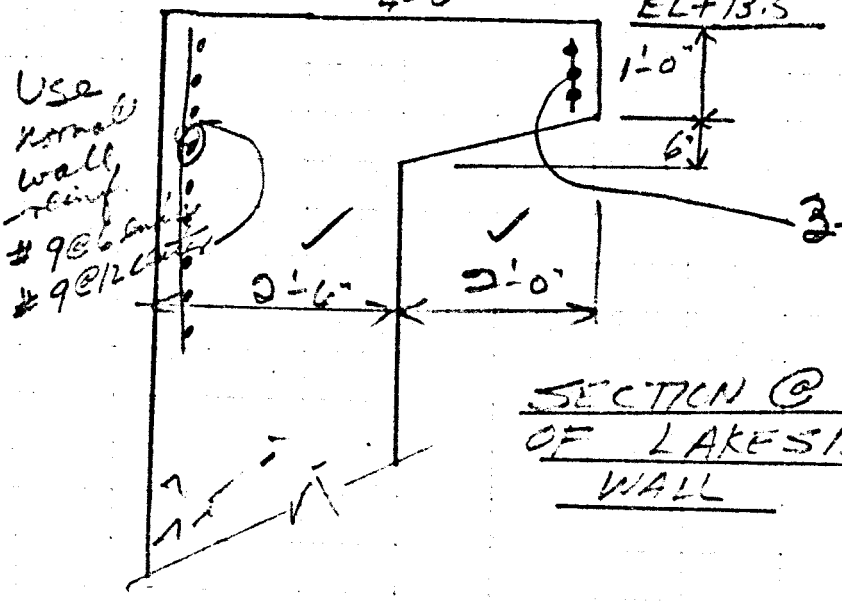
$$\pm M = \frac{0.87(40.4)^2}{10} = 142^{k} \text{ ✓}; \quad A_s = \frac{M}{1.46d} = 1.95^{\square'} \text{ ✓}$$

$$V = \frac{0.87(40.4)}{2} = 17.6^{k} \text{ ✓}. \quad v = \frac{V}{bd} = 9.7 \text{ psi ok ✓}$$

Use beam ✓

Shear area $= 48(30) + 15(24) = 1800^{\square'}$ ✓ OK

f_c — ok ✓

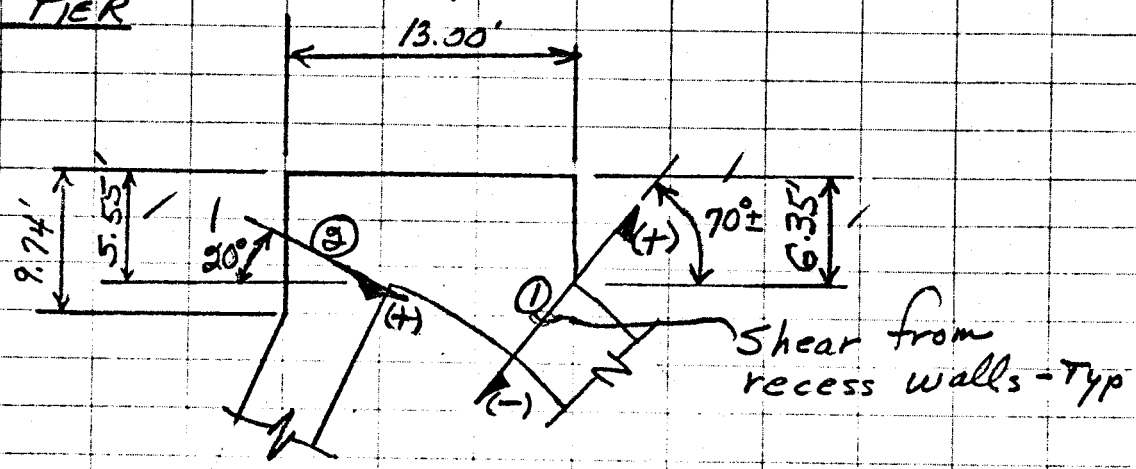


SECTION @ TOP OF LAKESIDE WALL

Computed by RGP Date 1-3-73
Checked by GAS Date 1/3/73
Reviewed by RJF Date 1/7/73
Approved by ACC Date

Job No. 4671 Page No. 34-24
Subject STRUCTURAL
GULFSIDE GATE BAY
RECESS WALLS
Sheet No. 1 of

RECESS PIER



Assume shear from recess walls is uniform intensity for full wall height

Shear Q: From PCA BULLETIN ST63 for wall b/a = 2 w/TOP FREE.

LOAD I + II 1

Total $V = 0.148\ wa^2 L = 0.148\,(70.8)(55) = 575^{k}$

$V_1 = \frac{575}{27.5} = \underline{-20.9^{k}/_1}$ ✓

LOAD I + II 7

Equivalent $p_2 = \left[896(11.5+7) - 446(14.5)\left(\frac{1}{2}\right)\right]\frac{2}{(27.5)^2}$

$p_2 = +35.3^{\#}/_0'$

$V_1 = 20.9\left(\frac{35.3}{93.5}\right) \cong \underline{+7.9^{k}/_1}$

LOAD I + II 12

$p_2 = 39^{\#}/_1'$

Total $V_1 = \frac{39}{93.5}(20.9) \cong \underline{-8.7^{k}/_1}$ ✓

Computed by RGP Date 1-4-73
Checked by GAS Date 1/5/73
Reviewed by RJ Date 2/17/73
Approved by KCL Date 5-7-73

Job No. 4671 Page No. 34-25
Subject STRUCTURAL
GULFSIDE GATE BAY
RECESS WALLS
Sheet No. 2 of

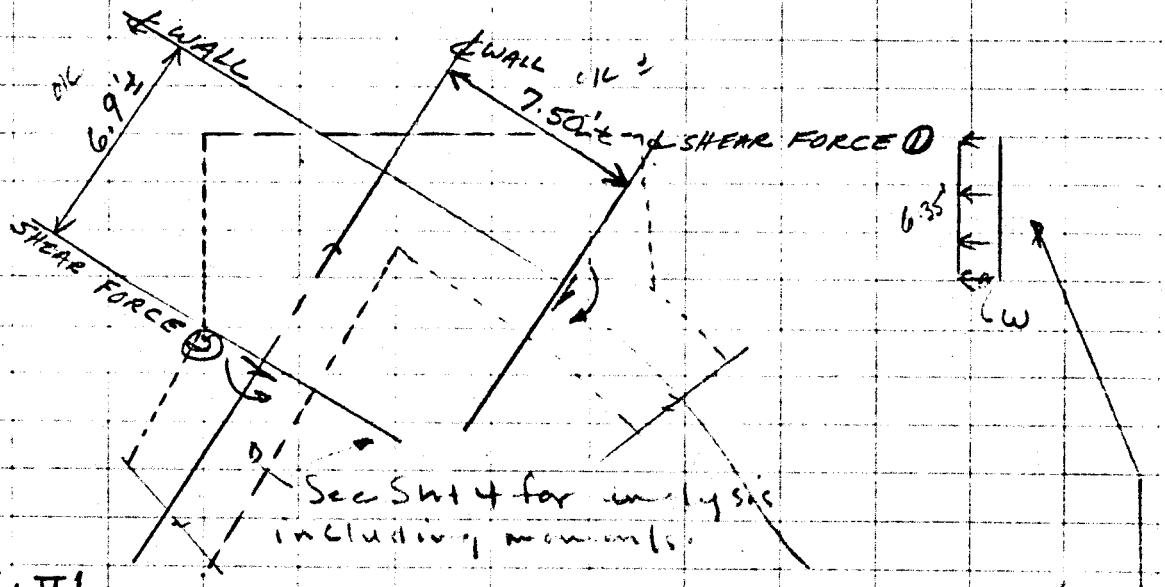
Shear ② From PCA BULLETIN ST 63
for wall b/a = 1.5, w/Top FREE

LOAD I + II 2

Total $V = 0.175\,wa^2b = 0.175(29.5)(42)$

say = 200^K

$$V/_1 = \frac{200}{27.5} = \pm 7.3\ ^K/_1$$



Case I + II 1

Max torsion on Wall = 20.9 (27.5)(7.5)
+(216+166+104+37) ≅ 4895^IK

Max Overturning Moment (Neglect effect of walls to resist external load applied directly to recess pier)

$0.0935(27.5)^3(\frac{1}{6})(6.35) = 2050^{IK}$

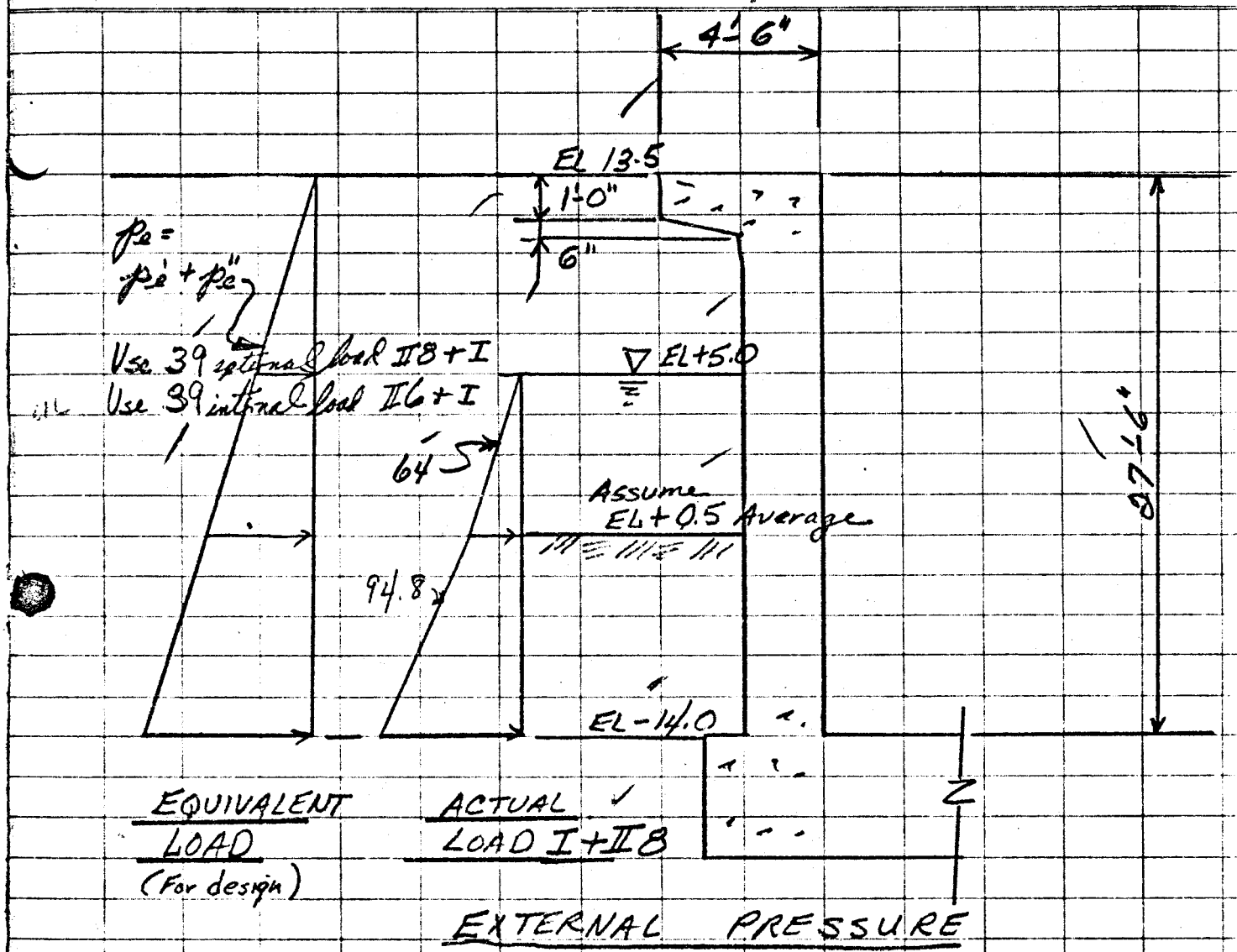
Max Shear = $0.0935(27.5)^2(\frac{1}{2}) = 35.4\ ^K/_1$

Job No. 4671 Page No. 3A-27

Computed by RGP Date 1-3-73
Checked by GAS Date 1/5/73
Reviewed by KRP Date 2/2/73
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
LAKESIDE GATE BAY
RECESS WALLS

Sheet No. 1 of



See sheets 2 thru 4 for equivalent loads

SEE "Concrete Information No. ST 63, Rectangular Concrete Tanks" by the Portland Cement Association

Moment = $C \times wa^3$ = 810 000 C Ext. Load
C Int. Load

Shear = $C \times wa^2$ = 29 500 C Ext. Load
C Int. Load

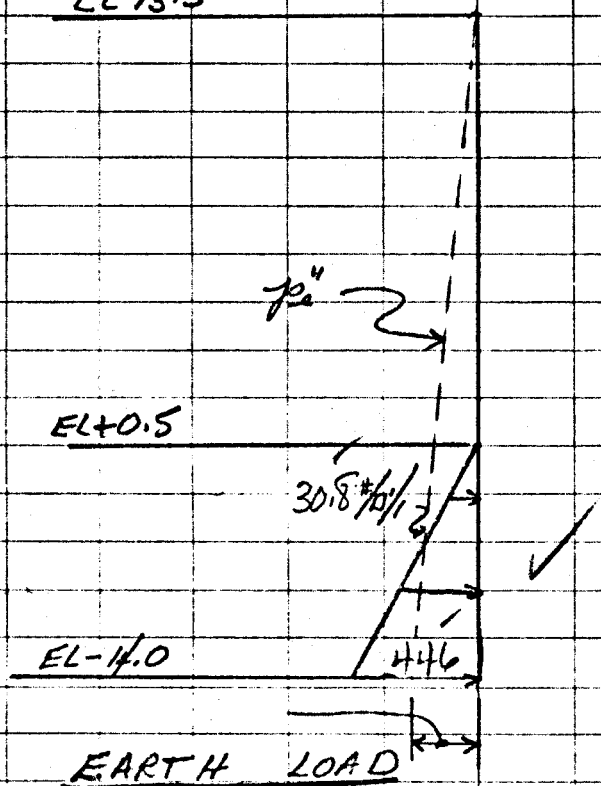
Job No. 4671 Page No. 3A-28

Computed by RGP Date 1-3-73
Checked by GAS Date 1/3/73
Reviewed by RTB Date 2/7/73
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
LAKESIDE GATE BAY
RECESS WALLS

Sheet No. 9 of

EQUIVALENT LATERAL LOADS - EARTH LOAD



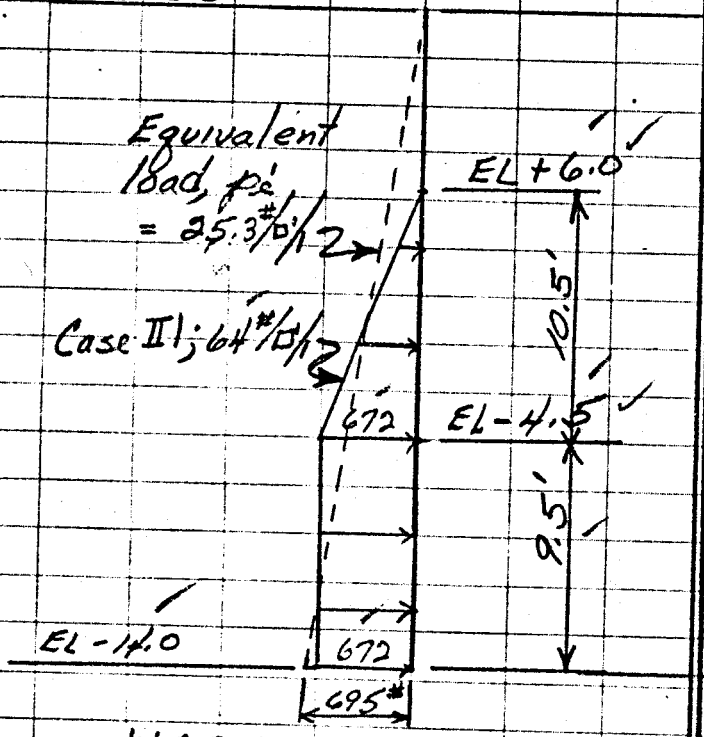
$$44.6(14.5)(1/2) = \frac{(27.5)^2 p_e}{2}$$

$$p_e'' = 8.4\ \#/ft$$

Computed by RGP Date 1-3-73
Checked by GAS Date 1/2/73
Reviewed by RDT Date 2/1/73
Approved by _____ Date _____

Job No. 4671 Page No. 3A-29
Subject STRUCTURAL
LAKESIDE GATE BAY
RECESS WALLS
Sheet No. 3 of _____

EQUIVALENT LATERAL LOADS - Water Load



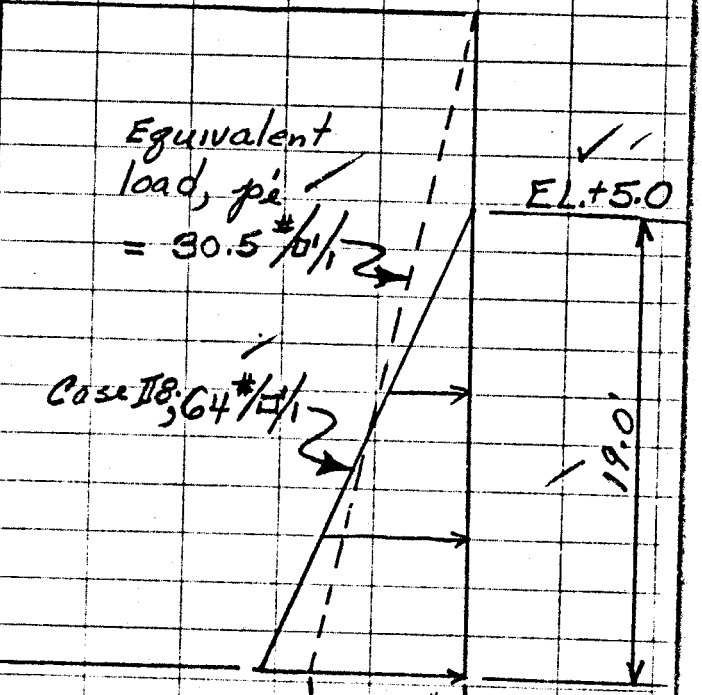
WATER LOAD
CASE II1

$672(9.5) = 6390$ #/'
$672(10.5)(\frac{1}{2}) = 3530$ #/'
9920 #/'

$\frac{1}{2}(27.5)^2 p_e = 9920$

$p_e \cong 25.3$ #/□'

Case II1 DOES NOT CONTROL



WATER LOAD
CASE II8

$19.0\left(\frac{12}{2}\right) = \frac{(27.5)^2 p_e}{2}$

$p_e = 30.5$ #/□'

Case II8 Controls for external water load on walls.

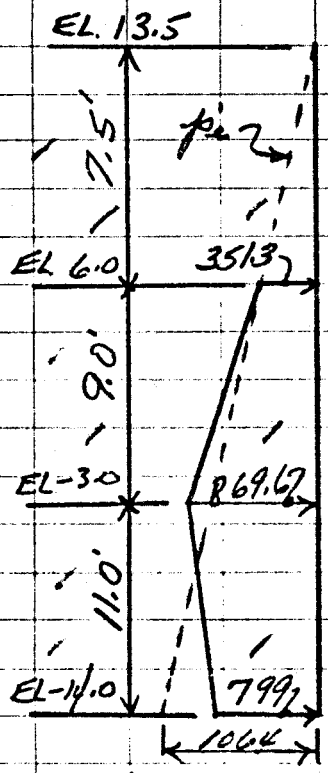
Job No. 4671 Page No. 3A-30

Computed by RGP Date 1-3-73
Checked by GAS Date 1/2/73
Reviewed by RTP Date 2/1/73
Approved by RGP Date 2-1-73

Subject STRUCTURAL
LAKESIDE GATE BAY
RECESS WALLS

Sheet No. 4 of

CASE II 6B CONTROLS FOR INTERIOR WATER LOAD ON THE LOCKSIDE WALL



WATER LOAD
CASE II 6B (with waves)

799 (11) = 8790 #/'
70.6 (11) (1/2) = 388
351.3 (9) = 3160
518.3 (9) (1/2) = 2332
14670 #/'

$\frac{27.5^2}{2} p_a =$

$p_a = 38.7$ #/0'/'

Job No. 4671 Page No. 3A-31

Computed by RGP GNS Date 1-3-73
Checked by Date 1/3/73
Reviewed by RTC Date 1/7/73
Approved by Date

Subject STRUCTURAL
LAKESIDE GATE BAY
RECESS WALLS

Sheet No. 5 of

DESIGN walls for external water load due to CASE II 8 and chamber side wall for water load due to case II 6 (with waves)

LOCKSIDE WALL

From "gulfside gate bay" & "gulfside wall"

Stresses will be $\frac{39'}{73.5'} = 0.417$ of gulfside wall (PCA) for this wall external & internal loads.

Use max V = 29.5 (@.417) ≅ 12.3 k
max M = 200 (@.417) = 83.4 k ✓

Use wall t = 2'-6" c/c
d = 25.5" horz
d = 24.5" vert

Horz. Reinf

#10@6 O.S. Fa Corner
#10@6 I.S. Fa Corner
#10@12 I.S. Fa Center
#10@12 O.S. Fa Center

Vert. Reinf.

#9@6 E.F. Bottom
#9@12 E.F. mid-height

Computed by RGP Date 1-3-73
Checked by GAS Date 1/5/73
Reviewed by RJE Date 1/7/73
Approved by ____ Date ____

Job No. 4671 Page No. 3A-32
Subject STRUCTURAL
LAKESIDE GATE BAY
RECESS WALLS
Sheet No. 6a of ____

LAKESIDE WALL

From "gulfside gate bay, "locksside wall", stresses will be 39/39 for this wall.

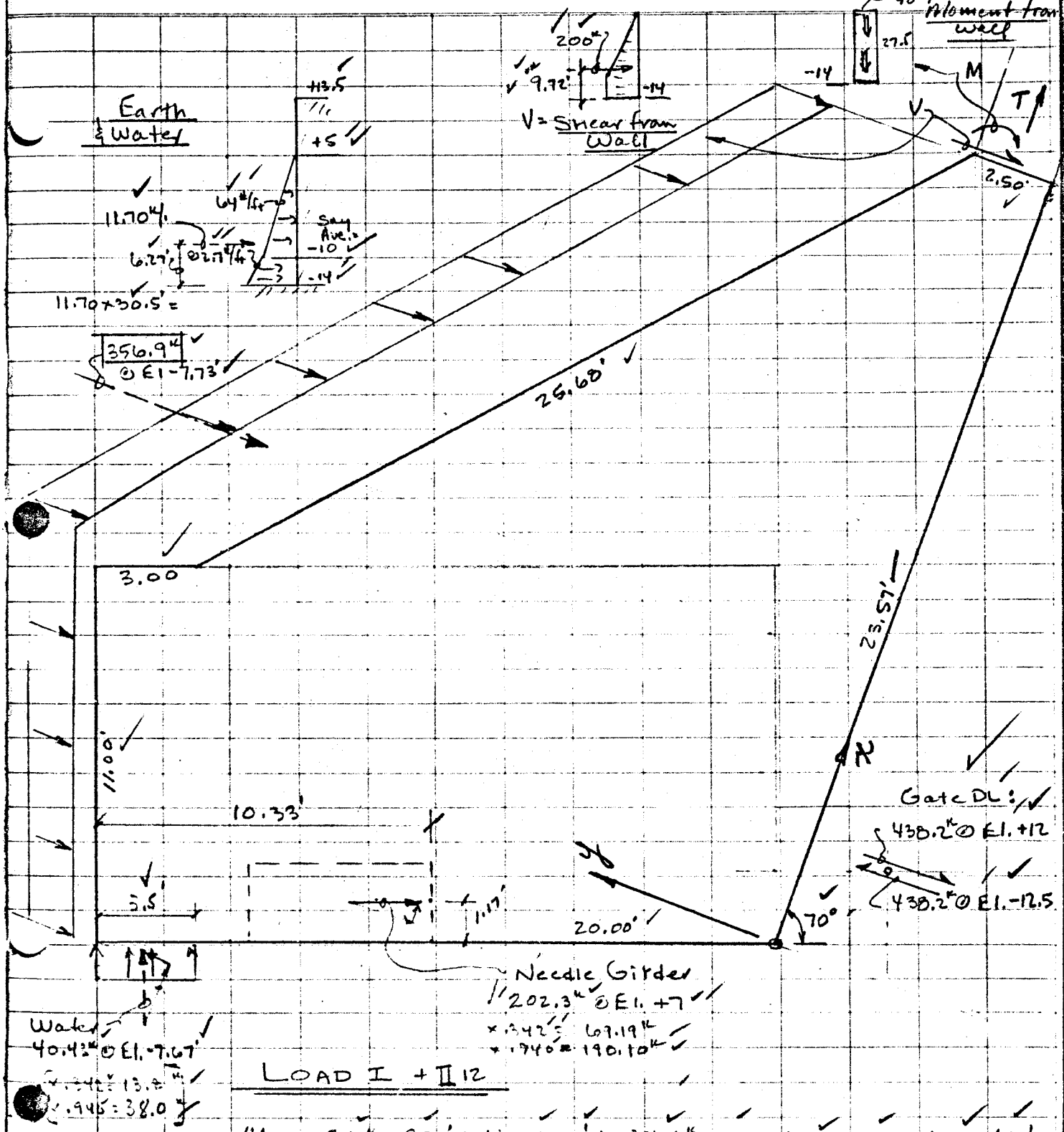
~~[illegible]~~ Use same design as for "gulfside gate bay, locksside wall".

Job No. 4671 Page No. 3A-33

Computed by GAS Date 1/8/73
Checked by WJZ Date 1/9/73
Reviewed by KSP KSP Date 3-20-73
Approved by [illegible] Date [illegible]

Subject Struct. Gulfside Gate Bay: Gate Support Bldg.

Sheet No. 1 of



LOAD I + II 12

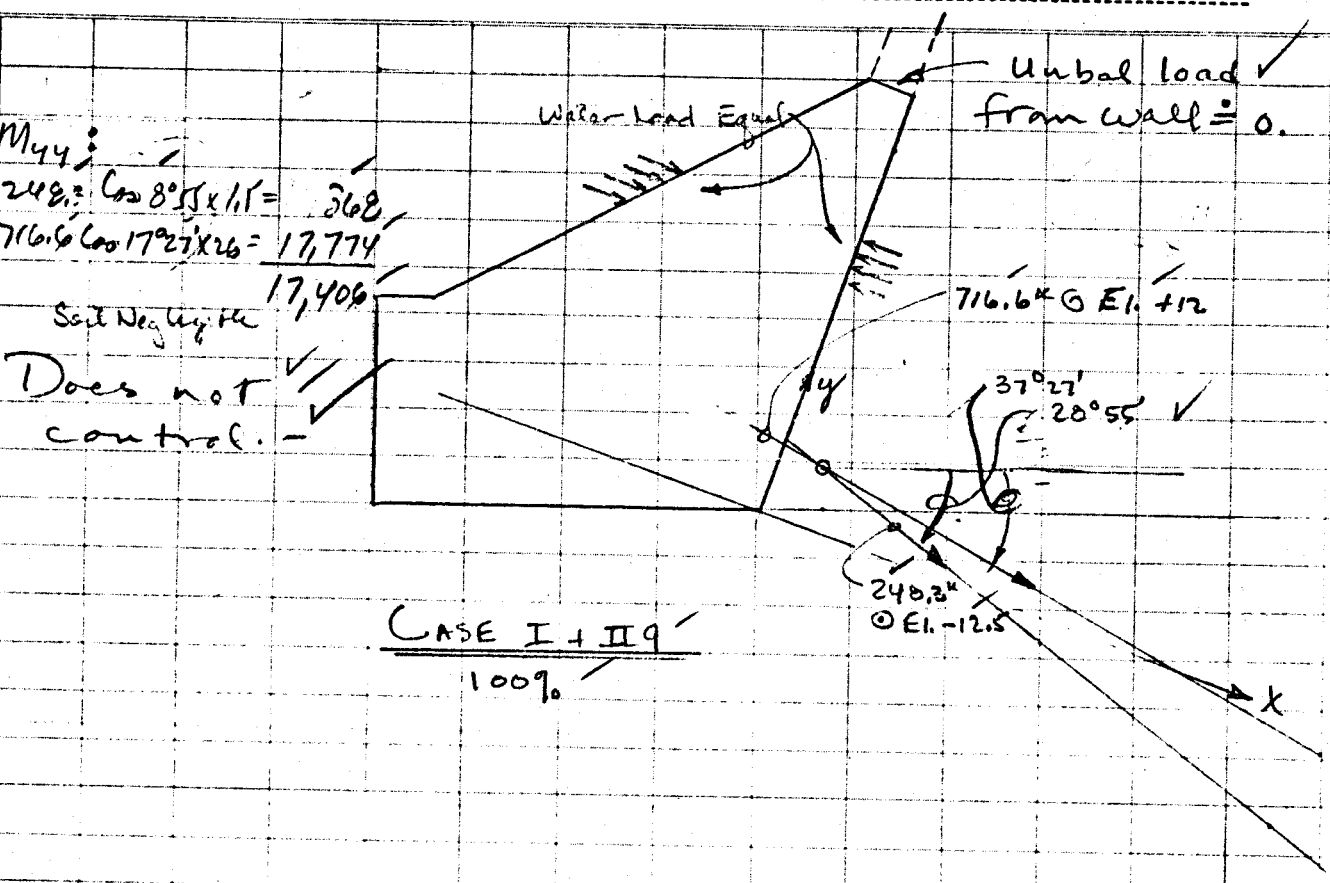
$M_{yy} = 200^{k} \times 9.72' + 190.10 \times 21' + 356.9^{k} \times 6.27 + 430.2 \times 24.5 - 13.8 \times 6.33'$

$1944 + 3992 + 2238 + 10726 - 87 = 19,923^{k}$

$M_{xx} = 37.97^{k} \times 6.27' + [illegible] = [illegible]$ Taken on wall

Computed by GAS Date 1/8/73
Checked by WJZ Date 2/2/73
Reviewed by RGP Date 3-20-73
Approved by Date

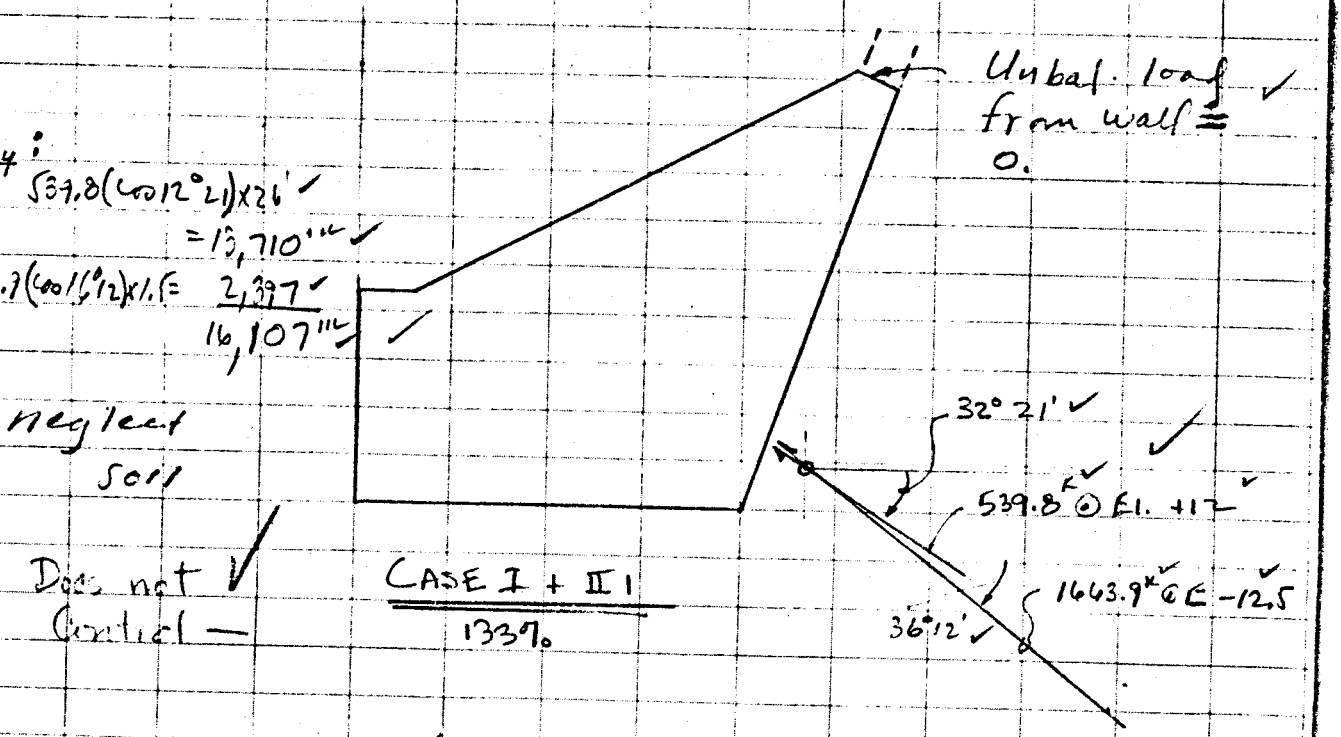
Job No. 4671 Page No. 3A-34
Subject Struct
Gulfside Gate Bay
Gate Support Block
Sheet No. ✓ of



M_{44}:
248.3 Cos 8°55 x 1.5 = 368 ✓
716.6 Cos 17°27' x 26 = 17,774 ✓
17,406 ✓

Soil Negligible ✓
Does not control. ✓

CASE I + II ✓
100% ✓



M_{44}:
539.8 (Cos 12°21) x 26' ✓
= 13,710'ᴷ ✓
1663.9 (Cos 16°12) x 1.5 = 2,397 ✓
16,107'ᴷ ✓

Neglect Soil

Does not Control ✓

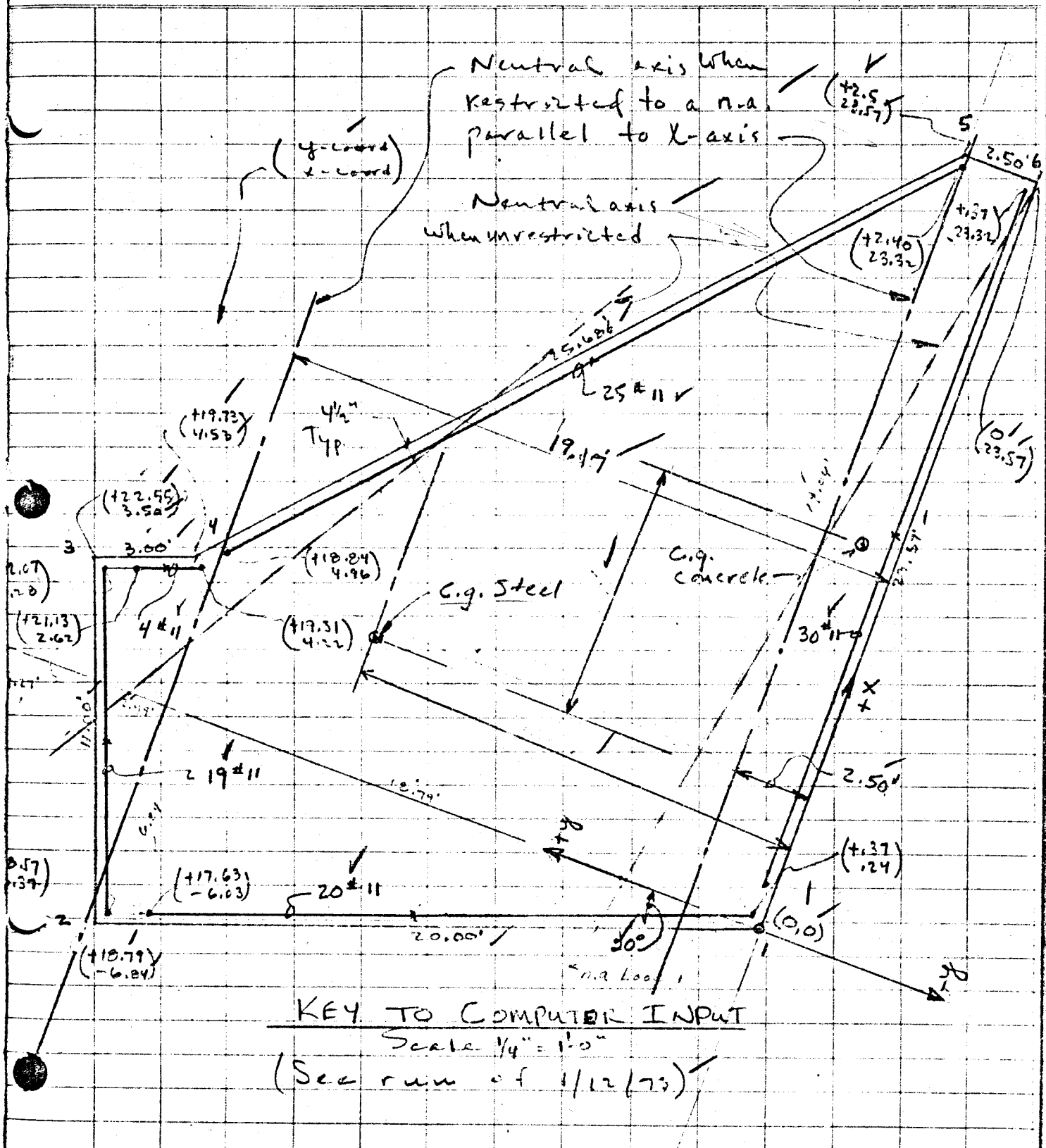
CASE I + II
133% ✓

Job No. 4671 Page No. 3A-35

Computed by GAS Date 1/2/73
Checked by WJZ Date 2/2/73
Reviewed by RSC RGP Date 3-20-73
Approved by [illegible] Date 3-21-73

Subject Struct. Gulfside Gate Bay Gate Support Bleed

Sheet No. 3 of



KEY TO COMPUTER INPUT

Scale 1/4" = 1'-0"

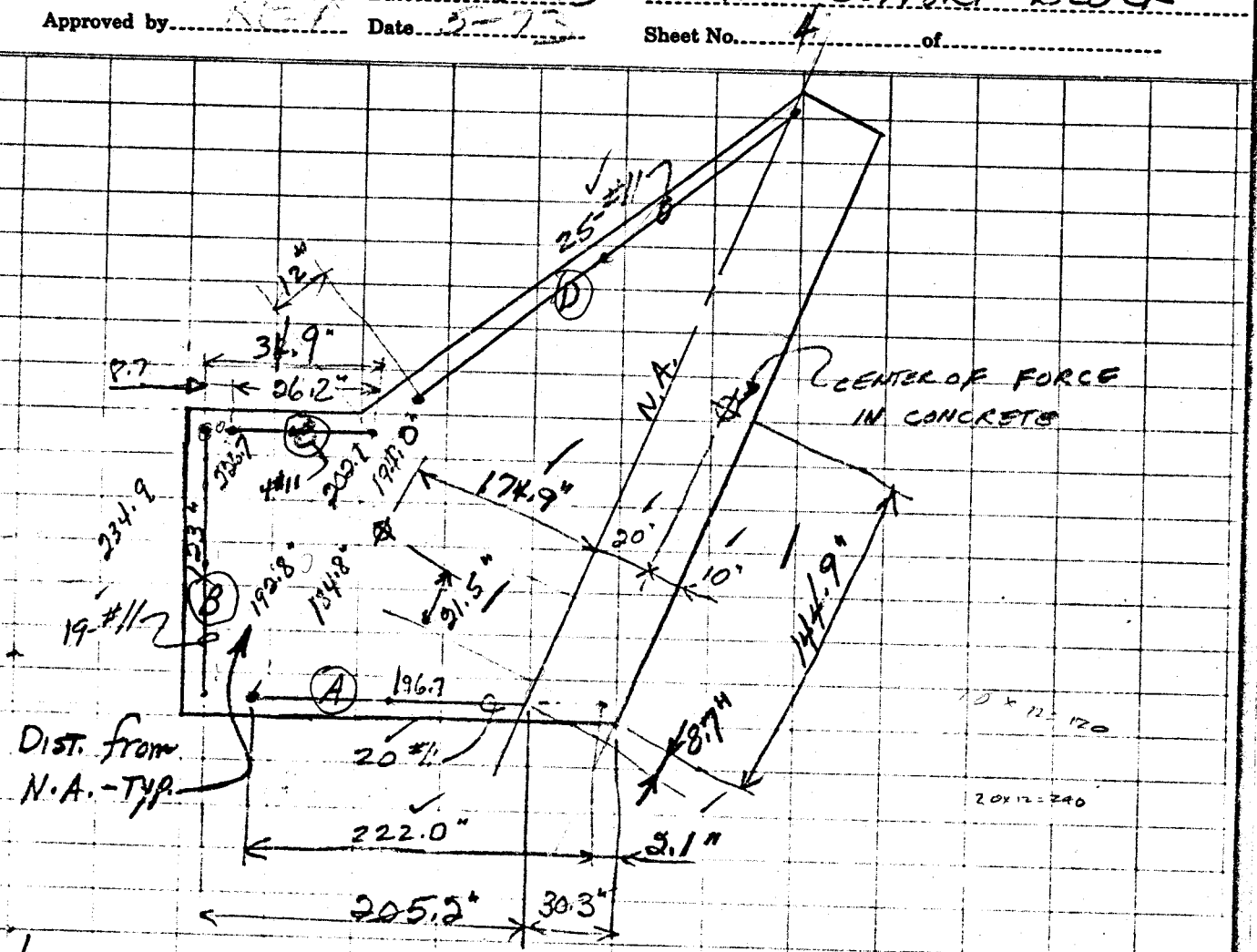
(See sum of 1/12/73)

Job No. 4671 Page No. 34-36

Computed by RGP Date 3-26-73
Checked by GA Date 3/30/73
Reviewed by [illegible] Date 3-30-73
Approved by [illegible] Date 3-[illegible]

Subject STRUCT. GULFSIDE GATE BAY GATE SUPPORT BLOCK

Sheet No. 4 of



LOCATE CENTER OF REINF TENSILE FORCE

$\frac{196.7\ (80)}{522.9}$

	No. BARS	ave f	Force	y Dist	Moment
BARS A.	17.7	.393	6.96	123.2"	857
BARS B	19.0	.910	17.29	214.5"	3709
BARS C	4.0	.913	3.65	214.7	783
BARS D	25.0	.413	10.33	129.3"	1336
			38.23 Asfs		6685 Asfs

Actual Values fs times these
Actual Values are Asfs times these

From N.A., y = 174.9"

	X DIST	
6.96	-53.6	-373
17.29	-19.2	332
3.65	44.3	162
10.33	130.	-1364
38.23		-821

$y = \frac{821}{38.23} = 91.5"$

STANLEY CONSULTANTS

IBM 1130 COMPUTER PROGRAM
CE 12.0005
BIAXIAL BENDING ANALYSIS (SHEET 1)

Sheet ... of ....

Dept. No. ..... Job No. .....

Computed by GMS Date..... Reviewed by..... Date..... Punched by..... Subject.....

Checked by RJB Date..... Approved by..... Date..... Verified by..... .....

Page No. .....

Job No. .....

JOB
XEQ BIAXL

ENGINEER: TWO 80 COLUMN LINES ARE USED TO IDENTIFY OR TITLE THE PROBLEM. ENTER TITLES NEXT TWO LINES.

GAGE BAR + GATE SUPPORT BLOCK JOB 4671 MADE GAS CHK RJB 1/12/73

NO. CONC. COORD.	NO. STEEL LINES	NO. PROBLEMS	NEUTRAL AXIS PARALLEL TO X-AXIS? YES(1)-NO(BLANK)
7	5	3	1

USE NO DECIMAL POINTS. RIGHT JUSTIFY.

POINT NO.	X COORD. CONCRETE (i)	Y COORD. CONCRETE (i)	X COORD. CONCRETE (i+1)	Y COORD. CONCRETE (i+1)	X COORD. CONCRETE (i+2)	Y COORD. CONCRETE (i+2)
	0.	0.	-82.1	225.5	42.	270.6
	54.4	236.8	292.8	30.	282.8	0.
	0.	0.				

NOTE: ENTER CONCRETE COORD'S CLOCKWISE TO SATISFY COUNTER. REPEAT INITIAL COORD. AT END. MAX. NO. = 75 UNITS = INCHES

34-37

STANLEY CONSULTANTS

TBM TT30 COMPUTER PROGRAM
CE 2.0005
BIAXIAL BENDING ANALYSIS (SHEET 2)

Sheet ... of ....

Dept. No. ..... Job No. .....

Page No. ..... Job No. .....

Computed by..... Date..... Reviewed by..... Date..... Punched by..... Subject.....

Checked by..... Date..... Approved by..... Date..... Verified by..... .....

POINT NO.	AREA STEEL EA. BAR SQ. INCHES	X COORD. STEEL (i)	Y COORD. STEEL (i)	NO. BARS IN LINE	X COORD. STEEL (i+1)	Y COORD. STEEL (i+1)
	1.56	2.9	4.5	20.	-72.4	211.6
		-76.4	222.8	19.	39.4	264.8
		43.4	253.6	4.	50.6	234.1
		59.5	226.1	25.	279.8	23.8
	1.56	279.8	4.5	30.	12.	4.5

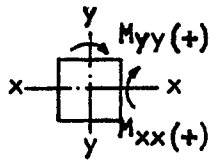
NOTE: ENTER STEEL COORD'S TO SATISFY COUNTER.
MAX. NO. = 75
UNITS = INCHES

PROBLEM NUMBER	P - AXIAL LOAD KIPS	Y - AXIS MOMENT IN-KIPS	X - AXIS MOMENT IN-KIPS	$n = E_S/E_C$	$r = \frac{E_S \text{ (COMPR.)}}{E_C \times n}$	ACCURACY LIMIT *
1	0.	0.	-2258333.	9.	1.	0.01
2	0.	0.	-2258888.	9.	2.	0.01
3	0.	0.	1932284.	9.	1.	0.01

Later run with r=0.1 to disregard compr. steel

*USUALLY 0.01

NOTE:
1. USE NO DECIMAL POINTS IN COLUMNS 6-10. RIGHT JUSTIFY.
2. ALL OTHER DATA COLUMNS 11-70 REQUIRE A DECIMAL POINT.
3. USE ONE BLANK CARD AT END OF DECK.
4. AXIAL LOADS AND MOMENTS MUST BE APPLIED WITH RESPECT TO COORDINATE AXIS SHOWN AT RIGHT.



34-38

PAGE 1

// JOB 0027

Run which disregards Compr. Steel.

LOG DRIVE	CART SPEC	CART AVAIL	PHY DRIVE
0000	0027	0027	0000

Use for DPM

V2 M11 ACTUAL 16K CONFIG 16K

// XEQ BIAXL

GULFSIDE GATE BAY - GATE SUPPORT BLOCK JOB 4671 MADE- GAS CHK-RJB 1/12/73

LDNO	IDENT	P	MYY	MXX	
1	0	0.	0.	-225888.	1
6 ITERATIONS		0.000 X	-0.009 Y	0.270 = STRESS	2

CONCRETE	X	Y	STRESS	
	0.00	0.00	0.27	2
	-82.10	225.50	-1.78	4
	42.00	270.60	-2.19	4
	54.40	236.80	-1.89	4
	282.80	30.00	-0.00	4
	282.80	0.00	0.27	4
	0.00	0.00	0.27	4

$y = \frac{.270}{.009} = 30.0"$

STEEL	X	Y	STRESS	
	2.90	4.50	0.20	5
	-72.40	211.60	-14.94	5
	-76.40	222.80	-15.86	5
	39.40	264.80	-19.31	5
	43.40	253.60	-18.39	5
	50.60	234.10	-16.79	5
	59.50	226.10	-16.13	5
	279.80	28.80	0.00	5
	279.80	4.50	0.20	5
	12.00	4.50	0.20	5

LDNO	IDENT	P	MYY	MXX	
3	0	0.	0.	193284.	1
6 ITERATIONS		0.000 X	0.006 Y	-1.380 = STRESS	2

CONCRETE	X	Y	STRESS	
	0.00	0.00	-1.38	2
	-82.10	225.50	0.13	4
	42.00	270.60	0.43	4
	54.40	236.80	0.20	4
	282.80	30.00	-1.17	4
	282.80	0.00	-1.38	4
	0.00	0.00	-1.38	4

$y = \frac{1.380}{.006} = 230"$

STEEL	X	Y	STRESS	
	2.90	4.50	-12.14	5
	-72.40	211.60	0.03	5
	-76.40	222.80	0.10	5
	39.40	264.80	0.35	5
	43.40	253.60	0.28	5
	50.60	234.10	0.17	5
	59.50	226.10	0.12	5
	279.80	28.80	-10.66	5
	279.80	4.50	-12.14	5
	12.00	4.50	-12.14	5

LDNO	IDENT	P	MYY	MXX	
0	0	0.	0.	0.	1
2 ITERATIONS		0.000 X	0.000 Y	0.000 = STRESS	2

Job No. 4671 Page No. 3A-40

Subject Struct. Lakeside Gate Bay Gate Support Block

Computed by GAS Date 1/8/73

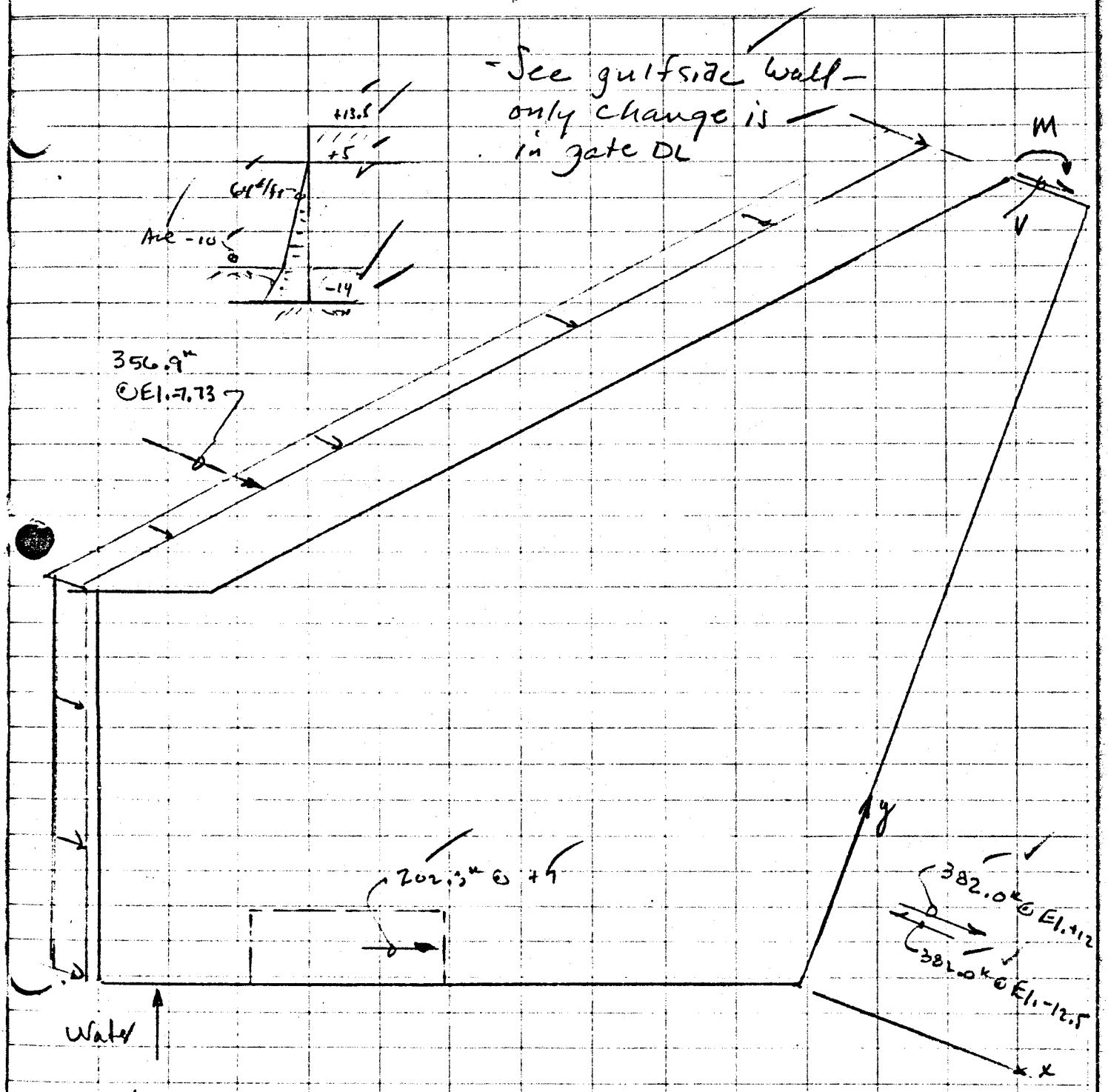
Checked by WJL Date 2/2/73

Reviewed by RGP Date 3-21-73

Approved by RGP Date [illegible]

Sheet No. 1 of

- See gulfside Wall - only change is in gate DL



LOAD I + #2

$M_{yy} = 18,824 - (438.2-382) \times 24.5 = \boxed{17,450^{ft\text{-}k}}$

@ .5 f_y Controls

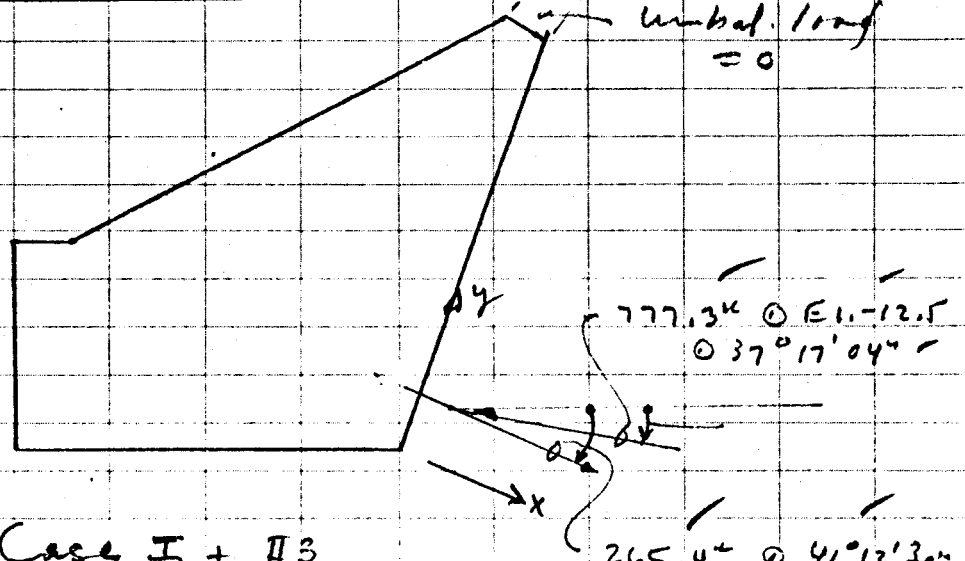
Job No. 4671 Page No. 3A-41

Computed by GAS Date 1/8/73
Checked by WJZ Date 2/2/73
Reviewed by RE RGL Date 3-21-73
Approved by RGL Date 5-73

Subject Struct
Lakeside Gate Bay

Sheet No. 2 of

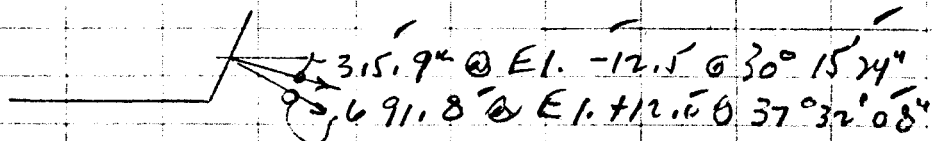
Gate Support Block



Case I + II 3

Closest case to ↓ bending — does not put tension onto right side.

Case I + II 6b



691.8 × 26 × Cos 17° 32' 08" = 17,150
315.9 × 11.5 × 10° 15' 24" = 466
17,616"ᵏ

@ .67Fy does not control.

17,450 vs. 18,824"ᵏ

USE SAME AS GULFSIDE GATE

Job No. 4671 Page No. 3A-42

Computed by RGP Date 3-12-73
Checked by WJZ Date 3-12-73
Reviewed by RJB Date 3-12-73
Approved by ..... Date .....

Subject STRUCTURAL CONTROL BLDG.

Sheet No. 1 of .....

For layout see plate V-4. Bldg is same as Freshwater Bayou Lock except 12'-4" x 12'-4" plan is now 12'-4" x 16'-4".

For layout and elevation see Gate Bay Loads - GULFSIDE, SECTION III-3, Part B, pg 3B-1.

Job No. 4671 Page No. 3A-43

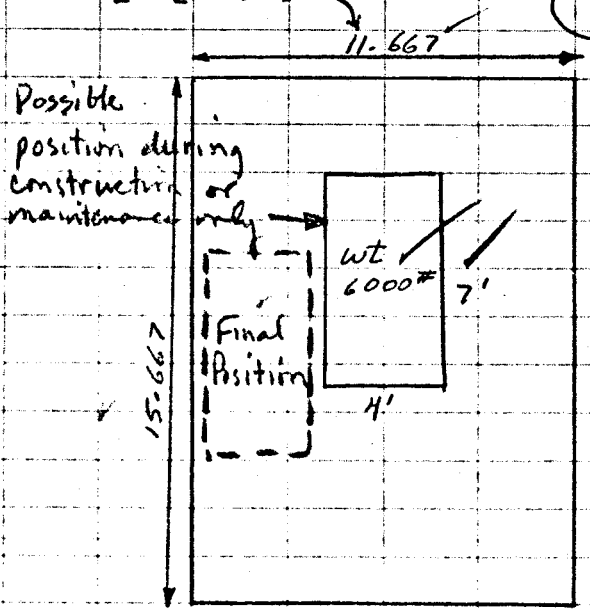
Computed by WJZ Date 2-15-73
Checked by RJE Date 2/28/73
Reviewed by RCF Date 3-12-73
Approved by ____ Date ____

Subject STRUCTURAL
CONTROL BUILDING

Sheet No. 1a of ____

OPERATING FLOOR

RTP { weight of oil pump, motor, oilwell, & oil = 5400 # ✓
+ 600 # ✓ for mounting pads ✓
Motor operates @ 1200 RPM ✓



use L.L. 150 PSF ✓
Assume 8" slab (100 PSF) ✓

$\frac{A}{B} = \frac{11.667}{15.667} = .745$ ✓

use $\frac{A}{B} = .75$ ✓

use Method 3 ACI CODE ✓

for short span (Live Load + Dead Load), ACI Method 3 Case 2

(-) M = -.069 X .250 X 11.667² = -2.35 IK ✓

D.L
(+) M = +.028 X .100 X 11.667² = 0.38 IK ✓
L.L
(+) M = +.045 X .150 X 11.667² = 0.92 IK ✓
+1.30 IK ✓

V = 0.76 X .250 X 11.667 X ½ = 1.108 K ✓

for long span
(-) M = -.022 X .250 X 15.667² = -1.35 IK ✓
(+) M = .009 X .100 X 15.667² = .22 IK
(+) M = .014 X .150 X 15.667² = .52 IK
.74 IK

V = .24 X .250 X 15.667 X ½ = .470 K ✓

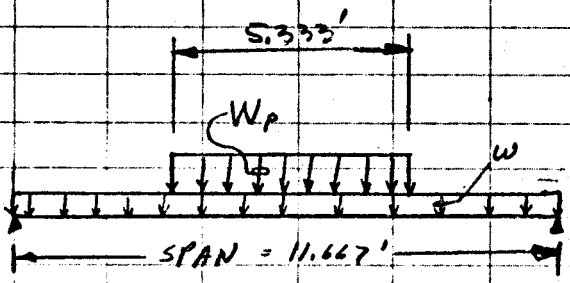
Job No. 4671 Page No. 3A-44

Computed by W.J.L. Date 2-15-73
Checked by R.W.Fichter Date 2/28/73
Reviewed by R.G.F. Date 3-12-73
Approved by ..... Date .....

Subject STRUCTURAL
CONTROL BUILDING

Sheet No. 2 of .....

OPERATING FLOOR (cont)



check for D.L. + 1/3 L.L.
+ hydraulic pump
@ 1/4 increase (impact)
(Constr. or Maint. Condition)

$$w = 100 + \frac{150}{3} = 150 \text{ PSF}$$

$$W_p = \frac{6000}{8.333} \times \frac{1}{5.333} \times 1.25 = 169 \text{ PSF}$$

For (-) Moment assume fixed ends

$a = 0.229$, $-M$ coef $= 1.353/12$ $\quad -M = \frac{1.353}{12} \times 11.667 \times 5.333 \times .169 = 1.19^{1K}$

$(-) M = .150 \times 11.667^2 \times 1/2 = 1.70^{1K}$

$-M_{total} = 1.70 + 1.19 = -2.89^{1K}$

Simple beam Reactions = R

$$R = .150 \times 11.667 \times 1/2 + .169 \times 5.333 \times 1/2 = 1.325^{K}$$

Simple beam Moment =

$$1.325 \times \frac{11.667}{2} - .150 \times 11.667^2 \times 1/8 - .169 \times 5.333^2 \times 1/8$$

$(+) M = 4.581^{1K}$

Use these values of shear and moment for design of slab steel in narrow direction

Job No. 4671 Page No. 3A-45

Computed by WJL Date 2-15-73
Checked by RJEschen Date 2/28/73
Reviewed by RCS Date 3-12-73
Approved by ____ Date ____

Subject STRUCTURAL
CONTROL BUILDING

Sheet No. 3 of ____

Short span

$f_s = 13$ ksi, $f_c = 0.5$ ksi } $a = .99$ use 1.0

Top steel

$$A_s = \frac{2.89}{1.0 \times 6.6} = .44 \square''$$ (using 1" clear)

$$\Sigma_o = \frac{1325}{2.4 \times .914 \times 6.6} = 92 \text{ ok}$$ use #6 @ 12"

Bottom steel

$$A_s = \frac{\#.58}{1.0 \times 6.6} = .69 \square''$$

$$\Sigma_o = \frac{1325}{3.1 \times .914 \times 6.6} = \text{OK}$$ use #8 @ 12"

Long Span

Bottom steel

$$A_s = \frac{.74}{1.0 \times 6} = .12 \square''$$

$$\Sigma_o = \frac{470}{1.6 \times .914 \times 6} = \text{OK}$$ use #4 @ 12

Top steel

$$A_s = \frac{1.35}{1.0 \times 6} = .93 \square''$$

$$\Sigma_o = \frac{470}{2.0 \times .914 \times 6} = \text{OK}$$ use #5 @ 12

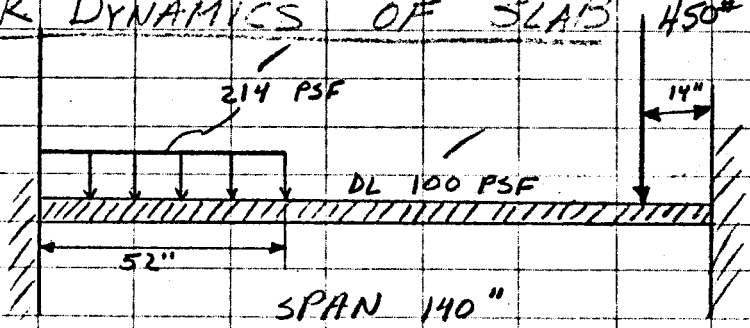
Job No. 4671 Page No. 3A-46

Computed by W.J.Z. Date 2-15-73
Checked by R.T.Beckler Date 2/21/73
Reviewed by [illegible] Date 3-12-73
Approved by ..... Date .....

Subject STRUCTURAL CONTROL BUILDING

Sheet No. ..... of .....

CHECK DYNAMICS OF SLAB



$$R_R = 100 \times \frac{70}{12} + \frac{450(126^2)}{140^3}(126 + 3\times14) + 104$$

$R_R = 1125\#$ ✓

Shear = 0 @ 81.0" ✓ from right end
59.0" ✓ from left end

Δ max. @ 59.0" ✓ from left end =

$$\frac{100}{12} \times \frac{59.0^2}{24\times4\times10^6\times512}(140-59.0)^2 = .0039'$$ ✓

$$+ \frac{450\times14^2\times59.0^2}{6\times4\times10^6\times512\times(140)^3}(3\times126\times140 - 3\times126\times59.0 - 14\times59.0)$$

$= .0003'$ ✓

$+$ (estimated) $\sim .0016$ ✓

$\Delta_t = .0058$ ✓

$$N = \frac{187.7}{\sqrt{\Delta}} = 2460 \text{ r.p.m.}$$ ✓

Motor Speed 1200 R.P.M ✓

OK TWO WAY SLAB WILL increase N and end rotations decrease N ✓

Job No. 4671 Page No. 3A-47

Computed by WJT Date 2/14/73
Checked by RTBoucher Date 2/21/73
Reviewed by KGF Date 3-12-73
Approved by ____ Date ____

Subject STRUCTURAL CONTROL BUILDING

Sheet No. 1 of ____

Roof Slab

use for design 11'-8" X 15'-8"

$m = .745 \approx .75$ ✓

Assume D.L. 75 psf ✓

Hurricaine Conditions — Use 65psf L.L. ✓

Using Method 3 from Appendix A of ACI CODE

the actual boundary conditions of the slab will be somewhere between cases 2 and 9 but closer to case 9 (due to Case 9 windows)

SHORT DIRECTION:

Neg. Mom.
- case 2 $= -.069 \times .140 \times 11.667^2 = -1.31$ 'K
- case 9 $= -.078 \times .140 \times 11.667^2 = -1.49$ 'K

D.L. Pos. Mom
- case 2 $= .028 \times .075 \times 11.667^2 = 0.29$ 'K
- case 9 $= .031 \times .075 \times 11.667^2 = 0.32$ 'K

L.L. Pos. Mom
- Case 2 $= .045 \times .065 \times 11.667^2 = 0.40$ 'K
- Case 9 $= .046 \times .065 \times 11.667^2 = 0.41$ 'K

Check Pos M - Case 1 $.061 \times .140 \times 11.667^2 = 1.16$ 'K

use Neg. Mom = -1.4 'K ✓

use Pos. Mom = +1.0 'K

Computed by WJZ Date 2/14/73
Checked by RJBeecher Date 2/28/73
Reviewed by KCV Date 3-12-73
Approved by Date

Neg. $A_s = \frac{1.4}{1.44 \times 4.7'} = .21 \square''$

Pos. $A_s = \frac{1.0}{1.44 \times 4.7'} = .15 \square''$

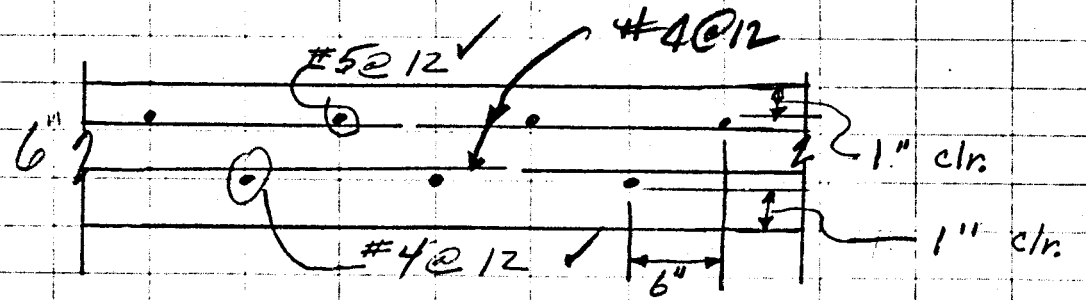
$V = \begin{cases} \text{case 2} = 0.76 \times .140 \times 11/2 = .58^{K}/_{'} \\ \text{case 9} = 0.86 \times .140 \times 11/2 = .66^{K}/_{'} \end{cases}$

use $V = .62^{K}/_{'}$

$v = \frac{620}{12 \times 4.7'} = 11.0 < 60 \text{ psi}$

ε_o by inspection - ok

Pos. Steel (top) use #4 @ 12
Neg. Steel (bottom) use #5 @ 12
} Stagger 6"



Job No. 4671 Page No. 3A-49

Computed by WJT Date 2/14/73
Checked by RJBachler Date 2/28/73
Reviewed by KGI Date 3-12-73
Approved by ..... Date .....

Subject STRUCTURAL
CONTROL BUILDING

Sheet No. 3 of .....

LONG DIRECTIONS

Neg. Mom
Case 2 = .022 x .140 x 15.667² = .76
Case 9 = .014 x .140 x 15.667² = .48
use .60

D.L. Pos. Mom
Case 2 = .009 x .075 x 15.667² = .17
Case 9 = .007 x .075 x 15.667² = .13
use .16

L.L. Pos. Mom.
Case 2 = .014 x .065 x 15.667² = .22
Case 9 = .013 x .065 x 15.667² = .21
use .22

$+A_s = \frac{.48}{1.44 \times 4.2} = .08$ □"

$-A_s = \frac{.60}{1.44 \times 4.2} = .10$ □"

$V = .17 \times .135 \times \frac{15}{2} = .172$

$\Sigma_o = \frac{172}{500 \times .891 \times 4.25} = .09$

use #4 @ 12 top & bottom

Job No. 1671 Page No. 3A-50

Computed by WJL Date 2/14/73
Checked by RBuckler Date 2/15/73
Reviewed by RGL Date 3-12-73
Approved by ____ Date ____

Subject STRUCTURAL CONTROL BUILDING

Sheet No. 4 of ____

OVER HANG

D.L. 75 PSF ✓ LL 65 PSF ✓

$M = .140 \times 2^2 \times \frac{1}{2} = .28$ 'K ✓

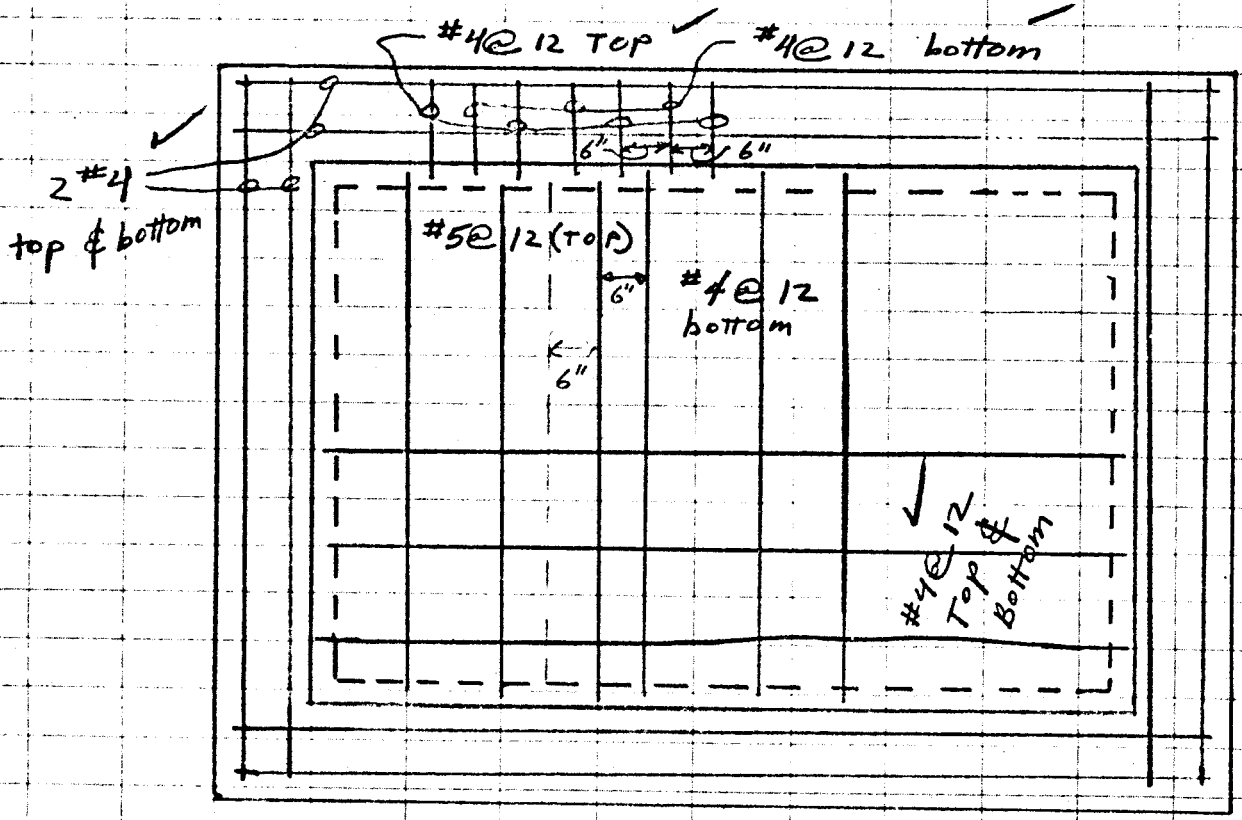
$A_s = \frac{.28}{1.44 \times 3.75} = .05$ □" ✓

$V = .135 \times 2 = .27$ K/'

OK ✓

$\Sigma_o = \frac{270}{350 \times .891 \times 3.75} = .23$ ✓

use #4 @ 12 top & bottom (stagger 6") ✓



SECTION IV-3 GATE BAYS

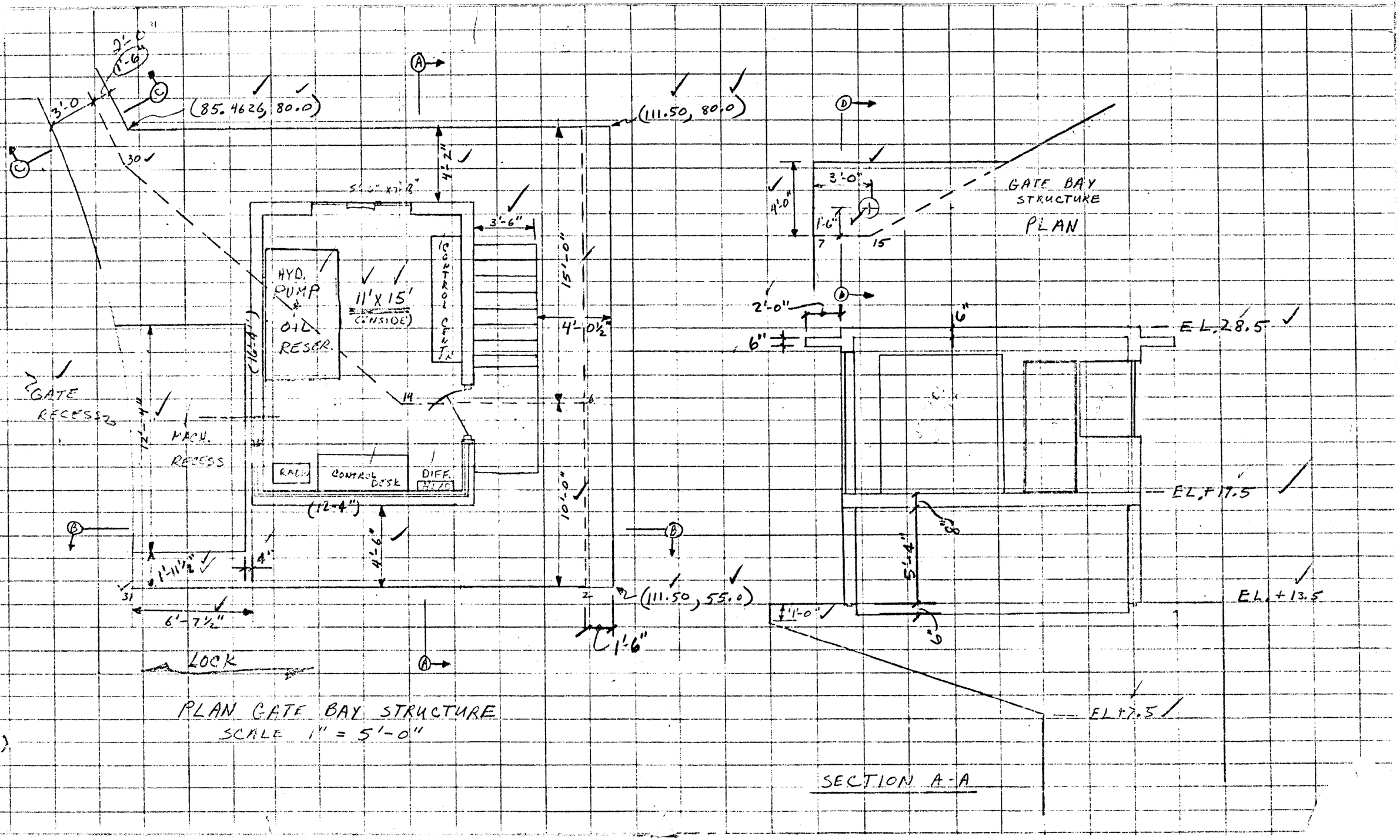
PART B - BASE SLAB

GULFSIDE

LAKESIDE

Computed by WJT Date 2-12-73
Checked by RLC Date 2/16/73
Reviewed by [redacted] Date 3-1-73
Approved by KC Date 5-4-73

Job No. 4671 Page No. 3B-1
Subject GATE BAY LOADS GULFSIDE
Sheet No. of

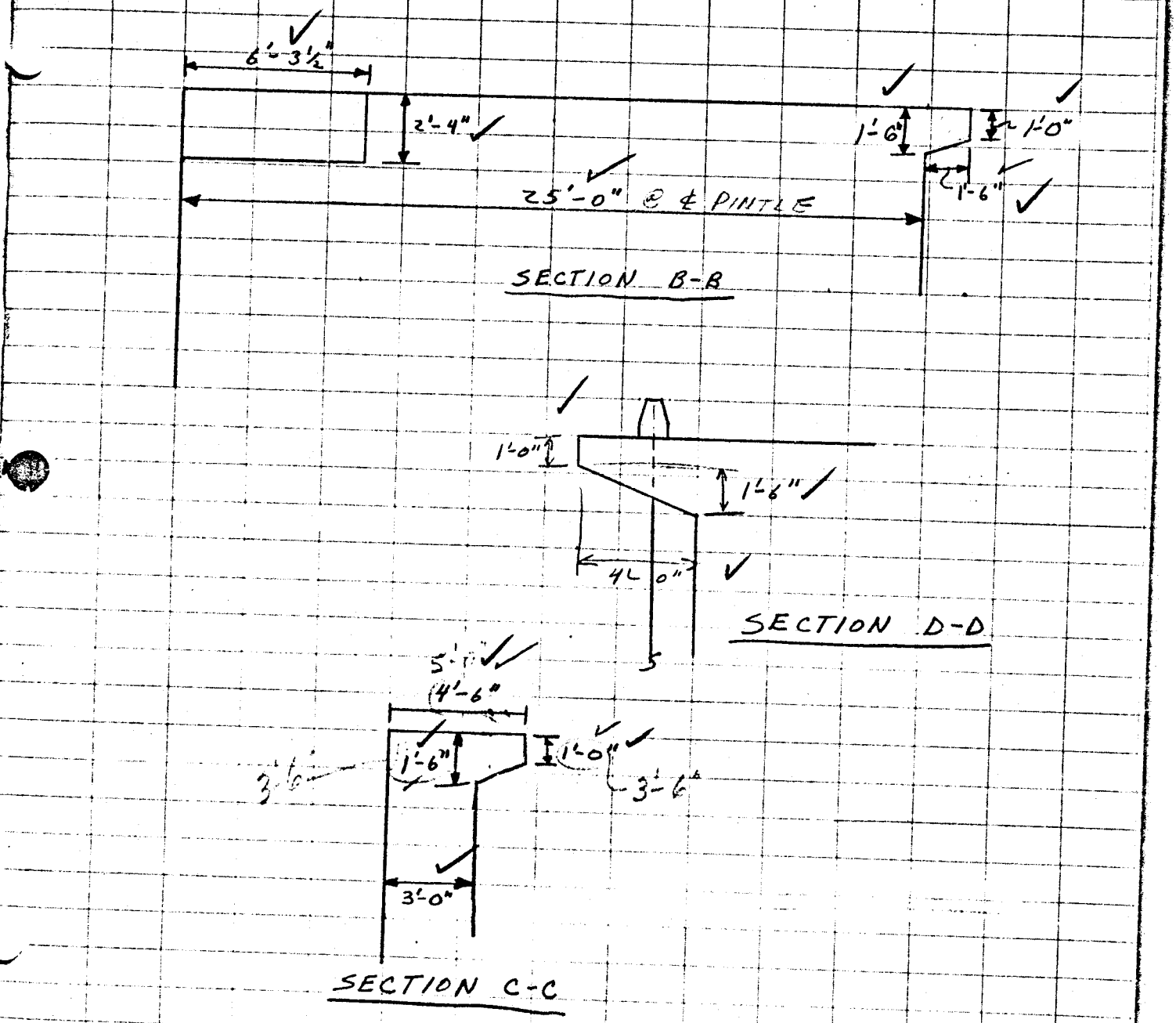


Job No. 4671 Page No. 3B-2

Computed by WJZ Date 2-16-73
Checked by RJBeckler Date 2/16/73
Reviewed by RGR Date 5-1-73
Approved by RGR Date 5-1-73

Subject GATE BAY LOADS GULFSIDE

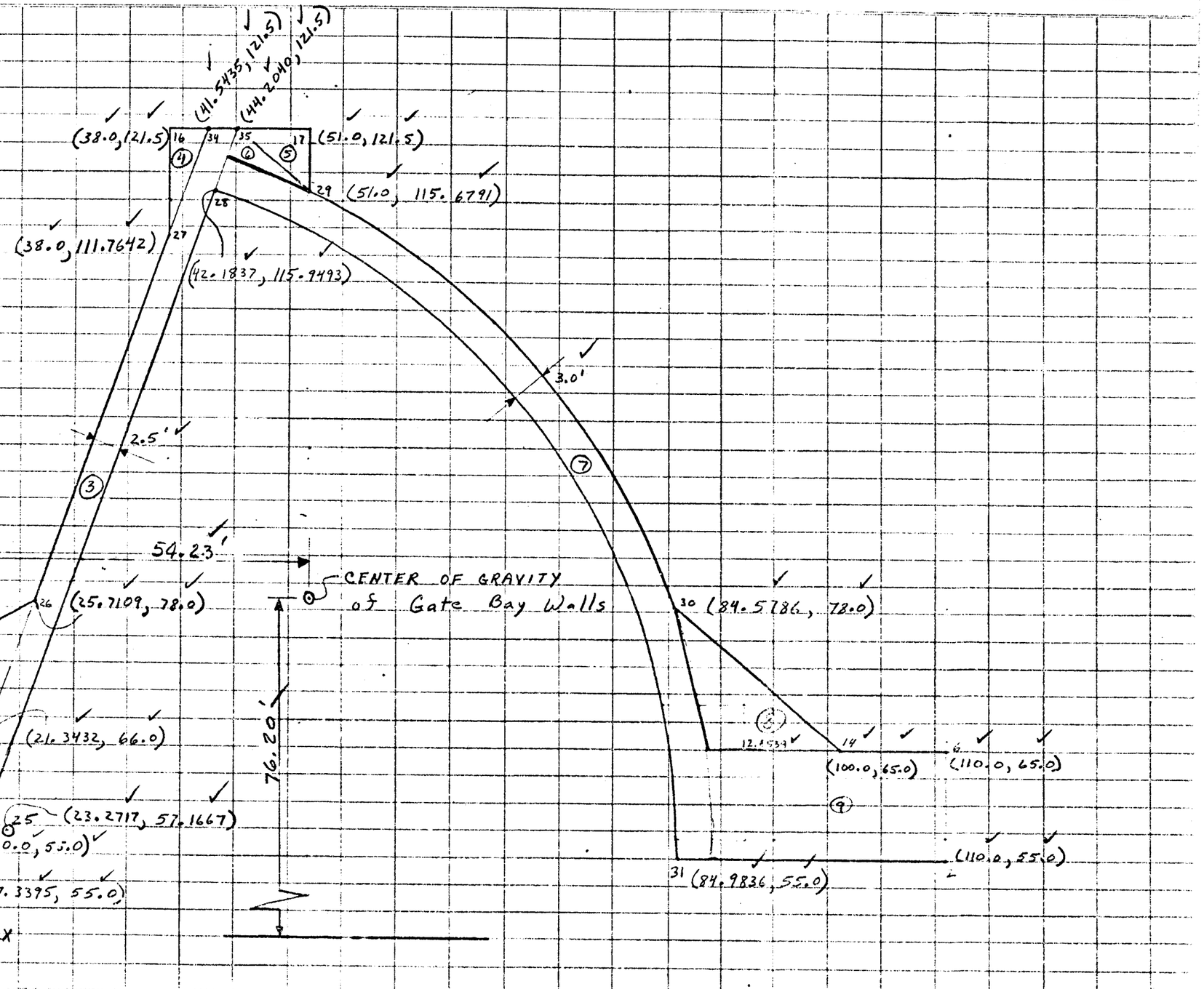
Sheet No. 2 of



Computed by WJL Date 2-15-73
Checked by [illegible] Date 2/16/73
Reviewed by [illegible] Date 3-1-73
Approved by [illegible] Date 5-7-73

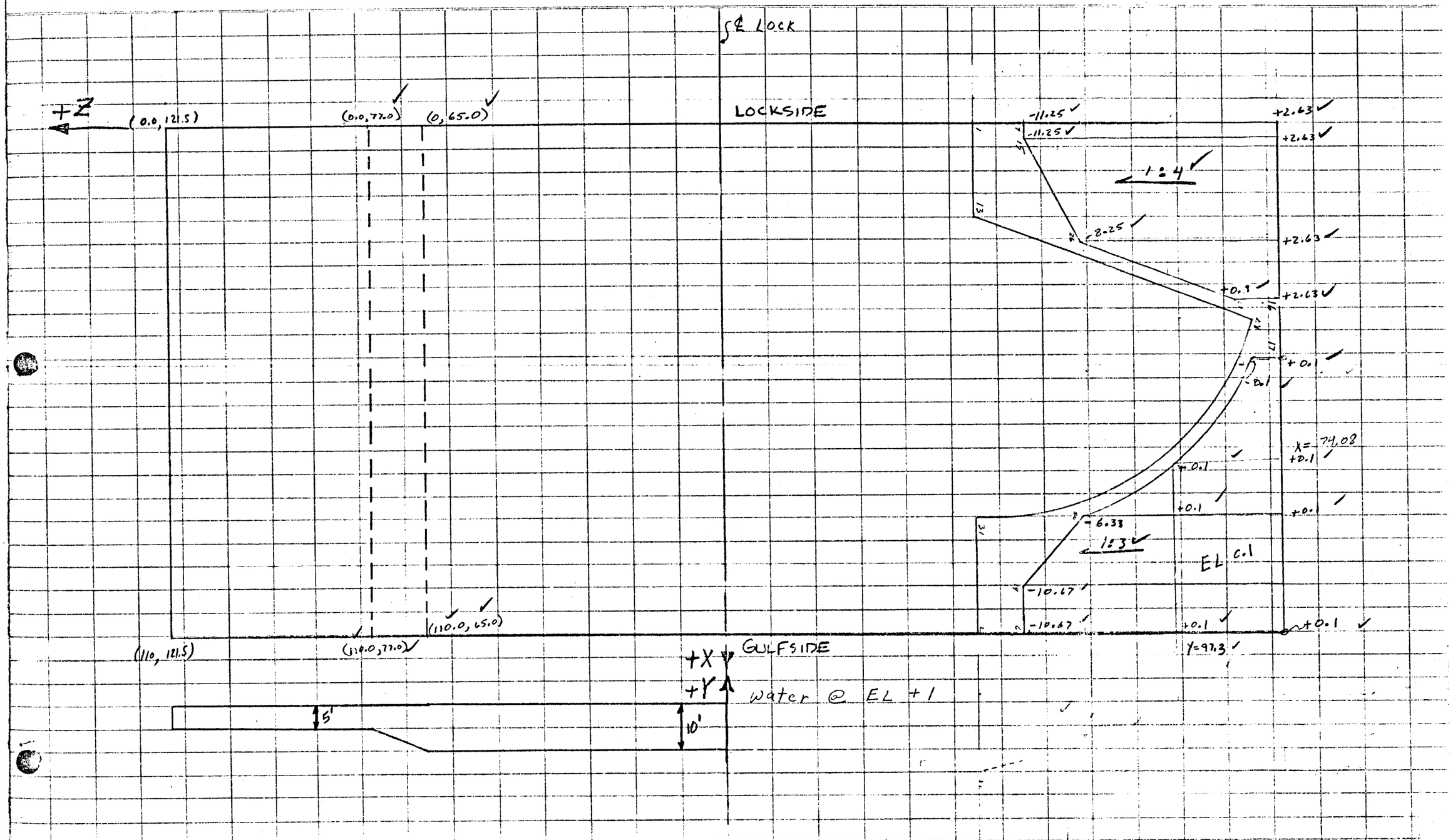
Job No. 4671 Page No. 3B-3
Subject GATE BAY LOADS
GULFSIDE
Sheet No. 3 of

item	$\bar{x}$	$\bar{z}$
①	9.71	- 60.69
②	16.68	- 70.00
③	30.77	- 88.25
④	39.18	-118.25
⑤	48.73	-119.56
⑥	46.46	-119.53
⑦	71.50	- 91.03
⑧	70.71	- 69.33
⑨	98.88	- 60.02



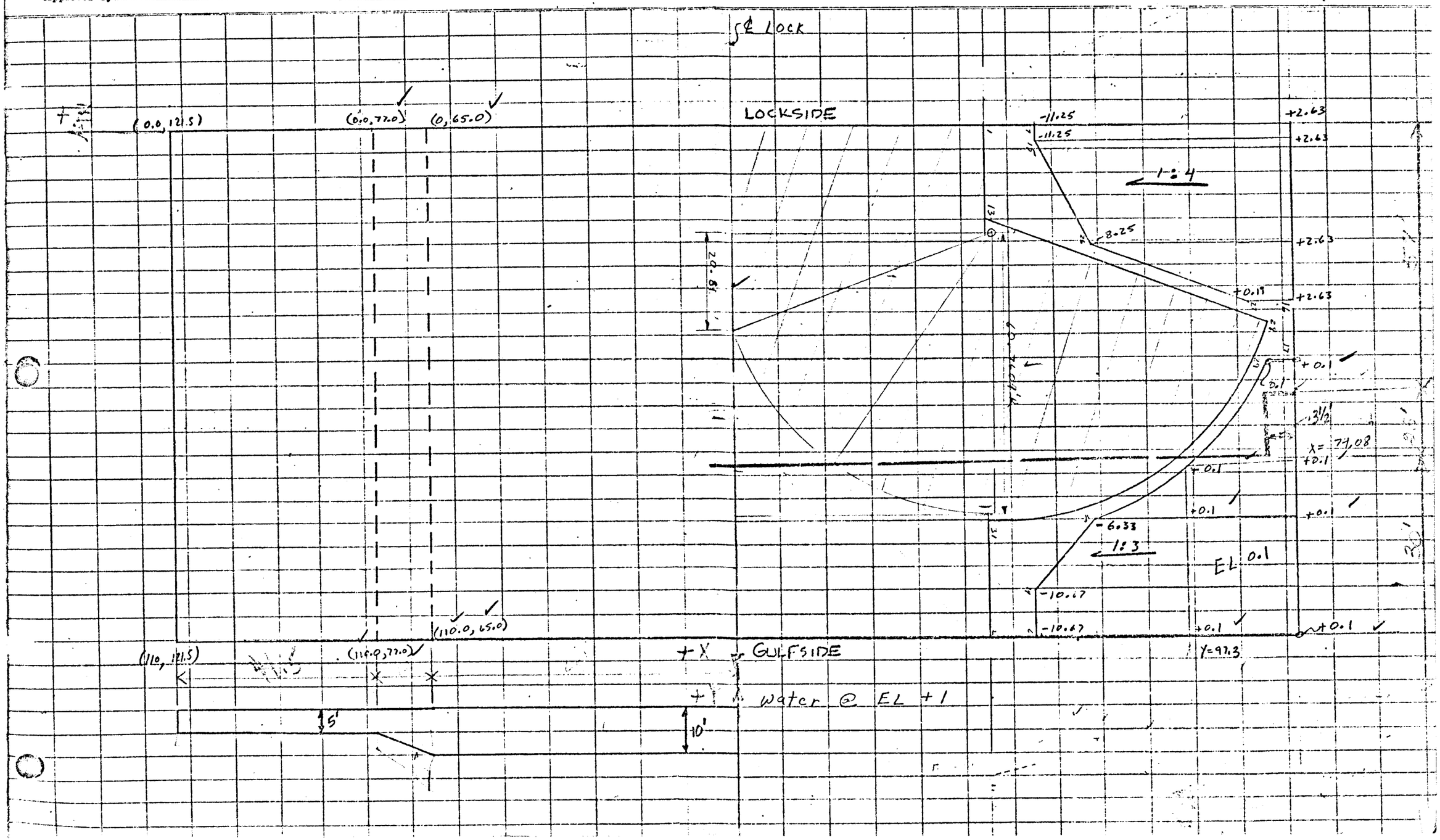
Computed by WJZ Date 2-21-73
Checked by _____ Date _____
Reviewed by RGI Date 3-1-73
Approved by RGI Date 3-2-73

Job No. 4671 Page No. 38-4
Subject GATE B ✓ LOADS ✓
GULFSIDE
Sheet No. 4 of _____



Computed by WJF Date 2-21-73
Checked by ____ Date ____
Reviewed by ____ Date ____
Approved by ____ Date ____

Job No. 4671 Page No. 3B-5
Subject ~~C.G. BASE SLAB (GULFSIDE~~
GATE BAY LOADS - GULFSIDE
Sheet No. 42 of ____



Computed by WJL Date 2-21-73
Checked by RJ Eccher Date 2/28/73
Reviewed by [illegible] Date 5-1-73
Approved by [illegible] Date 5-1-73

Job No. 4671 Page No. 3B-6
Subject GATE BAY LOADS
GULF SIDE
Sheet No. 5 of

ITEM	DESCRIPTION	WEIGHT (K)	ARM X (FT)	MOMENT (Z)	ARM Z (FT)	MOMENT (X)
WALLS						
①	½ (21.3432 + 17.3395) X 11 X 27.5 X .150	877.6	9.71	- 8521.5	-60.69	- 53261.5
②	18.3432 X 12 X ½ X 27.5 X .150	454.0	16.68	- 7572.7	- 70.0	- 31780.0
③	70.7678 X 2.5 X 27.5 X .150	729.8	30.77	-22455.9	- 88.25	- 64404.9
④	3.5435 X 9.7358 X ½ X 27.5 X .150	71.2	39.18	- 2789.6	-118.25	- 8419.4
⑤	6.7960 X 5.8209 X ½ X 27.5 X .150	81.6	48.73	- 3976.4	-119.56	- 9756.1
⑥	12.18 X 27.5 X 0.150	50.2	46.46	- 2332.3	-119.53	- 6000.4
⑦	74.0774 X π/180 X 63.25 X 3 X 27.5 X .15	1012.0	71.50	-72358.0	- 91.03	- 92122.4
⑧	12.4539 X 13 X ½ X 27.5 X .150	333.9	90.71	-30288.0	- 69.33	- 23149.3
⑨	(22.0164 + 22.4539) X ½ X 10 X 27.5 X .150	917.2	98.88	-90692.7	- 60.02	- 55050.3
MACHINERY RECESS	6.2917 X 12.3333 X 2.3333 X (-.150)	- 27.2	88.1	+ 2396.3	- 63.1	+ 1716.3
CONTROL HOUSE Floor RECESS	11 X 15 X ½ X (-.150)	- 12.4	97.8	+ 1212.7	- 67.6	+ 838.2
NEEDLE GIRDER RECESS (2)	2.333 X 5.833 X 7.667 X (-.150) X 2	- 31.2	55.0	+ 1716.0	- 56.17	+ 1752.5
Walkways	1 X 2 X 39.77 X .150	11.9	31.6	- 376.0	- 97.0 OK	- 1154.3
	.5 X 2 X ½ X 38.5 X .150	2.9	31.9	- 92.5	- 96.9	- 281.0
	1 X 1.5 X 52.6 X 0.150	11.8	67.5 OK	- 796.5	- 96.5 OK	- 1138.7
	.5 X 1.5 X ½ X 52.3 X .150	2.9	67.1	- 194.6	- 96.1	- 278.7
slab under control House	1 X 15 X 11.5 X .150	25.9	105.75	- 2738.9	- 72.5	- 1877.8
	½ X 5 X 15 X 10 X .150	56.3	105.0	- 5911.5	- 70.0	- 3941.0
	1.5 X ½ X .5 X 25 X .150	1.4	110.5	- 154.7	- 67.5	- 94.5
	1.5 X 1 X 10 X .150	2.3	110.75	- 254.7	- 60.0	- 138.0
1.667	X 13 X 15.42 X ½ X .150	25.1	94.86	- 2381.0	- 73.67	- 1849.1
	1 X 2 X 14.54 X .150	4.4	92.73	- 408.0	- 79.0	- 347.6
	1 X 2 X 0.884 X ½ X .150	0.1	85.16	- 8.5	- 78.67	- 7.9
	⅙ X 15.42 X (28.1667 + 4 X 7.0417) X .150	21.7	95.4	- 2070.2	- 74.1	- 1608.0
	14.5374 X .6667 X 2 X ½ X .150 OK	1.5	92.73	- 139.1	- 78.67	- 118.0
	.8840 X ⅙ X (.6667 + 4 X .3333) X .150 OK	0.1	85.2	- 8.5	- 78.6	- 7.9
Slab under Fire Pumps	1 X 3 X 1 X .150	1.8	1.5	- 2.7	- 68.0	- 122.4
	4 X 3 X 1.5 X ½ X .150	1.4	1.5	- 2.1	- 67.33	- 94.3
	4 X 7.57 X 1 X ½ X .150	2.3	5.5	- 12.7	- 68.67	- 157.9
	⅙ X 7.57 X (3 + 4 X .75) X .150	1.1	5.3	- 5.8	- 67.2	- 73.9
	TOTALS -	4631.6	X̄ = 54.23	-251,170.5	Z̄ = -76.20	-352,928.3

Computed by WJT Date 2-22-73
Checked by RLeicher Date 2/28/73
Reviewed by _____ Date 3-1-73
Approved by _____ Date _____

Job No. 4671 Page No. 38-7
Subject GATE AA LOADS
SHLESIDE
Sheet No. 6 of _____

ITEM	DESCRIPTION	WEIGHT(K)	ARM (X)	MOMENT (M_z)	ARM (Z)	MOMENT (M_x)
BASE SLAB	110 X 65 X 10 X .150	10725.0	55.0	- 589875	- 32.5	- 348563
	110 X 56.5 X 5 X .150	4661.3	55.0	- 256372	- 93.25	- 434666.
	110 X 12 X 5 X ½ X .150	495.0	55.0	- 27225	- 69.0	- 34155
	TOTALS - BASE SLAB	15881.3	$\bar{X}$ = 55.00	- 873472	$\bar{Z}$ = -51.47	- 817 384
SAND	505.65 X 10 X .056	283.2	105	- 29736	- 99	- 28037
	½ (505.65 + 475.35) X 15.42 X .056	423.6	93	- 39395	- 101	- 42784
	½ (475.35 + 326.24) X 10.5 X .056	235.7	80	- 18856	- 105	- 24749
	½ (326.24 + 82.07) X 23.08 X .056	263.9	67	- 17681	- 106	- 27973
	366.66 X 3 X .056	61.6	1.5	- 92	- 103	- 6345
	½ (366.66 + 352.35) X 22.71 X .056	457.2	12	- 5486	- 102	- 46634
	½ (352.35 + 119.95) X 12.29 X .056	162.5	32	- 5200	- 105	- 17063
SHELL	42.28 X 10 X .034	14.4	105	- 1512	- 87	- 1253
	½ (42.28 + 28.60) X 15.42 X .034	18.6	94	- 1748	- 90	- 1674
	½ (28.60 + 8.31) X 10.5 X .034	6.6	80	- 528	- 98	- 647
	56.80 X 3 X .034	5.8	1.5	- 9	- 94	- 545
	½ (56.80 + 44.81) X 22.71 X .034	39.2	13	- 510	- 98	- 3842
	½ (44.81 + 10.03) X 12.29 X .034	11.5	32	- 368	- 106	- 1219
KEY KAP	74.78 X 10 X .063	47.1	105	- 4946	- 86	- 4051
	½ (74.78 + 47.35) X 15.42 X .063	59.3	94	- 5574	- 88	- 5218
	½ (47.35 + 6.67) X 10.5 X .063	17.9	80	- 1432	- 96	- 1718
	114.33 X 3 X .063	21.6	1.5	- 32	- 93	- 2009
	½ (114.33 + 89.61) X 22.71 X .063	145.9	13	- 1897	- 98	- 14298
	½ (89.61 + 20.06) X 12.29 X .063	42.5	32	- 1360	- 106	- 4505
	TOTALS - SOILS	2318.1	$\bar{X}$ = 58.8	- 136362	$\bar{Z}$ = -101.2	- 234564

Computed by WJZ Date 2-26-73
Checked by RJBechler Date 2/28/73
Reviewed by [illegible] Date 3-1-73
Approved by RCP Date 5-7-73

Job No. 4671 Page No. 38-8
Subject GATE BAY LOADS
GULFSIDE
Sheet No. 7 of

ITEM	DESCRIPTION		WEIGHT	ARM (X)	MOMENT (Y)	ARM Z	MOMENT (X)
CONTROL HOUSE	16.333 X 20.333 X .50 X.150	Roof + O'hang	24.9	97.8	- 2435.2	- 67.67	- 1685.0
	12.333 X 16.333 X .667 X.150	Floor	20.2	97.8	- 1975.6	- 67.67	- 1366.9
	8.5 X 54.667 X .667 X.150	Upper Walls	46.5	97.8	- 4547.7	- 67.67	- 3146.7
	5.833 X 54 X .833 X.150	Lower Walls	39.4	97.8	- 3853.3	- 67.67	- 2666.2
Steps	10.5' X 3.5 X .150		5.5	105.8	- 581.9	- 67.5	- 371.3
Fire Pump	700 #		0.70	3.0	- 2.1	- 67.5	- 47.3
Machinery	@ operating floor		11.0	96.0	- 1056.0	- 70.3	- 773.3
	@ basement		6.6	96.0	- 633.6	- 70.3	- 464.0
	@ Machinery Recess		3.9	88.1	- 343.6	- 63.0	- 245.7
TOTALS - CONTROL HSE / MACHINERY			158.7	$\bar{x}$ = 97.22	- 15429.0	$\bar{z}$ = -67.84	- 10766.4

CONCRETE NEEDLES 99.8 k each (10.5) = say 240 k each end each side of Lock
Needle Girders 56.8 k each " 28.4 k " " " " " "

Job No. _____ Page No. 38-9

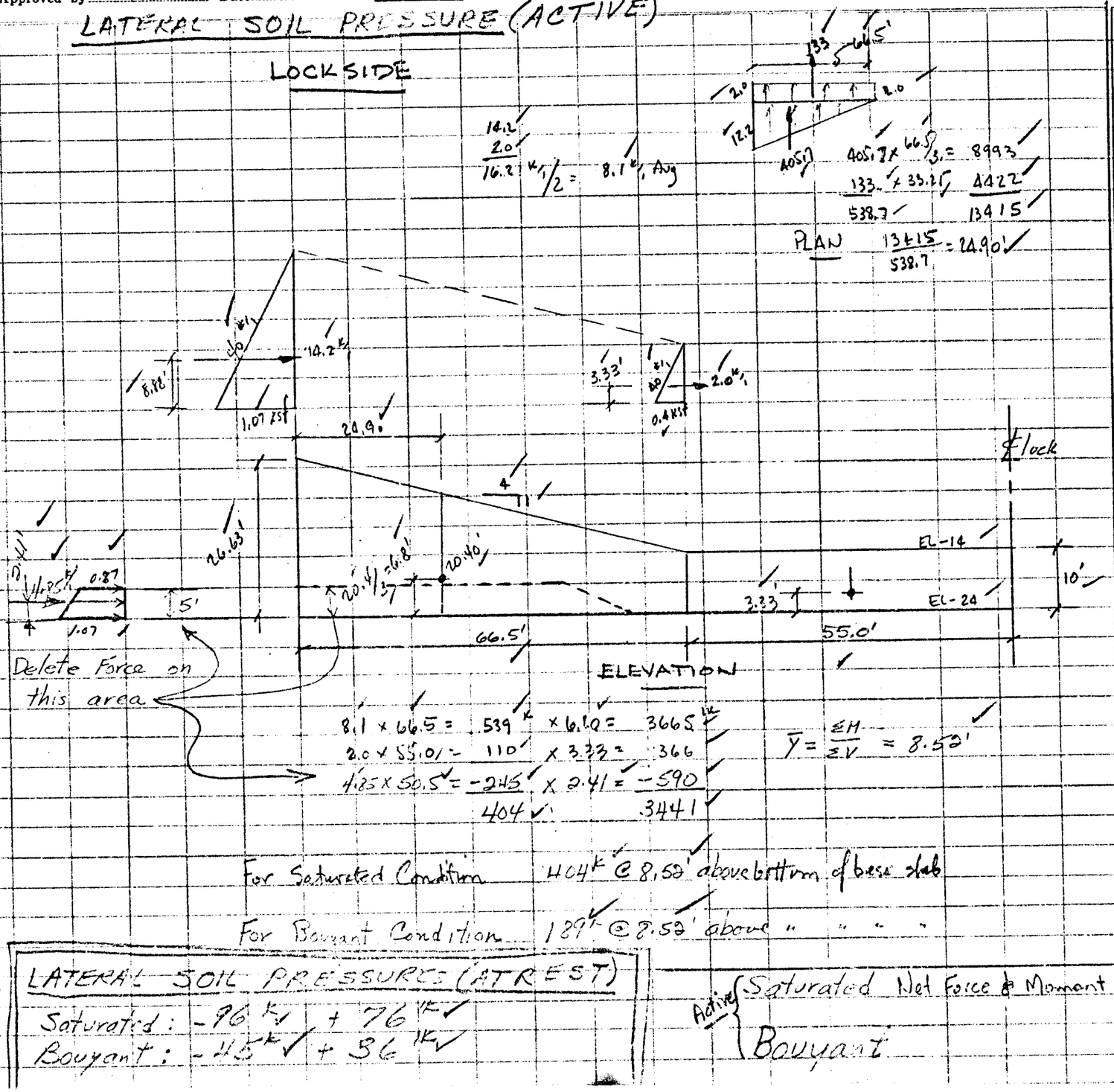
Subject STRUCTURAL
GATE BAY LOADS
GULFSIDE GATE BAY

Sheet No. 8 of _____

Computed by RJBechler Date 3/14/73
Checked by RGP Date 3/19/73
Reviewed by _____ Date _____
Approved by _____ Date _____

LATERAL SOIL PRESSURE (ACTIVE)

LOCKSIDE



14.2 / 2.0 / 16.2 K/ft / 2 = 8.1 K/ft Avg

133 / 66.5' / 2.0 / 12.2 / 405.7 K

405.7 × 66.5/3. = 8993
133. × 33.25 = 4422
538.7 / 13415

PLAN 13415 / 538.7 = 24.90'

ELEVATION

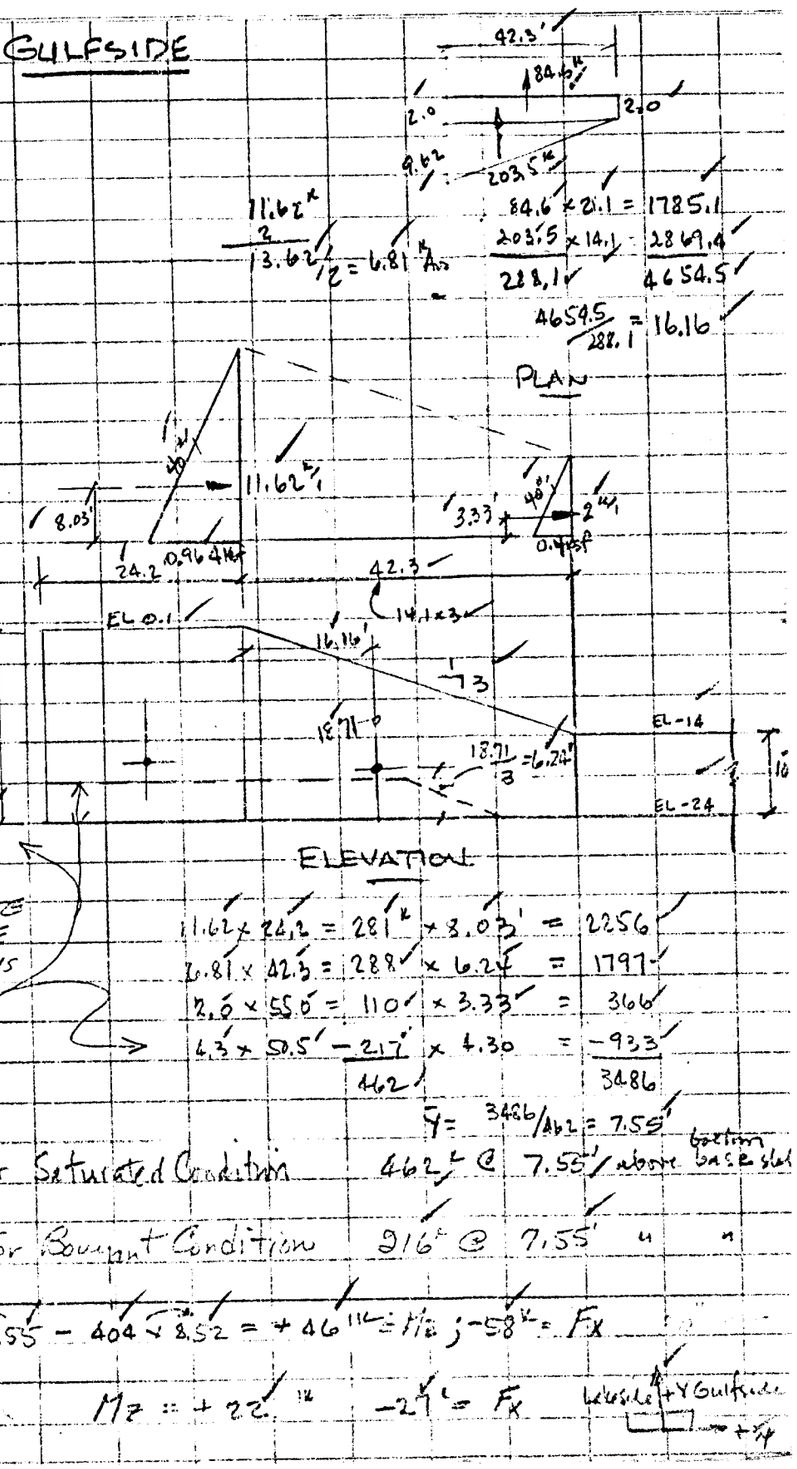
8.1 × 66.5 =	539 K	× 6.10 =	3665 K-ft
2.0 × 55.0 =	110'	× 3.33 =	366
4.85 × 50.5 =	-245'	× 2.41 =	-590
	404		3441

$\bar{Y} = \frac{\Sigma M}{\Sigma V} = 8.52'$

For Saturated Condition 404 K @ 8.52' above bottom of base slab

For Bouyant Condition 189 K @ 8.52' above " " "

GULFSIDE



11.62 / 2 / 13.62 / 2 = 6.81 K Avg

84.6 × 21.1 = 1785.1
203.5 × 14.1 = 2869.4
288.1 / 4654.5

4654.5 / 288.1 = 16.16'

PLAN

ELEVATION

11.62 × 24.2 =	281 K	× 8.03' =	2256
6.81 × 42.3 =	288 K	× 6.24' =	1797
2.0 × 55.0 =	110'	× 3.33' =	366
4.3 × 50.5' − 21.7' / 462		× 4.30 =	-933 / 3486

$\bar{Y} = 3486/462 = 7.55'$ bottom base slab

For Saturated Condition 462 K @ 7.55' above bottom base slab

For Bouyant Condition 216 K @ 7.55' " "

LATERAL SOIL PRESSURES (AT REST)

Saturated: -96 K / + 76 K
Bouyant: -42 K / + 56 K

Active { Saturated / Bouyant

Net Force & Moment: 462 + 7.55 − 404 × 8.52 = +46 K = Fz ; -58 K = Fx

Mz = +22 K − 2 K' = Fx

Lakeside +Y Gulfside

Job No. 4671 Page No. 38-10

Computed by RGP Date 3-6-73
Checked by RJBeller Date 3/9/73
Reviewed by _____ Date _____
Approved by RGP Date 5-7

Subject STRUCTURAL
GATE BAY LOADS
GULFSIDE

Sheet No. 9 of _____

DEAD LOAD SUMMARY (For ½ of Gate Bay)

	Weight	$\bar{x}$	$\bar{z}$	
WALLS	4631.6^k ✓	54.23' ✓	−76.20 ✓	
BASE SLAB	15881.3 ✓	55.00' ✓	−51.47 ✓	
CONTROL HSE & MECHINERY	158.7 ✓	97.22 ✓	−67.84 ✓	
Subtotal	20671.6 ✓	55.15' ✓	−57.14 ✓	
GATE LEAF	288.8 ✓	55.15 ✓	−76.44 ✓	GATE Open
		52.98 ✓	−33.80 ✓	GATE Closed
Subtotal	20960.4 ✓	55.15 ✓	−57.41 ✓	Gate Open
		55.11 ✓	−56.82 ✓	Gate Closed
Soil Saturated	4967.4 ✓	58.8 ✓	−101.2 ✓	
Subtotal	25927.8 ✓	55.85 ✓	−65.80 ✓	Gate Open
Soil (bouyant)	2318.1 ✓	58.8 ✓	−101.2 ✓	
Subtotal	23278.5 ✓	55.51 ✓	−61.77 ✓	Gate Open
		55.48 ✓	−61.24 ✓	Gate Closed
CONCRETE NEEDLES	480.0 ✓			
NEEDLE GIRDERS	56.8 ✓			

Job No. 4671 Page No. 3B-11

Subject GATE BAY LOADS
GULFSIDE

Sheet No. 10 of

Computed by WJT Date 3-2-23
Checked by RJBechler Date 3/5/73
Reviewed by [illegible] Date 3-5-23
Approved by [illegible] Date [illegible]

ITEM	DESCRIPTION	AREA	ARM (x)	MOMENT (x)	ARM z	MOMENT (x)
Water Area outside Gate Bays	55.5 ✓ x 3 ✓	166.5 ✓	1.5 ✓	- 250 ✓	- 93.75 ✓	- 15609 ✓
	22.711 ✓ x 43.5 ✓	987.9 ✓	14.36 ✓	- 14186 ✓	- 99.75 ✓	- 98543 ✓
	½ ✓ x 12 ✓ x 22.711 ✓	136.3 ✓	10.57 ✓	- 1441 ✓	- 74 ✓	- 10086 ✓
	9.736 ✓ x 12.289 ✓	119.6 ✓	31.86 ✓	- 3810 ✓	- 116.63 ✓	- 13949 ✓
	½ ✓ x 12.289 ✓ x 33.7642 ✓	207.5 ✓	29.81 ✓	- 6186 ✓	- 100.51 ✓	- 20856 ✓
Lockside		1617.8 ✓	$\bar{x}$ = 15.99 ✓	- 25873 ✓	$\bar{z}$ = - 98.31 ✓	-159043 ✓
GULFSIDE	56.5 ✓ x 10 ✓	565 ✓	105 ✓	- 59325 ✓	- 93.25 ✓	- 52686 ✓
	15.4214 ✓ x 43.5 ✓	670.8 ✓	92.29 ✓	- 61908 ✓	- 99.75 ✓	- 66912 ✓
	13 ✓ x ½ ✓ x 15.4214 ✓	100.2 ✓	94.86 ✓	- 9505 ✓	- 73.67 ✓	- 7382 ✓
	5.821 ✓ x 33.5786 ✓	195.5 ✓	67.79 ✓	- 13253 ✓	- 118.59 ✓	- 23184 ✓
	450 ✓	450 ✓	74 ✓	- 33300 ✓	- 100 ✓	- 45000 ✓
		1981.5 ✓	$\bar{x}$ = 89.47 ✓	- 177291 ✓	$\bar{z}$ = - 98.49 ✓	-195164 ✓

Computed by WJL Date 3-2-73
Checked by [illegible] Date 3/5/73
Reviewed by RGP Date 3-5-73
Approved by ____ Date ____

Job No. 4671 Page No. 3B-12
Subject GATE BAY LOADS
GULFSIDE
Sheet No. 11 of ____

ITEM	DESCRIPTION	AREA	ARM (X)	MOMENT (Z)	ARM Z	MOMENT (X)
Water area INSIDE GATE BAY	23.272 ✓ X 55 ✓	1280.0 ✓	11.64 ✓	- 14899 ✓	- 27.50 ✓	- 35200 ✓
	57.1667 ✓ X 20.81 ✓ X ½ ✓	594.8 ✓	30.21 ✓	- 17969 ✓	- 19.06 ✓	- 1.337 ✓
	π ✓ X (60.7604)² ✓ X 70/360 ✓	2255.2 ✓	54.43 ✓	- 122751 ✓	- 35.35 ✓	- 7.721 ✓
	π ✓ X (64.92)² ✓ X 70/360 ✓	2574.6 ✓	53.99 ✓	- 137200 ✓	- 78.31 ✓	- 20.617 ✓
	- 2.1667 ✓ X 60.7604 ✓	- 131.6 ✓	53.65 ✓	+ 7060 ✓	- 56.08 ✓	+ 7380 ✓
	TOTAL WATER AREA (INSIDE GATE BAY) - LOCKSIDE	6573.0 ✓	$\bar{X}$ = 43.47 ✓	- 285759 ✓	$\bar{Z}$ = - 48.76 ✓	- 32045 ✓
	623.5 ✓	623.5 ✓	74.0 ✓	- 46139 ✓	- 14.0 ✓	- 1729 ✓
	25.968 ✓ X 55 ✓	1428.2 ✓	92.02 ✓	- 138564 ✓	- 27.50 ✓	- 39276 ✓
	TOTAL WATER AREA (INSIDE GATE BAY) - GULFSIDE	2051.7 ✓	$\bar{X}$ = 90.02 ✓	- 184703 ✓	$\bar{Z}$ = - 27.40 ✓	- 48005 ✓
UPLIFT Area	80 ✓ X 65 ✓	5200 ✓ EL -24 ✓	40 ✓		- 32.5 ✓	
	80 ✓ X 56.5 ✓	4520 ✓ EL -19 ✓	40 ✓		- 93.25 ✓	
	- 23 ✓ X 3.5 ✓	- 80.5 ✓ EL -11 ✓	68.5 ✓		- 119.75 ✓	
	80 ✓ X 12 ✓	960 ✓ (2.5' ave. Dif.)	40 ✓		- 69.0 ✓	
	LOCKSIDE					
	30 ✓ X 65 ✓	1950 ✓ EL -24.0 ✓	95 ✓		- 32.5 ✓	
	30 ✓ X 56.5 ✓	1695 ✓ EL -19.0 ✓	95 ✓		- 93.25 ✓	
	23 ✓ X 3.5 ✓	80.5 ✓ EL -19.0 ✓	68.5 ✓		- 119.75 ✓	
	30 ✓ X 12 ✓	360 ✓ (2.5' ave. Dif.)	95 ✓		- 69.0 ✓	
	GULFSIDE					

Computed by RGP Date 3-6-73
Checked by RBecker Date 3/19/73
Reviewed by ____ Date ____
Approved by RGP Date 5-15

Job No. 4671 Page No. 38-13
Subject STRUCTURES
GATE BAY LOADS
GULFSIDE
Sheet No. 12 of

SUMMARY OF WATER LOADS BASED UPON 50% OF STRUCTURE

Line	Water Load	Area (Ft²)	II1 Pressure (K/Ft²)	II1 Force	II1 x̄	II1 Moment	II2 Press.	II2 Force	II2 x̄	II2 Moment	II3 Press.	II3 Force	II3 x̄	II3 Moment	I4 Press.	I4 Force	I4 x̄	I4 Moment
1	Outside Gate Bay - Lockside	1617.8	0.832	1346	15.99	21522	.608	984.		15734	.480	777.		12424	0.608	984.		15734
2	- Gulfside	1981.5	2.123	4207	81.97	376400	1.942	3848.		344281	1.881	3727.		333455	1.472	2917.		260984
3	Inside Gate Bay - Lockside	6573	0.832	5470	43.47	237781	.608	3998.		173973	.480	3156.		137191	0.608	3998.		173973
4	- Gulfside	2051.7	2.123	4356	90.02	392197	1.942	3984		358640	1.881	3859		347387	1.472	3020		271860
5				15377	66.83	1027830		12814	69.66	892628		11519	72.09	830457		10919	66.17	722551
6	Uplift - Lockside																	
7	EL -29	5200	1472	7654	40	306160	1248	6490		259600	1.120	5824		232960	1248	6490		259600
8	EL -19	4520	1.152	5207	40	208280	.928	4195		167800	.800	3616		144640	.928	4195		167800
9	EL -19	- 80.5	1.152	- 93	68.5	- 6371	.928	- 75		- 5138	.800	- 64		- 4384	.928	- 75		- 5138
10	5' Diff	960	0.160	154	40	6160	0.160	154		6160	.160	154		6160	.160	154		6160
11				12922	31.79	514229		10764	39.80	428422		9530	39.81	379376		10764	39.80	428422
12	- Gulfside							Use x̄ = 39.79 for all load conditions										
13	EL -29	1950	2355	4592	95	436240	0.240	4368		414960	2.176	4243		403085	2.112	4118		391210
14	EL -19	1695	2.035	3449	95	327655	1.920	3254		309130	1.856	3146		298705	1.792	3037		288515
15	EL -19	80.5	2.035	164	68.5	11234	1.920	155		10618	1.856	149		10267	1.792	144		9864
16	5' Diff	360	0.160	58	95	5510	.160	58		5510	.160	58		5510	.160	58		5510
17				8263	94.48	780639		7835	94.48	740218	7596	94.48	717672		7357	94.48	695099	
18			(K/1)				Use x̄ = 94.50 for all load conditions											
19	Lateral Pressure	65	22.748	1479	18.75	- 27731	14.94	971		- 18206	13.415	877		- 16444	5.832			
20		65	38.772	2520	12.5	- 31500	39.446	2565		- 50263	33.88	2528		- 31600	16.24	1035	9.75	- 10676
21		12	21.231	255	30.0	- 5100	13.917	167		- 3340	12.594	151		- 3020	5.922	709	24.	- 17016
22		12	33.949	407	14.17	- 5767	34.559	415		- 5881	34.656	469		- 5796	14.678	176	11.0	- 1936
23		44.5	19.715	877	14.5	- 12634	12.981	576		- 12840	11.67	520		- 11				
24		44.5	29.196	1296	15.5	- 20576	23.33	1319		- 30899	22.018	1300		- 29	12.58	557	12.25	- 6823
25				6134		- 104256		6013		- 92610		5785		- 88489		2527		- 36451
26	.064 (H)² (½) (65)		(2366 - H)	1100	13.4	- 14735	13.21	791	13.3	5142	13.15	637	13.3	- 5716				
27	(H)² (12)		(2366 - H)	161	93.5	15037	17.4	111	3.17	907	5.42	86	7.5	645				
28	(H)² (44.5)		(18 - H)	414	11.0	- 5071	2.99	299	9.13	2939	13.63	223	9.17	2045				
29				1675		15007		1201		8988		946		6406				

Computed by RGP Date 3-6-73
Checked by RJ Cooke Date 3/19/73
Reviewed by ____ Date ____
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Job No. 4671 Page No. 3B-14
Subject STRUCTURAL
GATE DAY LOADS
GULFSIDE
Sheet No. 13 of

SUMMARY OF WATER LOADS
BASED UPON 50% OF STRUCTURE

Line	Area (ft²)	II 6 Press	II 6 Force	II 6 x	II 6 Moment	II 7 p	II 7 F	II 7 x	II 7 M	II 8 p	II 8 F	II 8 x	II 8 M	II 9 p	II 9 F	II 9 x	II 9 M	II 10 p	II 10 F	II 10 x	II 10 M
(1)	1617.8	.704	1139	15.99	18 213	.632	2640		42 214	.536	2485		39 735	1.472	2381		38 072	1.280	2071		33 115
(2)	1981.5	1.280	3536	89.47	226 896	.736	1458		130 447	.560	1110		99 312	.608	1205		107 811	.704	1395		124 810
(3)	6573.	.704	4629	43.47	201 223	1.632	10730		466 435	.536	10100		439 047	1.472	9678		420 703	1.280	8416		365 844
(4)	2051.7	1.280	2626	90.02	236 393	.736	1510		135 930	.560	1149		103 433	.608	1247		112 255	.704	1444		129 989
(5)			10930	62.46	682 725		16328	47.44	775 024		14144	45.91	681 527		14511	46.78	678 841		13326	49.06	653 758
(6)	Uplift - Lakeside																				
(7)	5200	1.344	6989	40	279 560	2.272	11814		472 560	2.176	11315		452 600	2.112	10982		439 280	1.920	9984		399 360
(8)	4520	1.024	4628	40	185 120	1.968	8893		352 920	1.856	8389		335 560	1.792	8100		324 000	1.664	7232		289 280
(9)	- 80.5	1.024	- 82	68.54	- 5617	1.968	- 157		- 10 755	1.856	- 149		- 10 207	1.792	- 144		- 9 864	1.664	- 129		- 8 837
(10)	960	.160	154	40	6160	.160	154		6160	.160	154		6160	.160	154		6160	.160	154		6160
(11)			11689	39.50	465 225		20634	39.78	820 885		19709	39.78	784 113		19092	39.79	759 576		17241	39.79	685 963
(12)	Uplift - Gulfside					Use x = 39.79 for all load conditions															
(13)	1950	1.920	3744	95	355 680	1.376	2683		254 885	1.005	1960		186 200	.228	445		42 275	.240	468		44 460
(14)	1695	1.600	2712	95	257 640	1.056	1790		170 050	.880	1492		141 740	.928	1573		149 435	.912	1736		164 920
(15)	80.5	1.600	129	68.5	8831	1.056	85		5823	.880	71		4864	.928	75		5138	.912	82		5617
(16)	360	.160	58	95	5510	.160	58		5510	.160	58		5510	.160	58		5510	.160	58		5510
			6643	94.49	627 667		4616	94.51	436 268		3961	94.53	374 414		4140	94.52	391 134		4497	94.52	425 042
						Use x = 94.50 for all load conditions															
	LATERAL PRESSURE																				
	121.5	2.592	315	24	7560	6.272	762	24.37	185 706	7.112	864	24.93	21542	5.832	709	24.0	17016	2.592	315	24	7560
	65	12.090	786	10.5	8253	11.260	732	10.85	79 422	11.900	774	11.50	8901	11.162	726	10.75	7804	12.090	786	10.5	8253
	12	10.656	128	11.75	1504	11.260	135	12.37	1670	11.900	143	12.87	1839	11.162	134	12.0	1608	10.656	128	11.75	1504
	44.5	9.216	410	13.0	5330	11.260	501	13.37	6698	11.900	530	13.87	7351	11.162	497	13.0	6461	9.216	410	13.0	5330
			1639		-22647		2876		44568		2881		41810		2537		36451		1639		22647

Job No. 4671 Page No. 3B-15

Computed by RGP Date 3-6-73
Checked by RJRechmer Date 3/19/73
Reviewed by ____ Date ____
Approved by RGP Date 5-73

Subject STRUCTURAL
GATE BAY LOADS
GULFSIDE

Sheet No. 14 of ____

		Area (ft²)	p	Force	y	Moment
	WATER LOAD					
	Outside Gate Bay	3599.3 ✓	1216 ✓ psf	4377 ✓ K	56.44 ✓	247038 ✓
	Inside Gate Bay					
6(55)(2)	H_2O loaded	391.6 ✓	1216 ✓	476 ✓	55.00 ✓	26180 ✓
24.7 - 391.6	No load	8233.1 ✓	0	0 ✓	55.00 ✓	— ✓
				4853 ✓	56.30 ✓	273 218
	UPLIFT					
5(110)	EL -24	7150 ✓	1856 ✓	13270 ✓		
5(110)	-19	6215 ✓	1536 ✓	9546 ✓		
	5' Diff	1320 ✓	160 ✓	211 ✓		
				23 027 ✓	55.0 ✓	1,266 500 ✓
	LATERAL WATER PRESSURE	— None ✓	—	—	—	—
	WATER LOAD					
	Outside Gate Bay	3599.3 ✓	0.992 ✓ ksf	3571 ✓ K	56.44 ✓	201 547 ✓ IK
	Inside Gate Bay	8624.7 ✓	0.992 ✓	8556 ✓	54.55 ✓	466730 ✓
				12127 ✓	55.11 ✓	668277 ✓
	UPLIFT					
	EL -24	7150 ✓	1.632 ✓	11669 ✓		
	EL -19	6215 ✓	1.312 ✓	8154 ✓		
	5' diff	1320 ✓	0.160 ✓	211 ✓		
				20034 ✓	55.00 ✓	1,101,870 ✓ IK
	LATERAL WATER PRESS	— None ✓	—	—	—	—

LOADS FROM SAP OF SYSTEM

Job No. 467 Page No. 3B-16

Computed by R.V. Becker Date 3/19/73
Checked by RGP Date 3-20-73
Reviewed by Date
Approved by RGP Date 5-73

Subject GATE BAY LOADS
GULF SIDE
Sheet No. 15 of

LOAD SUMMARY @ EL -24.0 and @ BASE SLAB
(SUMMARY IS FOR 50% of structure)

CONSTRUCTION CONDITION A - Area Dewatered
Case I without backfill
No Water Load
Gate in open position

Vert Forces	Horz Forces	Arm	Moment
-20960.4		+0.15	-3144
-20960.4			-3144

CONSTRUCTION CONDITION B - Area Dewatered
Case I with backfill
No Water Load
Gate in open position

DL.	-25927.8		+0.85	-22.039
Lat Load (Soil)		-58		+ 46
	-25927.8	-58		-21993

Computed by RJBecker Date 3/15/73
Checked by RGP Date 3-20-73
Reviewed by Date
Approved by Date 5-73

LOADS ARE SUMMARIZED FOR 50% of structure

Job No. 4671 Page No. 3B-17
Subject GATE BAY LOADS GULFSIDE
Sheet No. 16 of

LOAD SUMMARY AT EL -24.0 and @ BASE SLAB

I+II1

	+ Vert Forces	+ Horz Forces	(-) ℄ (+) Arm	+ Moment
D.L	-23278.5K ✓		+0.48 ✓	-11174K ✓
Water Load	-15379 ✓		+11.83 ✓	-181934 ✓
Uplift {	+12922 ✓		-15.21 ✓	-196544 ✓
	+8263 ✓		+39.50 ✓	+326389 ✓
Lateral Load {		-45 -6834K ✓	—	+109250 +36 ✓
		+1722 ✓	—	-15007 ✓
	-17472.5K ✓	-5157K ✓		+31016K ✓

I+II2

	V.F.	H.F.	Arm	M
	-23278.5 ✓		+0.48 ✓	-11174 ✓
	-12814 ✓		+14.66 ✓	-187853 ✓
	+10764 ✓		-15.21 ✓	-163720 ✓
	+7835 ✓		+39.50 ✓	+309483 ✓
		-45 -6032 ✓	—	+92610 +36 ✓
		+1201 ✓	—	-8988 ✓
	-17493.5 ✓	-4831 ✓		+30394 ✓

I+II3

V.F.	H.F.	Arm	M
-23278.5 ✓		+0.48 ✓	-11174 ✓
-11519 ✓		+17.09 ✓	-196860 ✓
+9530 ✓		-15.21 ✓	-144951 ✓
+7596 ✓		+39.50 ✓	+300042 ✓
	-45 -5785 ✓	—	+88489 +36 ✓
	+946 ✓	—	-6406 ✓
-17671.5 ✓	-4884 ✓		+29196 ✓

I+II4

-23278.5 ✓		+0.48 ✓	-11174 ✓
-10919 ✓		+11.17 ✓	-121965 ✓
+10764 ✓		-15.21 ✓	-163720 ✓
+7357 ✓		+39.50 ✓	+290652 ✓
	-45 -2537 ✓	—	+36451 +36 ✓
-16076.5 ✓	-2587 ✓		+30230 ✓

I+II5

-23278.5 ✓		+0.48 ✓	-11174 ✓
-10930 ✓		+7.46 ✓	-81538 ✓
+11689 ✓		-15.21 ✓	-177790 ✓
+6643 ✓		+39.50 ✓	+262399 ✓
	-45 -1639 ✓	—	+22641 +36 ✓
-15876.5 ✓	-1684 ✓		+14680 ✓

I+II7

-23278.5 ✓		+0.48 ✓	-11174 ✓
-16538 ✓		-7.56 ✓	+123515 ✓
+20634 ✓		-15.21 ✓	-313843 ✓
+4616 ✓		+39.50 ✓	+182332 ✓
	-45 +2876 ✓	—	-44568 +36 ✓
-14366.5 ✓	+2829 ✓		-63702 ✓

I+II8

-23278.5 ✓		+0.48 ✓	-11174 ✓
-14844 ✓		-9.09 ✓	+134932 ✓
+19709 ✓		-15.21 ✓	-299774 ✓
+3961 ✓		+39.50 ✓	+156460 ✓
	-45 +2981 ✓	—	-41810 +36 ✓
-14452.5 ✓	+2836 ✓		-61330 ✓

I+II9

-23278.5 ✓		+0.48 ✓	-11174 ✓
-14511 ✓		-8.22 ✓	+119280 ✓
+19692 ✓		-15.21 ✓	-299389 ✓
+4140 ✓		+39.50 ✓	+163530 ✓
	-45 +2557 ✓	—	-36451 +36 ✓
-14557.5 ✓	+2492 ✓		-55168 ✓

I+II10

-23278.5 ✓		+0.48 ✓	-11174 ✓
-13326 ✓		-5.94 ✓	+79156 ✓
+17241 ✓		-15.21 ✓	-262236 ✓
+4497 ✓		+39.50 ✓	+177632 ✓
	-45 +1639 ✓	—	-22641 +36 ✓
-14866.5 ✓	+1594 ✓		-39233 ✓

I+II11

DL	-23278.5 ✓		+0.48 ✓	-11174 ✓
W.L	-12127 ✓		+0.11 ✓	-1334 ✓
Uplift	+20034 ✓		0 ✓	0 ✓
Lat. Load		-45 ✓	—	+36 ✓
	-15371.5 ✓	-45 ✓		-12472 ✓

I+II12

	-23287 ✓		+0.52 ✓	-11955 ✓
	-4853 ✓		+1.30 ✓	-6309 ✓
	+23027 ✓		0 ✓	0 ✓
		-45 ✓		+36 ✓
	-536.8 ✓		0 ✓	0 ✓
	-5352.5 ✓	-45 ✓		-18228 ✓

← DL w/Gate Removed

← Needles & Needle Girders (480+508)

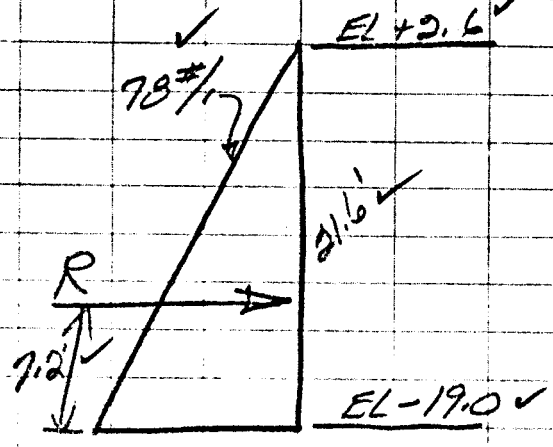
Job No. 4671 Page No. 3B-18

Computed by RGP Date 3-26-73
Checked by RVBecker Date 3/28/73
Reviewed by ____ Date ____
Approved by RGP Date 5-73

Subject STRUCTURAL
GATE BAY LOADS
GULFSIDE

Sheet No. 17 of ____

SOIL LATERAL PRESSURE - "1" TO ℄ OF LOCK



USE "AT REST" PRESSURE 66 psf/' and with 1 on 4 SLOPE, INCREASE TO 78 psf/'

PRESSURE TAKEN AT OUTSIDE EDGE OF FOOTING.

$$R = \frac{78(21.6)^2}{2} = 18196\ \#/'$$

$\times \frac{110'}{1000} = 2002^k$ TOTAL
USE 2000^k

Soil SATURATED EH = 2000^k @ EL. -11.8
Soil SUBMERGED EH = 934^k @ EL -11.8

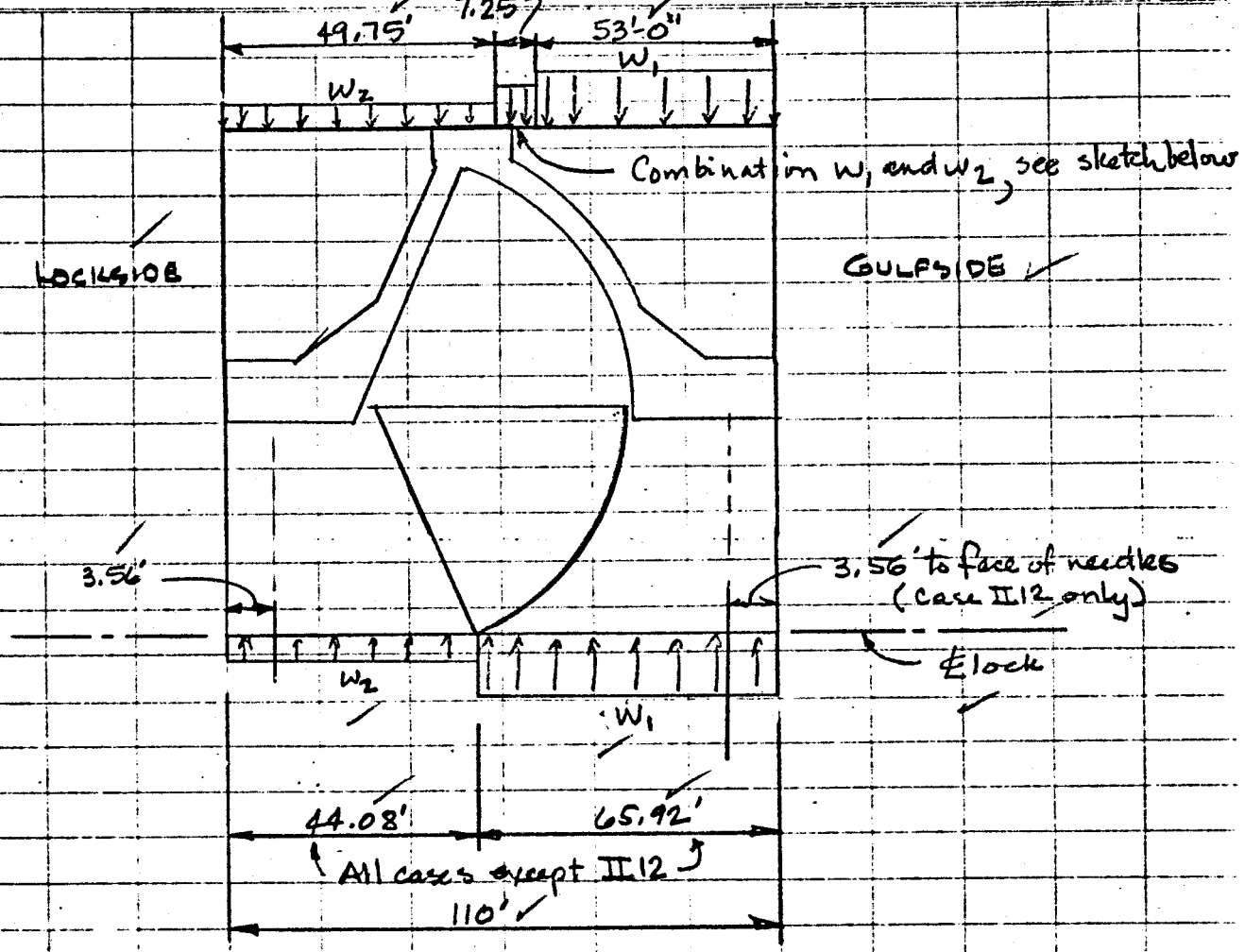
$\left(\frac{30.8}{66} \times 2000 = 933.3\right)$

Job No. 4671 Page No. 38-19

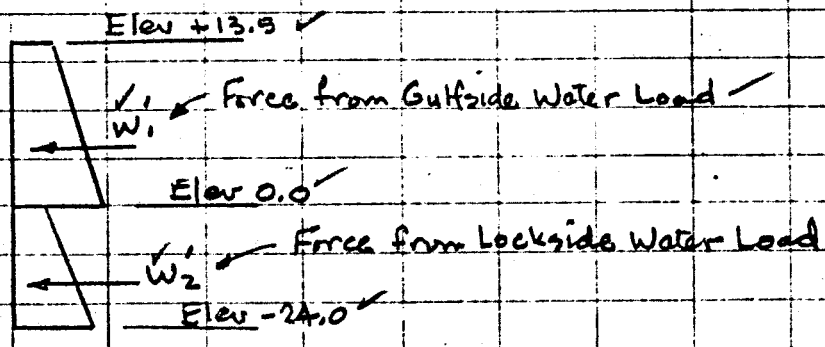
Computed by R.V. Becker Date 3/27/73
Checked by KGF Date 3-28-73
Reviewed by ____ Date ____
Approved by ____ Date ____

Subject STRUCTURAL
GATE BAY LOADS
GULFSIDE

Sheet No. 18 of ____



WATER LOAD DIAGRAM (DIRECTION OF Z AXIS)



Section @ Floodwall junction and Base slab
(Typical for 7.25' of length on WALL.)

Job No. 4671 Page No. 38-20

Computed by R.J. Bechler Date 3/28/73
Checked by RGP Date 3-29-73
Reviewed by Date
Approved by [illegible] Date 5-73

Subject STRUCTURAL
GATE BAY LOADS (Horiz.)
GULFSIDE

Sheet No. 19 of

WATER LOAD 1 to ℄ Lock & SOIL 1 to Lock

		Force	Arm	Moment @EL -29.0	
I+II 1	22.748 × 53	1206	18.75	22613	
	38.772 × 53	2055	12.50	25688	
	16.928 × 49.75 }	965	7.67	7402	
	16.928 × 7.25 }				
	.6066 × 13.5 × 7.25	59	30.75	1814	
	.7464 × 13.5/2 × 7.25	36	28.50	1026	
	− 1.5164 × 27.5/2 × 65.92	− 1374	19.17	− 26340	
	− .6066 × 27.5 × 65.92	− 1100	23.75	− 26125	
	− .064 × (13)² × 1/2 × 44.08	− 238	14.33	− 3411	
		+ 1609		+ 2667	WATER
		+ 2543	5.53'	14062	WATER + SOIL
I+II 2	14.944 × 53	792	18.75	14850	
	39.465 × 53	2092	12.50	26150	
	12.168 × 57	694	6.50	4511	
	0.3985 × 13.5 × 7.25	39	30.75	1199	
	0.7517 × 13.5/2 × 7.25	37	28.50	1055	
	− 1.5435 × 27.5/2 × 65.92	− 1399	19.17	− 26819	
	− 0.3985 × 27.5 × 65.92	− 722	23.75	− 17148	
	− .064 × (9.5)² × 1/2 × 44.08	− 127	13.17	− 1673	
		+ 1406		+ 2125	WATER
		+ 2340	5.78'	13520	WATER + SOIL
I+II 3	13.685 × 53	715	18.75	13406	
	32.895 × 53	2061	12.50	25763	
	9.800 × 57	559	5.83	3259	
	0.3596 × 13.5 × 7.25	35	30.75	1076	
	0.7469 × 13.5/2 × 7.25	37	28.50	1055	
	− 1.5214 × 27.5/2 × 65.92	− 1379	19.17	− 26435	
	− 0.3596 × 27.5 × 65.92	− 652	23.75	− 15485	
	− 0.064 × (7.5)² × 1/2 × 44.08	− 79	12.50	− 988	
		+ 1297		+ 1651	WATER
		+ 2231	5.85'	13046	WATER + SOIL

Job No. 4671 Page No. 3B-21

Computed by R.J. Becker Date 3/28/73
Checked by RGP Date 3-28-73
Reviewed by _____ Date _____
Approved by RGP Date 5-73

Subject STRUCTURAL
GATE BAY LOADS
GULFSIDE

Sheet No. 20 of _____

WATER LOAD & SOIL LOAD TO LOCK (SUMMARY)

		Force	Arm	Moment @EL.-24.0	
I+II4	34.848 x 53 ✓	1847 ✓	11.00 ✓	20317 ✓	
	12.168 x 57 ✓	694 ✓	6.50 ✓	4511 ✓	
	✓0.576 x 9/2 x 7.25	19 ✓	27.00 ✓	513 ✓	
	- 16.928 x 65.92 ✓	- 1116 ✓	17.67 ✓	- 19720 ✓	
	- 2.888 x 44.08 ✓	- 127 ✓	13.17 ✓	- 1673 ✓	
		+1317 ✓		+ 3948 ✓	WATER
		+2251 ✓	6.89' ✓	15343 ✓	WATER + SOIL
I+II5	28.8 x 53 ✓	1526 ✓	10.00 ✓	15260 ✓	
	14.112 x 57 ✓	804 ✓	7.00 ✓	5628 ✓	
	0.384 x 6/2 x 7.25 ✓	8 ✓	26.00 ✓	208 ✓	
	- 12.8 x 65.92 ✓	- 844 ✓	16.67 ✓	- 14069 ✓	
	- 3.872 x 44.08 ✓	- 171 ✓	13.67 ✓	- 2338 ✓	
		+1323 ✓		+ 4689 ✓	WATER
		+2257 ✓	7.13' ✓	16084 ✓	WATER + SOIL
I+II7	14.792 x 53 ✓	784 ✓	7.17 ✓	5621 ✓	
	40.328 x 49.75 ✓	2006 ✓	11.83 ✓	23731 ✓	
	✓0.736 x 24 x 7.25 ✓	128 ✓	12.00 ✓	1536 ✓	
	1.536 x 24/2 x 7.25 ✓	134 ✓	8.00 ✓	1072 ✓	
	- 4.232 x 65.92 ✓	- 279 ✓	13.83 ✓	- 3859 ✓	
	- 20.808 x 44.08 ✓	- 917 ✓	18.50 ✓	- 16965 ✓	
		+ 1856 ✓		+ 11136 ✓	WATER
		+2790 ✓	8.08' ✓	22531 ✓	WATER + SOIL
I+II8	11.250 x 53 ✓	596 ✓	6.25 ✓	3725 ✓	
	36.992 x 49.75 ✓	1840 ✓	11.33 ✓	20847 ✓	
	✓0.660 x 24 x 7.25	111 ✓	12.00	1332 ✓	
	✓1.536 x 24/2 x 7.25	134 ✓	8.00 ✓	1072 ✓	
	- 2.450 x 65.92 ✓	- 162 ✓	12.92 ✓	- 2093 ✓	
	- 18.432 x 44.08 ✓	- 812 ✓	18.00 ✓	- 14616 ✓	
		+1707 ✓		+ 10267 ✓	WATER
		+2641 ✓	8.20' ✓	21662 ✓	WATER + SOIL

= C1.3 x ✓

Job No. 4671 Page No. 3B-22

Computed by RJBechler Date 3/28/73
Checked by RGP Date 3-28-73
Reviewed by ____ Date ____
Approved by ____ Date ____

Subject STRUCTURAL
GATE BAY LOADS
GULFSIDE

Sheet No. 21 of ____

WATER LOAD + SOIL "1" TO LOCK SUMMARY

		Force	Arm	Moment @ EL -24.0	
I+II 9	12.168 x 53 ✓	645 ✓	6.50 ✓	4193 ✓	
	34.848 x 49.75 ✓	1734 ✓	11.00 ✓	19074 ✓	
	0.576 x 24 x 7.25 ✓	100 ✓	12.00 ✓	1200 ✓	
	1.536 x 24/2 x 7.25 ✓	134 ✓	8.00 ✓	1072 ✓	
	-2.888 x 65.92 ✓	-190 ✓	13.17 ✓	-2502 ✓	
	-16.928 x 44.08 ✓	-746 ✓	17.67 ✓	-13182 ✓	
		+1677 ✓		+9855 ✓	WATER
		+2611 ✓	8.14' ✓	+21250 ✓	WATER + SOIL
I+II 10	14.112 x 53 ✓	748 ✓	7.00 ✓	5236 ✓	
	28.8 x 49.75 ✓	1433 ✓	10.00 ✓	14330 ✓	
	0.324 x 24 x 7.25 ✓	67 ✓	12.00 ✓	804 ✓	
	1.536 x 24/2 x 7.25 ✓	134 ✓	8.00 ✓	1072 ✓	
	-3.812 x 65.92 ✓	-255 ✓	13.67 ✓	-3486 ✓	
	-12.8 x 44.08 ✓	-564 ✓	16.67 ✓	-9402 ✓	
		+1563 ✓		+8554 ✓	WATER
		+2497 ✓	7.99' ✓	+19949 ✓	WATER + SOIL
I+II 12	1.856 x 29/2 x 110	2960 ✓	9.67 ✓	28623 ✓	
	1.216 x 19/2 x 3.56 x 2	-82 ✓	16.33 ✓	-1339 ✓	
		+2878 ✓		+27284 ✓	WATER
		+3812 ✓	10.15' ✓	+38679 ✓	WATER + SOIL

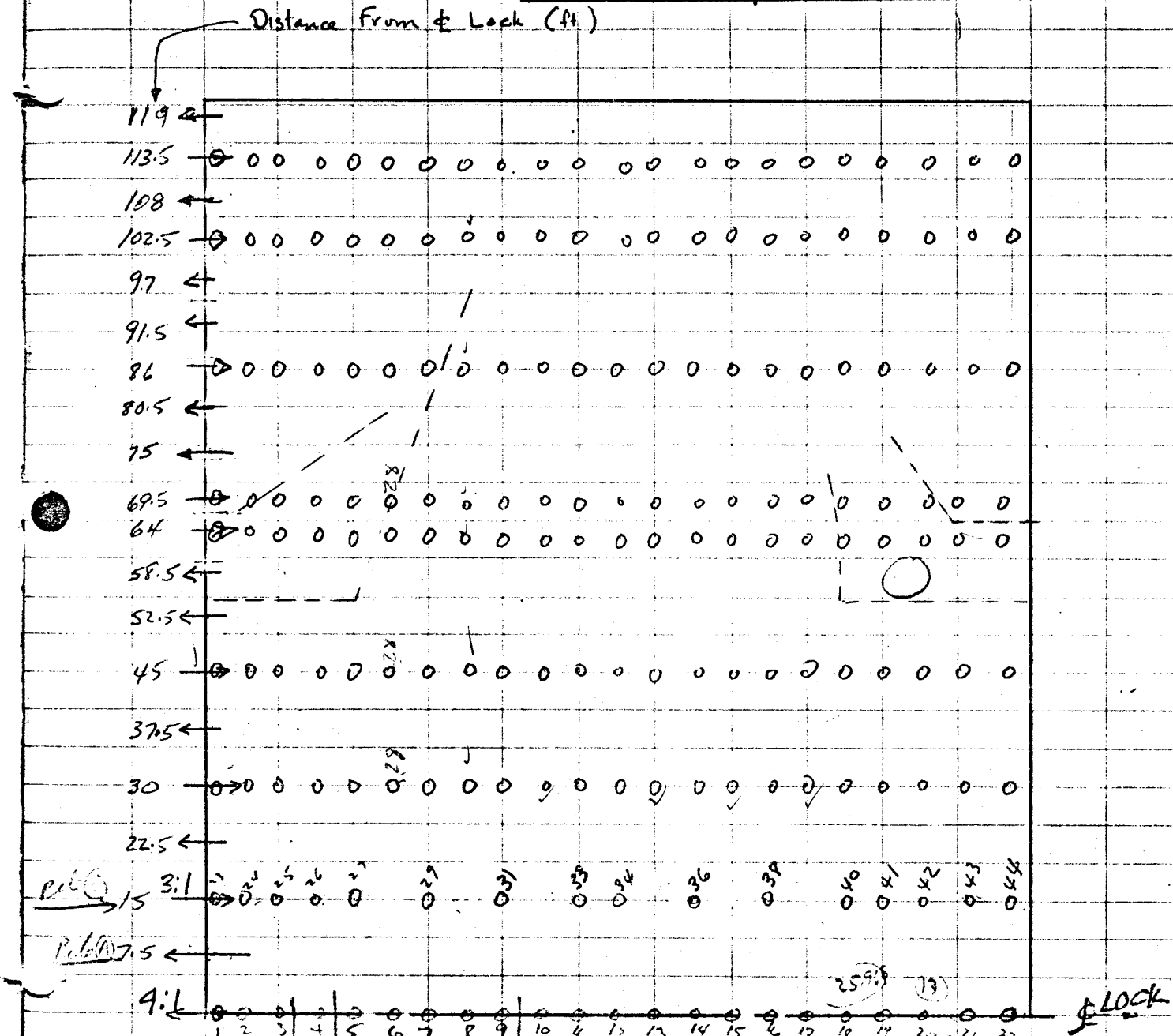
Job No. 4671 Page No. 3B-23

Computed by WJF Date 4/4/73
Checked by RJBecker Date 4/10/73
Reviewed by ____ Date ____
Approved by ____ Date 5-73

Subject STRUCTURAL
PILING LAYOUT
GULFSIDE GATE

Sheet No. 1 of ____

PILING LAYOUT FOR COMPUTER



$$66.10 = \frac{1275(22) - 6(15)}{19.5(22) - 6}$$

$$65.17 = \frac{749.5(22)}{11.5(22)}$$

$$67.48' = \frac{505.5(22) - 6(15)}{8(22) - 6}$$

GULFSIDE GATE BAY PILING .086956 OF TOTAL STRUCTURE

THREE DIMENSIONAL PILE GROUP (RIGID HEADSTOCK)

GEOMETRY OF PILE GROUP

PILE	XI	YI	ZI	XJ	YJ	ZJ	AREA	E	G	IXX	IYY	KS
1	-54.5	-8.0	8.0	-52.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
2	-49.5	-8.0	8.0	-47.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
3	-44.5	-8.0	8.0	-42.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
4	-39.5	-8.0	8.0	-37.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
5	-34.5	-8.0	8.0	-32.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
6	-29.5	-8.0	8.0	-27.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
7	-24.5	-8.0	8.0	-22.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
8	-19.5	-8.0	8.0	-17.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
9	-14.5	-8.0	8.0	-12.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
10 A	-9.5	-8.0	8.0	-7.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
11	-4.5	-8.0	8.0	-2.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
12	0.5	-8.0	8.0	2.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
13	5.5	-8.0	8.0	7.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
14	10.5	-8.0	8.0	12.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
15	15.5	-8.0	8.0	17.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
16	20.5	-8.0	8.0	22.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
17	25.5	-8.0	8.0	27.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
18	30.5	-8.0	8.0	32.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
19	35.5	-8.0	8.0	37.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
20	40.5	-8.0	8.0	42.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
21	45.5	-8.0	8.0	47.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
22	50.5	-8.0	8.0	52.5	0.0	8.0	21.5	29000.	11200.	734.0	262.0	4.0
23	-49.8	-8.0	0.0	-52.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
24	-44.8	-8.0	0.0	-47.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
25	-39.8	-8.0	0.0	-42.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
26	-34.8	-8.0	0.0	-37.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
27	-29.8	-8.0	0.0	-32.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
28	-24.9	-8.0	0.0	-27.5	0.0	0.0	26.2	29000.	11200.	893.6	319.0	4.9
29	-19.8	-8.0	0.0	-22.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
30	-14.8	-8.0	0.0	-17.5	0.0	0.0	26.2	29000.	11200.	893.6	319.0	4.9
31 B	-9.8	-8.0	0.0	-12.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
32	-4.8	-8.0	0.0	-7.5	0.0	0.0	26.2	29000.	11200.	893.6	319.0	4.9
33	0.2	-8.0	0.0	-2.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
34	5.2	-8.0	0.0	2.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
35	10.2	-8.0	0.0	7.5	0.0	0.0	26.2	29000.	11200.	893.6	319.0	4.9
36	15.2	-8.0	0.0	12.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
37	20.2	-8.0	0.0	17.5	0.0	0.0	26.2	29000.	11200.	893.6	319.0	4.9
38	25.2	-8.0	0.0	22.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
39	30.2	-8.0	0.0	27.5	0.0	0.0	26.2	29000.	11200.	893.6	319.0	4.9
12 40	35.2	-8.0	0.0	32.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
11 41	40.2	-8.0	0.0	37.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
10 42	45.2	-8.0	0.0	42.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
9 43	50.2	-8.0	0.0	47.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
8 44	55.2	-8.0	0.0	52.5	0.0	0.0	29.9	29000.	11200.	1021.2	364.5	5.6
45	-54.5	-8.0	-8.0	-52.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
46	-49.5	-8.0	-8.0	-47.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
5 47 A	-44.5	-8.0	-8.0	-42.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
4 48	-39.5	-8.0	-8.0	-37.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
3 49	-34.5	-8.0	-8.0	-32.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0

50	-29.5	-8.0	-8.0	-27.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
51	-24.5	-8.0	-8.0	-22.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
52	-19.5	-8.0	-8.0	-17.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
53	-14.5	-8.0	-8.0	-12.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
54	-9.5	-8.0	-8.0	-7.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
55	-4.5	-8.0	-8.0	-2.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
56	0.5	-8.0	-8.0	2.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
57	5.5	-8.0	-8.0	7.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
58	10.5	-8.0	-8.0	12.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
59	15.5	-8.0	-8.0	17.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
60	20.5	-8.0	-8.0	22.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
61	25.5	-8.0	-8.0	27.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
62	30.5	-8.0	-8.0	32.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
63	35.5	-8.0	-8.0	37.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
64	40.5	-8.0	-8.0	42.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
65	45.5	-8.0	-8.0	47.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0
66	50.5	-8.0	-8.0	52.5	0.0	-8.0	21.5	29000.	11200.	734.0	262.0	4.0

DE GATE BAY PILING .086956 OF TOTAL STRUCTURE

LOAD CASE 1 Ia Constn Cond. w/o Backfill

FX	FY	FZ	MX	MY	MZ
0.00	-3645.27	0.00	0.00	0.00	-546.78

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
0.183027E-03	-0.719728E-03	0.138004E-08	0.172690E-09	0.774276E-11	-0.123153E-06

PILE FORCES (FT.KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	-2.279	0.000	-0.000	0.000	48.963 ÷5.75=
2	0.000	-2.280	0.000	-0.000	0.000	49.008
3	0.000	-2.281	0.000	-0.000	0.000	49.053
4	0.000	-2.282	0.000	-0.000	0.000	49.099
5	0.000	-2.283	0.000	-0.000	0.000	49.144
6	0.000	-2.284	0.000	-0.000	0.000	49.189
7	0.000	-2.285	0.000	-0.000	0.000	49.234
8	0.000	-2.286	0.000	-0.000	0.000	49.279
9	0.000	-2.287	0.000	-0.000	0.000	49.324
10	0.000	-2.288	0.000	0.000	0.000	49.370
11	0.000	-2.289	0.000	0.000	0.000	49.415
12	0.000	-2.290	0.000	-0.000	0.000	49.460
13	0.000	-2.291	0.000	-0.000	0.000	49.505
14	0.000	-2.292	0.000	-0.000	0.000	49.550
15	0.000	-2.293	0.000	-0.000	0.000	49.595
16	0.000	-2.294	0.000	-0.000	0.000	49.641
17	0.000	-2.295	0.000	-0.000	0.000	49.686
18	0.000	-2.296	0.000	-0.000	0.000	49.731
19	0.000	-2.297	0.000	-0.000	0.000	49.776
20	0.000	-2.298	0.000	-0.000	0.000	49.821
21	0.000	-2.295	0.000	-0.000	0.000	49.866
22	0.000	-2.299	0.000	-0.000	0.000	49.912
23	0.000	-0.482	0.000	0.000	0.000	75.413
24	0.000	-0.483	0.000	-0.000	0.000	75.473
25	0.000	-0.485	0.000	0.000	0.000	75.533
26	0.000	-0.487	0.000	-0.000	0.000	75.593
27	0.000	-0.488	0.000	-0.000	0.000	75.653
28	0.000	-0.429	0.000	0.000	0.000	66.344
29	0.000	-0.492	0.000	0.000	0.000	75.773
30	0.000	-0.432	0.000	0.000	0.000	66.449
31	0.000	-0.495	0.000	0.000	0.000	75.893
32	0.000	-0.435	0.000	0.000	0.000	66.554
33	0.000	-0.499	0.000	-0.000	0.000	76.013
34	0.000	-0.500	0.000	-0.000	0.000	76.073
35	0.000	-0.439	0.000	-0.000	0.000	66.711
36	0.000	-0.504	0.000	-0.000	0.000	76.192
37	0.000	-0.442	0.000	-0.000	0.000	66.816
38	0.000	-0.507	0.000	-0.000	0.000	76.312
39	0.000	-0.445	0.000	-0.000	0.000	66.921
40	0.000	-0.511	0.000	-0.000	0.000	76.432
41	0.000	-0.512	0.000	-0.000	0.000	76.492
42	0.000	-0.514	0.000	-0.000	0.000	76.552

43	0.000	-0.516	0.000	-0.000	0.000	76.612
44	0.000	-0.517	0.000	-0.000	0.000	76.672
45	0.000	-2.279	0.000	-0.000	0.000	45.963
46	0.000	-2.280	0.000	-0.000	0.000	49.008
47	0.000	-2.281	0.000	-0.000	0.000	49.053
48	0.000	-2.282	0.000	-0.000	0.000	49.098
49	0.000	-2.283	0.000	-0.000	0.000	49.144
50	0.000	-2.284	0.000	-0.000	0.000	49.189
51	0.000	-2.285	0.000	-0.000	0.000	49.234
52	0.000	-2.286	0.000	-0.000	0.000	49.279
53	0.000	-2.287	0.000	-0.000	0.000	49.324
54	0.000	-2.288	0.000	-0.000	0.000	49.369
55	0.000	-2.289	0.000	-0.000	0.000	49.415
56	0.000	-2.290	0.000	0.000	0.000	49.460
57	0.000	-2.291	0.000	0.000	0.000	49.505
58	0.000	-2.292	0.000	0.000	0.000	49.550
59	0.000	-2.293	0.000	0.000	0.000	49.595
60	0.000	-2.294	0.000	0.000	0.000	49.640
61	0.000	-2.295	0.000	0.000	0.000	49.686
62	0.000	-2.296	0.000	0.000	0.000	49.731
63	0.000	-2.297	0.000	0.000	0.000	49.776
64	0.000	-2.298	0.000	0.000	0.000	49.821
65	0.000	-2.298	0.000	0.000	0.000	49.866
66	0.000	-2.299	0.000	0.000	0.000	49.911

DE GATE BAY PILING .085956 OF TOTAL STRUCTURE

LOAD CASE 2 Ib Constr. Cond. w/Backfill

FX	FY	FZ	MX	MY	MZ
-10.09	-4509.16	0.00	0.00	0.00	-3824.85

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
0.205449E-03	-0.889805E-03	0.171576E-08	0.214691E-09	0.927378E-11	-0.758978E-06

PILE FORCES (FT.KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	-2.603	0.000	-0.000	0.000	58.579
2	0.000	-2.609	0.000	-0.000	0.000	58.857
3	0.000	-2.615	0.000	-0.000	0.000	59.136
4	0.000	-2.621	0.000	-0.000	0.000	59.414
5	0.000	-2.627	0.000	-0.000	0.000	59.692
6	0.000	-2.633	0.000	-0.000	0.000	59.971
7	0.000	-2.639	0.000	-0.000	0.000	60.249
8	0.000	-2.645	0.000	-0.000	0.000	60.528
9	0.000	-2.651	0.000	-0.000	0.000	60.806
10	0.000	-2.657	0.000	0.000	0.000	61.084
11	0.000	-2.663	0.000	0.000	0.000	61.363
12	0.000	-2.669	0.000	-0.000	0.000	61.641
13	0.000	-2.675	0.000	-0.000	0.000	61.919
14	0.000	-2.681	0.000	-0.000	0.000	62.198
15	0.000	-2.687	0.000	-0.000	0.000	62.476
16	0.000	-2.693	0.000	-0.000	0.000	62.755
17	0.000	-2.699	0.000	-0.000	0.000	63.033
18	0.000	-2.705	0.000	-0.000	0.000	63.311
19	0.000	-2.711	0.000	-0.000	0.000	63.590
20	0.000	-2.717	0.000	-0.000	0.000	63.868
21	0.000	-2.723	0.000	-0.000	0.000	64.146
22	0.000	-2.729	0.000	-0.000	0.000	64.425
23	0.000	-0.723	0.000	0.000	0.000	89.451
24	0.000	-0.733	0.000	-0.000	0.000	89.820
25	0.000	-0.744	0.000	0.000	0.000	90.189
26	0.000	-0.754	0.000	-0.000	0.000	90.559
27	0.000	-0.765	0.000	-0.000	0.000	90.928
28	0.000	-0.678	0.000	0.000	0.000	79.999
29	0.000	-0.786	0.000	0.000	0.000	91.666
30	0.000	-0.697	0.000	0.000	0.000	80.647
31	0.000	-0.807	0.000	0.000	0.000	92.405
32	0.000	-0.715	0.000	0.000	0.000	81.294
33	0.000	-0.828	0.000	-0.000	0.000	93.143
34	0.000	-0.838	0.000	-0.000	0.000	93.513
35	0.000	-0.742	0.000	-0.000	0.000	82.264
36	0.000	-0.859	0.000	-0.000	0.000	94.251
37	0.000	-0.761	0.000	-0.000	0.000	82.912
38	0.000	-0.880	0.000	-0.000	0.000	94.990
39	0.000	-0.779	0.000	-0.000	0.000	83.559
40	0.000	-0.901	0.000	-0.000	0.000	95.728
41	0.000	-0.912	0.000	-0.000	0.000	96.098
42	0.000	-0.922	0.000	-0.000	0.000	96.467

43	0.000	-0.933	0.000	-0.000	0.000	96.836
44	0.000	-0.943	0.000	-0.000	0.000	97.205
45	0.000	-2.603	0.000	-0.000	0.000	58.579
46	0.000	-2.609	0.000	-0.000	0.000	58.857
47	0.000	-2.615	0.000	-0.000	0.000	59.136
48	0.000	-2.621	0.000	-0.000	0.000	59.414
49	0.000	-2.627	0.000	-0.000	0.000	59.692
50	0.000	-2.633	0.000	-0.000	0.000	59.971
51	0.000	-2.639	0.000	-0.000	0.000	60.249
52	0.000	-2.645	0.000	-0.000	0.000	60.527
53	0.000	-2.651	0.000	-0.000	0.000	60.806
54	0.000	-2.657	0.000	-0.000	0.000	61.084
55	0.000	-2.663	0.000	-0.000	0.000	61.362
56	0.000	-2.669	0.000	0.000	0.000	61.641
57	0.000	-2.675	0.000	0.000	0.000	61.919
58	0.000	-2.681	0.000	0.000	0.000	62.198
59	0.000	-2.687	0.000	0.000	0.000	62.476
60	0.000	-2.693	0.000	0.000	0.000	62.754
61	0.000	-2.699	0.000	0.000	0.000	63.033
62	0.000	-2.705	0.000	0.000	0.000	63.311
63	0.000	-2.711	0.000	0.000	0.000	63.589
64	0.000	-2.717	0.000	0.000	0.000	63.868
65	0.000	-2.723	0.000	0.000	0.000	64.146
66	0.000	-2.729	0.000	0.000	0.000	64.424

DE GATE BAY PILING .056956 OF TOTAL STRUCTURE

LOAD CASE 3 I+II//

FX	FY	FZ	MX	MY	MZ
-7.83	-2673.29	0.00	0.00	0.00	-2169.03

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
0.117838E-03	-0.527434E-03	0.101888E-08	0.127490E-09	0.544637E-11	-0.430571E-06

PILE FORCES (FT.KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	-1.520	0.000	-0.000	0.000	34.869
2	0.000	-1.524	0.000	-0.000	0.000	35.027
3	0.000	-1.527	0.000	-0.000	0.000	35.185
4	0.000	-1.531	0.000	-0.000	0.000	35.343
5	0.000	-1.534	0.000	-0.000	0.000	35.501
6	0.000	-1.537	0.000	-0.000	0.000	35.659
7	0.000	-1.541	0.000	-0.000	0.000	35.817
8	0.000	-1.544	0.000	-0.000	0.000	35.975
9	0.000	-1.548	0.000	-0.000	0.000	36.133
10	0.000	-1.551	0.000	0.000	0.000	36.291
11	0.000	-1.554	0.000	0.000	0.000	36.449
12	0.000	-1.558	0.000	-0.000	0.000	36.606
13	0.000	-1.561	0.000	-0.000	0.000	36.764
14	0.000	-1.565	0.000	-0.000	0.000	36.922
15	0.000	-1.568	0.000	-0.000	0.000	37.080
16	0.000	-1.571	0.000	-0.000	0.000	37.238
17	0.000	-1.575	0.000	-0.000	0.000	37.396
18	0.000	-1.578	0.000	-0.000	0.000	37.554
19	0.000	-1.582	0.000	-0.000	0.000	37.712
20	0.000	-1.585	0.000	-0.000	0.000	37.870
21	0.000	-1.588	0.000	-0.000	0.000	38.028
22	0.000	-1.592	0.000	-0.000	0.000	38.186
23	0.000	-0.432	0.000	0.000	0.000	52.991
24	0.000	-0.466	0.000	-0.000	0.000	53.201
25	0.000	-0.474	0.000	0.000	0.000	53.410
26	0.000	-0.480	0.000	-0.000	0.000	53.620
27	0.000	-0.486	0.000	-0.000	0.000	53.829
28	0.000	-0.430	0.000	0.000	0.000	47.352
29	0.000	-0.496	0.000	0.000	0.000	54.248
30	0.000	-0.441	0.000	0.000	0.000	47.719
31	0.000	-0.509	0.000	0.000	0.000	54.667
32	0.000	-0.451	0.000	0.000	0.000	46.086
33	0.000	-0.521	0.000	-0.000	0.000	55.086
34	0.000	-0.527	0.000	-0.000	0.000	55.296
35	0.000	-0.467	0.000	-0.000	0.000	48.636
36	0.000	-0.539	0.000	-0.000	0.000	55.715
37	0.000	-0.477	0.000	-0.000	0.000	49.004
38	0.000	-0.551	0.000	-0.000	0.000	56.133
39	0.000	-0.487	0.000	-0.000	0.000	49.371
40	0.000	-0.563	0.000	-0.000	0.000	56.552
41	0.000	-0.569	0.000	-0.000	0.000	56.762
42	0.000	-0.575	0.000	-0.000	0.000	56.971

43	0.000	-0.581	0.000	-0.000	0.000	57.181
44	0.000	-0.587	0.000	-0.000	0.000	57.390
45	0.000	-1.520	0.000	-0.000	0.000	34.869
46	0.000	-1.524	0.000	-0.000	0.000	35.027
47	0.000	-1.527	0.000	-0.000	0.000	35.185
48	0.000	-1.531	0.000	-0.000	0.000	35.343
49	0.000	-1.534	0.000	-0.000	0.000	35.501
50	0.000	-1.537	0.000	-0.000	0.000	35.659
51	0.000	-1.541	0.000	-0.000	0.000	35.817
52	0.000	-1.544	0.000	-0.000	0.000	35.975
53	0.000	-1.548	0.000	-0.000	0.000	36.133
54	0.000	-1.551	0.000	-0.000	0.000	36.290
55	0.000	-1.554	0.000	-0.000	0.000	36.448
56	0.000	-1.558	0.000	0.000	0.000	36.606
57	0.000	-1.561	0.000	0.000	0.000	36.764
58	0.000	-1.565	0.000	0.000	0.000	36.922
59	0.000	-1.568	0.000	0.000	0.000	37.080
60	0.000	-1.571	0.000	0.000	0.000	37.238
61	0.000	-1.575	0.000	0.000	0.000	37.396
62	0.000	-1.578	0.000	0.000	0.000	37.554
63	0.000	-1.582	0.000	0.000	0.000	37.712
64	0.000	-1.585	0.000	0.000	0.000	37.870
65	0.000	-1.588	0.000	0.000	0.000	38.028
66	0.000	-1.592	0.000	0.000	0.000	38.186

DE GATE BAY PILING .086956 OF TOTAL STRUCTURE

LOAD CASE 4 I+II/2

FX	FY	FZ	MX	MY	MZ
-7.83	-930.86	0.00	0.00	0.00	-3170.07

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
0.305874E-04	-0.183412E-03	0.359054E-09	0.449232E-10	0.173785E-11	-0.615695E-06

PILE FORCES (FT.KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	-0.399	0.000	-0.000	0.000	10.521
2	0.000	-0.404	0.000	-0.000	0.000	10.747
3	0.000	-0.409	0.000	-0.000	0.000	10.973
4	0.000	-0.413	0.000	-0.000	0.000	11.199
5	0.000	-0.418	0.000	-0.000	0.000	11.425
6	0.000	-0.423	0.000	-0.000	0.000	11.650
7	0.000	-0.428	0.000	-0.000	0.000	11.876
8	0.000	-0.433	0.000	-0.000	0.000	12.102
9	0.000	-0.438	0.000	-0.000	0.000	12.328
10	0.000	-0.443	0.000	0.000	0.000	12.554
11	0.000	-0.448	0.000	0.000	0.000	12.780
12	0.000	-0.452	0.000	-0.000	0.000	13.005
13	0.000	-0.457	0.000	-0.000	0.000	13.231
14	0.000	-0.462	0.000	-0.000	0.000	13.457
15	0.000	-0.467	0.000	-0.000	0.000	13.683
16	0.000	-0.472	0.000	-0.000	0.000	13.909
17	0.000	-0.477	0.000	-0.000	0.000	14.134
18	0.000	-0.482	0.000	-0.000	0.000	14.360
19	0.000	-0.487	0.000	-0.000	0.000	14.586
20	0.000	-0.491	0.000	-0.000	0.000	14.812
21	0.000	-0.496	0.000	-0.000	0.000	15.038
22	0.000	-0.501	0.000	-0.000	0.000	15.263
23	0.000	-0.212	0.000	0.000	0.000	15.705
24	0.000	-0.220	0.000	-0.000	0.000	16.005
25	0.000	-0.229	0.000	0.000	0.000	16.305
26	0.000	-0.237	0.000	-0.000	0.000	16.604
27	0.000	-0.246	0.000	-0.000	0.000	16.904
28	0.000	-0.223	0.000	0.000	0.000	15.074
29	0.000	-0.253	0.000	0.000	0.000	17.503
30	0.000	-0.237	0.000	0.000	0.000	15.599
31	0.000	-0.280	0.000	0.000	0.000	15.102
32	0.000	-0.252	0.000	0.000	0.000	16.124
33	0.000	-0.297	0.000	-0.000	0.000	18.701
34	0.000	-0.306	0.000	-0.000	0.000	19.001
35	0.000	-0.275	0.000	-0.000	0.000	16.912
36	0.000	-0.323	0.000	-0.000	0.000	19.600
37	0.000	-0.290	0.000	-0.000	0.000	17.437
38	0.000	-0.340	0.000	-0.000	0.000	20.199
39	0.000	-0.305	0.000	-0.000	0.000	17.962
40	0.000	-0.357	0.000	-0.000	0.000	20.798
41	0.000	-0.365	0.000	-0.000	0.000	21.097
42	0.000	-0.374	0.000	-0.000	0.000	21.397

43	0.000	-0.382	0.000	-0.000	0.000	21.696
44	0.000	-0.391	0.000	-0.000	0.000	21.996
45	0.000	-0.399	0.000	-0.000	0.000	10.521
46	0.000	-0.404	0.000	-0.000	0.000	10.747
47	0.000	-0.409	0.000	-0.000	0.000	10.973
48	0.000	-0.413	0.000	-0.000	0.000	11.199
49	0.000	-0.418	0.000	-0.000	0.000	11.425
50	0.000	-0.423	0.000	-0.000	0.000	11.650
51	0.000	-0.428	0.000	-0.000	0.000	11.876
52	0.000	-0.433	0.000	-0.000	0.000	12.102
53	0.000	-0.438	0.000	-0.000	0.000	12.328
54	0.000	-0.443	0.000	-0.000	0.000	12.554
55	0.000	-0.448	0.000	-0.000	0.000	12.779
56	0.000	-0.452	0.000	0.000	0.000	13.005
57	0.000	-0.457	0.000	0.000	0.000	13.231
58	0.000	-0.462	0.000	0.000	0.000	13.457
59	0.000	-0.467	0.000	0.000	0.000	13.683
60	0.000	-0.472	0.000	0.000	0.000	13.909
61	0.000	-0.477	0.000	0.000	0.000	14.134
62	0.000	-0.482	0.000	0.000	0.000	14.360
63	0.000	-0.487	0.000	0.000	0.000	14.586
64	0.000	-0.491	0.000	0.000	0.000	14.812
65	0.000	-0.496	0.000	0.000	0.000	15.038
66	0.000	-0.501	0.000	0.000	0.000	15.263

DE GATE BAY PILING .086956 OF TOTAL STRUCTURE

LOAD CASE 5 I+II

FX	FY	FZ	MX	MY	MZ
-896.86	-3038.68	0.00	0.00	0.00	5394.05

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.176332E-02	-0.554928E-03	0.193974E-08	0.244518E-09	-0.188648E-10	0.119556E-05

PILE FORCES (FT.KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	10.114	0.000	0.000	0.000	77.646
2	0.000	10.124	0.000	0.000	0.000	77.207
3	0.000	10.133	0.000	0.000	0.000	76.769
4	0.000	10.143	0.000	0.000	0.000	76.330
5	0.000	10.152	0.000	0.000	0.000	75.892
6	0.000	10.162	0.000	0.000	0.000	75.453
7	0.000	10.171	0.000	0.000	0.000	75.015
8	0.000	10.180	0.000	0.000	0.000	74.576
9	0.000	10.190	0.000	0.000	0.000	74.138
10	0.000	10.199	0.000	-0.000	0.000	73.699
11	0.000	10.209	0.000	-0.000	0.000	73.261
12	0.000	10.218	0.000	0.000	0.000	72.822
13	0.000	10.228	0.000	0.000	0.000	72.384
14	0.000	10.237	0.000	0.000	0.000	71.945
15	0.000	10.247	0.000	0.000	0.000	71.507
16	0.000	10.256	0.000	0.000	0.000	71.068
17	0.000	10.266	0.000	0.000	0.000	70.630
18	0.000	10.275	0.000	0.000	0.000	70.191
19	0.000	10.284	0.000	0.000	0.000	69.753
20	0.000	10.294	0.000	0.000	0.000	69.314
21	0.000	10.303	0.000	0.000	0.000	68.876
22	0.000	10.313	0.000	0.000	0.000	68.437
23	0.000	-16.081	0.000	-0.000	0.000	2.196
24	0.000	-16.064	0.000	0.000	0.000	1.614
25	0.000	-16.048	0.000	-0.000	0.000	1.033
26	0.000	-16.031	0.000	0.000	0.000	0.451
27	0.000	-16.015	0.000	0.000	0.000	-0.130
28	0.000	-15.999	0.000	-0.000	0.000	-0.623
29	0.000	-15.982	0.000	-0.000	0.000	-1.293
30	0.000	-15.970	0.000	-0.000	0.000	-1.643
31	0.000	-15.949	0.000	-0.000	0.000	-2.456
32	0.000	-15.941	0.000	-0.000	0.000	-2.662
33	0.000	-15.918	0.000	0.000	0.000	-3.620
34	0.000	-15.899	0.000	0.000	0.000	-4.201
35	0.000	-15.896	0.000	0.000	0.000	-4.191
36	0.000	-15.866	0.000	0.000	0.000	-5.365
37	0.000	-15.869	0.000	0.000	0.000	-5.210
38	0.000	-15.833	0.000	0.000	0.000	-6.528
39	0.000	-15.840	0.000	0.000	0.000	-6.230
40	0.000	-15.800	0.000	0.000	0.000	-7.691
41	0.000	-15.788	0.000	0.000	0.000	-8.273
42	0.000	-15.767	0.000	0.000	0.000	-8.855

43	0.000	-15.750	0.000	0.000	0.000	-9.436
44	0.000	-15.733	0.000	0.000	0.000	-10.018
45	0.000	10.114	0.000	0.000	0.000	77.645
46	0.000	10.124	0.000	0.000	0.000	77.207
47	0.000	10.133	0.000	0.000	0.000	76.768
48	0.000	10.143	0.000	0.000	0.000	76.330
49	0.000	10.152	0.000	0.000	0.000	75.891
50	0.000	10.162	0.000	0.000	0.000	75.453
51	0.000	10.171	0.000	0.000	0.000	75.014
52	0.000	10.180	0.000	0.000	0.000	74.576
53	0.000	10.190	0.000	0.000	0.000	74.137
54	0.000	10.199	0.000	0.000	0.000	73.699
55	0.000	10.209	0.000	0.000	0.000	73.260
56	0.000	10.218	0.000	-0.000	0.000	72.822
57	0.000	10.228	0.000	-0.000	0.000	72.383
58	0.000	10.237	0.000	-0.000	0.000	71.945
59	0.000	10.247	0.000	-0.000	0.000	71.506
60	0.000	10.256	0.000	-0.000	0.000	71.068
61	0.000	10.266	0.000	-0.000	0.000	70.629
62	0.000	10.275	0.000	-0.000	0.000	70.191
63	0.000	10.284	0.000	-0.000	0.000	69.752
64	0.000	10.294	0.000	-0.000	0.000	69.314
65	0.000	10.303	0.000	-0.000	0.000	68.876
66	0.000	10.313	0.000	-0.000	0.000	68.437

DE GATE BAY PILING .086956 OF TOTAL STRUCTURE

LOAD CASE 6 I+II 2

FX	FY	FZ	MX	MY	MZ
-844.69	-3042.33	0.00	0.00	0.00	5285.88

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.165173E-02	-0.558267E-03	0.191407E-08	0.238845E-09	-0.173828E-10	0.116489E-05

PILE FORCES (FT.KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	9.407	0.000	0.000	0.000	75.726
2	0.000	9.416	0.000	0.000	0.000	75.299
3	0.000	9.426	0.000	0.000	0.000	74.872
4	0.000	9.435	0.000	0.000	0.000	74.444
5	0.000	9.444	0.000	0.000	0.000	74.017
6	0.000	9.453	0.000	0.000	0.000	73.590
7	0.000	9.462	0.000	0.000	0.000	73.163
8	0.000	9.472	0.000	0.000	0.000	72.735
9	0.000	9.481	0.000	0.000	0.000	72.308
10	0.000	9.490	0.000	-0.000	0.000	71.881
11	0.000	9.499	0.000	-0.000	0.000	71.454
12	0.000	9.509	0.000	0.000	0.000	71.027
13	0.000	9.518	0.000	0.000	0.000	70.599
14	0.000	9.527	0.000	0.000	0.000	70.172
15	0.000	9.536	0.000	0.000	0.000	69.745
16	0.000	9.545	0.000	0.000	0.000	69.318
17	0.000	9.555	0.000	0.000	0.000	68.890
18	0.000	9.564	0.000	0.000	0.000	68.463
19	0.000	9.573	0.000	0.000	0.000	68.036
20	0.000	9.582	0.000	0.000	0.000	67.609
21	0.000	9.591	0.000	0.000	0.000	67.181
22	0.000	9.601	0.000	0.000	0.000	66.754
23	0.000	-15.173	0.000	-0.000	0.000	5.029
24	0.000	-15.157	0.000	0.000	0.000	5.462
25	0.000	-15.141	0.000	-0.000	0.000	4.895
26	0.000	-15.125	0.000	0.000	0.000	4.328
27	0.000	-15.108	0.000	0.000	0.000	3.762
28	0.000	-15.206	0.000	-0.000	0.000	2.800
29	0.000	-15.076	0.000	-0.000	0.000	2.628
30	0.000	-15.178	0.000	-0.000	0.000	1.806
31	0.000	-15.044	0.000	-0.000	0.000	1.495
32	0.000	-15.150	0.000	-0.000	0.000	0.813
33	0.000	-15.012	0.000	0.000	0.000	0.361
34	0.000	-14.996	0.000	0.000	0.000	-0.204
35	0.000	-15.108	0.000	0.000	0.000	-0.676
36	0.000	-14.968	0.000	0.000	0.000	-1.338
37	0.000	-15.080	0.000	0.000	0.000	-1.669
38	0.000	-14.931	0.000	0.000	0.000	-2.471
39	0.000	-15.051	0.000	0.000	0.000	-2.662
40	0.000	-14.899	0.000	0.000	0.000	-3.605
41	0.000	-14.883	0.000	0.000	0.000	-4.172
42	0.000	-14.867	0.000	0.000	0.000	-4.738

43	0.000	-14.851	0.000	0.000	0.000	-5.305
44	0.000	-14.834	0.000	0.000	0.000	-5.872
45	0.000	9.407	0.000	0.000	0.000	75.726
46	0.000	9.416	0.000	0.000	0.000	75.299
47	0.000	9.426	0.000	0.000	0.000	74.871
48	0.000	9.435	0.000	0.000	0.000	74.444
49	0.000	9.444	0.000	0.000	0.000	74.017
50	0.000	9.453	0.000	0.000	0.000	73.590
51	0.000	9.462	0.000	0.000	0.000	73.162
52	0.000	9.472	0.000	0.000	0.000	72.735
53	0.000	9.481	0.000	0.000	0.000	72.308
54	0.000	9.490	0.000	0.000	0.000	71.881
55	0.000	9.499	0.000	0.000	0.000	71.453
56	0.000	9.509	0.000	-0.000	0.000	71.026
57	0.000	9.518	0.000	-0.000	0.000	70.599
58	0.000	9.527	0.000	-0.000	0.000	70.172
59	0.000	9.536	0.000	-0.000	0.000	69.744
60	0.000	9.545	0.000	-0.000	0.000	69.317
61	0.000	9.555	0.000	-0.000	0.000	68.890
62	0.000	9.564	0.000	-0.000	0.000	68.463
63	0.000	9.573	0.000	-0.000	0.000	68.036
64	0.000	9.582	0.000	-0.000	0.000	67.608
65	0.000	9.591	0.000	-0.000	0.000	67.181
66	0.000	9.601	0.000	-0.000	0.000	66.754

DE GATE BAY PILING .086956 OF TOTAL STRUCTURE

LOAD CASE 7 I+II 3

FX	FY	FZ	MX	MY	MZ
-849.39	-3073.29	0.00	0.00	0.00	5074.06

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.166017E-02	-0.564145E-03	0.193000E-08	0.240835E-09	-0.174512E-10	0.112468E-05

PILE FORCES (FT,KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	9.457	0.000	0.000	0.000	76.157
2	0.000	9.466	0.000	0.000	0.000	75.745
3	0.000	9.475	0.000	0.000	0.000	75.332
4	0.000	9.484	0.000	0.000	0.000	74.920
5	0.000	9.492	0.000	0.000	0.000	74.507
6	0.000	9.501	0.000	0.000	0.000	74.095
7	0.000	9.510	0.000	0.000	0.000	73.682
8	0.000	9.519	0.000	0.000	0.000	73.270
9	0.000	9.528	0.000	0.000	0.000	72.857
10	0.000	9.537	0.000	-0.000	0.000	72.445
11	0.000	9.546	0.000	-0.000	0.000	72.032
12	0.000	9.555	0.000	0.000	0.000	71.620
13	0.000	9.564	0.000	0.000	0.000	71.207
14	0.000	9.572	0.000	0.000	0.000	70.795
15	0.000	9.581	0.000	0.000	0.000	70.382
16	0.000	9.590	0.000	0.000	0.000	69.970
17	0.000	9.599	0.000	0.000	0.000	69.557
18	0.000	9.608	0.000	0.000	0.000	69.145
19	0.000	9.617	0.000	0.000	0.000	68.732
20	0.000	9.626	0.000	0.000	0.000	68.320
21	0.000	9.635	0.000	0.000	0.000	67.907
22	0.000	9.644	0.000	0.000	0.000	67.495
23	0.000	-15.255	0.000	-0.000	0.000	6.118
24	0.000	-15.240	0.000	0.000	0.000	5.571
25	0.000	-15.224	0.000	-0.000	0.000	5.024
26	0.000	-15.209	0.000	0.000	0.000	4.476
27	0.000	-15.193	0.000	0.000	0.000	3.929
28	0.000	-13.281	0.000	-0.000	0.000	2.964
29	0.000	-15.162	0.000	-0.000	0.000	2.635
30	0.000	-13.264	0.000	-0.000	0.000	2.005
31	0.000	-15.131	0.000	-0.000	0.000	1.741
32	0.000	-13.227	0.000	-0.000	0.000	1.046
33	0.000	-15.100	0.000	0.000	0.000	0.646
34	0.000	-15.084	0.000	0.000	0.000	0.099
35	0.000	-13.166	0.000	0.000	0.000	-0.392
36	0.000	-15.053	0.000	0.000	0.000	-0.994
37	0.000	-15.159	0.000	0.000	0.000	-1.351
38	0.000	-15.022	0.000	0.000	0.000	-2.089
39	0.000	-13.191	0.000	0.000	0.000	-2.309
40	0.000	-14.991	0.000	0.000	0.000	-3.183
41	0.000	-14.975	0.000	0.000	0.000	-3.730
42	0.000	-14.960	0.000	0.000	0.000	-4.277

43	0.000	-14.944	0.000	0.000	0.000	-4.824
44	0.000	-14.929	0.000	0.000	0.000	-5.372
45	0.000	9.457	0.000	0.000	0.000	76.157
46	0.000	9.466	0.000	0.000	0.000	75.744
47	0.000	9.475	0.000	0.000	0.000	75.332
48	0.000	9.484	0.000	0.000	0.000	74.919
49	0.000	9.492	0.000	0.000	0.000	74.507
50	0.000	9.501	0.000	0.000	0.000	74.095
51	0.000	9.510	0.000	0.000	0.000	73.682
52	0.000	9.519	0.000	0.000	0.000	73.270
53	0.000	9.528	0.000	0.000	0.000	72.857
54	0.000	9.537	0.000	0.000	0.000	72.445
55	0.000	9.546	0.000	0.000	0.000	72.032
56	0.000	9.555	0.000	-0.000	0.000	71.620
57	0.000	9.564	0.000	-0.000	0.000	71.207
58	0.000	9.572	0.000	-0.000	0.000	70.795
59	0.000	9.581	0.000	-0.000	0.000	70.382
60	0.000	9.590	0.000	-0.000	0.000	69.970
61	0.000	9.599	0.000	-0.000	0.000	69.557
62	0.000	9.608	0.000	-0.000	0.000	69.145
63	0.000	9.617	0.000	-0.000	0.000	68.732
64	0.000	9.626	0.000	-0.000	0.000	68.320
65	0.000	9.635	0.000	-0.000	0.000	67.907
66	0.000	9.644	0.000	-0.000	0.000	67.495

DE GATE BAY PILING .086936 OF TOTAL STRUCTURE

LOAD CASE 8 I + II 4

FX	FY	FZ	MX	MY	MZ
-449.04	-2795.90	0.00	0.00	0.00	5257.36

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.819382E-03	-0.529466E-03	0.146408E-08	0.182850E-09	-0.672183E-11	0.108662E-05

PILE FORCES (FT.KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	4.197	0.000	0.000	0.000	58.048
2	0.000	4.206	0.000	0.000	0.000	57.650
3	0.000	4.215	0.000	0.000	0.000	57.251
4	0.000	4.223	0.000	0.000	0.000	56.853
5	0.000	4.232	0.000	0.000	0.000	56.454
6	0.000	4.240	0.000	0.000	0.000	56.056
7	0.000	4.249	0.000	0.000	0.000	55.657
8	0.000	4.258	0.000	0.000	0.000	55.258
9	0.000	4.266	0.000	0.000	0.000	54.860
10	0.000	4.275	0.000	-0.000	0.000	54.461
11	0.000	4.283	0.000	-0.000	0.000	54.063
12	0.000	4.292	0.000	0.000	0.000	53.664
13	0.000	4.301	0.000	0.000	0.000	53.266
14	0.000	4.309	0.000	0.000	0.000	52.867
15	0.000	4.318	0.000	0.000	0.000	52.469
16	0.000	4.326	0.000	0.000	0.000	52.070
17	0.000	4.335	0.000	0.000	0.000	51.672
18	0.000	4.343	0.000	0.000	0.000	51.273
19	0.000	4.352	0.000	0.000	0.000	50.875
20	0.000	4.361	0.000	0.000	0.000	50.476
21	0.000	4.369	0.000	0.000	0.000	50.077
22	0.000	4.378	0.000	0.000	0.000	49.679
23	0.000	-8.262	0.000	-0.000	0.000	30.161
24	0.000	-8.247	0.000	0.000	0.000	29.632
25	0.000	-8.232	0.000	-0.000	0.000	29.104
26	0.000	-8.217	0.000	0.000	0.000	28.575
27	0.000	-8.202	0.000	0.000	0.000	28.046
28	0.000	-7.164	0.000	-0.000	0.000	24.112
29	0.000	-8.172	0.000	-0.000	0.000	26.989
30	0.000	-7.138	0.000	-0.000	0.000	23.186
31	0.000	-8.142	0.000	-0.000	0.000	25.932
32	0.000	-7.111	0.000	-0.000	0.000	22.260
33	0.000	-8.112	0.000	0.000	0.000	24.874
34	0.000	-8.097	0.000	0.000	0.000	24.346
35	0.000	-7.072	0.000	0.000	0.000	20.870
36	0.000	-8.067	0.000	0.000	0.000	23.288
37	0.000	-7.046	0.000	0.000	0.000	19.943
38	0.000	-8.037	0.000	0.000	0.000	22.231
39	0.000	-7.019	0.000	0.000	0.000	19.017
40	0.000	-8.007	0.000	0.000	0.000	21.174
41	0.000	-7.992	0.000	0.000	0.000	20.645
42	0.000	-7.977	0.000	0.000	0.000	20.117

43	0.000	-7.962	0.000	0.000	0.000	19.588
44	0.000	-7.945	0.000	0.000	0.000	19.059
45	0.000	4.197	0.000	0.000	0.000	58.048
46	0.000	4.206	0.000	0.000	0.000	57.649
47	0.000	4.215	0.000	0.000	0.000	57.251
48	0.000	4.223	0.000	0.000	0.000	56.852
49	0.000	4.232	0.000	0.000	0.000	56.454
50	0.000	4.240	0.000	0.000	0.000	56.055
51	0.000	4.249	0.000	0.000	0.000	55.657
52	0.000	4.258	0.000	0.000	0.000	55.258
53	0.000	4.266	0.000	0.000	0.000	54.860
54	0.000	4.275	0.000	0.000	0.000	54.461
55	0.000	4.283	0.000	0.000	0.000	54.063
56	0.000	4.292	0.000	-0.000	0.000	53.664
57	0.000	4.301	0.000	-0.000	0.000	53.266
58	0.000	4.309	0.000	-0.000	0.000	52.867
59	0.000	4.318	0.000	-0.000	0.000	52.468
60	0.000	4.326	0.000	-0.000	0.000	52.070
61	0.000	4.335	0.000	-0.000	0.000	51.671
62	0.000	4.343	0.000	-0.000	0.000	51.273
63	0.000	4.352	0.000	-0.000	0.000	50.874
64	0.000	4.361	0.000	-0.000	0.000	50.476
65	0.000	4.369	0.000	-0.000	0.000	50.077
66	0.000	4.378	0.000	-0.000	0.000	49.679

DE GATE BAY PILING .086956 OF TOTAL STRUCTURE

LOAD CASE 9 I+II 5

FX	FY	FZ	MX	MY	MZ
-292.87	-2761.11	0.00	0.00	0.00	2535.64

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.487195E-03	-0.530447E-03	0.130974E-08	0.163661E-09	-0.239705E-11	0.531568E-06

PILE FORCES (FT.KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	2.170	0.000	0.000	0.000	49.891
2	0.000	2.174	0.000	0.000	0.000	49.696
3	0.000	2.179	0.000	0.000	0.000	49.501
4	0.000	2.183	0.000	0.000	0.000	49.306
5	0.000	2.187	0.000	0.000	0.000	49.111
6	0.000	2.191	0.000	0.000	0.000	48.916
7	0.000	2.195	0.000	0.000	0.000	48.721
8	0.000	2.200	0.000	0.000	0.000	48.526
9	0.000	2.204	0.000	0.000	0.000	45.331
10	0.000	2.208	0.000	-0.000	0.000	48.136
11	0.000	2.212	0.000	-0.000	0.000	47.941
12	0.000	2.216	0.000	0.000	0.000	47.746
13	0.000	2.221	0.000	0.000	0.000	47.551
14	0.000	2.225	0.000	0.000	0.000	47.356
15	0.000	2.229	0.000	0.000	0.000	47.161
16	0.000	2.233	0.000	0.000	0.000	46.966
17	0.000	2.237	0.000	0.000	0.000	46.772
18	0.000	2.242	0.000	0.000	0.000	46.577
19	0.000	2.246	0.000	0.000	0.000	46.382
20	0.000	2.250	0.000	0.000	0.000	46.187
21	0.000	2.254	0.000	0.000	0.000	45.992
22	0.000	2.258	0.000	0.000	0.000	45.797
23	0.000	-5.301	0.000	-0.000	0.000	38.330
24	0.000	-5.494	0.000	0.000	0.000	38.071
25	0.000	-5.486	0.000	-0.000	0.000	37.813
26	0.000	-5.479	0.000	0.000	0.000	37.554
27	0.000	-5.472	0.000	0.000	0.000	37.296
28	0.000	-4.781	0.000	-0.000	0.000	32.454
29	0.000	-5.457	0.000	-0.000	0.000	36.778
30	0.000	-4.768	0.000	-0.000	0.000	32.001
31	0.000	-5.442	0.000	-0.000	0.000	36.261
32	0.000	-4.756	0.000	-0.000	0.000	31.547
33	0.000	-5.427	0.000	0.000	0.000	35.744
34	0.000	-5.420	0.000	0.000	0.000	35.485
35	0.000	-4.736	0.000	0.000	0.000	30.867
36	0.000	-5.405	0.000	0.000	0.000	34.968
37	0.000	-4.723	0.000	0.000	0.000	30.414
38	0.000	-5.391	0.000	0.000	0.000	34.451
39	0.000	-4.711	0.000	0.000	0.000	29.961
40	0.000	-5.376	0.000	0.000	0.000	33.934
41	0.000	-5.369	0.000	0.000	0.000	33.675
42	0.000	-5.361	0.000	0.000	0.000	33.416

43	0.000	-5.354	0.000	0.000	0.000	33.158
44	0.000	-5.346	0.000	0.000	0.000	32.899
45	0.000	2.170	0.000	0.000	0.000	49.891
46	0.000	2.174	0.000	0.000	0.000	49.696
47	0.000	2.179	0.000	0.000	0.000	49.501
48	0.000	2.183	0.000	0.000	0.000	49.306
49	0.000	2.187	0.000	0.000	0.000	49.111
50	0.000	2.191	0.000	0.000	0.000	48.916
51	0.000	2.195	0.000	0.000	0.000	48.721
52	0.000	2.200	0.000	0.000	0.000	48.526
53	0.000	2.204	0.000	0.000	0.000	48.331
54	0.000	2.208	0.000	0.000	0.000	48.136
55	0.000	2.212	0.000	0.000	0.000	47.941
56	0.000	2.216	0.000	-0.000	0.000	47.746
57	0.000	2.221	0.000	-0.000	0.000	47.551
58	0.000	2.225	0.000	-0.000	0.000	47.356
59	0.000	2.229	0.000	-0.000	0.000	47.161
60	0.000	2.233	0.000	-0.000	0.000	46.966
61	0.000	2.237	0.000	-0.000	0.000	46.771
62	0.000	2.242	0.000	-0.000	0.000	46.576
63	0.000	2.246	0.000	-0.000	0.000	46.381
64	0.000	2.250	0.000	-0.000	0.000	46.186
65	0.000	2.254	0.000	-0.000	0.000	45.991
66	0.000	2.258	0.000	-0.000	0.000	45.797

DE GATE BAY PILING .086956 OF TOTAL STRUCTURE

LOAD CASE 10 I+II 7

FX	FY	FZ	MX	MY	MZ
492.00	-2498.51	0.00	0.00	0.00	-11078.54

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
0.117787E-02	-0.818051E-03	0.500883E-09	0.630667E-10	0.191520E-10	-0.224512E-05

PILE FORCES (FT,KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	-7.964	0.000	-0.000	0.000	7.754
2	0.000	-7.982	0.000	-0.000	0.000	8.577
3	0.000	-7.999	0.000	-0.000	0.000	9.401
4	0.000	-8.017	0.000	-0.000	0.000	10.224
5	0.000	-8.035	0.000	-0.000	0.000	11.048
6	0.000	-8.053	0.000	-0.000	0.000	11.871
7	0.000	-8.070	0.000	-0.000	0.000	12.695
8	0.000	-8.088	0.000	-0.000	0.000	13.518
9	0.000	-8.106	0.000	-0.000	0.000	14.341
10	0.000	-8.124	0.000	0.000	0.000	15.165
11	0.000	-8.141	0.000	0.000	0.000	15.988
12	0.000	-8.159	0.000	-0.000	0.000	16.812
13	0.000	-8.177	0.000	-0.000	0.000	17.635
14	0.000	-8.195	0.000	-0.000	0.000	18.459
15	0.000	-8.212	0.000	-0.000	0.000	19.282
16	0.000	-8.230	0.000	-0.000	0.000	20.105
17	0.000	-8.248	0.000	-0.000	0.000	20.929
18	0.000	-8.266	0.000	-0.000	0.000	21.752
19	0.000	-8.283	0.000	-0.000	0.000	22.576
20	0.000	-8.301	0.000	-0.000	0.000	23.399
21	0.000	-8.319	0.000	-0.000	0.000	24.223
22	0.000	-8.337	0.000	-0.000	0.000	25.046
23	0.000	8.387	0.000	0.000	0.000	77.620
24	0.000	8.355	0.000	-0.000	0.000	78.713
25	0.000	8.324	0.000	0.000	0.000	79.805
26	0.000	8.293	0.000	-0.000	0.000	80.897
27	0.000	8.262	0.000	-0.000	0.000	81.989
28	0.000	7.203	0.000	0.000	0.000	72.801
29	0.000	6.200	0.000	0.000	0.000	64.174
30	0.000	7.148	0.000	0.000	0.000	74.715
31	0.000	8.138	0.000	0.000	0.000	86.359
32	0.000	7.094	0.000	0.000	0.000	76.629
33	0.000	8.076	0.000	-0.000	0.000	85.343
34	0.000	8.045	0.000	-0.000	0.000	89.636
35	0.000	7.012	0.000	-0.000	0.000	79.501
36	0.000	7.983	0.000	-0.000	0.000	91.820
37	0.000	6.956	0.000	-0.000	0.000	81.413
38	0.000	7.921	0.000	-0.000	0.000	94.005
39	0.000	6.904	0.000	-0.000	0.000	83.329
40	0.000	7.858	0.000	-0.000	0.000	96.189
41	0.000	7.827	0.000	-0.000	0.000	97.282
42	0.000	7.796	0.000	-0.000	0.000	98.374

43	0.000	7.765	0.000	-0.000	0.000	99.466
44	0.000	7.734	0.000	-0.000	0.000	100.558
45	0.000	-7.964	0.000	-0.000	0.000	7.754
46	0.000	-7.982	0.000	-0.000	0.000	8.577
47	0.000	-7.999	0.000	-0.000	0.000	9.401
48	0.000	-8.017	0.000	-0.000	0.000	10.224
49	0.000	-8.035	0.000	-0.000	0.000	11.048
50	0.000	-8.053	0.000	-0.000	0.000	11.871
51	0.000	-8.070	0.000	-0.000	0.000	12.694
52	0.000	-8.088	0.000	-0.000	0.000	13.518
53	0.000	-8.106	0.000	-0.000	0.000	14.341
54	0.000	-8.124	0.000	-0.000	0.000	15.165
55	0.000	-8.141	0.000	-0.000	0.000	15.988
56	0.000	-8.159	0.000	0.000	0.000	16.812
57	0.000	-8.177	0.000	0.000	0.000	17.635
58	0.000	-8.195	0.000	0.000	0.000	18.459
59	0.000	-8.212	0.000	0.000	0.000	19.282
60	0.000	-8.230	0.000	0.000	0.000	20.105
61	0.000	-8.248	0.000	0.000	0.000	20.929
62	0.000	-8.266	0.000	0.000	0.000	21.752
63	0.000	-8.283	0.000	0.000	0.000	22.576
64	0.000	-8.301	0.000	0.000	0.000	23.399
65	0.000	-8.319	0.000	0.000	0.000	24.223
66	0.000	-8.337	0.000	0.000	0.000	25.046

DE GATE BAY PILING .086956 OF TOTAL STRUCTURE

LOAD CASE 11 I+II8

FX	FY	FZ	MX	MY	MZ
493.21	-2513.46	0.00	0.00	0.00	-10666.02

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
0.118112E-02	-0.521061E-03	0.505509E-09	0.636465E-10	0.192205E-10	-0.216569E-05

PILE FORCES (FT,KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	-8.000	0.000	-0.000	0.000	8.221
2	0.000	-8.017	0.000	-0.000	0.000	9.015
3	0.000	-8.034	0.000	-0.000	0.000	9.810
4	0.000	-8.051	0.000	-0.000	0.000	10.604
5	0.000	-8.069	0.000	-0.000	0.000	11.398
6	0.000	-8.086	0.000	-0.000	0.000	12.192
7	0.000	-8.103	0.000	-0.000	0.000	12.987
8	0.000	-8.120	0.000	-0.000	0.000	13.781
9	0.000	-8.137	0.000	-0.000	0.000	14.575
10	0.000	-8.154	0.000	0.000	0.000	15.370
11	0.000	-8.171	0.000	0.000	0.000	16.164
12	0.000	-8.188	0.000	-0.000	0.000	16.958
13	0.000	-8.206	0.000	-0.000	0.000	17.753
14	0.000	-8.223	0.000	-0.000	0.000	18.547
15	0.000	-8.240	0.000	-0.000	0.000	19.341
16	0.000	-8.257	0.000	-0.000	0.000	20.135
17	0.000	-8.274	0.000	-0.000	0.000	20.930
18	0.000	-8.291	0.000	-0.000	0.000	21.724
19	0.000	-8.308	0.000	-0.000	0.000	22.518
20	0.000	-8.325	0.000	-0.000	0.000	23.313
21	0.000	-8.343	0.000	-0.000	0.000	24.107
22	0.000	-8.360	0.000	-0.000	0.000	24.901
23	0.000	8.399	0.000	0.000	0.000	78.426
24	0.000	8.369	0.000	-0.000	0.000	79.480
25	0.000	8.339	0.000	0.000	0.000	80.533
26	0.000	8.309	0.000	-0.000	0.000	81.587
27	0.000	8.279	0.000	-0.000	0.000	82.640
28	0.000	7.218	0.000	0.000	0.000	73.337
29	0.000	8.219	0.000	0.000	0.000	84.748
30	0.000	7.166	0.000	0.000	0.000	75.184
31	0.000	8.139	0.000	0.000	0.000	86.855
32	0.000	7.114	0.000	0.000	0.000	77.030
33	0.000	8.099	0.000	-0.000	0.000	88.962
34	0.000	8.070	0.000	-0.000	0.000	90.016
35	0.000	7.035	0.000	-0.000	0.000	79.800
36	0.000	8.010	0.000	-0.000	0.000	92.123
37	0.000	6.982	0.000	-0.000	0.000	81.647
38	0.000	7.950	0.000	-0.000	0.000	94.231
39	0.000	6.930	0.000	-0.000	0.000	83.493
40	0.000	7.890	0.000	-0.000	0.000	96.338
41	0.000	7.860	0.000	-0.000	0.000	97.392
42	0.000	7.830	0.000	-0.000	0.000	98.445

43	0.000	7.800	0.000	-0.000	0.000	99.499
44	0.000	7.770	0.000	-0.000	0.000	100.553
45	0.000	-8.000	0.000	-0.000	0.000	8.221
46	0.000	-8.017	0.000	-0.000	0.000	9.015
47	0.000	-8.034	0.000	-0.000	0.000	9.809
48	0.000	-8.051	0.000	-0.000	0.000	10.604
49	0.000	-8.069	0.000	-0.000	0.000	11.398
50	0.000	-8.086	0.000	-0.000	0.000	12.192
51	0.000	-8.103	0.000	-0.000	0.000	12.987
52	0.000	-8.120	0.000	-0.000	0.000	13.781
53	0.000	-8.137	0.000	-0.000	0.000	14.575
54	0.000	-8.154	0.000	-0.000	0.000	15.370
55	0.000	-8.171	0.000	-0.000	0.000	16.164
56	0.000	-8.188	0.000	0.000	0.000	16.958
57	0.000	-8.206	0.000	0.000	0.000	17.752
58	0.000	-8.223	0.000	0.000	0.000	18.547
59	0.000	-8.240	0.000	0.000	0.000	19.341
60	0.000	-8.257	0.000	0.000	0.000	20.135
61	0.000	-8.274	0.000	0.000	0.000	20.930
62	0.000	-8.291	0.000	0.000	0.000	21.724
63	0.000	-8.308	0.000	0.000	0.000	22.518
64	0.000	-8.325	0.000	0.000	0.000	23.313
65	0.000	-8.343	0.000	0.000	0.000	24.107
66	0.000	-8.360	0.000	0.000	0.000	24.901

13 13

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DE GATE BAY PILING .086956 OF TOTAL STRUCTURE

LOAD CASE 12 I+II 9

FX	FY	FZ	MX	MY	MZ
433.39	-2531.72	0.00	0.00	0.00	-9594.38

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
0.105412E-02	-0.521659E-03	0.566498E-09	0.712309E-10	0.175745E-10	-0.194747E-05

PILE FORCES (FT.KIP.KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	-7.227	0.000	-0.000	0.000	11.434
2	0.000	-7.243	0.000	-0.000	0.000	12.148
3	0.000	-7.258	0.000	-0.000	0.000	12.863
4	0.000	-7.274	0.000	-0.000	0.000	13.577
5	0.000	-7.289	0.000	-0.000	0.000	14.291
6	0.000	-7.304	0.000	-0.000	0.000	15.005
7	0.000	-7.320	0.000	-0.000	0.000	15.720
8	0.000	-7.335	0.000	-0.000	0.000	16.434
9	0.000	-7.351	0.000	-0.000	0.000	17.148
10	0.000	-7.366	0.000	0.000	0.000	17.863
11	0.000	-7.381	0.000	0.000	0.000	18.577
12	0.000	-7.397	0.000	-0.000	0.000	19.291
13	0.000	-7.412	0.000	-0.000	0.000	20.005
14	0.000	-7.428	0.000	-0.000	0.000	20.720
15	0.000	-7.443	0.000	-0.000	0.000	21.434
16	0.000	-7.458	0.000	-0.000	0.000	22.148
17	0.000	-7.474	0.000	-0.000	0.000	22.862
18	0.000	-7.489	0.000	-0.000	0.000	23.577
19	0.000	-7.505	0.000	-0.000	0.000	24.291
20	0.000	-7.520	0.000	-0.000	0.000	25.005
21	0.000	-7.535	0.000	-0.000	0.000	25.719
22	0.000	-7.551	0.000	-0.000	0.000	26.434
23	0.000	7.340	0.000	0.000	0.000	75.428
24	0.000	7.313	0.000	-0.000	0.000	76.376
25	0.000	7.286	0.000	0.000	0.000	77.323
26	0.000	7.259	0.000	-0.000	0.000	78.271
27	0.000	7.233	0.000	-0.000	0.000	79.218
28	0.000	6.305	0.000	0.000	0.000	70.245
29	0.000	7.179	0.000	0.000	0.000	81.113
30	0.000	6.258	0.000	0.000	0.000	71.906
31	0.000	7.125	0.000	0.000	0.000	83.008
32	0.000	6.211	0.000	0.000	0.000	73.566
33	0.000	7.071	0.000	-0.000	0.000	84.903
34	0.000	7.044	0.000	-0.000	0.000	85.850
35	0.000	6.140	0.000	-0.000	0.000	76.057
36	0.000	6.990	0.000	-0.000	0.000	87.745
37	0.000	6.093	0.000	-0.000	0.000	77.717
38	0.000	6.936	0.000	-0.000	0.000	89.640
39	0.000	6.046	0.000	-0.000	0.000	79.376
40	0.000	6.882	0.000	-0.000	0.000	91.535
41	0.000	6.855	0.000	-0.000	0.000	92.483
42	0.000	6.826	0.000	-0.000	0.000	93.430

43	0.000	6.801	0.000	-0.000	0.000	94.378
44	0.000	6.774	0.000	-0.000	0.000	95.325
45	0.000	-7.227	0.000	-0.000	0.000	11.434
46	0.000	-7.243	0.000	-0.000	0.000	12.148
47	0.000	-7.258	0.000	-0.000	0.000	12.863
48	0.000	-7.274	0.000	-0.000	0.000	13.577
49	0.000	-7.289	0.000	-0.000	0.000	14.291
50	0.000	-7.304	0.000	-0.000	0.000	15.005
51	0.000	-7.320	0.000	-0.000	0.000	15.720
52	0.000	-7.335	0.000	-0.000	0.000	16.434
53	0.000	-7.351	0.000	-0.000	0.000	17.148
54	0.000	-7.366	0.000	-0.000	0.000	17.862
55	0.000	-7.381	0.000	-0.000	0.000	18.577
56	0.000	-7.397	0.000	0.000	0.000	19.291
57	0.000	-7.412	0.000	0.000	0.000	20.005
58	0.000	-7.428	0.000	0.000	0.000	20.720
59	0.000	-7.443	0.000	0.000	0.000	21.434
60	0.000	-7.458	0.000	0.000	0.000	22.148
61	0.000	-7.474	0.000	0.000	0.000	22.862
62	0.000	-7.489	0.000	0.000	0.000	23.577
63	0.000	-7.505	0.000	0.000	0.000	24.291
64	0.000	-7.520	0.000	0.000	0.000	25.005
65	0.000	-7.535	0.000	0.000	0.000	25.719
66	0.000	-7.551	0.000	0.000	0.000	26.434

DE GATE BAY PILING .086956 OF TOTAL STRUCTURE

LOAD CASE 13 I+II10

FX	FY	FZ	MX	MY	MZ
277.22	-2585.46	0.00	0.00	0.00	-6823.09

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
0.722883E-03	-0.524420E-03	0.728015E-09	0.913185E-10	0.132903E-10	-0.138293E-05

PILE FORCES (FT.KIP.KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	-5.213	0.000	-0.000	0.000	19.885
2	0.000	-5.224	0.000	-0.000	0.000	20.392
3	0.000	-5.235	0.000	-0.000	0.000	20.900
4	0.000	-5.246	0.000	-0.000	0.000	21.407
5	0.000	-5.257	0.000	-0.000	0.000	21.914
6	0.000	-5.268	0.000	-0.000	0.000	22.421
7	0.000	-5.279	0.000	-0.000	0.000	22.928
8	0.000	-5.290	0.000	-0.000	0.000	23.436
9	0.000	-5.301	0.000	-0.000	0.000	23.943
10	0.000	-5.312	0.000	0.000	0.000	24.450
11	0.000	-5.323	0.000	0.000	0.000	24.957
12	0.000	-5.334	0.000	-0.000	0.000	25.464
13	0.000	-5.344	0.000	-0.000	0.000	25.972
14	0.000	-5.355	0.000	-0.000	0.000	26.479
15	0.000	-5.366	0.000	-0.000	0.000	26.986
16	0.000	-5.377	0.000	-0.000	0.000	27.493
17	0.000	-5.388	0.000	-0.000	0.000	28.001
18	0.000	-5.399	0.000	-0.000	0.000	28.508
19	0.000	-5.410	0.000	-0.000	0.000	29.015
20	0.000	-5.421	0.000	-0.000	0.000	29.522
21	0.000	-5.432	0.000	-0.000	0.000	30.029
22	0.000	-5.443	0.000	-0.000	0.000	30.537
23	0.000	4.576	0.000	0.000	0.000	67.703
24	0.000	4.557	0.000	-0.000	0.000	68.375
25	0.000	4.537	0.000	0.000	0.000	69.048
26	0.000	4.518	0.000	-0.000	0.000	69.721
27	0.000	4.499	0.000	-0.000	0.000	70.394
28	0.000	3.920	0.000	0.000	0.000	62.272
29	0.000	4.461	0.000	0.000	0.000	71.740
30	0.000	3.887	0.000	0.000	0.000	63.452
31	0.000	4.423	0.000	0.000	0.000	73.085
32	0.000	3.853	0.000	0.000	0.000	64.631
33	0.000	4.384	0.000	-0.000	0.000	74.431
34	0.000	4.365	0.000	-0.000	0.000	75.104
35	0.000	3.803	0.000	-0.000	0.000	66.399
36	0.000	4.327	0.000	-0.000	0.000	76.449
37	0.000	3.769	0.000	-0.000	0.000	67.578
38	0.000	4.289	0.000	-0.000	0.000	77.795
39	0.000	3.736	0.000	-0.000	0.000	68.758
40	0.000	4.250	0.000	-0.000	0.000	79.141
41	0.000	4.231	0.000	-0.000	0.000	79.813
42	0.000	4.212	0.000	-0.000	0.000	80.486

43	0.000	4.193	0.000	-0.000	0.000	81.159
44	0.000	4.174	0.000	-0.000	0.000	81.932
45	0.000	-5.213	0.000	-0.000	0.000	19.885
46	0.000	-5.224	0.000	-0.000	0.000	20.392
47	0.000	-5.235	0.000	-0.000	0.000	20.899
48	0.000	-5.246	0.000	-0.000	0.000	21.407
49	0.000	-5.257	0.000	-0.000	0.000	21.914
50	0.000	-5.268	0.000	-0.000	0.000	22.421
51	0.000	-5.279	0.000	-0.000	0.000	22.928
52	0.000	-5.290	0.000	-0.000	0.000	23.436
53	0.000	-5.301	0.000	-0.000	0.000	23.943
54	0.000	-5.312	0.000	-0.000	0.000	24.450
55	0.000	-5.323	0.000	-0.000	0.000	24.957
56	0.000	-5.334	0.000	0.000	0.000	25.464
57	0.000	-5.344	0.000	0.000	0.000	25.972
58	0.000	-5.355	0.000	0.000	0.000	26.479
59	0.000	-5.366	0.000	0.000	0.000	26.986
60	0.000	-5.377	0.000	0.000	0.000	27.493
61	0.000	-5.388	0.000	0.000	0.000	28.000
62	0.000	-5.399	0.000	0.000	0.000	28.508
63	0.000	-5.410	0.000	0.000	0.000	29.015
64	0.000	-5.421	0.000	0.000	0.000	29.522
65	0.000	-5.432	0.000	0.000	0.000	30.029
66	0.000	-5.443	0.000	0.000	0.000	30.536

Job No. 4671 Page No. 3B-52

Computed by WJZ Date 4/4/73
Checked by RJ Date 4/13/73
Reviewed by Date
Approved by A.L.P. Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE
Sheet No. 1 of 21

TRANSVERSE MOMENT @ ℄

CONSTRUCTION CONDITION A { Area Dewatered, No Backfill
No water Load, Gates in open position

	Vert Force	Horiz Force	Arm	± Moment @ El -19
Walls	-4631.6			-352 928
Baseslab	-15881.3			-817 384
Control Hse Mach Etc	-158.7			-10766
Gate	-288.8		-76.44	-22 076
sub total	-20960.4			-1203 154

Piles w/batter toward Lakeside

$$P_v = 49.4375 \times 22 \times 11.5 \times \frac{4}{\sqrt{17}} = 12134^{K} \uparrow$$

$$M_{\circlearrowright} = 12134 \times 65.2 = +791\,137$$

Piles w/batter toward Gulfside

$$P_v = \left[(1216.68)(11.5) + (399.8)10.5\right]\frac{1}{2} \times \frac{3}{10} = 8628^{K}$$

$$M_{\circlearrowright} = 8628 \times 67.48 = +582\,217$$

Moment @ ℄ → +170 200 IK

Job No. 4671 Page No. 3B-53

Computed by WJT Date 4/4/73
Checked by RJ Date 4/13/73
Reviewed by [illegible] Date 4/24/73
Approved by RGT Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 2 of

TRANSVERSE MOMENT @ ℄

CONSTRUCTION CONDITION B { Area Dewatered, Add Backfill
No Water Load, Gate in open position

	Vert Force	Horiz Force	Arm	℄ Moment @ EL -19
Walls	4631.6			-352 928
Baseslab	15881.3			-817 384
Control House Walk Tk	158.7			-10 766
Gate	288.8		-76.44	-22076
Soil	4967.4			-502 637
Soil		2000	7.2	+14400
sub totals	-25927.8	2000		-1691 391

Piles w/batter toward LAKESIDE

$$P = 61.502 \times 22 \times 11.5 \times \frac{4}{\sqrt{17}} = 15095^{K}$$

$$M_{@\ell} = 15095 \times 65.2 = \longrightarrow 984\,194$$

Pile w/batter toward GULFSIDE

$$P = \tfrac{1}{2}\left[(1493.25)\,11.5 + 490.68\,(10.5)\right]\tfrac{3}{10} = 10\,589^{K}$$

$$M_{@\ell} = P \times 67.48 = \longrightarrow 714\,545$$

Moment @ ℄ → + 7348^{IK}

Job No. 4671 Page No. 3B-54

Computed by WJT Date 4/4/73
Checked by RJ Lechner Date 4/13/73
Reviewed by [illegible] Date 4/[illegible]/73
Approved by [illegible] Date 5-[illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 3 of

TRANSVERSE MOMENT @ ℄

I+II

	Vert Force	Horiz Force	Arm	℄ Moment @ EL -19
Walls	-9631.6			-352 928
Base slab	-15881.3			-817 384
Control Hse Mech Etc	- 158.7			- 10 766
Gate (closed position)	- 288.8		33.80	- 9 761
Soils ⇐	- 2318.1			-234 564
Soils		934	7.2	+ 6725
Subtotal	-23279	+934		-1,418,678
Vert Water Loads (-15379 K)	- 1346		98.31	- 132 325
	- 4207		98.49	- 414 347
	- 5470		48.76	- 266 717
	- 4356		23.40	- 101 930
				-915319
Uplift (+21185)	+ 7654		32.50	+ 248 755
	+ 5207		93.25	+ 485553
	- 93		119.75	- 11137
	+ 154		69.00	+ 10626
	+ 4592		32.50	+ 149240
	+ 3449		93.25	+ 321 619
	+ 164		119.75	+ 19639
	+ 58		69.0	+ 4002
				+1,228,297
Horiz Water Load		+1609		- 5378
Subtotal	-17473	+2543		-1,111,078

Piles w/batter toward LAKESIDE

$P = 73.0415 \times 22 \times 11.5 \times \frac{4}{\sqrt{17}} = 17928^{K}$

$M_{XX} = P \times 65.2 = +1\,168\,906$

Piles w/batter toward GULFSIDE

$P = [(-60.57)11.5 + (-20.56)(10.5)]\left[\frac{1}{2}\right]\left(\frac{3}{\sqrt{10}}\right) = -444^{K}$

$M_{XX} = P \times 67.48 = -29\,961$

Moment @ ℄ → +27 867

Job No. 4671 Page No. 3B-55

Computed by WJZ Date 4/4/73
Checked by RJ Date 4/12/73
Reviewed by ____ Date ____
Approved by RCF Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 7 of ____

TRANSVERSE MOMENT @ E

I + II 5

	Vert Forces	Horiz Force	Arm	± Moment @ El -19
Refer I+II 1	-23279 ✓	+934 ✓		-1,418,678 ✓
Vert Water Load	-1139 ✓		98.31 ✓	-111 975 ✓
	-2536 ✓		98.49 ✓	-249 771 ✓
	-4629 ✓		48.76 ✓	-225 710 ✓
	-2626 ✓		23.40 ✓	- 61 448 ✓
Uplift	+6989 ✓		32.50 ✓	+227 143 ✓
	+4628 ✓		93.25 ✓	+431 561 ✓
	- 82 ✓		119.75 ✓	- 9820 ✓
	+ 154 ✓		69.00 ✓	+10626 ✓
	+3744 ✓		32.50 ✓	+121 680 ✓
	+2712 ✓		93.25 ✓	+252 894 ✓
	+129 ✓		119.75 ✓	+15 448 ✓
	+ 58 ✓		69.00 ✓	+ 4002 ✓
Horiz Water Load		+1323 ✓		- 1926 ✓
sub totals	-15877 ✓	+2257 ✓		-1015 974 ✓

Piles w/batter toward Lakeside

$P = 47.844 \times 22 \times 11.5 \times \sqrt[4]{17} = 11743$ ✓ K

$M_{XX} = P \times 65.2 =$ ——→ +765 644 ✓

Piles w/batter toward Gulfside

187.24
569.83

$P = [569.83\ (11.5) + 187.24\ (10.5)]\left(\frac{1}{2}\right)\left(\frac{3}{10}\right) = 4041$ ✓ K

$M_{XX} = P \times 67.48 =$ +272 687 ✓

Moment @ E ——→ + 22 357 ✓ K

Job No. 4671 Page No. 3B-56

Computed by WJF Date 1/4/73
Checked by RJ Fischer Date 4/12/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 8 of

TRANSVERSE MOMENT @ ℄

I+II 7

	Vert Forces	Horiz Forces	Arm	℄ Moment @ El -19.
Refer I+II 1	-23279 ✓	+939 ✓		-1,418,678 ✓
Vert Water Load	-2640 ✓		98.31 ✓	- 259 538 ✓
	-1458 ✓		98.49 ✓	- 143 598 ✓
	-10730 ✓		48.76 ✓	- 523 195 ✓
	-1510 ✓		23.40 ✓	- 35 334 ✓
Uplift	+11814 ✓		32.50 ✓	+383 955 ✓
	+ 8823 ✓		93.25 ✓	+822 745 ✓
	- 157 ✓		119.75 ✓	- 18 801 ✓
	+ 154 ✓		69.00 ✓	+ 10 626 ✓
	+2683 ✓		32.50 ✓	+ 87 198 ✓
	+1790 ✓		93.25 ✓	+166 918 ✓
	+ 85 ✓		119.75 ✓	+ 10 179 ✓
	+ 58 ✓		69.00 ✓	+ 4002 ✓
Horiz Water Load		+1856 ✓		+ 1856 ✓
sub totals	-14367 ✓	+2790 ✓		-911665 ✓

Piles w/batter toward Lakeside.

$P = 16.4 \times 22 \times 11.5 \times \sqrt[4]{17} = 4025^{k}$ ✓

$M_{@\,\text{℄}} = P \times 65.2 = 262\,430^{IK}$ → +262 430 ✓

Piles w/batter toward Gulfside

$P = [1425.43(11.5) + 468.39(10.5)]\left(\frac{1}{2}\right)\left(\frac{3}{10}\right) = 10108^{k}$ ✓

$M_{@\,\text{℄}} = P \times 67.48 =$ +682 088 ✓

Moment @ ℄ → + 32 853 IK ✓

Job No. 4671 Page No. 3B-57

Computed by WAT Date 4/4/73
Checked by RJ Reichle Date 4/13/73
Reviewed by [illegible] Date 4/[illegible]/73
Approved by [illegible] Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 11 of

TRANSVERSE MOMENT @ ℄

I+II10

	Vert Forces	Horiz Forces	Arm	± Moment @ EL -19	
Refer I+II1	-23279 ✓	+934 ✓		-1,418,678 ✓	
Vert Water Loads	-2071 ✓		98.31 ✓	-203600 ✓	-1851481
	-1395 ✓		98.49 ✓	-137394 ✓	
	-8416 ✓		48.76 ✓	-410364 ✓	
	-1444 ✓		23.40 ✓	-33790 ✓	
	-13326 ✓				
Uplift	+9984 ✓		32.50 ✓	+324480 ✓	+1054729
	+7232 ✓		93.25 ✓	+674384 ✓	
	-129 ✓		119.75 ✓	-15448 ✓	
	+154 ✓		69.00 ✓	+10626 ✓	
	+2621 ✓		32.50 ✓	+85183 ✓	
	+1736 ✓		93.25 ✓	+161882 ✓	
	+82 ✓		119.75 ✓	+9820 ✓	
	+58 ✓		69.00 ✓	+4002 ✓	
	+21738				
Horiz Water Load		+1563 ✓		+739 ✓	
sub totals	-14867 ✓	+2497 ✓		-948158 ✓	

Piles w/batter toward Lakeside

$P = 25.211 \times 22 \times 11.5 \times 4/\sqrt{17} = 6188^{K}$ ✓

$M_{\text{Rx}} = P \times 65.2 = 403458^{IK} \rightarrow +403458$ ✓

Piles w/batter toward Gulfside

$P = [1196.28(11.5) + 393.09(10.5)](1/2)(3/110) = 848^{K}$ ✓

$M_{\text{Rx}} = P \times 67.48 =$ +572433 ✓

Moment @ ℄ → + 27733 IK ✓

Job No. 4671 Page No. 38-58

Computed by WJF Date 4/4/73
Checked by RJBeckemeyer Date 4/13/73
Reviewed by [illegible] Date [illegible]
Approved by RCP Date 5-7-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 12 of

TRANSVERSE MOMENT @ ℄

I+II1 (Also II6)

	Vert Force	Horiz Force	Arm	±Moment @EL-19
Refer I+II1	-23279 ✓	+934 ✓		-1,418,678 ✓
Vert Water Load	-1604 ✓		98.31 ✓	-157 689 ✓
	-1966 ✓		98.49 ✓	-193 631 ✓
	-6520 ✓		48.76 ✓	-317 915 ✓
	-2035 ✓		23.40 ✓	-47 619 ✓
	-12125			-716,854
Uplift	+8486 ✓		32.50 ✓	+275 795 ✓
	+5930 ✓		93.25 ✓	+552 973 ✓
	-106 ✓		119.75 ✓	-12694 ✓
	+154 ✓		69.00 ✓	+10626 ✓
	+3182 ✓		32.50 ✓	+103 415 ✓
	+2224 ✓		93.25 ✓	+207 388 ✓
	+106 ✓		119.75 ✓	+12694 ✓
	+58 ✓		69.00 ✓	+4002 ✓
	20034			+1,154,991
Horiz Water Load	0 ✓			0 ✓
sub totals	-15370 ✓	+934 ✓		-981 333 ✓

Piles w/batter toward Lakeside

$P = 36.5275 \times 22 \times 11.5 \times \frac{4}{\sqrt{17}} = 8966^{k}$ ✓

$M_{XX} = P \times 65.2 = 584\,583^{1k} \rightarrow +584\,583$ ✓

Piles w/batter toward Gulfside

$P = [(883.05)11.5 + (290.17)(10.5)]\left(\frac{1}{2}\right)\left(\frac{3}{\sqrt{10}}\right) = 6268^{k}$ ✓

$M_{XX} = P \times 67.48 =$ $+422560$ ✓

Moment @ ℄ → $+25810^{1k}$ ✓

Job No. 4671 Page No. 38-59

Computed by WJT Date 4/4/73
Checked by RKeller Date 4/13/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 13 of ____

TRANSVERSE MOMENT @ ℄

I+II 12

		Vert Forces	Horiz Forces	Arm	±Moment @ El -19
Refer I+II 1		-23279 ✓	+934 ✓		-1,418,678 ✓
Vert Water Loads	1.216 × 1617.8	-1967 ✓		98.31 ✓	-193 576 ✓
	× 1981.5	-2410 ✓		98.49 ✓	-237 361 ✓
	× 391.6	-476 ✓		27.5 ✓	-13090 ✓
Uplift	1.856 × 5200	+9651 ✓		32.50 ✓	+313 658 ✓
	1.536 × 4520	+6943 ✓		93.25 ✓	+647 435 ✓
	do × (-8.5)	-124 ✓		119.75 ✓	-14 849 ✓
	0.160 × 960	+154 ✓		69.00 ✓	+10626 ✓
	1.856 × 1950	+3619 ✓		32.50 ✓	+117.618 ✓
	1.536 × 1695	+2604 ✓		93.25 ✓	+242823 ✓
	do × 80.5	+124 ✓		119.75 ✓	+14 849 ✓
	0.160 × 360	+58 ✓		69.00 ✓	+4002 ✓
Horiz Water Load			+2878 ✓		+12894 ✓
Delete Sector Gate		+288.8 ✓			+9761 ✓
Add Needles		-480.0 ✓		27.5 ✓	-13200 ✓
Add Needle Girder		-56.8 ✓			-1700 ✓
Subtotal		5351. ✓	3812 ✓		-518588 ✓

Piles w/batter toward lakeside ✓ ✓

$P = 12.892 \times 22 \times 11.5 \times \frac{4}{1m} = 3164^{k}$

$M = P \times 65.2 =$ +206 293 ✓

Piles w/batter toward Gulfside ✓ ✓ ✓

$P = [301.61 \cdot (11.5) + 99.11 \cdot (10.5)](\frac{1}{2})(\frac{3}{10}) = 2139^{k}$

$M_{\text{Rb}} = P \times 67.48$ ✓ = +144 340 ✓

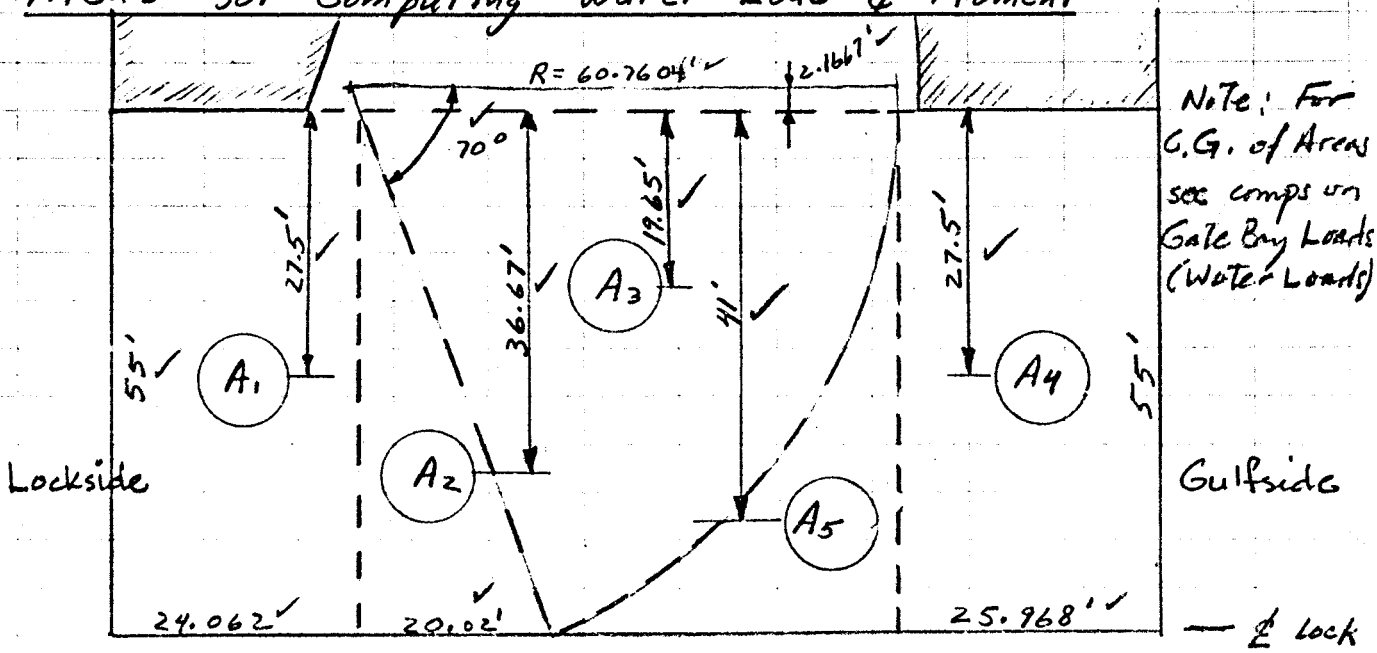
Moment @ ℄ → -167 955 ✓

Job No. 4671 Page No. 3B-60

Computed by WJL Date 4/6/73
Checked by RWR Date 4/7/73
Reviewed by ____ Date ____
Approved by KCP Date 5-7-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE
Sheet No. 14 of ____

Area's for Computing Water Load & Moment



Note: For C.G. of Areas see comps on Gate Bay Loads (Water Loads)

A_T = 55' x 110' = 6050 □'

A_1 = 24.062 x 55 = 1323 □'

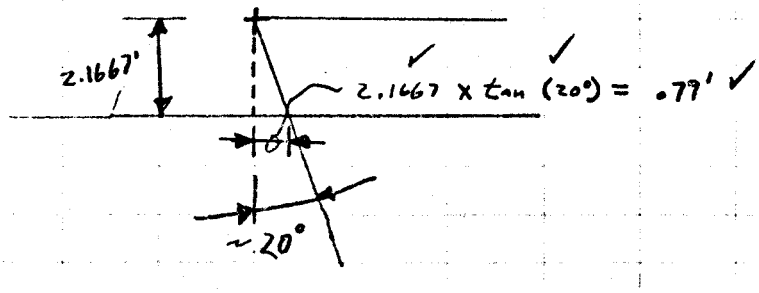
A_2 = 20.02 x 55 x ½ = 551 □'

A_3 = π (60.7604)² x 70/360 − (2.1667 x 60.37) = 2124 □'

A_4 = 25.968 x 55 = 1428 □'

A_5 = $A_T - A_1 - A_2 - A_3 - A_4$ = 624 □'

Uplift Areas:
80 x 55 = 4400 ft² Locksside
30 x 55 = 1650 ft² Gulfside



Job No. 4671 Page No. 33-61

Computed by WJL Date 4/5/73
Checked by RCechler Date 4/13/73
Reviewed by ST Date 4/16/73
Approved by CAL Date

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 15 of

TRANSVERSE MOMENT AT WALL

Construction Condition A { area dewatered, no backfill; no water load, Gate open

Since load is symmetrical about ℄ Lock shear in base slab @ ℄ must be 0.0

Moment @ ℄ =

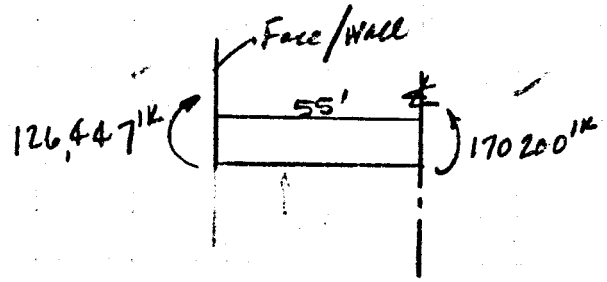
-1203154 ✓ (structure & LOADS)
$+\ 791137$ ✓ (Piling)
$+\ 582217$ ✓ "
$+\ 170200^{1k}$ ✓

Shear @ face of Gate bay structure

(Piling) $49.4375 \times 22 \times 4.5 \times \frac{4}{\sqrt{17}} = +4748$ ✓
" $\frac{3}{10}\left[(1216.68+399.8)\left(\frac{111.5}{16}\right)(2) + (1216.68)\left(\frac{111.5}{16}\right)(1)\right] = +3034$ ✓
(slab) $-.150 \times 10' \times 110' \times 55$ ✓ $= -9075$ ✓
-1293^{k} ✓

Moment @ face of Gate Bay Structure

M. Resisting @ ℄ ✓ $= +170200$ ✓
$+4748$ ✓ $\times -28.33$ ✓ $= +134511$ ✓
$+3034$ ✓ $\times -23.5$ ✓ $= +\ 71299$ ✓
-9075 ✓ $\times -27.5$ ✓ $= -249563$ ✓
$+126447^{1k}$ ✓



Job No. 4671 Page No. 3B-62

Computed by WJL Date 4/5/73
Checked by RJB Date 4/12/73
Reviewed by Date
Approved by Date

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE
Sheet No. 16 of

TRANSVERSE MOMENT AT WALL

Construction Condition B { Area dewatered, backfill in place
No water load, Gate Open

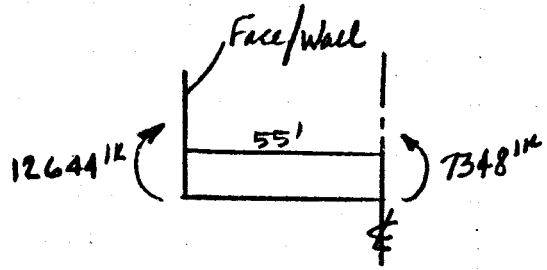
Moment @ ℄ = -1 691 391 ✓ (structure & Loads)
+ 984 194 ✓ (Piling)
+ 714.545 ✓ "
+ 7348 ^k ✓

Shear @ face of Gate Bay Structure

(Piling) 3/10 ✓ 61.502 ✓ x 22 ✓ x 4.5 x 4/√17 ✓ = 5907 ^k ✓
" 3/10 [(1493.25 + 498.68)(11.5/16)(2) + 1493.25(11.5/16)] = 3724 ✓
(slab) -.150 x 10 x 110 x 55 ✓ = -9075 ✓
+ 556 ^k

Moment @ face of Gate Bay Structure

M. Resisting @ ℄ = + 7348 ✓
+ 5907 x -28.33 = + 167 345 ✓
+ 3724 x -23.5 = + 87 514 ✓
-9075 x -27.5 = - 249 563 ✓
+ 12644 ^k ✓



Job No. 4671 Page No. 3B-63

Computed by WJL Date 4/6/73
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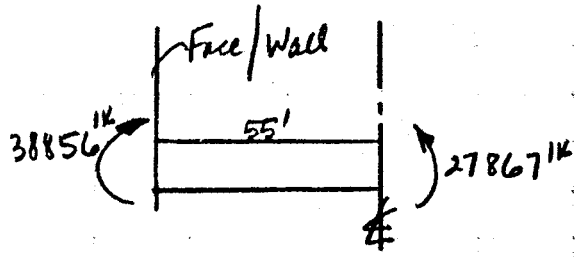
Reviewed by ____ Date ____
Approved by ____ Date ____

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 17 of ____

TRANSVERSE MOMENT ATWALL - Case I + II

Moment @ ℄ slab =			+ 27867
(Piling)			
73.0415 x 22 x 4.5 x 4/17 =	7015	x 28.33	+ 198735
3/10 [(-83.13)(11.5/16)2 + (-62.57)(11.5/16)] =	-156	x 23.5	- 3666
Base slab =	-9075	x -27.5	- 249563
UPLIFT			
2.355 x 1650 =	3886	x -27.5'	+ 106865
1.472 x 4400 =	6477	x -27.5'	+ 178118
WATER LOAD			
0.832 x 1323 =	-1101	x -27.5	- 30278
" x 551 =	-458	x -36.67	- 16795
" x 2124 =	-1767	x -19.65	- 34722
2.123 x 1428 =	-3032	x -27.5	- 83380
" x 624 =	-1325	x -41	- 54325
@ Face Gate Bay Structure	+464 K		+ 38856 K



Job No. 4671 Page No. 3B-64

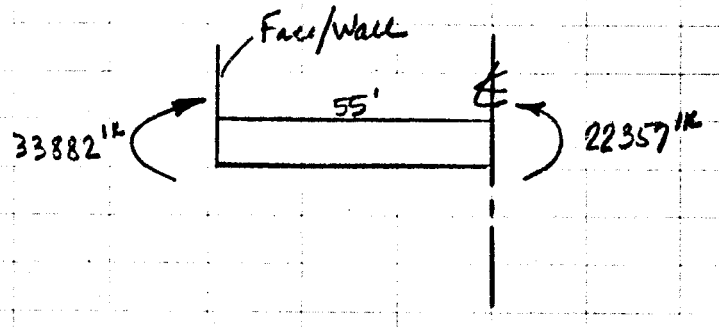
Computed by RGP Date 4-12-73
Checked by RJ Becker Date 4/13/73
Reviewed by _____ Date _____
Approved by K.E.P. Date 5-7-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 18 of _____

TRANSVERSE MOMENT AT WALL - CASE I + II 5

Moment @ ℄ SLAB =	—		+ 22357 ^1k ✓
Piling			
47.844 ✓ × 22 ✓ × 4.5 ✓ × 4/177 ✓ =	+ 4595 ^k ✓	× 28.33 ✓	+ 130176 ✓
[(569.83' ✓ + 187.24' ✓)(11.5/16)(2) + (569.83' ✓)(11.5/16)] 3/110 ✓ =	+ 1421 ✓	× 23.5 ✓	+ 33394 ✓
BASE SLAB	- 9075 ✓		- 249563 ✓
UPLIFT			
1.920 ✓ (1650) ✓ =	+ 3168 ✓	× 27.5 ✓	+ 87120 ✓
1.344 ✓ (4400) ✓ =	+ 5914 ✓	× 27.5 ✓	+ 162635 ✓
WATER LOAD			
0.704 ✓ (1323) ✓ =	- 931 ✓	× 27.5 ✓	- 25603 ✓
" (551) ✓ =	- 388 ✓	× 36.67 ✓	- 14228 ✓
" (2124) ✓ =	- 1495 ✓	× 19.65 ✓	- 29377 ✓
1.280 ✓ (1428) ✓ =	- 1828 ✓	× 27.5 ✓	- 50270 ✓
" (624) ✓ =	- 799 ✓	× 41 ✓	- 32759 ✓
@ FACE OF GATE BAY WALL =	+ 582 ^k ✓		+ 33882 ^1k ✓



Job No. 4671 Page No. 3B-65

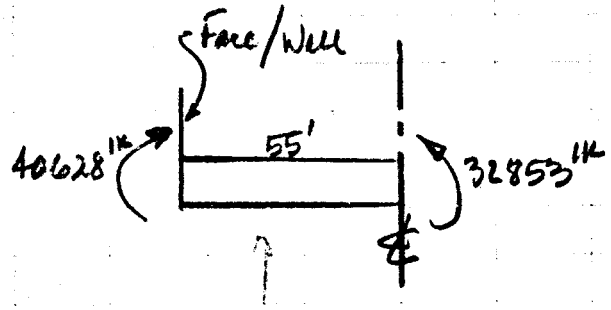
Computed by WJZ Date 4/6/73
Checked by RJBecker Date 4/13/73
Reviewed by [illegible] Date [illegible]
Approved by RCP Date 4/5/73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 19 of

TRANSVERSE MOMENT AT WALL, CASE I + II

Moment @ ℄ slab =				+ 32 853
(Piling)				
$16.4 \times 22 \times 4.5 \times 4/117$ =		1.575	x 28.33	+ 44 620
$[1893.82(\frac{11.5}{16})^2 + 1495.43(\frac{11.5}{16})]3/110$ =		3 555	x 23.5	+ 83 543
base slab =		−9 075	x −27.5 =	−249 563
uplift				
1.376 x 1650 =		2 270	x −27.5 =	+ 62425
2.272 x 4400 =		9997	x −27.5 =	+ 274 918
WATER LOAD				
1.632 x 1323 =		−2 159	x −27.5 =	− 59 373
" x 551 =		− 899	x −36.67 =	− 32 966
" x 2124 =		−3 466	x −19.65 =	− 68 107
.736 x 1428 =		−1 051	x −27.5 =	− 28 903
" x 624 =		− 459	x −41 =	− 18 819
@ face of Gate Bay structure + 28.8 k				+ 40 628 ft-k



Job No. 4671 Page No. 3B-66

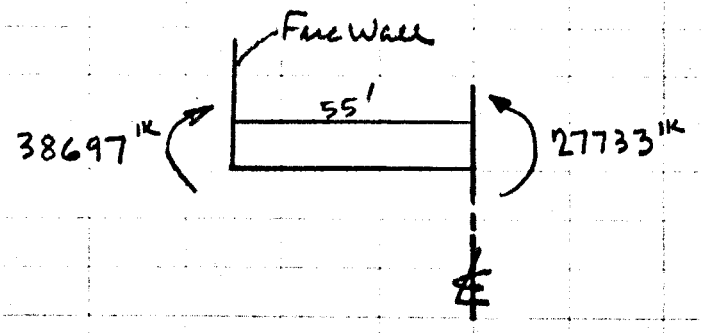
Computed by RGP Date 4-12-73
Checked by RJBecker Date 4/13/73
Reviewed by _____ Date _____
Approved by RGK Date 5-1-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 20 of _____

TRANSVERSE MOMENT AT WALL - CASE I + II 10

MOMENT @ ℄ SLAB			+ 27733 K ✓
PILING ✓ ✓ ✓ 4/117 ✓			
25.211 x 22 x 4.5 x 4/117	= + 2421 K ✓	x 28.33 ✓	+ 68587 ✓
[(1196.28 + 393.09)(11.5/16)(2)			
+ (1196.28)(11.5/16)] 3/110	= + 2983 ✓	x 23.5 ✓	+ 70100 ✓
BASE SLAB	- 9075 ✓		- 249563 ✓
UPLIFT			
1.344 ✓ (1650) ✓	= + 2218 ✓	x 27.5 ✓	+ 60995 ✓
1.920 ✓ (4400) ✓	= + 8448 ✓	x 27.5 ✓	+ 232320 ✓
WATER LOAD			
1.280 ✓ (1323) ✓	= - 1693 ✓	x 27.5 ✓	- 46558 ✓
" ✓ (551) ✓	= - 705 ✓	x 36.67 ✓	- 25852 ✓
" ✓ (2124) ✓	= - 2719 ✓	x 19.65 ✓	- 53428 ✓
0.704 ✓ (1428) ✓	= - 1005 ✓	x 27.5 ✓	- 27638 ✓
" ✓ (624) ✓	= - 439 ✓	x 41 ✓	- 17999 ✓
@ FACE OF GATE BAY WALL	+ 434 K ✓		+ 38697 K ✓



Job No. 4621 Page No. 3B-67

Computed by WJL Date 4/5/73
Checked by RJ Date 4/13/73
Reviewed by Date
Approved by KCP Date 5-1-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 21 of

I + II 11 (also I + II 6) TRANSVERSE MOMENT AT WALL

Moment @ ℄ =

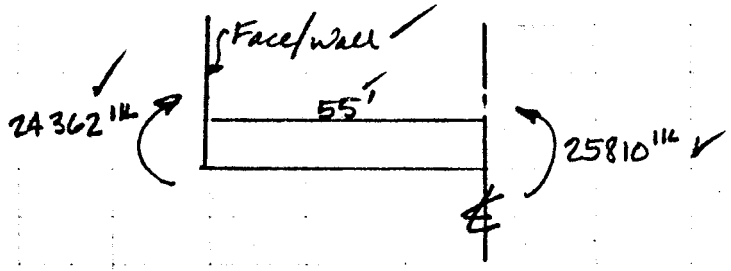
- 981 333 ✓ (structure & Loads)
+ 584 583 ✓ (Piling)
+ 42560 ✓ "
+ 25810 lk ✓

Shear @ face of Gate Bay Structure

(Piling) ✓36.5275 ✓ × 2 ✓ × 4.5 ✓ × 4/√17 ✓ = 3508 ✓
" 3/10 [1173.22 (11.5/16) (2) ✓ + 290.17 (11.5/16)] = 1798 ✓
(slab) -150 ✓ × 10 ✓ × 110 ✓ × 55 ✓ = -9075 ✓
(water uplift) + .064 ✓ × 10 ✓ × 110 ✓ × 55 ✓ = 3872 ✓
+ 103 k ✓

Moment @ face of Gate Bay Structure

@ ℄ = + 25810 lk ✓
+ 3508 ✓ × -28.33 ✓ = + 99382 ✓
+ 1798 × 23.5 ✓ = + 42253 ✓
- 9075 ✓ × -27.5 ✓ = -249563 ✓
+ 3872 ✓ × -27.5 ✓ = + 106480 ✓
+ 24362 lk ✓



Job No. 4671 Page No. 3B-68

Computed by WJF Date 4/6/73
Checked by RJL Date 4/13/73
Reviewed by ____ Date ____
Approved by RGF Date 4/20/73

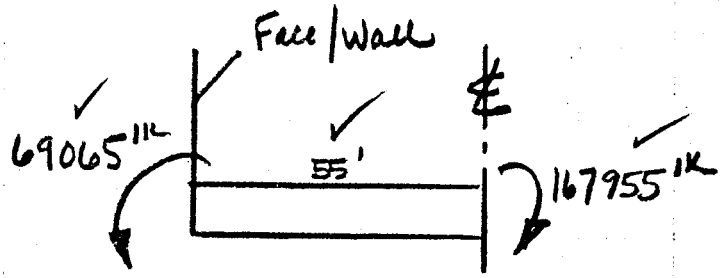
Subject STRUCTURAL
GATE BAY BASE SLAB
GULF SIDE GATE

Sheet No. 22 of ____

TRANSVERSE MOMENT AT WALL - CASE I + II 12

Moment @ ℄ slab = - 167 955 lk

(Piling)				
12.892 x 22 x 4.5 x 4/117	= 1 238	x 28.33		+ 35 073
[400.72 (11.5/16)(2) + 301.6 (11.5/16)] 3/40	= 752	x 23.5		+ 17 672
(Slab)				
-.150 x 10 x 110 x 55	= - 9 075	x 27.5		- 249 563
(Water)				
uplift 1.856 x 110 x 55	= 11 229	x 27.5		+ 308 798
WATERLOAD				
1.216 x 391.6 a'	= - 476	x 27.5		- 13 090
@ face Gate Bay Structure	+ 3668k			- 69065 lk



Job No. 4671 Page No. 3B-69

Computed by RGP Date 4-13-73
Checked by KJBecker Date 4/13/73
Reviewed by ____ Date ____
Approved by RGP Date 5-1-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 1 of ____

LONGITUDINAL MOMENTS & FORCES – CONSTR COND. Ia

Compute Shear at Edge of slab (Locate C.G.) & slab Moment

			Force	Arm (ft)	Moment
		SLAB (.15)(12)(110)(110)	−18 150	0	—
		Piles A.			
1622 F		48.263 (22)(9)(1/144)	= 9 406	0	—
45 to 66		(49.912 − 48.963)(1/2)(22)(9)(1/144)	= 91	18.33	+ 1668
Piles B	23	(75.413)(6)(11.5/16)(3/110)	= 308.5	−52.5	− 16 196
	24	(75.473)(6) do do	= 308.8	−47.5	− 14 668
	25	(75.533)(6) do do	= 309.0	−42.5	− 13 133
	26	(75.593)(6) do	= 309.3	−37.5	− 11 599
	27	75.653 (6) do	= 309.5	−32.5	− 10 059
	28	66.340 (4) (11.5/14)	= 206.8	−27.5	− 5687
	29	75.773 (6) (11.5/16)	= 310.0	−22.5	− 6975
	30	66.409 (4) (11.5/14)	= 207.1	−17.5	− 3624
	31	75.893 (6) (11.5/16)	= 310.5	−12.5	− 3881
	32	66.55 (4) (11.5/14)	= 207.5	−7.5	− 1556
	33	76.013 (6) (11.5/16)	= 311.0	−2.5	− 778
	34	76.073 (6) do	= 311.2	+2.5	+ 778
	35	66.711 (4) (11.5/14)	= 207.9	+7.5	+ 1559
	36	76.192 (6) (11.5/16)	= 311.7	+12.5	+ 3896
	37	66.815 (4) (11.5/14)	= 208.3	+17.5	+ 3645
	38	76.312 (6) (11.5/16)	= 312.2	+22.5	+ 7025
	39	66.921 (4) (11.5/14)	= 208.6	+27.5	+ 5737
	40	76.432 (6) (11.5/16)	= 312.7	+32.5	+ 10 163
	41	76.492 (6)	= 312.9	+37.5	+ 11 734
	42	76.552 (6)	= 313.2	+42.5	+ 13 311
	43	76.612 (6)	= 313.4	+47.5	+ 14 887
	44	76.672 (6) (11.5/16)(3/110)	= 313.7	+52.5	+ 16 469
			−2499.2		+2716

Unbalanced shear = $\frac{+2499.2}{110} \pm \frac{2716(6)}{(110)^2}$ = + 23.43 k/ft, + 21.73 k/ft } ½ each side

Job No. 4671 Page No. 3B-70

Computed by RGP Date 4-13-73
Checked by GAZ Date 4/17/73
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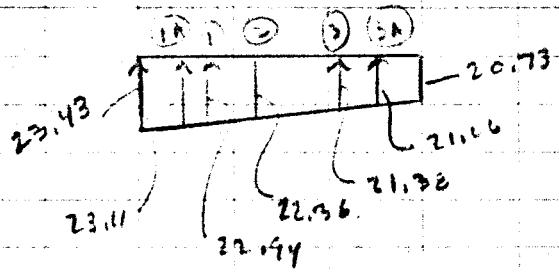
Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 2 of

MOMENT @ (1A)

		FORCE	ARM	MOMENT
SLAB .15(10)(110)(13)	−	2145.0	-6.5	+ 13943
Piles				
48.963(3)(9)(4/m)	+	1282.5	-5.5	− 7054
(49.053-48.963)(½)(3)(9)(4/m)	+	1.2	-3.83	− 5
#23	+	308.5	-10.5	− 3239
#24	+	308.8	-5.5	− 1698
#25	+	309.0	-0.5	− 155
Shear @ ~~Edge of Slab~~ Face of wall (1A)				
23.11 (13)	+	300.4	-6.5	− 1953
0.32 (13)(½)	+	2.1	-4.33	− 9
				− 170
				− 178



Job No. 4671 Page No. 38-71

Computed by RGP Date 4-13-73

Checked by GAS Date 4/19/73

Reviewed by ____ Date ____

Approved by ____ Date 5-73

Subject STRUCTURAL GATE BAY BASE SLAB GUIDELINE

Sheet No. 3 of ____

Moment @ ①

	Force	Arm	Moment
Slab .15(10)(110)(20)	- 3300 K	- 10.	+ 33000
Piles			
1,2,3,4 {48.963 (4)(9) (4/17)	1710	- 10.	- 17100
45,46,47,48 {(49.099 - 48.963)(1/2)(4)(9)(4/17)	2.4	- 7.5	18
#23	308.5	- 17.5	- 5399
#24	308.8	- 12.5	- 3860
#25	309.0	- 7.5	- 2318
#26	309.3	- 2.5	773

Shear @ Edge of slab

22.94 (20)	+ 458.8	-10.0	- 4588
0.49 (20)(1/2)	+ 4.9	2 - 6.67	- 33
	+ 111.7 K		- ~~1056~~ 1122 K

Computed by RGP Date 4-13-73
Checked by GAS Date 4/17/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Job No. 4671 Page No. 38-72
Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE
Sheet No. 4 of ____

MOMENT @ ②

		Force	Arm	Moment
Moment @ ①				- ~~1056~~ 1122
Shear @ ①	+	111.7	- 24.08	- 2690
SLAB .15(10)(24.083)(110) =	-	3973.5	- 12.04'	+ 47847
PILES				24345
5,6,7,8,9 (49.324 - 49.144)(5)(9)(4/π)(½) =	+	2145.5	- ~~8.95~~ 11.58	- ~~17700~~
(49.144)(5)(9)(4/π) =	+	3.9	- 11.58 ~~8.95~~	- ~~35~~ 45
#27		309.5	- 21.58	- 6679
#28	206.8	~~211.0~~	- 16.58	- 3428 ~~3001~~
#29		310.0	- 11.58	- 3590
#30	207.1	~~181.2~~	- 6.58	- 1363 ~~1192~~
#31		310.5	- 1.58	- 491

Shear @ Edge of Slab

Shear @ ① 92.35 (~~24~~.08) = + ~~538.2~~ - ~~12~~.04 - ~~6480~~

Sket ~~59~~ (24.08) (½) = + ~~71~~ - 8.03 - ~~57~~

+ ~~4866~~ 4809

- 2130

Computed by RGP Date 4-13-73
Checked by GAS Date 4/17/73
Reviewed by ____ Date ____
Approved by KAL Date 5-73

Job No. 4671 Page No. 3B-73
Subject STRUCTURAL GATE DAM BASE SLAB GULFSIDE
Sheet No. 5 of ____

MOMENT @ ③

	FORCE	ARM	MOMENT
SLAB .15 (10) (110) (25.968)	-4284.7 k	12.98	- 55615
PILES			
49.731 (5) (9) (4/Tn)	+ 2171.1	13.47	+ 29245
(49.912 - 49.731) (5) (9) (4/Tn)	+ 7.9	16.80	+ 133
#44	+ 313.7	23.47	+ 7363
#43	+ 313.4	18.47	+ 5788
#42	+ 313.2	13.47	+ 4219
#41	+ 312.9	8.47	+ 2650
#40	+ 312.7	3.47	+ 1085
SHEAR @ Edge of Slab			
20.73 (25.968)	+ 538.3	12.98	+ 6987
.64 (25.968) (1/2)	+ 8.3	8.66	+ 72
			+ .1927 k

Job No. 4671 Page No. 3B-74

Computed by RGP Date 4-13-73
Checked by GAD Date 4/17/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Subject: STRUCTURAL
GATE DAY BASE SLAB
GULFSIDE

Sheet No. 6 of ____

Moment @ (3A)

	FORCE	ARM	Moment
SLAB .15(10)(13)(110)	-2145.0 k	+6.5	- 13943 ft-k
Piles			
49.921 (3)(9)(4/11)	+1305.0	+ 5.5	+ 7178
(49.912 - 49.821)(½)(3)(9)(4/11)	+ 1.2	+ 7.17	+ 9
#44	+ 313.7	+ 10.5	+ 3294
#43	+ 313.4	+ 5.5	+ 1724
#42	+ 313.2	+ 0.5	+ 157

Shear @ Edge of Slab

20.73 (13)	+ 269.5	+ 6.5	+ 1752
.32 (13) (½)	+ 2.1	+ 4.33	+ 9
			+ 180 ft-k

Computed by RGP Date 4-13-73
Checked by [illegible] Date [illegible]
Reviewed by ____ Date ____
Approved by [illegible] Date 5-7-73

Job No. 4671 Page No. 3B-75
Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE
Sheet No. 7 of ____

LONGITUDINAL MOMENTS & FORCES - CONST. COND. Ib

Compute shear @ Edge of slab (Locate C.G.)

		Force	Arm (in)	@ℓ SLAB Moment
Slab		−18 150 ✓	0 ✓	—
Piles ✓ ✓				
Ⓐ 58.579 (22) (9) (4/117) ✓		= +11 252. ✓	0	— ✓
(64.425 − 58.579) (½) (23) (9) (4/117)		= + 561.5 ✓	18.33 ✓	+ 10 292
Ⓑ #23 89.451 (11.5/6) (6) (3/110) ✓		= 366.0 ✓	−52.5 ✓	− 19 215 ✓
#24 89.820 (4.0912) ✓		= 367.5 ✓	−47.5 ✓	− 17 456 ✓
#25 "		= 369.0 ✓	−42.5 ✓	− 15 683 ✓
26 "		= 370.5 ✓	−37.5 ✓	− 13 894 ✓
27 (4.0912) ✓		= 372.0 ✓	−32.5 ✓	− 12 090 ✓
28 — (11.5/4) (4) (3/110) ✓		= 249.4 ✓	−27.5 ✓	− 6 859 ✓
29 (4.0912) ✓		= 375.0 ✓	−22.5 ✓	− 8438 ✓
30 — (3.1171) ✓		= 251.4 ✓	−17.5 ✓	− 4400 ✓
31 (4.0912) ✓		= 378.0 ✓	−12.5 ✓	− 4725 ✓
32 — (3.1171) ✓		= 253.4 ✓	−7.5 ✓	− 1901 ✓
33 (4.0912) ✓		= 381.0 ✓	−2.5 ✓	− 953 ✓
34 " ✓		= 382.5 ✓	2.5 ✓	+ 956 ✓
35 — (3.1171) ✓		= 256.4 ✓	7.5 ✓	1923 ✓
36 (4.0912) ✓		= 385.6 ✓	12.5 ✓	4820
37 — (3.1171) ✓		= 258.4 ✓	17.5 ✓	4522 ✓
38 (4.0912) ✓		= 388.6 ✓	22.5 ✓	8744 ✓
39 — (3.1171) ✓		= 260.4 ✓	27.5 ✓	7161 ✓
40 (4.0912) ✓		= 391.6 ✓	32.5 ✓	12727 ✓
41 " ✓		= 393.1 ✓	37.5 ✓	14741 ✓
42 " ✓		= 394.7 ✓	42.5 ✓	16775 ✓
43 " ✓		= 396.2 ✓	47.5 ✓	18820 ✓
44 (4.0912) ✓		= 397.7 ✓	52.5 ✓	20879 ✓
✓		+ 1301.9 k ✓	✓	✓ + 16746 k

Unbalanced Shear $\frac{-1301.9}{110} \pm \frac{16746\,(6)}{(110)^2} = -3.54 \pm 20.14$ ✓ ✓ ½ ea. side

Job No. 4671 Page No. 3B-76

Computed by RGP Date 4-13-73
Checked by GAS Date 4/19/73
Reviewed by ____ Date ____
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Subject STRUCTURAL
GATE BAY BASE SLAB

Sheet No. 8 of ____

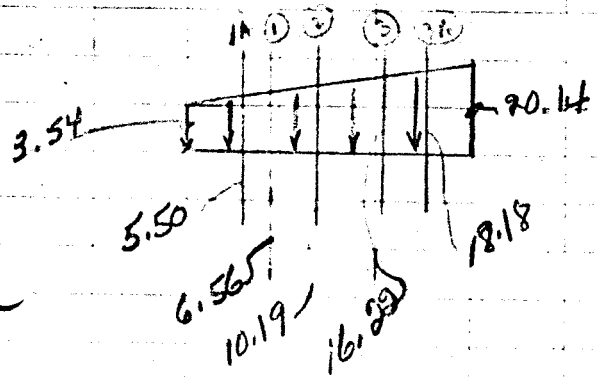
LONGITUDINAL MOMENTS & FORCES - CASE -Ib

Moment @ (1A)

	Force	arm	Moment
Slab	-2145.0		+13943 ^k
Piles			
(A) 58.579 (3)(9) (4/17)	+1534.4	-5.5	- 8439
(59.136 - 58.579)(1/2)(3)(9)(4/17)	7.3	-3.83	- 28
(B) #23	366.0	-10.5	- 3843
#24	367.5	-5.5	- 2021
#25	369.0	-0.5	- 185

SHEAR @ EDGE of SLAB

3.54 (13)	- 46.0	-6.5	+ 299
1.96 (13)(1/2)	- 12.7	-4.33	+ 55
			- 219 ^k



Job No. 4671 Page No. 3B-22

Computed by RGP Date 4-13-73
Checked by GAS Date 4/13/73
Reviewed by ____ Date ____
Approved by RGP Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 9 of ____

Moment @ ①

	Force	Arm	Moment
Slab	−3300 k ✓		+33 000 ft-k
Piles ✓ ✓ ✓ ✓			
Ⓐ (58.579)(4)(9)(4/m)	+ 2045.9 ✓	−10.0 ✓	− 20459 ✓
(59.414−58.579)(½)(4)(9)(4/m)	+ 14.6 ✓	− 7.5 ✓	− 110 ✓
Ⓑ #23	+ 366.0 ✓	−17.5 ✓	− 6405 ✓
#24	+ 367.5 ✓	−12.5 ✓	− 4594 ✓
#25	+ 369.0 ✓	− 7.5 ✓	− 2768 ✓
#26	+ 370.5 ✓	− 2.5 ✓	− 926 ✓

Shear @ Edge of slab

Stat { 354 (20)	− 708	−10.0 ✓	+ 708
Stat { 202 (20)(½)	− 202	− 6.67 ✓	+ 201
	+ 130.2 k		− 1353 ft-k

MOMENT @ ②

Moment @ ①		✓	− 1353 ft-k
Shear @ ①	Stat { + 130.2	−24.08	− 3183
Slab	− 3973.5 ✓		+ 47847 ✓
Piles ✓			−30176
Ⓒ (59.692)(5)(9)(4/m)	+ 2605.9 ✓	−20.5 11.50	− 21499
(60.396−59.692)(½)(5)(9)(4/m)	24.3 ✓	−14.58 8.25	− 200 ✓
Ⓓ #27	372.0 ✓	−21.58 ✓	− 8028 ✓
#28	249.4 ✓	−16.58 ✓	− 4135 ✓
#29	375.0 ✓	−11.58 ✓	− 4343 ✓
#30	251.4 ✓	− 6.58 ✓	− 1654 ✓
#31	378.0 ✓	− 1.58 ✓	− 597 ✓

Shear @ Edge of Slab

Stat { 656 (24.08) ✓ =	− 1580	−12.04 ✓	+ 19012
Stat { 343 (24.08)(½) =	− 413	− 8.03 ✓	+ 3317
	1993		−3569 ft-k

Computed by RGP Date 4-13-73
Checked by GWB Date 4/18/73
Reviewed by ____ Date ____
Approved by RGP Date 5-7-73

Job No. 4671 Page No. 3B-78
Subject STRUCTURAL
GATE BAY BASE SLABS
GULFSIDE
Sheet No. 10 of ____

Moment @ (3)

	Force	Arm	Moment
Slab	- 4284.7k		- 55615.1k
Piles			
(A) 63.311 (5)(9)(4/ft)	+ 2764.8	13.47	37242
(64.425 - 63.311)(1/2)(5)(9)(4/ft)	24.3	16.80	408
(B) #44	397.7	23.47	9334
#43	396.2	18.47	7318
#42	394.7	13.47	5317
#41	393.1	8.47	3330
#40	391.6	3.47	1359
Shear @ edge of slab			
(25.968)	- 421.2	12.98	- 5467
(25.968)(1/2)	- 50.9	17.31	- 881
			+ 2345k

MOMENT @ (3A)

SLAB	- 2145.0		- 13943
PILES			
(A) 63.868 (3)(9)(4/ft)	1672.9	5.5	9201
(64.425 - 63.868)(1/2)(3)(9)(4/ft)	7.3	7.17	52
(B) #44	397.7	10.5	4176
#43	396.2	5.5	2179
#42	394.7	0.5	197
Shear @ edge of slab			
(13)	- 236.3	6.5	- 1536
(13)(1/2)	- 12.7	6.67	- 85
			+ 241k

Computed by RGP Date 4-13-73
Checked by GAS Date 4/18/73
Reviewed by ____ Date ____
Approved by ____ Date 5-7-73

Job No. 4671 Page No. 38-79
Subject STRUCTURAL GATE BAY BASE SLAB GULFSIDE
Sheet No. 11 of ____

LONGITUDINAL MOMENTS & FORCES - CASE I + III

Compute Shear @ Edge of Slab (Locate C.G.)

	Force	Arm	@ ℄ Slab Moment
Slab .086(10)(110)(110)	-10406 K	—	—
Piles			
Ⓐ 34.869(22)(9)(4/4)	6697.9	0	—
(38.186-34.869)(1/2)(22)(9)(4/17)	318.6	18.33	5840
Ⓑ #23 52.991 (4.0912)	216.8	-52.5	-11382
#24 53.201	217.7	-47.5	-10341
25 53.410	218.5	-42.5	-9286
26 53.620	219.4	-37.5	-8228
27 53.829	220.2	-32.5	-7157
28 47.352 (3.1171)	147.6	-27.5	-4059
29 54.248	221.9	-22.5	-4993
30 47.719 (3.1171)	148.7	-17.5	-2602
31 54.667	223.7	-12.5	-2796
32 48.086 (3.1171)	149.9	-7.5	-1124
33 55.086	225.4	-2.5	-564
34 55.296	226.2	2.5	566
35 48.636 (3.1171)	151.6	7.5	1137
36 55.715	227.9	12.5	2849
37 49.004 (3.1171)	152.8	17.5	2674
38 56.133	229.7	22.5	5168
39 49.371 (3.1171)	153.9	27.5	4232
40 56.552	231.4	32.5	7521
41 56.762	232.2	37.5	8708
42 56.971	233.1	42.5	9907
43 57.181	233.9	47.5	11110
44 57.390	234.8	52.5	12327
	+1127.8 K		+95071K

unbalanced Shear = $\frac{-1127.8}{110} \pm \frac{9507(6)}{(110)} = -5.54 \pm 14.96$ (½ ea side)

Job No. 4671 Page No. 3B-80

Computed by RGP Date 4-13-73
Checked by CAS Date 4/18/73
Reviewed by ____ Date ____
Approved by RGP Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

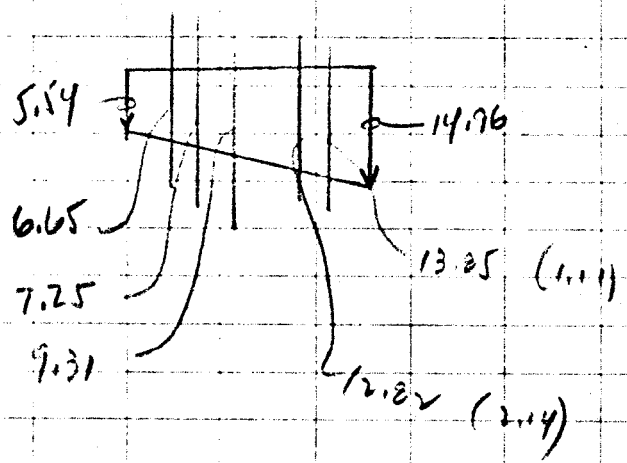
Sheet No. 12 of ____

Moment @ (1A)

	Force	Arm	Moment
SLAB	− 1229.8		+ 7994 (11K)
Piles			
(A) 34.869 (3)(9)(4/117)	+ 913.4	-5.5	− 5024
(35.185 − 34.869)(1/2)(3)(9)(4/117)	4.1	-3.83	− 16
(B) # 23	216.8	-10.5	− 2276
# 24	217.7	-5.5	− 1197
# 25	218.5	-0.5	− 109

Shear @ Edge of Slab

5.54 (13)	− 72.0	-6.5	+ 468
1.11 (13)(1/2)	− 7.2	-4.33	+ 31
			− 129 (1K)



Job No. 4671 Page No. 3B-81

Computed by RGP Date 4-13-73
Checked by GAS Date 4/13/73
Reviewed by ____ Date ____
Approved by RGP Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 13 of ____

MOMENT @ ①

	Force	Arm	Moment
SLAB .086(10)(20)(110)	− 1892 K	−10.0	+ 18 920 ft-k
Piles			
Ⓐ 34.869(4)(9)(4/17)	+ 1217.8	−10.0	− 12 178
(35.343 − 34.869)(1/2)(4)(9)(4/17)	+ 8.3	−7.5	− 62
Ⓑ #23	216.8	−17.5	− 3794
#24	217.7	−12.5	− 2721
#25	218.5	−7.5	− 1639
#26	219.4	−2.5	− 549
Shear @ Edge of Slab			
5.54 (20)	− 110.8	−10.0	+ 1108
1.71 (20)(1/2)	− 17.1	−6.67	+ 114
	+ 78.4 K		− 801 ft-k

MOMENT @ ②

Moment @ ①			− 801
Shear @ ①	+ 78.4	−24.08	− 1888
Slab 0.086(10)(2408)(110)	− 2278.0	−12.04	+ 27427
			17747
Piles			
Ⓐ 35.501(5)(9)(4/17)	+ 1549.8	−11.58	− 17946
(36.133 − 35.501)(1/2)(5)(9)(4/17)	13.8	−8.25	− 114 ~~150~~
Ⓑ #27	220.2	−21.58	− 4752
#28	147.6	−16.51	− 2447
#29	221.9	−11.58	− 2570
#30	148.7	−6.58	− 978
#31	223.7	−1.58	− 353
Shear @ Edge of slab			
7.25 (24.08)	− 174.6	−12.04	+ 2102
2.06 (24.08)(1/2)	− 24.8	−8.03	+ 199
			+ ~~8 993~~ ft-k
			− 2122

Job No. 4671 Page No. 3B-82

Computed by RGP Date 4-13-73
Checked by GAS Date 4/18/73
Reviewed by ____ Date ____
Approved by RGP Date 4-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 14 of ____

Moment @ (3)

	Force	Arm	Moment
Slab .086 (25.968)(10)(110)	− 24566	12.984	− 31896
Piles			
(A) 37.554 (5)(9)(4/11)	+ 1639.4	13.47	22083
(38.186 − 37.554)(½)(5)(9)(4/11)	13.8	16.80	232
(B) #44	234.8	23.47	5511
#43	233.9	18.47	4320
#42	233.1	13.47	3140
#41	232.2	8.47	1967
#40	231.4	3.47	803
Shear @ Edge of Slab			
12.74 (25.968)	− 330.8	12.98	− 4294
2.22 (25.968)(½)	− 28.8	17.31	− 499
			+ 1367

Moment @ (3A)

	Force	Arm	Moment
SLAB .086 (10)(13)(110)	− 1229.8	6.5	− 7994
Piles			
(A) 37.87 (3)(9)(4/11)	+ 992.0	5.5	5456
(38.186 − 37.87)(½)(3)(9)(4/11)	4.1	7.17	29
(B) #44	234.8	10.5	2465
#43	233.9	5.5	1286
#42	233.1	0.5	117
Shear @ Edge of wall			
13.85 (13)	− 180.1	6.5	− 1171
1.11 (13)(½)	− 7.2	6.67	− 48
			+ 140

Job No. 4671 Page No. 38-83

Computed by KGP Date 4-13-73
Checked by GAS Date 4/16/73
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Approved by RCP Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 15 of

LONGITUDINAL MOMENTS & FORCES - CASE I + II 12

Compute Shear at Edge of Slab (Locate C.G.)

		Force	Arm	& Moment
SLAB ① .150KCF		−18150 K ✓	—	—
Piles ✓ ✓ ✓				
Ⓐ 10.521 (22) (9) (4/117)		+2021. ✓	0	—
(15.263 − 10.521)(½)(22)(9)(4/117) ✓		455.4 ✓	18.33 ✓	+ 8347 ✓
Ⓑ #23	15.705 ✓ (4.0912)	64.3 ✓	−52.5 ✓	− 3376 ✓
#24	15.305 ✓	65.5 ✓	−47.5 ✓	− 3111 ✓
#25	16.305 ✓	66.7 ✓	−42.5 ✓	− 2835 ✓
#26	16.604 ✓	67.9 ✓	−37.5 ✓	− 2546 ✓
#27	16.904 ✓	69.2 ✓	−32.5 ✓	− 2249 ✓
#28	15.074 ✓ (3.1171) ✓	47.0 ✓	−27.5 ✓	− 1293 ✓
#29	17.503 ✓	71.6 ✓	−22.5 ✓	− 1611 ✓
#30	15.599 ✓ (3.1171) ✓	48.6 ✓	−17.5 ✓	− 851 ✓
#31	18.102 ✓	74.1 ✓	−12.5 ✓	− 926 ✓
#32	16.124 ✓ (3.1171) ✓	50.3 ✓	−7.5 ✓	− 377 ✓
#33	18.701 ✓	76.5 ✓	−2.5 ✓	− 191 ✓
#34	19.001 ✓	77.7 ✓	2.5 ✓	194 ✓
#35	16.912 ✓ (3.1171) ✓	52.7 ✓	7.5 ✓	✓ 395
#36	19.600 ✓	80.2 ✓	12.5 ✓	✓ 1003
#37	17.437 ✓ (3.1171) ✓	54.4 ✓	17.5 ✓	✓ 952
#38	20.199 ✓	82.6 ✓	22.5 ✓	✓ 1859
#39	17.962 ✓ (3.1171) ✓	56.0 ✓	27.5 ✓	✓ 1540
#40	20.798 ✓	85.1 ✓	32.5 ✓	✓ 2766
#41	21.097 ✓	86.3 ✓	37.5 ✓	✓ 3236
#42	21.397 ✓	87.5 ✓	42.5 ✓	✓ 3719
#43	21.696 ✓	88.8 ✓	47.5 ✓	✓ 4218
#44	21.996 ✓	90.0 ✓	52.5 ✓	✓ 4725
UPLIFT 1.555 (110)(110) ✓		+22457.6 ✓	0 ✓	— ✓
WATER LOAD 47.6 (2) ✓		− 952.0 ✓	0 ✓	—
NEEDLES 480* (2) ✓		− 960.0 ✓	0 ✓	—
Needle Girders 45.3 (2) ✓		− 90.6 ✓	0 ✓	— ✓
		+6324.4 K ✓ ↑		& +13588 IK

Job No. 4671 Page No. 3B-84

Computed by R.V. Bracher Date 4/16/73
Checked by G.A.S. Date 4/16/73
Reviewed by _____ Date _____
Approved by R.C.C. Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 16 of _____

Unbalanced Shear = $-\frac{6324.4}{110} \pm \frac{13588(6)}{(110)^2} = -50.76^{k}/_{l} \\ -64.23^{k}/_{l}$ } ½ each side

$-\frac{6324.4}{110} = -57.49$

$\frac{13588(6)}{(110)^2} = 6.71$

Moment @ (1)

	Force	Arm	Moment
Slab 0.15 (10)(110)(20)	− 3300	−10	+ 33000
Piling 10.521 (4)(9)(4/517)	+ 367.4	−10	− 3674
(11.199 − 10.521)(1/2)(4)(9)(4/517)	+ 11.8	−7.5	− 89
	+ 64.3	−17.5	− 1125
	+ 65.5	−12.5	− 819
	+ 66.7	−7.5	− 500
	+ 67.9	−2.5	− 170
Water Load	− 476.0	−18.22	+ 8673
Uplift 1.856 × 110 × 20	+4083.2	−10.0	−40832
Shear −50.76 (20)	− 1015.2	−10.0	+ 10152
−2.45 × 20 × 1/2	− 24.5	−6.67	+ 163
Needles	− 480.0	−15.8	+7584
Needle Girders	− 45.3	−11.3	+ 512
	−614.2^{k}		+12875^{ik}

Moment @ (2)

Shear @ (1)	−614.2	−24.08	+ 14790
Moment @ (1)			+ 12875
Slab	−3973.5	−12.04	+ 47841
Piling 11.425 × 5 × 9 × 4/517	+ 498.8	−11.58	− 5776
(12.328 − 11.425)(1/2) × 45 × 4/517	+ 19.7	−8.25	− 162
#27	+ 69.2	−21.58	− 1493
28	+ 47.0	−16.58	− 779
29	+ 71.6	−11.58	− 829
30	+ 48.6	−6.58	− 320
31	+ 24.1	−1.58	− 117
Shear 53.21 (24.08)	−1281.3	−12.04	+ 15427
2.95 (24.08)(1/2)	− 35.5	−8.03	+ 285
Uplift 1.856 (24.082)(110)	+4916.6	−12.04	− 59196
	−159.6^{k}		+22544^{ik}

Job No. 4671 Page No. 3B-65

Computed by RJBecker Date 4/17/73
Checked by GAS Date 4/18/73
Reviewed by ____ Date ____
Approved by RCP Date 5-73

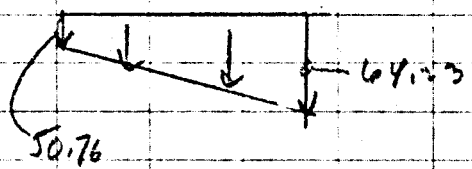
Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 17 of ____

Moment @ (3)

		Force	Arm	Moment
Slab	0.15 x 25.968 x 10 x 110	- 4285	12.98	- 55619
Piling	18 14.360 x 9 x 4/5	+ 125	3.47	+ 434
	19 14.586 (8.7313)	+ 127	8.47	+ 1076
	20 14.812	+ 129	13.47	+ 1738
	21 15.038	+ 131	18.47	+ 2420
	22 15.263	+ 133	23.47	+ 3122
	40 20.798 x 11.5/16 x 6 x 3/10	+ 85	3.47	+ 295
	41 21.097 (4.0912)	+ 86	8.47	+ 728
	42 21.397	+ 88	13.47	+ 1185
	43 21.696	+ 89	18.47	+ 1644
	44 21.996	+ 90	23.47	+ 2112
Water Load		- 476	24.19	- 11514
Uplift	1.856 x 110 x 25.968	+ 5302	12.98	+ 68820
Needles		- 480	21.77	- 10450
Needle Girders		- 45	17.27	- 777
Shear	61.05 x 25.968	- 1585	12.98	- 20573
	3.18 x 25.968 x 1/2	- 41	17.31	- 710
				- 16069

Shear @ ends



Computed by RJ Becker Date 4/18/73
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Job No. 4671 Page No. 38-86
Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE
Sheet No. 18 of

LONGITUDINAL MOMENTS & FORCES - I + II.1

Computo slab shear @ face of wall

	Force	Arm	Moment
Slab	-18.150	0	—
Piling 77.646 × 22 × 9 × 4/517	+14915	0	—
(77.646 - 68.457) × 1/2 × 22 × 9 × 4/517	+ 884	-18.33	-16 204
#23 2.196 (4.0912)	+ 9	-52.5	- 473
#24 1.614	+ 7	-47.5	- 333
#25 1.033	+ 4	-42.5	- 170
0.451	+ 2	-37.5	- 75
-0.130	- 1	-32.5	+ 33
-0.623 (3.1171)	- 2	-27.5	+ 55
-1.293 (4.0912)	- 5	-22.5	+113
-1.693 (3.1171)	- 5	-17.5	+ 88
-2.456 (4.0912)	-10	-12.5	+125
-2.662 (3.1171)	- 8	- 7.5	+ 60
-3.620 (4.0912)	-15	- 2.5	+ 38
-4.201 (")	-17	+2.5	- 43
-4.191 (3.1171)	-13	7.5	- 98
-5.365 (4.0912)	- 5	12.5	- 63
-5.210 (3.1171)	-16	17.5	-280
-6.528 (4.0912)	-27	22.5	-608
-6.230 (3.1171)	-19	27.5	-523
-7.691 (4.0912)	-31	32.5	- 1008
-8.273	-34	37.5	- 1275
-8.855	-36	42.5	-1530
-9.436	-39	47.5	-1853
#44 -10.018	-41	52.5	-2153
Subtotal	-2653K		-26177 1K

Job No. 4671 Page No. 3B-87

Computed by R.J. Becker Date 4/18/73
Checked by CAS Date 4/19/73
Reviewed by [illegible] Date 4-19-73
Approved by [illegible] Date 5-7-73

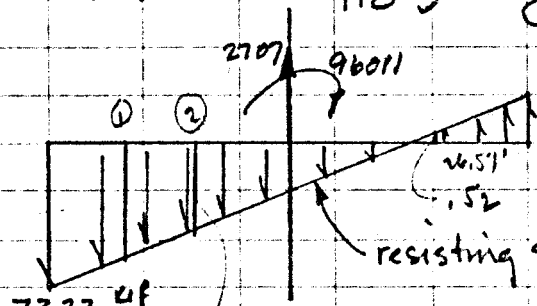
Subject STRUCTURAL
GATE BAY BASE SLAB
GULF SIDE

Sheet No. 19 of

	Force	Arm	Moment (+)
Subtotal (prev page)	-2653		-26177
Water Load (1323# x 0.832 kef) 2	-2202	-42.97	+94620
(551# ") 2	-916	-24.26	+22222
(2124 ") 2	-3534	-0.57	+2014
Uplift (1428 x 2.123) 2	-6064	+42.02	-254910
(624 x 2.123) 2	-2650	+19.0	-50350
(4400 x 1.472) 2	+12954	-15.0	-194310
(1650 x 2.355) 2	+7772	+40.0	+310880
	+2707		-96011

Unbalanced Shear = $\frac{2707}{110} \pm \frac{96011(6)}{(110)^2} = 24.61 \pm 47.61$

$= 72.22^{k/ft} \quad -23.0^{k/ft}$



54.91'

34.07

Computed by RJBecker Date 4/18/73
Checked by CAS Date 4/19/73
Reviewed by _____ Date _____
Approved by RCP Date _____

Job No. 4671 Page No. 3B-88
Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE
Sheet No. 20 of _____

Moment @ ①

	Force	Arm	Moment (+)
Slab	− 3300	−10	+33000
Piling ① 77.646 × 9 × 4/517	+ 678	−17.5	− 11865
② 77.207 (8.7313)	+ 674	−12.5	− 8425
③ 76.769 "	+ 670	−7.5	− 5025
④ 76.330 "	+ 666	−2.5	− 1665
㉒ 2.196 × 11.5/16 × 6 × 3/510	+ 9	−17.5	− 210
㉔ 1.614 (4.0912)	+ 7	−12.5	−125
㉕ 1.033 "	+ 4	−7.5	− 45
㉖ 0.451 "	+ 2	−2.5	− 8
Water Load 0.832 × 110 × 20	− 1830	−10	+18300
Uplift 1.472 × (" ")	+3238	−10	−32380
Shear 54.91 × 20	− 1098	−10	+10980
17.31 × 20/2	− 173	−13.33	+ 2306
	− 453 K		+4838 IK

Moment @ ②

Shear @ ①	− 453	−24.08	+10908
Moment @ ①			+4838
Slab	− 3974	− 12.04	+47845
Piling 74.138 × 5 × 9 × 4/517	+ 3237	−11.58	− 37484
(75.892 − 74.138) 1/2 × 45 × 4/517	+ 38	− 8.25	− 314
#27	−1	−21.58	+ 22
28	−2	− 16.58	+ 33
29	−5	−11.58	+ 58
30	−5	− 6.58	+ 33
31	−10	− 1.58	+16
Shear 34.07 (24.08)	− 820	−12.04	+9873
20.84 (24.08)(1/2)	−251	− 16.06	+4032
Water Load 0.832 × 24.08 × 110	−2204	−12.04	+26536
Uplift 1.472 " "	+3899	−12.04	− 46944
			+19450 IK

Job No. 4671 Page No. 3B-89

Computed by R J Bacher Date 4/18/73
Checked by GA Date 4/19/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 21 of

Moment @ (3)	Force	Arm	Moment (↺)
Slab ✓ ✓	-4285 K ✓	12.98 ✓	-55619 ✓
Piling 18 70.191 (8.713)	+612 ✓	3.47 ✓	+2124 ✓
19 69.753 ✓ "	+608 ✓	8.47 ✓	+5150 ✓
20 69.314 ✓ "	+604 ✓	13.47 ✓	+8136 ✓
21 68.876 ✓ "	+600 ✓	18.47 ✓	+11082 ✓
22 68.437 ✓ "	+596 ✓	23.47 ✓	+13988 ✓
40 -7.691 ✓ (4.092) ✓	-31 ✓	3.47 ✓	-108 ✓
41 -8.273 ✓ "	-34 ✓	8.47 ✓	-288 ✓
42 -8.855 ✓ "	-36 ✓	13.47 ✓	-485 ✓
43 -9.436 ✓ "	-39 ✓	18.47 ✓	-720 ✓
44 -10.018 ✓ "	-41 ✓	23.47 ✓	-962 ✓
Water Load 2.123 ✓ x 110 x 25.968 ✓	-6064 ✓	12.98 ✓	-78711 ✓
Uplift 2.355 ✓ " ✓ " ✓	+6727 ✓	12.98 ✓	+87316 ✓
Shear 0.53 x 25.968 ✓	+14 ✓	12.98 ✓	+182 ✓
22.47 x " ✓ x 1/2 ✓	+11 ✓	17.31 ✓	+190 ✓
			+8725 ✓

Shear

Job No. 4671 Page No. 3B-90

Computed by RJ Becker Date 4/18/73
Checked by [illegible] Date 4/19/73
Reviewed by [illegible] Date [illegible]
Approved by RCP Date 5-73

Subject STRUCTURAL GATE BAY BASE SLAB GULFSIDE

Sheet No. 22 of

LONGITUDINAL MOMENTS & FORCES - I+II S

Compute slab shear @ face of wall

		Force	Arm	(+) Moment
Slab		-18150 K	0	—
Piling 45.797 x 22 x 9 x 4/√17		+8797	0	—
(49.891 - 25.957) x 1/2 x 22 x 9 x 4/√17		+378	-18.33	- 6929
*23	38.330 (4.0912)	+157	-52.5	- 8243
	38.071	+156	-47.5	- 7410
	37.813	+155	-42.5	- 6588
	37.554	+154	-37.5	- 5775
27	37.296	+153	-32.5	- 4973
	32.454 (3.1171)	+101	-27.5	- 2778
	36.778	+151	-22.5	- 3398
	32.001 (3.1171)	+98	-17.5	- 1715
31	36.261	+148	-12.5	- 1850
	31.547 (3.1171)	+98	-7.5	- 735
	35.764	+146	-2.5	- 365
	35.485	+145	+2.5	+363
	30.867 (3.1171)	96	+7.5	+720
	34.968	+143	12.5	+1788
	30.414 (3.1171)	+98	17.5	+1663
	34.457	+141	22.5	+3173
	29.961 (3.1171)	+93	27.5	+2558
	33.934	+139	32.5	+4518
	33.675	+138	37.5	+5175
	33.416	+137	42.5	+5823
	33.158	+136	47.5	+6460
	32.899	+135	52.5	+7089
	Subtotal	-6060		-11430 IK

Job No. 4671 Page No. 3B-91

Computed by RJBechler Date 4/18/73
Checked by GAS Date 4/19/73
Reviewed by [illegible] Date 4-19-73
Approved by RCP Date 5-7-73

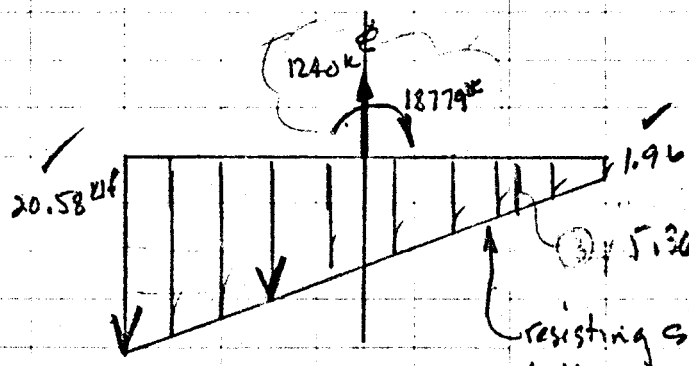
Subject STRUCTURAL
GATE BAY BASE SLAB
GULLSIDE

Sheet No. 23 of

			Force	Arm	Moment
Subtotal (prev page)			-6060 K		-11430 K
Water Load	1323 x 2	0.704	- 1863	-42.97	+80053
	551 x 2	"	- 776	-24.26	+18826
	2124 x 2	"	- 2991	- 0.57	+ 1705
	1428 x 2	1.280	- 3656	+42.02	-153625
	624 x 2	"	- 1597	+19.00	- 30343
Uplift	4400 x 2	1.344	+11827	-15.0	- 177405
	1650 x 2	1.920	+ 6336	+40.0	+253440
			+ 1240		- 18779 K

Unbalanced shear = $\frac{1240}{110} \pm \frac{18779 \times 6}{(110)^2} = 11.27 \pm 9.31$

$= 20.58^{K/F}$, $1.96^{K/F}$



(3.38) 17.19 @ 20' - ①

(7.46) 13.12 @ 4.08 - ②

Job No. 4671 Page No. 3B-72

Computed by R.J. Bechler Date 4/18/73
Checked by GAD Date 4/19/73
Reviewed by [illegible] Date 4-19-73
Approved by KCP Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 24 of

Moment @ ①

	Force	Arm	Moment (+)
Slab	-3300 ^k	-10	+33000 ^{ft-k}
Piling ⑨ 49.891 (8.713)	+435	-17.5	-7613
⑩ 49.696 "	+433	-12.5	-5413
⑬ 49.501 "	+431	-7.5	-3233
⑭ 49.306 "	+430	-2.5	-1075
⑮ 38.330 (4.0912)	+157	-17.5	-2748
⑪ 38.071 "	+156	-12.5	-1950
⑫ 37.813 "	+155	-7.5	-1163
⑯ 37.554 "	+154	-2.5	-385
Water Load 0.704 × 110 × 20	-1549	-10	+15490
Uplift 1.344 × " "	+2957	-10	-29570
Shear 17.19 × 20	-344	-10	+3440
3.39 × 20 × 1/2	-34	-6.67 13.3	+227 -454
	+81 ^k		-993 ^{ft-k} -766

Moment @ ②

Shear @ ①	+81	-24.08	-1951
Moment @ ①	—	—	-993 -766
Slab	-3974	-12.04	+47845
Piling 48.331 × 5 × 9 × 4/5π	+2110	-11.58	-24434
(49.111 - 48.331) × 1/2 × 45 × 4/5π	+17	-8.25	-140
㉒	+153	-21.58	-3302
㉘	+101	-16.58	-1675
㉙	+151	-11.58	-1749
㉚	+98	-6.58	-645
㉛	+148	-1.58	-234
Shear 13.12 × 24.08	-261	-12.04	+3142
4.07 × 24.08 × 1/2	-49	-8.03 13.3	+651
Water Load 0.704 × 24.08 × 110	-1865	-12.04	+22455
Uplift 1.344 " "	+3560	-12.04	-42862
			-5511 -4665

Job No. 4671 Page No. 3B-93

Computed by RJBechler Date 4/18/73
Checked by GAD Date 4/19/73
Reviewed by RGP Date 4-19-73
Approved by RGP Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 25 of

Moment @ (3)

			Force	Arm	Moment (+)
Slab			-4285	12.98	-55619
Piling	18	46.577 × (8.713)	+406	3.47	+1409
	19	46.382 "	+404	8.47	+3422
	20	46.187 "	+402	13.47	+5415
	21	45.992 "	+401	18.47	+7406
	22	45.797 "	+399	23.47	+9365
	40	33.934 × (4.091)	+139	3.47	+482
	41	33.675 "	+138	8.47	+1169
	42	33.416 "	+137	13.47	+1845
	43	33.158 "	+136	18.47	+2512
	44	32.899 "	+135	23.47	+3168
Water Load		2.123 × 110 × 25.968	-6064	12.98	-78711
Uplift		2.355 " "	+6727	12.98	+87316
Shear		1.96 × 25.968	-51	12.98	-662
		4.40 × " × ½	-57	17.31	-989
				8.65	+17150
					-11976

Job No. 4671 Page No. 3B-94

Computed by RGP Date 4-13-73
Checked by GAS Date 4/17/73
Reviewed by RGP Date 4-20-73
Approved by RGP Date 5-7-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 24 of

LONGITUDINAL MOMENTS & FORCES - CASE I + II 7

Compute Shear @ Edge of Slab (locate C.G.)

		FORCE	ARM	@℄ slab Moment
		-18150 K ✓	—	—
SLAB				
Piles				
Ⓐ	7.754 (22)(9)(.97)	1489.2 ✓	—	— K
	(25.046 - 7.754)(½)(22)(9)(.97)	1660.6 ✓	18.33 ✓	✓ +30439
Ⓑ	#23 77.62 ✓ (4.0912) ✓	317.6 ✓	-52.5 ✓	✓ -16674
	24 78.713	322.0 ✓	-47.5 ✓	✓ -15295
	25 79.805	326.5 ✓	-42.5 ✓	✓ -13876
	26 80.897	331.0 ✓	-37.5	✓ -12413
	27 81.989	335.4 ✓	-32.5	✓ -10901
	28 72.801 ✓ (3.1171)	226.9 ✓	-27.5	✓ - 6240
	29 84.174	344.4 ✓	-22.5	✓ - 7749
	30 74.715 (3.1171) ✓	232.9 ✓	-17.5	✓ - 4076
	31 86.359	353.3 ✓	-12.5	✓ - 4416
	32 76.629 (3.1171) ✓	238.9 ✓	- 7.5	✓ - 1792
	33 88.543	362.2 ✓	- 2.5	✓ - 906
✓	34 89.636	366.7 ✓	2.5	✓ ✓ 917
	35 79.501 (3.1171) ✓	247.8 ✓	7.5	✓ 1859
	36 91.820	375.7 ✓	12.5	✓ 4696
	37 81.415 (3.1171) ✓	253.8 ✓	17.5	✓ 4442
	38 94.005	384.6 ✓	22.5	✓ 8654
	39 83.329 (3.1171) ✓	259.7 ✓	27.5	✓ 7142
	40 96.189	393.5 ✓	32.5	✓ 12789
	41 97.282	398.0 ✓	37.5	✓ 14925
	42 98.374	402.5 ✓	42.5	✓ 17106
	43 99.466	406.9 ✓	47.5	✓ 19328
	44 100.558	411.4 ✓	52.5	✓ 21599
				✓ K
	SUBTOTAL	-7708.5 ✓		+ 49558 K

Job No. 4671 Page No. 3B-95

Computed by RYP Date 4-13-73
Checked by GAS Date 4/19/73
Reviewed by (RJP) Date 4-20-73
Approved by RJP Date 4-20-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE GATE

Sheet No. 27 of

	Force	Arm	@ ℄ slab Moment
Subtotal (forwarded)	-7708.5 k		+ 49 558 ft-k
UPLIFT locksside: 2.272 (80)(110)	+ 19 993.6	-15.0	- 299 904
gulfside: 1.376 (30)(110)	+ 4540.8	25.0 / 40	+ ~~113 520~~ 181 632
WATER LOAD			
1.632 (1323)	- 2159.1	-42.97	+ 92 777
1.632 (551)	- 899.2	-24.26	+ 21 815
1.632 (2124)	- 3466.4	-0.57	+ 1976
0.736 (624)	- 459.3	19.0	- 8727
0.736 (1428)	- 1051.0	42.02	- 44 163
TOTALS	+ 8790.9 k		(- ~~73 148~~ 50 36 ft-k

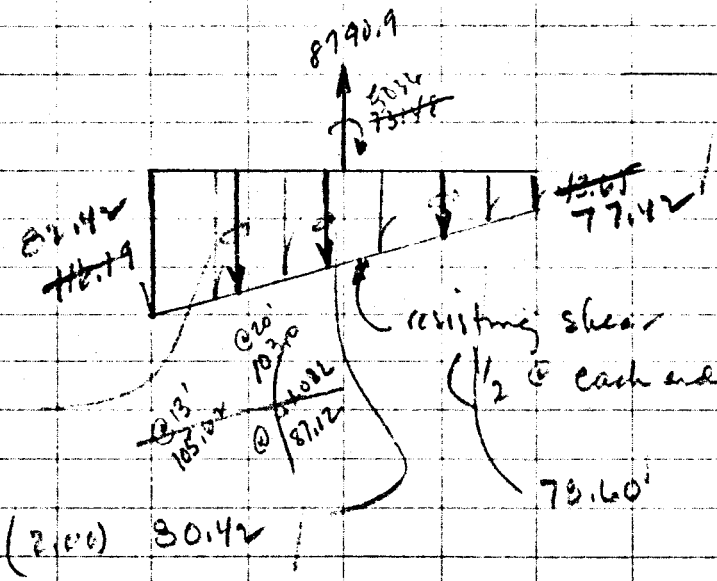
Unbalanced Shear = $-\frac{8790.9}{110} \pm \frac{50\,36}{(110)^2/2}$

$= -79.9 \pm 2.50$

-43.65 or -14.19

-82.4

-77.4



Job No. 4671 Page No. 3B-96

Computed by RMP Date 4-13-73
Checked by [illegible] Date 4/19/73
Reviewed by [illegible] Date 4-20-73
Approved by [illegible] Date 5-1-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 28 of

	FORCE	ARM	MOMENT
MOMENT @ (1A)			k
SLAB	-21450k	-6.5	+13943
Piles: (A) 7.754 (3)(9)(.97)	203.1	-5.5	- 1117
(9.401-7.754)(½)(3)(9)(.97)	21.6	-3.83	- 83
(B) #23	317.6	-10.5	- 3335
#24	322.0	-5.5	- 1771
#25	326.5	-0.5	- 163
UPLIFT & WATER LOAD			
(2.272-1.632)(13)(110)	+ 915.2	-6.5	- 5949
Shear @ Edge of Slab	1063.4		
91.83 ~~[illegible]~~ (13)	- 1373.1	-6.5	+8925
0.59 ~~[illegible]~~ (13)(½)	- ~~55.7~~ 38	(-4.33) -8.67	+165 ×33 + ~~241~~
			+ ~~1069~~
			+8473 k
Moment @ (1)			k
Slab	-3300	-10.0	+33000
Pile (A) 7.754 (4)(9)(.97)	+ 270.8	-10.0	- 2708
(10.224-7.754)(½)(4)(9)(.97)	43.1	-7.5	- 323
(B) #23	317.6	-17.5	- 5558
#24	322.0	-12.5	- 4025
#25	326.5	-7.5	- 2449
#26	331.0	-2.5	- 828
UPLIFT & WATER LOAD			
(2.272-1.632)(20)(110)	+ 1408.0	-10.0	- 14080
SHEAR @ EDGE OF SLAB	1630.8		+ 16308
81.1 ~~[illegible]~~ (20)	- ~~2060.0~~	-10.0	+ ~~20600~~
.91 ~~[illegible]~~ (20)(½)	- 911.4	(-6.67)	+ 12165
	- ~~2442.9~~	(-1).3	k
	-1120.5		+ ~~24509~~
			+11152

Job No. 4671 Page No. 3B-97

Computed by R.J. Becker Date 4/18/73
Checked by G.A.S. Date 4/19/73
Reviewed by R.D.P. Date 4-20-73
Approved by R.C.L. Date 5-7-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFS 106

Sheet No. 29 of

Moment @ (2)

		Force	Arm	Moment
Shear @ (1)		19207	-24.08	46250
Moment @ (1)		—	—	+12458
Slab		-3974	-12.04	+47845
Piling	11.048 × 5 × 9 × 4/√17	+482	-11.58	-5582
	(14.341 - 11.048) × ½ × 45 × 4/√17	+72	-8.25	-594
	27	+335	-21.58	-7229
	28	+227	-16.58	-3764
	29	+344	-11.58	-3984
	30	+233	-6.58	-1533
	31	+353	-1.58	-558
Shear	30.142 × 24.08	1732	-12.04	+23321
	1.111 × 24.08 × ½	-1913	-16.06	+30709
Water Load	1.632 × 24.08 × 110	-4323	-12.04	+52049
Uplift	2.272 " "	+6018	-12.04	-72457
				-73135

Job No. 4671 Page No. 3B-98

Computed by RJBacher Date 4/19/73
Checked by GAJ Date 4/19/73
Reviewed by [illegible] Date 4-20-73
Approved by [illegible] Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 30 of

Moment @ (3)

			Force	Arm	Moment
Slab			- 4285	12.98	- 55619
Piling	18	21.752 (8.713)	+ 190	3.47	+ 659
	19	22.576 "	+ 197	8.47	+ 1669
	20	23.399 "	+ 204	13.47	+ 2748
	21	24.223 "	+ 211	18.47	+ 3897
	22	25.046 "	+ 218	23.47	+ 5116
	40	96.189 (4.091k)	+ 394	3.47	+ 1367
	41	97.282 "	+ 398	8.47	+ 3371
	42	98.374 "	+ 402	13.47	+ 5415
	43	99.466 "	+ 407	18.47	+ 7517
	44	100.558 "	+ 411	23.47	+ 9646
Water Load	0.736	x 110 x 25.968	- 2102	12.98	- 27284
Uplift	1.376	" "	+ 3931	12.98	+ 51024
Shear	~~43.65~~	x 25.968	-2019 ~~+34~~	12.92	-26090 ~~+441~~
	1.18 ~~1.112~~	x (") x 1/2	-15 ~~-22~~	8.66	- ~~190~~ -130

~~7066#~~
-1669#

Job No. 4671 Page No. 3B-99

Computed by RGP Date 4-18-73
Checked by GA Date 4/19/73
Reviewed by ____ Date ____
Approved by KCH Date 5-7-73

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 31 of ____

LONGITUDINAL MOMENTS & FORCES - CASE I+II 0

Compute Shear @ Edge of SLAB (LOCATE C.G.)

		FORCE	ARM	@℄ SLAB MOMENT
SLAB		− 18150 K ✓	0	—
PILES ✓ ✓ ✓ ✓				
Ⓐ 19.885 (22) (9) (4/117)		+ 3819.7 ✓	0 ✓	— ✓ 1k
(30.537 − 19.885)(½)(22)(9)(4/117)		1023.1 ✓	18.33	+ 18 753
Ⓑ #23	67.703 × 4.0912	277.0 ✓	−52.5 ✓	− 14 543 ✓
24	68.375 " ✓	279.7 ✓	−47.5	− 13 286 ✓
25	69.048 "	282.5 ✓	−42.5	− 12 006 ✓
26	69.721 "	285.2 ✓	−37.5	− 10 695 ✓
27	70.394 "	288.0 ✓	−32.5	− 9 360 ✓
28	62.272 × 3.1171 ✓	194.1 ✓	−27.5	− 5 338 ✓
29	71.740	293.5 ✓	−22.5	− ✓ 6 604
30	63.452 × 3.1171 ✓	197.8 ✓	−17.5	− ✓ 3 462
31	73.085	299.0 ✓	−12.5	− ✓ 3 738
✓ 32	64.631 × 3.1171 ✓	201.5 ✓	−7.5 ✓	− ✓ 1 511
33	74.431	304.5 ✓	−2.5	− ✓ 761
34	75.104	307.3 ✓	2.5	✓ 768
35	66.399 × 3.1171 ✓	207.0 ✓	7.5	✓ 1553
36	76.449	312.8 ✓	12.5	✓ 3 910
37	67.578 × 3.1171 ✓	210.6 ✓	17.5	✓ 3 686
38	77.795 ✓	318.3 ✓	22.5	✓ 7 162
39	68.758 × 3.1171	214.3 ✓	27.5	✓ 5 893
40	79.141	323.8 ✓	32.5	✓ 10 524
41	79.813	326.5 ✓	37.5	✓ 12 244
42	80.486	329.3 ✓	42.5	✓ 13 995
43	81.159	332.0 ✓	47.5	✓ 15 770
44	81.832	334.8 ✓	52.5	✓ 17 577
	Subtotal	− 7187.7 ✓		+ 30 531 ✓ 1k

Job No. 4671 Page No. 3B-100

Computed by RGP Date 4-18-73
Checked by GAS Date 4/19/73
Reviewed by RGP Date 4-20-73
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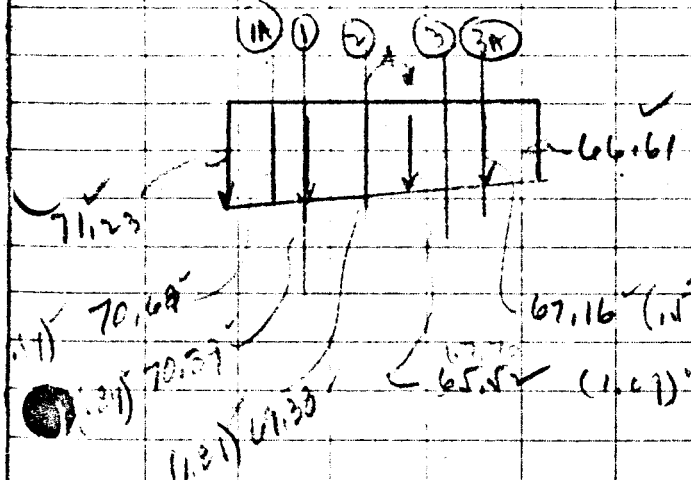
Subject STRUCTURAL
GULFSIDE GATE BAY
GULFSIDE

Sheet No. 32 of

	FORCE	ARM	@℄SLAB MOMENT
Subtotal (forwarded)	-7187.7		+ 30 531
Uplift: Locksde: 1.92(110)(80)	= 16 896	-15.0	- 253 440
GULFSIDE: 1.344(110)(30)	= 4435.2	~~250~~ 40	+ ~~110 880~~ + 177 408
WATER LOAD 1.28(1323)	= -1693.4	-42.97	+ 72 765
1.28(551)	= - 705.3	-24.26	+ 17 111
1.28(2124)	= -2718.7	-0.57	+ 1 550
0.704(624)	= - 439.3	19.0	- 8 347
0.704(1428)	= -1005.3	42.02	- 42 243
TOTALS	+7581.5		- ~~71 193~~ -4665

$$\text{Unbalance shear} = \frac{-7581.5}{110} \pm \frac{4665}{(110)^2}(6) = -68.92 \pm 2.31 = -71.23 \text{ or } -66.61$$



Job No. 4671 Page No. 3B-101

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Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 33 of

MOMENT @ (1)

	FORCE	ARM	MOMENT
SLAB .15(10)(20)(110)	-3300	-10.0	+33000
Piles			
(A) 19.885(4)(9)(4/11)	+ 694.5	-10.0	- 6945
(21.407-19.885)(1/2)(4)(9)(4/11)	+ 26.6	-7.5	- 200
@ #23	+ 277.0	-17.5	- 4848
#24	+ 279.7	-12.5	- 3496
#25	+ 282.5	-7.5	- 2119
#26	+ 285.2	-2.5	713
Uplift 1.92(20)(110)	+ 4224.	-10.0	- 42240
WATER LOAD: 1.28(20)(110)	- 2816.	-10.0	+ 28160
Shear @ edge of slab	1407.8		14075
70.37 33.62 (20)	- 739.4	-10.0	+ 6794
.24 6.42 (20)(1/2)	- 8.4 4.42	6.67 13.3	+ 112 123
	- 1462.7 k		+14789 k
	- 723.1 k		+ 7751

MOMENT @ (1A)

SLAB .15(10)(13)(110)	- 2145 k	-6.5	+13943
Piles (A) 694.5(3)(1/4) =	+ 520.9 k	-5.5	- 2865
(20.900-19.885)(1/2)(3)(9)(4/11) =	+ 13.3	-3.83	- 51
#23	+ 277.0	-10.5	- 2909
#24	+ 279.7	-5.5	- 1538
#25	+ 282.5	-0.5	- 141
UPLIFT 1.92(13)(110)	+ 915.2	-6.5	- 5949
WATER LOAD: 1.28(13)(110)			
Shear @ Edge of Slab	918.8		5975
70.62 33.62 (13) =	- 457.1	-6.5	+ 2971
.54 4.17 (13)(1/2) =	- 27.1 5.5	-4.33 8.67	+ 30417
			+144 13 + 3 415

Job No. 4671 Page No. 3B-102

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Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 34 of

MOMENT @ ②

	FORCE	ARM	Moment
			+ 14789 k
Moment @ ①	1462.7 ✓		+ ~~7751~~
Shear @ ① ✓ - ✓ ✓	- ~~2891~~	- 24.08 ✓	+ 35277 ~~78257~~
Piles @ 21.914 (5)(9)(.97)	+ 956.5 ✓	- 11.58 ✓	✓ 11180
(23.943 - 21.914)(½)(5)(9)(.97) ✓ ✓	+ 44.3 ✓	- 8.25 ✓	- ✓ 365
@ #27	+ 288.0 ✓	- 21.58 ✓	- ✓ 6215
28	+ 194.1 ✓	- 16.58 ✓	- ✓ 3218
29	+ 293.5 ✓	- 11.58 ✓	✓ 3399
30	+ 197.8 ✓	- 6.58 ✓	- ✓ 1302
31	+ 299.0 ✓	- 1.58 ✓	- ✓ 472
Uplift & Water Load ✓ ✓			✓
(1.92 - 1.28)(24.08)(110)	+ 1695.2 ✓	- 12.04 ✓	- 20410
Shear @ Edge of ~~slab~~	1670.1		20115 ✓
61.3 ~~4.57~~ (24.08) ✓	- ~~1474.2~~	- 12.04 ✓	+ ~~11609~~
1.05 ~~7.05~~ (24.08)(½)	- ~~93~~ 75.1	+ 22.3 ~~5.58~~ 16.06	+ ~~3502~~ 3502
Slab .15 (24.08)(10)(110)	- 3973.2	- 12.04	+ 47837.
✓ ✓ ✓ ✓			✓ k
			- ~~40941~~
			+ 71760
			-

Job No. 4671 Page No. 3B-103

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Reviewed by [illegible] Date 4-20-73

Approved by [illegible] Date [illegible]

Subject STRUCTURAL GATE BAY BASE SLAB GULFSIDE

Sheet No. 35 of

MOMENT @ (3)

	Force	Arm	Moment
SLAB: .15(25.968)(10)(110)	- 4284.7	12.984	- 55633
Piles: (A) 28.058 (5)(9)(.97)	+ 1224.7	13.47	16497
(30.537 - 28.058)(½)(45)(.97)	+ 54.1	16.80	909
(B) #44	+ 334.8	23.47	7858
#43	+ 332.0	18.47	6132
#42	+ 329.3	13.47	4436
#41	+ 326.5	8.47	2765
#40	+ 323.8	3.47	1124
UPLIFT & Water load			
(1.344 - .704)(25.968)(110)	+ 1828.1	12.984	+ 23736
SHEAR @ EDGE OF SLAB	1729.7		
.1 [illegible] (25.968)	- [illegible]	12.984	- [illegible]
1.0 [illegible] (25.968)(½)	- 142.2	[illegible] 13.65	- [illegible]
	14.2		- 1475

MOMENT @ (3A)

SLAB	- 2145	+ 6.5	- 13943
Piles (A) 29.502 (3)(9)(.97)	773.2	5.5	4253
(30.537 - 29.502)(½)(27)(.97)	13.3	7.17	95
#44	334.8	10.5	3515
#43	332.0	5.5	1826
#42	329.3	0.5	165
UPLIFT & WATER LOAD			
(1.344 - .704)(13)(110)	915.2	6.5	5949
SHEAR @ edge of slab	- 865.9		- 5627
66.61 [illegible] (13)	- [illegible]	6.5	- [illegible]
.55 [illegible] (13)(½)	- [illegible]	[illegible] 4.33	- [illegible]
	3.6		- [illegible]
			- 3784

Job No. 4671 Page No. 3B-104

Computed by RGP Date 4-25-73
Checked by Date
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Approved by Date

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 36 of

Base Slab - Center SECTION - Compare pile Vs. Slab Deflection

FOR deflection assume one way action and 105' effective length

Case I + II 12

Uplift ≅ 1.86 ksf ↑
10' slab-α ≅ 1.50 ksf ↓
0.36 ksf ↑ taken by slab and piles

SLAB
@℄: $\Delta_{slab} \cong \frac{wl^4}{200EI} = 0.152\,w$

$w = 0.36$; Δ@℄ = 0.0547" 4 Cont. Bm.

Using $\frac{5wl^4}{384EI}$ ——— Δ@℄ = 0.143" Simp'd Bm.

Pile 14 x 73

$\text{Axial } \Delta = \frac{Pl}{AE} = \frac{P(12)(12)}{21.46(30)(1000)} = .000033\,P$

$P = .36(10)(7.5) = 27^k$

$\Delta = 0.006"$ assuming no pile tip movement.

By comparison of slab deflections and pile deflections, it can be seen that the slab will deflect and will transmit load to the piling in uplift. The assumption of a rigid headstock is not true for this slab in either direction. The center piling will take load from the center area of the slab only - Case Ia / Ib = 1.5 ksf ↓; Case I + H2O = 0.86 ksf ↓; case II + II 12 = 0.36 ksf ↑.

With pile spacings of:

10'X7.5'; pile loads are 112.5^k, 64.5^k and -27^k respectively.
5'X7.5'; " " " " 56.3^k, 32.3^k and -13.5^k "

due to slab and water loads vertically.
If piles settle ≈ 1/8", w carried in slab moments will be

$$w = \frac{200 E I \Delta}{\ell^4} = 0.825 \text{ k.s.f.}$$

$$\pm M = \frac{w\ell^2}{10} = \frac{0.825 (105)^2}{10} = 910 \text{ ft-k}$$

If pile (differential) Δ is limited to 1/8" under load, this is max moment which could develope transverse in the slab. Actual pile load will be distributed to other piles so that maximum pile loads will be greater than computed because of non-rigidity in headstock.
If pile differential settlement exceeds 1/8", then slab moments can be increased a substantial amount. Due to non-uniformity of pile tip support and foundation sands, slab must be provided with ample compression and tension reinforcement.

Job No. 4671 Page No. 3B-106

Computed by RGP Date 4-25-73

Checked by ____ Date ____

Reviewed by ____ Date ____

Approved by ____ Date ____

Subject STRUCTURAL
GATE BAY BASE SLAB
GULFSIDE

Sheet No. 38 of ____

The transverse moments computed for cases Ia and dewatered (gate removed) condition may be disregarded. They are a limiting case with rigid head stock. The slab deflection will reduce these moments and redistribute load to piles.

Minimum steel for temperature and shrinkage is .0025(12)(120) = 3.60 □"/' which is sufficient to handle local weak support points using ½ Top & ½ Bottom. For overall distribution, however minimum steel should be much larger than this. The minimums established by codes are not developed for this type structure and in the designers opinion should be increased for this structure to about 6 sq in per ft with half in top & half in bottom. Design moments will increase this amount in many areas.

Job No. 4671 Page No. 3B-107

Computed by RGP Date 4-10-73
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Subject STRUCTURAL GATE BAY PILING BALANCE GULFSIDE

Sheet No. ____ of ____

CASE Ia - CONSTRUCTION CONDITION - NO BACKFILL

	AXIAL "L" for Pile	VERT.	HORIZ.
Pile			
#1 thru #22 }	2175.3k ✓	2110.4k ✓	527.6k ✓
#45 " #66 }			
949228 } #23 " #44	1616.4 ✓	1531.5 ✓	- 516.9 ✓
977864 }			
Moment in pile			
#1 → 22 } -100.7 / 8.2462			
45 → 66 }	- 12.2 ✓	+ 3.0 ✓	- 11.8 ✓
949228 → 23 → 44 -10.1 ÷ 8.4433	- 1.2 ✓	+ 0.4	+ 1.1
Σ Pile Forces		+ 3645.3 ✓	+ 0 ✓
Structure "		- 3645.3 ✓	0 ✓
ΣV & ΣH		0.0	+ 0
% error		OK	OK

CASE Ib - CONSTRUCTION CONDITION - WITH BACKFILL

Pile #1 thru #22 }	2706.1 ✓	2625.3 ✓	656.3 ✓
#45 " #66 }			
#23 " #44	1987.5 ✓	1883.1 ✓	- 635.6 ✓
Moment in Pile			
#1 - #22 } -58.6(2) / L_1			
45 - 66 }	- 14.3	+ 3.5	- 13.9
23 - 44 -17.6 ÷ L_2	- 2.1	+ 0.7	+ 2.0
ΣPILE FORCES		4512.6 ✓	8.8 ✓
STRUCTURE "		- 4509.2 ✓	- 10.1 ✓
ΣV & ΣH		+ 3.4	- 1.3
% error		0.075%	OK

Job No. 4671 Page No. 3B-108

Computed by RGP Date 4-10-73
Checked by GAS Date 4/27/73
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Approved by RAL Date 5-7-73

Subject STRUCTURAL
GATE BAY FILING BALANCE
GULFSIDE

Sheet No. ____ of ____

CASE I + II 11

	AXIAL "L" to or Pile	VERT.	HORIZ.
Pile			
#1 thru #22 }	1607.2k ✓	1559.2 ✓	+ 389.8 ✓
#45 " #66 }			
#23 " #44	1173.3 ✓	1111.7 ✓	- 375.2 ✓
Moment in pile			
#1 → 22 } -68.5 / L1	- 8.3	+ 2.0'	- 8.0'
45 → 66 }			
23 → 44 -35 ÷ L2	- 4.4	+ 1.3'	+ 4.0'
Σ Pile Forces		2674.2 ✓	+ 10.6
Structure 11		- 2673.3 ✓	- 7.8
ΣV & ΣH		0.9	+ 2.8
% error		0.034 OK	OK

CASE I + II 12

Pile #1 thru #22 }	567.2 ✓	550.3 ✓	+ 137.6 ✓
#45 " #66 }			
#23 " #44	400.7 ✓	379.7 ✓	- 128.1 ✓
Moment in Pile			
#1 - #22 } -19.8 / L1 =	- 2.4	+ 0.6	- 2.3
45 - 66 }			
23 - 44 -6.4 ÷ L2	- 0.8	+ 0.3	+ 0.8
Σ PILE FORCES		930.9 ✓	+ 8.0 ✓
STRUCTURE 11		- 930.9 ✓	- 7.8
ΣV & ΣH	-	- 0.0	0.2
% error		None OK	OK

Job No. 4671 Page No. 3B-109

Computed by RGP Date 4-10-73
Checked by GAS Date 4/27/73
Reviewed by RSE Date 4/4/73
Approved by A.A.P. Date 5-7-73

Subject STRUCTURAL
GATE BAY FILING BALANCE
GULFSIDE

Sheet No. ____ of ____

CASE I + III

	AXIAL "L" or Pile	VERT.	HORIZ.
Pile			
#1 thru #22, #45 " #66	+ 3213.8 ✓	3117.8 ✓	+ 779.5 ✓
#23 " #44	- 83.1 ✓	- 78.7 ✓	+ 26.6
Moment in pile			
#1 → 22, 45 → 66 $\frac{449.4}{L_1}$	+ 54.5	- 13.2	+ 52.9 ✓
23 → 44 $-338 \div L_2$	- 40.1	+ 12.8	+ 38.0
Σ Pile Forces		3038.7 ✓	897.0
Structure "		- 3038.7 ✓	-896.9 ✓
ΣV & ΣH		0	0.1
% error		None ok	Ok

CASE I + II 5

Pile #1 thru #22, #45 " #66	2105.1 ✓	2042.2 ✓	510.6 ✓
#23 " #44	757.3 ✓	717.5 ✓	- 242.2 ✓
Moment in Pile			
#1 - #22, 45 - 66 $\frac{97.4}{L_1}$ =	+ 11.8	- 2.91	+ 11.4
23 - 44 $-115.4 \div L_2$ =	- 13.6	+ 4.4	+ 12.9
ΣPILE FORCES		2761.2 ✓	292.7
STRUCTURE "		- 2761.1 ✓	- 292.9 ✓
ΣV & ΣH		+ 0.1	- 0.2
% error		ok	ok

Job No. 4671 Page No. 3B-110

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Subject STRUCTURAL GATE BAY PILING BALANCE GULFSIDE

Sheet No. ____ of ____

CASE I + II 7

	AXIAL "L" or to Pile	VERT.	HORIZ.
Pile			
#1 thru #22	721.6 ✓	700.1 ✓	1750 ✓
#45 " #66			
#23 " #44	1893.8 ✓	1794.4 ±	-605.6 ±
			590
Moment in pile			
#1 → 22, 45 → 66 $\frac{-358.6}{L_1}$ =	- 43.4	+ 10.6 [3]	- 42.2 [1.3]
23 → 44 $\frac{+171.3}{L_2}$ =	+ 20.3	- 6.4 [4]	- 19.1 [11]
Σ Pile Forces		2498.5	-491.9
Structure 11		-2498.5 ✓	+492.0
ΣV & ΣH		0	+ 0.1
% error		✓ ok	ok

CASE I + II 10

Pile #1 thru #22			✓
#45 " #66	1109.3 ✓	1076.2 ✓	269.0
#23 " #44	1589.3 ✓	1505.9 ✓	-508.2 ✓
Moment in Pile			
#1 - #22, 45 - 66 $\frac{-234.4}{L_1}$ -	28.4 ✓	+ 6.9	- 27.6 [9]
23 - 44 $\frac{+93.1}{L_2}$ = +	11.0	- 3.2	- 10.4 [6]
ΣPILE FORCES		+2585.5 ✓	-277.2 ✓
STRUCTURE 11		-2585.5 ✓	277.2 ✓
ΣV & ΣH		0	0
% error		ok	ok

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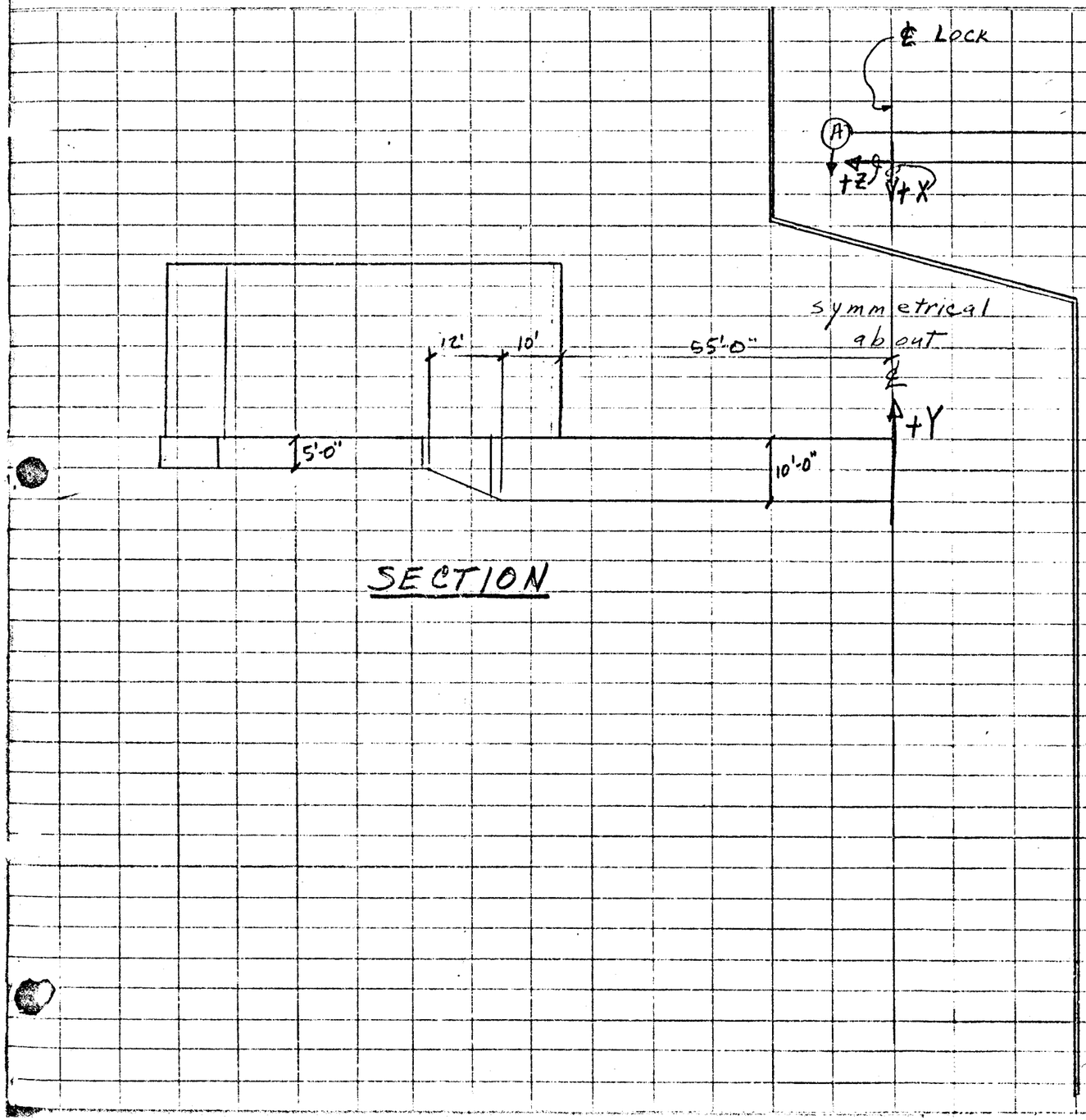
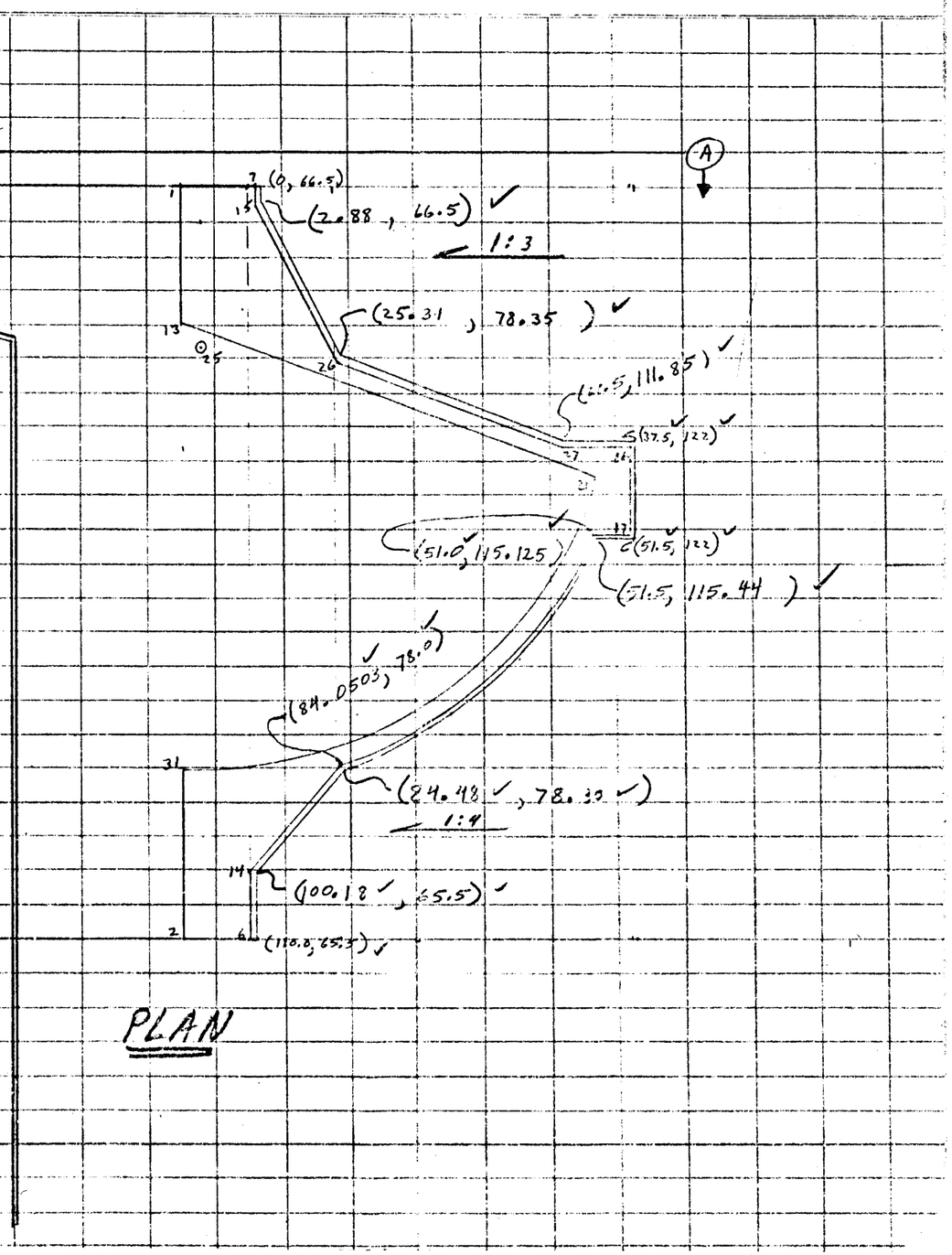
Job No. 4671 Page No. 3B-111
Subject STRUCTURAL GATE DAY LOADS LAKESIDE
Sheet No. 1 of



SECTION



PLAN

Computed by WJZ Date 2-27-73
Checked by RTEicher Date 3/14/73
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Approved by [illegible] Date [illegible]

Job No. 4671 Page No. 33-112
Subject STRUCTURAL
GATE BAY LOADS
LAKESIDE
Sheet No. 2 of

ITEM	DESCRIPTION	WEIGHT	ARM (X)	MOMENT (Z)	ARM (Z)	MOMENT (X)
GATE BAY WALLS (change 3'-0" wall to 2'-6")	SAME AS GULFSIDE EXCEPT	4631.6 ✓		251170.5 ✓		-352928.3 ✓
	-26.25 ✓ x 0.5 ✓ x 45.7° ✓ x π/180 ✓ x 64.50 ✓ x .150 ✓	-101.3 ✓	70.2 ✓	-7111.3 ✓	-98.9 ✓	+10018.6 ✓
	TOTALS - WALLS	4530.3 ✓	$\bar{X}$ = 53.87 ✓	244059.2 ✓	$\bar{Z}$ = -75.69 ✓	-342909.7 ✓
GATE BAY BASE SLAB	65 ✓ x 110 ✓ x x 10 ✓ x .150 ✓	10725.0 ✓	55.0 ✓	589875 ✓	-32.5 ✓	-348563 ✓
	990.3 ✓ x 5 ✓ x .150 ✓	742.7 ✓	52.5 ✓	38992 ✓	-70 ✓	-51989 ✓
	990.3 ✓ x 5 ✓ x ½ ✓ x .150 ✓	371.3 ✓	52.5 ✓	19493 ✓	-68 ✓	-25248 ✓
	(165.2 ✓ + 1508.7 ✓) x 5 ✓ x .150 ✓	1255.4 ✓	52 ✓	65281 ✓	-95 ✓	-119263 ✓
	TOTALS - BASE SLAB	13094.4 ✓	$\bar{X}$ = 54.50 ✓	713641 ✓	$\bar{Z}$ = -41.63 ✓	-545063 ✓
SAND	693 x .5 x .056 ✓	19.4 ✓	33.0 ✓	640 ✓	-103 ✓	-1998 ✓
SHELL	1.05 x .5 x 64.1 x .034 ✓	1.1 ✓	24.5 ✓	27 ✓	-81.5 ✓	-90 ✓
RIPRAP	2.11 x .5 x 64.1 x .063 ✓	4.3 ✓	24.5 ✓	105 ✓	-81.5 ✓	-350 ✓
SAND	476 x .5 x .056 ✓	13.3 ✓	71.0 ✓	944 ✓	-103 ✓	-1370 ✓
SHELL	1.03 x .5 x 87.5 x .034 ✓	1.5 ✓	80.5 ✓±	121 ✓	-94 ✓	-141 ✓
RIPRAP	2.06 x .5 x 87.5 x .063 ✓	5.7 ✓	80.5 ✓±	459 ✓	-94 ✓	-536 ✓
	TOTALS - SOILS	45.3 ✓	$\bar{X}$ = 50.68 ✓	2296 ✓	$\bar{Z}$ = -99.01 ✓	-4485 ✓
	use same weights and moments as gulfside for Control building & machinery	158.7 ✓	$\bar{X}$ = 97.22 ✓	-15429.0 ✓	$\bar{Z}$ = -67.84 ✓	-10766.4 ✓

Job No. 46.71 Page No. 3B-113

Computed by WJF Date 3-14-73
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Reviewed by [illegible] Date 3-21-73
Approved by RCP Date [illegible]

Subject STRUCTURAL
GATE BAY LOADS
LAKESIDE GATES

Sheet No. 3 of

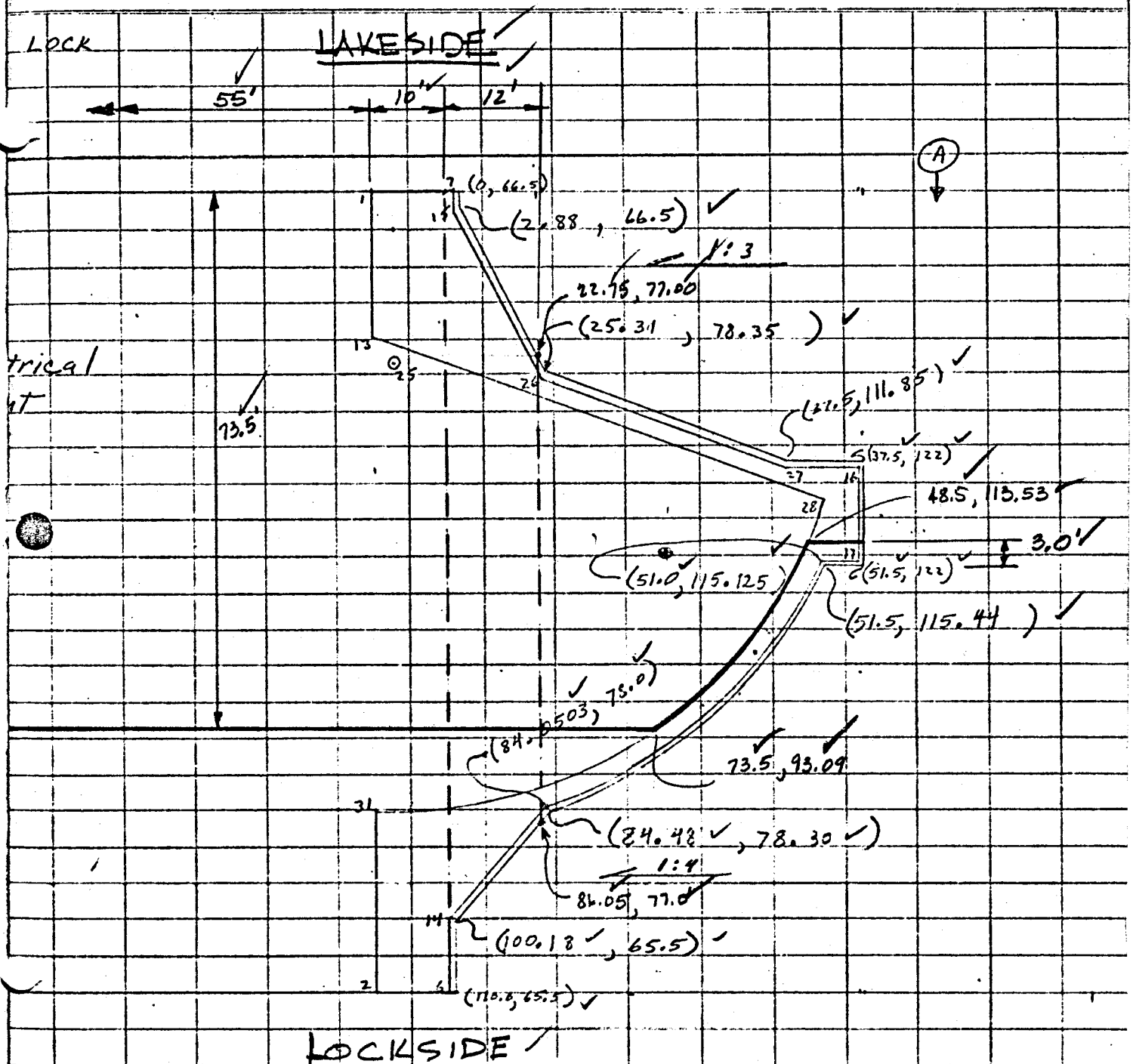
DEAD LOAD SUMMARY (FOR ½ of GATE BAY)

ITEM	WEIGHT	$\bar{x}$	M_z (about z)	Gate Position	
WALLS	-4530.3	53.87	-244059		
BASE SLAB	-13094.4	54.50	-713641		
Cntl. Hse & MACH.	-158.7	97.22	-15429		
..	-17783.4	54.72	-973129		
GATE	-256.8	54.64	-14032	OPEN	$\bar{z} = 75.73$
		51.44	-13210	closed	$\bar{z} = 34.04$
	-18040.2	54.72	-987161	OPEN	
		54.67	-986339	closed	
Soil (Bouy.)	-45.3	50.68	-2296		
	-18085.5	54.71	-989457	OPEN	
		54.66	-988635	closed	
Soil (Sat)	-97.1	50.68	-4921		
	-18137.3	54.70	-992082	OPEN	
Needles	-480.0				
Needle girder	-56.8				

Job No. 4671 Page No. 3B-114

Subject STRUCTURAL
GATE BAY LOADS
LAKESIDE

Sheet No. 4 of



Computed by WJK Date 3-5-73
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Reviewed by [illegible] Date 3-11-73
Approved by [illegible] Date [illegible]

Job No. 4671 Page No. 3B-115
Subject STRUCTURAL
GATE BAY LOADS
LAKESIDE
Sheet No. 5 of

ITEM	DESCRIPTION		AREA	ARM (X)	MOMENT (Z)	ARM (Z)	MOMENT (X)
WATER LOAD INSIDE GATE BAY	USE SAME AREA for Water (Lakeside)		6573.0 ✓	$\bar{x}$ = 43.47 ✓	-285759 ✓	$\bar{z}$ = -48.76 ✓	-320495 ✓
	inside Gate Bay Structure as on Gulfside Gate	(Lockside)	2051.7 ✓	$\bar{x}$ = 90.02 ✓	-184703 ✓	$\bar{z}$ = -23.40 ✓	-48005 ✓
Water outside Gate Bay Structure	.5 X 85.5 ✓ Lakeside		42.8 ✓	19 ✓	813 ✓	-94 ✓	-4023 ✓
	.5 X 87.5 ✓ Lockside		43.8 ✓	81 ✓	3548 ✓	-93 ✓	-4073 ✓
UPLIFT	EL -24	73.5 ✓ x 65 ✓	Total @-24 (4777.5 ✓)	(36.75)		(-32.5 ✓)	
	EL -19	(1.5 x 22.75) + (19.87 x 10.5 x 1/2) ✓ ✓ ✓ ✓ ✓	138.4 ✓	15.1 ✓	2090 ✓	-69.0 ✓	-9550 ✓
		12 ✓ x 50.75 ✓	609 ✓	48.1 ✓	29293 ✓	-71.0 ✓	-43239 ✓
		1421.5 ✓	1421.5 ✓	50 ✓	71075 ✓	-95 ✓	-135043 ✓
		Lakeside	Total @-19 (2168.9 ✓)	(47.24) ✓	(102458 ✓)	(-86.60 ✓)	(-187832 ✓)
	2.5' Avg Diff	138.4 ✓	138.4 ✓	17.0 ✓	2353 ✓	-68.0 ✓	-9411 ✓
		609 ✓	609 ✓	48.1 ✓	29293 ✓	-69.0 ✓	-42021 ✓
			Total @2.5 diff (747.4 ✓)	(42.34) ✓	(31646) ✓	(-68.81 ✓)	(-51432) ✓
	EL -24	36.5 ✓ x 65 ✓	Total @-24 (2372.5 ✓)	(91.75 ✓)		(-32.5 ✓)	
	EL -19	(14.7 ✓ x 12 ✓ x 1/2) + 4.7 ✓	92.3 ✓	90.5 ✓	8353 ✓	-69 ✓	-6369 ✓
		12.6 ✓ x 12 ✓	151.2 ✓	79.8 ✓	12066 ✓	-71 ✓	-10735 ✓
		15.5 ✓ x 8 ✓	124 ✓	77.5 ✓	9610 ✓	-82 ✓	-10168 ✓
		41 ✓ x 3 ✓	123 ✓	64 ✓	7872 ✓	-107 ✓	-13161 ✓
		Lockside	Total @-19 (490.5 ✓)	(77.27) ✓	(37901) ✓	(-82.43 ✓)	(-40433 ✓)
	2.5 Avg Diff	92.3 ✓	92.3 ✓	89.2 ✓	8233 ✓	-68 ✓	-6276 ✓
		151.2 ✓	151.2 ✓	79.8 ✓	12066 ✓	-69 ✓	-10433 ✓
			Total @ 2.5 diff (243.5 ✓)	(83.24) ✓	(20299 ✓)	(-68.62 ✓)	(-16709 ✓)

Computed by RGP Date 3/15/73
Checked by RGP Date 3/16/73
Reviewed by ____ Date ____
Approved by ____ Date ____

SUMMARY OF WATER LOADS BASED UPON 50% OF STRUCTURE

Job No. 4671 Page No. 3B-116
Subject STRUCTURAL
GATE BAY LOADS
LAKESIDE
Sheet No. 6 of ____

			Area (ft²)	I+II1 Press	I+II1 Force	I+II1 x	I+II1 Moment	I+II2 Press	I+II2 Force	I+II2 x	I+II2 Moment	I+II3 Press	I+II3 Force	I+II3 x	I+II3 Moment	I+II4 Press	I+II4 Force	I+II4 x	I+II4 Moment
WATER LOAD																			
Outside Gate Bay	Lockside		43.8	1.280	56k	81	4536	1.152	50k		4050	1.152	50k		4050	1.280	56k		4536
	Lakeside		42.8	.608	26	19	494	.480	21		399	0.608	26		494	.764	30		570
Inside Gate Bay	Lockside		2051.7	1.280	2686	90.02	236393	1.152	2364		212807	1.152	2364		212807	1.280	2686		236393
	Lakeside		6573	.608	3996	43.47	173706	.480	3155		137148	0.608	3996		173706	.764	4627		201136
					6704	61.92	415129		5590	63.40	354404		6436	60.76	391057		7339	60.31	442635
UPLIFT	Lockside																		
	EL -24		2372.5	1.92	4555	91.75	417921	1.792	4252		390121	1.792	4252		390121	1.92	4555		417921
	EL -19		490.5	1.60	785	77.27	60657	1.472	722		55789	1.472	722		55789	1.60	785		60657
	2.5' diff		243.5	0.160	39	83.36	3251	0.160	39		3251	0.160	39		3251	0.160	39		3251
					5379	89.58	481829		5013	89.60	449161		5013	89.60	449161		5379	89.58	481829
	Lakeside																		
	EL -24		4777.5	1.248	5962	36.75	219104	1.120	5351		196649	1.248	5962		219104	1.34	6421		235972
	EL -19		2162.9	0.928	2013	47.24	95094	0.800	1735		81961	0.928	2013		95094	1.02	2221		104920
	2.5' diff		747.4	0.160	120	42.34	5081	0.160	120		5081	0.160	120		5081	0.160	120		5081
					8095	39.44	319279		7206	39.37	283691		8095	39.44	319279		8762	39.49	345973
LATERAL PRESSURE		Length				y													
	Lockside																		
		65'		28.8k/ft	1872	10.00	18720	25.088	1631	9.33	15217	25.088	1631	9.33	15217	28.8	1872	10.00	18720
		12'		24.4	293	11.67	3419	21.008	252	11.00	2772	21.008	252	11.00	2772	24.4	293	11.67	3419
		42.5'		20.0 k/ft	890	13.33	11864	16.928	753	12.67	9541	16.928	753	12.67	9541	20.0	890	13.33	11864
					3055	11.13	34003		2636	10.44	27530		2636	10.44	27530		3055	11.13	34003
	Lakeside	65'		12.168	791	6.5	5142	9.800	637	5.83	3714	12.168	791	6.5	5142	14.12	917	7.00	6419
		10'		9.448	113	8.17	923	7.400	89	7.50	668	9.448	113	8.17	923	11.52	134	8.67	1162
		44.5'		6.728	299	9.83	2939	5.000	223	9.17	2045	6.728	299	9.83	2939	8.22	365	10.33	3770
					1203	7.48	9004		949	6.77	6427		1203	7.48	9004		1416	8.02	11351
	WATER + SOIL	Lockside			3244	10.98	35613		2825	10.32	29140		2825	10.32	29140		3244	10.98	35613
		Lakeside			1419	7.49	10635		1165	6.92	8058		1419	7.49	10635		1632	11.14 / 7.95	12982

Computed by RGP Date 3/15/73
Checked by KTBecker Date 3/16/73
Reviewed by ____ Date ____
Approved by ____ Date ____

SUMMARY OF WATER LOADS
BASED UPON 50% OF STRUCTURE

Job No. 4671 Page No. 38-117
Subject STRUCTURAL
GATE BAY LOADS
LAKESIDE
Sheet No. 7 of ____

WATER LOAD		Area (□')	I+II 6A Press	Force	x	Moment	I+II 6B Press	Force	x	Moment	I+II 7 Press	Force	x	Moment	I+II 8 Press	Force	x	Mom
Outside Gate Bay	Lakeside	43.8	0.704	31^k	81	2511	0.704	31^k		2511	0.992	43^k		3483	1.216	53^k	81	42
	Lakeside	42.8	1.280	55^k	19	1045	1.50-.704	64		1216	0.992	42		792	1.216	52	19	9
Inside Gate Bay	Lockside	2051.7	0.704	1444	90.02	129989	0.704	1444		129989	0.992	2035		2018	1.216×39.16	476	55	26
	Lakeside	657.3	1.280	841.3	83.47	70213	1.50-.704	979		429440	0.992	652.0		646.8				
				9943	50.21	499258		11418	49.32	563156		8610	54.50	469		581	54.15	314
UPLIFT Lockside																		
El -24		2372.5	1.344	3189	91.75	292591	1.344	3189		292591	1.632	3872		6318	1.256	4402		413
El -19		490.5	1.024	502	77.29	38790	1.024	502		38790	1.312	644		845	1.536	753		58
2.5' diff		243.5	0.160	39	83.36	3251	0.160	39		3251	0.160	39		6.2	0.160	39		3
				3730	89.71	334632		3730	89.71	334632		4555		7167		5175		465
Lakeside																	89.59	
El -24		4777.5	1.92	9173	36.75	337108	1.92-0	9173		337108	1.632	7797		12723	1.856	8867		825
El -19	2168.9		1.60	3470	47.24	163923	1.60-0	3470		165923	1.312	2806		3681	1.536	3331		127
2.5' diff		747.4	0.16	120	42.32	5081	0.16-0	120		5081	0.160	120		50.1	0.160	100		5
				12763	39.65	506112		12763	39.65	506112		10763		23046		12315		1122
														89.59			39.64	
LATERAL PRESSURE		Length																
Lockside		121.5'																
		65'	14.112	917	7.00	6419	14.112	917	7.00	6419					1749	9.69		169
		12'	11.152	134	8.67	1162	11.152	134	8.67	1162					272	11.5		31
		44.5'	8.192	364	10.33	3772	8.192	364	10.33	3772					820	13		106
				1416	8.02	11351		1416	8.02	11351					2841	10.81		307
Lakeside		65'	22.8	1272	10.00	12720	36.0-13.2	2391	11.5	27525					1749	9.67		
		10'	24.4	293	11.60	3419	31.6-13.2	379	12.58	4957					272	11.5		
		44.5'	20.0	890	13.33	11866	26.5-13.2	1192	14.70	17522					820	13		
				3055	11.13	34003		3940	12.59	49604					2841	10.81		3070
					5.09				8.02									
WATER + SOIL	Lockside			1605	7.5	12961		1605	8.05	12961					3030	10.66		323
	Lakeside			3271	10.99	35934		4156	10.33	51235					3057	10.58		323

Computed by RJBechler Date 3/16/73
Checked by RGP Date 3/16/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Job No. 4671 Page No. 3B-118
Subject STRUCTURAL GATE BAY LOADS LAKESIDE
Sheet No. 8 of ____

LOADS LISTED ARE FOR 50% OF STRUCTURE

LOAD SUMMARY AT EL -24.0 and ℄ BASE SLAB

I + II1

	↑+ Vert Force (k)	→+ Horiz Forces (k)	−℄+ Arm (ft)	↶+ Moment (ft-k)
DL	-18086		-0.34	+6149
Water Load	- 6704		+ 6.92	-46392
Uplift	+5379		+34.58	+186006
	+8095		-15.56	-125958
Lateral Load		- 3055	——	+34003
		+1203	——	- 9004
Soil		45	——	- 36
	-11316	-1807		+44768

I + II2

V.F.	H.F.	Arm	M
-18086		-0.34	+6149
- 5590		+8.40	-46956
+5013		+34.60	+173450
+7206		-15.63	-112630
	-2636	——	+27530
	+1249	——	- 6427
	+45	——	- 36
-11457	-1642		+41050

I + II3

V.F	H.F	Arm	Moment
-18086		-0.34	+6149
- 6436		+5.76	-37071
+5013		+34.60	+173450
+8098		-15.56	-125958
	-2636	——	+27530
	+1203	——	- 9006
	+45	——	- 36
-11414	-1388		+35060

I + II4

-18086		-0.34	+6149
- 7339		+5.31	-38970
+5379		+34.58	+186006
+8762		-15.51	-135899
	-3055	——	+34003
	+1416	——	-11351
	+45	——	- 36
-11284	- 1594		+39902

I + II6A

-18086		-0.34	+6149
- 9943		- 4.79	+47627
+3730		+34.71	+129468
+12763		-15.35	-195912
	-1416	——	+11351
	+3955	——	-34003
	+45	——	- 36
-11536	+1674		-35356

I + II6B

-18086		-0.34	+6149
-11418		-5.68	+64854
+3730		+34.71	+129468
+12763		-15.35	-195912
	- 1416	——	+11351
	+3940	——	-49604
	+45	——	- 36
-13011	+2569		-33730

I + II7 (I+II5 SAME)

-18086		-0.34	+6149
- 8640		-0.50	+4320
+4555		+34.63	+157740
+10763		-15.41	-165858
	0	——	0
	0	——	0
	+45	——	-36
-11408	+45		+2315

I + II6

-17829 (Gate Removed)		-0.29	+5170
- 581		-0.85	+ 494
+5195		+31.59	+177695
+12318		-15.36	-189204
	0	——	0
	0	——	0
	+45		-36
-536.8 (Neglect Air Cylinders)		0	0
-1434	+45		-3981

Construction Condition A

Area Dewatered, Case I w/o backfill
No Water Load, Gate in open position

-18040	- 0.38	+ 5057

Construction Condition B

Area Dewatered, Case I w/ backfill
No Water Load, Gate in open position

-18137		-0.30	+5241
	+96		-76
-18137	+96		+5365

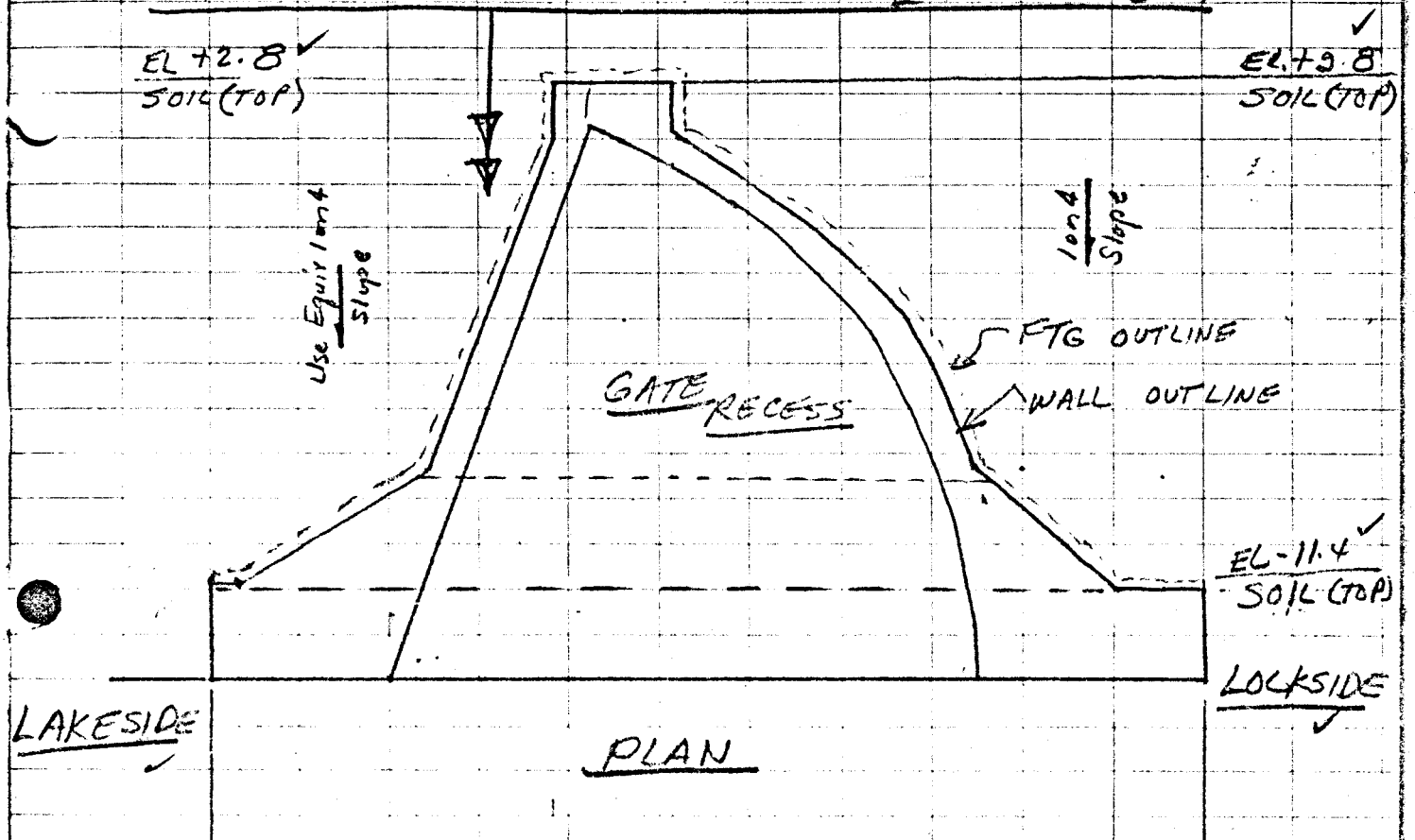
Job No. 4671 Page No. 3B-119

Computed by RGP Date 3-26-73
Checked by RJ Becker Date 3/30/73
Reviewed by Date
Approved by Date 5

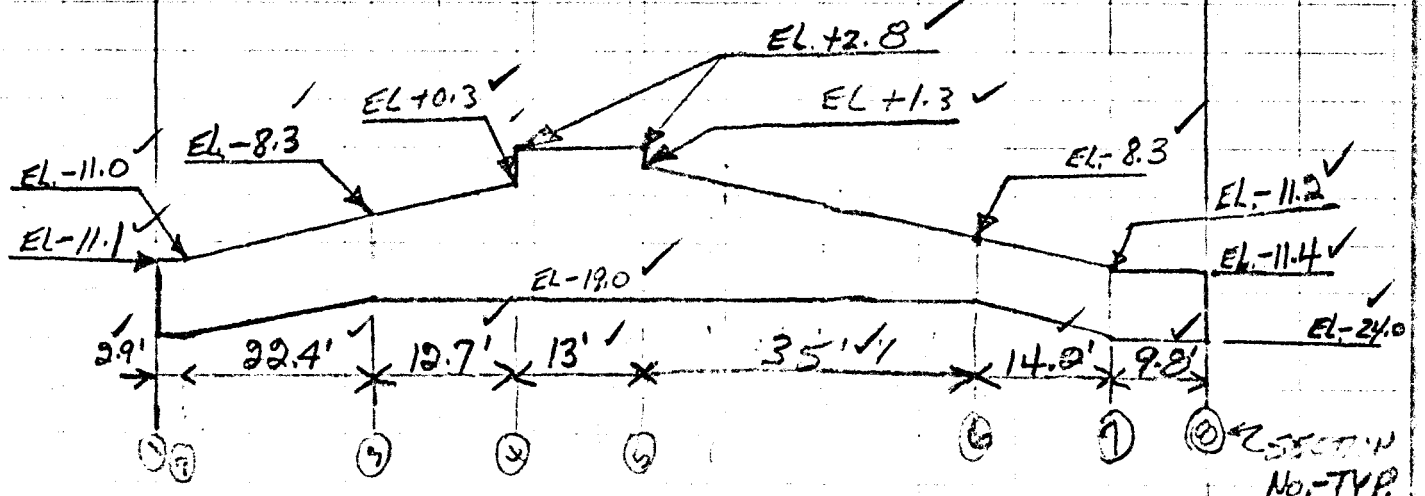
Subject STRUCTURAL
GATE BAY LOADS
LAKESIDE

Sheet No. of

SOIL LATERAL LOAD ⊥ to ℄ OF LOCK



PLAN



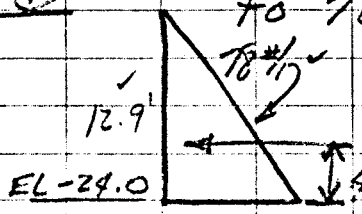
ELEVATION OF SURFACE SUBJECT TO SOIL LATERAL PRESSURE

Computed by RGP Date 3-26-73
Checked by [illegible] Date 3/30/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Job No. 4671 Page No. 3B-120
Subject STRUCTURAL
GATE BAY LOADS
LAKESIDE
Sheet No. ____ of ____

USE "AT REST" PRESSURE 66 psf/ft and with 1 on 4 slope increase to 78 #/ft

SECTION (1)



$R = \frac{78(12.9)}{2} = 6490\#$ @ EL. -19.7'

SECTION (2) $R = \frac{78(13)^2}{2} = 6591\#$ @ EL -19.7'

SECTION (3) $R = \frac{78(10.7)^2}{2} = 4465\#$ @ EL. -15.4

SECTION (4L) $R = \frac{78(19.3)^2}{2} = 14527\#$ @ EL -19.6

SECTION (4R) $R = 39(21.8)^2 = 18534\#$ @ EL -11.7

SECTION (5L) $R = 39(21.8)^2 = 18534\#$ @ EL -11.7

SECTION (5R) $R = 39(20.3)^2 = 16072\#$ @ EL -12.2

SECTION (6) $R = 39(10.7)^2 = 4465\#$ @ EL -15.4

SECTION (7) $R = 39(12.8)^2 = 6390\#$ @ EL -19.7

SECTION (8) $R = 39(12.6)^2 = 6192\#$ @ EL -19.8

Computed by RGP Date 3-26-73
Checked by RBecker Date 3/30/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Job No. 4671 Page No. 3B-121
Subject STRUCTURAL GATE BAY LOADS LAKESIDE
Sheet No. ____ of ____

Σ Forces & Moments @ EL. -24.0

Force per foot @ SECTION / AVG	Distance	Total Force	Arm above EL -29.0	MOMENT
1 6490 ✓				
6541 ✓	2.9 ✓	18900 ✓	4.3 ✓	81300 ✓
2 6591 ✓				
5528 ✓	22.4 ✓	123800 ✓	6.1 ✓	755200 ✓
3 4465 ✓				
9496 ✓	12.7 ✓	120600 ✓	10.4 ✓	1254200 ✓
✓ 14527 ✓				
18534 ✓	13.0 ✓	240900 ✓	12.3 ✓	2963100 ✓
5 16072 ✓				
10268 ✓	35.0 ✓	359400 ✓	10.7 ✓	3845600 ✓
4 4465 ✓				
5428 ✓	14.2 ✓	77100 ✓	6.4 ✓	493400 ✓
6390 ✓				
6291 ✓	9.8 ✓	61700 ✓	4.3 ✓	265300 ✓
6192 ✓				
		1,002,400 #. ✓		9,658,100 ✓ #.

$\bar{y} = 9.6'$ ✓

Soil Saturated ΣH 1009.4^k ✓ @ EL -14.4' ✓

Soil Submerged ΣH 467.8^k ✓ @ EL -14.4 ✓

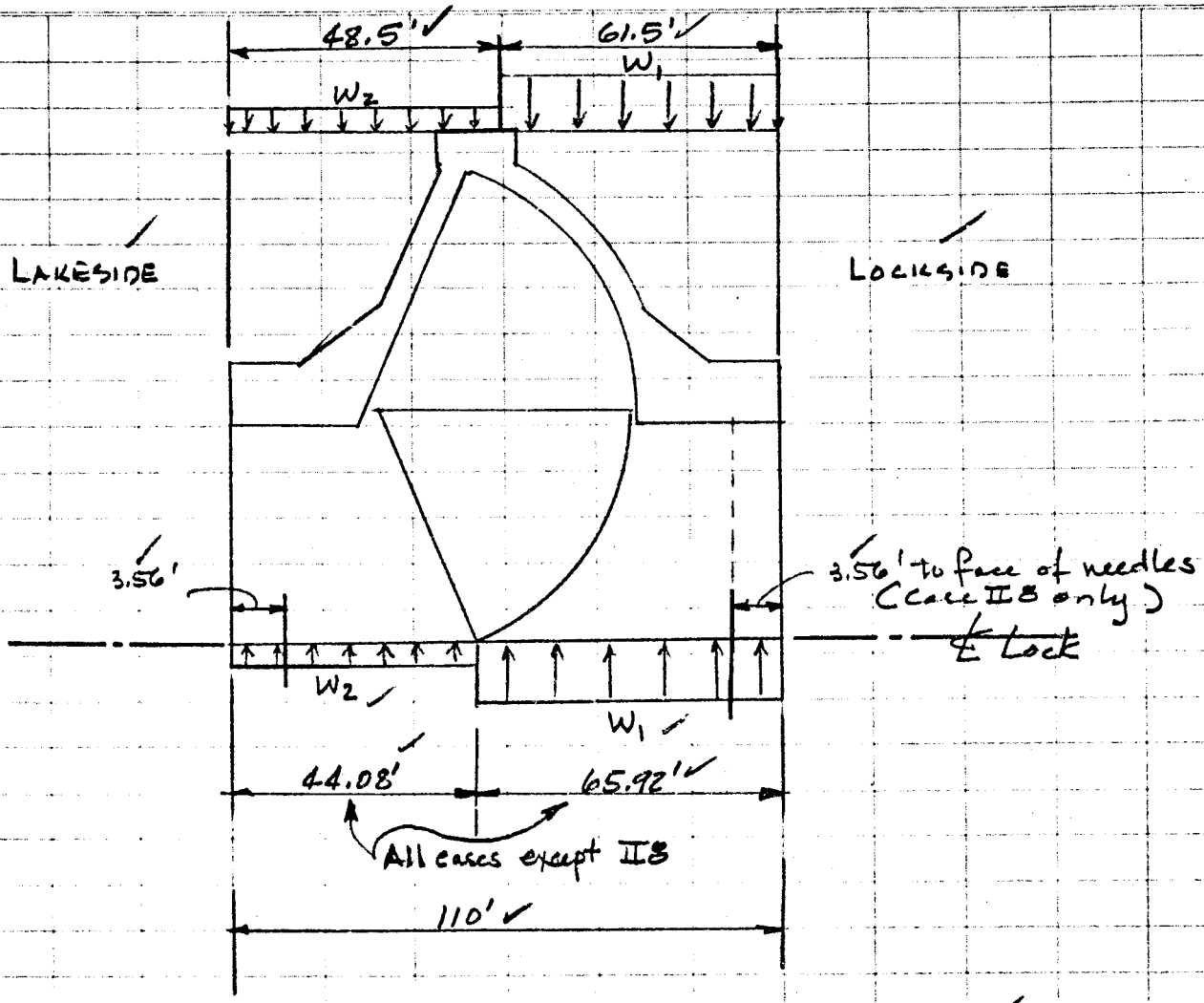
(30.8/66) = 0.466

Job No. 4671 Page No. 3B-122

Computed by R J Becker Date 3/27/73
Checked by RGP Date 3-28-73
Reviewed by _____ Date _____
Approved by KGP Date 5-73

Subject STRUCTURAL
GATE BAY LOADS
LAKESIDE

Sheet No. _____ of _____



WATER LOAD DIAGRAM (DIRECTION OF Z AXIS)

Job No. 4671 Page No. 3B-123

Computed by RJBecker Date 3/27/73
Checked by KOP Date 3-28-73
Reviewed by ____ Date ____
Approved by ____ Date 5-7-73

Subject STRUCTURAL
GATE BAY LOADS
LAKESIDE

Sheet No. ____ of ____

WATER LOAD (HORIZONTAL) "L" TO LOCK

	Load/Ft × Length of loaded area	Force (k)	Arm (ft)	Moment (ft-k) @ EL-24	
I+II1	28.8 × 61.5	1771	10.0	17710	
	12.168 × 48.5	590	6.5	3835	
	−1.28 × 20/2 × 65.92	−844	16.67	−14069	
	−0.608 × 9.5/2 × 44.08	−127	13.17	−1673	
		1390	4.18	5803	WATER
		1858	5.55	10310	WATER + SOIL
I+II2	25.088 × 61.5	1543	9.33	14396	
	9.80 × 48.5	475	5.83	2769	
	−1.152 × 18/2 × 65.12	−683	16.0	−10928	
	−0.480 × 7.5/2 × 44.08	−79	12.5	−988	
		1256	4.18	5249	WATER
		1724	5.66	9756	WATER + SOIL
I+II3	25.088 × 61.5	1543	9.33	14396	
	12.168 × 48.5	590	6.5	3835	
	−1.152 × 18/2 × 65.92	−683	16.0	−10928	
	−0.608 × 9.5/2 × 44.08	−127	13.17	−1673	
		1323	4.26	5630	WATER
		1791	5.66	10137	WATER + SOIL
I+II4	28.8 × 61.5	1771	10.00	17710	
	14.112 × 48.5	684	7.00	4788	
	−1.280 × 20/2 × 65.92	−844	16.67	−14069	
	−0.704 × 11/2 × 44.08	−171	13.67	−2338	
		1440	4.23	6091	WATER
		1908	5.55	10598	WATER + SOIL
I+II6A	14.112 × 61.5	868	7.00	6076	
	28.8 × 48.5	1397	10.00	13970	
	−0.704 × 11/2 × 65.92	−255	13.67	−3486	
	−1.280 × 20/2 × 44.08	−564	16.67	−9402	
		1446	4.95	7158	WATER
		1914	~~6.45~~ 6.09	11665	WATER + SOIL

Job No. 4671 Page No. 3B-124

Computed by R.J. Becker Date 3/29/73
Checked by RGP Date 3-28-73
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Approved by Date 5-7-73

Subject STRUCTURAL
GATE DAM LOADS
LAKESIDE

Sheet No. of

		Force	Arm	Moment @ El-24	
I+IIGB	14.112 × 61.5	868	7.00	6076	
	36.453 × 48.5	1768	11.45	20244	
	−0.704 × 11½ × 65.92	−255	13.67	−3486	
	−(1.503 − .3513) × 20½ × 44.08	−508	16.67	−8468	
	−0.3513 × 20 × 44.08	−310	20.00	−6200	
		1563K	6.22	8166	WATER
		2031	6.24	12673	WATER+SOIL
I+IIB					
	1.856 × 29½ × .110	2960	9.67	28623	
	1.216 × 19½ × 3.56 × 2	− 82	16.33	−1339	
		2878	9.48	27284	WATER
		3346	9.50	31791	WATER+SOIL

Computed by RGP Date 3-29-73
Checked by WJF Date 4/3/73
Reviewed by ____ Date ____
Approved by ____ Date ____

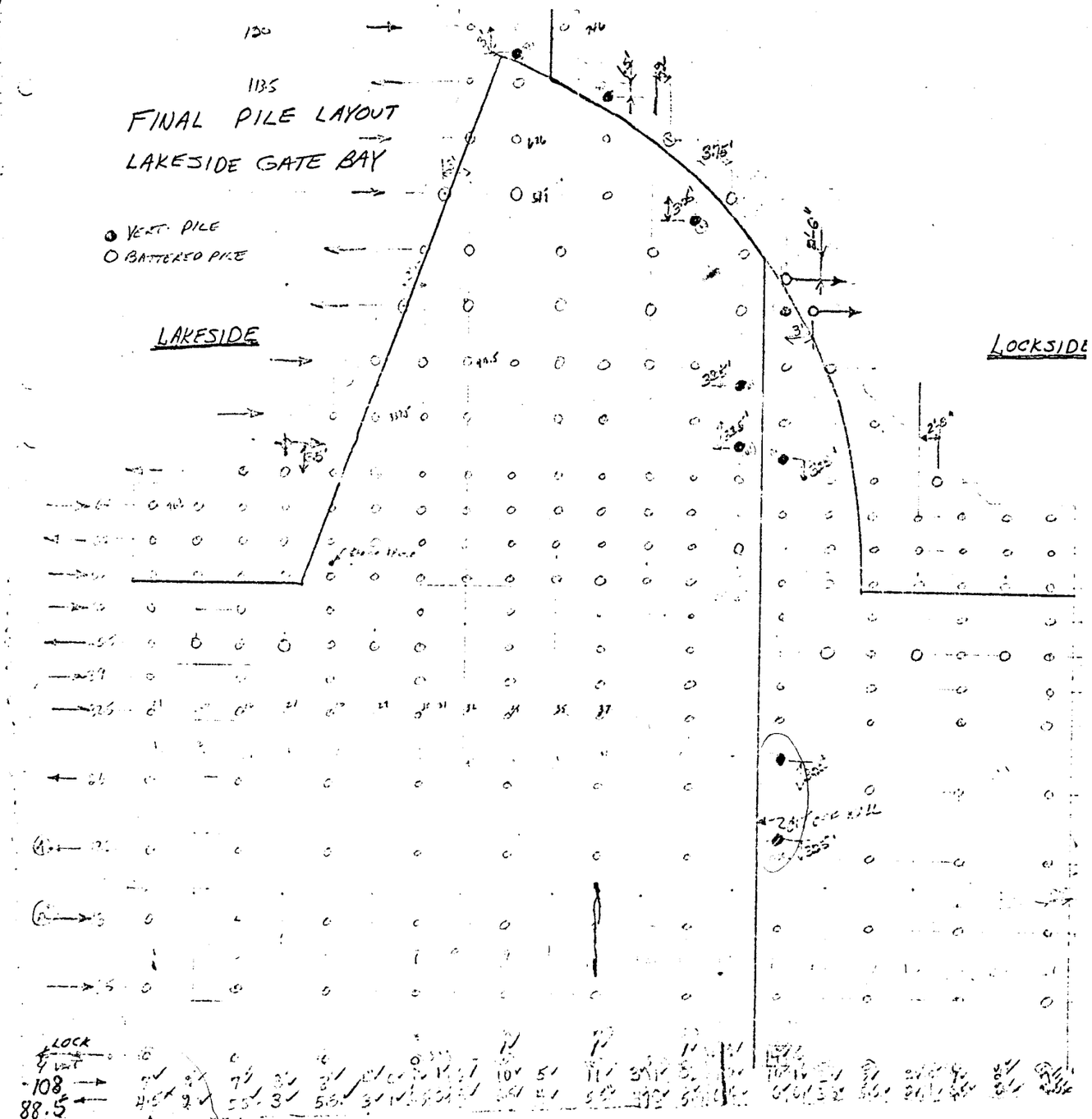
LOCATION OF C.G. WATER LOAD AND UPLIFT FROM ℄ OF LOCK. (LOADS ARE FOR 50% OF STRUCTURE)

Job No. 467 Page No. 3B-125
Subject STRUCTURAL GATE BAY LOADS LAKESIDE
Sheet No. ____ of ____

	Area	II1 Force	Arm	II1 Moment @ ℄ Lock	II2 Force	II2 Moment @ ℄ Lock	II3 Force	II3 Moment @ ℄ Lock	II4		II6A	
WATER LOAD												
OUTSIDE GATE BAY - Lockside	43.8 ✓	56 ✓	93. ✓	5208 ✓	50 ✓	4650 ✓	50 ✓	4650 ✓	56 ✓	5208 ✓	31 ✓	2883 ✓
Lakeside	42.8 ✓	26 ✓	94. ✓	2444 ✓	21 ✓	1974 ✓	26 ✓	2444 ✓	30 ✓	2820 ✓	55 ✓	5170 ✓
INSIDE GATE BAY - Lockside	205.7 ✓	2626 ✓	23.40 ✓	61448 ✓	2364 ✓	55318 ✓	2364 ✓	55318 ✓	2626 ✓	61448 ✓	1444 ✓	33790 ✓
- Lakeside	657.3 ✓	3996 ✓	48.76 ✓	194845 ✓	3155 ✓	153838 ✓	3996 ✓	194845 ✓	11697 ✓	995613 ✓	8413 ✓	410218 ✓
TOTAL - WATER LOAD		6704 ✓	-39.37 ✓	-263945 ✓	5590 ✓	-215780 ✓	6436 ✓	-257257 ✓	7339 ✓	-875087 ✓	9443 ✓	-452061 ✓
					-38.60 ✓		-39.97 ✓		-41.21 ✓		-47.81 ✓	
UPLIFT												
Lockside El-24	237.5 ✓	4555 ✓	-32.50 ✓	148038 ✓	4252 ✓	138190 ✓	4252 ✓		4555 ✓		3189 ✓	103643 ✓
-19	490.5 ✓	785 ✓	-89.43 ✓	64708 ✓	722 ✓	59514 ✓	722 ✓		785 ✓		502 ✓	41380 ✓
2.5' Aff.	28.5 ✓	39 ✓	-68.62 ✓	2676 ✓	39 ✓	2676 ✓	39 ✓		39 ✓		39 ✓	2676 ✓
		5379 ✓	-40.05 ✓	+215402 ✓	5013 ✓	+200380 ✓	5013 ✓	+200380 ✓	5379 ✓	+215402 ✓	3730 ✓	+147699 ✓
					-39.97 ✓		-39.97 ✓		-40.05 ✓		-39.60 ✓	
LAKESIDE El-24	477.5 ✓	5962 ✓	-32.50 ✓	193765 ✓	5351 ✓	173908 ✓	5962 ✓		6421 ✓	208683 ✓	9173 ✓	298193 ✓
-19	216.9 ✓	2013 ✓	-86.60 ✓	174326 ✓	1735 ✓	150251 ✓	2013 ✓		2221 ✓	192339 ✓	3470 ✓	300502 ✓
2.5' Aff.	24.4 ✓	120 ✓	-68.31 ✓	8257 ✓	120 ✓	8257 ✓	120 ✓		120 ✓	8257 ✓	120 ✓	8257 ✓
		8095 ✓	-46.49 ✓	+376348 ✓	7206 ✓	+332416 ✓	8095 ✓	+376348 ✓	8762 ✓	+409279 ✓	12763 ✓	+583832 ✓
					-46.13 ✓		-46.49 ✓		-46.71 ✓		-45.75 ✓	
TOTAL UPLIFT		13474 ✓	-43.92 ✓	+591770 ✓	12219 ✓	+532796 ✓	13108 ✓	+576728 ✓	14141 ✓	+624701 ✓	16493 ✓	+454581 ✓
					-43.60 ✓		-44.00 ✓		-44.18 ✓		-45.75 ✓	

	II-6B		II7		II8	
WATER LOAD						
OUTSIDE GATE BAY - Lockside	31 ✓	-93. ✓ 2883 ✓	43 ✓	3999 ✓	53 ✓	4929 ✓
- Lakeside	64 ✓	-94. ✓ 6016 ✓	42 ✓	3948 ✓	52 ✓	4888 ✓
INSIDE GATE BAY - Lockside	1444 ✓	-23.4 ✓ 33790 ✓	2035 ✓	47619 ✓	476 ✓	-27.5 ✓ 13090 ✓
- Lakeside	9279 ✓	-32.4 ✓ 301700 ✓	6520 ✓	317915 ✓		
	11418 ✓	-46.93 ✓ -526599 ✓	8630 ✓	-438 ✓ -373 ✓	581 ✓	-39.43 ✓ -22 ✓
UPLIFT Lockside El-24.0	3189 ✓	-32.50 ✓ 103643 ✓	3272 ✓	125840 ✓	4403 ✓	143
21.-19.0	502 ✓	-89.43 ✓ 41380 ✓	644 ✓	53035 ✓	753 ✓	62
2.5' Aff	39 ✓	-68.62 ✓ 2676 ✓	39 ✓	2676 ✓	39 ✓	2
TOTAL UPLIFT		-45.75 ✓ +754581 ✓				
LAKESIDE El-24.0						
21-19.0						
2.5' Aff						

3B-126



LAKESIDE PILING LAYOUT
FOR COMPUTER ANALYSIS

JOB 4671-02 RIGOLETS LOCK

3B-127

LAKESIDE GATE BAY PILING

THREE DIMENSIONAL PILE GROUP (RIGID HEADSTOCK)

GEOMETRY OF PILE GROUP

PILE	XI	YI	ZI	XJ	YJ	ZJ	AREA	E	G	IXX	IYY	KS
1	-54.5	-8.0	-10.0	-52.5	0.0	-10.0	96.7	29000.	11200.	3303.0	1179.0	18.0
2	-49.3	-8.0	-10.0	-47.3	0.0	-10.0	43.0	29000.	11200.	1468.0	524.0	8.0
3	-44.0	-8.0	-10.0	-42.0	0.0	-10.0	118.2	29000.	11200.	4037.0	1441.0	22.0
4	-38.8	-8.0	-10.0	-36.8	0.0	-10.0	64.5	29000.	11200.	2202.0	786.0	12.0
5	-33.5	-8.0	-10.0	-31.5	0.0	-10.0	118.2	29000.	11200.	4037.0	1441.0	22.0
6	-28.3	-8.0	-10.0	-26.3	0.0	-10.0	64.5	29000.	11200.	2202.0	786.0	12.0
7	-25.5	-8.0	-10.0	-23.5	0.0	-10.0	21.5	29000.	11200.	734.0	262.0	4.0
8	-23.0	-8.0	-10.0	-21.0	0.0	-10.0	139.7	29000.	11200.	4771.0	1703.0	26.0
9	-17.8	-8.0	-10.0	-15.8	0.0	-10.0	107.5	29000.	11200.	3670.0	1310.0	20.0
10	-12.5	-8.0	-10.0	-10.5	0.0	-10.0	139.7	29000.	11200.	4771.0	1703.0	26.0
11	-7.3	-8.0	-10.0	-5.3	0.0	-10.0	86.0	29000.	11200.	2936.0	1048.0	16.0
12	-2.0	-8.0	-10.0	0.0	0.0	-10.0	118.2	29000.	11200.	4037.0	1441.0	22.0
13	3.3	-8.0	-10.0	5.3	0.0	-10.0	86.0	29000.	11200.	2936.0	1048.0	16.0
14	8.5	-8.0	-10.0	10.5	0.0	-10.0	118.2	29000.	11200.	4037.0	1441.0	22.0
15	13.8	-8.0	-10.0	15.8	0.0	-10.0	86.0	29000.	11200.	2936.0	1048.0	16.0
16	21.0	-8.0	-10.0	9999.9	0.0	0.0	86.0	29000.	11200.	2936.0	1048.0	16.0
17	24.3	-8.0	-10.0	26.3	0.0	-10.0	75.2	29000.	11200.	2569.0	917.0	14.0
18	29.5	-8.0	-10.0	31.5	0.0	-10.0	118.2	29000.	11200.	4037.0	1441.0	22.0
19	34.8	-8.0	-10.0	36.8	0.0	-10.0	43.0	29000.	11200.	1468.0	524.0	8.0
20	37.5	-8.0	-10.0	39.0	0.0	-10.0	21.5	29000.	11200.	734.0	262.0	4.0
21	40.0	-8.0	-10.0	42.0	0.0	-10.0	96.7	29000.	11200.	3303.0	1179.0	18.0
22	45.3	-8.0	-10.0	47.3	0.0	-10.0	43.0	29000.	11200.	1468.0	524.0	8.0
23	50.5	-8.0	-10.0	52.5	0.0	-10.0	96.7	29000.	11200.	3303.0	1179.0	18.0
24	-50.5	-8.0	0.0	-52.5	0.0	0.0	301.0	29000.	11200.	10276.0	3668.0	56.0
25	-45.3	-8.0	0.0	-47.3	0.0	0.0	86.0	29000.	11200.	2936.0	1048.0	16.0
26	-40.0	-8.0	0.0	-42.0	0.0	0.0	301.0	29000.	11200.	10276.0	3668.0	56.0
27	-34.8	-8.0	0.0	-36.8	0.0	0.0	129.0	29000.	11200.	4404.0	1572.0	24.0
28	-29.5	-8.0	0.0	-31.5	0.0	0.0	344.0	29000.	11200.	11744.0	4192.0	64.0
29	-24.3	-8.0	0.0	-26.3	0.0	0.0	172.0	29000.	11200.	5872.0	2096.0	32.0
30	-19.0	-8.0	0.0	-21.0	0.0	0.0	387.0	29000.	11200.	13212.0	4716.0	72.0
31	-14.8	-8.0	0.0	-18.8	0.0	0.0	43.0	29000.	11200.	1468.0	524.0	8.0
32	-13.5	-8.0	0.0	-15.8	0.0	0.0	258.0	29000.	11200.	8808.0	3144.0	48.0
33	-10.5	-8.0	0.0	9999.9	0.0	0.0	43.0	29000.	11200.	1468.0	524.0	8.0
34	-8.5	-8.0	0.0	-10.5	0.0	0.0	430.0	29000.	11200.	14680.0	5240.0	80.0
35	-2.3	-8.0	0.0	-5.3	0.0	0.0	215.0	29000.	11200.	7240.0	2620.0	40.0
36	0.0	-8.0	0.0	9999.9	0.0	0.0	43.0	29000.	11200.	1468.0	524.0	8.0
37	2.0	-8.0	0.0	0.0	0.0	0.0	473.0	29000.	11200.	16148.0	5764.0	88.0
38	7.3	-8.0	0.0	5.3	0.0	0.0	129.0	29000.	11200.	4404.0	1572.0	24.0
39	9.2	-8.0	0.0	7.2	0.0	0.0	43.0	29000.	11200.	1468.0	524.0	8.0
40	10.5	-8.0	0.0	9999.9	0.0	0.0	43.0	29000.	11200.	1468.0	524.0	8.0
41	12.8	-8.0	0.0	10.8	0.0	0.0	387.0	29000.	11200.	13212.0	4716.0	72.0
42	16.2	-8.0	0.0	14.2	0.0	0.0	43.0	29000.	11200.	1468.0	524.0	8.0
43	18.8	-8.0	0.0	9999.9	0.0	0.0	86.0	29000.	11200.	2936.0	1048.0	16.0
44	23.0	-8.0	0.0	21.0	0.0	0.0	430.0	29000.	11200.	14680.0	5240.0	80.0
45	26.0	-8.0	0.0	24.0	0.0	0.0	43.0	29000.	11200.	1468.0	524.0	8.0
46	29.3	-8.0	0.0	26.3	0.0	0.0	172.0	29000.	11200.	5872.0	2096.0	32.0
47	33.5	-8.0	0.0	31.5	0.0	0.0	344.0	29000.	11200.	11744.0	4192.0	64.0
48	38.8	-8.0	0.0	36.8	0.0	0.0	86.0	29000.	11200.	2936.0	1048.0	16.0
49	44.0	-8.0	0.0	42.0	0.0	0.0	301.0	29000.	11200.	10276.0	3668.0	56.0

50	49.3	-8.0	0.0	47.3	0.0	0.0	86.0	29000.	11200.	2936.0	1048.0	16.0
51	54.3	-8.0	0.0	52.5	0.0	0.0	301.0	29000.	11200.	10276.0	2668.0	56.0
52	-54.5	-8.0	10.0	-52.5	0.0	10.0	96.7	29000.	11200.	3303.0	1179.0	18.0
53	-49.3	-8.0	10.0	-47.3	0.0	10.0	43.0	29000.	11200.	1468.0	524.0	8.0
54	-44.0	-8.0	10.0	-42.0	0.0	10.0	118.2	29000.	11200.	4037.0	1441.0	22.0
55	-38.8	-8.0	10.0	-36.8	0.0	10.0	64.5	29000.	11200.	2202.0	786.0	12.0
56	-33.5	-8.0	10.0	-31.5	0.0	10.0	118.2	29000.	11200.	4037.0	1441.0	22.0
57	-28.3	-8.0	10.0	-26.3	0.0	10.0	64.5	29000.	11200.	2202.0	786.0	12.0
58	-25.5	-8.0	10.0	-23.5	0.0	10.0	21.5	29000.	11200.	734.0	262.0	4.0
59	-23.0	-8.0	10.0	-21.0	0.0	10.0	139.7	29000.	11200.	4771.0	1703.0	26.0
60	-17.8	-8.0	10.0	-15.8	0.0	10.0	107.5	29000.	11200.	3670.0	1310.0	20.0
61	-12.5	-8.0	10.0	-10.5	0.0	10.0	139.7	29000.	11200.	4771.0	1703.0	26.0
62	-7.3	-8.0	10.0	-5.3	0.0	10.0	86.0	29000.	11200.	2936.0	1048.0	16.0
63	-2.0	-8.0	10.0	0.0	0.0	10.0	118.2	29000.	11200.	4037.0	1441.0	22.0
64	3.3	-8.0	10.0	5.3	0.0	10.0	86.0	29000.	11200.	2936.0	1048.0	16.0
65	8.5	-8.0	10.0	10.5	0.0	10.0	118.2	29000.	11200.	4037.0	1441.0	22.0
66	13.8	-8.0	10.0	15.8	0.0	10.0	86.0	29000.	11200.	2936.0	1048.0	16.0
67	21.0	-8.0	10.0	9999.9	0.0	0.0	86.0	29000.	11200.	2936.0	1048.0	16.0
68	24.3	-8.0	10.0	25.3	0.0	10.0	75.2	29000.	11200.	2569.0	917.0	14.0
69	29.5	-8.0	10.0	31.5	0.0	10.0	118.2	29000.	11200.	4037.0	1441.0	22.0
70	34.8	-8.0	10.0	36.8	0.0	10.0	43.0	29000.	11200.	1468.0	524.0	8.0
71	37.0	-8.0	10.0	39.0	0.0	10.0	21.5	29000.	11200.	734.0	262.0	4.0
72	40.0	-8.0	10.0	42.0	0.0	10.0	96.7	29000.	11200.	3303.0	1179.0	18.0
73	45.3	-8.0	10.0	47.3	0.0	10.0	43.0	29000.	11200.	1468.0	524.0	8.0
74	50.5	-8.0	10.0	52.5	0.0	10.0	96.7	29000.	11200.	3303.0	1179.0	18.0

KE LING

3B-129

LOAD CASE 1 Ia Constr. Cond. w/o Backfill

FX	FY	FZ	MX	MY	MZ
0.00	-36080.00	0.00	0.00	0.00	10102.00

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.707126E-03	-0.115038E-02	-0.169540E-08	-0.210120E-09	0.149761E-10	-0.768449E-06

PILE FORCES (FT,KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	12.417	0.000	-0.000	0.000	424.766
2	0.000	5.506	0.000	-0.000	0.000	189.371
3	0.000	15.106	0.000	-0.000	0.000	522.414
4	0.000	8.220	0.000	-0.000	0.000	285.832
5	0.000	15.036	0.000	-0.000	0.000	525.670
6	0.000	8.182	0.000	-0.000	0.000	287.608
7	0.000	2.724	0.000	-0.000	0.000	96.027
8	0.000	17.687	0.000	-0.000	0.000	625.093
9	0.000	13.573	0.000	-0.000	0.000	482.306
10	0.000	17.604	0.000	0.000	0.000	628.940
11	0.000	10.808	0.000	0.000	0.000	388.212
12	0.000	14.825	0.000	0.000	0.000	535.435
13	0.000	10.756	0.000	-0.000	0.000	390.602
14	0.000	14.755	0.000	-0.000	0.000	535.691
15	0.000	10.705	0.000	-0.000	0.000	392.970
16	0.000	15.769	0.000	-0.000	0.000	563.664
17	0.000	9.322	0.000	-0.000	0.000	345.920
18	0.000	14.615	0.000	-0.000	0.000	545.201
19	0.000	5.301	0.000	-0.000	0.000	198.352
20	0.000	2.646	0.000	-0.000	0.000	99.550
21	0.000	11.900	0.000	-0.000	0.000	448.737
22	0.000	5.276	0.000	-0.000	0.000	200.036
23	0.000	11.842	0.000	0.000	0.000	451.400
24	0.000	-87.792	0.000	-0.000	0.000	956.406
25	0.000	-25.108	0.000	0.000	0.000	275.002
26	0.000	-87.970	0.000	-0.000	0.000	966.692
27	0.000	-37.739	0.000	-0.000	0.000	416.055
28	0.000	-100.742	0.000	0.000	0.000	1114.260
29	0.000	-50.421	0.000	0.000	0.000	559.475
30	0.000	-113.564	0.000	0.000	0.000	1264.197
31	0.000	-12.623	0.000	0.000	0.000	140.714
32	0.000	-75.785	0.000	0.000	0.000	846.316
33	0.000	9.884	0.000	-0.000	0.000	179.089
34	0.000	-126.428	0.000	0.000	0.000	1416.501
35	0.000	-62.420	0.000	0.000	0.000	711.181
36	0.000	9.884	0.000	0.000	0.000	179.316
37	0.000	-139.362	0.000	-0.000	0.000	1571.172
38	0.000	-38.046	0.000	-0.000	0.000	430.294
39	0.000	-12.636	0.000	-0.000	0.000	143.651
40	0.000	9.884	0.000	0.000	0.000	180.574
41	0.000	-114.253	0.000	-0.000	0.000	1256.157
42	0.000	-12.703	0.000	-0.000	0.000	144.440

Not Max Load per pile

424.76 x 4 / 18 = 94.4

A

451.4 x 4 / 18 = 100.3

958.41 x 4 / 56 = 68.5

B

43	0.000	19.769	0.000	0.000	0.000	362.418
44	0.000	-127.204	0.000	-0.000	0.000	1452.013
45	0.000	-12.727	0.000	-0.000	0.000	145.539
46	0.000	-50.933	0.000	-0.000	0.000	583.195
47	0.000	-101.967	0.000	-0.000	0.000	1171.080
48	0.000	-25.517	0.000	-0.000	0.000	293.965
49	0.000	-89.400	0.000	-0.000	0.000	1032.931
50	0.000	-25.568	0.000	-0.000	0.000	296.332
51	0.000	-89.578	0.000	-0.000	0.000	1041.267
52	0.000	12.417	0.000	-0.000	0.000	424.765
53	0.000	5.506	0.000	-0.000	0.000	189.370
54	0.000	15.106	0.000	-0.000	0.000	522.413
55	0.000	8.220	0.000	-0.000	0.000	285.831
56	0.000	15.036	0.000	-0.000	0.000	525.668
57	0.000	8.182	0.000	-0.000	0.000	287.607
58	0.000	2.724	0.000	-0.000	0.000	96.026
59	0.000	17.687	0.000	-0.000	0.000	625.091
60	0.000	13.573	0.000	-0.000	0.000	482.305
61	0.000	17.604	0.000	-0.000	0.000	628.938
62	0.000	10.808	0.000	-0.000	0.000	388.211
63	0.000	14.825	0.000	-0.000	0.000	535.434
64	0.000	10.756	0.000	0.000	0.000	390.601
65	0.000	14.755	0.000	0.000	0.000	538.689
66	0.000	10.705	0.000	0.000	0.000	392.968
67	0.000	19.769	0.000	0.000	0.000	363.663
68	0.000	9.322	0.000	0.000	0.000	345.919
69	0.000	14.615	0.000	0.000	0.000	545.199
70	0.000	5.301	0.000	0.000	0.000	198.851
71	0.000	2.648	0.000	0.000	0.000	99.549
72	0.000	11.900	0.000	0.000	0.000	448.735
73	0.000	5.276	0.000	0.000	0.000	200.035
74	0.000	11.842	0.000	0.000	0.000	451.399

$\frac{1041.27}{56} \times 4 = 74.4$

KE LING

3B-131

LOAD CASE 2 Ib CONSTR. COND. W/BACKFILL

FX	FY	FZ	MX	MY	MZ
192.00	-36274.00	0.00	0.00	0.00	10730.00

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.623773E-03	-0.115279E-02	-0.167759E-08	-0.208371E-09	0.110181E-10	-0.745835E-06

PILE FORCES (FT,KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	10.013	0.000	-0.000	0.000	419.073
2	0.000	4.438	0.000	-0.000	0.000	186.823
3	0.000	12.170	0.000	-0.000	0.000	515.360
4	0.000	6.619	0.000	-0.000	0.000	281.959
5	0.000	12.101	0.000	-0.000	0.000	518.519
6	0.000	6.582	0.000	-0.000	0.000	283.682
7	0.000	2.190	0.000	-0.000	0.000	94.714
8	0.000	14.221	0.000	-0.000	0.000	616.530
9	0.000	10.909	0.000	-0.000	0.000	475.676
10	0.000	14.141	0.000	0.000	0.000	620.264
11	0.000	8.677	0.000	0.000	0.000	382.838
12	0.000	11.897	0.000	0.000	0.000	527.998
13	0.000	8.627	0.000	-0.000	0.000	385.158
14	0.000	11.829	0.000	-0.000	0.000	531.157
15	0.000	8.578	0.000	-0.000	0.000	387.456
16	0.000	17.453	0.000	-0.000	0.000	364.265
17	0.000	7.462	0.000	-0.000	0.000	341.034
18	0.000	11.693	0.000	-0.000	0.000	537.476
19	0.000	4.239	0.000	-0.000	0.000	196.025
20	0.000	2.117	0.000	-0.000	0.000	98.133
21	0.000	9.511	0.000	-0.000	0.000	442.338
22	0.000	4.214	0.000	-0.000	0.000	197.174
23	0.000	9.455	0.000	0.000	0.000	444.923
24	0.000	-80.471	0.000	-0.000	0.000	983.492
25	0.000	-23.016	0.000	0.000	0.000	282.135
26	0.000	-80.645	0.000	-0.000	0.000	991.535
27	0.000	-34.598	0.000	-0.000	0.000	426.650
28	0.000	-92.363	0.000	0.000	0.000	1142.374
29	0.000	-46.231	0.000	0.000	0.000	573.462
30	0.000	-104.132	0.000	0.000	0.000	1295.510
31	0.000	-11.575	0.000	0.000	0.000	144.186
32	0.000	-69.495	0.000	0.000	0.000	867.087
33	0.000	8.726	0.000	-0.000	0.000	178.470
34	0.000	-115.950	0.000	0.000	0.000	1450.945
35	0.000	-57.245	0.000	0.000	0.000	728.317
36	0.000	8.726	0.000	0.000	0.000	179.691
37	0.000	-127.817	0.000	-0.000	0.000	1608.678
38	0.000	-34.896	0.000	-0.000	0.000	440.470
39	0.000	-11.636	0.000	-0.000	0.000	147.036
40	0.000	8.726	0.000	0.000	0.000	180.911
41	0.000	-104.801	0.000	-0.000	0.000	1326.531
42	0.000	-11.653	0.000	-0.000	0.000	147.802

43	0.000	17.453	0.000	0.000	0.000	363.056
44	0.000	-116.693	0.000	-0.000	0.000	1485.412
45	0.000	-11.676	0.000	-0.000	0.000	148.869
46	0.000	-46.727	0.000	-0.000	0.000	596.484
47	0.000	-93.553	0.000	-0.000	0.000	1197.520
48	0.000	-23.413	0.000	-0.000	0.000	300.540
49	0.000	-82.032	0.000	-0.000	0.000	1055.873
50	0.000	-23.462	0.000	-0.000	0.000	302.837
51	0.000	-82.205	0.000	-0.000	0.000	1063.915
52	0.000	10.013	0.000	-0.000	0.000	419.072
53	0.000	4.438	0.000	-0.000	0.000	186.823
54	0.000	12.170	0.000	-0.000	0.000	515.358
55	0.000	6.619	0.000	-0.000	0.000	281.958
56	0.000	12.102	0.000	-0.000	0.000	518.518
57	0.000	6.582	0.000	-0.000	0.000	283.681
58	0.000	2.190	0.000	-0.000	0.000	94.713
59	0.000	14.221	0.000	-0.000	0.000	616.527
60	0.000	10.909	0.000	-0.000	0.000	475.674
61	0.000	14.141	0.000	-0.000	0.000	620.261
62	0.000	8.677	0.000	-0.000	0.000	382.837
63	0.000	11.897	0.000	-0.000	0.000	527.996
64	0.000	8.627	0.000	0.000	0.000	385.157
65	0.000	11.829	0.000	0.000	0.000	531.156
66	0.000	8.578	0.000	0.000	0.000	387.454
67	0.000	17.453	0.000	0.000	0.000	364.264
68	0.000	7.462	0.000	0.000	0.000	341.033
69	0.000	11.693	0.000	0.000	0.000	537.474
70	0.000	4.239	0.000	0.000	0.000	196.025
71	0.000	2.117	0.000	0.000	0.000	98.132
72	0.000	9.511	0.000	0.000	0.000	442.337
73	0.000	4.214	0.000	0.000	0.000	197.174
74	0.000	9.455	0.000	0.000	0.000	444.922

1313

KE LING

3B-133

LOAD CASE 3 I+II7

FX	FY	FZ	MX	MY	MZ
90.00	-22816.00	0.00	0.00	0.00	4630.00

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.406381E-03	-0.725764E-03	-0.105958E-08	-0.131538E-09	0.754289E-11	-0.544998E-06

PILE FORCES (FT,KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	6.739	0.000	-0.000	0.000	263.657
2	0.000	2.986	0.000	-0.000	0.000	117.596
3	0.000	8.187	0.000	-0.000	0.000	324.556
4	0.000	4.452	0.000	-0.000	0.000	177.654
5	0.000	8.137	0.000	-0.000	0.000	326.365
6	0.000	4.425	0.000	-0.000	0.000	178.913
7	0.000	1.472	0.000	-0.000	0.000	59.749
8	0.000	9.558	0.000	-0.000	0.000	389.023
9	0.000	7.330	0.000	-0.000	0.000	300.288
10	0.000	9.499	0.000	0.000	0.000	391.752
11	0.000	5.828	0.000	0.000	0.000	241.909
12	0.000	7.988	0.000	0.000	0.000	333.791
13	0.000	5.791	0.000	-0.000	0.000	243.604
14	0.000	7.938	0.000	-0.000	0.000	336.100
15	0.000	5.756	0.000	-0.000	0.000	245.283
16	0.000	11.384	0.000	-0.000	0.000	229.825
17	0.000	5.004	0.000	-0.000	0.000	216.092
18	0.000	7.839	0.000	-0.000	0.000	340.717
19	0.000	2.941	0.000	-0.000	0.000	124.321
20	0.000	1.419	0.000	-0.000	0.000	62.248
21	0.000	6.373	0.000	-0.000	0.000	280.657
22	0.000	2.823	0.000	-0.000	0.000	125.160
23	0.000	6.332	0.000	0.000	0.000	282.546
24	0.000	-51.842	0.000	-0.000	0.000	611.601
25	0.000	-14.520	0.000	0.000	0.000	176.574
26	0.000	-51.969	0.000	-0.000	0.000	617.477
27	0.000	-22.299	0.000	-0.000	0.000	265.880
28	0.000	-59.638	0.000	0.000	0.000	712.405
29	0.000	-29.805	0.000	0.000	0.000	357.865
30	0.000	-67.143	0.000	0.000	0.000	809.011
31	0.000	-7.464	0.000	0.000	0.000	90.066
32	0.000	-44.816	0.000	0.000	0.000	541.835
33	0.000	5.692	0.000	-0.000	0.000	112.236
34	0.000	-74.785	0.000	0.000	0.000	907.296
35	0.000	-36.927	0.000	0.000	0.000	455.727
36	0.000	5.692	0.000	0.000	0.000	113.128
37	0.000	-82.462	0.000	-0.000	0.000	1007.261
38	0.000	-22.817	0.000	-0.000	0.000	275.978
39	0.000	-7.509	0.000	-0.000	0.000	92.148
40	0.000	5.692	0.000	0.000	0.000	114.020
41	0.000	-67.632	0.000	-0.000	0.000	831.678
42	0.000	-7.521	0.000	-0.000	0.000	92.708

43	0.000	11.384	0.000	0.000	0.000	228.941
44	0.000	-75.328	0.000	-0.000	0.000	932.482
45	0.000	-7.537	0.000	-0.000	0.000	93.488
46	0.000	-30.167	0.000	-0.000	0.000	374.688
47	0.000	-60.407	0.000	-0.000	0.000	752.702
48	0.000	-15.120	0.000	-0.000	0.000	189.023
49	0.000	-52.983	0.000	-0.000	0.000	664.491
50	0.000	-15.156	0.000	-0.000	0.000	190.702
51	0.000	-53.109	0.000	-0.000	0.000	670.367
52	0.000	6.739	0.000	-0.000	0.000	263.656
53	0.000	2.986	0.000	-0.000	0.000	117.596
54	0.000	8.187	0.000	-0.000	0.000	324.555
55	0.000	4.452	0.000	-0.000	0.000	177.653
56	0.000	8.137	0.000	-0.000	0.000	326.864
57	0.000	4.425	0.000	-0.000	0.000	178.913
58	0.000	1.472	0.000	-0.000	0.000	59.749
59	0.000	9.558	0.000	-0.000	0.000	389.022
60	0.000	7.330	0.000	-0.000	0.000	300.287
61	0.000	9.499	0.000	-0.000	0.000	391.751
62	0.000	5.828	0.000	-0.000	0.000	241.909
63	0.000	7.988	0.000	-0.000	0.000	333.790
64	0.000	5.791	0.000	0.000	0.000	243.604
65	0.000	7.938	0.000	0.000	0.000	336.099
66	0.000	5.755	0.000	0.000	0.000	245.283
67	0.000	11.384	0.000	0.000	0.000	229.824
68	0.000	5.004	0.000	0.000	0.000	216.091
69	0.000	7.839	0.000	0.000	0.000	340.716
70	0.000	2.941	0.000	0.000	0.000	124.320
71	0.000	1.418	0.000	0.000	0.000	62.248
72	0.000	6.373	0.000	0.000	0.000	280.656
73	0.000	2.823	0.000	0.000	0.000	125.160
74	0.000	6.332	0.000	0.000	0.000	282.545

13113

KE LING

3B-135

LOAD CASE 4 I+II8

FX	FY	FZ	MX	MY	MZ
90.00	-2868.00	0.00	0.00	0.00	-7762.00

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.156538E-04	-0.899467E-04	-0.122475E-09	-0.154121E-10	-0.853188E-12	-0.360519E-06

PILE FORCES (FT,KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	0.027	0.000	0.000	0.000	24.734
2	0.000	0.006	0.000	0.000	0.000	11.268
3	0.000	0.000	0.000	0.000	0.000	31.758
4	0.000	-0.008	0.000	0.000	0.000	17.735
5	0.000	-0.032	0.000	0.000	0.000	33.285
6	0.000	-0.026	0.000	0.000	0.000	18.568
7	0.000	-0.010	0.000	0.000	0.000	6.263
8	0.000	-0.077	0.000	0.000	0.000	41.142
9	0.000	-0.074	0.000	0.000	0.000	32.335
10	0.000	-0.116	0.000	-0.000	0.000	42.947
11	0.000	-0.083	0.000	-0.000	0.000	26.979
12	0.000	-0.131	0.000	-0.000	0.000	37.867
13	0.000	-0.107	0.000	0.000	0.000	28.100
14	0.000	-0.164	0.000	0.000	0.000	39.394
15	0.000	-0.131	0.000	0.000	0.000	29.211
16	0.000	0.513	0.000	0.000	0.000	30.401
17	0.000	-0.135	0.000	0.000	0.000	26.531
18	0.000	-0.229	0.000	0.000	0.000	42.448
19	0.000	-0.089	0.000	0.000	0.000	15.716
20	0.000	-0.046	0.000	0.000	0.000	7.916
21	0.000	-0.215	0.000	0.000	0.000	35.980
22	0.000	-0.101	0.000	0.000	0.000	16.271
23	0.000	-0.242	0.000	-0.000	0.000	37.229
24	0.000	-3.230	0.000	0.000	0.000	68.913
25	0.000	-0.934	0.000	-0.000	0.000	20.239
26	0.000	-3.314	0.000	0.000	0.000	72.801
27	0.000	-1.438	0.000	0.000	0.000	32.025
28	0.000	-3.883	0.000	-0.000	0.000	87.644
29	0.000	-1.965	0.000	-0.000	0.000	44.922
30	0.000	-4.476	0.000	-0.000	0.000	103.598
31	0.000	-0.499	0.000	-0.000	0.000	11.627
32	0.000	-3.020	0.000	-0.000	0.000	70.715
33	0.000	0.256	0.000	0.000	0.000	13.430
34	0.000	-5.094	0.000	-0.000	0.000	120.662
35	0.000	-2.541	0.000	-0.000	0.000	61.706
36	0.000	0.256	0.000	-0.000	0.000	14.020
37	0.000	-5.735	0.000	0.000	0.000	138.637
38	0.000	-1.592	0.000	0.000	0.000	38.705
39	0.000	-0.529	0.000	0.000	0.000	13.005
40	0.000	0.256	0.000	-0.000	0.000	14.610
41	0.000	-4.900	0.000	0.000	0.000	118.592
42	0.000	-0.537	0.000	0.000	0.000	13.375

43	0.000	0.513	0.000	-0.000	0.000	29.816
44	0.000	-5.453	0.000	0.000	0.000	137.222
45	0.000	-0.548	0.000	0.000	0.000	13.890
46	0.000	-2.205	0.000	0.000	0.000	56.050
47	0.000	-4.458	0.000	0.000	0.000	114.301
48	0.000	-1.126	0.000	0.000	0.000	29.135
49	0.000	-3.984	0.000	0.000	0.000	103.900
50	0.000	-1.150	0.000	0.000	0.000	30.246
51	0.000	-4.068	0.000	0.000	0.000	107.788
52	0.000	0.027	0.000	0.000	0.000	24.734
53	0.000	0.006	0.000	0.000	0.000	11.268
54	0.000	0.000	0.000	0.000	0.000	31.758
55	0.000	-0.008	0.000	0.000	0.000	17.735
56	0.000	-0.032	0.000	0.000	0.000	33.285
57	0.000	-0.026	0.000	0.000	0.000	18.568
58	0.000	-0.010	0.000	0.000	0.000	6.263
59	0.000	-0.077	0.000	0.000	0.000	41.142
60	0.000	-0.074	0.000	0.000	0.000	32.335
61	0.000	-0.116	0.000	0.000	0.000	42.947
62	0.000	-0.083	0.000	0.000	0.000	26.979
63	0.000	-0.131	0.000	0.000	0.000	37.867
64	0.000	-0.107	0.000	-0.000	0.000	28.100
65	0.000	-0.164	0.000	-0.000	0.000	39.394
66	0.000	-0.131	0.000	-0.000	0.000	29.210
67	0.000	0.513	0.000	-0.000	0.000	30.401
68	0.000	-0.135	0.000	-0.000	0.000	26.531
69	0.000	-0.229	0.000	-0.000	0.000	42.449
70	0.000	-0.089	0.000	-0.000	0.000	15.716
71	0.000	-0.046	0.000	-0.000	0.000	7.916
72	0.000	-0.215	0.000	-0.000	0.000	35.980
73	0.000	-0.101	0.000	-0.000	0.000	16.271
74	0.000	-0.242	0.000	-0.000	0.000	37.229

1313

KE LING

3B-137

LOAD CASE 5 I+II1

FX	FY	FZ	MX	MY	MZ
-3614.00	-22632.00	0.00	0.00	0.00	89536.01

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.208090E-02	-0.789877E-03	-0.156679E-08	-0.185364E-09	0.870143E-10	0.233408E-05

PILE FORCES (FT,KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	52.184	0.000	-0.000	0.000	472.898
2	0.000	22.231	0.000	-0.000	0.000	208.396
3	0.000	63.994	0.000	-0.000	0.000	568.100
4	0.000	34.963	0.000	-0.000	0.000	307.201
5	0.000	64.207	0.000	-0.000	0.000	558.212
6	0.000	35.080	0.000	-0.000	0.000	301.808
7	0.000	11.703	0.000	-0.000	0.000	100.123
8	0.000	76.134	0.000	-0.000	0.000	648.020
9	0.000	58.660	0.000	-0.000	0.000	494.026
10	0.000	76.386	0.000	0.000	0.000	636.335
11	0.000	47.083	0.000	0.000	0.000	388.029
12	0.000	64.547	0.000	0.000	0.000	526.550
13	0.000	47.240	0.000	-0.000	0.000	380.770
14	0.000	65.060	0.000	-0.000	0.000	518.662
15	0.000	47.395	0.000	-0.000	0.000	373.579
16	0.000	57.157	0.000	-0.000	0.000	230.964
17	0.000	41.606	0.000	-0.000	0.000	320.590
18	0.000	65.497	0.000	-0.000	0.000	498.887
19	0.000	23.852	0.000	-0.000	0.000	179.598
20	0.000	11.934	0.000	-0.000	0.000	89.422
21	0.000	53.754	0.000	-0.000	0.000	400.091
22	0.000	23.930	0.000	-0.000	0.000	176.003
23	0.000	53.929	0.000	0.000	0.000	392.001
24	0.000	-202.761	0.000	-0.000	0.000	402.756
25	0.000	-57.855	0.000	0.000	0.000	111.512
26	0.000	-202.218	0.000	-0.000	0.000	377.598
27	0.000	-86.549	0.000	-0.000	0.000	156.481
28	0.000	-230.486	0.000	0.000	0.000	402.766
29	0.000	-115.089	0.000	0.000	0.000	194.260
30	0.000	-258.599	0.000	0.000	0.000	420.752
31	0.000	-28.717	0.000	0.000	0.000	45.996
32	0.000	-172.169	0.000	0.000	0.000	269.818
33	0.000	28.578	0.000	-0.000	0.000	126.942
34	0.000	-286.557	0.000	0.000	0.000	431.548
35	0.000	-141.137	0.000	0.000	0.000	206.871
36	0.000	28.578	0.000	0.000	0.000	123.122
37	0.000	-314.360	0.000	-0.000	0.000	435.153
38	0.000	-85.617	0.000	-0.000	0.000	113.233
39	0.000	-28.524	0.000	-0.000	0.000	37.076
40	0.000	28.578	0.000	0.000	0.000	119.301
41	0.000	-256.505	0.000	-0.000	0.000	323.675
42	0.000	-28.473	0.000	-0.000	0.000	34.679

$\frac{4}{18} = 105.1$

$\frac{4}{18}$

$56 = 28.8$

$431.548 \times \frac{4}{80} = 21.6$

43	0.000	57.157	0.000	0.000	0.000	234.747
44	0.000	-284.232	0.000	-0.000	0.000	323.685
45	0.000	-28.401	0.000	-0.000	0.000	31.341
46	0.000	-113.536	0.000	-0.000	0.000	122.214
47	0.000	-226.765	0.000	-0.000	0.000	230.184
48	0.000	-56.613	0.000	-0.000	0.000	53.916
49	0.000	-197.877	0.000	-0.000	0.000	176.243
50	0.000	-56.458	0.000	-0.000	0.000	46.725
51	0.000	-197.334	0.000	-0.000	0.000	151.075
52	0.000	52.184	0.000	-0.000	0.000	472.897
53	0.000	23.231	0.000	-0.000	0.000	208.396
54	0.000	63.994	0.000	-0.000	0.000	568.098
55	0.000	34.963	0.000	-0.000	0.000	307.200
56	0.000	64.207	0.000	-0.000	0.000	538.210
57	0.000	35.080	0.000	-0.000	0.000	301.807
58	0.000	11.703	0.000	-0.000	0.000	100.123
59	0.000	76.134	0.000	-0.000	0.000	648.018
60	0.000	58.660	0.000	-0.000	0.000	494.024
61	0.000	76.386	0.000	-0.000	0.000	636.333
62	0.000	47.083	0.000	-0.000	0.000	388.028
63	0.000	64.847	0.000	-0.000	0.000	528.548
64	0.000	47.240	0.000	0.000	0.000	380.769
65	0.000	65.060	0.000	0.000	0.000	518.661
66	0.000	47.395	0.000	0.000	0.000	373.578
67	0.000	57.157	0.000	0.000	0.000	230.962
68	0.000	41.606	0.000	0.000	0.000	320.589
69	0.000	65.487	0.000	0.000	0.000	498.886
70	0.000	23.852	0.000	0.000	0.000	179.598
71	0.000	11.934	0.000	0.000	0.000	89.422
72	0.000	53.754	0.000	0.000	0.000	400.089
73	0.000	23.930	0.000	0.000	0.000	176.002
74	0.000	53.929	0.000	0.000	0.000	392.000

1315

KE LING

3B-139

LOAD CASE 6 I+II2

FX	FY	FZ	MX	MY	MZ
-3284.00	-22914.00	0.00	0.00	0.00	82160.01

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.193691E-02	-0.792630E-03	-0.153407E-06	-0.182115E-09	0.800462E-10	0.207594E-05

PILE FORCES (FT,KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	48.224	0.000	-0.000	0.000	457.452
2	0.000	21.467	0.000	-0.000	0.000	201.728
3	0.000	59.131	0.000	-0.000	0.000	550.314
4	0.000	32.304	0.000	-0.000	0.000	297.795
5	0.000	59.320	0.000	-0.000	0.000	541.520
6	0.000	32.408	0.000	-0.000	0.000	292.999
7	0.000	10.811	0.000	-0.000	0.000	97.240
8	0.000	70.330	0.000	-0.000	0.000	629.585
9	0.000	54.185	0.000	-0.000	0.000	480.337
10	0.000	70.554	0.000	0.000	0.000	619.192
11	0.000	43.486	0.000	0.000	0.000	377.874
12	0.000	59.889	0.000	0.000	0.000	515.138
13	0.000	43.625	0.000	-0.000	0.000	371.417
14	0.000	60.079	0.000	-0.000	0.000	506.344
15	0.000	43.763	0.000	-0.000	0.000	365.022
16	0.000	53.223	0.000	-0.000	0.000	283.512
17	0.000	38.413	0.000	-0.000	0.000	313.798
18	0.000	60.458	0.000	-0.000	0.000	488.756
19	0.000	22.019	0.000	-0.000	0.000	176.115
20	0.000	11.017	0.000	-0.000	0.000	87.722
21	0.000	49.621	0.000	-0.000	0.000	392.696
22	0.000	22.088	0.000	-0.000	0.000	172.917
23	0.000	49.776	0.000	0.000	0.000	385.501
24	0.000	-189.963	0.000	-0.000	0.000	428.633
25	0.000	-54.206	0.000	0.000	0.000	119.299
26	0.000	-189.480	0.000	-0.000	0.000	406.248
27	0.000	-81.103	0.000	-0.000	0.000	169.355
28	0.000	-215.997	0.000	0.000	0.000	436.701
29	0.000	-107.862	0.000	0.000	0.000	213.015
30	0.000	-242.376	0.000	0.000	0.000	464.758
31	0.000	-26.916	0.000	0.000	0.000	50.969
32	0.000	-161.379	0.000	0.000	0.000	300.337
33	0.000	26.611	0.000	-0.000	0.000	126.948
34	0.000	-268.617	0.000	0.000	0.000	484.420
35	0.000	-132.310	0.000	0.000	0.000	234.291
36	0.000	26.611	0.000	0.000	0.000	123.551
37	0.000	-294.721	0.000	-0.000	0.000	497.686
38	0.000	-80.274	0.000	-0.000	0.000	130.890
39	0.000	-26.745	0.000	-0.000	0.000	43.036
40	0.000	26.611	0.000	0.000	0.000	120.153
41	0.000	-240.514	0.000	-0.000	0.000	378.417
42	0.000	-26.699	0.000	-0.000	0.000	40.904

43	0.000	53.223	0.000	0.000	0.000	236.877
44	0.000	-266.549	0.000	-0.000	0.000	388.485
45	0.000	-26.635	0.000	-0.000	0.000	37.934
46	0.000	-106.480	0.000	-0.000	0.000	148.937
47	0.000	-212.687	0.000	-0.000	0.000	285.206
48	0.000	-53.102	0.000	-0.000	0.000	68.073
49	0.000	-185.619	0.000	-0.000	0.000	227.170
50	0.000	-52.964	0.000	-0.000	0.000	61.677
51	0.000	-185.136	0.000	-0.000	0.000	204.785
52	0.000	48.224	0.000	-0.000	0.000	457.450
53	0.000	21.467	0.000	-0.000	0.000	201.727
54	0.000	59.131	0.000	-0.000	0.000	550.312
55	0.000	32.304	0.000	-0.000	0.000	297.795
56	0.000	59.320	0.000	-0.000	0.000	541.518
57	0.000	32.408	0.000	-0.000	0.000	292.998
58	0.000	10.811	0.000	-0.000	0.000	97.239
59	0.000	70.330	0.000	-0.000	0.000	629.583
60	0.000	54.185	0.000	-0.000	0.000	480.336
61	0.000	70.554	0.000	-0.000	0.000	619.190
62	0.000	43.486	0.000	-0.000	0.000	377.873
63	0.000	59.889	0.000	-0.000	0.000	515.136
64	0.000	43.625	0.000	0.000	0.000	371.416
65	0.000	60.079	0.000	0.000	0.000	506.342
66	0.000	43.763	0.000	0.000	0.000	365.021
67	0.000	53.223	0.000	0.000	0.000	233.511
68	0.000	38.413	0.000	0.000	0.000	313.797
69	0.000	50.458	0.000	0.000	0.000	488.754
70	0.000	22.019	0.000	0.000	0.000	176.114
71	0.000	11.017	0.000	0.000	0.000	87.722
72	0.000	49.621	0.000	0.000	0.000	392.695
73	0.000	22.088	0.000	0.000	0.000	172.917
74	0.000	49.776	0.000	0.000	0.000	385.500

KE LING

3B-141

LOAD CASE 7 I+II3

FX	FY	FZ	MX	MY	MZ
-2776.00	-22828.00	0.00	0.00	0.00	70120.01

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.170509E-02	-0.780301E-03	-0.145930E-08	-0.174087E-09	0.690943E-10	0.167059E-05

PILE FORCES (FT.KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	41.962	0.000	-0.000	0.000	427.227
2	0.000	18.677	0.000	-0.000	0.000	198.604
3	0.000	51.439	0.000	-0.000	0.000	515.090
4	0.000	28.099	0.000	-0.000	0.000	279.046
5	0.000	51.592	0.000	-0.000	0.000	508.013
6	0.000	28.182	0.000	-0.000	0.000	275.186
7	0.000	9.401	0.000	-0.000	0.000	91.385
8	0.000	61.152	0.000	-0.000	0.000	592.015
9	0.000	47.109	0.000	-0.000	0.000	452.210
10	0.000	61.333	0.000	0.000	0.000	583.651
11	0.000	37.798	0.000	0.000	0.000	356.621
12	0.000	52.049	0.000	0.000	0.000	486.782
13	0.000	37.910	0.000	-0.000	0.000	351.425
14	0.000	52.202	0.000	-0.000	0.000	479.705
15	0.000	38.021	0.000	-0.000	0.000	346.278
16	0.000	46.888	0.000	-0.000	0.000	232.322
17	0.000	33.365	0.000	-0.000	0.000	298.490
18	0.000	52.507	0.000	-0.000	0.000	465.552
19	0.000	19.121	0.000	-0.000	0.000	167.992
20	0.000	9.566	0.000	-0.000	0.000	83.726
21	0.000	43.085	0.000	-0.000	0.000	375.115
22	0.000	19.177	0.000	-0.000	0.000	165.419
23	0.000	43.210	0.000	0.000	0.000	369.325
24	0.000	-168.990	0.000	-0.000	0.000	453.636
25	0.000	-48.227	0.000	0.000	0.000	127.061
26	0.000	-168.601	0.000	-0.000	0.000	435.622
27	0.000	-72.175	0.000	-0.000	0.000	182.872
28	0.000	-192.243	0.000	0.000	0.000	477.266
29	0.000	-96.011	0.000	0.000	0.000	233.535
30	0.000	-215.774	0.000	0.000	0.000	513.764
31	0.000	-23.963	0.000	0.000	0.000	56.545
32	0.000	-143.685	0.000	0.000	0.000	334.863
33	0.000	23.444	0.000	-0.000	0.000	124.363
34	0.000	-239.194	0.000	0.000	0.000	545.115
35	0.000	-117.832	0.000	0.000	0.000	266.185
36	0.000	23.444	0.000	0.000	0.000	121.629
37	0.000	-262.504	0.000	-0.000	0.000	571.319
38	0.000	-71.507	0.000	-0.000	0.000	151.917
39	0.000	-23.825	0.000	-0.000	0.000	50.161
40	0.000	23.444	0.000	0.000	0.000	118.895
41	0.000	-214.276	0.000	-0.000	0.000	444.282
42	0.000	-23.798	0.000	-0.000	0.000	48.445

43	0.000	46.888	0.000	0.000	0.000	235.030
44	0.000	-237.530	0.000	-0.000	0.000	467.913
45	0.000	-23.737	0.000	-0.000	0.000	46.056
46	0.000	-94.900	0.000	-0.000	0.000	181.969
47	0.000	-189.580	0.000	-0.000	0.000	353.743
48	0.000	-47.339	0.000	-0.000	0.000	85.837
49	0.000	-165.494	0.000	-0.000	0.000	291.511
50	0.000	-47.228	0.000	-0.000	0.000	80.691
51	0.000	-165.105	0.000	-0.000	0.000	273.497
52	0.000	41.962	0.000	-0.000	0.000	427.226
53	0.000	18.677	0.000	-0.000	0.000	188.603
54	0.000	51.439	0.000	-0.000	0.000	515.088
55	0.000	28.099	0.000	-0.000	0.000	279.045
56	0.000	51.592	0.000	-0.000	0.000	508.011
57	0.000	28.182	0.000	-0.000	0.000	275.185
58	0.000	9.401	0.000	-0.000	0.000	91.385
59	0.000	61.152	0.000	-0.000	0.000	592.013
60	0.000	47.109	0.000	-0.000	0.000	452.209
61	0.000	61.333	0.000	-0.000	0.000	583.650
62	0.000	37.798	0.000	-0.000	0.000	356.620
63	0.000	52.049	0.000	-0.000	0.000	486.781
64	0.000	37.910	0.000	0.000	0.000	351.424
65	0.000	52.202	0.000	0.000	0.000	479.704
66	0.000	38.021	0.000	0.000	0.000	346.277
67	0.000	46.558	0.000	0.000	0.000	232.321
68	0.000	33.363	0.000	0.000	0.000	298.489
69	0.000	52.507	0.000	0.000	0.000	465.550
70	0.000	19.121	0.000	0.000	0.000	167.992
71	0.000	9.566	0.000	0.000	0.000	83.726
72	0.000	43.085	0.000	0.000	0.000	375.114
73	0.000	19.177	0.000	0.000	0.000	165.418
74	0.000	43.210	0.000	0.000	0.000	369.324

KE LING

3B-143

LOAD CASE 8 I+II4

FX	FY	FZ	MX	MY	MZ
-3188.00	-22568.00	0.00	0.00	0.00	79804.01

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.188664E-02	-0.779786E-03	-0.150445E-08	-0.178677E-09	0.778398E-10	0.200678E-05

PILE FORCES (FT,KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	46.927	0.000	-0.000	0.000	447.865
2	0.000	20.889	0.000	-0.000	0.000	197.520
3	0.000	57.539	0.000	-0.000	0.000	528.890
4	0.000	31.434	0.000	-0.000	0.000	291.643
5	0.000	57.722	0.000	-0.000	0.000	530.389
6	0.000	31.534	0.000	-0.000	0.000	287.006
7	0.000	10.520	0.000	-0.000	0.000	95.256
8	0.000	68.434	0.000	-0.000	0.000	616.776
9	0.000	52.724	0.000	-0.000	0.000	470.616
10	0.000	68.650	0.000	0.000	0.000	606.730
11	0.000	42.312	0.000	0.000	0.000	370.310
12	0.000	58.272	0.000	0.000	0.000	504.886
13	0.000	42.447	0.000	-0.000	0.000	364.069
14	0.000	58.455	0.000	-0.000	0.000	496.385
15	0.000	42.580	0.000	-0.000	0.000	357.886
16	0.000	51.845	0.000	-0.000	0.000	229.961
17	0.000	37.374	0.000	-0.000	0.000	307.741
18	0.000	58.822	0.000	-0.000	0.000	479.383
19	0.000	21.423	0.000	-0.000	0.000	172.760
20	0.000	10.718	0.000	-0.000	0.000	86.056
21	0.000	48.277	0.000	-0.000	0.000	385.267
22	0.000	21.490	0.000	-0.000	0.000	169.669
23	0.000	48.427	0.000	0.000	0.000	376.311
24	0.000	-185.197	0.000	-0.000	0.000	424.620
25	0.000	-52.847	0.000	0.000	0.000	118.258
26	0.000	-184.730	0.000	-0.000	0.000	402.981
27	0.000	-79.071	0.000	-0.000	0.000	168.113
28	0.000	-210.587	0.000	0.000	0.000	435.820
29	0.000	-105.161	0.000	0.000	0.000	211.786
30	0.000	-236.311	0.000	0.000	0.000	462.476
31	0.000	-26.242	0.000	0.000	0.000	50.738
32	0.000	-157.342	0.000	0.000	0.000	299.132
33	0.000	25.922	0.000	-0.000	0.000	124.833
34	0.000	-261.901	0.000	0.000	0.000	482.950
35	0.000	-129.003	0.000	0.000	0.000	233.820
36	0.000	25.922	0.000	0.000	0.000	121.549
37	0.000	-287.358	0.000	-0.000	0.000	497.241
38	0.000	-78.269	0.000	-0.000	0.000	180.930
39	0.000	-26.077	0.000	-0.000	0.000	43.069
40	0.000	25.922	0.000	0.000	0.000	118.264
41	0.000	-234.811	0.000	-0.000	0.000	379.012
42	0.000	-26.033	0.000	-0.000	0.000	41.008

43	0.000	51.845	0.000	0.000	0.000	233.213
44	0.000	-259.901	0.000	-0.000	0.000	390.212
45	0.000	-25.971	0.000	-0.000	0.000	38.138
46	0.000	-102.826	0.000	-0.000	0.000	149.843
47	0.000	-207.388	0.000	-0.000	0.000	287.439
48	0.000	-51.779	0.000	-0.000	0.000	68.739
49	0.000	-180.998	0.000	-0.000	0.000	229.870
50	0.000	-51.646	0.000	-0.000	0.000	62.556
51	0.000	-180.531	0.000	-0.000	0.000	208.232
52	0.000	46.927	0.000	-0.000	0.000	447.864
53	0.000	20.889	0.000	-0.000	0.000	197.519
54	0.000	57.539	0.000	-0.000	0.000	538.888
55	0.000	31.434	0.000	-0.000	0.000	291.642
56	0.000	57.722	0.000	-0.000	0.000	530.387
57	0.000	31.534	0.000	-0.000	0.000	287.005
58	0.000	10.520	0.000	-0.000	0.000	95.256
59	0.000	68.434	0.000	-0.000	0.000	616.775
60	0.000	52.724	0.000	-0.000	0.000	470.615
61	0.000	68.650	0.000	-0.000	0.000	606.728
62	0.000	42.312	0.000	-0.000	0.000	370.309
63	0.000	58.272	0.000	-0.000	0.000	504.884
64	0.000	42.447	0.000	0.000	0.000	364.067
65	0.000	58.455	0.000	0.000	0.000	496.383
66	0.000	42.560	0.000	0.000	0.000	357.885
67	0.000	51.845	0.000	0.000	0.000	229.959
68	0.000	37.374	0.000	0.000	0.000	307.740
69	0.000	58.822	0.000	0.000	0.000	479.381
70	0.000	21.423	0.000	0.000	0.000	172.760
71	0.000	10.718	0.000	0.000	0.000	86.056
72	0.000	48.277	0.000	0.000	0.000	365.265
73	0.000	21.490	0.000	0.000	0.000	169.668
74	0.000	48.427	0.000	0.000	0.000	378.310

KE LING.

LOAD CASE 9 I+II 6A

FX	FY	FZ	MX	MY	MZ
3368.00	-23072.00	0.00	0.00	0.00	-70712.01

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
0.107371E-02	-0.672002E-03	-0.615091E-09	-0.844475E-10	-0.627536E-10	-0.310295E-05

PILE FORCES (FT.KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	-33.441	0.000	0.000	0.000	79.441
2	0.000	-14.914	0.000	0.000	0.000	37.674
3	0.000	-41.156	0.000	0.000	0.000	110.239
4	0.000	-22.525	0.000	0.000	0.000	63.681
5	0.000	-41.440	0.000	0.000	0.000	123.384
6	0.000	-22.680	0.000	0.000	0.000	70.851
7	0.000	-7.573	0.000	0.000	0.000	24.254
8	0.000	-49.309	0.000	0.000	0.000	161.352
9	0.000	-38.058	0.000	0.000	0.000	130.035
10	0.000	-49.644	0.000	-0.000	0.000	176.886
11	0.000	-30.652	0.000	-0.000	0.000	113.587
12	0.000	-42.290	0.000	-0.000	0.000	162.818
13	0.000	-30.850	0.000	0.000	0.000	123.238
14	0.000	-42.573	0.000	0.000	0.000	175.962
15	0.000	-31.035	0.000	0.000	0.000	132.798
16	0.000	-29.071	0.000	0.000	0.000	229.811
17	0.000	-27.363	0.000	0.000	0.000	124.563
18	0.000	-43.140	0.000	0.000	0.000	202.251
19	0.000	-15.739	0.000	0.000	0.000	75.958
20	0.000	-7.880	0.000	0.000	0.000	38.480
21	0.000	-35.528	0.000	0.000	0.000	176.233
22	0.000	-15.342	0.000	0.000	0.000	80.738
23	0.000	-35.760	0.000	-0.000	0.000	166.967
24	0.000	81.494	0.000	0.000	0.000	798.474
25	0.000	29.182	0.000	-0.000	0.000	252.369
26	0.000	80.772	0.000	0.000	0.000	631.932
27	0.000	34.463	0.000	0.000	0.000	353.644
28	0.000	91.487	0.000	-0.000	0.000	989.018
29	0.000	45.539	0.000	-0.000	0.000	503.978
30	0.000	101.995	0.000	-0.000	0.000	1153.664
31	0.000	11.311	0.000	-0.000	0.000	129.408
32	0.000	67.690	0.000	-0.000	0.000	764.646
33	0.000	-14.585	0.000	0.000	0.000	99.669
34	0.000	112.297	0.000	-0.000	0.000	1331.870
35	0.000	58.132	0.000	-0.000	0.000	677.770
36	0.000	-14.835	0.000	-0.000	0.000	104.748
37	0.000	122.394	0.000	0.000	0.000	1517.635
38	0.000	33.224	0.000	0.000	0.000	421.133
39	0.000	11.055	0.000	0.000	0.000	141.267
40	0.000	-14.535	0.000	-0.000	0.000	109.526
41	0.000	99.212	0.000	0.000	0.000	1284.720
42	0.000	10.986	0.000	0.000	0.000	144.453

43	0.000	-29.071	0.000	-0.000	0.000	224.780
44	0.000	109.205	0.000	0.000	0.000	1475.265
45	0.000	10.891	0.000	0.000	0.000	148.892
46	0.000	43.474	0.000	0.000	0.000	599.756
47	0.000	86.940	0.000	0.000	0.000	1218.450
48	0.000	21.531	0.000	0.000	0.000	309.438
49	0.000	75.001	0.000	0.000	0.000	1099.603
50	0.000	21.324	0.000	0.000	0.000	318.997
51	0.000	74.279	0.000	0.000	0.000	1133.062
52	0.000	-33.441	0.000	0.000	0.000	79.441
53	0.000	-14.914	0.000	0.000	0.000	37.674
54	0.000	-41.156	0.000	0.000	0.000	110.239
55	0.000	-22.525	0.000	0.000	0.000	63.681
56	0.000	-41.440	0.000	0.000	0.000	123.383
57	0.000	-22.580	0.000	0.000	0.000	70.851
58	0.000	-7.573	0.000	0.000	0.000	24.254
59	0.000	-49.309	0.000	0.000	0.000	161.351
60	0.000	-38.058	0.000	0.000	0.000	130.034
61	0.000	-49.644	0.000	0.000	0.000	176.856
62	0.000	-30.652	0.000	0.000	0.000	113.587
63	0.000	-42.290	0.000	0.000	0.000	162.817
64	0.000	-30.860	0.000	-0.000	0.000	123.238
65	0.000	-42.573	0.000	-0.000	0.000	175.962
66	0.000	-31.066	0.000	-0.000	0.000	132.797
67	0.000	-29.071	0.000	-0.000	0.000	229.810
68	0.000	-27.363	0.000	-0.000	0.000	124.562
69	0.000	-43.140	0.000	-0.000	0.000	202.261
70	0.000	-15.739	0.000	-0.000	0.000	75.958
71	0.000	-7.580	0.000	-0.000	0.000	38.480
72	0.000	-35.528	0.000	-0.000	0.000	176.232
73	0.000	-15.842	0.000	-0.000	0.000	80.738
74	0.000	-35.760	0.000	-0.000	0.000	186.987

KE LING

LOAD CASE 10 I+II 6B

FX	FY	FZ	MX	MY	MZ
5138.00	-26022.00	0.00	0.00	0.00	-67460.01

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
0.181926E-02	-0.731278E-03	-0.505603E-09	-0.751058E-10	-0.988088E-10	-0.302031E-05

PILE FORCES (FT,KIP,<IP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	-55.140	0.000	0.000	0.000	38.915
2	0.000	-24.556	0.000	0.000	0.000	19.600
3	0.000	-67.669	0.000	0.000	0.000	60.358
4	0.000	-36.985	0.000	0.000	0.000	36.378
5	0.000	-67.945	0.000	0.000	0.000	73.152
6	0.000	-37.135	0.000	0.000	0.000	43.357
7	0.000	-12.391	0.000	0.000	0.000	15.072
8	0.000	-80.625	0.000	0.000	0.000	101.574
9	0.000	-62.143	0.000	0.000	0.000	83.894
10	0.000	-80.951	0.000	-0.000	0.000	116.694
11	0.000	-49.915	0.000	-0.000	0.000	76.420
12	0.000	-68.773	0.000	-0.000	0.000	111.536
13	0.000	-50.118	0.000	0.000	0.000	85.814
14	0.000	-69.049	0.000	0.000	0.000	124.330
15	0.000	-50.318	0.000	0.000	0.000	93.119
16	0.000	-49.753	0.000	0.000	0.000	247.749
17	0.000	-44.204	0.000	0.000	0.000	91.371
18	0.000	-69.601	0.000	0.000	0.000	149.919
19	0.000	-25.360	0.000	0.000	0.000	56.864
20	0.000	-12.690	0.000	0.000	0.000	28.919
21	0.000	-57.172	0.000	0.000	0.000	133.129
22	0.000	-25.460	0.000	0.000	0.000	61.517
23	0.000	-57.397	0.000	-0.000	0.000	143.597
24	0.000	146.184	0.000	0.000	0.000	1055.212
25	0.000	41.667	0.000	-0.000	0.000	306.097
26	0.000	145.482	0.000	0.000	0.000	1037.780
27	0.000	62.200	0.000	0.000	0.000	473.103
28	0.000	165.462	0.000	-0.000	0.000	1280.397
29	0.000	82.532	0.000	-0.000	0.000	649.415
30	0.000	185.242	0.000	-0.000	0.000	1482.320
31	0.000	20.561	0.000	-0.000	0.000	165.677
32	0.000	123.197	0.000	-0.000	0.000	1002.037
33	0.000	-24.876	0.000	0.000	0.000	109.044
34	0.000	204.822	0.000	-0.000	0.000	1693.547
35	0.000	100.770	0.000	-0.000	0.000	858.294
36	0.000	-24.876	0.000	-0.000	0.000	113.988
37	0.000	224.200	0.000	0.000	0.000	1914.080
38	0.000	60.993	0.000	0.000	0.000	529.067
39	0.000	20.812	0.000	0.000	0.000	177.219
40	0.000	-24.876	0.000	-0.000	0.000	118.931
41	0.000	182.534	0.000	0.000	0.000	1607.938
42	0.000	20.245	0.000	0.000	0.000	180.321

43	0.000	-49.753	0.000	-0.000	0.000	242.853
44	0.000	201.812	0.000	0.000	0.000	1833.123
45	0.000	20.152	0.000	0.000	0.000	184.641
46	0.000	80.522	0.000	0.000	0.000	742.642
47	0.000	150.847	0.000	0.000	0.000	1503.718
48	0.000	40.060	0.000	0.000	0.000	380.626
49	0.000	139.864	0.000	0.000	0.000	1248.321
50	0.000	39.959	0.000	0.000	0.000	389.931
51	0.000	139.162	0.000	0.000	0.000	1380.889
52	0.000	-55.140	0.000	0.000	0.000	38.915
53	0.000	-24.556	0.000	0.000	0.000	19.599
54	0.000	-67.669	0.000	0.000	0.000	60.358
55	0.000	-36.985	0.000	0.000	0.000	36.378
56	0.000	-67.945	0.000	0.000	0.000	73.152
57	0.000	-37.135	0.000	0.000	0.000	43.357
58	0.000	-12.391	0.000	0.000	0.000	15.072
59	0.000	-80.625	0.000	0.000	0.000	101.573
60	0.000	-62.143	0.000	0.000	0.000	63.893
61	0.000	-80.951	0.000	0.000	0.000	116.694
62	0.000	-49.915	0.000	0.000	0.000	76.420
63	0.000	-68.773	0.000	0.000	0.000	111.535
64	0.000	-50.118	0.000	-0.000	0.000	85.813
65	0.000	-69.049	0.000	-0.000	0.000	124.330
66	0.000	-50.318	0.000	-0.000	0.000	95.118
67	0.000	-49.753	0.000	-0.000	0.000	247.749
68	0.000	-44.204	0.000	-0.000	0.000	91.370
69	0.000	-69.600	0.000	-0.000	0.000	149.919
70	0.000	-25.360	0.000	-0.000	0.000	56.864
71	0.000	-12.690	0.000	-0.000	0.000	25.919
72	0.000	-57.172	0.000	-0.000	0.000	133.129
73	0.000	-25.460	0.000	-0.000	0.000	61.516
74	0.000	-57.397	0.000	-0.000	0.000	143.597

1313

Job No. 4671 Page No. 3B-149

Computed by RJ Beecher Date 4/4/73
Checked by WJZ Date 4/11/73
Reviewed by Date
Approved by Date

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE

Sheet No. 1 of

Transverse Moment @ ℄

CONSTRUCTION CONDITION A { Area Dewatered, No Backfill
No Water Load, Gate in open position

	Vert Force	Horiz Force	Arm	℄ Moment @ El -19'
Walls	-4530.3 ✓			-342910 ✓
Base Slab	-13094.4 ✓			-545063 ✓
Control House Walls & Floor	-158.7 ✓			-10766 ✓
Gate	-256.8 ✓		-75.73 ✓	-19448 ✓
Subtotal	-18040 ✓			-918187 ✓

(-75.73 includes horizontal arm)

Piling Battered Lakeside +446933 ✓
" " Lockside +516767 ✓

MOMENT @ ℄ = +45513[1K] ✓

= +414 [1K], ✓

For Piling Moments see Sheets 9 & 10

Job No. 4671 Page No. 3B-150

Computed by R.J. Becker Date 4/4/73
Checked by W.J.L. Date 4/13/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE

Sheet No. 2 of

Transverse Moment @ ℄

CONSTRUCTION CONDITION B { Area Dewatered, Add Backfill
No Water Load, Gate in open position

	Vert Forces	Horiz Forces	Arm	℄ Moment @ El -19
Walls	-4530.3 ✓			-342910 ✓
Baseslab	-13094.4 ✓			-545063 ✓
Control Hse Mech Etc	-158.7 ✓			-10766 ✓
Gate	-256.8 ✓		-75.73 ✓	-19448 ✓
Soil	-97.1 ✓		-99.01 ✓	-9614 ✓
Soil		+1002.4 ✓	4.60 ✓	+4611 ✓
Subtotal	-18137 ✓	+1002 ✓		-923190 ✓
Piling Battered Lakeside				+441040 ✓
" " Lockside				+528175 ✓

MOMENT @ ℄ = +46025 ✓ ft-k

= +418 ✓ ft-k

Job No. 4671 Page No. 3B-157

Computed by RJ Beecher Date 4/4/73
Checked by [illegible] Date 4/13/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Subject STRUCTURAL GATE BAY BASE SLAB LAKESIDE

Sheet No. 3 of

Transverse Moment @ ℄

I + II

	Vert Force	Horiz Force	Arm	℄ Moment @ El -19
Walls	-4530.3 ✓			- 342910 ✓ ✓
Baseslab	-13094.4 ✓			- 545063 ✓ ✓
Control Hse Mach Etc	- 158.7 ✓			- 10766 ✓ ✓
Gate (Closed Position)	- 256.8 ✓		34.04 ✓	- 8741 ✓ ✓
Soils	- 45.3 ✓			- 4485 ✓
Soils		+ 467.8 ✓	4.60 ✓	+ 2152 ✓
Subtotal	- 18086 ✓	+ 468 ✓		- 909813 ✓ ✓
Water Load (vert)	- 6704 ✓ ✓			- 263945 ✓ ✓
Uplift	+ 13474 ✓ ✓			+ 591770 ✓ ✓
Horiz Water Load		+ 1390 ✓		- 1147 ✓
Subtotal	- 11316 ✓	+ 1858 ✓		- 583135 ✓
Piling Battered Lakeside				+ 437589 ✓ ✓
" " Lockside				+ 161732 ✓ ✓
			MOMENT @ ℄	+ 16186[16] ✓

= +147[16]/1 ✓

Job No. 4671 Page No. 3B-152

Computed by RJBeahler Date 4/4/73
Checked by WJZ Date 4/13/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE
Sheet No. 4 of

Transverse Moment @ ℄
I+II 2

	Vert Forces	Horiz Forces	Arm	℄ Moment @ EL -19
Refer I+II 1	-18086 ✓	+468 ✓		-909813 ✓ ✓
Vert water Load	-5590 ✓ ✓			-215780 ✓ ✓
Uplift	+12219 ✓			+532796 ✓ ✓
Horiz water Load		+1256 ✓		-1031 ✓
Subtotal	-11457 ✓	+1724 ✓		-593828 ✓
Piling Battered Lakeside				+426715 ✓ ✓
" " Lockside				+180595 ✓ ✓

MOMENT @ ℄ = +13482 ft-k ✓

= +123 ft-k ✓

Job No. 4671 Page No. 3B-153

Computed by R.J. Bechler Date 4/4/73
Checked by WJF Date 4/13/73
Reviewed by _____ Date _____
Approved by _____ Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE

Sheet No. 5 of _____

Transverse Moment @ ℄ I + II4

	Vert Forces	Horiz Forces	Arm	℄ Moment @ El -19
Refer I+II1	-18086 ✓	+468 ✓	✓	-909813 ✓ ✓
Vert Water Load	-7339 ✓			-295089 ✓ ✓
Uplift	+14141 ✓			+624701 ✓ ✓
Horiz Water Load		+1440 ✓		-1109 ✓
Subtotal	-11284 ✓	+1908 ✓		-581310 ✓ ✓
Piling Battered Lakeside				+418279 ✓ ✓
" " Lockside				+179954 ✓

MOMENT @ ℄ = +16923 ^IK ✓

= +154 ^IK/, ✓

Job No. 4671 Page No. 3B-154

Computed by R T Becker Date 4/4/73
Checked by W J F Date 4/13/73
Reviewed by _____ Date _____
Approved by _____ Date _____

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE

Sheet No. 6 of _____

Transverse Moment @ ℄
I+II 6B

	Vert Forces	Horiz Forces	Arm	℄ Moment @ El -19
Refer I+II 1	-18086 ✓	+468 ✓		-909 813 ✓
Vert Water Load	-11418 ✓			-524389 ✓
Uplift	+16493 ✓			+754 581 ✓
Horiz Water Load		+1563 ✓		+357 ✓
	-13011 ✓	+2031 ✓		-679270 ✓
Piling Battered Lakeside				+99 248 ✓
" " Lockside				+603 783 ✓
				MOMENT @ ℄ = +23761 ✓
				= +216 ✓

Computed by R J Becker Date 4/4/73
Checked by W J F Date 4/13/73
Reviewed by [illegible] Date [illegible]
Approved by R G P Date [illegible]

Job No. 4671 Page No. 3B-155
Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE
Sheet No. 7 of

Transverse Moment @ ℄

I + II 7 (I+II 5 SAME)

	Vert Forces	Horiz Forces	Arm	℄ Moment @ El -19
Refer I+II 1	-18086 ✓	+468 ✓		-909 813 ✓
Vert Water Load	-8640 ✓			-373 481 ✓
Uplift	+15318 ✓			+689 725 ✓
Horiz Water Load		0 ✓		0 ✓
Subtotal	-11408 ✓	+468 ✓		-593 569 ✓
Piling Battered Lakeside				+278 717 ✓
" " Lockside				+330 825 ✓

MOMENT @ ℄ = +15973 11 ✓

= +145 11 ✓

Job No. 4671 Page No. 3B-156

Computed by RJ Becker Date 4/4/73
Checked by WJ F Date 4/13/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

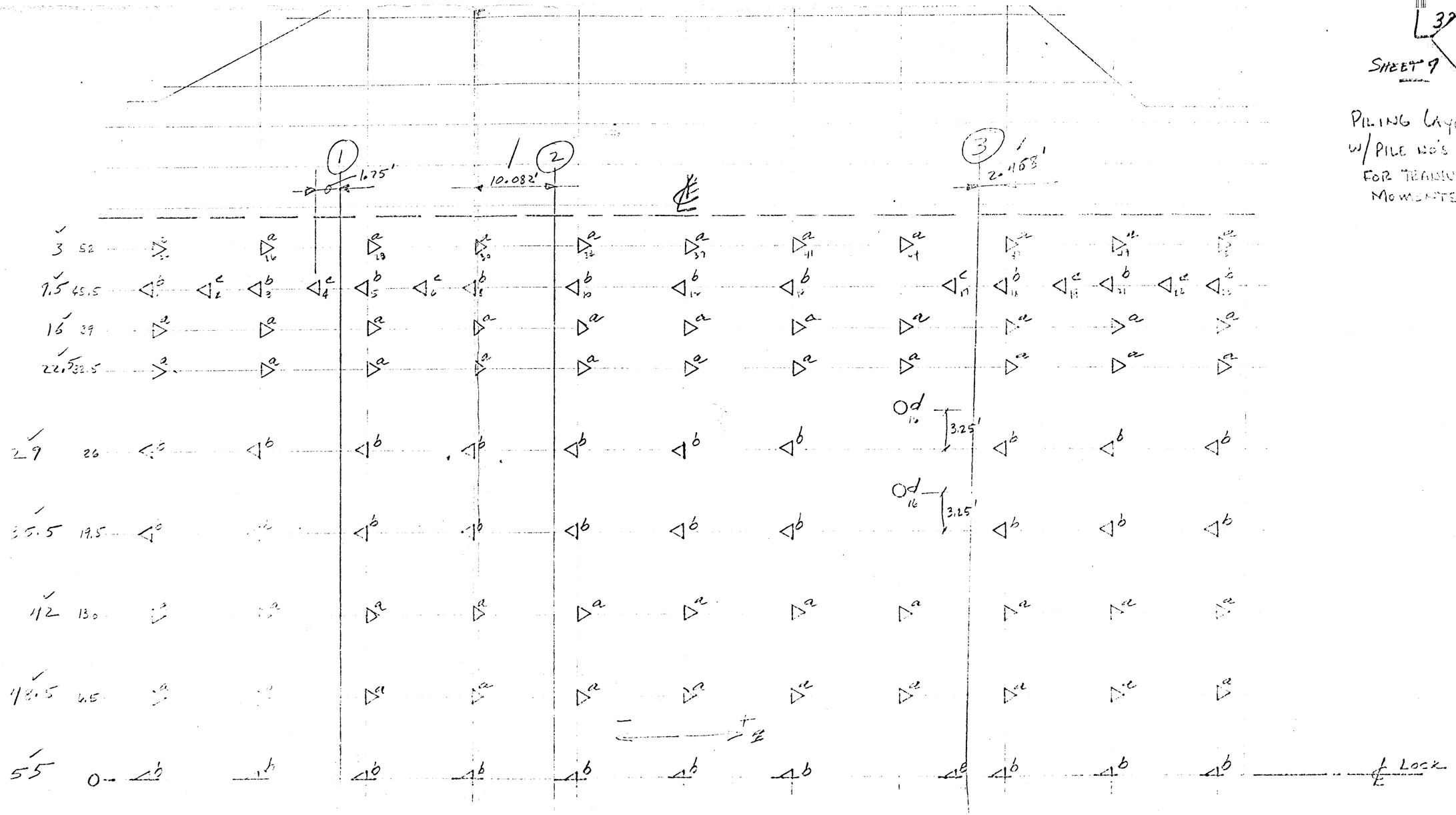
Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE

Sheet No. 8 of

Transverse Moment @ ℄
I+II 8 (Gate Removed)

	Vert Force	Horiz Force	Arm	℄ Moment @ El -19
Refer I+II 1 (less gate)	-17829 ✓	+468 ✓		-901072 ✓
Vert Water Load	-581 ✓			-22907 ✓
Uplift	+17513 ✓			+792744 ✓
Horiz Water Load		+2878 ✓		+12894 ✓
Needles	-480 ✓		27.5 ✓	-13200 ✓
Needle Girders	-11.5 ✓		56.5 ✓	-650 ✓
	-45.3 ✓		18.83 ✓	-853 ✓
Subtotal	-1434 ✓	+3346 ✓		-133044 ✓
Piling Battered Lakeside				+31538 ✓
" " Lockside				+45107 ✓
			MOMENT @ ℄ =	-5639914 ✓
				= -513 1K/1 ✓

PILING LAYOUT
W/ PILE NO'S USED
FOR TRANSV.
MOMENTS



Computed by RBeckler Date 4/5/13
Checked by WJ Date 4/6/13
Reviewed by ____ Date ____
Approved by ____ Date ____

Job No. 4611 Page No. 3B-157
Subject STRUCTURAL
CONC BOX BASE SLAB
LAKESIDE
Sheet No. 9 of ____

℄ SLAB MOMENTS FROM PILING BATTERED TOWARDS LAKESIDE (FOR TRANSVERSE MOMENTS)

Computer No.	Arm Z	Constr. Cond. A		Constr. Cond. B		I+II 7		I+II 8		I+II 1		I+II 2		I+II 4		I+II 6B	
1	33.56	424.8	14256	419.1	14065	263.7	8850	24.7	829	472.9	15871	457.5	15354	447.9	15032	38.9	1305
2	52.75	189.4	9991	186.8	9854	117.6	6203	11.3	596	208.4	10993	201.7	10640	197.5	10418	19.6	1034
3	39.22	522.4	20202	515.4	20523	324.6	12926	31.8	1266	568.1	22622	550.3	21913	538.9	21459	60.4	2405
4	57.82	285.8	16528	282.0	16308	177.7	10276	17.7	1024	307.2	17765	297.8	17222	291.6	16863	36.4	2105
5	39.82	525.7	20933	518.5	20647	326.9	13017	33.3	1326	558.2	22228	541.5	21563	530.6	21124	73.2	2915
6	57.72	287.6	16632	283.7	16406	178.4	10346	18.6	1076	301.2	17453	293.0	16944	287.2	16597	42.2	2510
7	27.50	96.0	2400	94.7	2286	59.7	5224	6.3	551	100.1	8759	97.2	8505	95.3	8339	15.1	1321
8	48.15	625.1	30099	616.5	29684	389.0	18730	41.1	1979	648.0	31201	629.6	30315	616.8	29699	101.6	4892
9	84.60	492.3	10803	475.7	40244	300.3	25405	32.3	2733	474.2	41792	460.3	40633	450.6	39813	53.9	7098
10	51.15	628.9	32168	620.3	31728	391.8	20041	42.9	2194	636.3	32542	619.2	31672	606.7	31033	116.7	5969
11	77.32	378.2	30039	382.8	29621	241.9	18718	27.0	2089	389.0	30023	377.9	29242	370.8	28654	76.8	5912
12	39.82	535.4	21320	528.0	21025	333.8	13292	37.9	1509	538.6	21049	515.1	20511	504.9	20105	111.5	4440
13	77.32	390.6	30225	385.2	29807	243.6	18850	28.1	2174	389.3	29466	377.4	28739	369.1	28174	85.8	6639
14	39.82	538.7	21451	531.2	21152	336.1	13384	39.4	1569	538.7	20655	526.3	20161	496.4	19767	124.3	4950
15	77.32	398.0	30410	387.5	29985	245.3	18981	29.2	2257	378.6	29309	365.0	28246	357.4	27694	95.1	7359
16	(Varies)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17	49.57	345.9	17146	341.0	16903	216.1	10712	26.5	1314	320.4	15892	313.6	15555	307.7	15258	91.4	4531
18	39.82	545.2	21710	537.5	21403	340.7	13567	42.4	1688	498.9	19866	488.8	19464	477.4	19040	149.9	5969
19	52.75	198.9	10492	196.0	10339	124.3	6557	15.7	828	178.6	9418	172.1	9089	172.6	9115	56.9	3001
20	68.00	99.6	6773	98.1	6671	62.2	4230	7.1	487	89.4	6079	87.7	5964	86.1	5855	22.9	1945
21	32.58	442.7	15428	442.8	14824	280.7	9420	36.0	1208	600.1	13427	342.7	13179	385.3	12931	133.1	4447
22	52.75	200.10	10550	197.2	10402	125.2	6604	16.3	860	176.0	9284	172.9	9120	169.7	8952	64.5	3214
23	32.56	451.4	15169	444.9	14951	282.5	9491	37.2	1248	392.0	13156	385.5	12937	377.3	12676	140.6	4819
		86.03.6	449935	8484.4	434828	5362.6	279814	603.6	30857	8541.3	438511	8321.3	427166	8155.6	418660	1717.6	88350
X 4/117		8346.1	427770	8231.1	421845	5202.5	266609	585.6	29936	8236.3	425418	8072.8	414412	7912.1	406160	1615.4	86177
16	52.69	362.7	19113	364.3	19195	229.8	12109	30.4	1602	331.0	12171	232.5	12303	230.0	12119	84.7	4351
Totals		8710.4	446933	8595.4	441040	5432.3	278717	616.0	31538	8567.3	437589	8306.3	426715	8142.1	418279	1743.1	89248

Computed by RJBeebee Date 4/5/73
Checked by WJL Date 4/6/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Job No. 4671 Page No. 38-158
Subject STRUCTURAL
GATE BAY BASEMAT
LAKESIDE
Sheet No. 10 of

℄ SLAB MOMENTS FROM PILING BATTERED TOWARD (GULFSIDE) LOCKSIDE (FOR TRANSVERSE MOMENTS)

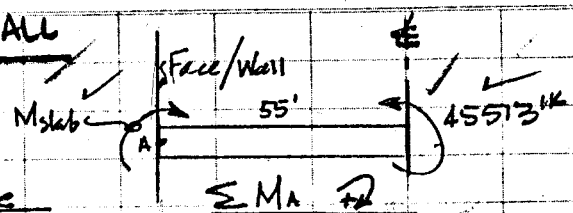
Computer Nde.	Arm ℄	Constr. Cond. A		Constr. Cond. B		I+II7		I+II8		I+II1		I+II2		I+II4		I+II6B	
24	37.57	479.2	18004	494.7	18473	305.8	11489	34.5	1296	201.4	7567	214.3	8051	212.3	7976	527.6	19822
25	60.00	137.5	8250	141.1	8466	87.8	5268	10.1	606	55.8	3348	59.6	3576	57.1	3546	153.0	9180
26	37.57	483.3	18158	495.8	18627	308.7	11598	36.4	1368	189.3	7093	203.1	7630	201.5	7570	543.9	20434
27	63.83	208.0	13277	213.3	13615	132.9	8483	16.0	1021	78.2	4992	84.7	5406	84.1	5368	236.6	15102
28	42.19	557.1	23504	571.2	24099	356.2	15028	43.8	1848	201.2	8497	219.4	9256	217.9	9193	640.2	27010
29	68.88	279.7	19266	286.7	19748	178.9	12323	22.5	1550	97.1	6688	106.5	7336	105.9	7294	324.7	22365
30	46.50	632.1	29393	647.8	30123	404.5	18809	51.8	2409	210.5	9784	232.4	10807	231.2	10751	741.2	34466
31	100.5	70.4	7075	72.1	7246	45.0	4523	5.8	583	23.0	2312	25.5	2563	25.4	2553	82.8	8321
32	83.75	423.2	35443	433.5	36306	270.9	22688	35.4	2965	134.8	11298	150.2	12579	149.6	12529	501.0	41959
(35 vert) 34	55.15	708.3	39063	725.5	40011	458.6	25016	60.3	3326	215.8	11901	242.2	13357	241.5	13319	846.8	46701
35 (30 vert)	79.10	355.6	28128	364.2	28808	227.1	18027	30.9	2444	103.4	8179	117.1	9263	116.7	9247	421.1	32942
37	56.91	785.6	44708	804.3	45773	503.6	28660	69.4	3950	217.6	12384	248.8	14159	248.6	14148	957.0	54463
38	67.00	215.1	14412	220.2	14753	138.0	9246	19.4	1300	56.4	3782	65.4	4382	65.5	4389	264.5	17732
39 (40 vert)	107.0	71.8	7683	73.5	7865	46.1	4933	6.5	696	18.5	1980	21.5	2301	21.5	2301	88.6	9480
41	46.50	648.1	30137	663.3	30843	415.8	19335	57.3	2757	161.8	7524	189.2	8798	189.5	8812	804.0	37396
42 (45 vert)	100.5	72.2	7256	73.9	7427	46.4	4663	6.7	673	17.3	1739	20.5	2060	20.5	2060	92.2	9265
44	51.00	726.0	37026	742.7	37878	466.2	23776	68.7	3504	161.8	8252	194.2	9904	195.1	9950	916.6	46737
45	87.50	72.8	6370	74.4	6510	46.7	4086	6.9	604	15.7	1374	19.0	1663	19.1	1671	92.3	8076
46	68.88	291.6	20085	298.2	20540	187.3	12901	28.0	1929	61.1	4209	74.5	5132	74.9	5159	371.3	25575
47	42.19	585.5	24702	598.2	25263	376.4	15880	57.2	2413	115.1	4856	142.6	6016	143.7	6063	751.9	31723
48	60.00	142.0	8520	150.3	9018	94.5	5670	14.6	876	27.0	1620	34.0	2040	34.4	2064	190.3	11418
49	37.57	516.5	19405	527.9	19833	332.2	12481	52.0	1954	88.1	3310	113.6	4268	114.9	4317	674.2	25330
50	60.00	142.2	8532	151.4	9084	95.4	5724	15.1	906	23.2	1404	30.8	1848	31.3	1878	195.0	11700
51	37.57	520.6	19559	532.0	19987	335.2	12593	53.9	2025	75.5	2837	102.6	3247	104.1	3911	690.4	25938
		7135.4	498416	7353.8	500296	5856.0	313200	805.2	43003	2543.7	136940	2911.5	156242	2908.5	156067	11113.2	573725
x4/117		8662.6	474067	9074.5	435358	5681.2	303849	781.2	41719	2473.6	132851	2824.6	151577	2821.7	151409	10781.4	576192
33	117.0	89.0	16413	89.2	16426	56.1	6564	6.7	784	63.5	7430	63.5	7430	62.4	7301	54.5	6377
36	112.0	89.9	10046	89.8	10058	56.6	6339	7.0	784	61.6	6899	61.8	6922	60.8	6810	57.0	6384
40	97.25	90.3	8782	90.5	8801	57.0	5543	7.3	710	59.7	5806	60.1	5845	59.1	5747	57.2	5586
43	74.50	181.2	13499	181.5	13522	114.5	8530	14.9	1110	117.4	8746	118.4	8821	116.6	8687	121.4	9044
TOTALS		9312.8	516167	9525.5	528175	5965.4	330825	817.1	45107	2775.8	161732	3128.4	180575	3120.6	179754	11073.8	603783

Computed by RJ Bechler Date 4/12/73
Checked by WJF Date 4/13/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Job No. 4671 Page No. 3B-159
Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE
Sheet No. 1 of 11

TRANSVERSE MOMENT @ FACE/WALL

CONSTRUCTION CONDITION A



Slab Moment @ ℄

→ Piling

Base slab 60.50' × 0.150 × 10

Force		ΣM_A +ω
		−45 513
+7909 K		−209 635
−9075	27.50	+249 563
−1166		−5585 IK

At Wall: M_{slab} = + 5585 IK

= + 50.8 IK/'

(See sheets 10 & 11)

Job No. 4671 Page No. 3B-160

Computed by R J Bechler Date 4/12/73

Checked by WJ Date 4/13/73

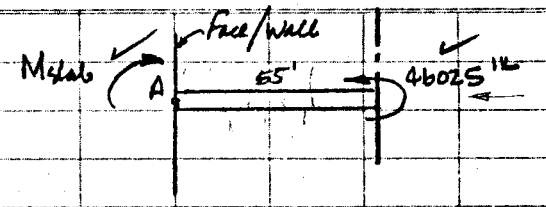
Reviewed by Date

Approved by Date 5-1-73

Subject STRUCTURAL GATE BAY BASE SLAB LAKESIDE

Sheet No. 2 of

CONSTRUCTION CONDITION B



	Force	Arm	ΣM_A +
Slab Moment @ ℄			-46025 lk
Piling	+7946		-210606
Base Slab	-9075	27.50	+249563
	-1129		-7068 lk

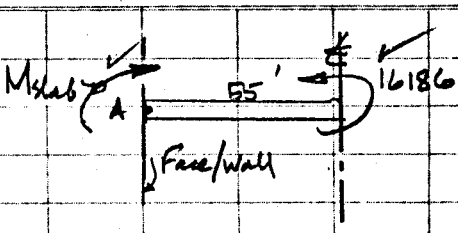
At Wall: $M_{slab} = +7068$ lk

$= +64.3$ lk/l

Computed by RJBecker Date 4/12/73
Checked by WJZ Date 4/13/73
Reviewed by _____ Date _____
Approved by RCP Date 4-15-73

Job No. 4671 Page No. 3B-161
Subject STRUCTURAL GATE BAY BASE SLAB, LAKESIDE
Sheet No. 3 of _____

I + II 1



	Force	Arm	ΣM_A ↻
Slab Moment @ ℄			- 16186
Piling	+ 5050		- 133953
Base Slab	- 9075	27.50	+ 249563
Uplift 1.920 kf x 2008 ft	+ 3855	27.50	- 106013
1.248 x 4043	+ 5046	27.50	- 138765
Water Load			
0.608 x 1323	- 804	27.50	+ 22110
0.608 x 551	- 335	36.67	+ 12284
0.608 x 2124	- 1291	19.65	+ 25368
1.280 x 1428	- 1828	27.50	+ 50270
1.280 x 624	- 799	41.0	+ 32759
			- 2563

At Wall: $M_{slab} = + 2563^{ft\text{-}k}$
$= + 23.3^{ft\text{-}k/ft}$

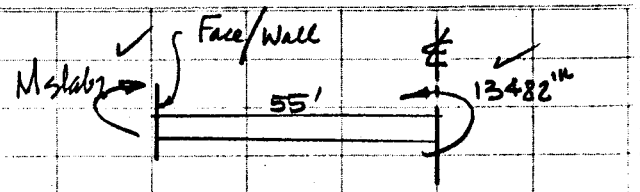
Job No. 4671 Page No. 3B-162

Computed by R J Bechler Date 4/12/73
Checked by WJF Date 4/13/73
Reviewed by _____ Date _____
Approved by RCP Date 5-7-73

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE

Sheet No. 4 of _____

I + II 2



		Force	Arm	ΣM_A
Slab Moment @ ℄				-13482
Piling		+5104		-135365
Base slab		-9075	27.50	+249563
Uplift	1.792 × 2008 □'	+3598	27.50	-98945
	1.120 × 4043	+4528	27.50	-124520
Water Load				
	0.480 × 1323	-635	27.50	+17463
	0.480 × 551	-264	36.67	+9681
	0.485 × 2124	-1020	19.65	+20043
	1.152 × 1428	-1645	27.50	+45238
	1.152 × 624	-719	41.0	+29479
				-845

At Wall: $M_{slab} = +845^{IK}$
$= +7.7^{IK/'}$

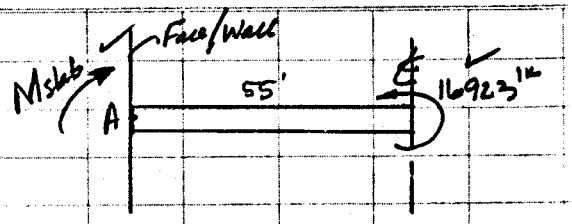
Job No. 4671 Page No. 3B-163

Computed by R J Beehler Date 4/12/73.
Checked by W J Date 4/13/73
Reviewed by Date
Approved by Date

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE

Sheet No. 5 of

I + II 4



	Force	Arm	ΣMA ↻
Slab Moment @ ℄			−16923
Piling	+5026		−133294
Base Slab	−9075	27.50	+249563
Uplift 1.920 x 2008	+3855	27.50	−106013
1.344 x 4043	+5434	27.50	−149435
Water Load			
0.704 x 1323	−931	27.50	+25603
0.704 x 551	−388	36.67	+14228
0.704 x 2124	−1495	19.65	+29377
1.280 x 1428	−1828	27.50	+50270
1.280 x 624	−799	41.0	+32759
			−3865 'k

At Wall: $M_{slab} = +3865$ 'k
$= +35.1$ 'k/'

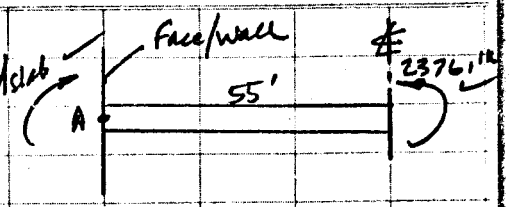
Computed by RJ Becker Date 4/12/73
Checked by WJ Date 4/13/73
Reviewed by Date 4/15/73
Approved by RGal Date 5-73

Job No. 4671 Page No. 3B-164

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE

Sheet No. 6 of

I+II 6B



		Force	Arm	ΣM_A ↻
Slab Moment @ ℄				− 23761
Piling		+ 5570		− 147482
Base slab		− 9075	27.50	+ 249563
Uplift	1,344 × 2008	+ 2699	27.50	− 74223
	1.920 × 4043	+ 7763	27.50	− 213483
Water Load				
	1.503 × 1323	− 1988	27.50	+ 54670
	1.503 × 557	− 828	36.67	+ 30363
	1.503 × 2124	− 3192	19.65	+ 62723
	0.704 × 1428	− 1005	27.50	+ 27638
	0.704 × 624	− 439	41.0	+ 17999
				− 15993

At Wall: M_{slab} = + 15993 1K
= + 145.4 1K/1

Job No. 4671 Page No. 38-165

Computed by R.J. Bacher Date 4/12/73

Checked by W.J. Date 4/13/73

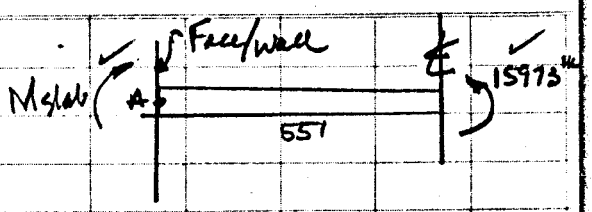
Reviewed by [illegible] Date [illegible]

Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE

Sheet No. 7 of

I + II 7



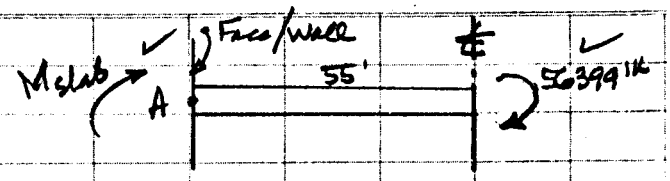
	Force	Arm	ΣMA ↻
Slab Moment @ ℄			-15973 ✓
Piling	+4999 ✓		-132503 ✓
Base slab	-9075 ✓	27.50 ✓	+249563 ✓
Uplift 1.632 ✓ × 6050 ✓	+9874 ✓	27.50 ✓	-271535 ✓
Water Load 0.992 ✓ × 6050 ✓	-6002 ✓	27.50 ✓	+165055 ✓
			-53931K ✓

At Wall: M_{slab} = +53931K ✓
= +49.01K, ✓

Computed by RT Becker Date 4/12/73
Checked by WJZ Date 4/13/73
Reviewed by [illegible] Date 4/13/73
Approved by [illegible] Date 4/13/73

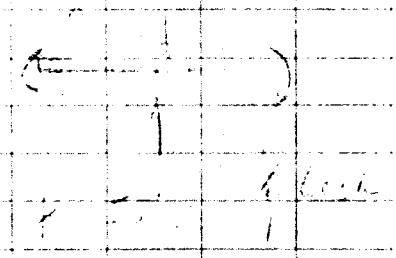
Job No. 4671 Page No. 3B-166
Subject STRUCTURAL
GATE BAY BASE SLAB
LARES 10¢
Sheet No. 8 of

I+II 8



	Force	Arm	ΣMA (+)
Slab Moment @ ℄			+56399
Piling	+628		-16643
Base slab	-9075	27.50	+249563
Uplift 1.856 x 6050	+11229	27.50	-308798
Water Load	-581	27.50	+15978
			-3501

At Wall: $M_{slab} = +350^{1K}$
$= +31.8^{1K}/_{1}$



Computed by RJ Becker Date 4/9/73
Checked by WJF Date 4/11/73
Reviewed by [illegible] Date 4/11/73
Approved by ____ Date ____

TRANSVERSE MOMENT AND SHEAR OF PILING AT FACE OF WALL (INCLUDES ONLY PILING FROM FACE OF WALL TO ℄ BASE SLAB)

Job No. 4671 Page No. 3B-168
Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE
Sheet No. 10 of ____

Computer No.		(1) Constr Cond A	(2) Constr. Cond. B	(3) I+II7	(4) I+II8	(5) I+II1	(6) I+II2	(8) I+II4	(10) I-II6B
20	5/14	342.3	351.2	218.4	24.6	143.8	153.1	151.6	376.9
26	5/14	345.2	354.1	220.5	26.0	134.9	145.1	143.9	388.5
28	5/16	348.2	357.0	222.6	27.4	125.9	137.1	136.2	400.1
30	5/18	351.2	359.9	224.7	28.8	116.9	129.1	128.5	411.8
34	5/20	354.1	362.7	226.8	30.2	107.9	121.1	120.7	423.4
37	5/22	357.1	365.6	228.9	31.6	98.9	113.1	113.0	435.0
41	5/18	360.0	368.5	231.0	32.9	89.9	105.1	105.3	446.6
44	5/20	363.0	371.4	233.1	34.3	80.9	97.1	97.6	458.3
47	5/16	366.0	374.2	235.2	35.7	71.9	89.1	89.8	469.9
49	5/14	368.9	377.1	237.3	37.1	62.9	81.1	82.1	481.5
51	5/14	371.9	380.0	239.4	38.5	54.0	73.1	74.4	493.2
a		3927.9 (3810.6)	4021.7 (3901.6)	2517.9 (2442.7)	347.1 (336.7)	1087.9 (1055.4)	1244.1 (1207.0)	1243.1 (1206.0)	4785.2 (4642.3)
		Moment @ Face/Wall = [100600]	[103002]	[64487]	[8889]	[27863]	[31865]	[31838]	[122557]
1	35/4.5	330.4	325.9	205.1	19.2	367.8	355.8	348.3	32.3
3	35/5.5	332.4	328.0	206.5	20.2	361.5	350.2	342.9	33.4
5	35/5.5	334.5	330.0	209.0	21.2	355.2	344.6	337.5	46.6
8	35/6.5	336.6	332.0	209.5	22.2	348.9	339.0	332.1	54.7
10	35/6.5	338.7	334.0	210.9	23.1	342.6	333.4	326.7	62.8
12	35/5.5	340.7	336.0	212.4	24.1	336.4	327.8	321.3	71.0
14	35/5.5	342.8	338.0	213.9	25.1	330.1	322.2	315.9	79.1
18	35/5.5	346.9	342.0	216.8	27.0	317.5	311.0	305.1	95.4
21	35/4.5	349.0	344.0	218.3	28.0	311.2	305.4	299.7	103.5
23	35/4.5	351.1	346.1	219.8	29.0	304.9	299.8	294.2	111.7
b		3403.1 (3301.5)	3356.0 (3255.8)	2121.2 (2057.9)	239.1 (232.0)	3376.1 (3275.3)	3289.2 (3191.0)	3223.7 (3127.4)	693.5 (672.8)
		Moment @ Face/Wall = [95744]	[94418]	[59679]	[6728]	[94984]	[92539]	[90695]	[19511]

( ) = No. × 4/√17
Arm = 26.40
Arm = 29.00

Computed by RJ Bachler Date 4/9/73
Checked by WJF Date 4/11/73
Reviewed by ____ Date ____
Approved by ____ Date ____

TRANSVERSE MOMENT AND SHEAR OF PILING AT FACE OF WALL (INCLUDES ONLY PILING FROM FACE OF WALL TO ℄ OF BASE SLAB.)

Job No. 4671 Page No. 38-169
Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE
Sheet No. 11 of ____

	Computer No.		(1) Constr Cond A	(2) Constr. Cond B	(3) I+II 7	(4) I+II 8	(5) I+III	(6) I+II 2	(8) I+II 4	(10) I-II 6B	
C piles	2 ✓	1/2 ✓	94.7 ✓	93.4 ✓	58.8 ✓	5.6 ✓	104.2 ✓	100.9 ✓	98.8 ✓	9.8 ✓	
	4 ✓	1/3 ✓	95.3 ✓	94.0 ✓	59.2 ✓	5.9 ✓	102.4 ✓	99.3 ✓	97.2 ✓	12.1 ✓	
	6 ✓	1/3 ✓	95.9 ✓	94.6 ✓	59.6 ✓	6.2 ✓	100.6 ✓	97.7 ✓	95.7 ✓	4.5 ✓	
	17 ✓	1/3.5 ✓	98.8 ✓	97.4 ✓	61.7 ✓	7.6 ✓	91.6 ✓	89.7 ✓	87.9 ✓	26.1 ✓	
	19 ✓	1/2 ✓	99.4 ✓	98.0 ✓	62.2 ✓	7.9 ✓	89.8 ✓	88.1 ✓	86.4 ✓	28.4 ✓	
	22 ✓	1/2 ✓	100.0 ✓	98.6 ✓	62.6 ✓	8.1 ✓	88.0 ✓	86.5 ✓	84.8 ✓	30.8 ✓	
			✓584.1 (566.7) ✓	576.0 (558.8) ✓	364.1 (353.2) ✓	41.8 (40.1) ✓	576.6 (559.4) ✓	562.2 (545.4) ✓	550.8 ✓ (534.4) ✓	21.7 ✓ (118.1) ✓	( ) = No. x 4/11 ✓
Moment @ Face/Wall =			[5384] ✓ ✓	[5309] ✓	[3355] ✓	[381] ✓	[5314] ✓	[5181] ✓	[5077] ✓	[1122] ✓	Arm = 9.50' ✓
d	16 ✓	2/4 ✓	(181.8 ✓) ✓	(182.1 ✓)	(114.9 ✓)	(15.2 ✓)	(115.5 ✓)	(116.8 ✓)	(115.0 ✓)	(23.9 ✓)	Vert Piles ✓
Moment @ Face/Wall =			[5272] ✓	[5281] ✓	[3332] ✓	[441] ✓	[3350] ✓	[3387] ✓	[3335] ✓	[3593] ✓	Arm = 29.00'
e	17 ✓	0.5/3.5 ✓	44.4 ✓ (47.9) ✓	43.7 ✓ (47.2) ✓	30.9 ✓ (30.0) ✓	3.8 ✓ (3.7) ✓	45.8 ✓ (44.4) ✓	44.8 ✓ (43.5) ✓	44.0 ✓ (42.7) ✓	12.1 ✓ (12.7) ✓	( ) = No. x 4/11 ✓
Moment @ Face/Wall =			[2635] ✓	[2596] ✓	[1650] ✓	[204] ✓	[2442] ✓	[2393] ✓	[2349] ✓	[699] ✓	Arm = 55.00'

	(1)	(2)	(3)	(4)	(5)	(6)	(8)	(10)	
TOTALS	7908.5 k ✓	7945.5 k ✓	4998.7 k ✓	627.7 k ✓	5050.0 k ✓	5103.7 k ✓	5025.5 k ✓	5569.8 k ✓	TOTAL SHEAR @ Face/Wall
	209635. in-k ✓	210606. in-k ✓	132503. in-k ✓	16643. in-k ✓	133953 in-k ✓	135365. in-k ✓	133294 in-k ✓	147482 in-k ✓	TOTAL MOMENT @ Face/Wall

Computed by WJL Date 4/11/73
Checked by RJ Date 4/12/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Job No. 4671 Page No. 3B-170
Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE
Sheet No. 1 of

SHEAR AND LONGITUDINAL MOMENT ABOUT ℄ BASE SLAB

Pile Computer No.	Arm	CONSTR. COND. A PX 4/√17	CONSTR. COND. A Moment	CONSTR COND B PX 4/√17	CONSTR COND B MOMENT	CASE I+II 7 PX 4/√17	CASE I+II 7 MOMENT	CASE I+II 8 PX 4/√17	CASE I+II 8 MOMENT	CASE I+II 1 PX 4/√17	CASE I+II 1 MOMENT	CASE I+II 2 PX 4/√17	CASE I+II 2 MOMENT
24	-52.5	332.1	-17 435	340.7	-17 887	211.9	-11 125	23.9	-1255	139.5	-7324	148.5	-7796
26	-42.0	334.9	-14 066	343.5	-14 427	213.9	-8984	25.2	-1058	130.9	-5498	140.8	-5914
28	-31.5	337.8	-10 641	346.3	-10 908	216.0	-6804	26.6	-838	122.1	-3846	133.0	-4190
30	-21.0	340.7	-7155	349.2	-7333	218.0	-4578	27.9	-586	113.4	-2381	125.2	-2629
34	-10.5	343.5	-3607	351.9	-3695	220.0	-2310	29.3	-308	104.7	-1099	117.5	-1234
37	0.0	346.4	-0-	354.7	-0-	222.1	-0-	30.7	-0-	95.9	-0-	109.7	-0-
41	10.5	349.3	3668	357.5	3754	224.1	2353	31.9	335	87.2	916	102.0	1071
44	21.0	352.2	7396	360.3	7566	226.1	4748	33.3	699	78.5	1649	94.2	1978
47	31.5	355.1	11 186	363.0	11 435	228.2	7188	34.6	1090	69.8	2199	86.4	2722
49	42.0	357.9	15 032	365.8	15 364	230.2	9668	36.0	1512	61.0	2562	78.7	3305
51	52.5	360.8	18 942	368.7	19 357	232.3	12 196	37.4	1964	52.4	2751	70.9	3722
		3810.7	+3320	3901.6	+3226	2442.8	+2352	336.8	+1555	1055.4	-10 071	1206.9	-8965
1	-52.5	320.5	-16 826	316.2	-16 601	199.0	-10 448	18.6	-977	356.8	-18 732	345.2	-18 123
3	-42.0	322.5	-13 545	318.2	-13 364	200.3	-8413	19.6	-823	350.7	-14 729	339.7	-14 267
5	-31.5	324.5	-10 222	320.1	-10 083	201.8	-6357	20.6	-649	344.6	-10 855	334.3	-10 530
8	-21.0	326.5	-6857	322.1	-6764	203.2	-4267	21.5	-452	338.5	-7109	328.9	-6907
10	-10.5	328.6	-3450	324.0	-3402	204.6	-2148	22.4	-235	332.4	-3490	323.4	-3396
12	0.0	330.5	-0-	326.0	-0-	206.1	-0-	23.4	-0-	326.4	-0-	318.0	-0-
14	10.5	332.6	3492	327.9	3443	207.5	2179	24.4	256	320.2	3362	311.6	3282
18	31.5	336.5	10 600	331.8	10 452	210.3	6624	26.2	825	308.0	9702	301.7	9504
21	42.0	338.6	14 221	333.7	14 015	211.8	8896	27.2	1142	301.9	12 680	296.3	12 445
23	52.5	340.6	17 882	335.8	17 630	213.2	11 193	28.1	1475	295.8	15 530	290.8	15 267
		3301.4	-4705	3255.8	-4674	2057.8	-2741	232.0	+562	3275.3	-13 641	3190.9	-12 725

NOT USED

Computed by WJT Date 4/11/73
Checked by GAS Date 4/17/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date 5-16

Job No. 4671 Page No. 38-171
Subject STRUCTURAL
GATE GUY BASE SLAB
LAKESIDE GATES.
Sheet No. 2 of

P.C. COMPUTER No.		Arm	CONSTR. Px 4/√17	COND. A MOMENT	CONSTR. Px 4/√17	COND. B MOMENT	CASE I + II 7 Px 4/√17	MOMENT	CASE I + II 8 Px 4/√17	MOMENT	CASE I + II 1 Px 4/√17	MOMENT	CASE I + II 2 Px 4/√17	MOMENT
c	2	-47.25	91.9	-4342	90.6	-4281	57.0	-2693	5.4	- 255	101.1	-4777	97.9	-4626
	4	-36.75	92.5	-3399	91.2	-3352	57.4	-2109	5.7	- 209	99.3	-3649	96.3	-3539
	6	-26.25	93.0	-2441	91.8	-2410	57.8	-1517	6.0	- 158	97.6	-2562	94.8	-2489
	17	+26.25	95.9	2517	94.5	2481	59.9	1572	7.4	194	88.9	2334	87.0	2284
	19	+36.75	96.4	3543	95.1	3495	60.3	2216	7.7	283	87.1	3201	85.5	3142
	22	+47.25	97.0	+4583	95.7	4522	60.7	2868	7.9	373	85.4	4035	83.9	3964
			566.7	+ 461	558.9	+ 455	353.1	+ 337	40.1	+ 228	559.4	-1418	545.4	-1264
e	17	+26.25	47.9	+1257	47.2	+1239	30.0	+ 788	3.7	+ 97	44.4	+1166	43.5	+1142
d	16	+21.0	181.8 (vertical)	+ 3818	182.1	+ 3824	114.9	+ 2413	15.2	+ 319	115.5	+ 2426	116.8	+ 2453

NOT USED

	(1) Constr. Cond. A	(2) Constr. Cond. B	(3) CASE I + II 7	(4) CASE I + II 8	(5) CASE I + II 1	(6) Case I + II 2
Total Force	7908.5	7945.6	4998.6	627.8	5050.0	5103.5
Total Moment	+4151	+4070	+3149	+2761	-21538	-19359

Job No. 4671 Page No. 3B-172

Computed by WJZ Date 4/12/73
Checked by GAS Date 4/13/73
Reviewed by RCC Date 4/19/73
Approved by ____ Date ____

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKE SIDE GATES

Sheet No. 3 of ____

PILE MOMENT & SHEAR (LONGITUDINAL) ABOUT E BASE SLAB

Pile COMPUTER NO.	Arm	CASE I + II 4 Px 4/√17	CASE I + II 4 MOMENT	CASE I + II 6B Px 4/√17	CASE I + II 6B MOMENT
24	-52.5	147.1	-7723	365.6	-19 194
26	-42.0	139.6	-5863	376.9	-15 830
28	-31.5	132.1	-4 161	388.2	-12 228
30	-21.0	124.7	-2619	399.5	-8 390
34	-10.5	117.1	-1 230	410.8	-4 313
37	0.0	109.6	-0-	422.0	-0-
41	10.5	102.2	1 073	433.3	4550
44	21.0	94.7	1 989	444.6	9 337
47	31.5	87.1	2 744	455.9	14 361
49	42.0	79.6	3 343	467.2	19 622
51	52.5	72.2	3 791	478.5	25 121
		1206.0	-8656	4642.5	+13 036
1	-52.5	337.9	-17 740	29.4	-1544
3	-42.0	332.7	-13 973	37.3	-1567
5	-31.5	327.4	-10 313	45.2	-1424
8	-21.0	322.2	-6 766	53.1	-1 115
10	-10.5	316.9	-3 327	60.9	-639
12	0.0	311.7	-0-	68.9	-0-
14	10.5	306.5	3 218	76.7	805
18	31.5	296.0	9 324	92.6	2 917
21	42.0	290.8	12 214	100.4	4 217
23	52.5	285.4	14 984	108.4	5 691
		3127.5	-12 379	672.9	+7341

Job No. 4671 Page No. 3B-173

Computed by WJF Date 4/12/73
Checked by GAS Date 4/17/73
Reviewed by [illegible] Date 4-18-73
Approved by [illegible] Date 5-2-73

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES

Sheet No. 4 of

PILE MOMENT AND SHEAR (LONGITUDINAL) ABOUT ℄ BASE SLAB

COMPUTER NO.	ARM	CASE I + II 4		CASE I + II 6B	
		P x 4/√17	MOMENT	P x 4/√17	MOMENT
2	-47.25 ✓	95.9 ✓	-4 531	9.5 ✓	- 449
4	-36.75 ✓	94.3 ✓	-3 466	11.7 ✓	- 430
6	-26.25 ✓	92.8 ✓	-2 436	14.1 ✓	- 370
17	+26.25 ✓	85.3 ✓	2 239	25.3 ✓	664
19	+36.75 ✓	83.8 ✓	+3 080	27.6 ✓	1 014
22	+47.25 ✓	82.3 ✓	3 889	29.9 ✓	1 413
		534.4 ✓	-1 225 ✓	118.1 ✓	+1842 ✓
17	+26.25 ✓	42.7 ✓	+1 121 ✓	12.7 ✓	+ 333 ✓
		(vert)	✓		
16	+21.0 ✓	115.0 ✓	+2 415 ✓	123.9 ✓	+2 602 ✓

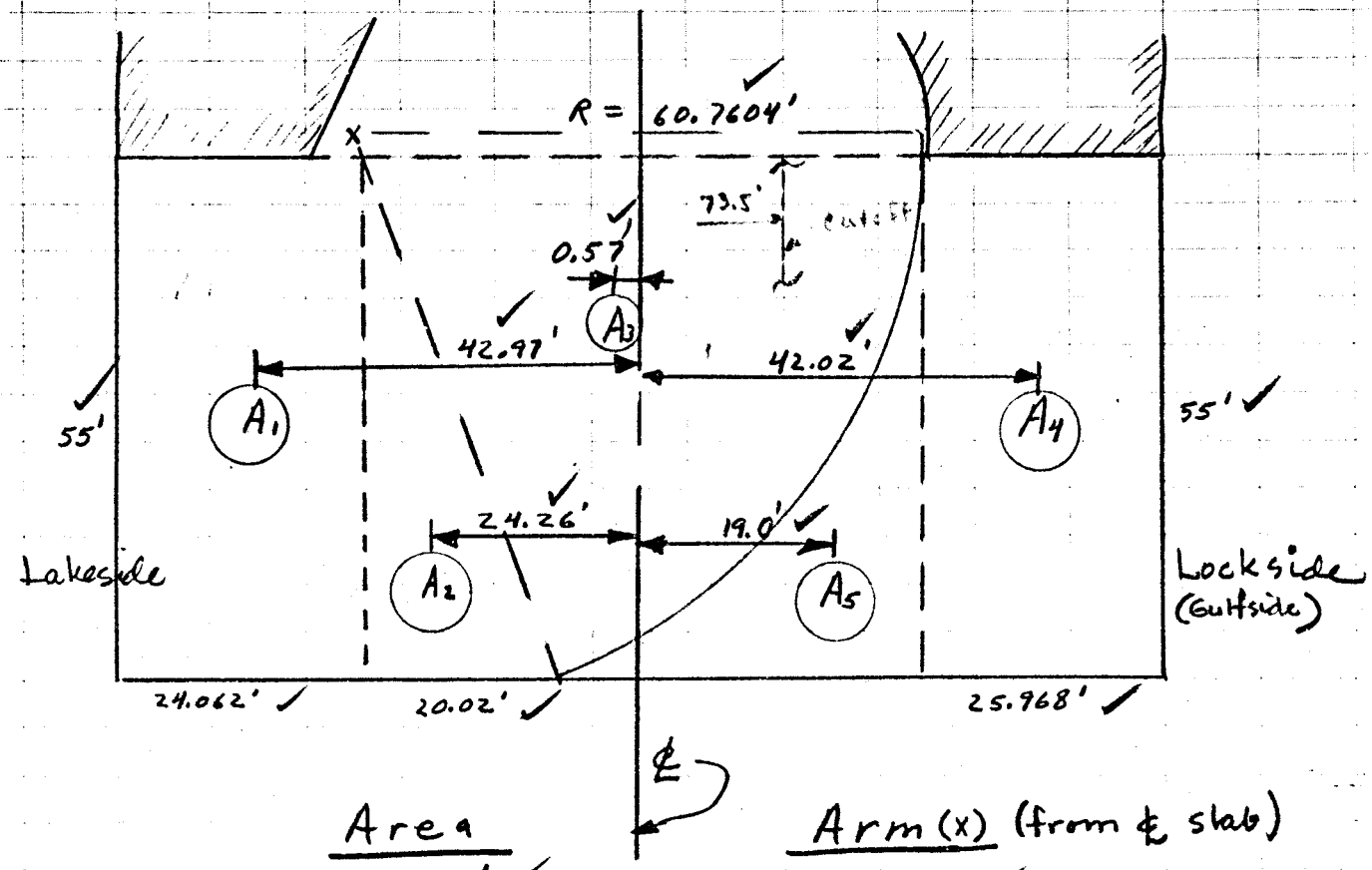
	(8) CASE I + II 4	(10) CASE I + II 6B
Total Force	5025.6 ✓	5 570.1 ✓
Total Moment	-18 724 ✓	+25 154 ✓

Job No. 4671 Page No. 32-174

Computed by WJL Date 4/12/73
Checked by RJ Redden Date 4/13/73
Reviewed by [illegible] Date 4-16-73
Approved by [illegible] Date 5-7-73

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKE SIDE GATE

Sheet No. 1 of



	Area	Arm (x) (from ℄ slab)
A_1 =	1323 □' ✓	-42.97 ✓
A_2 =	551 □' ✓	-24.26 ✓
A_3 =	2124 □' ✓	-0.57 ✓
A_4 =	1428 □' ✓	+42.02 ✓
A_5 =	624 □' ✓	+19 ✓

Job No. 4671 Page No. 3B-175

Computed by WJT Date 4/12/73
Checked by GAS Date 4/17/73
Reviewed by Date
Approved by Date

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES
Sheet No. 2 of

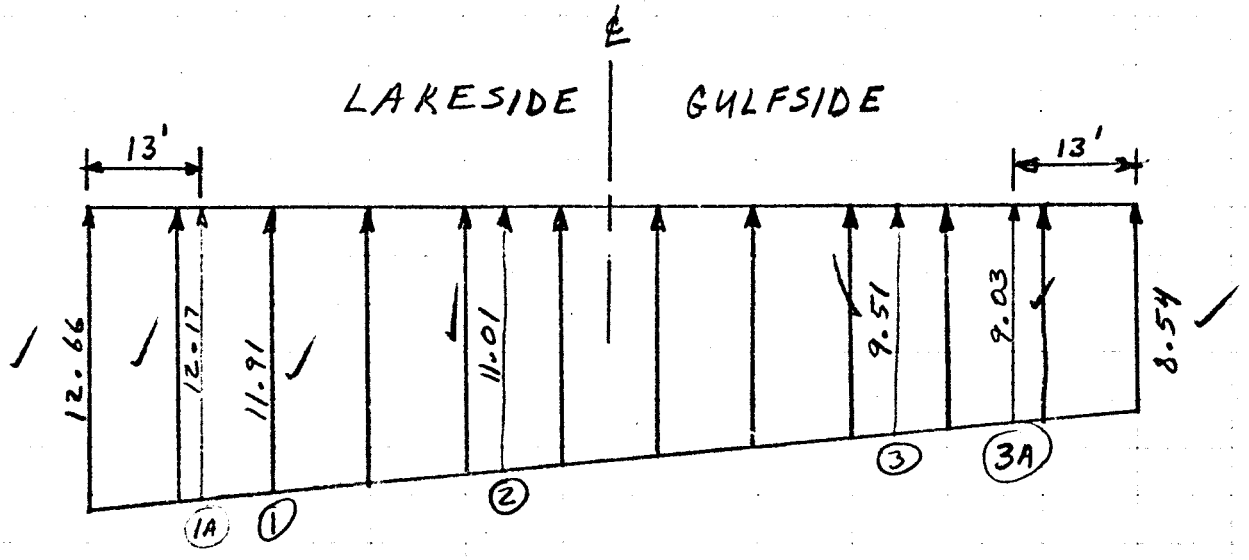
LONGITUDINAL MOMENTS & FORCES DUE TO WATER & SLAB

CONSTR. COND. Ia

		Force		Moment
No Water				
SLAB	55X10X110X.150 =	-9075	x 0.0 =	-0.0
Piles		+7908.5		+4151
totals		-1166.5		+4151

$$e = \frac{4151}{-1166.5} = -3.56'$$

$$\text{Unbalanced Shear} = \frac{-1166.5}{110} \pm \frac{4151 \times 6}{(110)^2} = \begin{matrix} 12.66 \\ 8.54 \end{matrix}$$



Job No. 4671 Page No. 3B-176

Computed by WJL Date 4/12/73
Checked by GAS Date 4/17/73
Reviewed by [illegible] Date 4-19-73
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 3 of

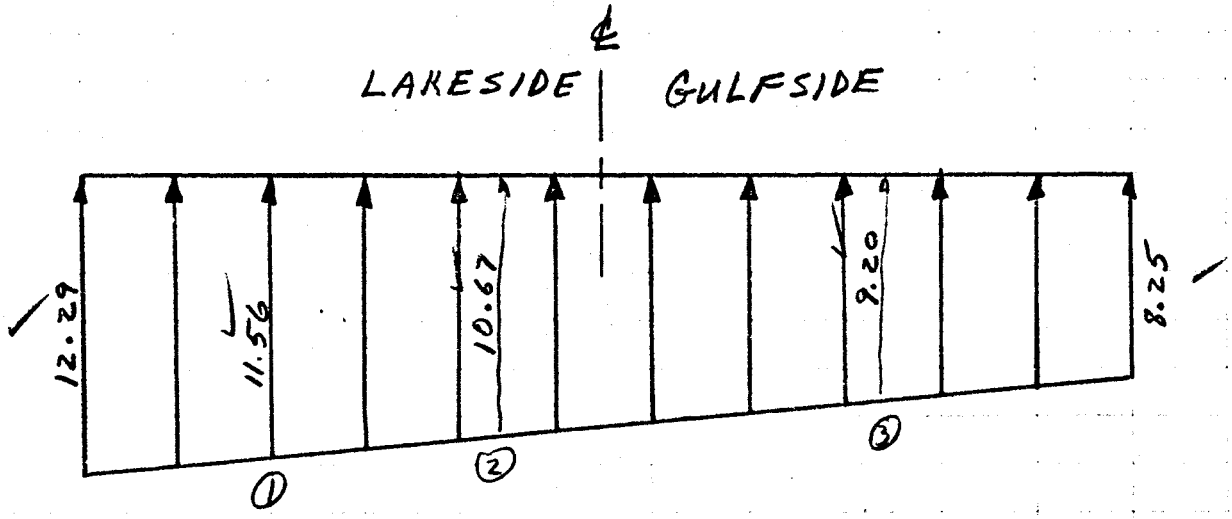
LONGITUDINAL MOMENT & FORCES

CONSTR. COND. IB

	Force		Moment
No Water			
SLAB	-9075 ✓	x0.0	-0-
Piles	+7945.6 ✓		+4070 ✓
	-1129.4 ✓ ↓		4070 ✓ ↓

$$e = \frac{4070}{1129.4} = -3.60'$$

$$\text{unbalanced shear} = \frac{-1129.4}{110} \pm \frac{4070 \times 6}{(110)^2} = \begin{matrix} 12.29 \\ 8.25 \end{matrix}$$



Job No. 4671 Page No. 3B-177

Computed by WJZ Date 4/12/73
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Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES

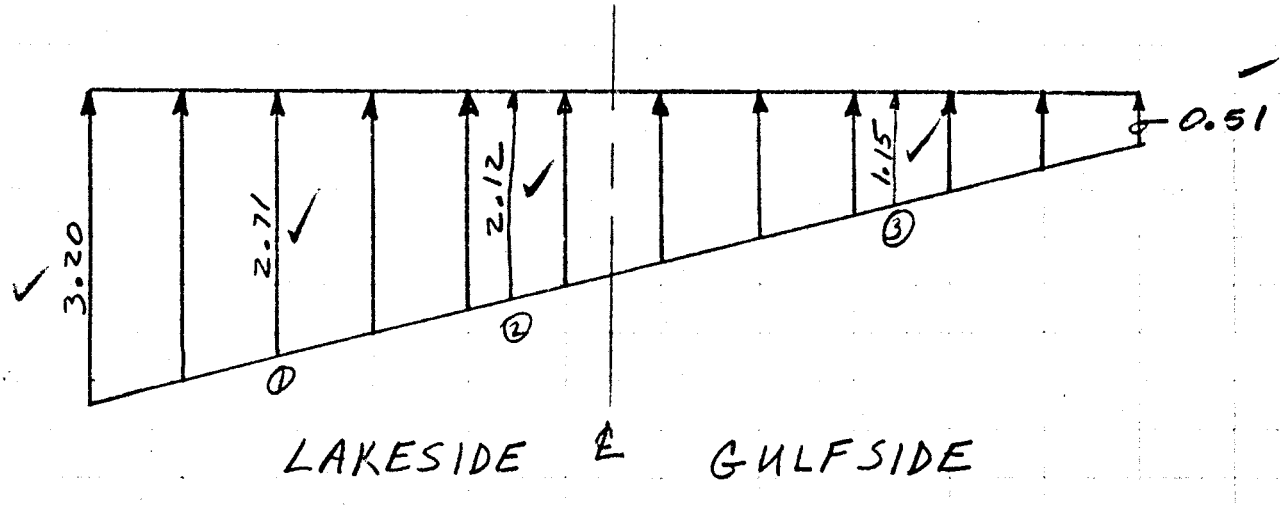
Sheet No. 4 of

LONGITUDINAL MOMENT & FORCES

CASE I + II ?		FORCE	Moment
Water			
A_1	1323 x:992	-1312.2 x-42.97 =	56 385
A_2	551 x:992	- 546.6 x-24.26 =	13 261
A_3	2124 x:992	-2107.0 x-0.57 =	1 201
A_4	1428 x:992	-1416.6 x42.02 =	-59 526
A_5	624 x:992	- 619.0 x 19 =	-11 761
UPLIFT			
	73.5X55 x +1.632	6597.4 x-18.25 =	-120 403
	36.5X55 x +1.632	3276.2 x36.75 =	120 400
SLAB			
		-9 075 x0.0	
Piles		+4 998.6	+3149
		-204.2	+2706

$$e = \frac{2706}{204.2} = -13.25$$

$$V = \frac{204.2}{110} \pm \frac{6 \times 2706}{(110)^2} = \begin{matrix} 3.20 \\ 0.51 \end{matrix}$$



Job No. 4671 Page No. 3B-176

Computed by WJL Date 4/12/73
Checked by GAS Date 4/17/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES

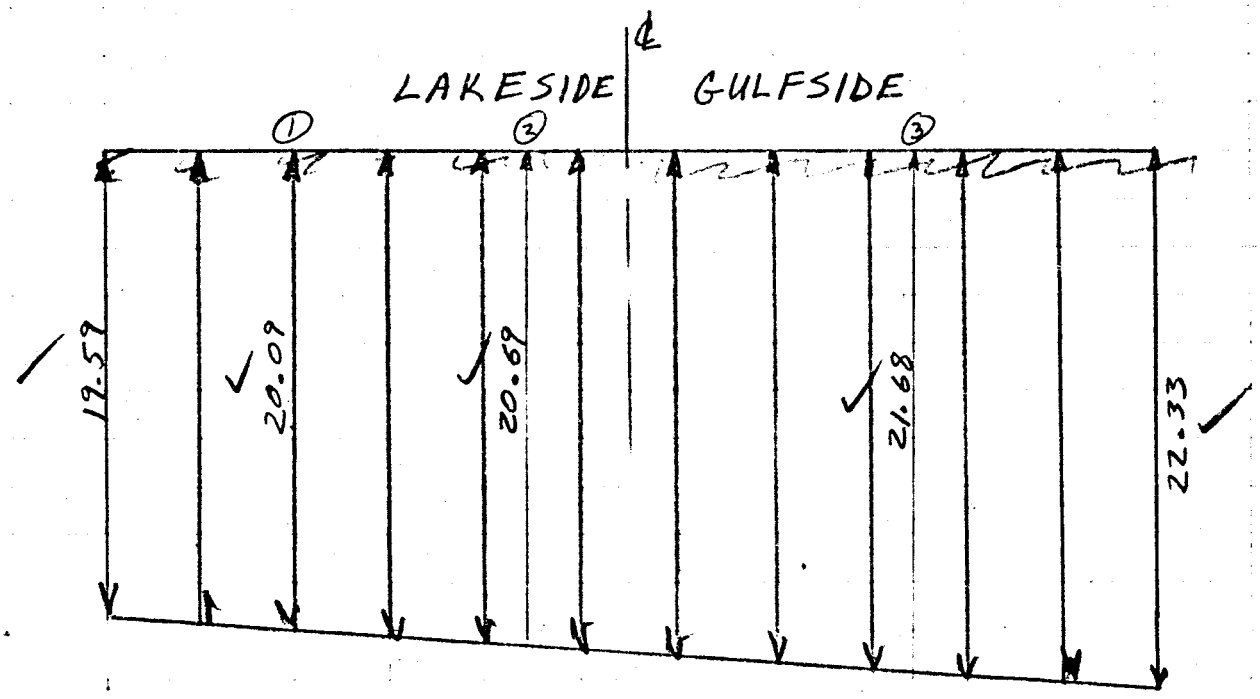
Sheet No. 5 of

LONGITUDINAL MOMENT & FORCES

CASE I + II 8	FORCE		MOMENT
Water ✓			
1.216 x 391.6 □' =	- 476 ✓	x 0.0	
UPLIFT ✓			
55 ✓ x 110 ✓ x 1.856 ✓ =	11 229 ✓	x 0.0	
SLAB			
	-9075 ✓	x 0.0	
Piles			
	628 ✓		+ 2761 ✓
	+2306 ✓		+ 2761 ✓

$$e = \frac{2761}{2306} = 1.2$$

$$V = \frac{2306}{110} \pm \frac{6 \times 2761}{(110)^2} = \begin{matrix} 22.33 \\ 19.59 \end{matrix}$$



Job No. 4671 Page No. 3B-179

Computed by WJL Date 4/12/73
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Approved by [illegible] Date 5-73

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKE SIDE GATES
Sheet No. 6 of

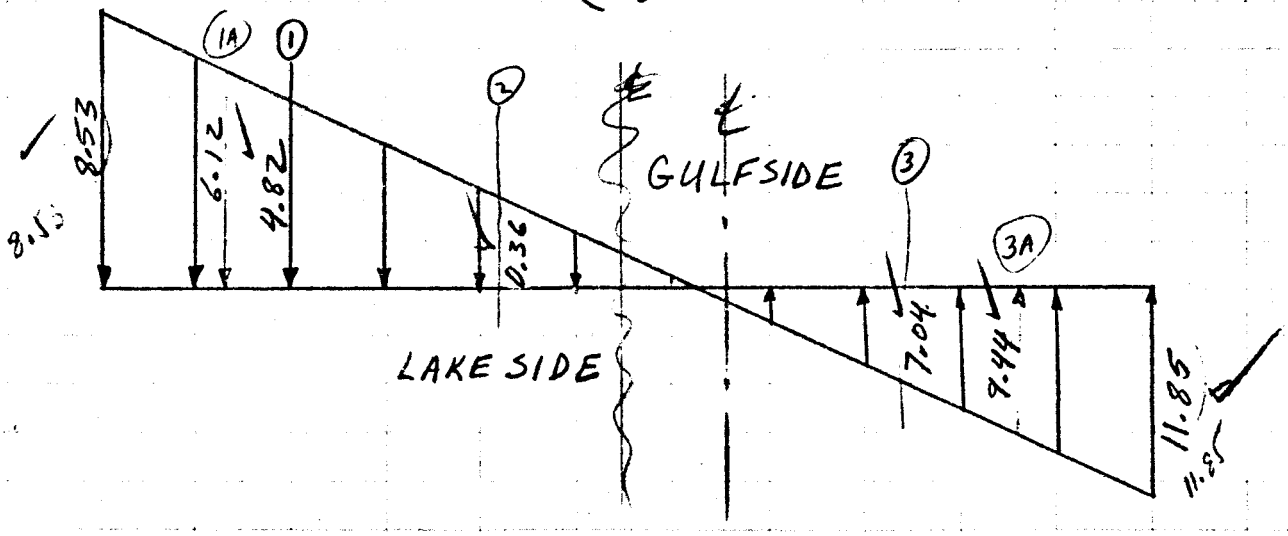
LONGITUDINAL MOMENT & FORCES

CASE I + II

		FORCE		MOMENT
Water				
A_1	1323 x .608	- 804	x -42.97	34548
A_2	551 x .608	- 335	x -24.26	8127
A_3	2124 x .608	-1291	x -0.57	736
A_4	1428 x 1.280	-1828	x 42.02	-76813
A_5	624 x 1.280	- 799	x 19	-15181
UPLIFT				
	55 x 73.5 x 1.248	5045	x -18.25	-92071
	55 x 36.5 x 1.920	3854	x 36.75	141635
SLAB		-9075		
Piles		5050		-21538
		-183		-20557

$$e = \frac{-20557}{-183} = 112.3$$

$$V = \frac{-183}{110} \pm \frac{6 \times 20557}{(110)^2} = \begin{matrix} +8.53 \\ -11.85 \end{matrix}$$



Job No. 4671 Page No. 3B-180

Computed by WJF Date 4/12/73
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Approved by RCP Date 5-7-73

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES

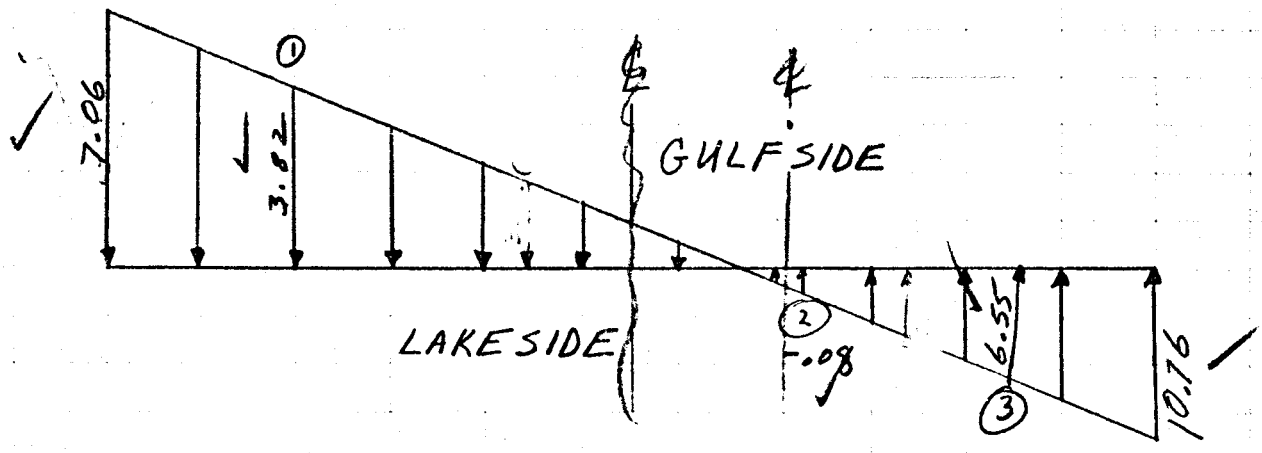
Sheet No. 8 of

LONGITUDINAL MOMENT & FORCES

CASE I + II 4	FORCE		MOMENT
Water			
A_1 1323 x .704	-931	x -42.97	40005
A_2 551 x .704	-388	x -24.26	9413
A_3 2124 x .704	-1495	x -0.57	852
A_4 1428 x 1.280	-1828	x 42.02	-76813
A_5 624 x 1.280	-799	x 19	-15181
UPLIFT			
73.5 x 55 x 1.344	5133	x -18.25	-99152
36.5 x 55 x 1.920	3854	x 36.75	141635
BASE SLAB			
	-9075		
Piles	5026		-18724
	-203		-17965

$$e = \frac{17965}{203} = 88.5'$$

$$V = \frac{-203}{110} \pm \frac{6 \times 17965}{(110)^2} = \begin{matrix} +7.06 \\ -10.76 \end{matrix}$$



Job No. 4621 Page No. 3B-181

Computed by WJF Date 4/12/73
Checked by GAS Date 4/17/73
Reviewed by Date
Approved by Date

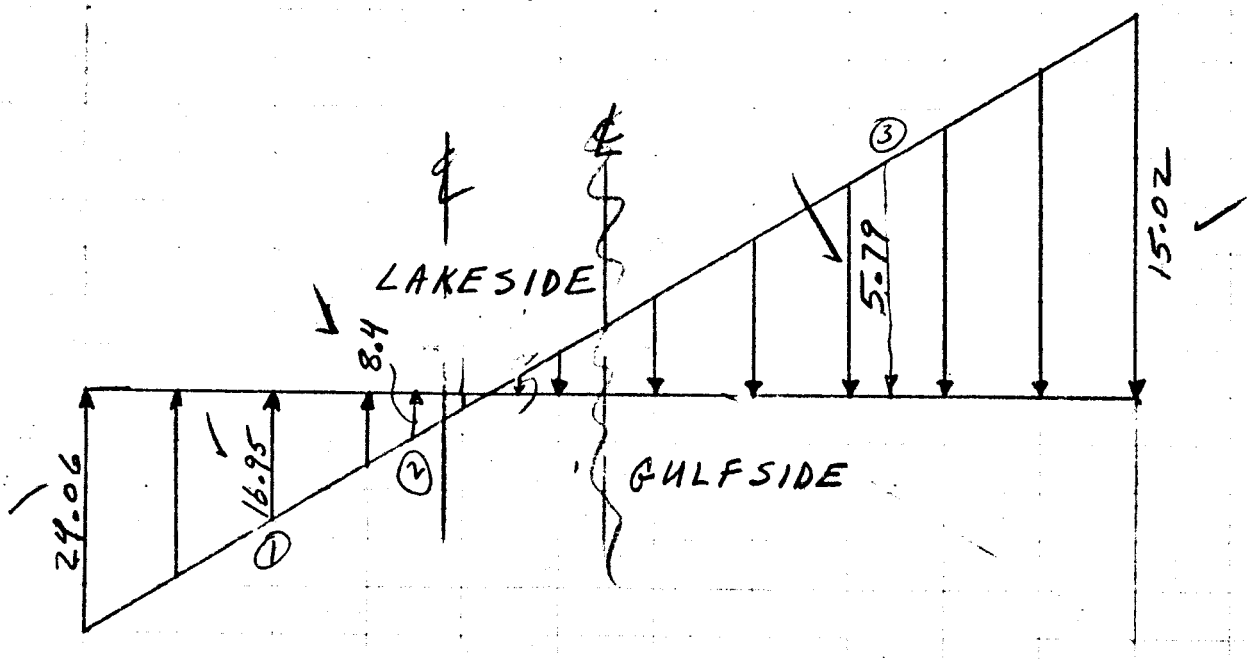
Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES
Sheet No. 9 of

LONGITUDINAL MOMENT & FORCES

CASE I + II 6B		FORCE		MOMENT
WATER				
A_1	1323 x 1.503	-1988	x -42.97	85424
A_2	551 x 1.503	- 828	x -24.26	20087
A_3	2124 x 1.503	-3192	x -0.57	1819
A_4	1428 x .704	-1005	x 42.02	-42230
A_5	624 x .704	- 439	x 19	-8341
UPLIFT				
	73.5 x 55 x 1.920	7762	x -18.25	-141657
	36.5 x 55 x 1.344	2698	x 36.75	99152
BASE SLAB				
		-9075		
PILES		5570		25154
		-497		39408

$$e = \frac{39408}{-497} = -79.3'$$

$$V = \frac{-497}{110} \pm \frac{6 \times 39408}{(110)^2} = \begin{matrix} +15.02 \\ -24.06 \end{matrix}$$



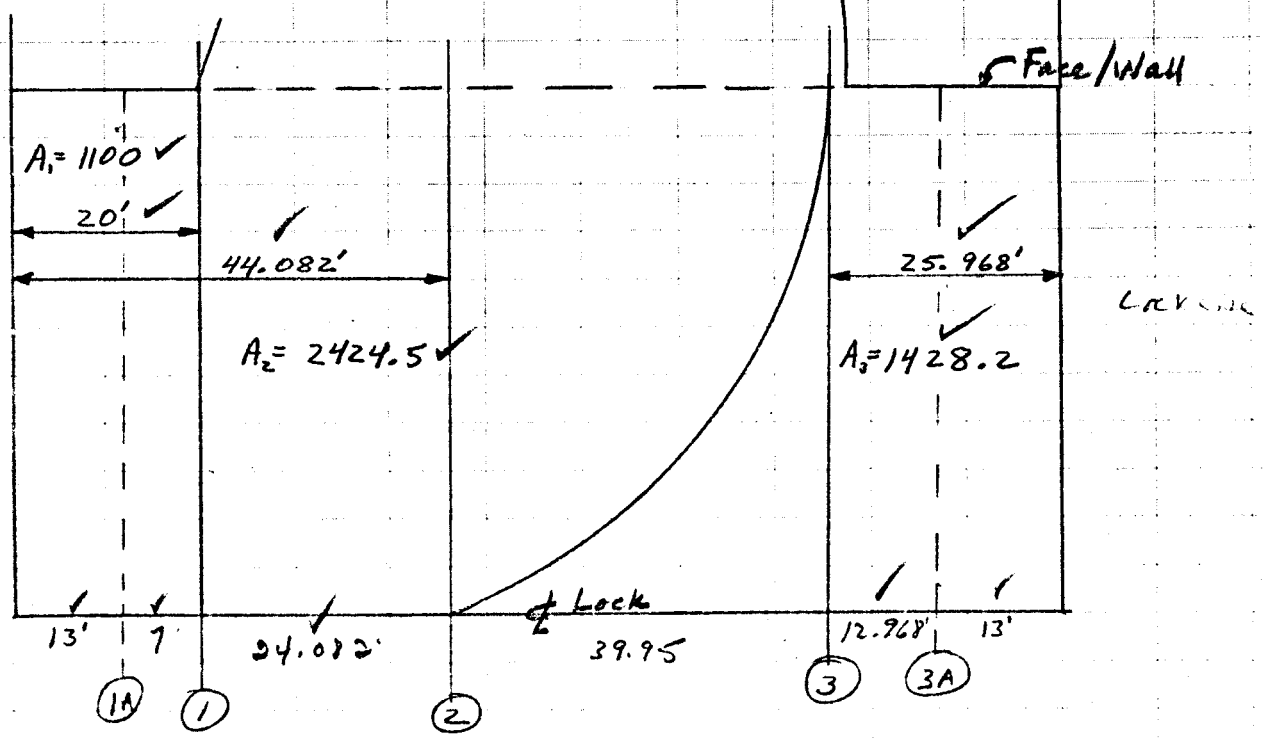
Job No. 4621 Page No. 3B-181

Computed by WJZ Date 4/12/73
Checked by [illegible] Date 4/17/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 1 of

LONGITUDINAL MOMENT



COMPUTE MOMENT @ SECTIONS ①, ②, & ③

Job No. 4671 Page No. 3B-182

Computed by WJZ Date 4/13/73
Checked by [illegible] Date 4/19/73
Reviewed by [illegible] Date 4/[illegible]/73
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES

Sheet No. 2 of

LONGITUDINAL MOMENT

Construction Condition IA (No Water)

Moment @ Section ①

Slab	.150 x 10 x 1100 =	1650 x 10 =	+16 500
Piles			
24		332.1 x 17.5 =	-5812
26		334.9 x 7 =	-2344
1		320.5 x 17.5 =	-5609
3		322.5 x 7 =	-2258
2		91.9 x 12.25 =	-1126
4		92.5 x 1.75 =	-162
Shear @ face /wall			
	-11.91 x 20 =	-238.2 x 10 =	-2382
	-0.75 x 20 x ½ =	-7.5 x $\frac{2 \times 20}{3}$ =	-100
			-3293

Moment @ Section ① = -59.9 [illegible]

Job No. 4671 Page No. 3B 183

Computed by WJL Date 4/12/93
Checked by CAS Date 4/17/93
Reviewed by [illegible] Date 4-19-93
Approved by [illegible] Date 5-12

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES

Sheet No. 3 of

Construction Condition IA (cont.)

Moment @ Section (1A)

SLAB	1.50 x 13 x 55 =	1073 x 6.5 =	+6975
PILES			
24		332.1 x 10.5	-3487
1		320.5 x 10.5	-3365
2		91.9 x 5.25	-482
Shear @ Face / Wall			
-	12.17 x 13 =	-158.2 x 6.5	--1028
-	0.49 x 13 x ½ =	- 3.2 x $\frac{2 \times 13}{3}$	-28
			-1415

Moment @ Section (1A) = -25.7 ft-k

Computed by WJZ Date 4/13/73
Checked by [illegible] Date 4/17/73
Reviewed by [illegible] Date 4-17-73
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 4 of

Construction Condition IA (cont.)

Moment @ Section ②

Slab	1.5 x 2424.5	= 3637 x 22.041 =	+80163
Piles			
24		332.1 x 41.582	-13 809
26		334.9 x 31.082	-10 409
28		337.8 x 20.582	-6 953
30		340.7 x 10.082	-3 435
1		320.5 x 41.582	-13 327
3		322.5 x 31.082	-10 024
5		324.5 x 20.582	-6 679
8		326.5 x 10.082	-3 292
2		91.9 x 36.332	-3 339
4		92.5 x 25.832	-2 389
6		93.0 x 15.332	-1 426
Shear @ face wall			
	11.01 x 44.082	= 485.3 x 22.041	-10 696
	1.65 x 44.082 x 1/2	= 36.4 x 29.388	-1070
			-6685

Moment @ Section ② = -121.5

Job No. 4671 Page No. 38-185

Computed by WJZ Date 4/13/73
Checked by GAS Date 4/13/73
Reviewed by [illegible] Date 4-17-73
Approved by [illegible] Date

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES

Sheet No. 5 of

Construction Condition IA (cont.)

Moment @ Section (3)

SLAB	1.5 x 1428.2 =	2142 x 12.984 =	-27 812
Piles			
47		355.1 x 2.468	+ 876
49		357.9 x 12.968	+4 641
51		360.8 x 23.468	+8 467
18		336.5 x 2.468	+ 830
21		338.6 x 12.968	+4391
23		340.6 x 23.468	+7 993
19		96.4 x 7.718	+ 744
22		97.0 x 18.218	+1 767
Shear @ face /wall			
	8.54 x 25.968	221.8 x 12.984	+2880
	0.97 x 25.968 x ½	12.6 x 8.656	+ 109
			+4886 lbs

Moment @ Section (3) = +88.8 lbs

Job No. 4671 Page No. 3B-186

Computed by WJF Date 4/13/73
Checked by GAS Date 4/17/73
Reviewed by Date
Approved by Date

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES

Sheet No. 6 of

Construction Condition IA (cont)

Moment @ Section (3A)

SLAB	1.5 x 13 x 55 =	1073 x 6.5 =	-6975
PILES			
51		360.8 x 10.5 =	+3788
23		340.6 x 10.5 =	+3576
22		97.0 x 5.25 =	+509
Shear @ FACE/Wall			
	8.54 x 13	111.0 x 6.5 =	+722
	0.49 x 13 x 1/2 =	3.2 x 13/3 =	+14
			+1634 lbs

Moment @ Section (3A) = +29.7 ft-kips

Job No. 4671 Page No. 3B-187

Computed by WJT Date 1/13/73
Checked by GDS Date 1/17/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES

Sheet No. 7 of

LONGITUDINAL MOMENT

Construction Condition IB (No Water)

Moment @ Section (1)

SLAB	1.5 x 1100 =	1650 X 10 =	+16500
Piles			
24		340.7 X 17.5	-5962
26		343.5 X 7	-2405
1		316.2 X 17.5	-5534
3		318.2 X 7	-2227
2		90.6 X 12.25	-1110
4		91.2 X 1.75	-160
Shear @ face /wall			
	11.56 X 20 =	231.2 X 10	-2312
	0.73 X 20 X 1/2 =	7.3 X $\frac{2 \times 20}{3}$	-97
			-3307

Moment @ Section (1) = -60.1 IK/N

Job No. 4671 Page No. 3B-188

Computed by WJL Date 4/13/73
Checked by GAS Date 4/17/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date 5-7-73

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES

Sheet No. 8 of

Construction Condition IB (cont.)
Moment @ Section (2)

SLAB	1.50 x 2424.5 =	3637 x 22.041 =	+80163 ✓
Piles			
24		340.7 ✓ x 41.582 ✓	-14167 ✓
26		343.5 ✓ x 31.082 ✓	-10677 ✓
28		346.3 ✓ x 20.582 ✓	-7128 ✓
30		349.2 ✓ x 10.082 ✓	-3521 ✓
1		316.2 ✓ x 41.582 ✓	-13148 ✓
3		318.2 ✓ x 31.082 ✓	-9890 ✓
5		320.1 ✓ x 20.582 ✓	-6588 ✓
8		322.1 ✓ x 10.082 ✓	-3247 ✓
2		90.6 ✓ x 36.332 ✓	-3292 ✓
4		91.2 ✓ x 25.832 ✓	-2356 ✓
6		91.8 ✓ x 15.332 ✓	-1407 ✓
Shear @ Face/Wall			
	10.67 x 44.082 ✓ =	470.4 ✓ x 22.041 ✓	-10368 ✓
	1.62 ✓ x 44.082 ✓ x 1/2 ✓ =	35.7 ✓ x 29.388 ✓	-1049 ✓
			-6675 ✓

Moment @ Section (2) = -121.4 ft-k ✓

Computed by WJZ Date 4/13/73
Checked by GRS Date 4/17/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 9 of

CONSTRUCTION CONDITION IB (cont)

Moment @ Section (3)

Slab	1.5 X 1428.2 =	- 2142 X 12.984 =	-27 812
Piles			
47		363.0 X 2.468	+ 896
49		365.8 X 12.968	+4744
51		368.7 X 23.468	+8 653
18		331.8 X 2.468	+ 819
21		333.7 X 12.968	+4327
23		335.8 X 23.468	+7 881
19		95.1 X 7.718	+ 734
22		95.7 X 18.218	+1 743
Shear @ face of wall			
	8.25 X 25.968 =	214.2 X 12.984	+2781
	0.95 X 25.968 X 1/2 =	12.3 X 8.656	+ 106
			14872

Moment @ Section (3) = +88.6 ft-k

Job No. 4671 Page No. 3B-190

Computed by WJT Date 4/13/73
Checked by [illegible] Date 4/17/73
Reviewed by [illegible] Date 4-18-73
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 10 of

LONGITUDINAL MOMENTS
CASE I + II 7

Moment @ Section ①

Water	(1.632 - .992) x 1100 =	704 x 10' =	-7040
SLAB	1.5 x 1100 =	1650 x 10 =	+16 500
Piles			
24		211.9 x 17.5	-3708
26		213.9 x 7	-1497
1		199.0 x 17.5	-3483
3		200.3 x 7	-1402
2		57.0 x 12.25	-698
4		57.4 x 1.75	-100
Shear @ face / Wall			
	2.71 x 20 =	54.2 x 10 =	-542
	0.49 x 20 x ½ =	4.9 x $\frac{2 \times 20}{3}$ =	-65
			-1977.2035

Moment @ Section ① = $\frac{-35.9^{11}4_{1}}{37.0}$

Computed by WJT Date 4/13/73
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Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 11 of

CASE I + II 7 (cont.)

Moment @ Section (2)

Water	0.64 X 2424.5 =	1552 X 22.041 =	-34208
SLAB	1.5 X 2424.5 =	3637 X 22.041 =	+80163
Piles			
24		211.9 X 41.582	-8811
26		213.9 X 31.082	-6648
28		216.0 X 20.582	-4446
30		218.0 X 10.082	-2198
1		199.0 X 41.582	-8275
3		200.3 X 31.082	-6226
5		201.8 X 20.582	-4153
8		203.2 X 10.082	-2049
2		57.0 X 36.332	-2071
4		57.4 X 25.832	-1483
6		57.8 X 15.332	-886
Shear @ face / wall			
	2.12 X 44.082 =	93.5 X 22.041	-2061
	1.08 X 44.082 X ½ =	23.8 X 29.388	-699
			-4051

Moment @ Section (2) -73.7 1K/1

Job No. 4671 Page No. 3B-192

Computed by WJZ Date 4/13/73
Checked by CAS Date 4/17/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 12 of ____

CASE I + II 7 (cont.)
Moment @ Section (3)

Water	(1.632 - .992) x 1428.2 =	914 x 12.984 =	+11 867
SLAB	1.5 x 1428.2 =	2142 x 12.984 =	-27 812
Piles			
47		228.2 x 2.468	+ 563
49		230.2 x 12.968	+2 985
51		232.3 x 23.468	+5452
18		210.3 x 2.468	+ 519
21		211.8 x 12.968	+2 747
23		213.2 x 23.468	+5003
19		60.3 x 7.718	+ 465
22		60.7 x 18.218	+1 106
Shear @ Face /Wall			
0.51 x 25.968		13.2 x 12.984 =	+ 171
0.64 x 25.968 x 1/2 =		8.3 x 8.656 =	+ 72
			3138

Moment @ Section (3) = +57.1 1K/

Job No. 4671 Page No. 3B-193

Computed by WJZ Date 4/13/73
Checked by [illegible] Date 4/13/73
Reviewed by [illegible] Date 4-16-73
Approved by RGP Date 5-7-73

Subject STRUCTURAL GATE BAY BASE SLAB LAKE SIDE GATE

Sheet No. 13 of

LONGITUDINAL MOMENTS
CASE I + II 8
Moment @ Section ①

Water	(195.8 X 1,216) =	238 X 18.22 =	+ 4 336
UPLIFT	1.856 X 1100 =	2042 X 10 =	- 20 420
SLAB	1.5 X 1100 =	1650 X 10 =	+ 16 500
Piles			
24		23.9 X 17.5	- 418
26		25.2 X 7.0	- 176
1		18.6 X 17.5	- 326
3		19.6 X 7.0	- 137
2		5.4 X 12.25	- 66
4		5.7 X 1.75	- 10
Shear @ / Face / Wall			
	19.59 X 20 =	- 391.8 X 10 =	+ 3 918
	.50 X 20 X 1/2 =	- 5.0 X 20/3 =	+ 33
			+ 3234

Moment @ Section ① = +59 1K/1

CASE I + II 8 (cont.)

Moment @ Section (2)

Water	195.8 x 1.216	= 238 x 42.302 =	+10 068
UPLIFT	1.856 x 2424.5	= 4500 x 22.041 =	-99 185
SLAB	1.5 x 2424.5	= 3637 x 22.041 =	+80 163
Piles			
24		23.9 x41.582	-994
26		25.2 x31.082	-783
28		26.6 x20.582	-547
30		27.9 x10.082	-281
1		18.6 x41.582	-773
3		19.6 x 31.082	-609
5		20.6 x20.582	-424
8		21.5 x10.082	-217
2		5.4 x36.332	-196
4		5.7 x25.832	-147
6		6.0 x15.332	- 92
Shear @ face/wall			
	-19.59 x 44.082	= -863.6 x22.041	+19 035
	-1.10 x 44.082 x ½	= - 24.2 x 14.694	+ 356
			+5374

Moment @ Section (2) = +98 1K/1

Computed by WJZ Date 4/13/73
Checked by [illegible] Date 4/17/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 15 of

CASE I + II 8 (cont.)
Moment @ Section (3)

Water	195.8 x 1.216 =	238 x 24.188 =	-5757
UPLIFT	1.856 x 1428.2 =	2651 x 12.984 =	+34 421
SLAB	1.5 x 1428.2 =	2142 x 12.984 =	-27 812
Piles			
47		34.6 x 2.468	+ 85
49		36.0 x 12.968	+467
51		37.4 x 23.468	+878
18		26.2 x 2.468	+65
21		27.2 x 12.968	+353
23		28.1 x 23.468	+659
19		7.7 x 7.718	+ 59
22		7.9 x 18.218	+144
Shear @ Face /wall			
−	21.68 x 25.968	= -563.0 x 12.984 =	-7 310
−	0.65 x 25.968 x ½	= -8.4 x 17.312 =	− 145
			-3892

Moment @ Section (3) = −71 [illegible]

Job No. 4671 Page No. 3B-196

Computed by WJZ Date 4/12/73
Checked by GAS Date 4/17/73
Reviewed by RGP Date 4-17-73
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Subject STRUCTURAL
GATE BAY BASE SLAB
LAKE SIDE GATE
Sheet No. 16 of _____

LONGITUDINAL MOMENT
CASE I + II

Moment @ Section (1)

water	$(1.248 - .608) \times 1100$	$= 704^{K} \times 10' =$	-7040^{IK}
SLAB	$1100 \times .150 \times 10$	$= -1650^{K} \times 10 =$	$+16500^{IK}$
Piles			
24		$139.5 \times 17.5 =$	-2441
26		$130.9 \times 7 =$	-916
1		$356.8 \times 17.5 =$	-6244
3		$350.7 \times 7 =$	-2455
2		$101.1 \times 12.25 =$	-1238
4		$99.3 \times 1.75 =$	-174
Shear @ face/wall			
-4.82×20		$= -96.4 \times 10 =$	$+964$
$-3.71 \times 20 \times \frac{1}{2}$		$= -37.1 \times \frac{2 \times 20}{3} =$	$+495$
			-2549^{IK}

Moment @ Section (1) = $-46.3^{IK/I}$

Job No. 4671 Page No. 38-197

Computed by WJZ Date 4/13/73
Checked by GA Date 4/17/73
Reviewed by ASL Date 4-17-73
Approved by PCR Date 5-2-73

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES

Sheet No. 17 of

CASE I + II (cont.)

Moment @ Section (1A)

Water	.64 x 13 x 55	= 458 x 6.5 =	-2977
SLAB	1.5 x 13 x 55	= 1073 x 6.5 =	+6975
Piles			
24		139.5 x 10.5	-1465
1		356.8 x 10.5	-3746
2		101.1 x 5.25	-531
Shear @ Face / Wall			
	-6.12 x 13 =	-79.6 x 6.5	+517
	-2.41 x 13 x ½ =	-15.7 x 2x13/3 =	+136
			-1091

Moment @ Section (1A) = -19.8 'K/'

Job No. 4671 Page No. 3B-198

Computed by WJF Date 4/13/73
Checked by [illegible] Date 4/17/73
Reviewed by RGK Date 4-18-73
Approved by [illegible] Date 4-18-73

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 18 of

CASE I + III (cont.)

MOMENT @ Section (2)

Water	.64 X 2424.5	= 1552 X 22.041	=	-34 208
SLAB	1.50 X 2424.5	= 3637 X 22.041	=	+80 163
Piles				
24		139.5 X 41.582	=	- 5801
26		130.9 X 31.082	=	- 4069
28		122.1 X 20.582	=	- 2513
30		113.4 X 10.082	=	- 1143
1		356.8 X 41.582	=	- 14 836
3		350.7 X 31.082	=	- 10 900
5		344.6 X 20.582	=	- 7093
8		338.5 X 10.082	=	- 3413
2		101.1 X 36.332	=	- 3673
4		99.3 X 25.832	=	- 2565
6		97.6 X 15.332	=	- 1496
Shear @ Face /wall				
-0.36 X 44.082		= -15.9 X 22.041	=	+ 350
-8.17 X 44.082 X 1/2		= -180.1 X 29.388	=	+ 5293
				- 5904

Moment @ Section (2) = -107.3 [1K]

Job No. 4621 Page No. 38-199

Computed by WJF Date 4/13/73
Checked by [illegible] Date 4/17/73
Reviewed by [illegible] Date 4-17-73
Approved by [illegible] Date 5-7-73

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 19 of

CASE I + II 1 (cont.)

Moment @ Section (3)

Water	(1.92 - 1.28) X 1428.2	= 914 X 12.984 =	+11 867
SLAB	.150 X 10 X 1428.2	= 2142 X 12.984 =	-27 812
Piles			
47		69.8 X 2.468 =	+ 172
49		61.0 X 12.968 =	+ 791
51		52.4 X 23.468 =	+1 230
18		308.0 X 2.468 =	+ 760
21		301.9 X 12.968 =	+3915
23		295.8 X 23.468 =	+6942
19		87.1 X 7.718 =	+ 672
22		85.4 X 18.218 =	+1 556
Shear @ face / wall			
	7.04 X 25.968 =	182.8 X 12.984 =	+2373
	4.81 X 25.968 X 1/2 =	62.5 X 17.312 =	+1 082
			+3548

Moment @ Section (3) = +64.5 IK/1

Job No. 4671 Page No. 3B-200

Computed by WJF Date 4/13/73
Checked by CAS Date 4/13/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATES

Sheet No. 20 of

CASE I + II (cont.)
Moment @ Section (3A)

Water	.64 X 13 X 55 =	458 X 6.5	+2977
SLAB	1.5 X 13 X 55 =	1073 X 6.5	-6975
Piles			
51		52.4 X 10.5	+550
23		295.8 X 10.5	+3106
22		85.4 X 5.25	+448
Shear @ Face / Wall			
	9.44 X 13 =	122.7 X 6.5	+798
	2.41 X 13 X 1/2 =	15.7 X 2X13/3	+136
			+1040

Moment @ Section (3A) = +18.9 ft-k

Job No. 4621 Page No. 3B-201

Computed by WJZ Date 4/13/73
Checked by GAS Date 4/13/73
Reviewed by [illegible] Date 4-[illegible]73
Approved by [illegible] Date 5-[illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 21 of

LONGITUDINAL MOMENTS

CASE I + II 4

Moment @ Section ①

Water	(1.344 - .704) X1100	= 704 X10 =	-7 040
SLAB	1.5 X1100	= 1650 X10 =	+16 500
Piles			
24		147.1 X17.5	-2574
26		139.6 X 7	- 977
1		337.9 X17.5	-5913
3		332.7 X 7	-2329
2		95.9 X12.25	-1175
4		94.3 X1.75	- 165
Shear @ Face/Wall			
	3.82X20	76.4 X 10	+ 764
	3.24 X20 X ½ =	32.4 X $\frac{2X20}{3}$	+ 432
			-2477

Moment @ Section ① = -45.0 K/L

Job No. 4671 Page No. 3B-202

Computed by WJZ Date 4/13/73
Checked by GBS Date 4/13/73
Reviewed by [illegible] Date 4-17-73
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 22 of

CASE I + II 4 (cont.)
Moment @ Section (2)

Water	0.64 X 2424.5 =	1552 X 22.041 =	-34208
SLAB	1.5 X 2424.5 =	3637 X 22.041 =	+80 163
Piles			
24		147.1 X 41.582	-6117
26		139.6 X 31.082	-4339
28		132.1 X 20.582	-2719
30		124.7 X 10.082	-1257
1		337.9 X 41.582	-14 051
3		332.7 X 31.082	-10 341
5		327.4 X 20.582	-6739
8		322.2 X 10.082	-3248
2		95.9 X 36.332	-3484
4		94.3 X 25.832	-2436
6		92.8 X 15.332	-1423
Shear @ Face / Wall			
	-.08 X 44.082 =	3.5 X 22.041 =	-77
	7.14 X 44.082 X ½ =	157.4 X 29.388 =	+4626
			-5650

Moment @ Section (2) = -102.7 "K/L"

Job No. 4671 Page No. 3B-203

Computed by WJZ Date 4/13/73
Checked by LAS Date 4/17/73
Reviewed by RGP Date 4-18-73
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 23 of

CASE I + II 4 (cont.)
Moment @ Section (3)

Water	(1.92 - 1.28) x 1428.2	= 914 x 12.984	=	+11 867
SLAB	1.5 x 1428.2	= 2142 x 12.984	=	-27 812
Piles				
47		87.1 x 2.468		+ 215
49		79.6 x 12.968		+1 032
51		72.2 x 23.468		+1 694
18		296.0 x 2.468		+ 731
21		290.8 x 12.968		+3 771
23		285.4 x 23.468		+6 698
19		83.8 x 7.718		+ 647
22		82.3 x 18.218		+1 499
Shear @ Face of Wall				
	6.55 x 25.968	= 170.1 x 12.984	=	+2209
	4.21 x 25.968 x 1/2	= 54.7 x 17.312	=	+ 947
				+3498

Moment @ Section (3) = +63.6 'K/'

Job No. 4671 Page No. 3B-204

Computed by WJZ Date 4/13/73
Checked by GAB Date 4/17/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY BASE SLAB
LAKESIDE GATE

Sheet No. 29 of

LONGITUDINAL MOMENTS

CASE I + II 6B

MOMENT @ SECTION ①

Water	(1.92 − 1.503) × 1100 =	459 × 10 =	−4590
SLAB	1.5 × 1100 =	1650 × 10 =	+16500
Piles			
24		365.6 × 17.5	−6398
26		376.9 × 7.0	−2638
1		29.4 × 17.5	−515
3		37.3 × 7.0	−261
2		9.5 × 12.25	−116
4		11.7 × 1.75	−20
Shear @ Face / Wall			
	16.95 × 20 =	339 × 10 =	−3390
	7.11 × 20 × ½ =	71.1 × $\frac{2 \times 20}{3}$	−948
			−2376

Moment @ Section ① = −43.2

Computed by WJK Date 4/13/73
Checked by [illegible] Date 4/17/73
Reviewed by [illegible] Date 4-17-73
Approved by [illegible] Date 5-25

CASE I+II 6B (cont.)
Moment @ Section (2)

Water	(1.92 * 1.503) x 2424.5	= 1011 x 22.041 =	-22 283
SLAB	1.5 x 2424.5	= 3637 x 22.041 =	+80 163
Piles			
24		365.6 x 41.582	-15 202
26		376.8 x 31.082	-11 715
28		388.2 x 20.582	-7 990
30		399.5 x 10.082	-4 028
1		29.4 x 41.582	-1223
3		37.3 x 31.082	-1159
5		45.2 x 20.582	-930
8		53.1 x 10.082	-535
2		9.5 x 36.332	-345
4		11.7 x 25.832	-302
6		14.1 x 15.332	-216
Shear @ Face/Wall			
	8.4 x 44.082	= 370.3 x 22.041	-8162
	15.66 x 44.028 x 1/2	= 345.2 x 29.388	-10 145
			-4072

Moment @ Section (2) -74.0

CASE I + II 6B (cont.)

Moment @ Section (3)

Water	(1.344 - .704) x 1428.2 =	914 x 12.984 =	+11 867
SLAB	1.5 x 1428.2 =	2142 x 12.984 =	-27 812
PILES			
47		455.9 x 2.468	+1 125
49		467.2 x 12.968	+6 059
51		478.5 x 23.468	+11 229
18		92.6 x 2.468	+ 229
21		100.4 x 12.968	+1 302
23		108.4 x 23.468	+2544
19		27.6 x 7.718	+ 213
22		29.9 x 18.218	+ 545
Shear @ Face / Wall			
	5.79 x 25.968 =	150.4 x 12.984	-1953
	9.23 x 25.968 x ½ =	119.8 x 17.312	-2074
			+3274

Moment @ Section (3) = +59.5

Job No. 4671 Page No. 3B-207

Computed by RGP Date 4-10-73
Checked by GAS Date 4/27/73
Reviewed by [illegible] Date 5/4/73
Approved by [illegible] Date [illegible]

Subject STRUCTURES
GATE BAY PILING BALANCE
LAKESIDE

Sheet No. ____ of ____

CASE Ia - Construction Cond. - No BACKFILL

	AXIAL "L" to or PILE	VERT	HORIZ
Pile #1 thru #23 } #52 thru #74 }	17207.2k	16693.4k ✓	4173.4k ✓
#16 & #67 straight	727.3 ✓	727.3 ✓	—
#24 thru #51	18270.9 ✓	17725.4	- 4431.3
#43; #40, #36; #33 straight	901.4	901.4	—

Moment in Pile ✓

#1 → #23 → 238.7(2) ÷ 8.2462 =	+ 57.9	- 14.1 [4]	+ 56.2 [1.7]
#52 → #74 → #16 & #67 → 19.8(2) ÷ 8. =	+ 5.0	—	+ 5.0
#24 → #51 → -1620.5 ÷ 8.2462 =	- 196.6	+ 47.6 [1.5]	+ [5.9] 190.7
#43; 40; 36; 33 49.5 ÷ 8. =	+ 6.2	—	+ 6.2

Σ Pile Vert. Forces + 36021.0k ✓ + 0.2
Struct. Vert Load - 36080.0k
ΣV = 1.0k .003% error OK

Σ Pile Horiz. Forces + 0.2k
Struct. Horiz LOAD 0
ΣH = +0.2k OK

Job No. 4671 Page No. 3B-208

Computed by RGP Date 4-10-73
Checked by GAS Date 4/27/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Subject STRUCTURES
GATE BAY PILING BALANCE
LAKESIDE

Sheet No. ____ of ____

CASE IB – Construction Cond. – with Backfill

	AXIAL or "1" to PILE	VERT	HORIZ
Pile #1 thru #23 }	16968.6k ✓	16462.0k ✓	+ 4115.5k ✓
#52 " #74 }			
#16 & #67 straight	728.5 ✓	728.5 ✓	— ✓
#24 thru #51	18707.7 ✓	18149.1 ✓	− 4537.3 ✓
#43) #40; #36; #33 straight	902.1 ✓	902.1 ✓	—
Moment in Pile			
#1 → #23 } 191.6(2) / 8.2462 }	+ 47.9 ✓	− 11.6 ✓	+ 46.5 ✓
#52 → #74 }			
#16 & #67 17.5(2) ÷ 8.	+ 4.4	—	+ 4.4
#24 → #51 − 1486.3 ÷ 8.2462	− 180.2	+ 43.7	+ 174.8
#43, 40, 36, 33 43.6 ÷ 8	+ 5.5	—	+ 5.5
Σ Pile Vert Forces		+ 36273.8k ✓	
Struct Vert Forces		− 36274.0 ✓	
Σ V =		−0.2k .0006% error OK	
Σ Pile Horiz Forces			−190.6k
Struct Horiz Forces			192.0
Σ H.			+ 1.4 0.73% error OK

CIL

Job No. 4671 Page No. 38-209

Computed by RGP Date 4-10-73
Checked by GAS Date 4/27/73
Reviewed by KJB Date 4/27/73
Approved by [illegible] Date 5-7-73

Subject: STRUCTURAL
GATE BAY Piling Balance
LAKESIDE

Sheet No. of

Case I + II

		AXIAL "1" to or PILE	VERT	HORIZ
P.G #1 thru #23 }		10735.0 k ✓	10404.8 ✓	+ 2601.2
#52 " #74 }		459.7 ✓	459.2	
#16 & #67				
#24 thru #51		11712.5 ✓	11362.8 ✓	- 2840.7 ✓
#43; 40; 36; 33		568.3 ✓	568.3 ✓	
Moment in Piles				
#1 → #23 }	128.6(2) ÷ 8.2462	+ 31.3	- 7.6 [2]	+ 30.3 [9]
52 → 74 }				
#16 & #67	11.4(2) ÷ 8	+ 2.9	—	+ 2.9
#24 → 51	-958.7 ÷ 8.2462	-116.2	+ 28.3 [8]	+ 112.7 [3.5]
#43; 40; 36; 33	28.5 ÷ 8	+ 3.6	—	+ 3.6
Σ Pile Vert. Forces			22816.3 k ✓	
Structure Vert Forces			22816.0 ✓	
ΣV			0.3 .001% error OK	
Σ Pile Horiz. Forces				- 90.0
Struct. Horiz. Forces				90.0
ΣH.				+ 0.0 No error OK

Job No. 4671 Page No. 3B-210

Computed by RGP Date 4-10-73
Checked by GAS Date 4/27/73
Reviewed by RJB Date 4/4/73
Approved by RCH Date 5-7-73

Subject STRUCTURAL
GATE BAY PILING Balance
Lakeside

Sheet No. ____ of ____

Case I + II 8

	AXIAL "1" or PILE	VERT	HORIZ
Pile #1 thru #23 }	1207.2k ✓	1171.2 ✓	992.8
#52 " #74 }			
#16 & #67	60.8k ✓	60.8 ✓	—
#24 thru #51	1609.7 ✓	1561.6 ✓	-390.4
#48, 40, 36, 33	71.8 ✓	71.8 ✓	—
Moment in Pile			
#1-#23 } -1.9(2) ÷ 8.2462	− 0.5	+ 0.1	− 0.5
52-74 }			
#16 & 67 1.0(2) ÷ 8	+ 0.3	—	+ 0.3
#24-51 -66.4 ÷ 8.2462	− 8.1	+ 1.9	+ 7.9
#48, 40, 36, 33 1.4 ÷ 8	+ 0.2	—	+ 0.2

Σ Pile Vert Forces 2867.4 ✓
Struct. " " 2868.0 ✓
ΣV = 0.4 0.014% error OK

Σ Pile Horiz. Forces -89.7
Struct " " ✓ 90.0
ΣH = +0.3 OK

Job No. 4671 Page No. 3B-211

Computed by RGP Date 4-10-73
Checked by CAS Date 4/27/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY PILING Balance
LAKESIDE

Sheet No. ____ of ____

Case I + II

		Axial or ⊥ to Pile	Vert	Horiz
Pile #1 thru #23, #52 thru #74		17082.6 ✓	16572.6 ✓	+4143.1 ✓
#16 & #67		462.0	462.0	— ✓
#24 thru #51		5099.7 ✓	4947.4 ✓	−1236.9
#43; 40, 36; 33		604.0	604.0	—
Moment in Pile				✓
#1 – #23, #52 – 74	1042.7(2) / 8.246	+ 252.9 ✓	− 61.3 (1.9)	+ 245.3 (7.6)
#16 & 67	57.2(2) ÷ 8	+ 14.3	—	+ 14.3
#24 → 51	−3657 ÷ 8.246	− 443.5 ✓	+ 107.6 (3.3) ✓	+ 430.3 (13.2) ✓
#43; 40, 36; 33	143 ÷ 8	+ 17.9	—	+ 17.9 ✓

Σ Pile Vert Forces = 22632.3 ✓
Struct " " ΣV = −22632.0 ✓
+0.3 0.001% error OK

Σ Pile Horiz Forces = 3614.0 ✓
Struct " " ΣH = −3614.0
0. No error OK

Job No. 4671 Page No. 3B-212

Computed by RGP Date 4-10-73
Checked by GAS Date 4/27/73
Reviewed by [illegible] Date [illegible]
Approved by [illegible] Date [illegible]

Subject STRUCTURAL
GATE BAY PILING BALANCE
LAKESIDE

Sheet No. ____ of ____

Case I + II 4

		Axial "L" or RL	Vert	Horiz
Rb #1 thru #23 }		16311.2k ✓	15824.2 ✓	+3956.0k ✓
#52 " 74 }				
#16 & #67		460.0 ✓	460.0 ✓	—
#24 thru #51		5816.8 ✓	5643.1 ✓	1410.2 ✓ -1368.7
#43, 40, 36, 33		597.8 ✓	597.8 ✓	—
Moment IN PILE				
#1 - #23 }	936.8(2) ÷ 8.246	+ 227.2 ✓	— 55.1 ✓ (1.7)	+ 220.4 (6.8) ✓
52 - 74 }				
16 & 67	51.8(2) ÷ 8 =	+ 12.9 ✓	—	+ 12.9
#24 - 51	-3342.6 ÷ 8.246	- 405.3 ✓	+ 98.3 (3.0) ✓	+ 393.2 (12) ✓
43, 40, 36, 33	129.5 ÷ 8 =	+ 16.2	—	+ 16.2
Σ Pile Vert Forces			22568.3 ✓ ✓	
Struct. " "			-22568.0	
	ΣV		0.3 ok	
Σ Pile Horiz Forces				3187.9k ✓
Struct. " "				-3188.0
	ΣH			0.1 ok

Job No. 4671 Page No. 38-213

Computed by RGP Date 4-10-73
Checked by GAS Date 4/27/73
Reviewed by [illegible] Date
Approved by [illegible] Date

Subject STRUCTURES
GATE BAY PILING BALANCE
LAKESIDE

Sheet No. of

CASE I + II 6B

		AXIAL "L" to Pile	VERT	HORIZ
Pile				
#1 thru #23 }		3495.2 ✓	3390.8 ✓	847.7 ✓
52 " 74 }				
16 & 67		495.4 ✓	495.4	—
#24 thru #51		22226.1 ✓	21562.5 ✓	-5390.6 ✓
43, 40, 36, 33		584.8 ✓	584.8 ✓	—
Moment in Pile				
1-23 }	-1105.7(2) ✓ / 8.246	- 268.1 ✓	+ 65.0	- 260.1
52-74 }				
16, 67	-49.8(2)÷(8) ✓	- 12.5 ✓	—	- 12.5 ✓
24-51	2608.6 ÷ 8,246	+ 316.4	- 76.7	(+) 307.0
43, 40, 36, 33	-124.5 ÷ 8	- 15.6	—	- 15.6

Σ Pile Vert Forces 36021.8
Struct. " " -36022.0

ΣV = -0.2 0.0008% error OK

Σ Pile Horiz Forces -5138.1
Struct. " " +5138.0

ΣH = 0.1 OK

SECTION IV-4 MISCELLANEOUS

Job No. 4671 Page No. 4A-1

Computed by RGP Date 1-4-73
Checked by GAS Date 1/10/73
Reviewed by _____ Date _____
Approved by RSE Date 5-73

Subject STRUCTURAL
OFFICE & Powerhouse

Sheet No. 1 of _____

Design Loads:

Floors: 100 psf + Equipment * & Walls

Roof: 65 psf vertical ↕ **

65 psf horizontal ↔ **

Walls: 65 psf wind ↔ **

STRUCTURE STABILITY: 31 psf wind **

* Include dynamic analysis for support of auxiliary generator.

Roof material: Kaiser Aluminum

Assume load bearing walls and reinforce to withstand wind loads.

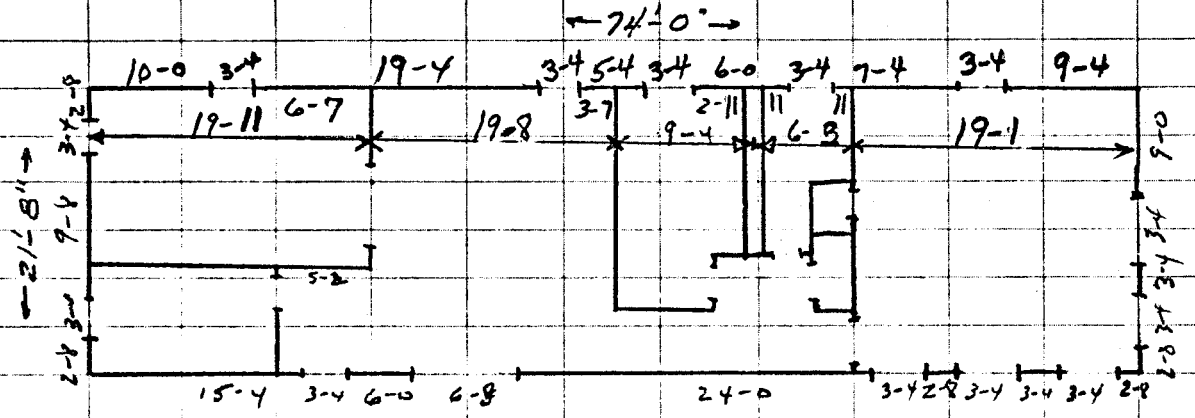
** Wind taken as 160 mph on individual components and 120 mph on total structure. Total structure load reduced by factor $\left(\frac{H}{30}\right)^{2/7}$ to account for height, H, above ground.

Job No. 4671 Page No. 4A-2

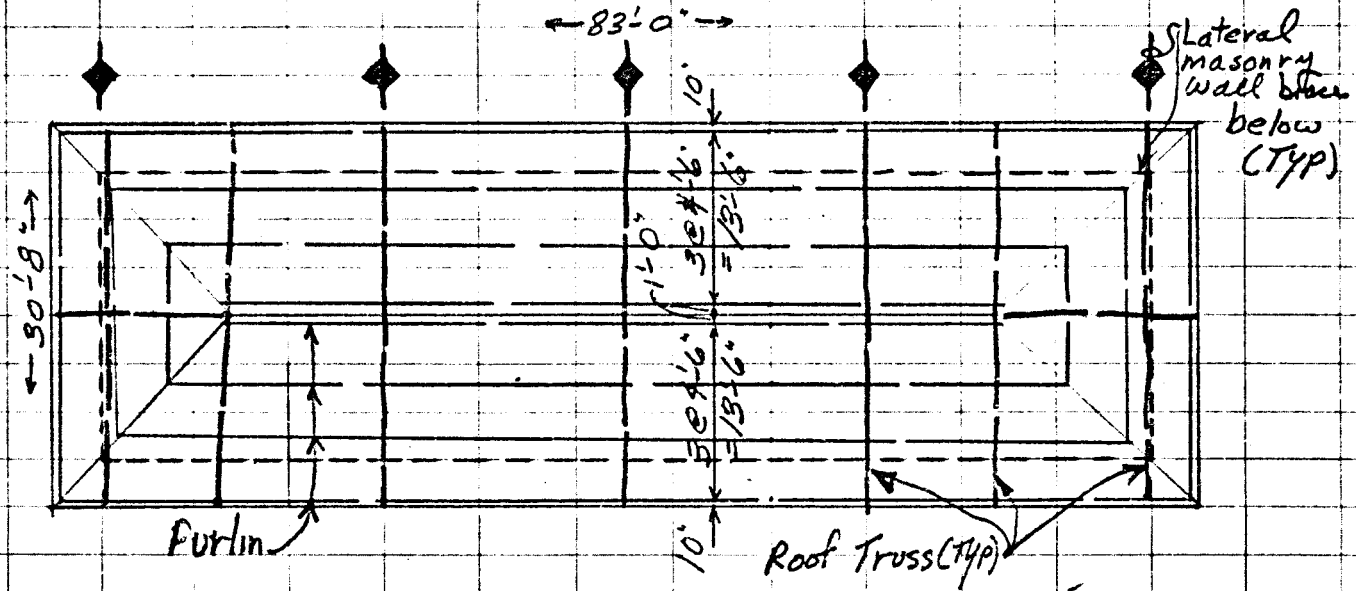
Computed by RGP Date 1-4-73
Checked by GAS Date 1/10/73
Reviewed by ____ Date ____
Approved by RGP Date 5-73

Subject STRUCTURAL
OFFICE & Powerhouse

Sheet No. 9 of ____



PLAN - MASONRY WALLS



PLAN - ROOF FRAMING

Job No. 4671 Page No. 4A-3

Computed by RGP Date 1-8-73
Checked by GAS Date 1/10/73
Reviewed by ____ Date ____
Approved by ____ Date 5-73

Subject: STRUCTURAL
Office & Powerhouse

Sheet No. 3 of ____

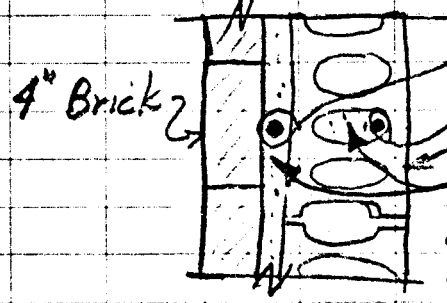
Exterior Masonry Wall

Vert. Span: $w = 65$ psf

$V = 65(9/2) = 293$ #/' ok

$M = 65(9)^2(1/8) = 660$ #/' ok

Use #4 @ 4'-0" (Uninterrupted wall)



Add #3 vertically each face at each side of each door, window and wall opening. Fill jambs with mortar 8" each side of openings (Provide special bars at double door openings.)

Job No. 4671 Page No. AA-4

Computed by RGP Date 1-8-73
Checked by GHS Date 1/10/73
Reviewed by _____ Date _____
Approved by RGP Date 5-73

Subject STRUCTURAL
Office & Powerhouse

Sheet No. 4 of _____

Horz. Spans

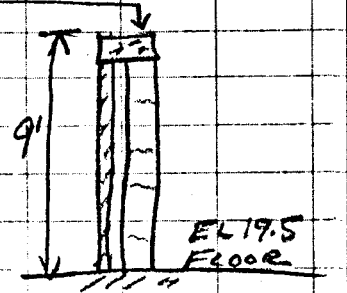
Top bond Beam

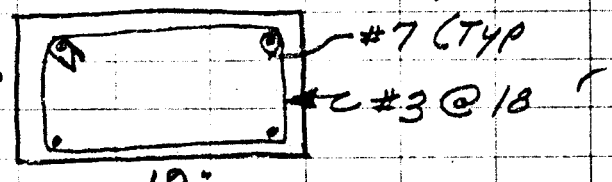
$w = 293\ \#/1'$

$L = 19'-8"\ max$

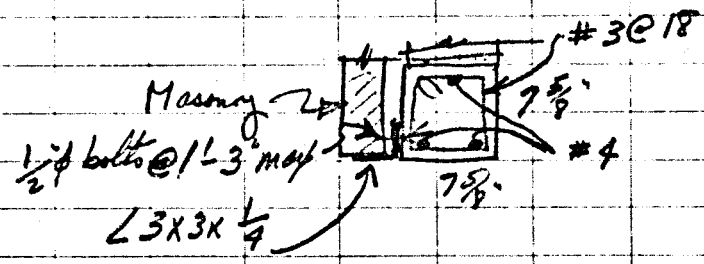
$V = 293\left(\frac{19.67}{2}\right) = 2880\#$ ok

$M = 293(19.67)^2\left(\frac{1}{8}\right) = 14150\ 1\#$





LINTLE Beams



Job No. 4671 Page No. 4A-5

Computed by RGP Date 1-8-73

Checked by GAS Date 1/10/73

Reviewed by _____ Date _____

Approved by RGP Date 5-73

Subject STRUCTURAL Office & Powerhouse

Sheet No. 5 of _____

INTERIOR Masonry wall brace for wind

Shear on Wall: $65(\frac{9}{2}+5)(19.67\text{ max})$ ℄

$= 12100\#$ max

$v = \frac{12100}{6\text{"wall} \times (96\text{"} \times 60\text{"})} = 13$ p.s.i. max

℄

Job No. 4671 Page No. 4A-6

Computed by RGP Date 1-8-73

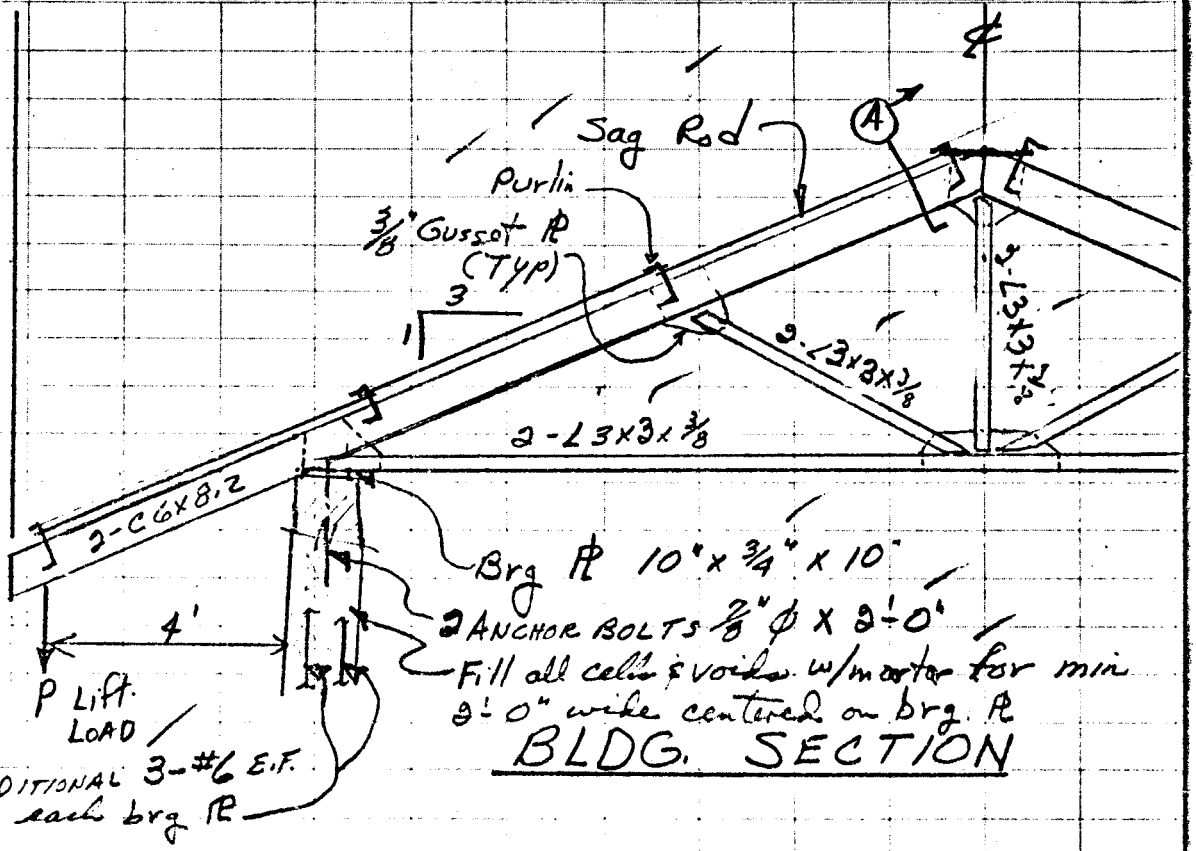
Checked by GAJ Date 1/10/73

Reviewed by Date

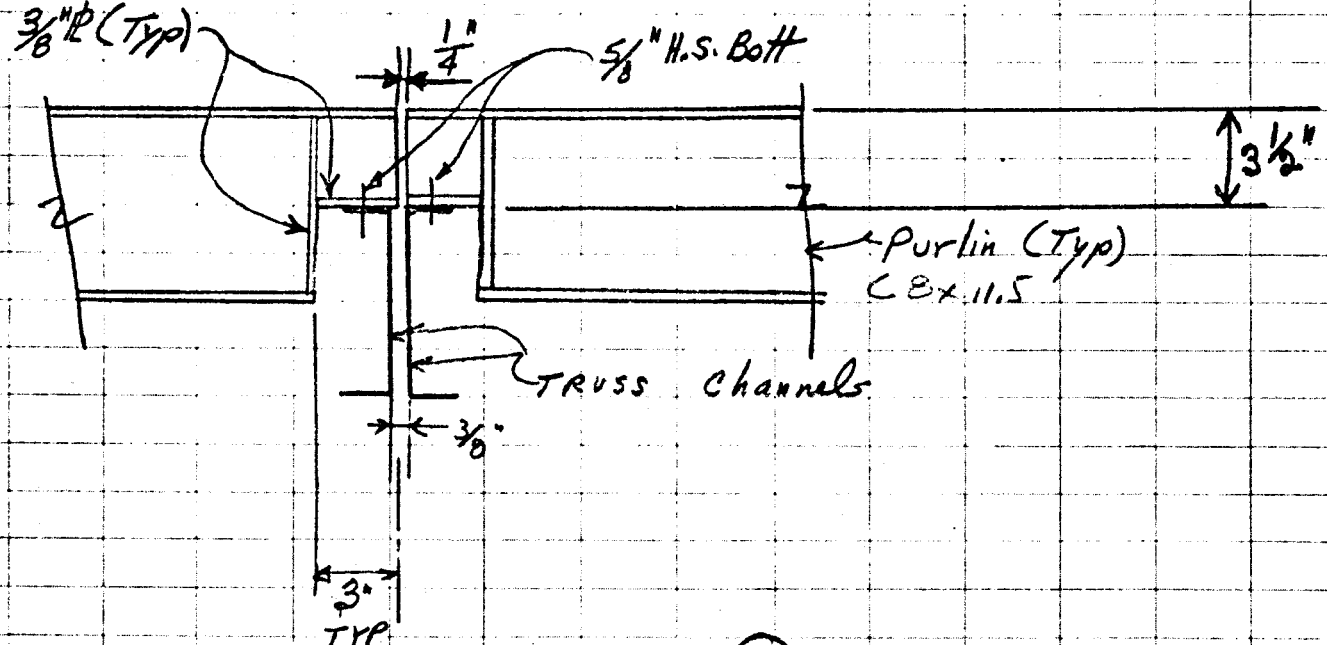
Approved by RGP Date 5-73

Subject STRUCTURAL Office & Powerhouse

Sheet No. 6 of



BLDG. SECTION



SECTION (A)

Computed by RGP Date 1-8-73
Checked by GAS Date 1/14/73
Reviewed by ____ Date ____
Approved by RGP Date 5-73

Job No. 4671 Page No. 4A-1
Subject STRUCTURAL
Office & Powerhouse
Sheet No. 7 of ____

ROOF

PURLIN: max $w = 65(4.5) = 293$ #/ft LL

Say with DL $w = 320$ #/ft

Max span = 19'-8"

$M = \frac{0.32(19.67)^2}{8} = 15.5^{k}$

Use C 8x11.5

$f = \frac{15.5(12)}{8.1} = 23$ ksi ok

Roof deck provides lateral support and sag rods eliminate lateral moment and torsion.

$V = 0.32\left(\frac{19.67}{2}\right) = 3.15^{k}$

TRUSS TOP CHORD

CANTILEVER: $M = 3.15(4.5) = 14.2^{k}$

Use 2 - C 6x8.2

Channel can be used to hoist following load (Use 1.25 impact factor)

Max $M = P(1.25)(4.5) = 18(8.6)\left(\frac{1}{12}\right)$

$P = 2.3^{k}$ Use max $P = 2.0^{k}$ @ 4' from o.s. face of Bldg.

Job No. 4671 Page No. 4A-8

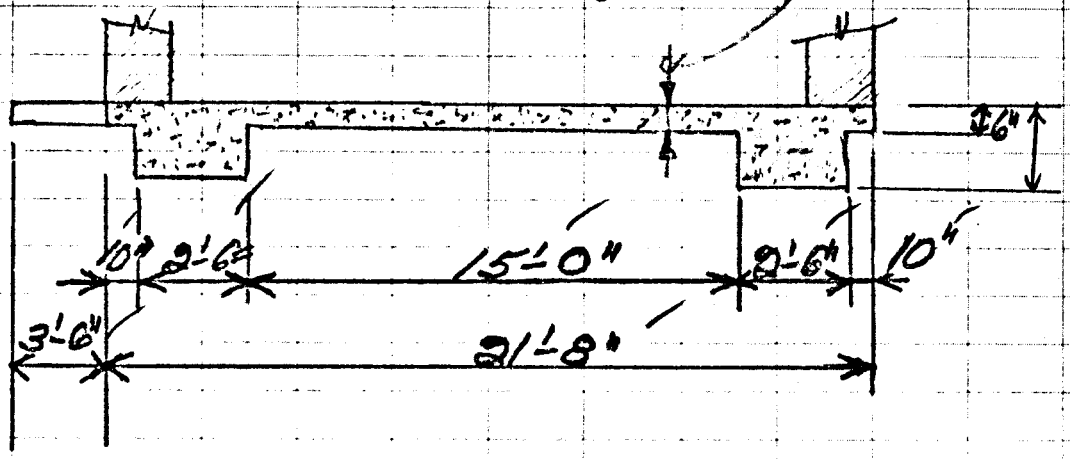
Computed by R.G.P. Date 1-30-73
Checked by WJL Date 2/5/73
Reviewed by RJB Date 2/9/73
Approved by RGP Date 15-73

Subject STRUCTURAL
OFFICE & POWERHOUSE BLDG.

Sheet No. 8 of

FLOOR SLAB

Assume 7" thickness of slab



L.L. = 100 psf including finishes & insulation

Slab D.L ≅ 88 psf

Walls: Brick 4" W/cavity grouted 45 psf ✓
Concrete Block 8" W/cavity grouted (not hollow) 56 psf

Include all exterior walls on beam load.
Include all interior walls as a part of the floor L.L. except in restroom area. OK

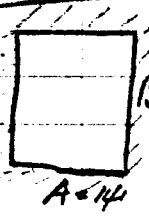
Computed by RGP Date 1-30-73
Checked by WJK Date 2/5/73
Reviewed by [illegible] Date 2/9/73
Approved by GT Date 2-5-73

Job No. 4671 Page No. 4A-9
Subject STRUCTURAL
OFFICE & POWERHOUSE BLDG.
Sheet No. 9 of

Design as two way slab ACI method 3

CASE 2

17'-0" x 14'-0"



$\frac{A}{B} = \frac{14}{17} = 0.825$

Neg $M_A = -0.0625(.188)(14)^2 = -9.3^{1k}/_1$

$+ M_A = [+0.025(.088) + 0.039(.100)](14)^2 = +1.2^{1k}/_1$

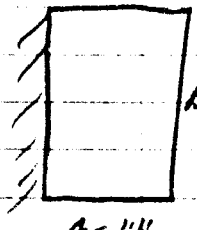
$V_A = 0.685(0.188)(14)(\frac{1}{2}) = 0.9^{k}/_1$

$v = 0k$
$10.7\ psi/_1$

Neg $M_B = -0.029(.188)(17)^2 = -1.6^{1k}/_1$

$+ M_B = [+0.0115(.088) + 0.018(.100)](17)^2 = +0.8^{1k}/_1$

CASE 6



$-M_A = 0.0845(.188)(14)^2 = -3.1^{1k}/_1$

$+M_A = [0.0435(.088) + 0.0485(.1)](14)^2 = +1.7^{1k}/_1$

$V_A = (.845)(.188)(14)(1/2) = 1.1^{k}/_1$

$v = 13.1\ psi/_1$

$-M_B = 0$

$+M_B = [0.016(.088) + 0.0205(.1)](17)^2 = 1.0^{1k}/_1$

Use $-M_A =$	$-3.0^{1k}/_1$	$d = 5.8"$	$A_s = 0.36^{in^2}/_1$
$+M_A =$	$+1.5^{1k}/_1$	$= 5.2"$	$= 0.20"$
$-M_B =$	$-1.5^{1k}/_1$	$= 5.9"$	$= 0.19"$
$+M_B =$	$+1.0^{1k}/_1$	$= 4.8"$	$= 0.15"$

min A_s = 0.11 on face

Job No. 4671 Page No. 4A-10

Computed by RGP Date 1-30-73

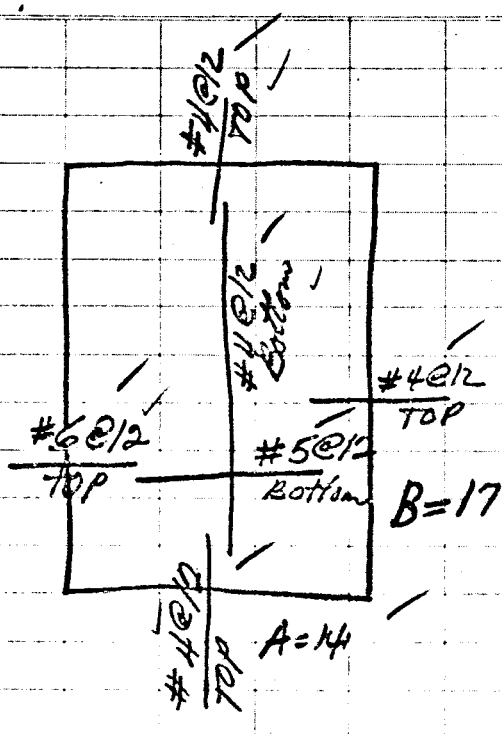
Checked by WJZ Date 2/5/73

Reviewed by _____ Date _____

Approved by _____ Date 5-7-73

Subject STRUCTURAL OFFICE & POWERHOUSE BLDG.

Sheet No. 10 of _____



At rest room area add #5@12 Top over supports and Bottom between supports.

BEAM - SHORT SPAN

$$w = \underset{\text{slab}}{0.188(14)\left(\tfrac{1}{3}\right)} + \underset{\text{Bm}}{0.37} + \underset{\text{wall}}{.101(9)} + \underset{\text{Roof}}{.45} \cong 2.6^{k}/_{'}$$

0.88

$$M_{AX}\ {}^{+}_{-}M = \frac{2.6(14)^2}{10} = 51^{'k}; \quad A_s = 2.44\ \square'' \quad d = 14.5''$$

Use 4-#8 T&B

$$\text{MAX } V = 2.6(14)\left(\tfrac{5}{8}\right) = 22.7^{k}; \quad v = \frac{22700}{15(30)} \cong 50\ psi\ \text{Ok}$$

#4@19 STIRRUPS

BEAM - LONG SPAN

$$w = 0.188(.71)(11.20)\left(\tfrac{14}{2}+2\right) + .37 + .91 + .42 = 2.9^{k}/_{'}$$

$$M_{AX}\ {}^{+}_{-}M = \frac{2.9(17.5)^2}{8} = 111^{'k}; \quad A_s = 4.9\ \square'' \quad d = 15.5''$$

$$V = \frac{2.9(15)}{2} = 31.8^{k}\ \text{Ok}$$

Use 5-#9 B
4-#8 T

#4@12 STIRRUPS

Computed by RGP Date 4-11-73
Checked by RJB Date 4-12-73
Reviewed by ____ Date ____
Approved by RGP Date 5-73

Job No. 4671 Page No. 4A-11
Subject STRUCTURAL
Powerhouse & Office
Sheet No. 11 of ____

EQUIPMENT FNDN

Diesel Engine driven Auxiliary Generator

Speed ≈ 1800 rpm ✓ 185 H.P. ✓ 4 stroke ✓

Wt. (Machine & Base) - - - 4500 # ✓

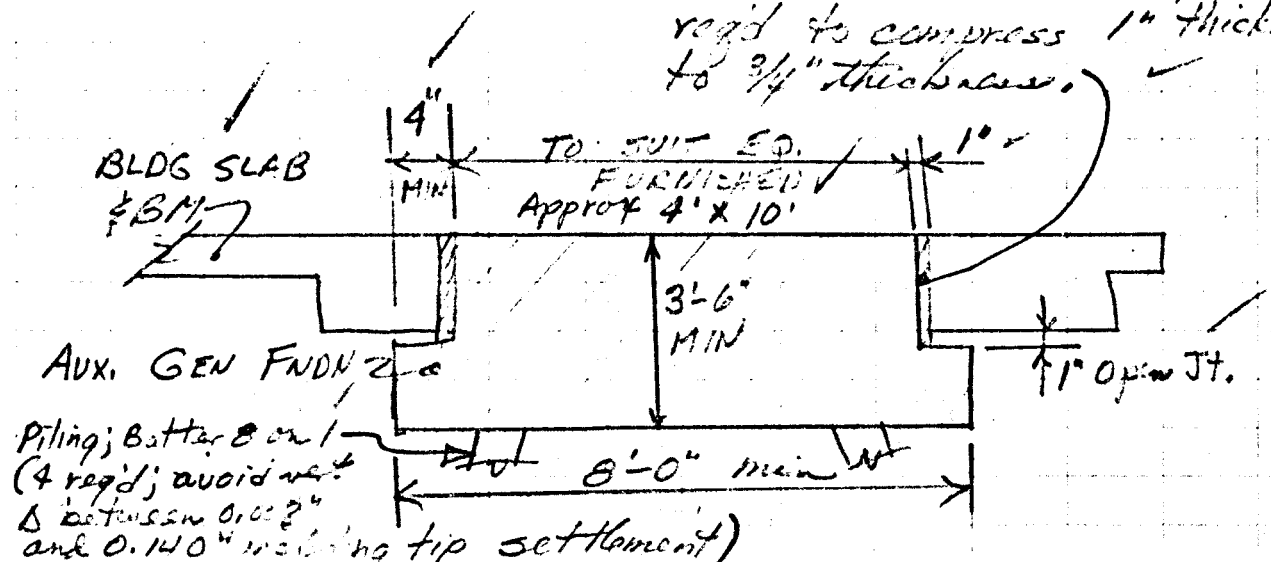
Dynamic unbalances -- Unknown {will be small with 6 cylinder Vee-engine ✓

No. Cylinders, stroke, bore, etc. - Unknown

During preparation of plans and specifications size for machine procured and blade nos. ✓ on the prints ✓ because finish must be compatible with machine furnished. Auxiliary machine being placed above ground ~~with light~~ subbase must be reasonably well balanced machine.

"Foundation shall be adjusted to be dynamically compatible with machine furnished." ✓

Neoprene Isolation Pt. material ✓
Min 15 and max 25 psi
reqd to compress 1" thickness
to 3/4" thickness. ✓



Job No. 4671 Page No. 44-12

Computed by RJ Bechler Date 2/13/73
Checked by RGP Date 3-8-73
Reviewed by ____ Date ____
Approved by RGP Date 5-73

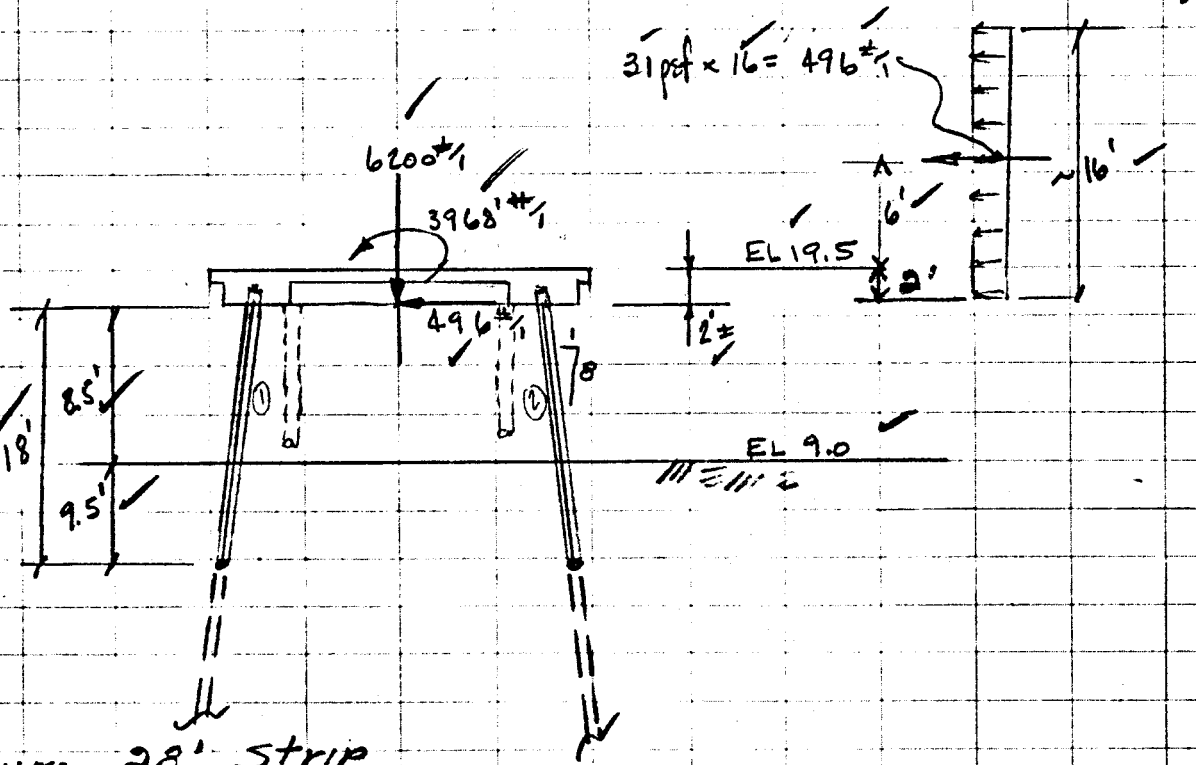
Subject STRUCTURAL
OFFICE & POWERHOUSE

Sheet No. 19 of ____

PILING

Dead Load

Roof:	Trusses	~40 plf x 30' / ~19' o.c.	= 63	# ✓
	Purlins	8 x 11.5 plf	92	✓
	Deck Tile	10 x 30'	300	Low
Walls		2 x 8.3 x (40 + 55 + 5)	1660	✓
	Bond Bm	2 x 100	200	✓
Slab		7/12 x 150 x 23' Avg width	2010	✓
Bms		2 x 2.5 x 1.5 x 150	1125	✓
		2 x 1.5 x 150 x 15'/19' o.c.	355	Low
Internal Walls etc say 20 psf x 20			400	✓
			6205 ±	Use 6200 #/' Avg ✓



Assume 28' strip

6.2 x 28 = 173.6 K ↓ ✓
3.968 x 28 = 111.1 IK ↻ ✓
0.496 x 28 = 13.9 K ← ✓

RIGOLETS LOCK JOB 4671

POWERHOUSE AND OFFICE PILING

THREE DIMENSIONAL PILE GROUP (RIGID HEADSTOCK)

GEOMETRY OF PILE GROUP

PILE	XI	YI	ZI	XJ	YJ	ZJ	AREA	E	G	IXX	IYY	KS
1	-11.9	-18.0	-7.0	-8.9	0.0	-7.0	119.2	4000.	1650.	1128.0	1128.0	2256.0
2	11.9	-18.0	-7.0	8.9	0.0	-7.0	119.2	4000.	1650.	1128.0	1128.0	2256.0
3	-11.9	-18.0	7.0	-8.9	0.0	7.0	119.2	4000.	1650.	1128.0	1128.0	2256.0
4	11.9	-18.0	7.0	8.9	0.0	7.0	119.2	4000.	1650.	1128.0	1128.0	2256.0
5	-6.9	-18.0	-7.0	9999.9	0.0	0.0	39.9	4000.	1650.	376.0	376.0	752.0
6	6.9	-18.0	-7.0	9999.9	0.0	0.0	39.9	4000.	1650.	376.0	376.0	752.0
7	-6.9	-18.0	7.0	9999.9	0.0	0.0	39.9	4000.	1650.	376.0	376.0	752.0
8	6.9	-18.0	7.0	9999.9	0.0	0.0	39.9	4000.	1650.	376.0	376.0	752.0

POWERHOUSE AND OFFICE PILING

LOAD CASE 1 DL + MAX WIND

FX	FY	FZ	MX	MY	MZ
-13.90	-173.60	0.00	0.00	0.00	111.10

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.194496E-01	-0.126569E-02	-0.417195E-09	-0.231775E-10	0.186747E-09	-0.285617E-03

PILE FORCES (FT,KIP,KIP)

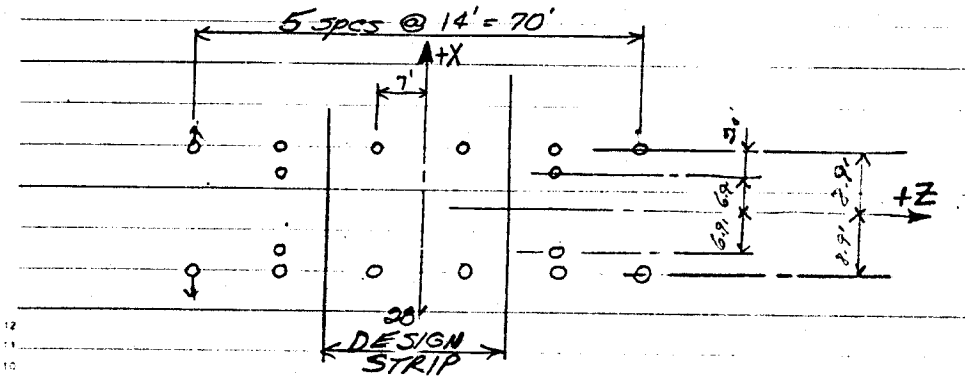
PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD	
1	0.000	6.946	0.000	-0.000	0.000	50.651	} per pile
2	0.000	-7.063	0.000	-0.000	0.000	14.590	
3	0.000	6.946	0.000	-0.000	0.000	50.651	
4	0.000	-7.063	0.000	-0.000	0.000	14.590	
5	0.000	2.378	0.000	-0.000	0.000	-6.251	} For 1/3 of design strip MULTIPLY VALUE BY 3
6	0.000	2.378	0.000	0.000	0.000	28.696	
7	0.000	2.378	0.000	-0.000	0.000	-6.251	
8	0.000	2.378	0.000	0.000	0.000	28.696	

MAX Pile Tension = 3(6.251) ≈ 19K

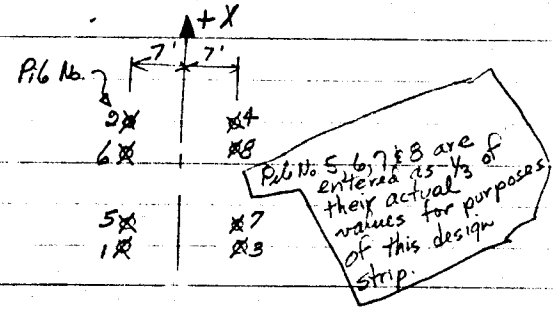
MAX Pile Compression = 3(28.696) ≈ 86K

REQ'D ULTIMATE CAPACITY = 86(1.5) = 129K

SAY 65 TONS



ACTUAL PILE GROUP



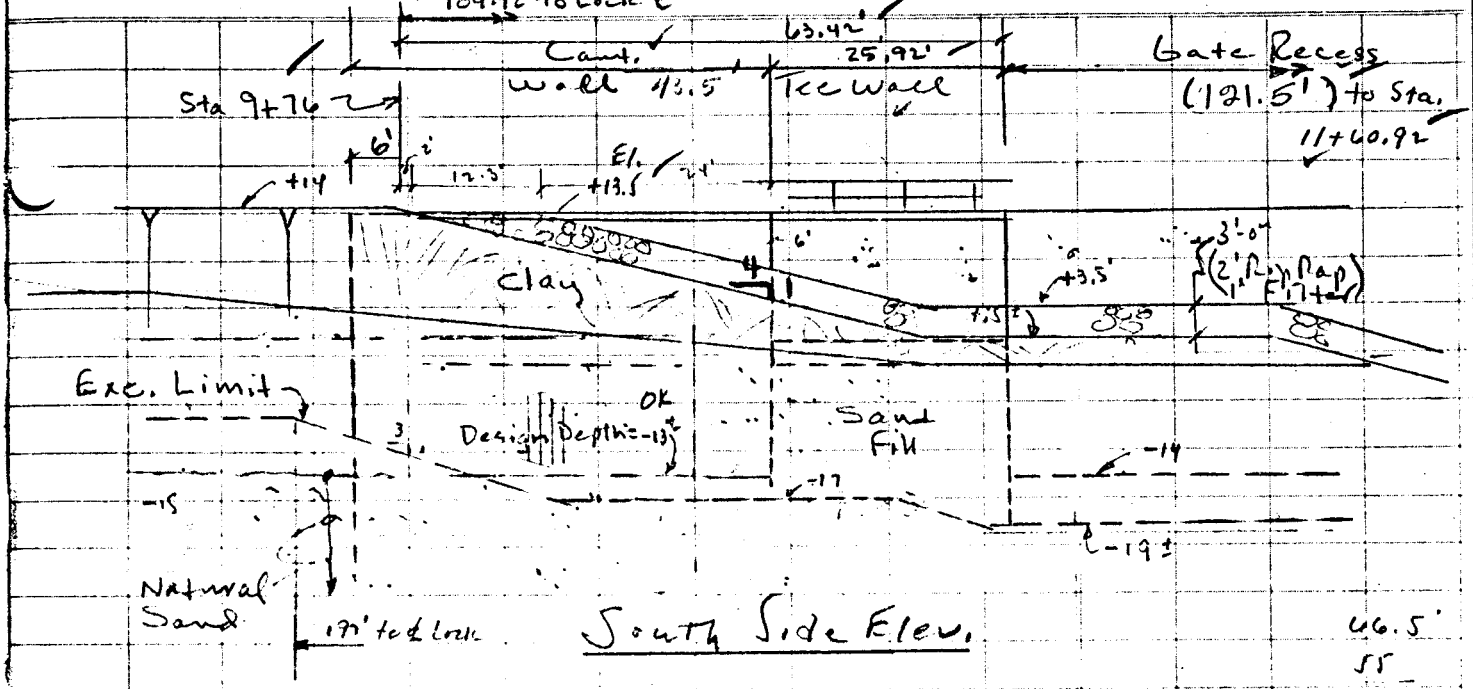
DESIGN STRIP

Job No. 4671 Page No. 4A-15

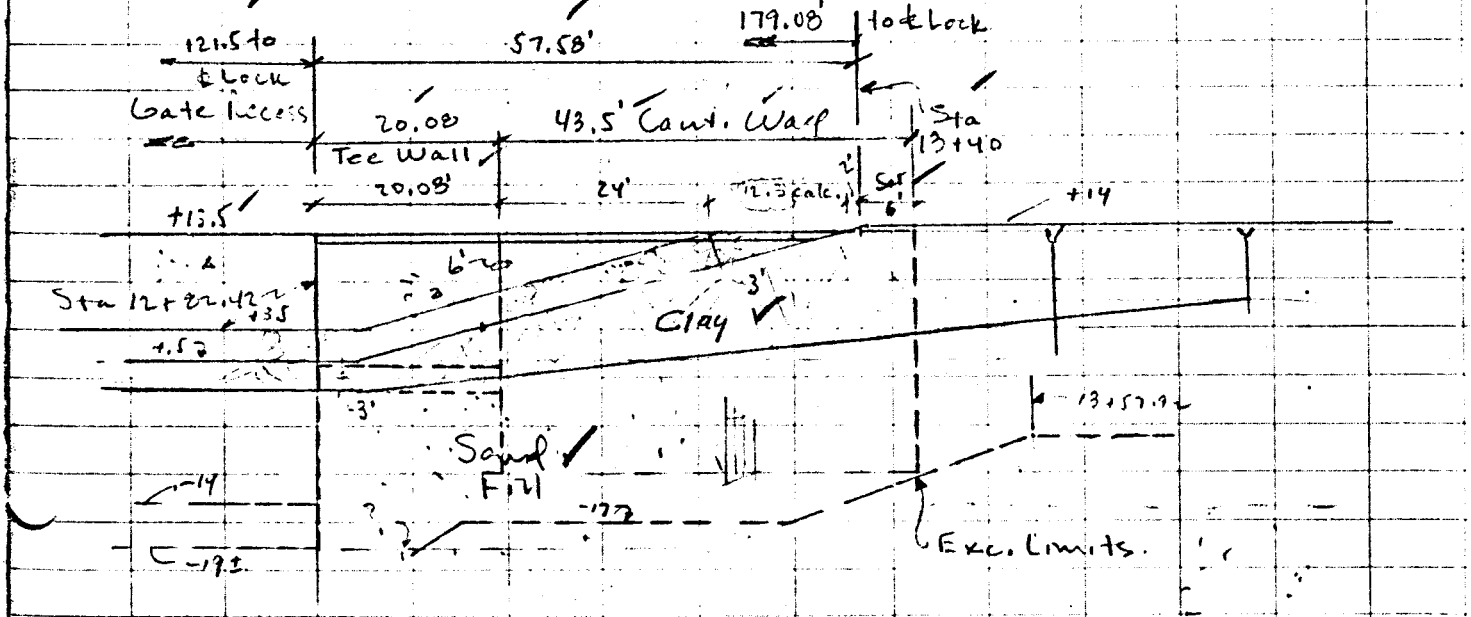
Computed by GAS Date 1/19/73
Checked by WJZ Date 2/5/73
Reviewed by KJV RCP Date 2-22-73
Approved by KJV Date 4-[illegible]/73

Subject Structural
Flood Walls - Tee
GULFSIDE

Sheet No. 1 of



46.5'
55
-121.5
+124.92
63.42



North Side Elev.

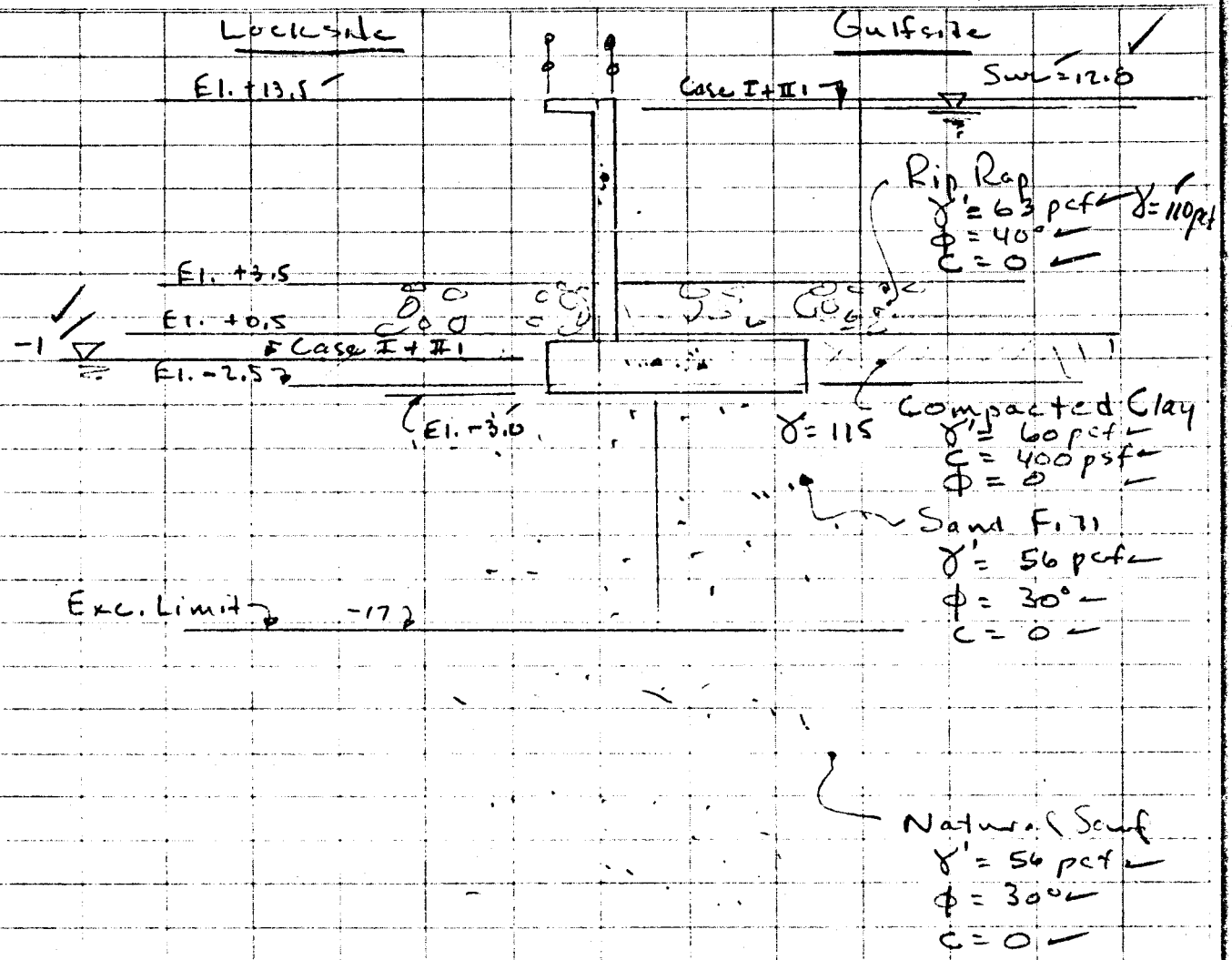
See Soil Boring 2-A14 Plate 31 of June '69 Report

Job No. 4671 Page No. 4A-16

Subject Structural
Flood Wall - Tee
GULFSIDE

Computed by GAS Date 1/17/73
Checked by WJZ Date 2/5/73
Reviewed by [illegible] ROP Date 2-27-73
Approved by RAP Date 1/28-73

Sheet No. 2 of



DESIGN SECTION

p.17 **Criteria**

Ref. EM1110-2-2501, Ch. 1

Per Ltr. 5 Jan 73 use F.S. = 1.3 w/o wave
1.25 w/ wave
in calc. press. on Sht pile cutoff

p.

Job No. 4671 Page No. 4A-17

Subject Struct. Flood Walls - Tee Gulfside

Computed by GAS Date 1/22/73

Checked by WJT Date 2/7/73

Reviewed by [illegible] Date 2-22-73

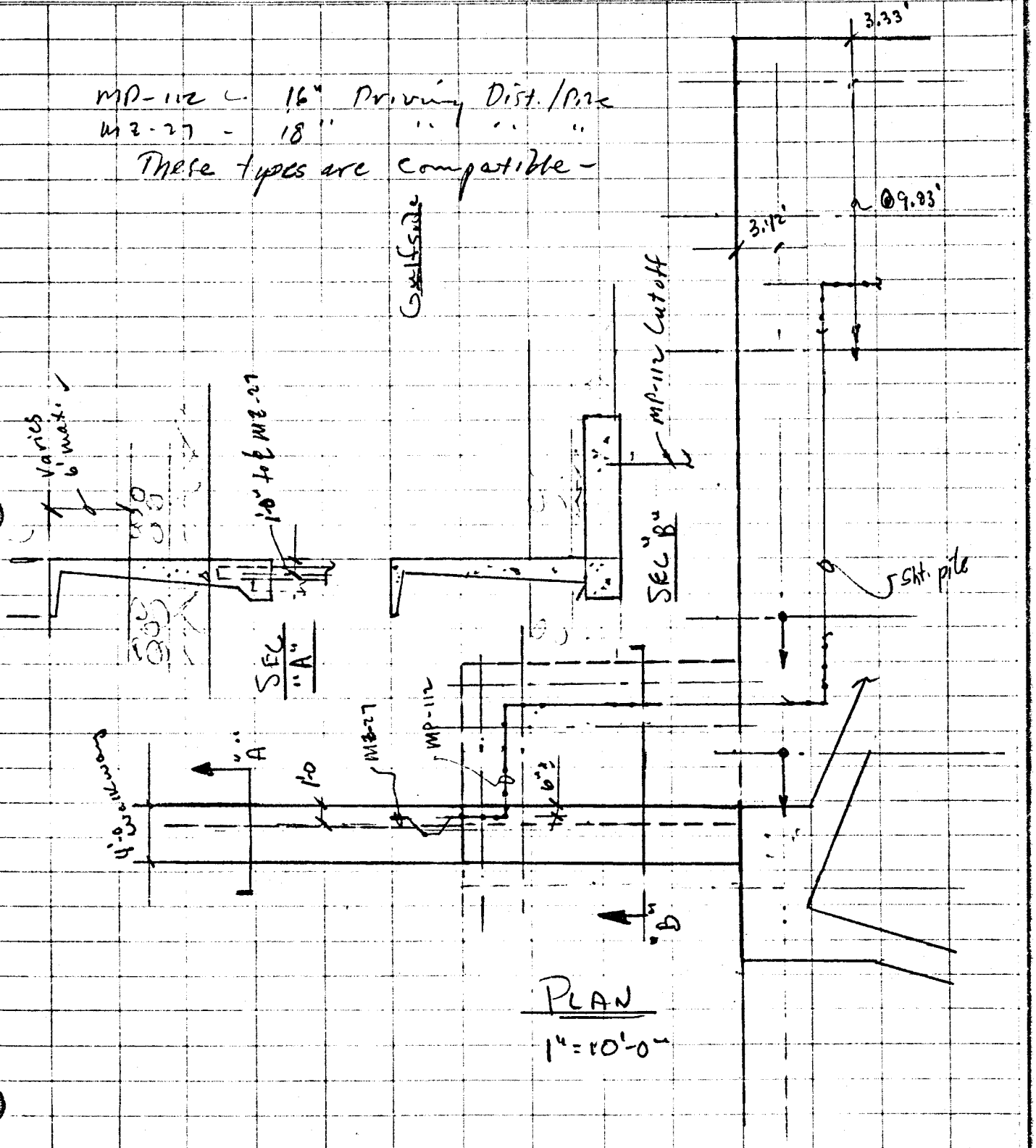
Approved by ROP Date 11-30-72

Sheet No. 3 of

MP-112 - 16" Driving Dist./Pile

MZ-27 - 18" " " "

These types are compatible -



PLAN

1" = 10'-0"

Job No. 4671 Page No. 4A-18

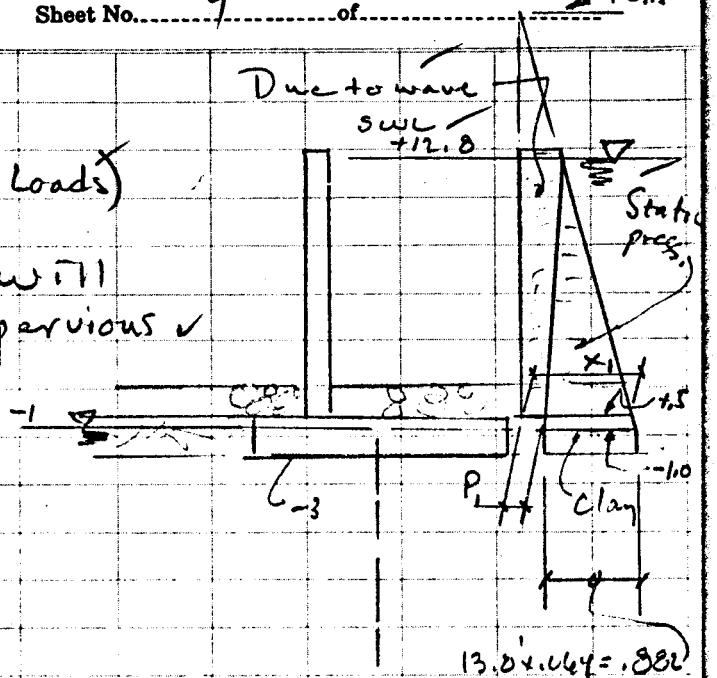
Computed by GAS Date 1/22/73
Checked by WJL Date 2/6/73
Reviewed by RJE Date
Approved by RLF Date 4-30-73

Subject Struct
Flood Wall - Tee
GULFSIDE

Sheet No. 4 of

Find wave forces on wall (due to Case III Loads)

Assume wave forces will apply down to top of impervious clay layer @ +0.5, OK



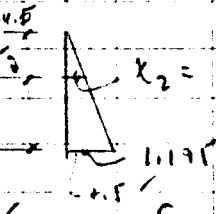
From hydraulic comps.:

$d/L = 11.3/94.5 = 0.12$

$H = 8.2'$

$P_1 = .408$ ksf See G.T. comps

$X_1 = .408 + 12.3 \times .064 = 1.195$ ksf



$X_2 = \frac{11.7}{24} \times 1.195 = 0.574$ ksf — OK — small error

Equiv. $f_{w.2} = .574/11.7' = 0.0492$ kcf

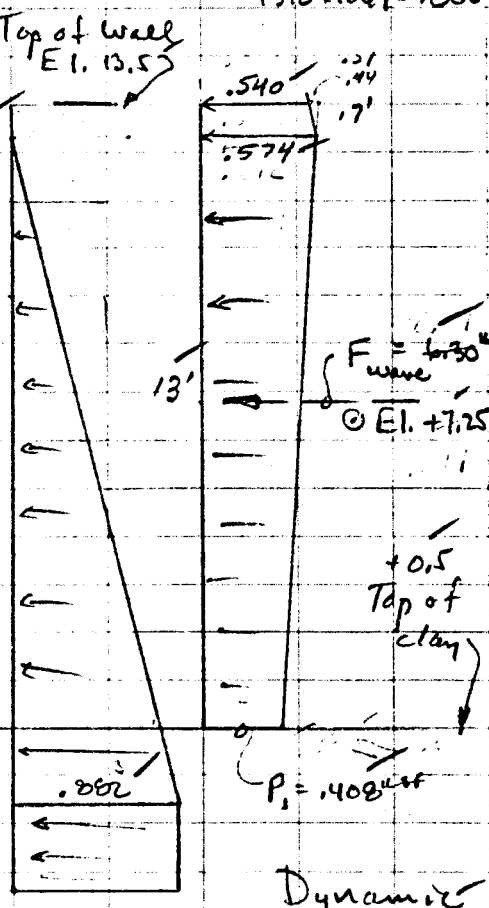
Find wave resultant. = F_{wave}

Moment top of wall

$.408^{ksf} \times 13' =$	$5.30 \times 6.5 =$	34.5
$1/2 \times .176 \times 13 =$	$1.15 \times 13/3 =$	4.96
$-1/2 \times .044 \times 0.7 =$	$-.15 \times .7/3 =$	$-.04$
	6.30^{k}	$39.42'^{k}$

$\bar{X} = 39.42/6.30 = 6.25'$

or El. $= 13.5 - 6.25 = +7.25$



Static water pressure

Dynamic water press. (due to wave)

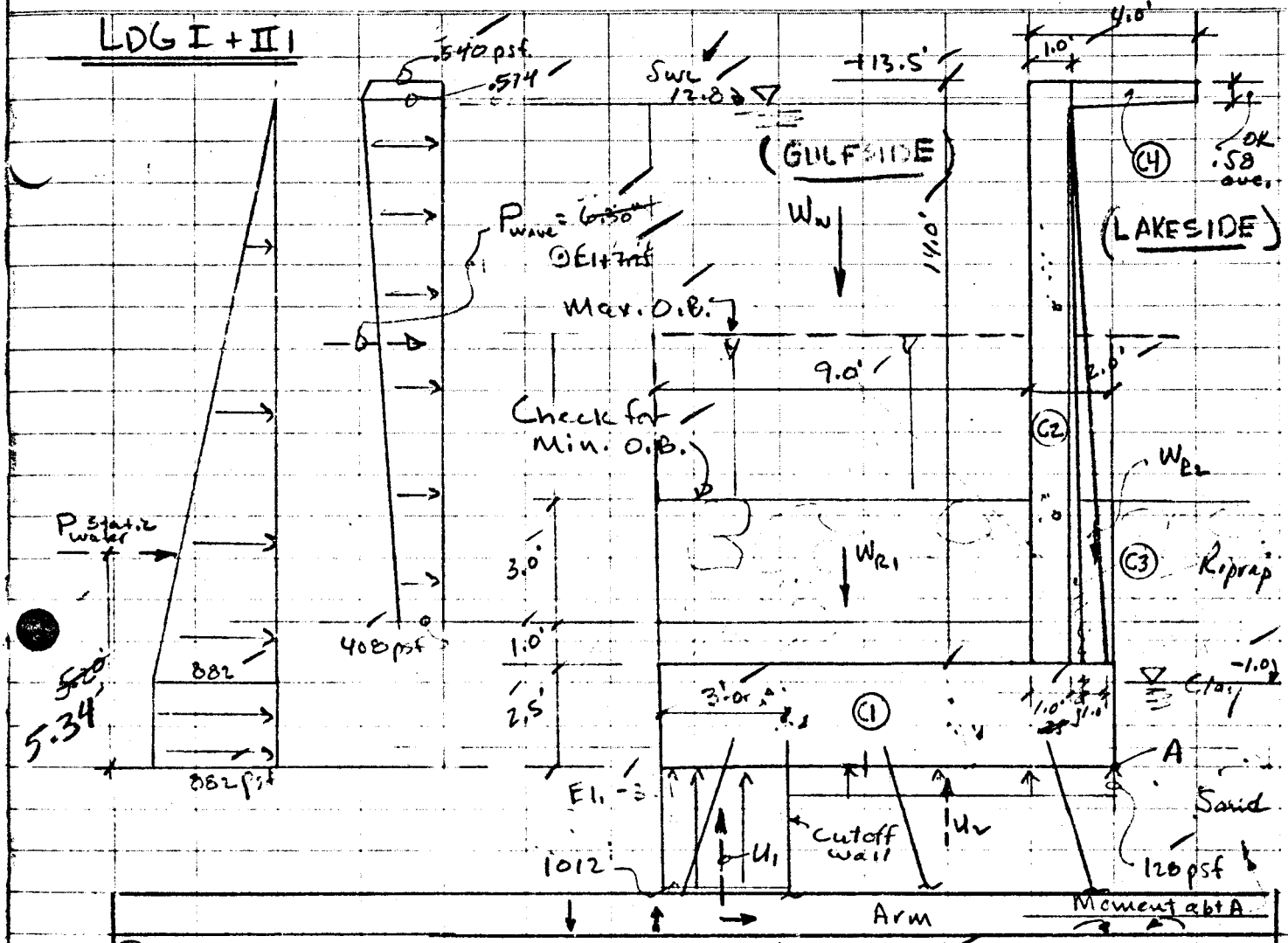
Σ Moment bot. of ftg.

	$6.30^{k} \times 10.2' =$	64.5	
$1/2 \times .832 \times 13.8 =$	$6.08 \times [2' + 12.8'/3] =$	37.1	40.13
$2' \times .832 =$	$1.76 \times 1' =$	1.76	
	14.14^{k}	$M = 105.4'^{k}$	$106.3'^{k}$ (Ldg Case II only)

Computed by GAS Date 1/23/73
Checked by WJZ Date 2/6/73
Reviewed by KOP KOP Date 2-28-73
Approved by [illegible] Date 4-30-73

Job No. 4671 Page No. 4A-19
Subject Struct. Flood Wall - Tec GULFSIDE
Sheet No. 5 of

LDG I + II

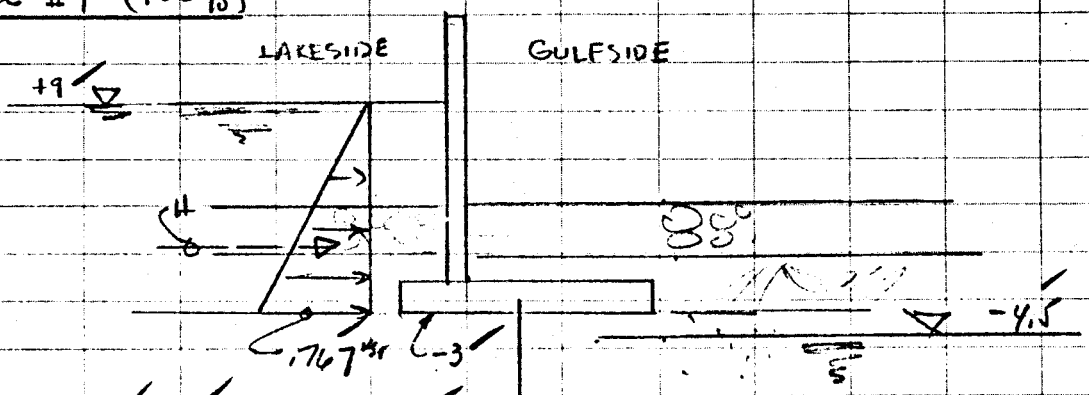


				Arm	Moment abt A
P_{wave}	See following Swr		6.30k	10.25	64.58
$P_{static\ water}$			7.84	5.34	40.77 -11.87
C1	2.5' x 11.0' x .150	4.125k		5.5'	22.69'k
C2	14.0 x 1.0 x .15	2.100		1.5	3.15
C3	1/2 x 1.00 x 25 x .15 x 44 / 13.33	1.00		.67	.67
C4	3.0 x .58 x .15	.261		-.5	.13
W_{R1}	9.0 x 4.0 x .06	2.160		6.5	14.04
W_{R2}	79 x 4.0 x .110 / 1340			.4	.14
W_W	13.3 x 9.0 x .064	7.661		6.5	49.79 OK
U_1	1.012 x 3'	3.036k		9.5	28.99
U_2	.128 x 8'	1.024		4.0	4.10
		13.57			
		ΣV = ~~14.06~~	ΣH = 14.14		ΣM = 49.13k

Computed by GAS Date 1/22/73
Checked by WJF Date 2/6/73
Reviewed by RS RGP Date 2-22-73
Approved by [illegible] Date 4-30-73

Job No. 4671 Page No. 4A-20
Subject Struct.
Flood Wall - Tee
GULFSIDE
Sheet No. 6 of

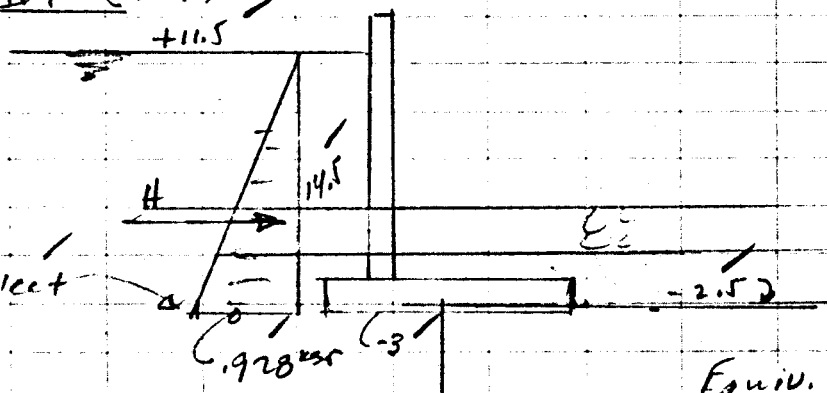
Case II 9 (100%)



$H = 0.767 \times 12\frac{1}{2}' = 4.6^{k}$

$M_{@\ base\ fig} = 4.6^{k} \times 12'/3 = \underline{18.4'^{k}}$ (Water Load only)

Case II 7 (133%)



$H = 0.928 \times 1/2 \times 14.5 = 6.74^{k}$

$M = 6.74 \times 14.5/3 = 32.6'^{k}$ (Water Load Only)

Equiv. loads @ 100% allow. stress

$\times .75 =$	5.05^{k}
$\times .75 =$	$24.5'^{k}$

Controls for maximized load from lakeside

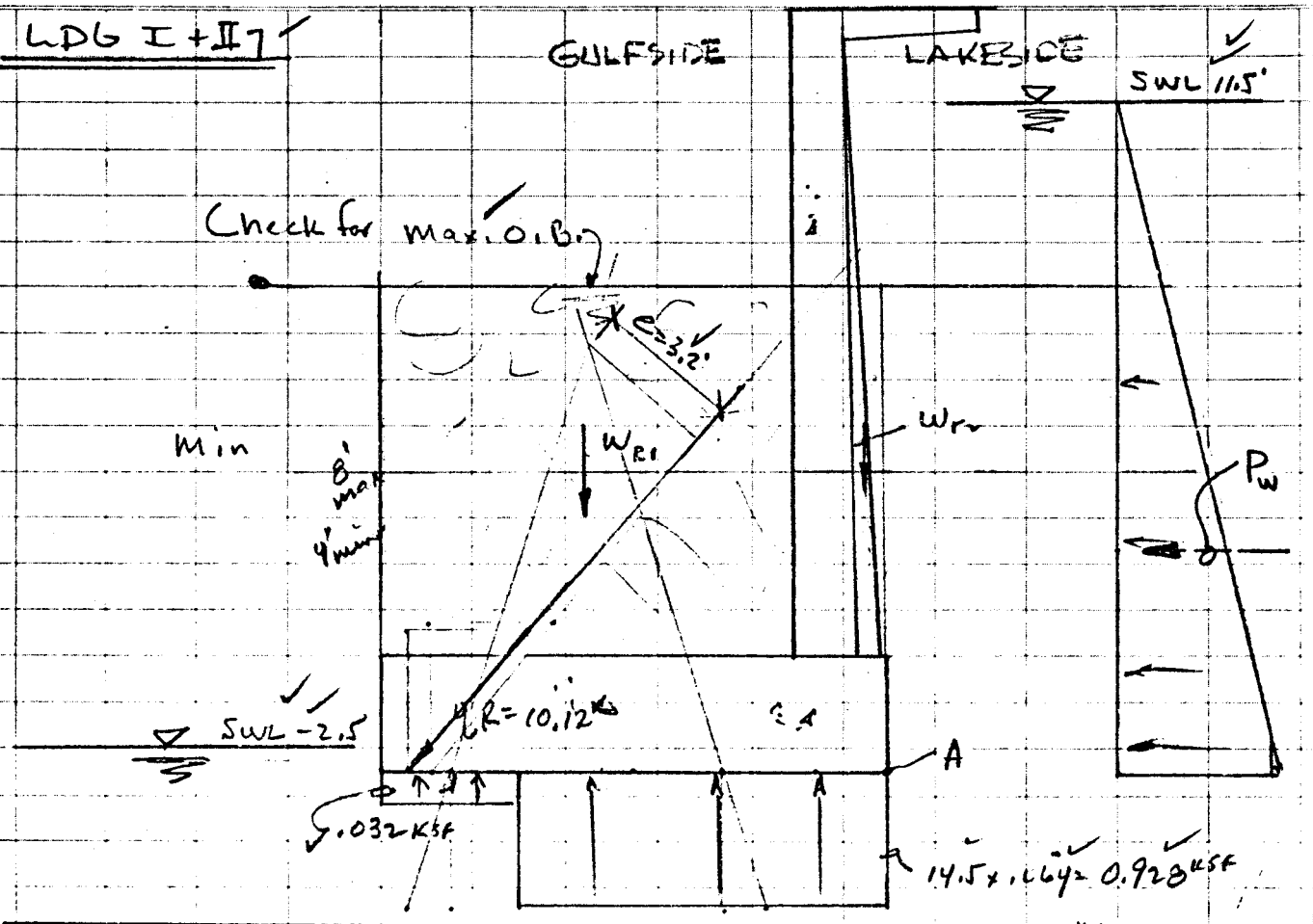
Job No. 4671 Page No. 4A-21

Computed by GAS Date 1/23/73
Checked by WJ Date 2/16/73
Reviewed by RSR RGP Date 3-28-73
Approved by RGP Date 4-30-73

Subject Struct. Flood Wall - Tee GULFSIDE

Sheet No. 7 of

LDG I + II ✓



		↓	↑	←	Arm	↷	↶ A
P_W	See following sht			6.74 OK	4.83		32.60 OK
C1		4.125					22.69
C2	See comp's. for LDG's I + II	2.100					3.15
C3		1.100 1.263					.24
C4		.261				.13	
W_{R1}	8' x 9 x .110 OK	7.920			6.5		51.48
W_{R2}	8' x 8 x .060 OK	.394			.20 .14		.16
U_1	3' x .03		.096		9.5	.91	
U_2	8' x .928	8.03	7.424		4.0	29.70	
		ΣV = 7.543		ΣH = 6.74		ΣM_A = 79.58	

$\bar{x} = 79.58 / 7.543 = 10.55'$ $R = \sqrt{7.543^2 + 6.74^2} = 10.12^K$; $M = 10.12 \times 3.2 = 32.38^{IK}$

$I = \frac{1}{3} \times 3.27^3 + 3 \times (.73^3 + 4.73^3) = 122.2\ ft^4/ft$ Max Pile Load Add'l $= \frac{32.38^{IK}}{37.36} = 0.87^K/pile$

$S = 122.2 / 4.73 = 37.36\ ft^3/ft$

Job No. 4671 Page No. 4A-22

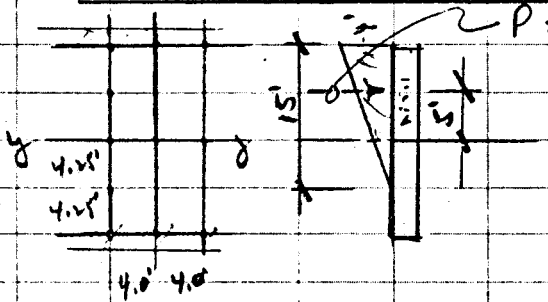
Computed by GAS Date 1/23/73 Subject Struct.

Checked by WJA Date 2/6/73 Flood Wall - Tee

Reviewed by RGP Date 8-9X-73 GULFSIDE

Approved by [illegible] Date [illegible] Sheet No. 8 of

✓ effect of unbal load due to Soil Slope



$P = \frac{1}{2} \times 4' + 15 \times 11' \times .060 = 19.8^{k}$

$M = 19.8 \times 5' = 99^{ft\text{-}k}$

$I_{yy} = 2 \times 3 \times 8.5^2 + 2 \times 4.25^2 = 469.6\ ft^4$

$S_{yy} = 469.6 / 8.5 = 55.25\ ft^3$

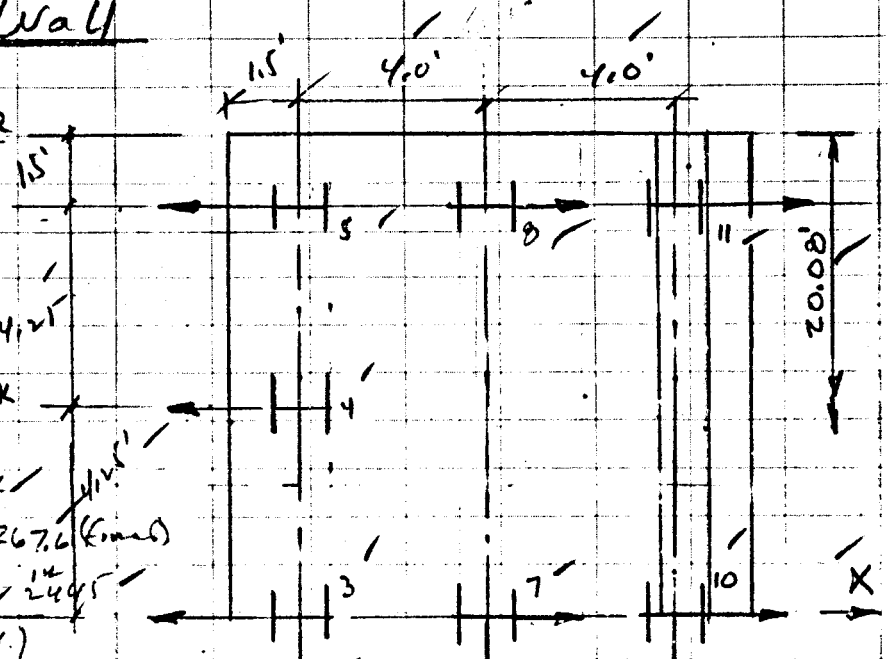
Outs. Pile load: $99^{ft\text{-}k} / 55.25 = 1.79^{k}/pile$ - low OK

Computed by GAS Date 1/23/13
Checked by WJZ Date 2/6/13
Reviewed by [illegible] Date 2-18-13
Approved by [illegible] Date 4-21-13

Job No. 4671 Page No. 4A-23
Subject Struct.
Flood Wall - Tee
GULFSIDE
Sheet No. 9 of

North Side Wall

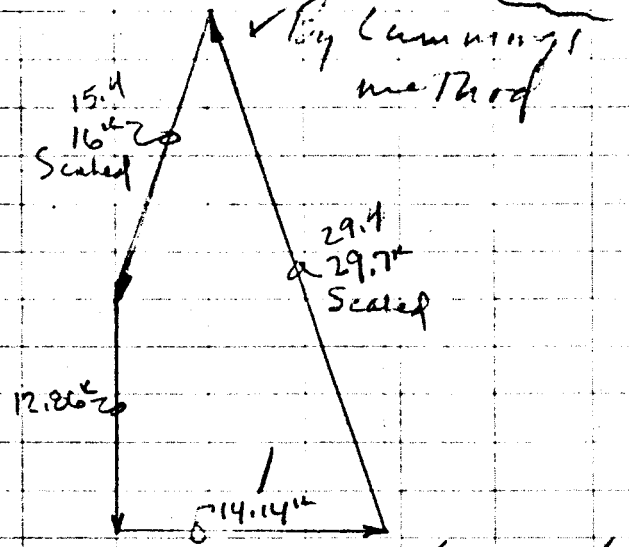
KEY FOR COMPUTER INPUT
Per 126P
Assume HP14x73 piles OK
Use 3'-0 length OK to infl. point.

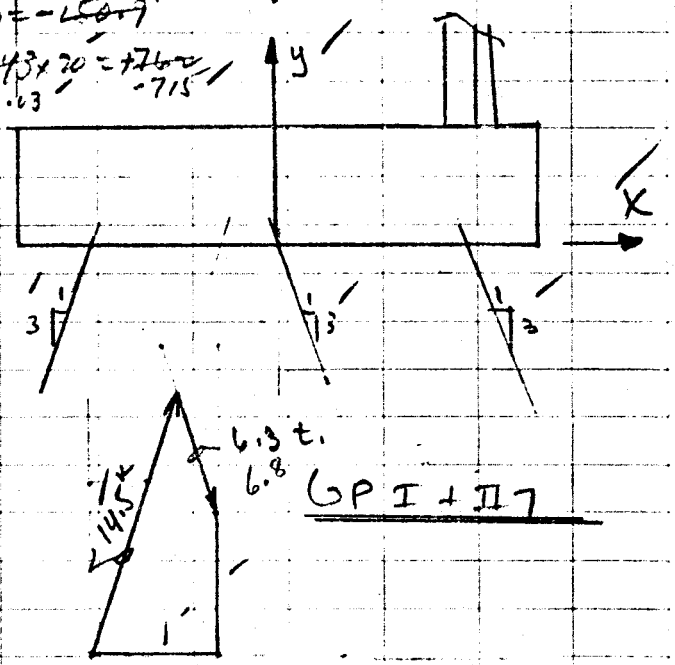


GpI $F_x = 14.14 \times 20 = 282.8^k$
$F_y = 12.86^k \times 20 = -257.2$ 267.6 (from 6)
$M_z = 9.14 \times 13.38 \times 20 = 2440^{in\text{-}k}$
$M_x = -99^{in\text{-}k}$ (see prev. sht.)

GpI + II 7 $F_x = 6.74 \times 20 = 134.8^k$; $F_y = \frac{2.03}{7.43} \times 20 = -\frac{160.8}{150.9}{}^k$
$M_z = \frac{5.05}{4.41} \times 7.43 \times 20 = +\frac{760}{715}$

GpI + II 1 LD6





GpI + II 7

Pile comp'n load = $\frac{29.7^k \times 20'}{6 \text{ pile}} = 99^k$/pile

Pile tension load = $\frac{16^k \times 20'}{5 \text{ pile}} = 64^k$/pile

Pile compr. = $\frac{[14.5+.87]20}{5} = 61.5^k$

Pile tens = $\frac{6.3 \times 20}{6} = 21.0^k$

STANLEY CONSULTANTS

INTERNATIONAL CONSULTANTS IN ENGINEERING ARCHITECTURE PLANNING AND MANAGEMENT

Sheet.... of ....

Dept. No. 354 Job No. 4671

Computed by GAS Date 1/24/73 Reviewed by ..... Date ..... Punched by ..... Subject Rigolets - "L" FLOOD WALL

Checked by ..... Date ..... Approved by RAC Date ..... Verified by .....

FLOOD WALL, TEE-TYPE SURFSIDE

JOB NO 4671 MADE GAS 1/24/73

11 2 0

-5.	-3.	8.5	-4.	0.	8.5	21.46	29000.	11400.	733.1	261.9	4.	
-5.		4.25	-4.		4.25							
-5.		0.	-4.		0.							
-5.		-4.25	-4.		-4.25							
-5.		-8.5	-4.		-8.5							
1.		8.5	0.		8.5							
1.		0.	0.		0.							
1.		-8.5	0.		-8.5							
5.		8.5	4.		8.5							
5.		0.	4.		0.							
5.		-8.5	4.		-8.5							
		267.6 final						-2440	final			
282.8		-257.2 prelim.	0.		-99.	0.		-2442.	prelim.			
-134.8		-140.9 prelim.	0.		-99.	0.		+ 742.	prelim.			
		140.6 final						71.5	final			

END

SHT 10 44-21

SC 3019

Sht 11 44-25

FLOOD WALL, TEE-TYPE GULFSIDE

JOB NO 4671 MADE GAS 1/24/73 2/6/73

THREE DIMENSIONAL PILE GROUP (RIGID HEADSTOCK)

GEOMETRY OF PILE GROUP

PILE	XI	YI	ZI	XJ	YJ	ZJ	AREA	E	G	IXX	IYY	KS
1	-5.0	-3.0	8.5	-4.0	0.0	8.5	21.4	29000.	11400.	733.1	261.9	4.0
2	-5.0	-3.0	4.2	-4.0	0.0	4.2	21.4	29000.	11400.	733.1	261.9	4.0
3	-5.0	-3.0	0.0	-4.0	0.0	0.0	21.4	29000.	11400.	733.1	261.9	4.0
4	-5.0	-3.0	-4.2	-4.0	0.0	-4.2	21.4	29000.	11400.	733.1	261.9	4.0
5	-5.0	-3.0	-8.5	-4.0	0.0	-8.5	21.4	29000.	11400.	733.1	261.9	4.0
6	1.0	-3.0	8.5	0.0	0.0	8.5	21.4	29000.	11400.	733.1	261.9	4.0
7	1.0	-3.0	0.0	0.0	0.0	0.0	21.4	29000.	11400.	733.1	261.9	4.0
8	1.0	-3.0	-8.5	0.0	0.0	-8.5	21.4	29000.	11400.	733.1	261.9	4.0
9	5.0	-3.0	8.5	4.0	0.0	8.5	21.4	29000.	11400.	733.1	261.9	4.0
10	5.0	-3.0	0.0	4.0	0.0	0.0	21.4	29000.	11400.	733.1	261.9	4.0
11	5.0	-3.0	-8.5	4.0	0.0	-8.5	21.4	29000.	11400.	733.1	261.9	4.0

13113

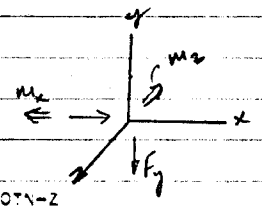
final use

Sht 12 4A-26

JOB NC 4671 MADE GAS 1/24/73

LOAD CASE 1 I+II

FX	FY	FZ	MX	MY	MZ
282.80	-267.60	0.00	-99.00	0.00	-2445.00



HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
0.465418E-03	-0.183144E-03	-0.392123E-05	-0.121246E-05	0.446040E-06	-0.831381E-04

PILE FORCES (FT,KIP,KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	-5.834	0.000	-0.030	0.000	-59.019
2	0.000	-5.826	0.000	-0.030	0.000	-57.939
3	0.000	-5.819	0.000	-0.030	0.000	-56.859
4	0.000	-5.811	0.000	-0.030	0.000	-55.779
5	0.000	-5.804	0.000	-0.030	0.000	-54.699
6	0.000	5.650	0.000	-0.011	0.000	61.470
7	0.000	5.346	0.000	-0.011	0.000	63.158
8	0.000	5.042	0.000	-0.011	0.000	64.846
9	0.000	0.992	0.000	-0.039	0.000	123.558
10	0.000	0.688	0.000	-0.039	0.000	125.246
11	0.000	0.385	0.000	-0.039	0.000	126.934

Sht 13 4A-27

JOB NO 4671 MADE GAS 1/24/73

LOAD CASE 2 I+II7

FX	FY	FZ	MX	MY	MZ
-134.80	-160.60	0.00	-99.00	0.00	715.00

HEADSTOCK MOVEMENT (FT,RADIANS)

DISPL-X	DISPL-Y	DISPL-Z	ROTN-X	ROTN-Y	ROTN-Z
-0.379289E-03	-0.895829E-04	-0.392121E-05	-0.121246E-05	0.446018E-06	0.387684E-05

PILE FORCES (FT.KIP.KIP)

PILE	B.MT-X BTM	B.MT-X TOP	B.MT-Y BTM	B.MT-Y TOP	TORQ.MT	AXIAL LOAD
1	0.000	13.907	0.000	-0.030	0.000	41.065
2	0.000	13.914	0.000	-0.030	0.000	42.145
3	0.000	13.922	0.000	-0.030	0.000	43.225 ave.
4	0.000	13.929	0.000	-0.030	0.000	44.305
5	0.000	13.937	0.000	-0.030	0.000	45.385
6	0.000	-16.345	0.000	-0.011	0.000	-8.567
7	0.000	-16.648	0.000	-0.011	0.000	-6.879
8	0.000	-16.952	0.000	-0.011	0.000	-5.191
9	0.000	-16.128	0.000	-0.039	0.000	-11.462
10	0.000	-16.431	0.000	-0.039	0.000	-9.774
11	0.000	-16.735	0.000	-0.039	0.000	-8.086

Computed by GAS Date 1/29/73
Checked by [illegible] Date 2/6/73
Reviewed by [illegible] Date
Approved by [illegible] Date 4-30-73

Job No. 4671 Page No. 4A-28
Subject Struct
Flood Wall - Tee
GULFSIDE
Sheet No. 14 of

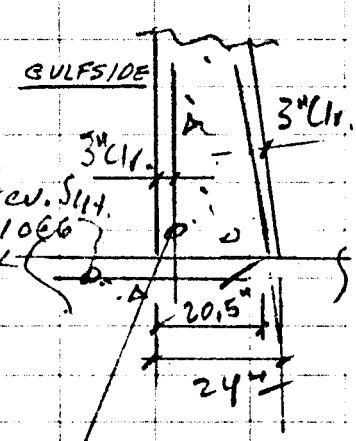
Cantilever stem

LDG I + II

		H	arm	M_{bot}
Wave		6.30'	7.75'	48.82 "k
Static Wtr.	$.064 \times 15.3^2/2 =$	5.66"	$\times 13.3/3$	25.09
Wall Wgt	$.261" \times 2.0'$	—		.52 "k
	Prev. Sht.	H = 11.96"		M = 74.43 "k

Man $d_{req'd} = \sqrt{74.43 \times .75 / .152} = 19.16"$ ✓

Shr $d_{req'd} = 11.96 \times .75 / .060 \times 12 = 12.46"$



Use t = 24" ✓
@ base

$A_s = 74.43 \times .75 / 1.44 \times 20.5 = 1.89^{on}$ ✓ #9@6" ✓

✓ Graph: $\varepsilon_{req'd} = 11.96 \times .75 / .234 \times 1.89 \times 20.5 = 2.10 < 7.00$ OK
$.231 \times .875 = 2.20$
Shear = OK $v = .049$

LDG I + II

$M = .064 \times 12^3/6 = 18.43"k$

$A_s = 18.43 \times .75 / 1.44 \times 20.5 = 0.47^{on}$

Job No. 4671 Page No. 4A-29

Computed by GAS Date 1/29/73
Checked by WJ Date 2/6/73
Reviewed by [illegible] Date
Approved by KGF Date 4-30-73

Subject Struct. Floor Wall - Tie
GULFSIDE
Sheet No. 15 of

FOOTING

Refer to LDG I + II 7 SAT

LDG CASE I + II 7

		V	arm	M_{AB}
Concr.	9.0'x 2.5'x .150	= - 3.375	4.1'	15.19
W_{R1}		- 7.720 OK	4.5'	35.64
U_1		+ .096	7.5	- .72
U_2	6.0'x .720	+ 5.568	3.0 =	-16.70
Piles 1-5	5x 43.23 x 3 (corr) / 20.08 x 100 =	+10.212 OK k/1	7.5 =	-76.59
	do x 1/10 =	3.404 k/1 →	1.0 =	+ 3.40
Piles 6-8	3/20.08 x 6.88 x 3/10 =	+ 0.975	3.5 =	- 3.41
	x 1/10 1/2	0.325 ←	1.0 =	- 0.33
Totals		ΣV = + 5.55 k/1		ΣM = - 43.52 k/1 — M @ Face of Stem

LDG CASE I + II 1

Concr.		3.375 k/1		15.19
W_{R1}		2.160	4.5	9.72
W_W		7.661	4.5	34.47
U_1		-3.036	7.5	-22.77
U_2	6'x.128	- .768	3.0	- 2.30
Piles 1-5	5/20.08 x 56.57	+14.086	7.5	105.65
	+ 5/20.08 x 7.053 adj			+ 1.76
Piles 6-8	3/20.08 x 62.515	- 9.34	3.5	-32.69
	3/20.08 x 6.607			- 0.99
Totals		V = 14.138 k/1		M = 103.04 k/1

Note: Pile loads for final structure are 50.80k & 63.16k — OK

ΣV = 14.114 ← ΣM = 102.12

Computed by GAS Date 1/29/73
Checked by WJZ Date 2/7/73
Reviewed by RS Date
Approved by Date 4-30-73

Job No. 4671 Page No. 4A-30
Subject Struct.
Flood Wall - Tee
GULFSIDE
Sheet No. 16 of

Size steel in base slab

Mom. $d_{req'd} = \sqrt{\frac{108.04 \times .75}{.154}} = 22.94"$ → 23.1

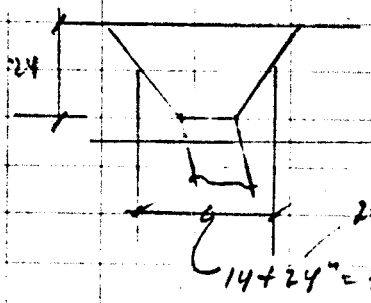
Shr. $d_{req} = \frac{14.138 \times .75}{.060 \times 12} = 14.73"$ ind clk → 14.70

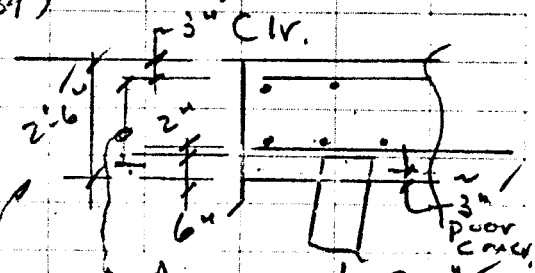
Materials

$f'_c = 3000$ psi
$f_c = 1,050$
$f_s = 20,000$
$K = 152$
$k = .326$
$j = .891$
$p = .0085$
$a = 1.44$

Pile punchout

Max. pile load = 123.5^k final (126.134^k)
is under cantilever wall
do OK





USE $t = 2'6"$

ANCHOR PILES WITH 4-#9 WELDED TO PILES

Perim = 4 x 32 = 152"
Resist = .110 x 152 + x 4" = 401^k ck > 127

Max. steel top = $\frac{108.0 \times .75}{1.46 \times 24} = 2.33$ in^2/ft #10 @ 6"

Bond - $\xi_o = \frac{14.138" \times .75}{.149 \times .891 \times 4} = 3.33$ in/ft < 7.98 ok
3.39

~~3.4 fi / 1/4 = 149 psi~~ $\frac{185}{D} = 146$

Max. steel bot. = $\frac{43.52 \times .75}{1.46 \times 24} = 0.93$ in^2/ft

Shr. & Temp = .0025 x 12 x 30 = 0.90 in^2

Job No. 4671 Page No. 4A-31

Computed by GAS Date 1/29/73

Checked by WJK Date 2/7/73

Reviewed by ____ Date ____

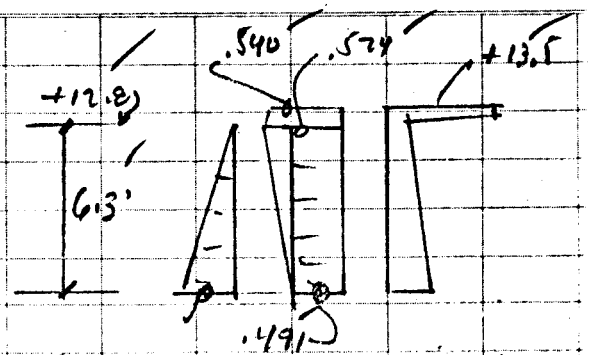
Approved by ____ Date ____

Subject Struct. Flood Wall - Tec GULFSIDE

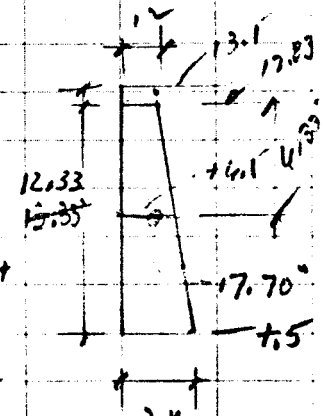
Sheet No. 17 of ____

STEM

@ El. +6.5 on Cant.



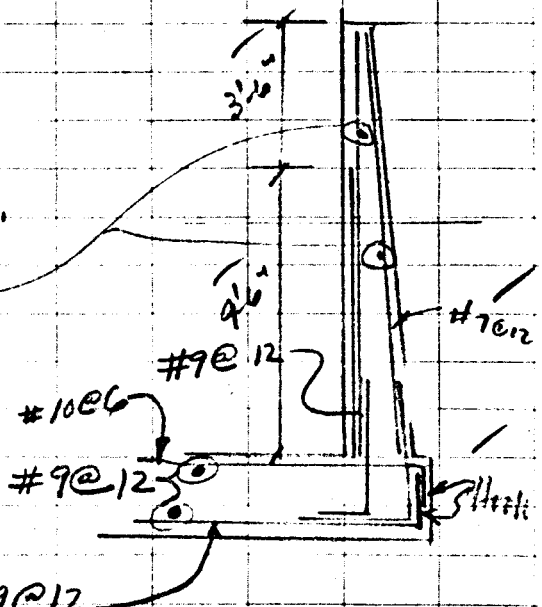
.491 × 6.3 =	3.09" ×	6.3/2 =	9.74
1/2 × .83 × 6.3 =	2.61 ×	4.1 =	10.70 1.10
.064 × 6.3²/2 =	1.27 ×	2.1 =	2.67
.557 × 0.7 =	.39 ×	6.65 =	2.59
	7.36"		25.98 kip
	5.011		16.10



(M) $d_{req'd} = \sqrt{\frac{25.98 \times .75}{.152}} =$ 8.91" ← 10.5 < 11.5" avail (w/ Straight Develop CIL)

(V) $d_{req'd} = \frac{7.36 \times .75}{.060 \times 12} =$ 7.67" 5.22

$A_s = \frac{16.10}{\frac{25.98 \times .75}{1.44 \times 14.5}} = \frac{16.10}{10.5} =$ 0.75" .80 < #9@12



Shrink & Temp. - 18 × 12 × .0025 = 0.54

0.27 E.F.

Horiz. #5@12

Job No. 4671 Page No. AA-32

Computed by GAS Date 1/29/73

Checked by WJZ Date 2/7/73

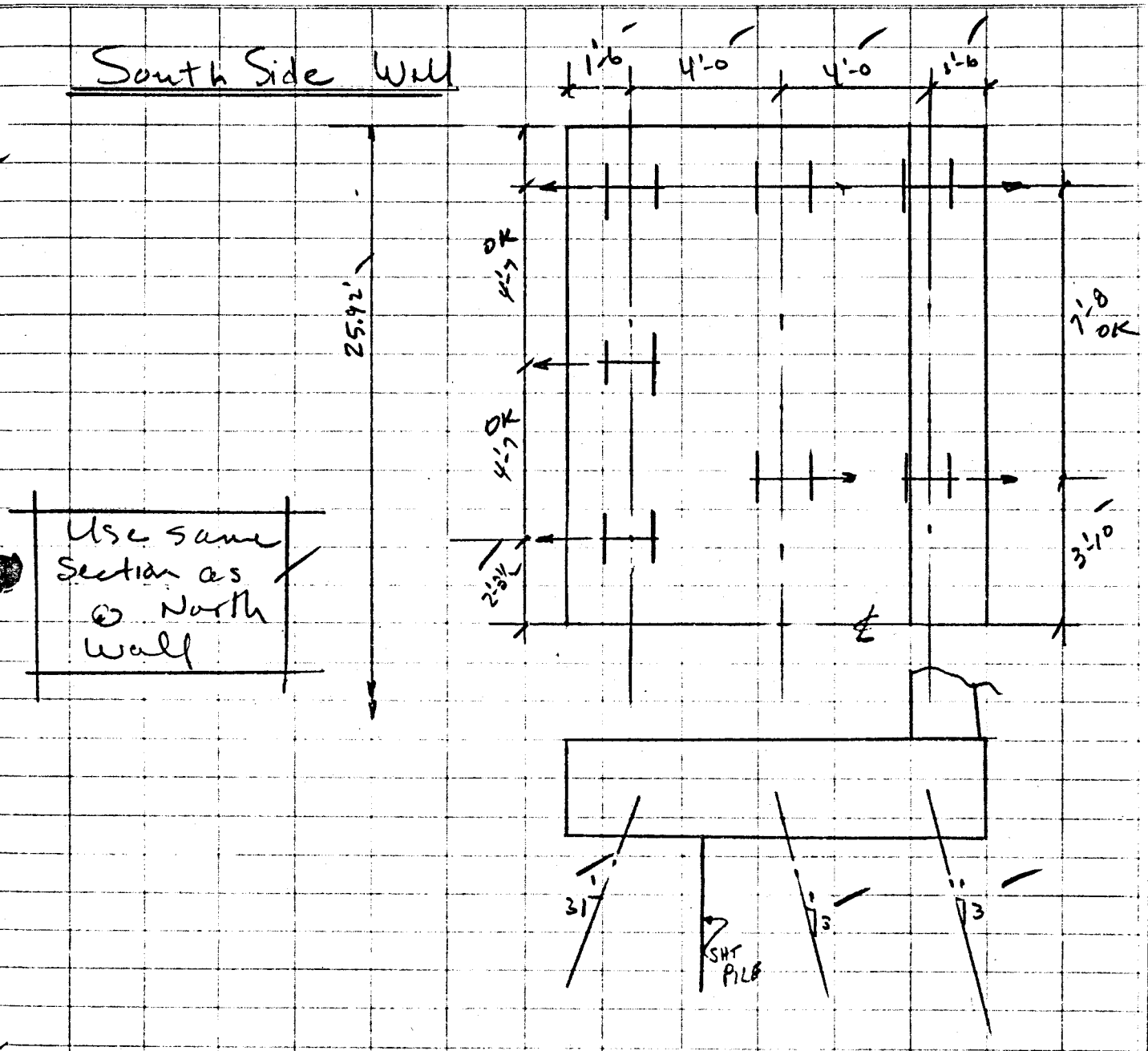
Reviewed by [illegible] Date

Approved by [illegible] Date 1-30-73

Subject Struct. Flood Wall - Tex GULFSIDE

Sheet No. 18 of

South Side Wall



Use same Section as @ North Wall

Job No. 4671 Page No. 4A-33

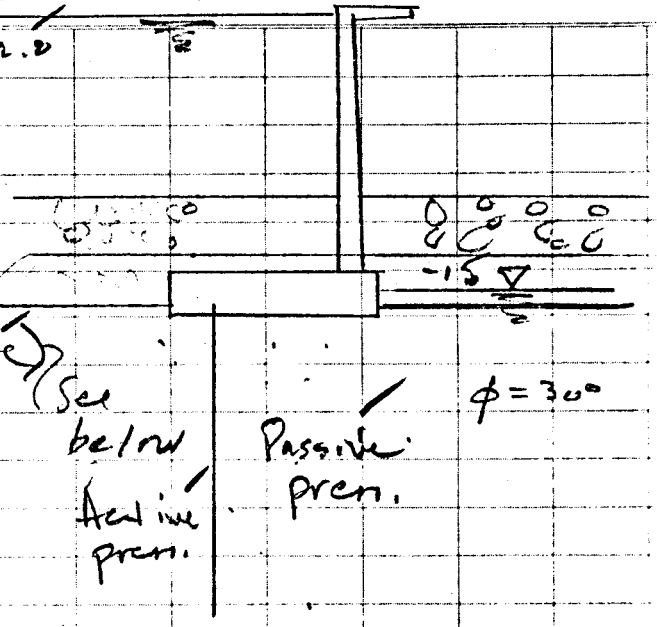
Computed by GAS Date 1/25/73
Checked by WJZ Date 2/2/73
Reviewed by RJD Date
Approved by RSC Date 4-30-73

Subject Struct. Flood Wall - Tee GULFSIDE

Sheet No. 19 of

Cutoff @ Tee-Wall

Perform for Q case only -
See Ltr 5 Jan 73



Use F.S. = 1.3 max. surge only
(F.S. = 1.25 " " + wave)

$\phi_A = 30°$
$\phi_D = 30°/1.3 = 23.0°$ (1)

$K_A = \tan^2(45° - 23/2) = 0.44$
$K_p = 1.0/.44 = 2.27$

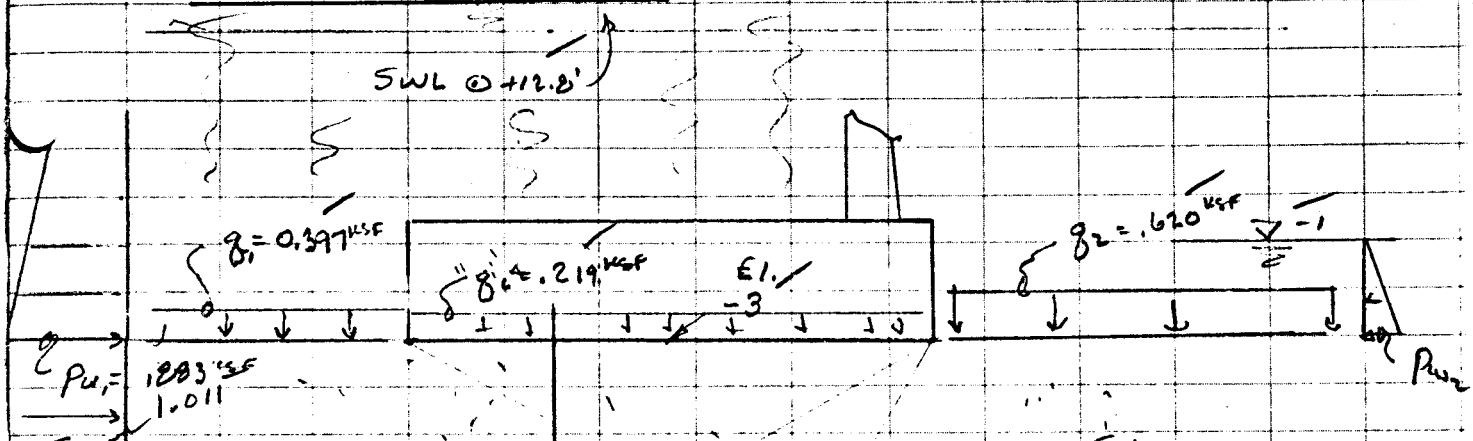
Assuming that dynamic pressures from waves will not penetrate below top of clay, and that the wall & H-piling assume all loads above the base of footing, OK

See that waves will have no effect on cutoff wall -

Computed by GAS Date 1/25/73
Checked by WJZ Date 2/7/73
Reviewed by [illegible] Date
Approved by [illegible] Date 4-30-73

Job No. 4671 Page No. 4A-34
Subject Struct. Flood Wall - Tee GULFSIDE
Sheet No. 20 of

Cutoff & Tee-Wall



$P_{w_1} = .883$ KSF
1.011

Find q_1:
3' x .063 = .189
3' x .060 = .180
.5 x .056 = .028
0.397 KSF

Find q_2:
3' x .110 = .330
1.5' x .115 or .112 = .172
1.5' x .060 = .090
0.5' x .056 = .028
0.620 KSF

Find press. of water = p_{w_1}
12.3 - (-3) = 15.8
= 13.8 x .064 = .883 KSF
15.8 x .064 = 1.011

Find P_{w_2}:
2' x .064 = 0.128 KSF
.128

Concrete q_c:
$q_c = 2.5 \times .087\frac{5}{} = .219$ KSF

Screening by piling
$\frac{a}{L} = \frac{5 \times 1.17'}{20.62} = .29$; $\frac{3 \times 1.17}{20.62} = 0.175$

$m = \frac{E_{active} - E_{to\ shtg\ pile}}{E_{active}} = .25$; $= .65$

Actual Pressure to shting = (1-m) Active pres = $0.15 \& E_a$; $= 0.35 E_a$

Note This but omit from computation of net pressure on sheeting -

Find only p. 514

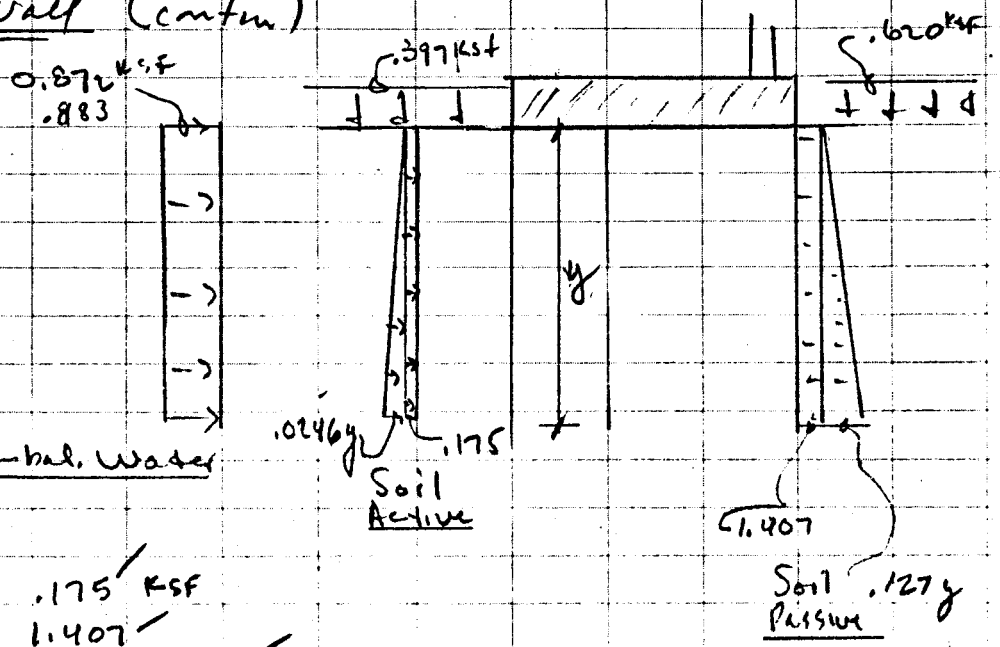
Job No. 4671 Page No. 4A-35

Computed by GAS Date 1/25/73
Checked by WJF Date 2/4/73
Reviewed by [illegible] Date
Approved by [illegible] Date 4-30-73

Subject Struct. Flood Wall - Tee GULFSIDE

Sheet No. 21 of

Cutoff @ Tee Wall (contin.)

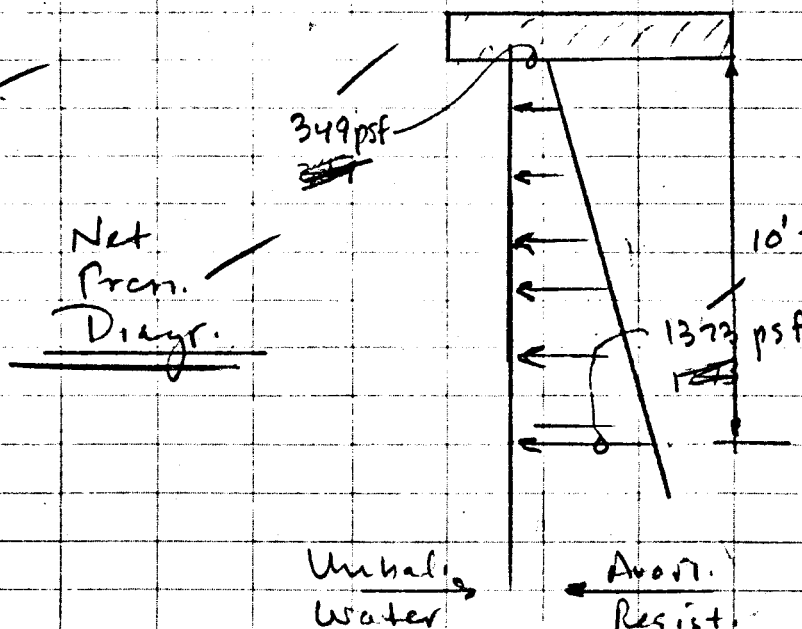


.397 × 0.44 = .175 KSF
.620 × 2.27 = 1.407
.44 × .056 × y = 0.0246y
2.27 × .056 × y = 0.127y

① y = 0' Net pres. = 0.883 − 1.407 + .175 = −.349 KSF

② y = 10'
Net pres. = 0.883 − 1.407 − 1.270 + .175 + .246 = 1.373 KSF

This condition improves as we go upslope



Net Pres. Diagr.

Job No. 4671 Page No. 4A-36

Subject Struct. FLOODWALL - CANTILEVER CD GULFSIDE

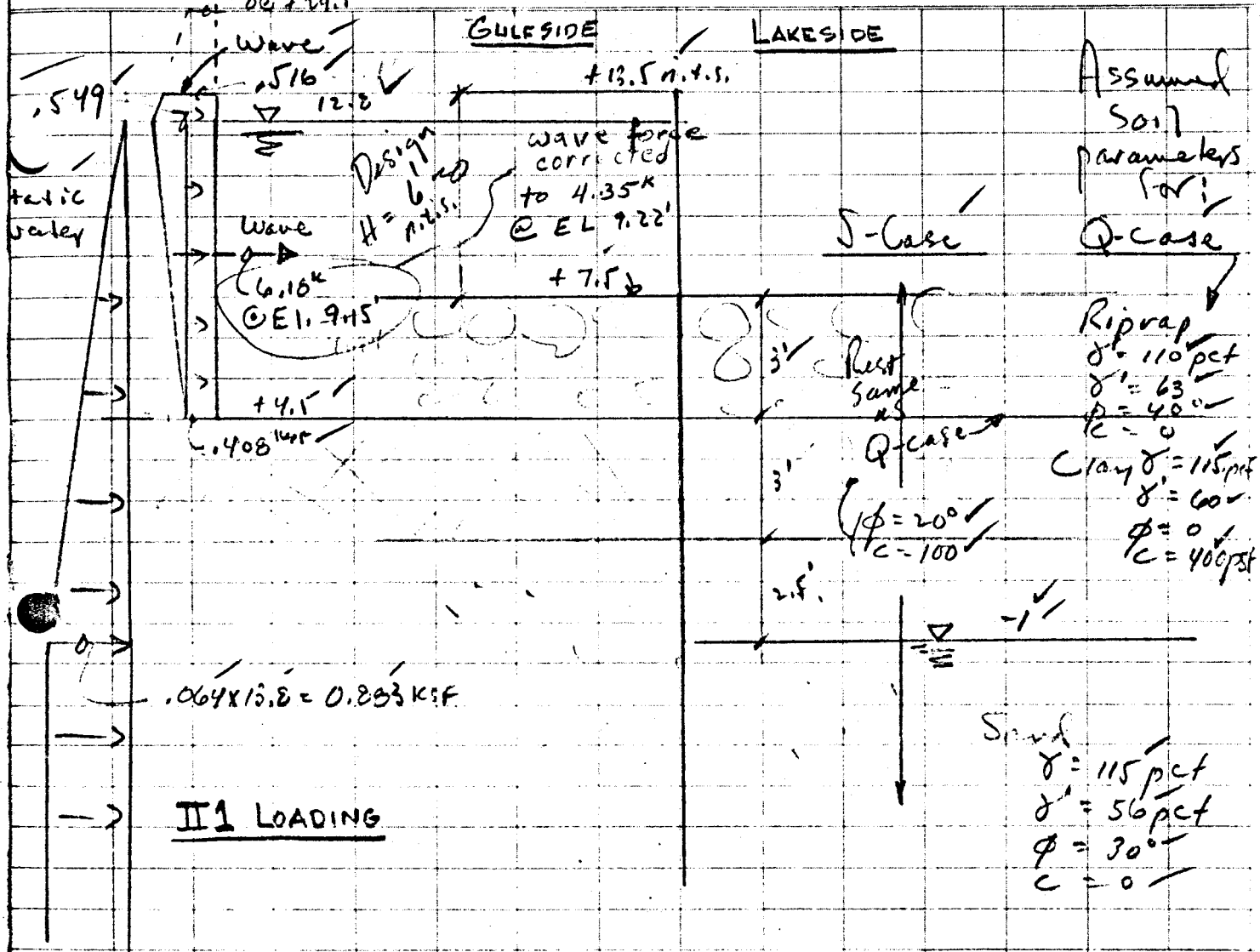
Computed by GAS Date 1/30/73

Checked by WJF Date 2/8/73

Reviewed by ____ Date ____

Approved by ____ Date ____

Sheet No. 1 of ____



II1 LOADING

$.408 + 8.3 \times .064 = .939$

$11.7/20 \times (.939) = .549$

Wave face:

$.408 \times 8.3 = 3.39 \times 8.3/2 = 14.07$

$1/2 \times .141 \times 8.3 = .59 \times 8.3/3 = 1.63$

$.533 \times .7 = .37 \times 2.7/2 = -.13$

$\Sigma H = 4.35^{K}$ $\Sigma M = 15.57^{1K}$

$\bar{X} = 15.57/4.35 = 3.58$

$EL = 12.8 - 3.58 = EL + 9.2$

Job No. 4671 Page No. 4A-37

Computed by GAS Date 1/30/73
Checked by WJT Date 2/7/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Subject Struct. Flood Wall - Cantileveered Gulfside

Sheet No. ____ of ____

LDG I + II

Use F.S. = 1.25 w/wave per Ltr. 1/5/73

$\phi_A = 40°$; $\phi_D = 40°/1.25 = 32°$ (per Ltr. 5 Jan 73)

$K_A = \tan^2(45 - 32/2) = 0.307$

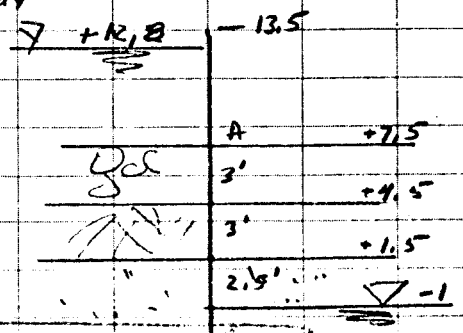
$K_p = 1.0/.307 = 3.25$

$\phi = 30°$ $\phi_D = 30°/1.25 = 24°$

$K_A = \tan^2(45 - 24/2) = 0.42$

$K_p = 1/.42 = 2.38$

$C = 0.400/1.25 = .320$ KSF

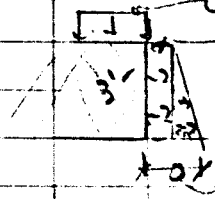


F.S. To be applied to $\tan\phi_A$ which gives $\phi_D = 34°$ rather than 32° used. Method used gives error on safe side and sheet pile penetration is determined by seepage rather than this analysis. ∴ Do Not Revise.

for Q Case

Active press.

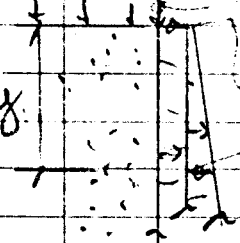
$3' \times .063 \times .307 = 0.058$ KSF



$q = 3' \times .063 = .189$ KSF

$p_1 = .189(1.0) - 2(.32)(1.0) = -.451$ KSF

$p_2 = .369(1.0) - 2(.32)(1.0) = -.271$



$q = .189$ KSF $+ 3' \times .060 = .369$ KSF

$p_1 = .369 \times 0.42 = .155$ KSF

$p_y = 0.42 \times .056 \times y = .0235y$

Passive Press.

$p_1 = 3' \times .110 \times 3.25 = 1.073$ KSF

$q = 3' \times .110 = .330$ KSF

$p_1 = .330(1.0) + 2(.32)(1.0) = .97$ KSF

$p_2 = .675 + .64 = 1.315$ KSF

$q = 0.330 + 3' \times .115 = .675$ KSF

$p_1 = .675 \times 2.38 = 1.607$ KSF

$p_2 = 2.5 \times .115 \times 2.38 = .684$ KSF

$q = .675 + 2.5 \times .115 = .963$

$p_1 = .963 \times 2.38 = 2.291$ KSF

$p_y = .056 \times 2.38 \times y = .133y$

Job No. 9671 Page No. AA-38

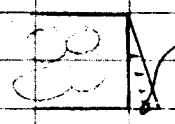
Computed by GAS Date 1/30/73
Checked by WJK Date 2/7/73
Reviewed by Date
Approved by Date

Subject Structure
Flood Wall - Cantilever
GULFSIDE

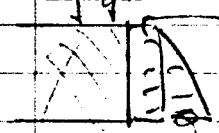
Sheet No. 3 of

Q-Case

Passive



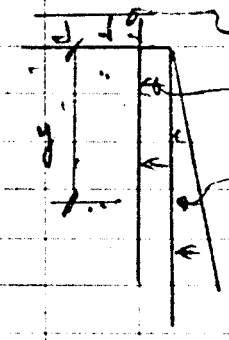
$p_1 = 3' \times .063 \times 3.25 = .615$



$q = .189^{KSF}$

$p_1 = .189(1.0) + 2(.32)$
$= .829^{KSF}$

$p_2 = (.180)(1.0) = .180^{KSF}$



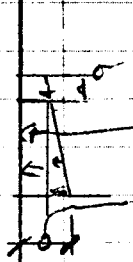
$q = 0.369^{KSF}$

$p_1 = 0.369 \times 2.32 = .878^{KSF}$

$p_y = .056 \times 2.32 \times y = .133y^{KSF}$

Active

$p_1 = 3' \times .110 \times .307 = .101$



$q = .330^{KSF}$

$p_1 = .330(1.0) - 2(.32) = -.310^{KSF}$

$p_2 = .675(1.0) - .64 = +.035$

$q = .675^{KSF}$

$p_1 = .675 \times .42 = .284$

$p_2 = 2.5 \times .115 \times .42 = .121$

$q = .963^{KSF}$ OK

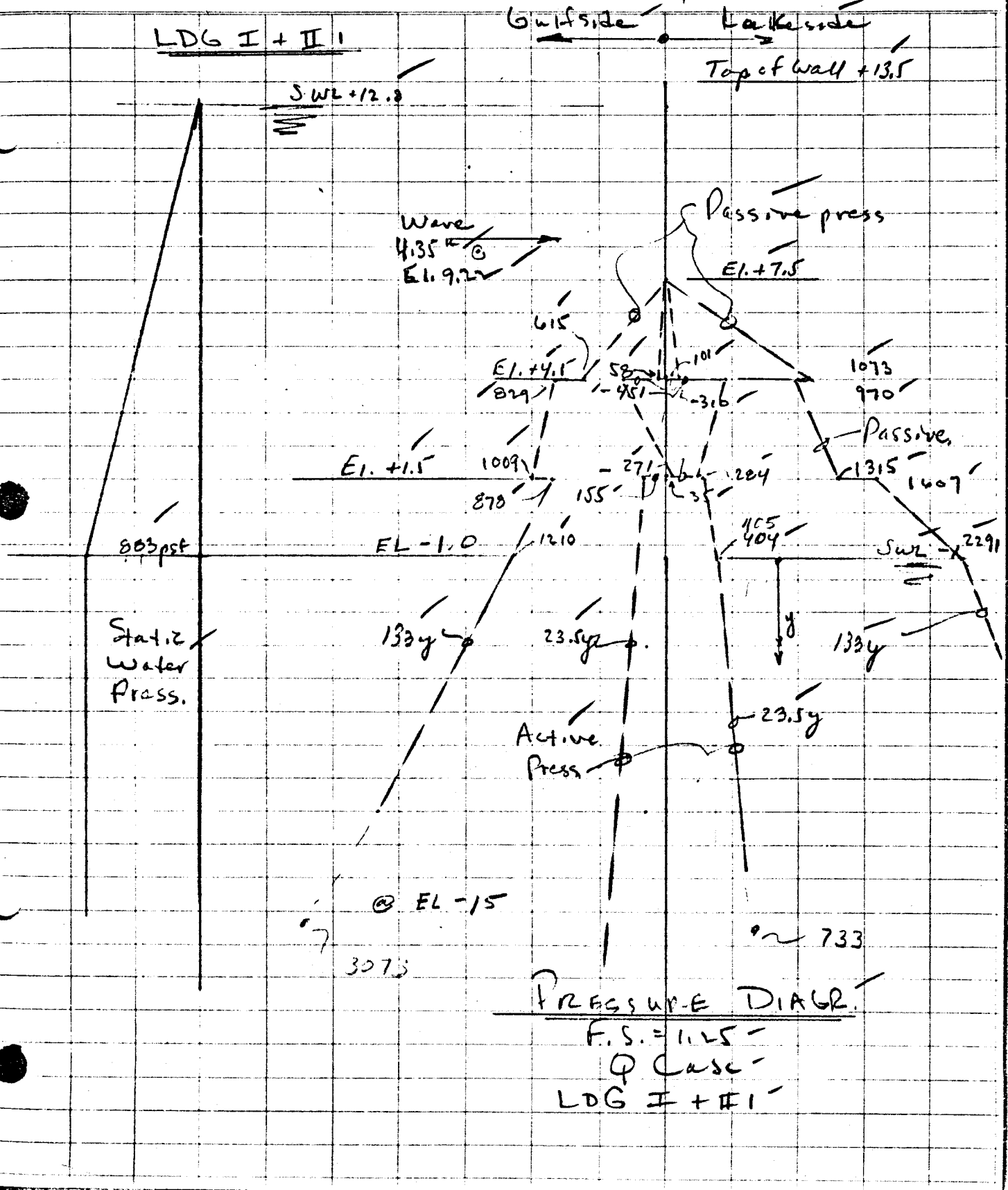
$p_1 = .963 \times .42 = .404^{KSF}$

$p_y = .056 \times .42 = .0235y$

for calculating pressure diagrams only

Computed by GAS Date 1/30/73
Checked by WJL Date 2/8/73
Reviewed by _____ Date _____
Approved by RGP Date 4-30-73

Job No. 4671 Page No. A-39
Subject Struct.
Flood Wall - Cantil.
GULFSIDE
Sheet No. 4 of _____



Job No. 4671 Page No. 4A-10

Computed by GAS Date 1/30/73

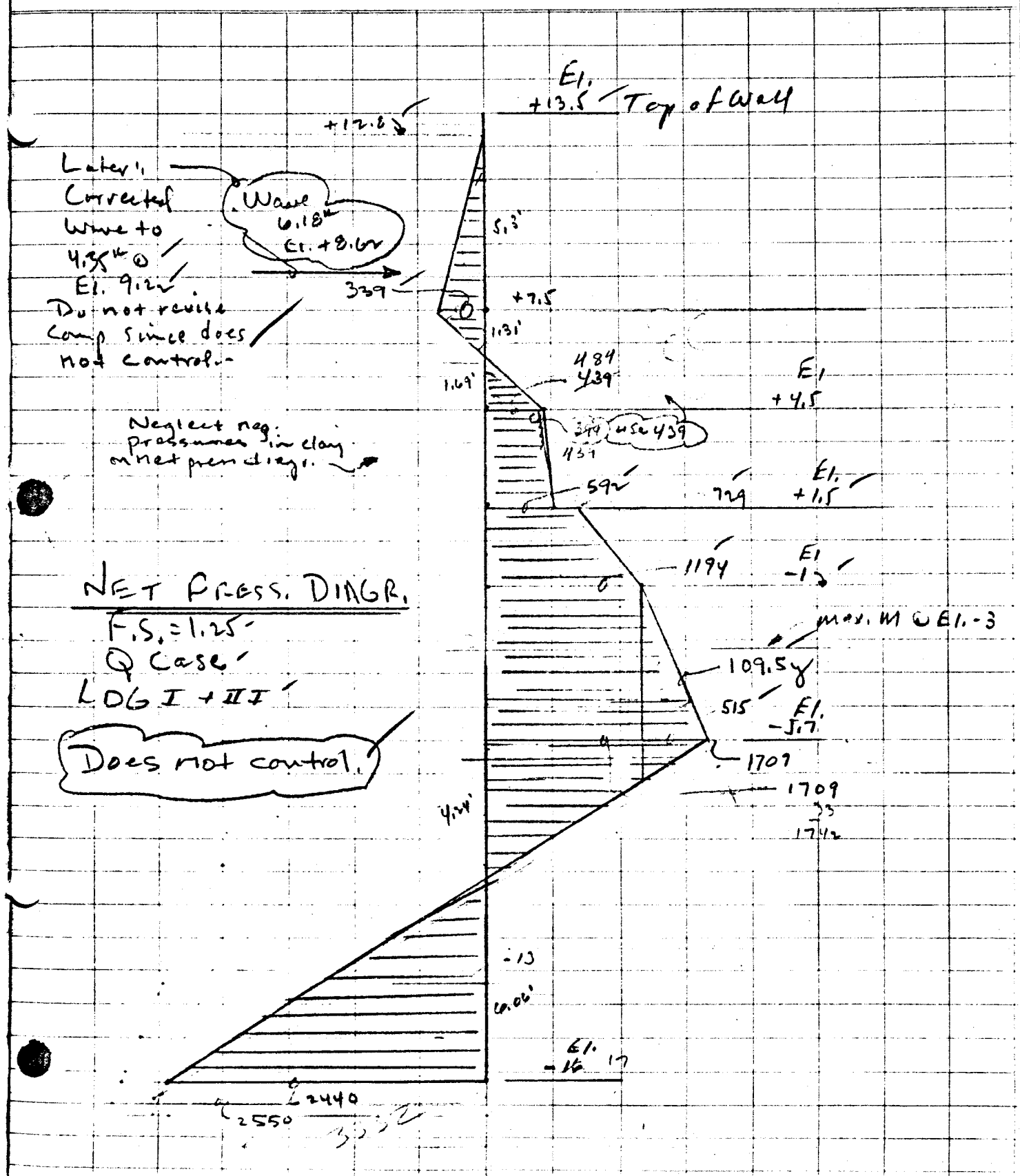
Checked by WJF Date 2/9/73

Reviewed by _____ Date _____

Approved by [redacted] Date 1-30-73

Subject Struct. Flood Wall - Cant. 7, GULFSIDE

Sheet No. 5 of _____



Computed by GAS Date 1/30/73
Checked by WJT Date 2/7/73
Reviewed by ____ Date ____
Approved by KGT Date 4-30-73

Job No. 4671 Page No. 4A-41
Subject Struct. Flood Wall - Cantil. GULFSIDE
Sheet No. 6 of ____

does not control revised not

ΣM_{abt} El. -16

		-6.18k	24.6v'	=	-(152.1)	≈ 110
½ × .339 × 5.3'	=	-.90 ×	25.26'	=	- 22.7	
½ × .339 × 1.3'	=	-.22 ×	23.06'	=	- 5.1	
½ × .439 × 1.69	=	+.37 ×	21.08'	=	+ 7.8	
.439 × 3.0	=	1.32 ×	19	=	25.0	
½ × .153 × 3.0	=	.46 ×	18.5	=	8.5	
.729 × 2.5	=	1.8v ×	16.25	=	29.6	
½ × .465 × 2.5	=	.58	15.83	=	9.2	
1.194 × 4.7	=	5.6v	12.65	=	71.0	
½ × .515 × 4.7	=	1.21	11.87	=	14.4	
½ × 1.709 × 4.94	=	3.6v	7.47	=	27.1	
-½ × 2.44 × 6.06	=	-7.39	2.02	=	-14.9	
		+0.31			-2.2 in	

Find max M pt.

per $\Sigma V = 0$ M_{max} @ -3.0

M =		(6.124)	11.62	=	(71.8)	≈ 53
		.90 ×	12.32	=	11.0	
		.22 ×	10.06	=	2.2	
		-.37 ×	8.08	=	-3.0	
		-1.32 ×	6	=	-4.0	
		-.46 ×	5.5	=	-2.5	
		-1.8v ×	3.25	=	-5.9	
		-.58 ×	2.83	=	-1.6	
1.194 × 2		-2.39 ×	1.0	=	-2.4	
½ × 2 × .219	=	-.22 ×	⅔	=	-.2	
		-(14.0) CK	-2	M_{max} =	(65.4)	≈ 46 CK

M_{max} of P3 27 = 1.33 × 24.0 × 30.2 = 30 in

Job No. 4671 Page No. 4A-42

Computed by GAS Date 1/30/73
Checked by WJF Date 2/9/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Subject Street Flood Wall - Cont.
GULFSIDE

Sheet No. 7 of ____

Check out Case - (Consol. - drained)

F.S. = 1.25

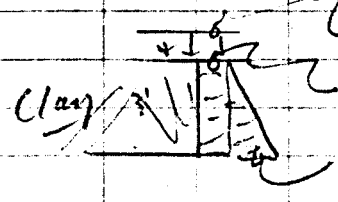
$\phi = 20°$; $\phi_D = 20/1.25 = 16$ $K_a = 0.57$, $K_p = 1.76$

$C = 100$; $\phi_D = 100/1.25 = 80$ psf

Gulfside - ✓ change from Q-case -

$q = 3' \times .063 = .189$ KSF

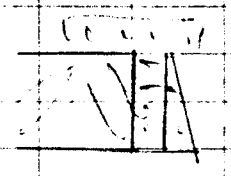
Active



$p_1 = .189 \times .57 - 2 \times .08 \times \tan 45° - 8 = -.013$ KSF (.753)

$p_2 = 3' \times .060 \times .57 = +.103$

Passive



$p_1 = .189 \times 1.76 + 2 \times .08 \times \tan 45° + 8 = +0.545$ KSF (1.327; .333; .212)

$p_2 = .180 \times 1.76 = 0.317$ KSF

Lakeside

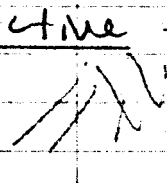
Passive

$q = 3' \times .110 = .330$

$p_1 = .330 \times 1.76 + .212 = .793$ KSF

$p_2 = .180 \times 1.76 = 0.317$

Active



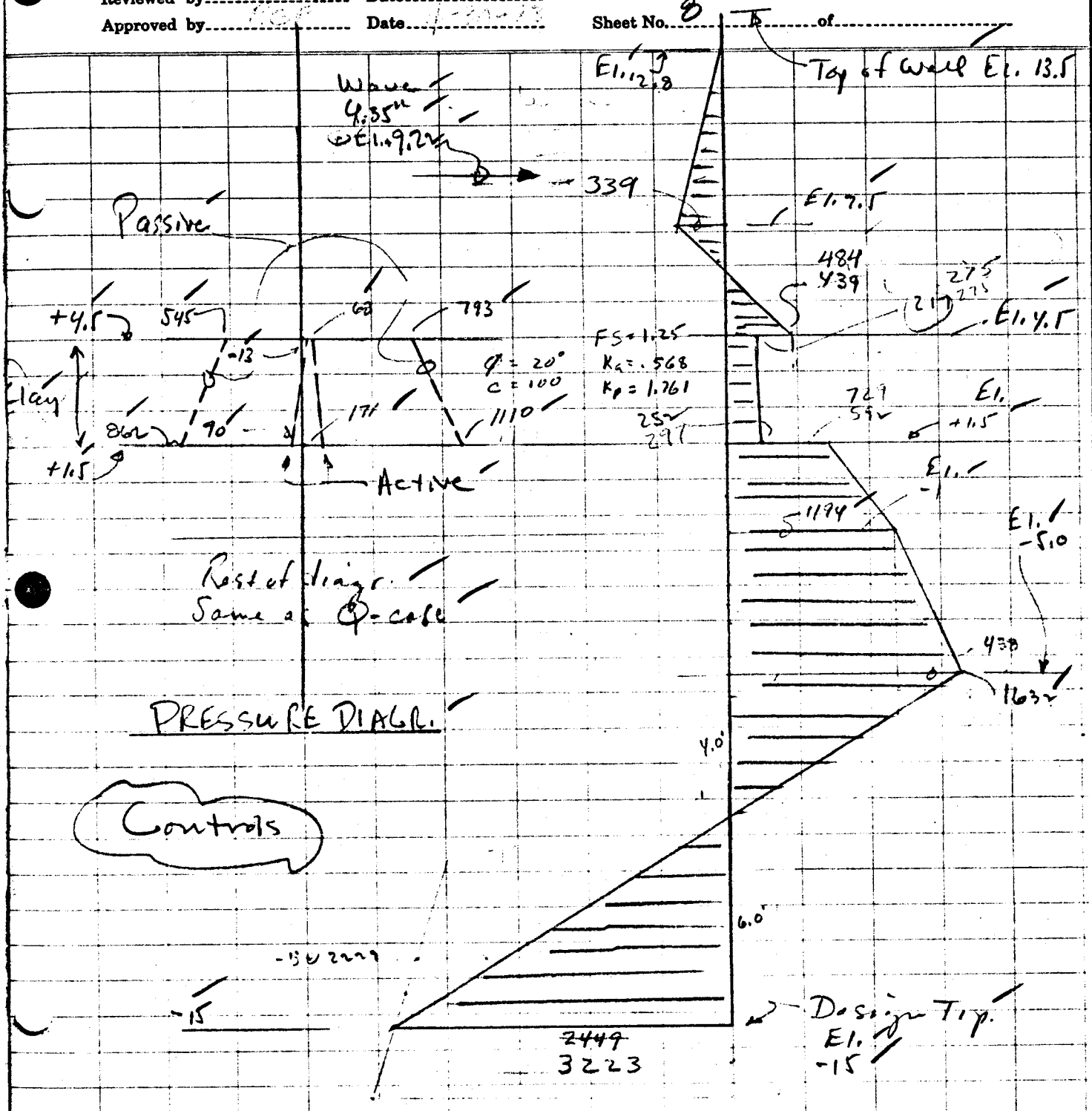
$p_1 = .330 \times 0.57 - .120 = +0.068$

$p_2 = .180 \times .57 = +.103$

Rest of pressures are Same as Q case computed previously -

Computed by GAS Date 1/30/73
Checked by WJF Date 2/7/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Job No. 4671 Page No. 4A-43
Subject Struct. Flood Wall - Cont'd.
GULFSIDE
Sheet No. 8 To ____ of ____



NET PRESSURE DIAGR.
F.S. = 1.25
S Case
LDG I + II

Computed by GAS Date 1/30/73
Checked by WJK Date 2/9/73
Reviewed by ____ Date ____
Approved by ____ Date ____

Job No. 4671 Page No. AA-44
Subject Struct. Flood Wall - Contin. GULFSIDE
Sheet No. 9 of ____

Find tip elev.

Sum abt EL -15

	-4.35	x 24.75	= -105.3
	-.90	x 24.26	= -21.8
-12.5	-.27	x 22.09	= -4.9
	-.43	x .61	= -4.6
	+.37	x 20.88	= +7.4
3.0 x .275	.83	x 18	= 14.9
1/2 x .135 x 3 = .022	.03	x 17.5	= .5
	1.82	x 15.25	= 27.7
	.58	x 14.83	= 8.6
1.194 x 4.0 =	4.78	x 12.0	= 57.4
1/2 x .438 x 4.0 =	1.88	x 11.33	= 10.0
1/2 x 1.63 x 4.0 = 3.26	3.26	x 8.67	= 28.3
	2.74		24.3
-1/2 x 2.99 x 6.0 = 3.22	-3.35	10.2	-34.21
	-0.43	~ 0 ok	-4.07
			-14.9 -23.6
			+5.5 Say OK for
			-3.0 tip to

Find max. moment in SHT piling

M max @ = +1.3

@ v -2.4

	4.35	x 10.45 = 45.5
	.90	x 10.56 = 9.5
	.12	8.36 = 1.8
M = 47.83	- .37	6.38 = - 2.4
	- .165	4.3 = - 2.8
	- .105	3.8 = - .2
	- 1.82	1.55 = - 2.8
	- .158	1.15 = - .7
1.174 x 1.3 =	- 1.55	1.3/2 = - 1.0
1/2 x .142 x 1.3 =	- .09	1.3/3 = - .0
	+.36 ~ OK	

M_{max} = 46.9 k-ft

LOG I + II (S. Case)

< 1.3 x 24.0 x 30.2 / 12 = 60.4 k-ft OK

PZ 27 OK

Job No. 4671 Page No. 4A-45

Computed by GAS Date 1/30/73

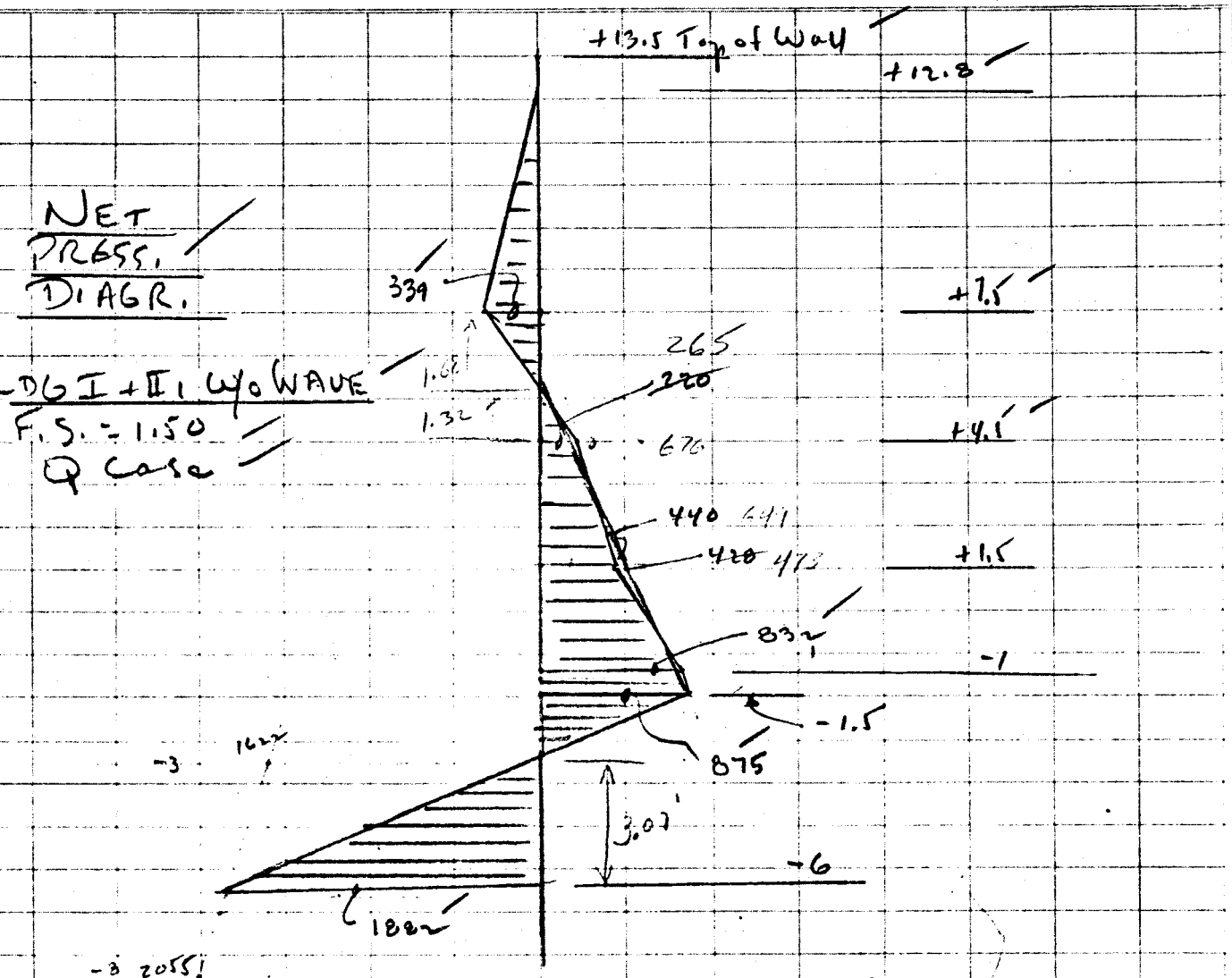
Checked by WJT Date 2/12/73

Reviewed by _____ Date _____

Approved by _____ Date 4-30-73

Subject Strut. Fixed Wall - Cont'd. GULFSIDE

Sheet No. 10 of _____



Scaling:

Approx.

$\frac{1}{2} \times 7' \times .339 = 1.19^{k} \times 14' = 16.6^{'k}$

$-\frac{1}{2} \times .85 \times 9' = -3.83^{k} \times 6' = -22.9^{'k}$

$\frac{1}{2} \times 3' \times 1.28 = +2.8' \times 1' = 2.8$

$+0.16^{k}$ $-3.5^{'k}$ OK

ΣM ab El-6

Indicates design tip elev. is ≈ -6 and does not control - Gp I + II with wave requires tip el. = -15

Job No. 4671 Page No. 4A-46

Computed by GAS Date 1/30/73
Checked by WJZ Date 2/7/73
Reviewed by ____ Date ____
Approved by ____ Date 4-30-73

Subject Struct
Flood Wall - Cont'd.
GULFSIDE

Sheet No. 11 of ____

LOG I + MAX. SWL = +12.8' w/o WAVE

Use F.S. = 1.5

$\phi = 40.0$ $\phi_D = 40°/1.5 = 26.67°$; $K_A = \tan^2(45-13.33) = .38$
$K_p = 1.0/.38 = 2.63$

$\phi = 30°$ $\phi_D = 30°/1.5 = 20°$ $K_A = \tan^2(45-10) = .419$
$K_p = 1.00/.49 = 2.04$

$\phi = 0$ $K_a = K_p = 1.0$
$C = 0.400$ $C_D = .400/1.5 = 0.267$ KSF

(Refer to prev. comps.)

Gulfside Lakeside

ACTIVE

1.2518

$.336/.307 \times .058 = .072$ KSF

$p_1 = .133 - 2(.267) = -.344$
$p_2 = .369 - .533 = -.164$

$p_1 = .419/.42 \times .115 = .181$
$p = .149 \times .156 \times y = .0274y$

PASSIVE

$p_1 = .497$ KSF

$p_1 = .139 + .533 = .722$ KSF
$p_2 = .180$ KSF

$p_1 = 0.753$ KSF
$p_2 = .114y$ KSF

PASSIVE

$p_1 = 0.868$ KSF

$p_1 = .330 + .533 = 0.863$ KSF
$p_2 = .675 + .533 = 1.208$

$p_1 = .675 \times 2.04 = 1.377$
$p_2 = .587$

$p_1 = 1.964$ KSF
$p_2 = .114y$

Active

$p_1 = 0.125$

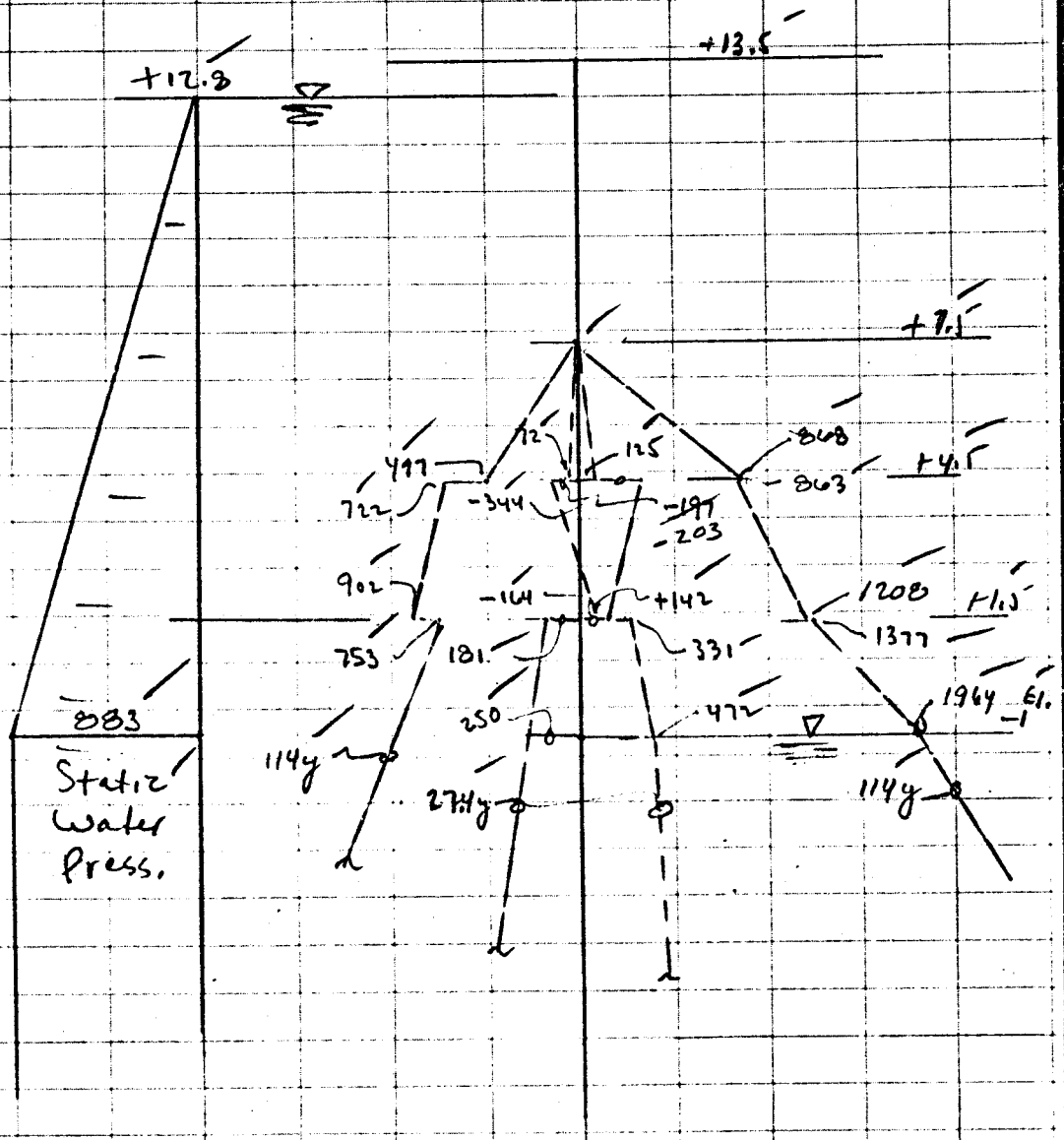
$p_1 = .330 - .533 = -.203$
$p_2 = +.142$ $-.203$

$p_1 = .675 \times .49 = .331$
$p_2 = .141$ KSF

$p_1 = .963 \times .49 = 0.472$
$p_2 = .0274y$

Computed by GAS Date 1/30/73
Checked by WJL Date 2/9/73
Reviewed by ____ Date ____
Approved by RGT Date 4-24-73

Job No. 4671 Page No. 4A-47
Subject Struct. Flood Wall - Cont.'d. GULFSIDE
Sheet No. 17 of ____



PRESSURE DIAGR.
F.S. = 1.50
Q Case
LDG I + II w/o WAVE

Job No. 4671 Page No. 4A-48

Computed by GAS Date 12/21/72
Checked by WEB Date 12.28.72
Reviewed by NSP Date 2-12-73
Approved by _____ Date _____

Subject STRUCTURAL
DOLPHINS - STEEL SHT PILE

Sheet No. 1 of _____

DOLPHINS

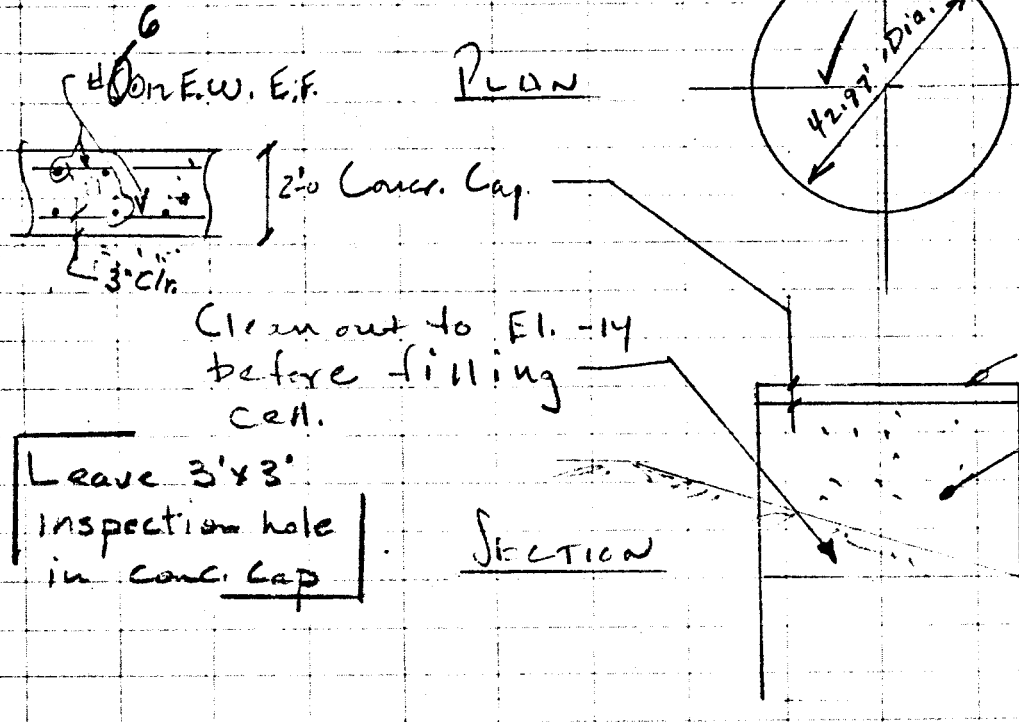
Refer: Corps Draft EM 1110-2-2906, Nov. 1970

Design for an impact load from barge = 1000K at a F.S. = 1.0

Check wave forces @ F.S. = 1.25

Use Straight pile w/ 3/8" web.

108 - PS 20 piles x 45' long.



Job No. 4671 Page No. 4A-49

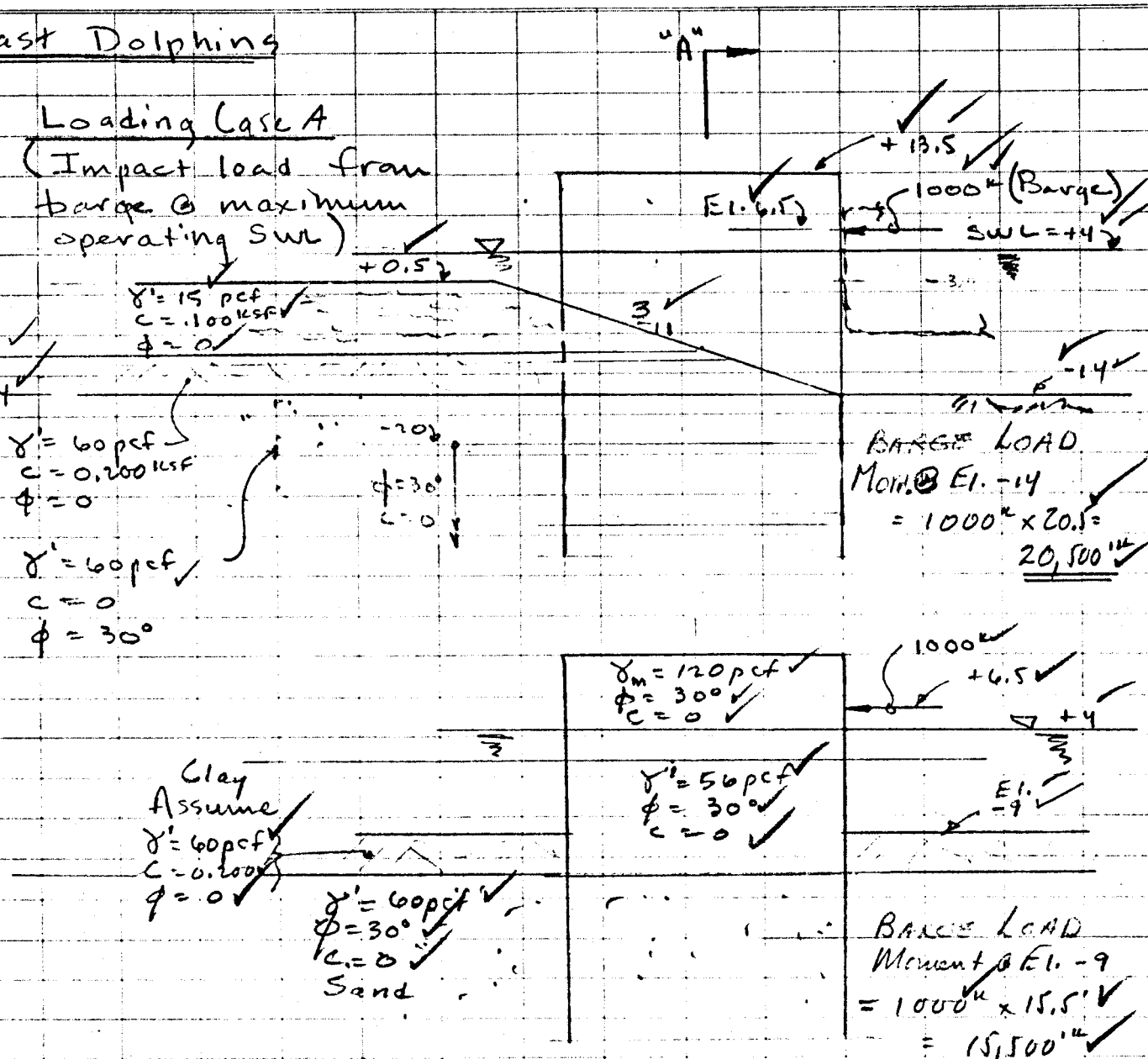
Computed by GAS Date 12/21/72
Checked by WEB Date 12.28.72
Reviewed by RGF Date 2-12-73
Approved by RGF Date [illegible]

Subject STRUCTURAL
DOLPHINS - STEEL SHT. PILING

Sheet No. 2 of

East Dolphins

Loading Case A
(Impact load from barge @ maximum operating SWL)



SEC A-A

Refer to:
Soil Borings 5-L, 6-L, 7-L, 8-L & 1-UL

Job No. 4671 Page No. 4A-50

Computed by GAS Date 12/22/72 Subject STRUCTURAL

Checked by WEB Date 12-28-72 DOLPHIN - STEEL SHEET PILING

Reviewed by RGP Date 2-10-73

Approved by RGP Date 5-73 Sheet No. 3 of

Loading Case B (Wave loading)

G.T. Comps 2/68 (Case 1-A)

$P_1 = 1.291 - 13.8 \times .044 = 0.408^{k/sf}$

$H_1 = 22.5' \times .452 = 10.17$

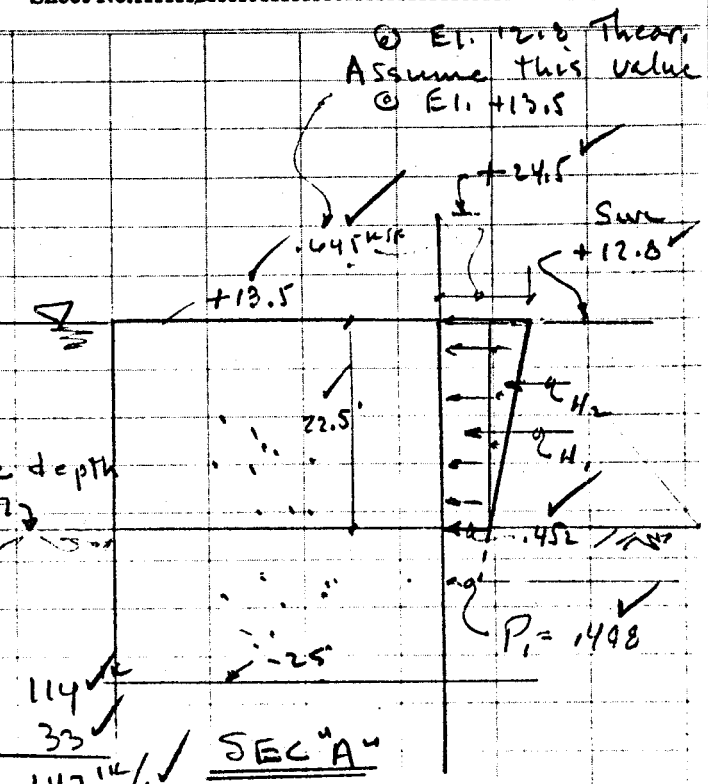
$H_2 = \frac{1}{2} \times 22.5 \times .173 = 2.17$

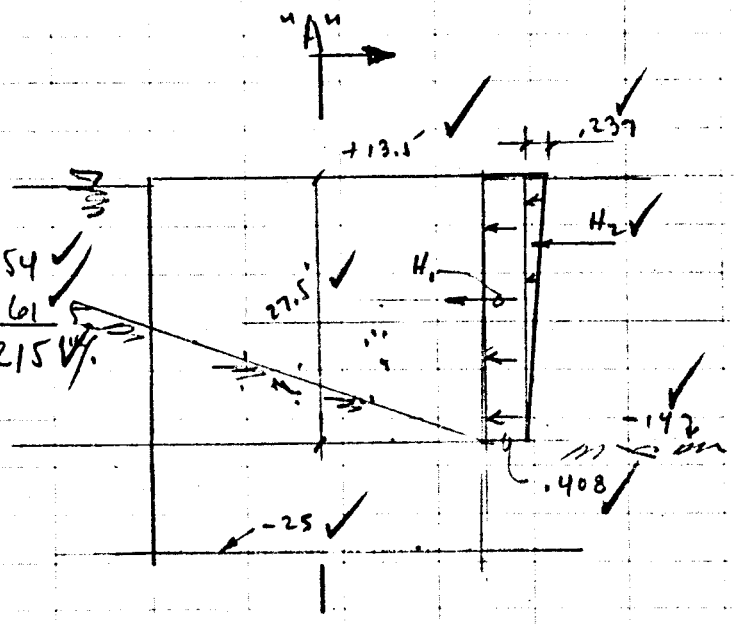
$12.34^{k/l'}$

$M_{abt\ El.-25} = 10.17 \times (11.25) = 114$

$+ 2.17 \times (\frac{2}{3} \times 22.5) = 33$

$147^{'k/l'}$ SEC "A"





$\Sigma M_{abt\ El.-14}$

$H_1 = 27.5 \times .408 = 11.2 \times 27.5/2 = 154$

$H_2 = \frac{1}{2} \times 22.5 \times .239 = 3.3 \times 27.5 \times \frac{2}{3} = 61$

$215^{'k/l'}$

Job No. 4671 Page No. 4A-57

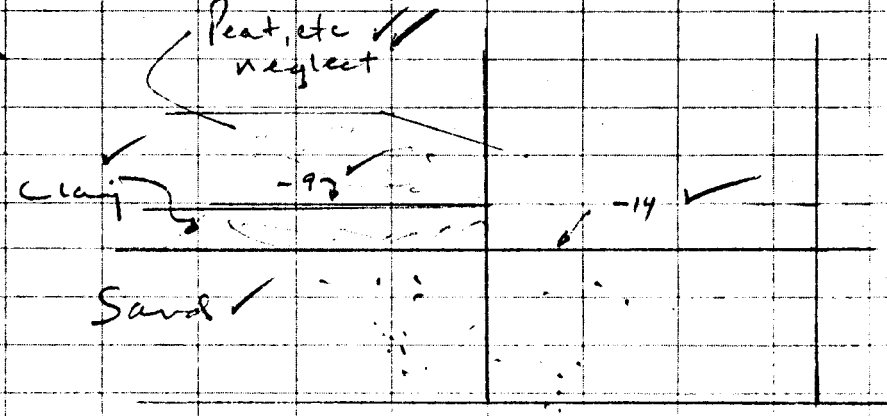
Computed by GAS Date 12/21/72 Subject STRUCTURAL

Checked by WEB Date 12.28.72 DOLPHIN - STEEL SHELL PILING

Reviewed by KGA Date 9-12-73

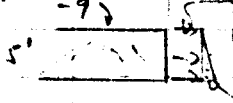
Approved by RGP Date 5-73 Sheet No. 4 of

East Dolphin
- Soil Resistances



Passive

Clay $c = .200^{k}/sf$



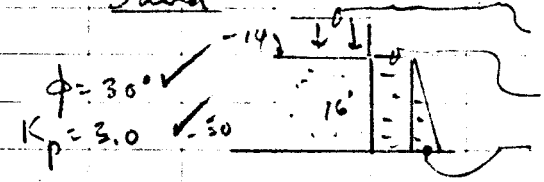
$p_1 = 2c + \tan 45° + \phi/2 \times 2 \times .2 = 0.4^{k}/sf$

$p_2 = 5' \times .060 \times 1.0 = 0.3^{k}/sf$

$H_1 = 0.4 \times 5 = 2.0^{k}$

$H_2 = 1/2 \times 0.3 \times 5 = 0.75^{k}$

Sand



$q = 5' \times .060 \times 0.3^{k}/sf$

$p_1 = 3.0 \times 0.3 = 0.9^{k}/sf$

$p_2 = 3.0 \times .060 \times 16 = 2.88^{k}/sf$

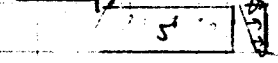
$H_1 = 0.3 \times 16' = 4.8^{k}$

$H_2 = 1/2 \times 2.88 \times 16' = 23.0^{k}$

$M_{@-14} = 2.0^{k} \times 2.5 + 0.75 \times 5/3 = 6^{k}/'$

Active

Clay

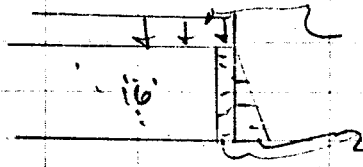


$-0.4^{k}/sf$

$-0.4 - .060 \times 5' \times 1.0 = -.100$

$H_1 = 5' \times -.100 = -0.5^{k}$

$H_2 = 1/2 \times 5' \times .3 = -0.75^{k}$



$q = 0.3^{k}/sf$

$p_1 = .333 \times .3 = 0.100$

$p_2 = .333 \times .060 \times 16 = .32^{k}/sf$

$H_1 = 0.100 \times 16 = 1.6^{k}$

$H_2 = 1/2 \times 16 \times .32 = 2.6^{k}$

Job No. 4671 Page No. 4A-52

Computed by GAS Date 12/21/72
Checked by WEB Date 12-28-72
Reviewed by RGP Date 2-12-73
Approved by RGP Date 5-73

Subject STRUCTURAL
DOLPHIN - STEEL SHT PILING

Sheet No. 5 of

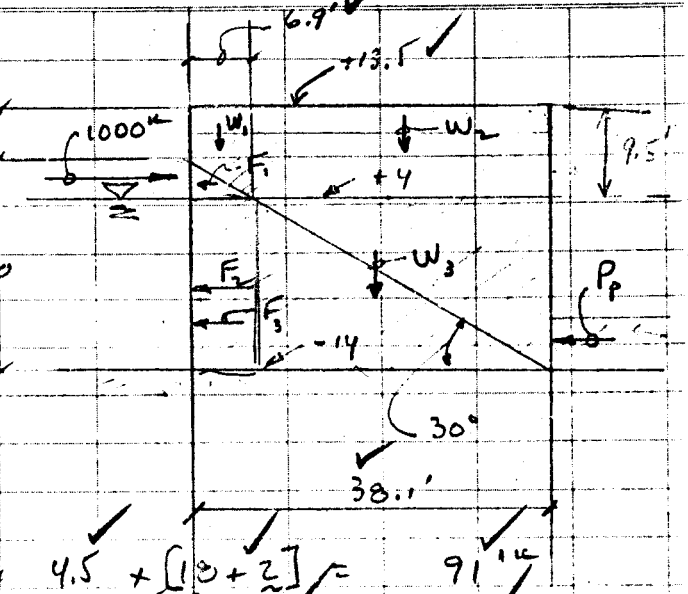
East Dolphins

Tilting (Case A Ldg)

try D = 43'; equiv E

Equiv. E = $\sqrt{\pi/4 \times 43^2}$ = 38.1'

38.1 tan 30° = 22.0'



Shear resist. in fill (M_r)

F_1 = [9.5' × .120 × 6.9'] × tan 30° × 4.5 + [18 + 2] = 91 #/'

F_2 = [9.5' × .120 × 31.2'] × .577 = 20.6# × [18/2] = 185

F_3 = [18' × .056 × 38.1'] × .577 = 22.2# × [18/3] = 133

47.3# SF M_{act} = 409 #/'

M_r = 409 #/' × 38.1' = 15,600 '#

Total Resist due to Shr. ±1.1.4

Resist due to Interlock Friction (M_f)

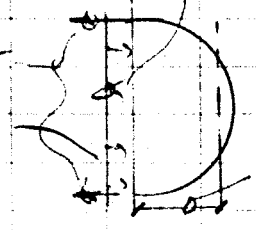
K = tan² 45° × ½ = 0.333

.120 × .333 = 0.040 #/cf ; .056 × .333 = 0.0186 #/cf

P_f = 0.040 × 9.5²/2 + .040 × 9.5 × 18 + .0186 × 18²/2 = 11.6 #/'

AB 1.8# + 6.8# + 3.0

T = 21.5 + 11.6 #/' = 250# — 500



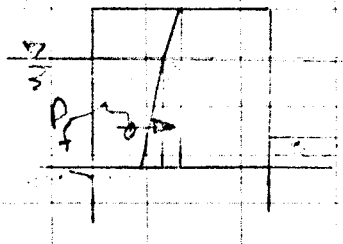
Total M_f = ½[250 × .3 × 38.1'] = 5,720 '#

2860 '#

CASE A loading

Tilting F.S. = $\frac{15,600 + 5,720}{20,500 - 6\text{#} \times 4/3}$ = 1.05 > 1.00

22.2 #



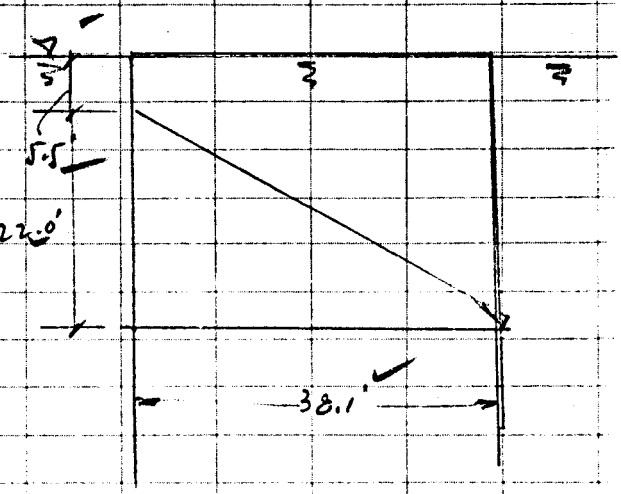
Job No. 4671 Page No. 4A-53

Computed by GAS Date 12/21/72
Checked by WEB Date 12.29.72
Reviewed by KGP Date 2-12-73
Approved by KGP Date 5-73

Subject STRUCTURAL
DOLPHIN - STEEL SHT PILING

Sheet No. 6 of

Tilting
Case B + Ldg.



Final M_r:

$5.5 \times .056 \times (22.0^2/2) = 75$ ft-k

$.056 \times 22.0^3/3 = 199$

274 ft-k

Final M_f:

$f_f = .0186 \times 27.5^2/2 = 7.0$ k/ft

$T = 7.0 \times 21.5 = 151$ k

Total $M_f = 2[151 \times .3 \times 38.1] = 3450$ ft-k

$M_f = 3,450/43.0 = 80$ ft-k

F.S. $= \frac{274 + 20}{215} = 1.65 > 1.05$ ok

Job No. 4621 Page No. 4A-54

Computed by GAS Date 12/21/72 Subject STRUCTURAL

Checked by WEB Date 12.28.72 DOLPHIN - STEEL SHT PILING

Reviewed by RGP Date 2-12-72

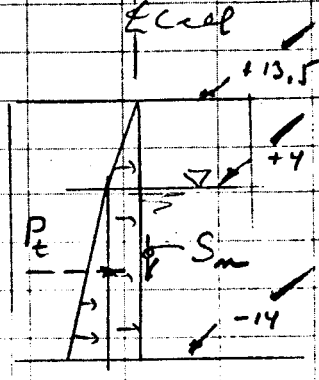
Approved by RGP Date 5-73 Sheet No. 7 of

East Dolphins

Vert. Shr. @ ℄ cell try E = 38' Diam. = $\sqrt{32^2/\pi/4} = \frac{42.4}{42.97} \rightarrow 108$ piles

$K = \frac{\cos^2\phi}{2-\cos^2\phi} = \frac{0.866^2}{2-(.866)^2} = 0.60$

$0.6 \times .120 = 0.072^{ksf}$; $0.6 \times .056 = .0336$



Find S_m:

$.072 \times 9.5^2/2 = 3.25^k$

$.072 \times 9.5 \times 18 = 12.31$

$.0336 \times 18^2/2 = 5.44$

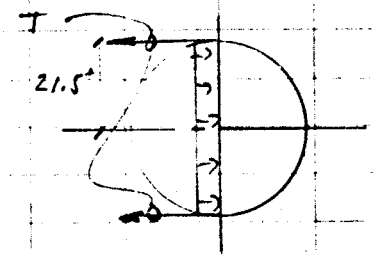
$P_t = 21.00^k/'$

$S_m = 21.0 \times \tan 30° = 12.1^k/'$ (Resist. due to Shear in Sand)

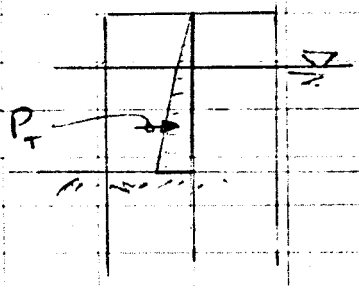
Total $S_m = 12.1^k/' \times 43.0 = 520^k$

Find S_t = Resist. due to interlock friction.

Tension = $21.0^k/' \times 21.5' = 453^k$



Total S_t for cell = $2 \times 453^k \times 0.3 = 272^k$ (assumed Coef. of interlock fract.)



Find Q

$Q = 3/2 \times \frac{[20,500 - 6^{ksf} \times 43]}{38'} = 800^k$ (20,742)

LDG A ~ F.S. = $\frac{520 + 272}{800} = 0.99 \sim 1.0$ Susp. OK

controls

Unusual impact load from barge.

no record of this type of failure & There is question as to whether failure can even occur by this mode

Ref.: 1970 Specialty Conf. - "Lat. Stresses ..."

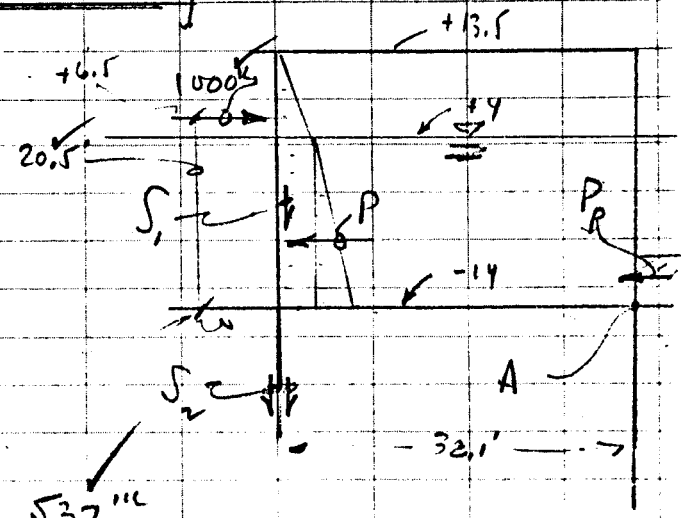
Computed by GAS Date 12/21/72
Checked by WEB Date 12.28.72
Reviewed by RGF Date 2-12-73
Approved by RGF Date 5-73

Job No. 4671 Page No. 4A-55
Subject STRUCTURAL
DOLPHIN - STEEL SHT PILING
Sheet No. 8 of

East Dolphins.

✓ Pullout of outboard sheeting

Σ Moments abt A



Say P = 1000k / 38.1 = 26.2k/'

S_1 = 26.2k × tan δ = 13.1k

M_A = 15.1k × 32.1' = 499'k

Driving forces = 26.2k/' × 20.5 = 537'k

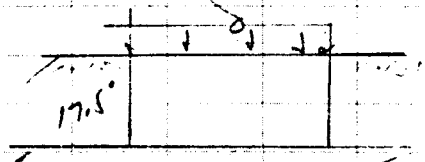
Pullout cap. of embedded portion = ½ × 0.5 × .060 × (17.5)² × 2 sides × tan 11° / 0.5 = 4.58k

M_A = 4.58k × 32.1 = 174'k

Case A Ldg: F.S. = (499 + 174) / (537 − 6 passive) = 1127 / 1100 > 1.00 OK

USE Total Length.
+13.5 + 14 + 17.5 = 45'
Piling

✓ For Capacity



Ult. Cap. = .060 (17.5 × 20) = 21.0
.060 × 32.1/2 × 3 = 9.1
Tip coef. 30.1k

f_{soil} = 2.1 + 17.5 + .060 + 531 × 1.2 / 38.1² = 3.2 + 2.1 = 5.4 max F.S. = 30.1 / 5.4 = 5.6 > 3 OK

Job No. 4671 Page No. AA-56

Computed by GAS Date 12/21/72 Subject STRUCTURAL

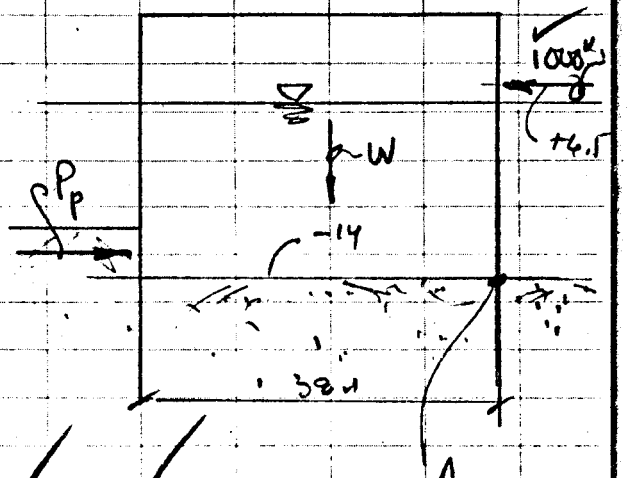
Checked by WEB Date 12.28.72 DOLPHIN-STEEL SHT PILING

Reviewed by RGP Date 2-12-73

Approved by RGP Date 5-73 Sheet No. 9 of

East Dolphins

✓ Overturning



$M_{OT} = 1000^{\#} \times 20.5 = 20{,}500'^{\#}$

less $M_{passive} = 38.1 \times 6^{\#} = -230'$

$M_{Driving} = 20{,}270'^{\#}$

$W = [9.5 \times .120 + 18 \times .056] \times 38.1 = 81.8^{\#}/_{'}$

2.15

$M_{abt\ A} = 81.8 \times 38.1/2 = 1560'^{\#}/_{'}$

Total $M_{Resist} = 1560 \times 38.1 = 59{,}500'^{\#}$

$F.S. = \frac{59{,}500}{20{,}270} = 2.93 < 3.0$ to 3.1 but Say OK for barge load

This is checked as an indicator only, since the cell would not actually fail in this mode.

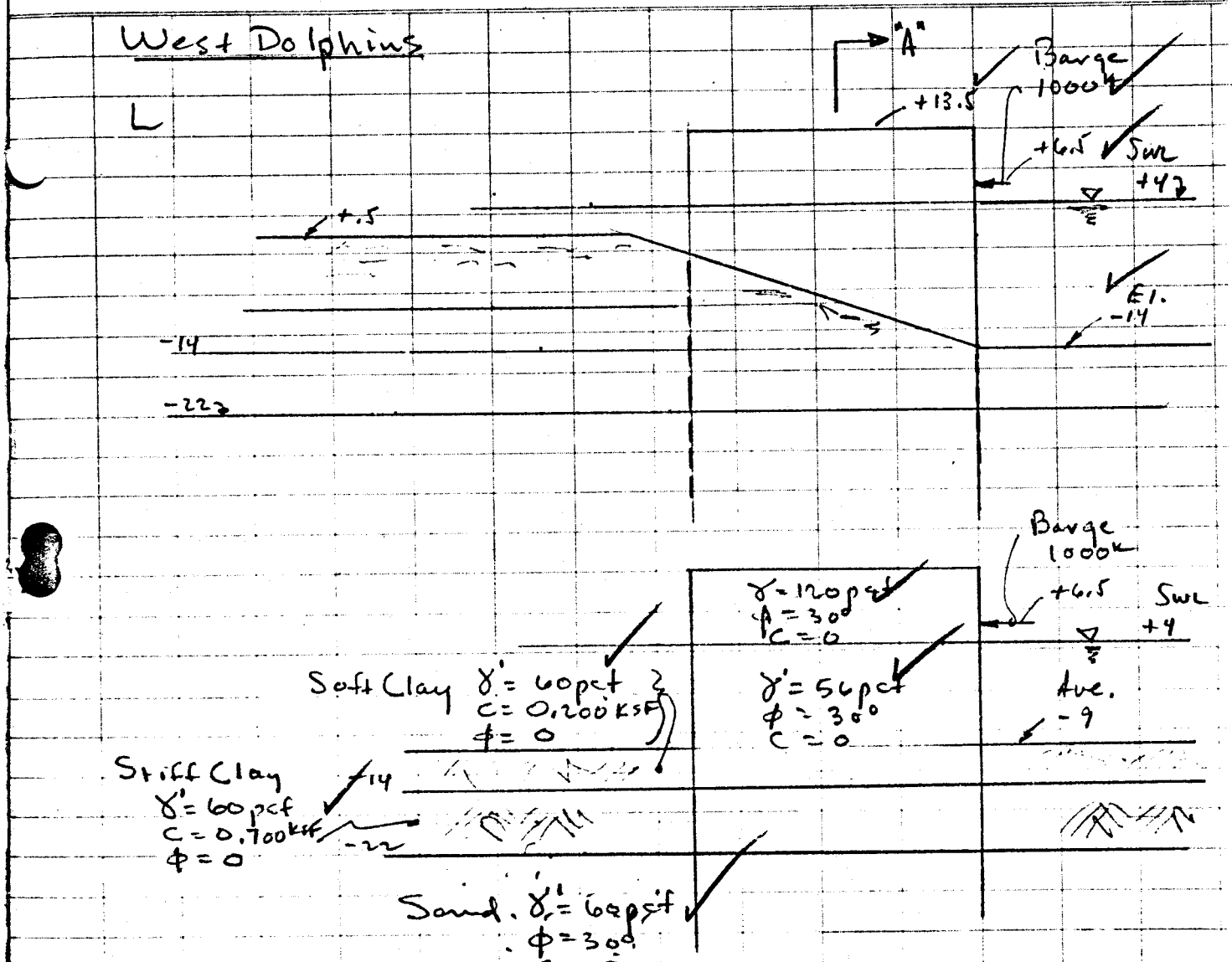
Job No. 4671 Page No. 4A-57

Computed by GAS Date 12/21/72
Checked by WEB Date 12.28.72
Reviewed by SCP Date 2-12-73
Approved by RGP Date 5-73

Subject STRUCTURAL
DOLPHIN - STEEL SHT PILING

Sheet No. 10 of

West Dolphins



SEC "A"

Refer: Soil Borings 1-L, 2-L, 3-L, 4-L & 3-CH

Job No. 4671 Page No. 4A-57

Computed by GAS Date 12/21/72
Checked by WEB Date 12.28.72
Reviewed by RGP Date 2-12-73
Approved by RGP Date 5-73

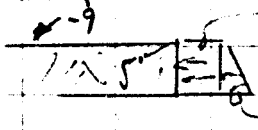
Subject STRUCTURAL
DOLPHIN - STEEL SHT PILING

Sheet No. 11 of

West Dolphins

Passive Resistances See Sht. 4

Soft Clay @ $C = 0.2$, $\phi = 0$, $\gamma' = 60$ pcf



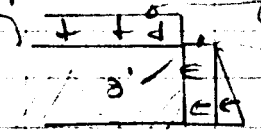
$p_1 = 2 \times .2 = 0.4$ KSF

$p_2 = 5' \times .060 \times 1.0 = 0.3$ KSF

$H_1 = 0.4 \times 5 = 2.0^k$

$H_2 = 1/2 \times 0.3 \times 5 = 0.75^k$

Layer of sand @ $\phi = 30°$



$q = 5' \times .060 = 0.300$ KSF

$p_1 = 3.0 \times .3 = 0.9$ KSF

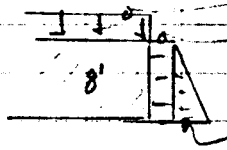
$p_2 = 3.0 \times .060 \times 8 = 1.44$ KSF

$H_1 = 0.9$ KSF $\times 8 = 7.2^k$

$H_2 = 1/2 \times 8 \times 1.44 = 5.8^k$

if This were 8'-0 of Sand @ $\phi = 30°$

Stiff Clay @ $C = 0.7$ KSF, $\phi = 0$, $\gamma' = 60$ pcf



$q = 0.300$ KSF

$p_1 = 0.300 \times 1.0 + 2 \times 0.7 = 1.7$ KSF

$p_2 = .060 \times 1.0 \times 8' = 0.48$ KSF

$H_1 = 1.7 \times 8' = 13.6^k$

$H_2 = \frac{1}{2} \times 0.48 \times 8' = 1.92^k$

Compare Sand vs. Clay -

$\Sigma H = 7.2 + 5.8 = 13.0^k$ Sand

$13.6 \times 1.9 = 15.5^k$ Clay

ΣM abt bot of layer $= 7.2 \times 8/2 + 5.2 \times 8/3 = 29 + 17 = 44'^k$ Sand

$13.6 \times 8/2 + 1.9 \times 8/3 = 54 + 5 = 59'^k$ Clay

Note clay as strong or stronger than a sand layer of same depth

Job No. 4671 Page No. 4A-59

Computed by GAS Date 12/21/72 Subject STRUCTURAL

Checked by WEB Date 12.28.72 DOLPHIN - STEEL SHT PILING

Reviewed by RGP Date 2-12-73

Approved by RGP Date 5-73 Sheet No. 19 of

West Dolphin S.

Sliding

$W = [7.5 \times .12 + 18 \times .056] \times 32.1$

$= 82^{k}$

$W \tan\phi = 82 \times .577 = 47.3^{k}$

Cohesion x Width

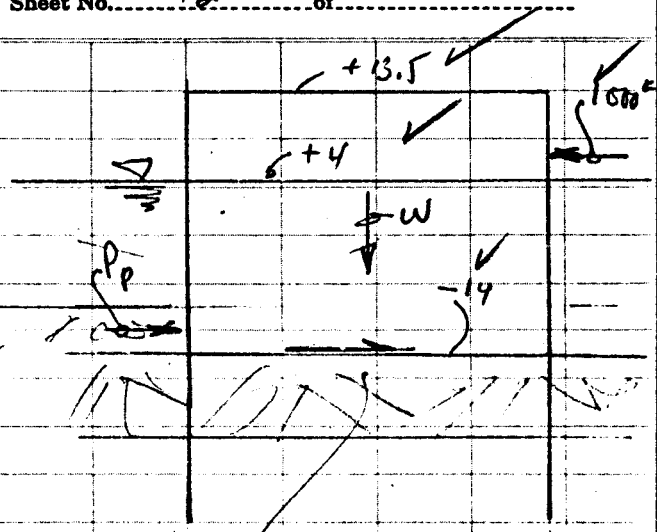
$0.7^{ksf} \times 32.1 = 26.7^{k}$

$1000^{k} / 32.1 = 26.2^{k}$

Lowest possible

$F.S. = \frac{26.7}{26.2 - 2.7} = 1.14 > 1.0$

OK



Check for $\phi = 0$, $c = 0.7^{ksf}$

Actually, consolidates under full load & gains strength

USE SAME CELL AS AT EAST DOLPHIN

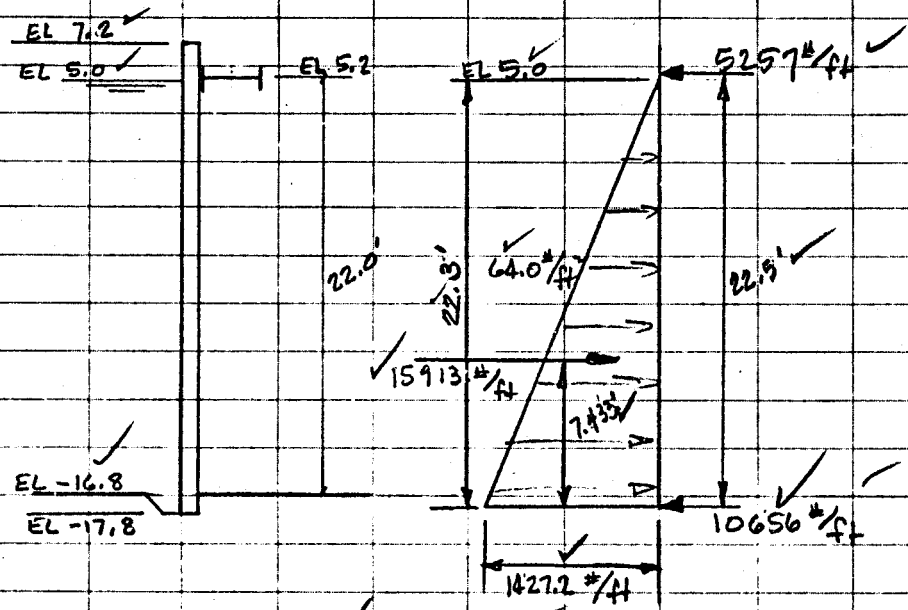
Job No. 4671 Page No. 4A-60

Computed by RJBechler Date 10/26/72
Checked by WJP Date 10-27-72
Reviewed by GAS Date 1/31/73
Approved by [illegible] Date 2-12-73

Subject STRUCTURAL NEEDLE DESIGN

Sheet No. 1 of

@ CHEF MENTEUR LOCK: (Controls Needle Design)



$R_{Top} = 15913 \times \frac{7.433}{22.5} = 5257$ #/ft

$R_{Bot} = 15913 - 5257 = 10656$ #/ft

Point of zero shear:

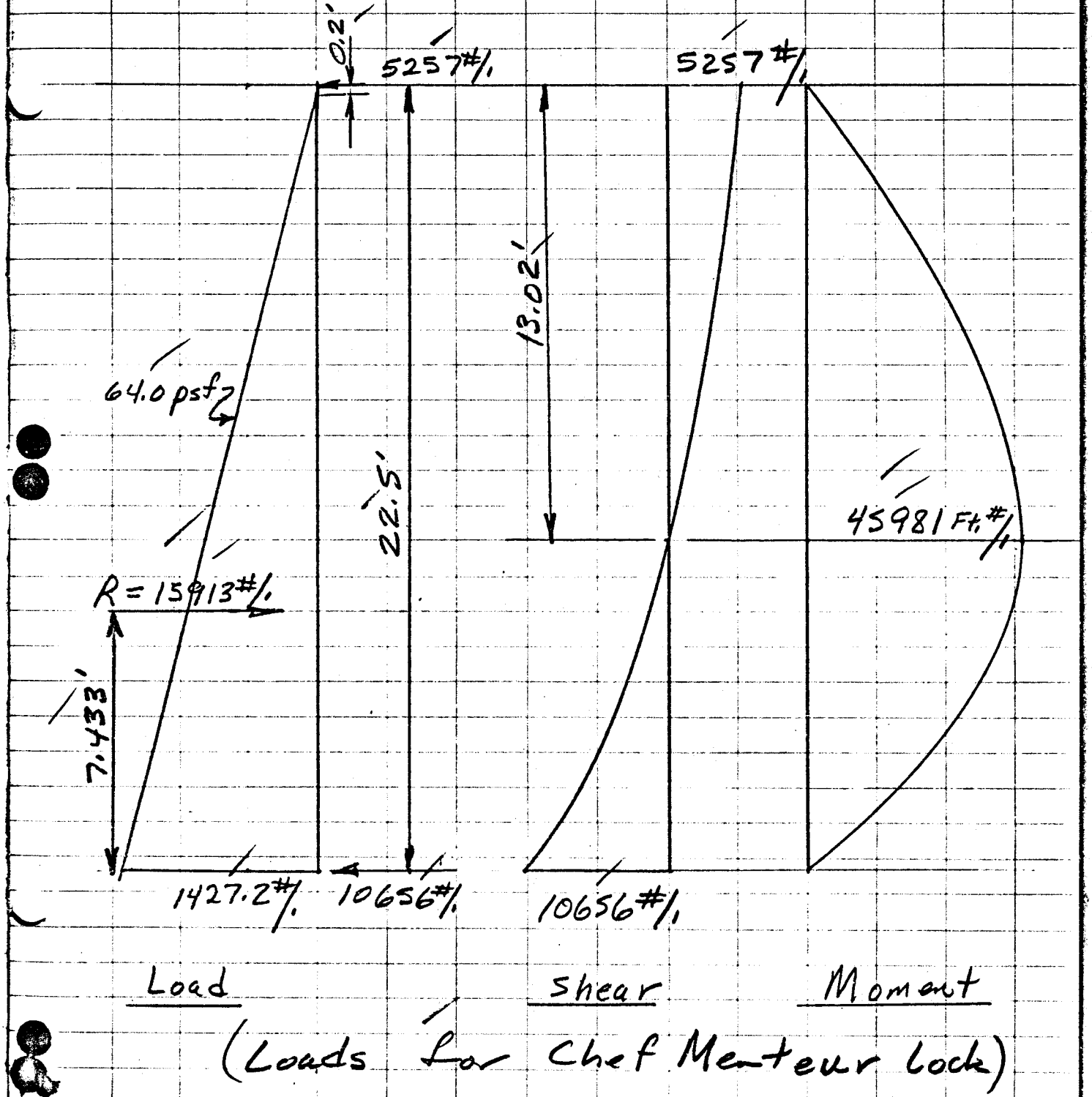
$0.2' + \sqrt{\frac{5257}{64/2}} = 0.2 + 12.82 = 13.02'$ from top reaction

Moment (max) $= 5257 \times 13.02 - 5257 \times \frac{12.82}{3}$

$= 68446 - 22465 = 45981$ ft#

Computed by WEB Date 1.5.73
Checked by WJL Date 1/29/73
Reviewed by GAS Date 1/31/73
Approved by _____ Date 2-1-73

Job No. 4671 Page No. 4A-61
Subject Structural Needle Design
Sheet No. 1A of _____



(Loads for Chef Menteur Lock)

Job No. 4671 Page No. 4A-62

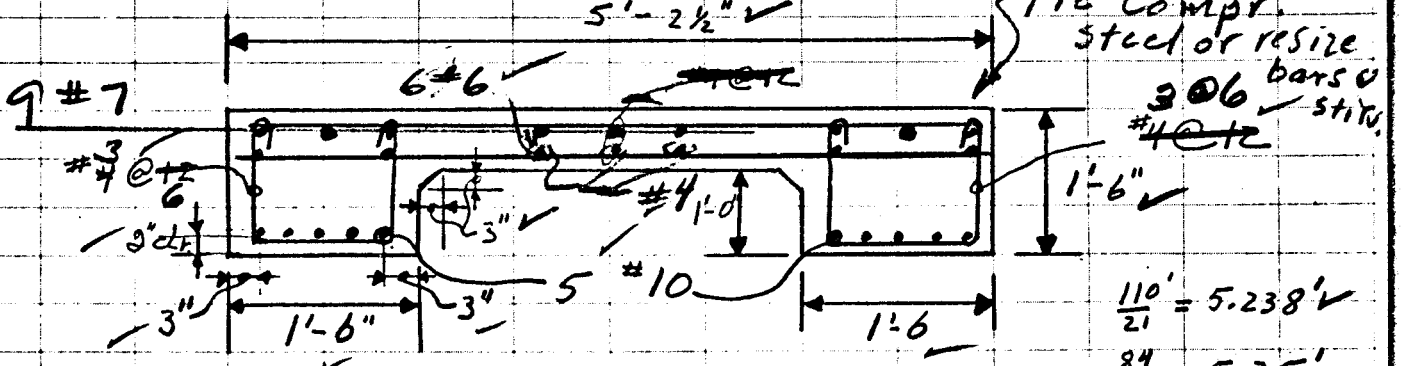
Computed by WJZ Date 12/21/72
Checked by RGP Date 1-4-73
Reviewed by GAE Date 1/31/73
Approved by _____ Date 2-1-73

Subject STRUCTURAL NEEDLE DESIGN

Sheet No. 2 of _____

Loading conditions at Chef Menteur Lock will control the needle design.

M_{max} = 45.981 'K/' @ 13.02' from top.



$\frac{110'}{21}$ = 5.238' ✓

$\frac{84}{16}$ = 5.25' ✓

for design only

M_{max} = 45.981 X 5.25 = 241.400 'K/needle ✓

$A_s = \frac{241.400}{1.44 \times 15.3}$ = 10.95 □" ✓

use 10 # 10 ✓

Sec 5.4.4

Shear 3' from bottom ✓

$V = 10656 - 1427.2 \times 3 + 64 \times 3^2 \times \frac{1}{2} = 6662.4^{\#}$

$v = \frac{6662.4}{36 \times 15.3} = 12.1$ psi < 60 psi ok

use #4 stirrups @ 12" spacing

(185/0)

$u = 18.95 < 145.7$ ok

Job No. 4671 Page No. 4A-63

Computed by WEB Date 1.8.73
Checked by WJZ Date 1/29/73
Reviewed by GHS Date 1/31/73
Approved by RCD Date 2-1-73

Subject STRUCTURAL NEEDLE DESIGN

Sheet No. 3 of

(Base makes section @ Tapering compressive reinf. reg'd too high)

$$d_{req} = \sqrt{\frac{241{,}400}{152 \times 5.208}} = 17.42'' > 15.3$$

$k = .326$, $kd = .326 \times 15.3 = 5.0'' < 6.0$

Find A_s' (see table 7 RCDH)

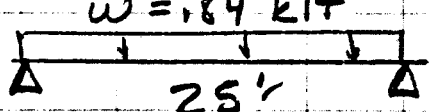
$$d'/d = \frac{2.4}{15.3} = 0.157 \text{, } c = 0.665$$

$$KF = \frac{152 \times 62.5 \times 15.3^2}{12{,}000} = 185'k$$

$$A_s' = \frac{241 - 185}{.665 \times 15.3} = 5.5\ \square''$$

use 4 #10 $A_s = 5.08\ \square''$ + additional #4's in section

Compare A_s' with that needed for Dead Load Bending



$$w = 5.208(.5)(.15) + 1.5(1.0)(2)(.15) = .84$$

$$M = .84\left(\frac{25^2}{8}\right) = 66'k$$

$$d_{req} = \sqrt{\frac{66{,}000}{152 \times 3.0}} = 12.03''$$

$$A_s = \frac{66}{1.44 \times 15.3} = 3.0\ \square''$$

$M_{(cantilever-Storage}$ $M = .15(5.21)(7\frac{2}{2}) = 19.2'k$

Computed by WEB Date 1.8.73
Checked by WJF Date 1/29/73
Reviewed by GAS Date 1/31/73
Approved by [illegible] Date 2-13

Job No. 4671 Page No. AA-64
Subject STRUCTURAL NEEDLE DESIGN
Sheet No. 4 of

Compare A's with that needed for Dead Load Bending – Cantilever

$M = .84\left(\frac{10^2}{2}\right) = 42'k$ $R_x = .84\left(\frac{25}{2}\right)^2\left(\frac{1}{15}\right) = 17.5^k$

Shear: @ d (1.27') from base

$V = 10656 - 1427.2(1.27) + .64\left(\frac{1.27^2}{2}\right)$

$V = 10656 - 1810 + 52 = 8898^{\#}$

$v = \frac{8898 \times 5.25}{15.3 \times 36} = 85 psi$ (60 psi to conc.)

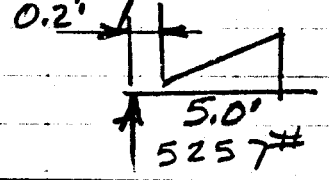
$V' = 8898 \times 5.25 \times \frac{15}{85} = 8250^{\#}$

Stirrups: $A_v = \frac{8250 \times 6}{2 \times 20{,}000 \times 15.3} = 0.081^{\square"}$

use #3 ties @ 6"

Bond: $u = \frac{10656 \times \frac{5.25}{2}}{5 \times 3.99 \times \frac{7}{8} \times 15.3} = 104 < 207$

Check Moment & Shear @ 6.5' from top of Needle



$M = 5257(5.0) - 64\left(\frac{4.8^3}{6}\right)$

$M = 26300 - 1180 = 25120$ 'lb

Job No. 4671 Page No. 4A-65

Computed by WEB Date 1.8.73
Checked by WJZ Date 1/29/73
Reviewed by [illegible] Date 1/31/73
Approved by [illegible] Date 2-7-73

Subject STRUCTURAL NEEDLE DESIGN

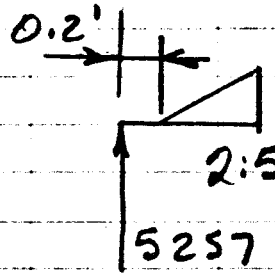
Sheet No. 5 of

$$V = 5257 - 64'\left(\frac{4.8^{2}}{2}\right)^{140} = 4517\#$$

$$d_{req} = \sqrt{\frac{25120 \times 5.25}{152 \times 5.208}} = 12.9''$$

$$v = \frac{4517 \times 5.25}{36' \times 15.3'} = 43 psi$$

Moment @ $4'_{4.5}$ from top of Needle



$$M = 5257 \times 2.5 - 64'\left(\frac{2.3^{3}}{8'}\right)$$

$$M = 13150 - 98 = 13052'^{\#}$$

$$d_{req} = \sqrt{\frac{13052 \times 5.25}{152 \times 5.208}} = 9.3''$$

$$A_s = \frac{13.052 \times 5.25}{1.44 \times 9.3'} = 5.2^{\square''}$$

use $10^{\#}7'$
$A_s = 6.0$

Lifting-Eye:

$$A_s = \frac{17.5^{OK}}{20'} = .88'^{\square''}$$ use $1\frac{1}{2}''\phi$ plain Bar $A_s = 1.767$

$$f_s = \frac{17.5'}{2 \times 1.767'} = 5.00'$$

$$L(Bond) = \frac{5000(1.5^{2})(2)}{4(4.8)(55)} = 2'^{11}$$

(Allows for impact loading)

Job No. 4671 Page No. 4A-66

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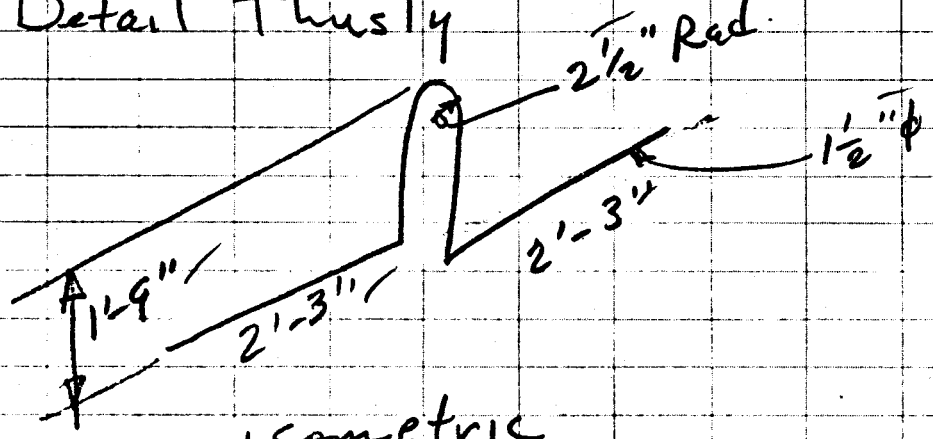
Subject STRUCTURAL NEEDLE DESIGN

Sheet No. 6 of [illegible]

Detail Thusly



Isometric

Conc. $M = \frac{26.2}{2}(1.75) = 23.0'k$

$A_s = \frac{23.0}{1.44 \times 15.3} = 1.03$ 3 #6

$V = 13.1k$ $v = \frac{13100}{15.3 \times 12} = 71$ psi

$V' = \frac{11}{71} \times 13.1 = 2.03k$

$A_v = \frac{2030 \times 6}{20{,}000 \times 15.3} = .04$

use #3 ties @ 6

Top Lifting eye $R = 25 \times .84 = 21k$

$f_s = \frac{21}{2 \times .785} = 13.4$ ksi use 1" ϕ Bar

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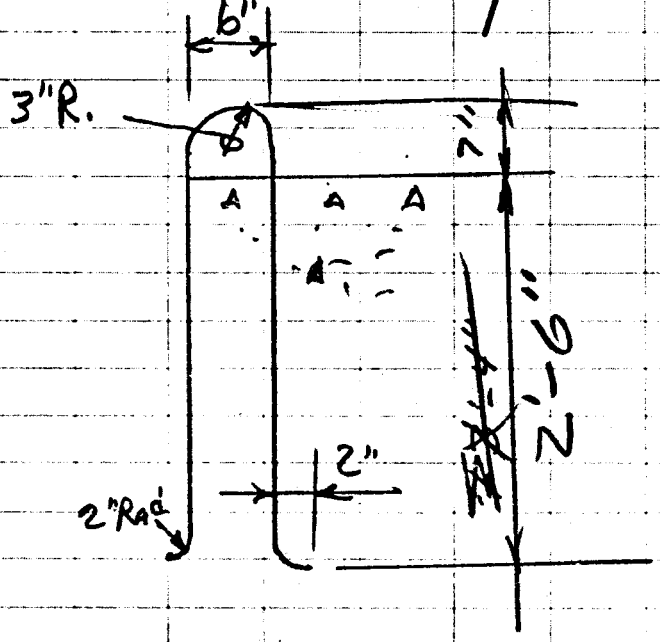
Job No. 4671 Page No. 4A-67
Subject STRUCTURAL NEEDLE DESIGN
Sheet No. 7 of

$$L = \frac{13500\,(1^2)(2)}{4(4.8)(55)} = 26''$$

Detail Thusly



Job No. 4671 Page No. 4A-68

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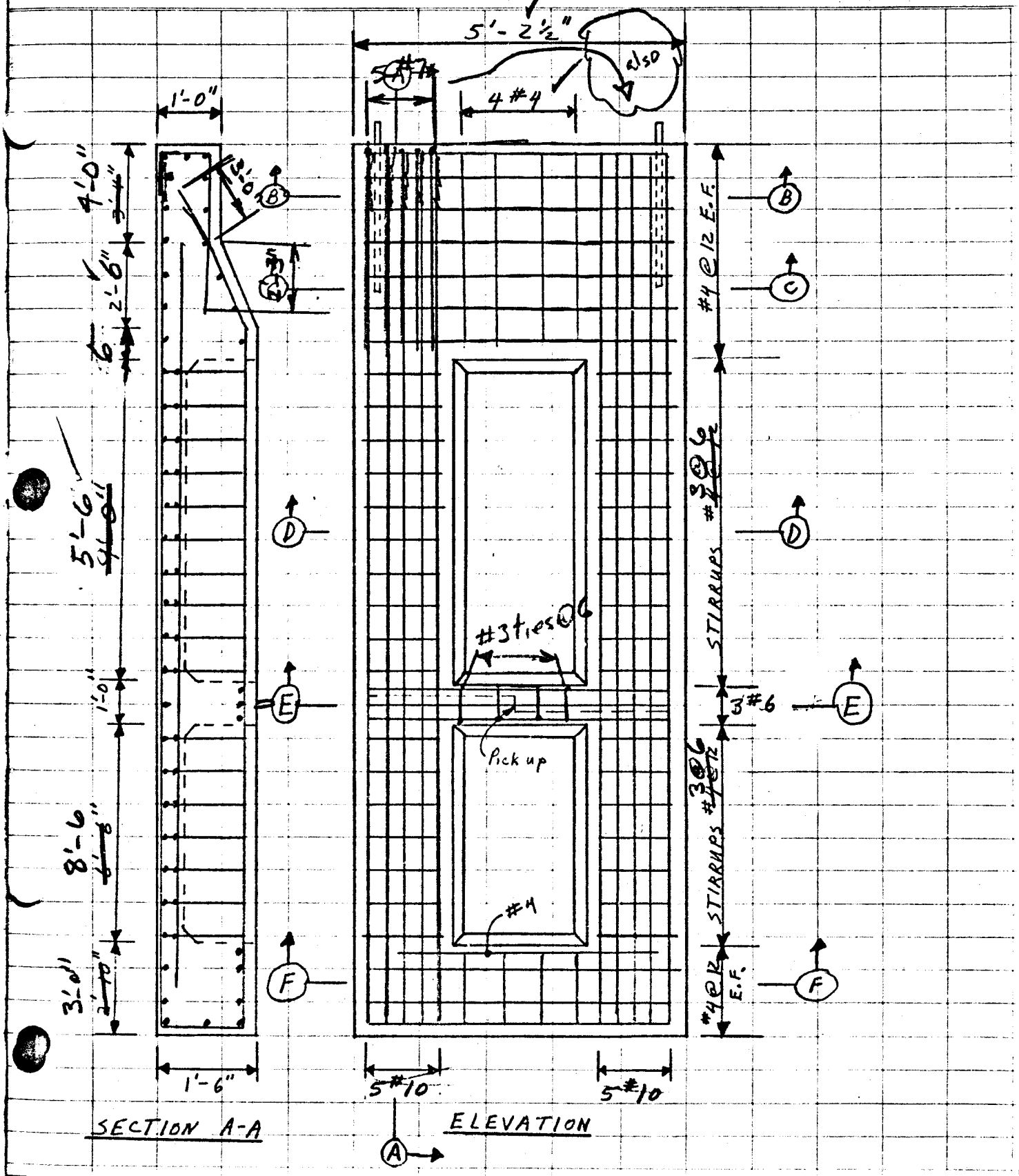
Subject STRUCTURAL
NEEDLE DESIGN

Sheet No. ____ of ____



Job No. 4671 Page No. AA-69

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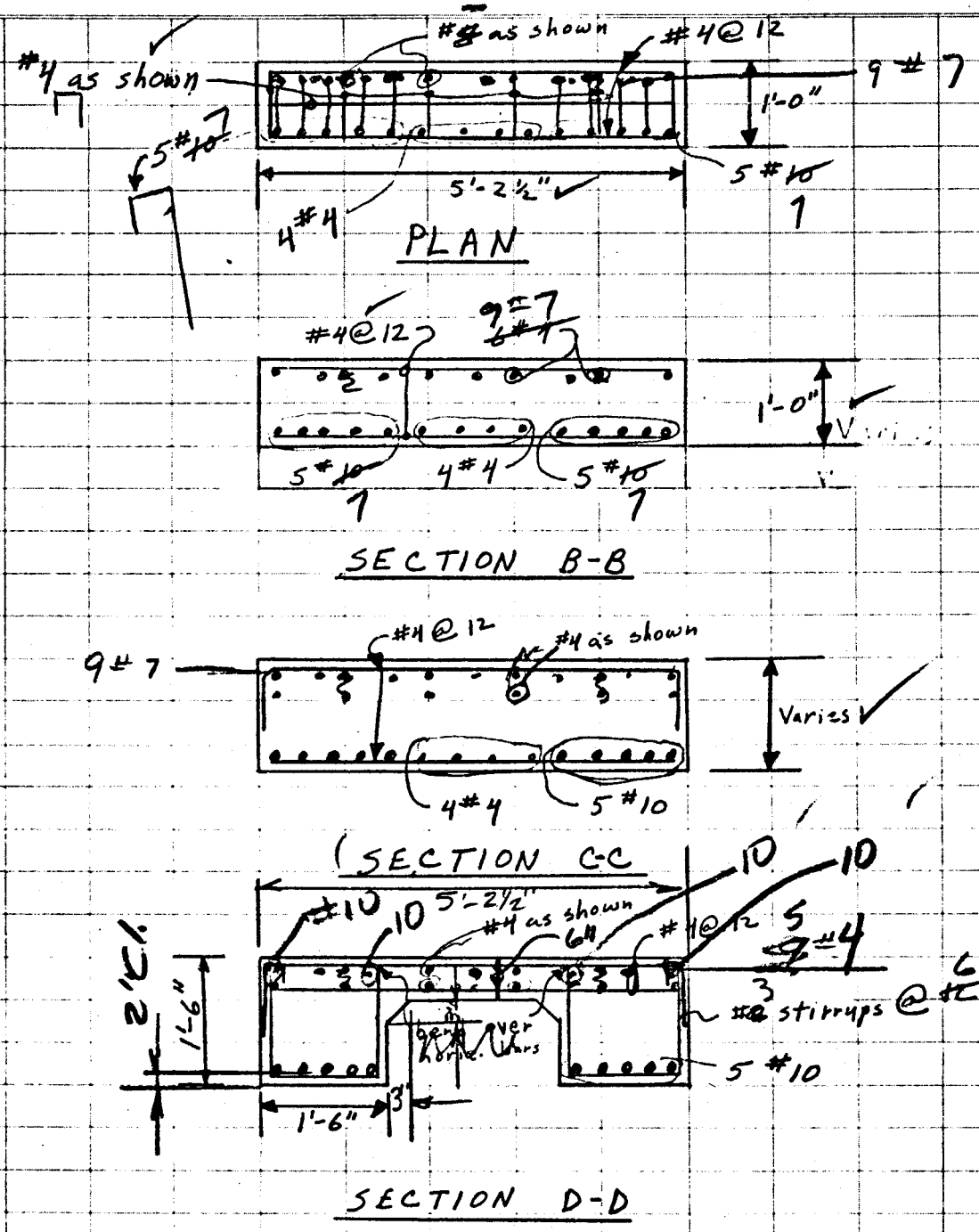
Subject STRUCTURAL NEEDLE DESIGN

Sheet No. of



Job No. 4671 Page No. 4A-7.0

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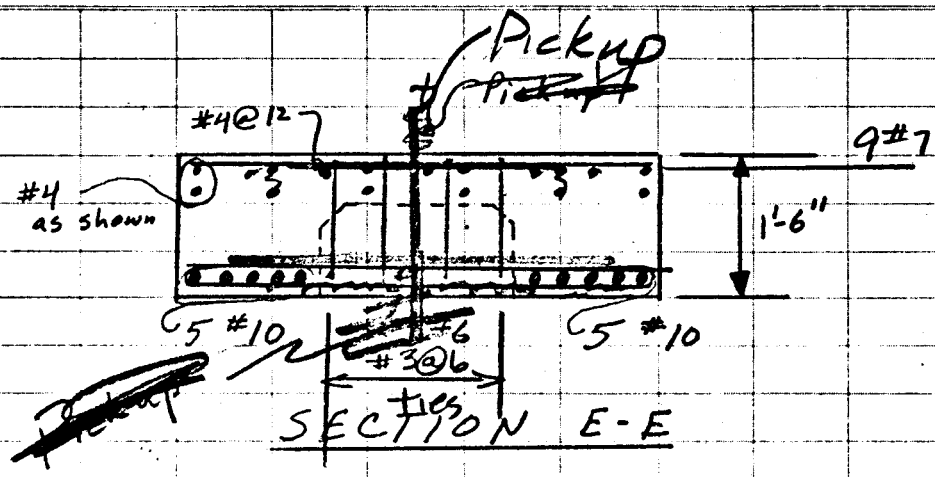
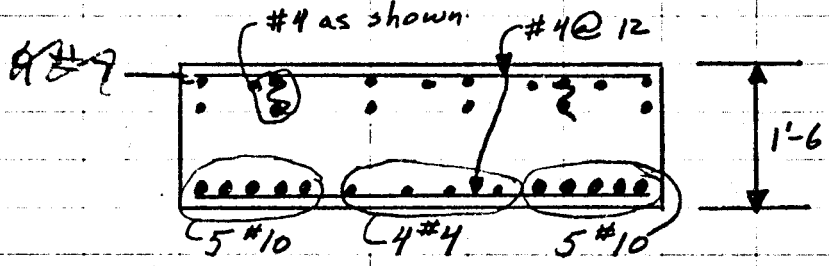
Subject STRUCTURAL NEEDLE DESIGN

Sheet No. ____ of ____



SECTION E-E



Job No. 4671 Page No. 4A-71

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Approved by RGP Date 2-73

Subject STRUCTURAL NEEDLE DESIGN

Sheet No. ____ of ____

Wt & center of Gravity (From Base)

$5.21(3.0)(1.5)(.15)$	=	3.52×1.5	= 5.28
$15.0(0.5)(5.21)(.15)$	=	5.85×10.5	= 61.5
$1.5(1.0)(2)(15.0)(.15)$	=	6.75×10.5	= 70.9
$1.0(1.0)(2.21)(.15)$	=	$.33 \times 10.0$	= 3.33
$5.21(7.0)(1.0)(.15)$	=	5.46×21.5	= 117.8
$5.21(\frac{1}{2})(2.5)(0.5)(.15)$	=	$.49 \times 19.33$	= 9.45
$5.21(0.5)(1.0)(.15)$	=	$.39 \times 18.25$	= 7.1
		22.79 k	275.39 'k

$$\overline{X} = \frac{275.39}{22.79} = 12.1'$$

272.58

275.39

22.79

22.78

12.0'

Job No. 4671 Page No. 4A-72

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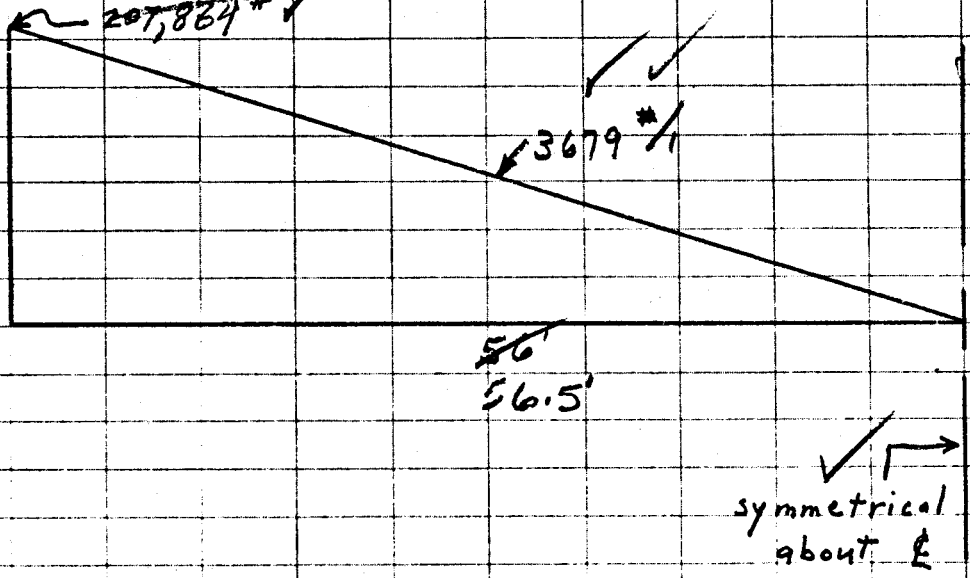
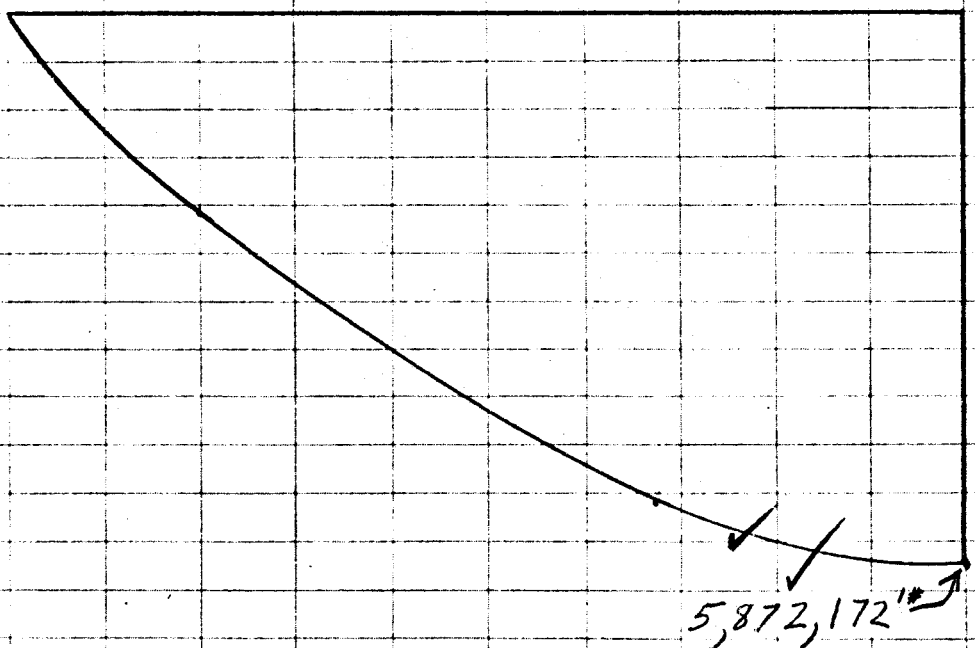
Subject Structural
Needle Girder
110' Lock

Sheet No. 2 of ____

Water Load Shear Diagram (Horizontal)



Water Load Moment Diagram (Horizontal)



Job No. 4671 Page No. 4A-73

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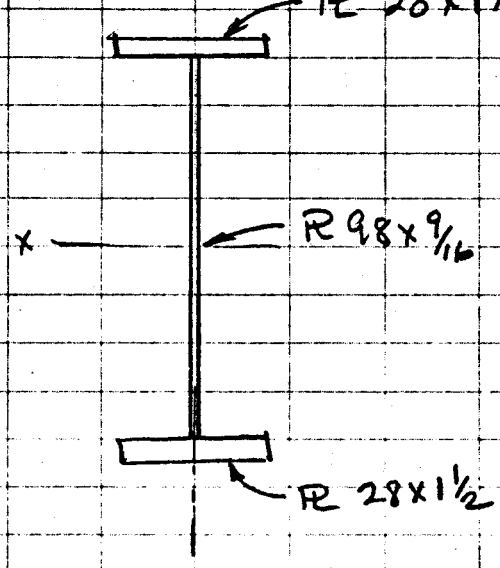
Subject STRUCTURAL
Needle Girder

Sheet No. 3 of ____

CENTER SECTION



Section Properties

$A = 2 \times 28 \times 1.5 + \frac{9}{16} \times 98 = 139.1\ in^2$ (55.1)

I_x $\frac{9}{16} \times 98^3 \times \frac{1}{12} = 44\,118$

$2 \times 28 \times 1.5 \times 49.75^2 = 207,905$

$252,013\ in^4$ (~~252,018~~)

$S_x = \frac{252,013}{50.5} = 4990\ in^3$ (23)

$I_y = \frac{2 \times 1.5 \times 28^3}{12} = 5488\ in^4$

$S_y = \frac{5488}{14} = 392\ in^3$

AISC 1.10.6

$h/t = 98 \div \frac{9}{16} = 174.2 < \frac{760}{\sqrt{18}}$ (155 for 1/2)

Find: F_b (Ctr. Span)

$A_f + \frac{1}{6} A_w = 1.5 \times 28 + \frac{1}{6} \times \frac{9}{16} \times 98 = 60.6$ (42, 9.19, ~~18.38~~) 51.2

$r_T = \sqrt{\frac{\frac{1}{2}(5488)}{512}} = 7.32$ (~~6.72~~)

$\ell / r_T = \frac{37.67 \times 12}{7.32} = 61.8$ (~~67.4~~, ~~60.1~~) use

Job No. 4671 Page No. 4A-74

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Subject STRUCTURAL
Needle Girder

Sheet No. 14 of

Per EM 1110-1-2101 Pg. 8

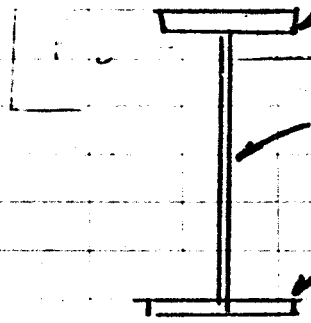
(Formula 4) $K_2 = 1 - \frac{(\ell/r_T)^2}{2 \times C_c^2 \times C_b}$

$k_2 = 1 - \frac{60.1^2 \; .143 \; .114}{67.4^2 \; .120} = 1 - \frac{.886}{2 \times 126.1^2 \times 1} = .857$

$F_b = .857 \times 0.5 \times 36 = .886 \times .95 \times 36 = 15.42$ ksi ← use

(Formula 5) $F_b = \frac{10 \times 10^6}{\ell d / A_f} = \frac{10 \times 10^6}{37.67 \times 12 \times 101 / 42} = 9.2$ ksi

END SECTION



$A = 2 \times 24^{7.2} \times 1.5 + 60^{22.5} \times 3/8 = 54.5$ □"

$I_x: \; 3/8 \times 60^3/12 = 6750$

$2 \times 36 \times 30.75^2 = 68100$

$74,850$ in^4

$S_x = \frac{74850}{31.5} = 2380$ in^3

$I_y: \; 2(1.5)(24^3/12) = 3460$ in^4

$S_y = \frac{3460}{12} = 288$ in^3

$A_f + \frac{1}{6} A_w = 36 + \frac{1}{6} \times 3/8 \times 60^{3.75} = 39.75$

$r_T = \sqrt{\frac{1/2 (3460)}{39.75}} = 6.59$

$\ell/r_T = \frac{37.67 \times 12}{6.59} = 68.5$

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Job No. 4671 Page No. 4A-75
Subject STRUCTURAL NEEDLE GIRDER
Sheet No. 5 of

(End Span) $C_b = 1.75$ $\ell/r_T = \frac{68.5}{67.4}$

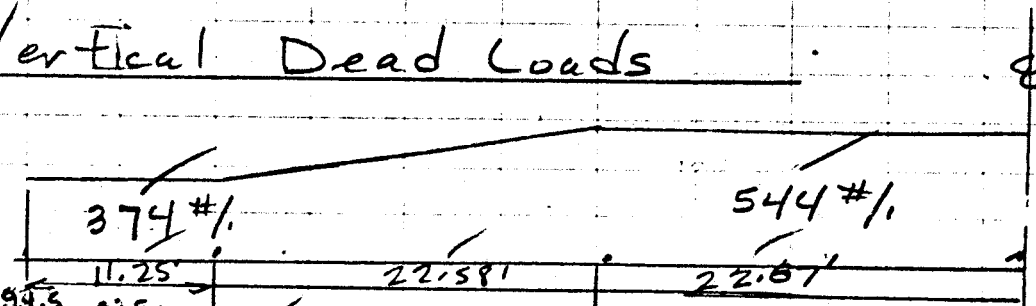
$K_2 = 1 - \frac{68.5^2}{2 \times 126.1^2 \times 1.75} = 1 - .0843 = .9157$

$F_b = .9157 \times .5 \times 36 = 16.45$ ksi ← use

@ 63" Section

$F_b = \frac{10 \times 10^6}{37.667 \times 12 \times 63 / \frac{36}{30}} = 10.5$ ksi

Vertical Dead Loads



$\left(\frac{3 \times 24}{1728} + \frac{3 \times 60}{1728}\right) 12 (490) = 321$

$\frac{12 \times 60}{1728} \times \frac{490}{7} = 30$

wood $\frac{1}{2} \times 46$ = 23

374#/'

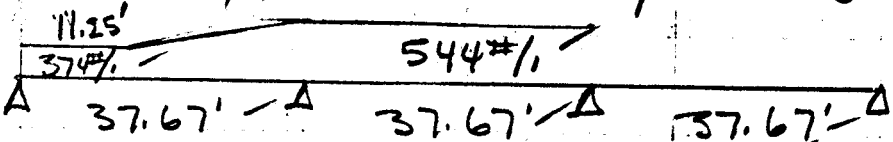
$w = \frac{139.1 \times 12 \times 490}{1728} = 473$

stiff $\frac{12 \times 98}{1728} \times \frac{490}{7} = 48$

wood $\frac{1}{2} \times 46$ = 23

544#/'

Girder Supported @ 1/3 pts. (Assume Constant I



$FEM = .374\left(\frac{37.67^2}{8}\right) + \left(\frac{.7}{3} - \frac{.7^2}{4} + \frac{.7^3}{20}\right)\left(\frac{.170 \times 26.42}{2}\right)(37.67)$

Job No. 4671 Page No. 4A76

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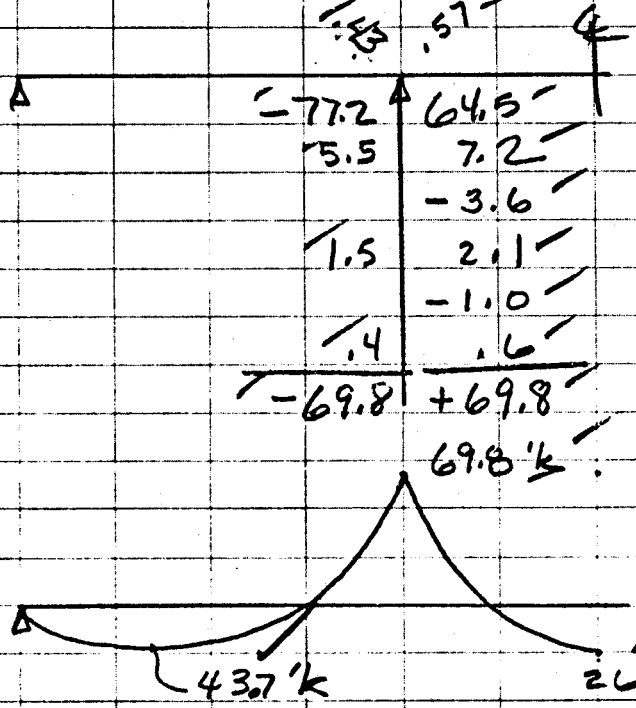
Subject STRUCTURAL NEEDLE GIRDER

Sheet No. 6 of _____

FEM = 66.4 + 10.8 = 77.2'k

$FEM = .544\left(\frac{37.67^2}{12}\right) = 64.5'k$



$.544\left(\frac{37.67^2}{8}\right) = 96.7'k$

-69.8

$-26.9'k$

$\frac{10.65}{16.37} = \frac{1}{37.67}$

$5.72 = \left[69.8\right]\frac{1}{37.67}$

$16.34'k = \left[69.8\right]\frac{1}{37.67}$

$\left[\frac{.374(37.67^2)}{2} + .170\left(\frac{26.42^2}{2\times3}\right) - 69.8\right]\frac{1}{37.67} = 10.65$

$\left[\frac{.374(37.67^2)}{2} + .17\left(\frac{26.42^2}{2}\right)\left(11.25 + \frac{2\times26.42}{3}\right) + 69.8\right]\frac{1}{37.67} = 16.37$

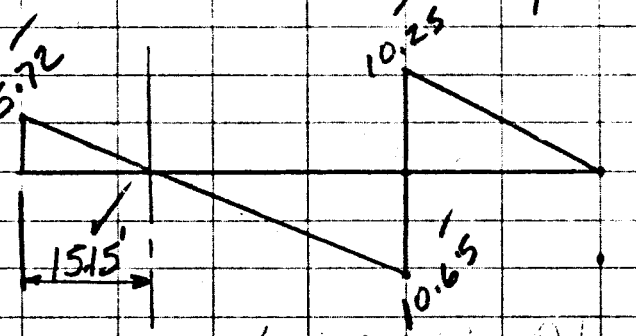
End Span $V_1 = \left[\frac{.374(37.67^2)}{2} + .17\left(\frac{26.42^2}{2}\right)\left(\frac{2}{3}\right)\right] = 16.34'k$

$V_{R2} = \left[\frac{.374(37.67^2)}{2} + .17\left(\frac{26.42^2}{2}\right)\right] = 14.1$

Total $= .374(37.67)\frac{37.67}{2} = 265.5'k$

$V_m = 265.5 - (16.34 + 14.1) = 10.25'k$

VERTICAL D.L.
Moment Diag.



VERTICAL D.L.
Shear diag

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Approved by _____ Date _____

Job No. 4671 Page No. 4A-77
Subject STRUCTURAL NEEDLE GIRDER
Sheet No. 7 of _____

Compute dist for zero Shear

$$374x + \frac{170}{26.42}\frac{(x-11.25)^2}{2} = 5720$$

$$374x + 3.22(x^2 - 22.5x + 126.7) = 5720$$

$$3.22x^2 + 301.5x = 5720 - 408 = 5312$$

$$x^2 + 93.7x = 1650$$

$$(x + 46.85)^2 = 1650 + 2195 = 3845$$

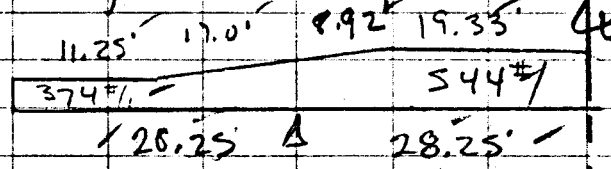
$$x = 62.0 - 46.85 = 15.15$$

check $15.15 \times 374 + \frac{170}{26.42}\left(\frac{3.90^2}{2}\right) = 5719$ ok

$$M = 5720(15.15) - 374\left(\frac{15.15^2}{2}\right) - \frac{170}{26.42}\left(\frac{3.90^3}{6}\right)$$

$M = 43736$ #/ Vert. Dl.

Lifting Shears & Moments



$$M = .374\left(28.25^2/2\right) + \frac{.170}{25.92}\left(\frac{17.0^3}{6}\right) = 155.0\ 'k$$

$$V_L = .374(28.25) + \frac{.17}{25.92}\left(\frac{17^2}{2}\right) = 11.50$$

$$V_R = .544(28.25) - \frac{.170}{25.92}\left(\frac{4.92^2}{2}\right) = 15.12$$

5

Job No. 4671 Page No. 4A-78

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Reviewed by CWS Date 1/31/73
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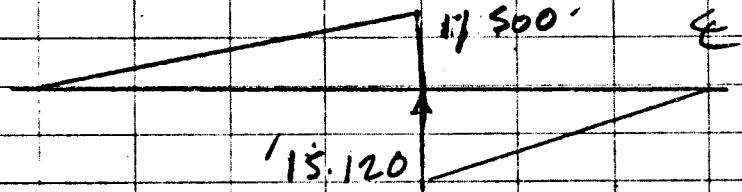
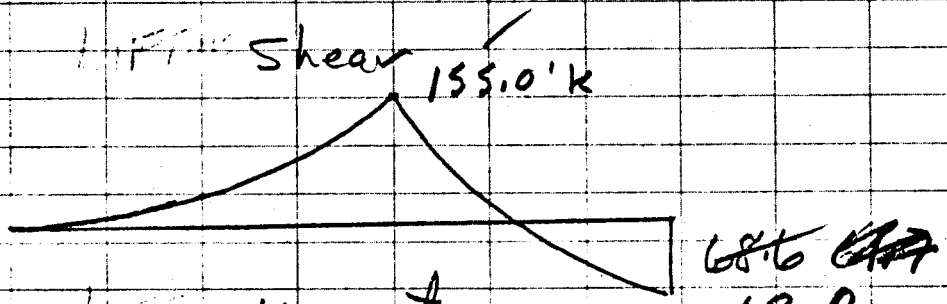
Subject STRUCTURAL NEEDLE GIRDER

Sheet No. 8 of .....

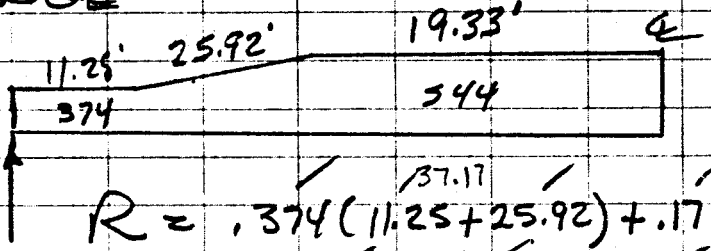
$M_{\text{@}} = 15.38(28.25) - .544\left(\frac{28.25^2}{2}\right) + \frac{.17}{2}\left(\frac{8.92}{2}\right)^2(25.33)$

$M_{\text{@}} = 434 - 217 + 6.4 - 154.8 = 68.6$ 'k 61.7





STORAGE



$R = .374(11.25 + 25.92) + .17\left(\frac{25.92}{2}\right) + .544(19.33)$ (37.17)

$R = 13.9 + 2.2 + 10.5 = 26.6$ k

$M = 26.6(56.5) - .374\left(\frac{56.5^2}{2}\right) - 2.2(27.97) - .17\left(\frac{19.33^2}{2}\right)$

$M = 1503 - 597 - 61.5 - 31.8 = 813.7$ (812.7) 'k

Check Stresses

Water Load + Dead Load (Ctr)

$$f_b = \frac{587'(12)}{4990'} + \frac{26.9(12)}{392'} = 14.1 + .82 = 14.92 < 15.4$$

Water + Dead Load (Support) @ Vert

$$M = 207.86\,(37.67) - 3.68\left(\frac{37.67^2}{2}\right) = 5000'k$$

$$f_b = \frac{5{,}000(12)}{4990'} + \frac{69.8(12)}{392'} = 12.0 + 2.1 = 14.1 < 15.4$$

Water + DL (11.25')

$$M_{H_2O} = 207.86\,(11.25) - \frac{3.68\,(11.25^2)}{2} = 2107'k$$

$$M_{DL} = 5.72(11.25) - .374\left(\frac{11.25^2}{2}\right) = 40.7'k$$

$$f_b = \frac{2107(12)}{3460} + \frac{40.7(12)}{288'} = 7.3 + 1.7 = 9.0 < 16.45$$

Bending in Lifting

$$f_b = \frac{155 \times 12'}{288'} = 6.4\ ksi\ OK$$

Job No. H671 Page No. 4A-80

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Approved by [illegible] Date 2-7-73

Subject STRUCTURAL NEEDLE GIRDER

Sheet No. 10 of

Web Shear

$h/t = \frac{60}{3/8} = 160$ $\quad a/h = 1.0$, 9.2

$\therefore F_v = 10.3$ ksi

$$f_v = \frac{207.864}{13/8 \times 60} = 9230 \text{ psi} < 10300$$

Brg. Stiffeners

$$\frac{207.864}{2 \times 1/2 \times 20} = 10{,}400 < 18{,}000$$

use 4 R's 1/2 x 10

use R's 5/8 x 10

$w/t = 16$

Intermediate Stiffeners

$A_s = .077 \; (3/8)(60) = 1.80$ ~~1.62~~

use R's 3/8 x 10

$I_{min} = \left(\frac{h}{50}\right)^4 = 2.07 \text{ in}^4$ for $h = 60$

$I = \frac{1}{12} \times .375 \times 20^3 = 250$ OK

Job No. 4671 Page No. AA-81

Computed by WJF Date 1/29/73

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Reviewed by Date 1/ /73

Approved by Date 2-7-73

Subject STRUCTURAL NEEDLE GIRDER

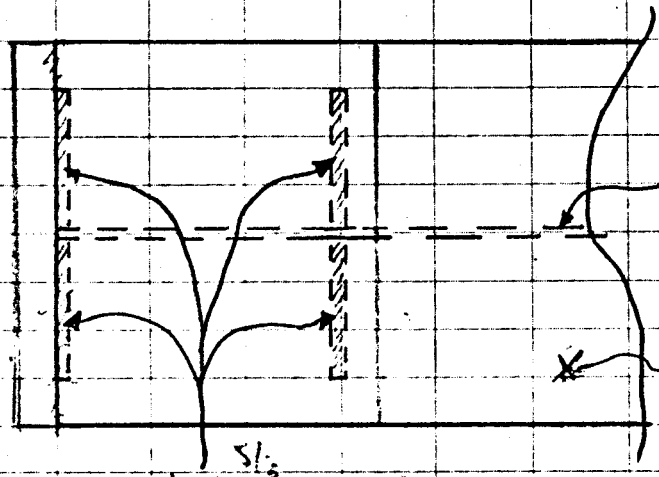
Sheet No. 11 of

Bearing PL

try PL 24" X 13" $A_p = 312$ □"

$$f_b = \frac{207,864}{312} = 667 \text{ psi} < 750$$

1.1 as applied



$$n = \frac{24}{2} - 10 = 2$$

$$t = \sqrt{\frac{3 \times 667 \times 2^2}{18000}} = .667" \quad \text{use } 3/4"$$

Use bearing PL 3/4" X 13" X 24" ok

1½" flange is adequate also

Job No. 4671 Page No. 4A-8

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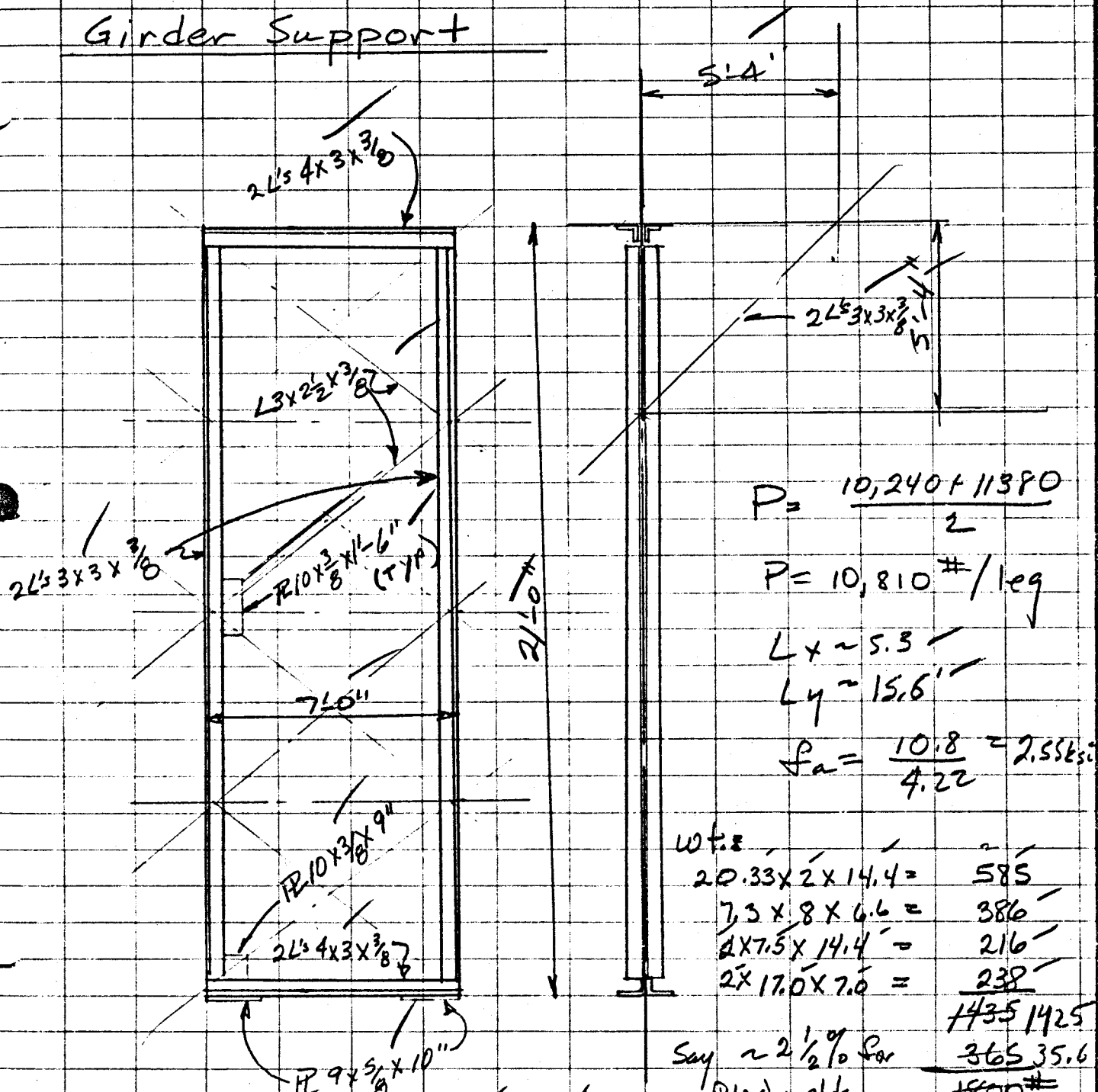
Approved by [illegible] Date 2-7-73

Subject STRUCTURAL
Needle Girder Support

Sheet No. 1 of 1

Girder Support



$P = \frac{10,240 + 11380}{2}$

$P = 10,810\ \#/\text{leg}$

$L_x \sim 5.3'$

$L_y \sim 15.6'$

$f_a = \frac{10.8}{4.22} = 2.55 \text{ ksi}$

Wt:

20.33 x 2 x 14.4 =	585
7.3 x 8 x 6.6 =	386
2 x 7.5 x 14.4 =	216
2 x 17.0 x 7.6 =	238
	1435 1425
Say ~2½% for PL's & welds	365 35.6
	1800#
	1461

$\frac{Kl}{r_y} = \frac{15.6 \times 12}{1.41} = 133$

$\frac{Kl}{r_x} = \frac{5.3 \times 12}{.913} = 70$

$F_a = \frac{124,000}{133^2} = 7.0 \text{ ksi}$