



PLANT SYSTEMS GROUP - SALT LAKE CITY, UTAH

CALCULATION COVER SHEET

JOB NUMBER	CLIENT	PROJECT	CALC. NUMBER
11021	CC&V	High Grade Ore	C-007a

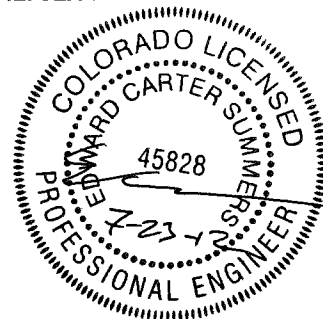
TITLE/SUBJECT:

Flotation Support Concrete

STATEMENT OF PROBLEM:

Design Concrete Pedestals, Footings, and Retaining Wall for Flotation Supports

P.E. SEAL



SOURCES OF DATA, FORMULA & REFERENCES:

GA from Vendors
Site Specific Design Criteria (Excel Spread Sheet)
ASCE /SEI 7-10 Minimum Design Loads for Buildings and Other Structure
ACI 318-08
ENERCALC Version 6
AutoDesk Robot Structural Analysis Professional 2012

CONCLUSIONS & RECOMMENDATIONS:

See details in report

A	Feb-12	Ready for Check	CCK	WC/ECS		
0	Jul-12	Issued for Permit	CCK	WC/ECS		
REV	DATE	DESCRIPTION/STATUS	CALC BY	CHKD BY	DWG./SPECS REVISED	QA REVIEW



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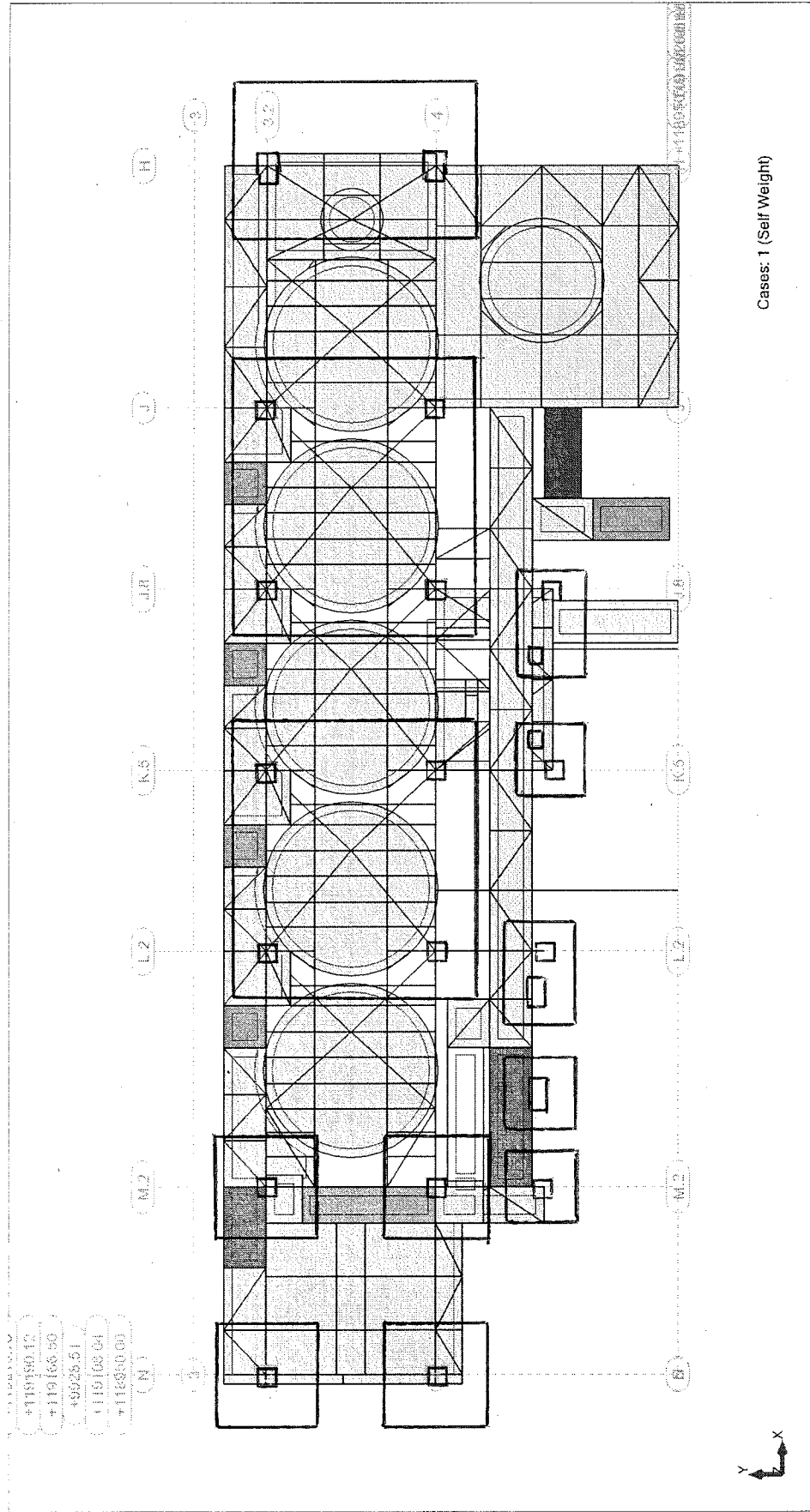
A	Feb-12	Ready for Check	CCK	WC/ECS		
0	Jul-12	Issued for Permit	CCK	WC/ECS		
REV	DATE	DESCRIPTION/STATUS	CALC BY	CHKD BY	DWG./SPECS REVISED	QA REVIEW



7158 S. FLSmidth Drive
Midvale, UT 84047-5559

Engineer: Clint Karren
Calc No.: S-008 Job.: 11021
Project: Flotation Supports Rev. 3
Client: CC&V

View - Cases: 1 (Self Weight)

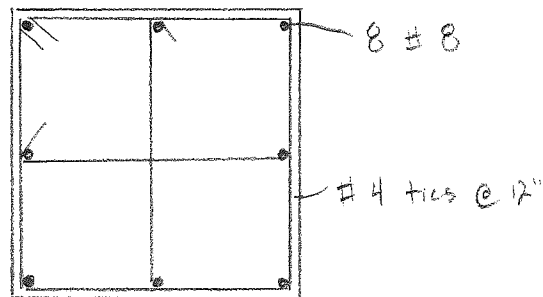


	PROJECT	CC & V High Grade Ore	PROJ NO.	11021
	SUBJECT		CALC NO.	
			BY	DATE 2-15-11
			CHK	DATE
			SHEET	OF REV

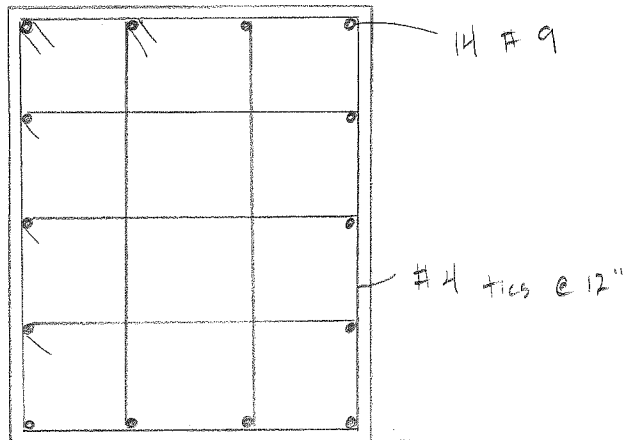
Member Size	Base Plate	Anchor Bolt
W8	14" x 14" x 3/4" (Standard)	7/8" (Standard)
W10	16" x 16" x 1" (Standard)	7/8" (Standard)
W12	18" x 18" x 1 1/2"	1"

Concrete Pedestals:

Typical: 24" x 24"



Along Grid H: 36" x 24"





PROJECT Cripple Creek & Victor	Proj No.	11021
	Calc No.	
SUBJECT Column Load Summary	By	CCK Feb-1-2012
LRFD Load Combinations	Check	
-From Robot: Flatiron Supports & Sampler Platforms, rtd	Sheet	of

Column Location: M.2 , 4.4

W8x24

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	-0.08 k	0.00 k	2.02 k
Live	-0.10 k	0.00 k	2.58 k
Seismic X	-0.01 k	0.00 k	0.09 k
Seismic -X	0.01 k	0.00 k	-0.10 k
Seismic Y	0.00 k	-0.01 k	0.09 k
Seismic -Y	0.00 k	0.01 k	-0.09 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

	P_u	V_{u_x}	V_{u_y}
1 1.4D	2.83 k	-0.11 k	0.00 k
2 1.2D+1.6L	6.55 k	-0.26 k	0.00 k
3 1.2D+L	5.00 k	-0.20 k	0.00 k
4 1.2D+L	5.00 k	-0.20 k	0.00 k
5 (1.2+0.2 S_{DS})D+1.0E+L	5.18 k	-0.19 k	0.01 k
(1.2+0.2 S_{DS})D-1.0E+L	4.99 k	-0.21 k	-0.01 k
6 0.9D+1.6W	1.82 k	-0.07 k	0.00 k
0.9D-1.6W	1.82 k	-0.07 k	0.00 k
7 (0.9-0.2 S_{DS})D+1.0E	1.82 k	-0.06 k	0.01 k
(0.9-0.2 S_{DS})D-1.0E	1.63 k	-0.08 k	-0.01 k

DESIGN VALUES

Compression	$P_u =$	6.55 k
Tension	$T_u =$	1.63 k
Shear	$V_{u_x} =$	0.26 k
	$V_{u_y} =$	0.01 k

FLSMIDTH	PROJECT CC&V High Grade Ore	Proj No.	11021
		Calc No.	
	SUBJECT Base Plate Design	By	CCK Mar-1-2012
		Check	
		Sheet	of

BASE PLATE DESIGN

Column Location: M.2, 4.4

Reference: AISC Steel Design Guide 1, 2nd Ed.

Column Member:	W8X24		
d (in):	7.93	P_u (k):	6.55
b_f (in):	6.5		
t_f (in):	0.4	Concrete Length (in):	24
f'_c (ksi):	4	Concrete Width (in):	24
f_y (ksi):	36		

Required Plate Area

ϕ_c :	0.65
$A_{1(req)}$ (in ²):	1.48

Trial Base Plate Size

Δ :	1.17	
	Trial Size	Use
Length -N (in):	3	14
Width -B (in):	1	14

Areas

A_1 (in ²):	196
A_2 (in ²):	576
ϕ_c :	0.65
$\phi_c P_p$ (k):	742.56

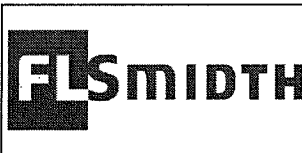
Bearing Length

X:	0.009
λ :	0.094
m:	3.2
n:	4.4
$\lambda n'$:	0.2
l:	4.4

Minimum Plate Thickness

ϕ_b :	0.9
t_{min} (in):	0.20
Design Thickness	1/4 - min 3/4"

Use 14 in wide x 0.75 in thick x 14 in long 36 ksi Base Plate

	PROJECT CC&V High Grade Ore	Proj No.	11021
		Calc No.	
	SUBJECT Anchor Bolt Design	By	CCK Feb-1-2012
		Check	
		Sheet	of

ANCHOR BOLT DESIGN

Reference: ACI 318-08 Appendix D

Column Location: M.2, 4.4 AISC Steel Design Guide Series No 7 (2nd Edition)

Pier Width, w =	24	in	perpendicular to web
Pier Depth, d =	24	in	parallel to web
g =	2.83	in	lateral offset distance between anchor bolt and reinforcing
cover =	2	in	vertical distance from top of pier to vertical reinforcing
N _u =	0.0	kips	Net Tension ☒ Seismic Load
V _u =	0.3	kips	Net Shear ☒ Seismic Load
Anchor Material =	ASTM F1554-36		Friction Factor
n =	4		Number of Anchor Bolts
d _b =	7/8	in	Diameter of Anchor Bolt
F _{y,a} =	36	ksi	Yield Strength of Anchor Bolt
F _{u,a} =	58	ksi	Ultimate Strength of Anchor Bolt
F _{y,bar} =	60	ksi	Yield Strength of Reinforcing
f' _c =	4	ksi	Concrete Compressive Strength

1. Steel Strength of Anchor in Tension (ACI 318-08 Appendix D, D.5.1)

A _{se} :	0.46	in ²	φ:	0.75	
f _{uta} :	58	ksi	N _{sa} :	80.39	kips
n:	4		φN _{sa} :	60 kips	
Interaction:					0.00

2. Pull-Out Strenght of Anchor in Tension (ACI 318-08 Appendix D, D.5.3)

A _{brg} :	1.00	in ²	ψ _{c,p} :	1.00	
f' _c :	4	ksi	φ:	0.75	
N _p :	32	kips	N _{pn} :	24.00	kips
n:	4		φN _{pn} :	72 kips	
Interaction:					0.00

3. Steel Strenght of Anchor in Shear (ACI 318-08 Appendix D, D.6.1)

A _{se} :	0.46	in ²	φ:	0.65	
f _{uta} :	58	ksi	V _{sa} :	38.59	kips
n:	4		φV _{sa} :	25 kips	
Interaction:					0.01

4. Combined Shear and Tension Interaction (ACI 318-08 Appendix D, D.7)

N _{ua} :	0.0	kips	V _{ua} :	0.3	kips
φN _n :	60 kips	kips	φV _n :	25 kips	kips
Interaction:					0.01

	PROJECT	CC&V High Grade Ore	Proj No.	11021
			Calc No.	
	SUBJECT	Anchor Bolt Design	By	CCK Feb-1-2012
			Check	
			Sheet	of

ANCHOR BOLT DESIGN

5. Reinforcement Strength and Anchor Bolt Embedment (ACI 318-08 Appendix D, D.5.2.9 & AISC D.G.7)

Bar Size:	8	in ²		
Number of Bars:	4		l_d (in)	29.65 in
A_s :	0.79		l_e (in)	0.00 in
ϕ :	0.75		h_{ef} (in)	3.89 in
F_y :	60	ksi	Embedment:	26 in
N_{sa} :	142.20	kips		
ϕN_{sa} :	107 kips			
			Interaction:	0.00

6. Tie Rebar Strength (ACI 318-08 Appendix D, D.6.2.9 & AISC D.G.7)

Bar Size =	4			
Spacing :	12	in		
A_s :	0.2	in ²		
b_w :	24.0	in		
d :	21.6	in		
ϕ :	0.75			
ϕV_n :	61 kips			
			Interaction:	0.00

SUMMARY: USE 4- 0.875 in. Anchor Bolt, Embedded 26 in.
With # 4 Ties @ 12 in. o.c.

	PROJECT Cripple Creek & Victor	Proj No.	11021
		Calc No.	
	SUBJECT Column Load Summary	By	CCK Feb-1-2012
	LRFD Load Combinations	Check	
		Sheet	of

Column Location: N , 3.2

W10x33

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	0.00 k	-0.72 k	4.91 k
Live	0.02 k	-1.52 k	8.99 k
Seismic X	-0.04 k	0.01 k	-0.15 k
Seismic -X	0.04 k	-0.01 k	0.15 k
Seismic Y	0.02 k	-0.52 k	1.42 k
Seismic -Y	-0.02 k	0.52 k	-1.42 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

		P_u	V_{u_x}	V_{u_y}
1	1.4D	6.87 k	0.00 k	-1.01 k
2	1.2D+1.6L	20.28 k	0.03 k	-3.30 k
3	1.2D+L	14.88 k	0.02 k	-2.38 k
4	1.2D+L	14.88 k	0.02 k	-2.38 k
5	$(1.2+0.2S_{DS})D+1.0E+L$	16.51 k	0.06 k	-1.89 k
	$(1.2+0.2S_{DS})D-1.0E+L$	13.67 k	-0.02 k	-2.93 k
6	0.9D+1.6W	4.42 k	0.00 k	-0.65 k
	0.9D-1.6W	4.42 k	0.00 k	-0.65 k
7	$(0.9-0.2S_{DS})D+1.0E$	5.63 k	0.04 k	-0.10 k
	$(0.9-0.2S_{DS})D-1.0E$	2.79 k	-0.04 k	-1.14 k

DESIGN VALUES

Compression	$P_u =$	20.28 k
Tension	$T_u =$	2.79 k
Shear	$V_{u_x} =$	0.06 k
	$V_{u_y} =$	3.30 k

FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Column Load Summary	By CCK Feb-1-2012
	<i>LRFD Load Combinations</i>	Check
		Sheet of

Column Location: N , 4

W10x33

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	0.01 k	-0.15 k	2.88 k
Live	0.04 k	-0.41 k	4.70 k
Seismic X	-0.04 k	0.02 k	-0.05 k
Seismic -X	0.04 k	-0.02 k	0.05 k
Seismic Y	0.00 k	-0.64 k	-1.36 k
Seismic -Y	0.00 k	0.64 k	1.36 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

		P_u	V_{u_x}	V_{u_y}
1	1.4D	4.03 k	0.01 k	-0.21 k
2	1.2D+1.6L	10.98 k	0.08 k	-0.84 k
3	1.2D+L	8.16 k	0.05 k	-0.59 k
4	1.2D+L	8.16 k	0.05 k	-0.59 k
5	$(1.2+0.2S_{DS})D+1.0E+L$	9.64 k	0.09 k	0.04 k
	$(1.2+0.2S_{DS})D-1.0E+L$	6.92 k	0.01 k	-1.24 k
6	0.9D+1.6W	2.59 k	0.01 k	-0.14 k
	0.9D-1.6W	2.59 k	0.01 k	-0.14 k
7	$(0.9-0.2S_{DS})D+1.0E$	3.83 k	0.05 k	0.51 k
	$(0.9-0.2S_{DS})D-1.0E$	1.11 k	-0.03 k	-0.77 k

DESIGN VALUES

Compression $P_u = 10.98$ k
Tension $T_u = 1.11$ k
Shear $V_{u_x} = 0.09$ k
 $V_{u_y} = 1.24$ k

FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Column Load Summary	By CCK Feb-1-2012
	<i>LRFD Load Combinations</i>	Check
		Sheet of

Column Location: M.2 , 3.2

W10x33

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	-0.37 k	-1.50 k	19.47 k
Live	-0.76 k	-8.20 k	80.08 k
Seismic X	-0.23 k	0.40 k	-1.63 k
Seismic -X	0.24 k	-0.41 k	1.64 k
Seismic Y	0.16 k	-2.83 k	11.24 k
Seismic -Y	-0.16 k	2.83 k	-11.24 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

	P_u	V_{u_x}	V_{u_y}
1 1.4D	27.26 k	-0.52 k	-2.10 k
2 1.2D+1.6L	151.49 k	-1.66 k	-14.92 k
3 1.2D+L	103.44 k	-1.20 k	-10.00 k
4 1.2D+L	103.44 k	-1.20 k	-10.00 k
5	$(1.2+0.2S_{DS})D+1.0E+L$	115.51 k	-0.98 k
	$(1.2+0.2S_{DS})D-1.0E+L$	93.03 k	-1.45 k
6	0.9D+1.6W	17.52 k	-0.33 k
	0.9D-1.6W	17.52 k	-0.33 k
7	$(0.9-0.2S_{DS})D+1.0E$	27.93 k	-0.08 k
	$(0.9-0.2S_{DS})D-1.0E$	5.45 k	-0.55 k

DESIGN VALUES

Compression	$P_u = 151.49$ k
Tension	$T_u = 5.45$ k
Shear	$V_{u_x} = 1.66$ k
	$V_{u_y} = 14.92$ k



PROJECT Cripple Creek & Victor	Proj No.	11021
	Calc No.	
SUBJECT Column Load Summary	By	CCK Feb-1-2012
LRFD Load Combinations	Check	
	Sheet	of

Column Location: M.2 , 4

W10x33

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	0.09 k	2.85 k	21.19 k
Live	0.21 k	10.14 k	82.05 k
Seismic X	-0.14 k	-0.05 k	-1.25 k
Seismic -X	0.14 k	0.04 k	1.20 k
Seismic Y	-0.02 k	-3.03 k	-10.95 k
Seismic -Y	0.02 k	3.03 k	10.95 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

		P_u	V_{u_x}	V_{u_y}
1	1.4D	29.67 k	0.13 k	3.99 k
2	1.2D+1.6L	156.71 k	0.44 k	19.64 k
3	1.2D+L	107.48 k	0.32 k	13.56 k
4	1.2D+L	107.48 k	0.32 k	13.56 k
5	$(1.2+0.2S_{DS})D+1.0E+L$	119.33 k	0.46 k	16.71 k
	$(1.2+0.2S_{DS})D-1.0E+L$	97.43 k	0.18 k	10.65 k
6	0.9D+1.6W	19.07 k	0.08 k	2.57 k
	0.9D-1.6W	19.07 k	0.08 k	2.57 k
7	$(0.9-0.2S_{DS})D+1.0E$	29.12 k	0.22 k	5.47 k
	$(0.9-0.2S_{DS})D-1.0E$	7.22 k	-0.06 k	-0.59 k

DESIGN VALUES

Compression	$P_u = 156.71 \text{ k}$
Tension	$T_u = 7.22 \text{ k}$
Shear	$V_{u_x} = 0.46 \text{ k}$
	$V_{u_y} = 19.64 \text{ k}$

FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Column Load Summary	By CCK Feb-1-2012
	LRFD Load Combinations	Check
		Sheet of

Column Location: L.2 , 4.4

W10x33

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	0.00 k	0.00 k	2.24 k
Live	0.00 k	0.00 k	3.32 k
Seismic X	-0.02 k	0.00 k	-0.11 k
Seismic -X	0.02 k	0.00 k	0.12 k
Seismic Y	0.00 k	-0.02 k	-0.08 k
Seismic -Y	0.00 k	0.02 k	0.08 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

	P_u	V_{u_x}	V_{u_y}
1 1.4D	3.14 k	0.00 k	0.00 k
2 1.2D+1.6L	8.00 k	0.00 k	0.00 k
3 1.2D+L	6.01 k	0.00 k	0.00 k
4 1.2D+L	6.01 k	0.00 k	0.00 k
5 (1.2+0.2 S_{DS})D+1.0E+L	6.22 k	0.02 k	0.02 k
(1.2+0.2 S_{DS})D-1.0E+L	5.99 k	-0.02 k	-0.02 k
6 0.9D+1.6W	2.02 k	0.00 k	0.00 k
0.9D-1.6W	2.02 k	0.00 k	0.00 k
7 (0.9-0.2 S_{DS})D+1.0E	2.04 k	0.02 k	0.02 k
(0.9-0.2 S_{DS})D-1.0E	1.81 k	-0.02 k	-0.02 k

DESIGN VALUES

Compression $P_u = 8.00$ k
Tension $T_u = 1.81$ k
Shear $V_{u_x} = 0.02$ k
 $V_{u_y} = 0.02$ k

	PROJECT CC&V High Grade Ore	Proj No.	11021
		Calc No.	
	SUBJECT Base Plate Design	By	CCK Mar-1-2012
		Check	
		Sheet	of

BASE PLATE DESIGN

Column Location: M.2, 4

Reference: AISC Steel Design Guide 1, 2nd Ed.

Column Member:	W10X33		
d (in):	9.73	P_u (k):	156.71
b_f (in):	7.96		
t_f (in):	0.435	Concrete Length (in):	24
f'_c (ksi):	4	Concrete Width (in):	24
f_y (ksi):	36		

Required Plate Area

ϕ_c :	0.65
$A_{1(req)}$ (in ²):	35.45

Trial Base Plate Size

Δ :	1.44	
	Trial Size	Use
Length -N (in):	8	16
Width -B (in):	5	16

Areas

A_1 (in ²):	256
A_2 (in ²):	576
ϕ_c :	0.65
$\phi_c P_p$ (k):	848.64

Bearing Length

X:	0.183
λ :	0.449
m:	3.4
n:	4.8
$\lambda n'$:	1.0
l:	4.8

Minimum Plate Thickness

ϕ_b :	0.9
t_{min} (in):	0.94
Design Thickness	1

Use 16 in wide x 1 in thick x 16 in long 36 ksi Base Plate

	PROJECT CC&V High Grade Ore	Proj No.	11021
		Calc No.	
	SUBJECT Anchor Bolt Design	By	CCK Feb-1-2012
		Check	
		Sheet	of

ANCHOR BOLT DESIGN

Reference: ACI 318-08 Appendix D

Column Location: M.2, 4 AISC Steel Design Guide Series No 7 (2nd Edition)

Pier Width, w =	24	in	perpendicular to web
Pier Depth, d =	24	in	parallel to web
g =	2.83	in	lateral offset distance between anchor bolt and reinforcing
cover =	2	in	vertical distance from top of pier to vertical reinforcing
N _u =	0.0	kips	Net Tension ☒ Seismic Load
V _u =	19.6	kips	Net Shear ☒ Seismic Load
Anchor Material =	ASTM F1554-36		Friction Factor
n =	4		Number of Anchor Bolts
d _b =	7/8	in	Diameter of Anchor Bolt
F _{y,a} =	36	ksi	Yield Strength of Anchor Bolt
F _{u,a} =	58	ksi	Ultimate Strength of Anchor Bolt
F _{y,bar} =	60	ksi	Yield Strength of Reinforcing
f' _c =	4	ksi	Concrete Compressive Strength

1. Steel Strength of Anchor in Tension (ACI 318-08 Appendix D, D.5.1)

A _{se} :	0.46	in ²	φ:	0.75	
f _{uta} :	58	ksi	N _{sa} :	80.39	kips
n:	4		φN _{sa} :	60 kips	
Interaction:					0.00

2. Pull-Out Strength of Anchor in Tension (ACI 318-08 Appendix D, D.5.3)

A _{brg} :	1.00	in ²	ψ _{c,p} :	1.00	
f' _c :	4	ksi	φ:	0.75	
N _p :	32	kips	N _{pn} :	24.00	kips
n:	4		φnN _{pn} :	72 kips	
Interaction:					0.00

3. Steel Strength of Anchor in Shear (ACI 318-08 Appendix D, D.6.1)

A _{se} :	0.46	in ²	φ:	0.65	
f _{uta} :	58	ksi	V _{sa} :	38.59	kips
n:	4		φV _{sa} :	25 kips	
Interaction:					0.78

4. Combined Shear and Tension Interaction (ACI 318-08 Appendix D, D.7)

N _{ua} :	0.0	kips	V _{ua} :	19.6	kips
φN _n :	60 kips	kips	φV _n :	25 kips	kips
Interaction:					0.78

FLSMIDTH	PROJECT CC&V High Grade Ore	Proj No.	11021
		Calc No.	
	SUBJECT Anchor Bolt Design	By	CCK Feb-1-2012
		Check	
		Sheet	of

ANCHOR BOLT DESIGN

5. Reinforcement Strength and Anchor Bolt Embedment (ACI 318-08 Appendix D, D.5.2.9 & AISC D.G.7)

Bar Size:	8	in ²			
Number of Bars:	4		l_d (in)	29.65	in
A_s :	0.79		l_e (in)	0.00	in
ϕ :	0.75		h_{ef} (in)	3.89	in
F_y :	60	ksi	Embedment:	26 in	
N_{sa} :	142.20	kips			
ϕN_{sa} :	107 kips				
					Interaction: 0.00

6. Tie Rebar Strength (ACI 318-08 Appendix D, D.6.2.9 & AISC D.G.7)

Bar Size =	4				
Spacing :	12	in			
A_s :	0.2	in ²			
b_w :	24.0	in			
d :	21.6	in			
ϕ :	0.75				
ϕV_n :	61 kips				
					Interaction: 0.32

SUMMARY: USE 4- 0.875 in. Anchor Bolt, Embedded 26 in.
With # 4 Ties @ 12 in. o.c.

FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Column Load Summary	By CCK Feb-1-2012
	<i>LRFD Load Combinations</i>	Check
		Sheet of

Column Location: L.2 , 3.2

W12x45

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	1.33 k	-0.15 k	29.33 k
Live	9.18 k	-0.10 k	161.35 k
Seismic X	-11.70 k	0.01 k	-34.09 k
Seismic -X	11.93 k	-0.01 k	34.76 k
Seismic Y	-0.28 k	-0.47 k	2.41 k
Seismic -Y	0.29 k	0.47 k	-2.40 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

	P_u	V_{u_x}	V_{u_y}
1 1.4D	41.06 k	1.86 k	-0.21 k
2 1.2D+1.6L	293.36 k	16.28 k	-0.34 k
3 1.2D+L	196.55 k	10.78 k	-0.28 k
4 1.2D+L	196.55 k	10.78 k	-0.28 k
5 (1.2+0.2 S_{DS})D+1.0E+L	232.56 k	22.76 k	0.18 k
(1.2+0.2 S_{DS})D-1.0E+L	163.71 k	-0.87 k	-0.76 k
6 0.9D+1.6W	26.40 k	1.20 k	-0.14 k
0.9D-1.6W	26.40 k	1.20 k	-0.14 k
7 (0.9-0.2 S_{DS})D+1.0E	59.91 k	13.07 k	0.34 k
(0.9-0.2 S_{DS})D-1.0E	-8.94 k	-10.56 k	-0.60 k

DESIGN VALUES

Compression	$P_u = 293.36$ k
Tension	$T_u = -8.94$ k
Shear	$V_{u_x} = 22.76$ k
	$V_{u_y} = 0.76$ k



PROJECT Cripple Creek & Victor	Proj No. 11021
	Calc No.
SUBJECT Column Load Summary	By CCK Feb-1-2012
LRFD Load Combinations	Check
	Sheet of

Column Location: L.2 , 4

W12x40

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	1.37 k	0.18 k	28.28 k
Live	8.57 k	0.14 k	155.09 k
Seismic X	-10.25 k	-0.08 k	-28.52 k
Seismic -X	10.44 k	0.08 k	29.03 k
Seismic Y	-0.06 k	-0.40 k	-4.24 k
Seismic -Y	0.06 k	0.40 k	4.23 k

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LRFD LOAD COMBINATIONS

Column/Footing Loads

	P_u	V_{u_x}	V_{u_y}
1 1.4D	39.59 k	1.92 k	0.25 k
2 1.2D+1.6L	282.08 k	15.36 k	0.44 k
3 1.2D+L	189.03 k	10.21 k	0.36 k
4 1.2D+L	189.03 k	10.21 k	0.36 k
5 (1.2+0.2 S_{DS})D+1.0E+L	219.26 k	20.71 k	0.76 k
(1.2+0.2 S_{DS})D-1.0E+L	161.71 k	0.02 k	-0.04 k
6 0.9D+1.6W	25.45 k	1.23 k	0.16 k
0.9D-1.6W	25.45 k	1.23 k	0.16 k
7 (0.9-0.2 S_{DS})D+1.0E	53.28 k	11.61 k	0.55 k
(0.9-0.2 S_{DS})D-1.0E	-4.27 k	-9.08 k	-0.25 k

DESIGN VALUES

Compression $P_u = 282.08$ k
Tension $T_u = -4.27$ k
Shear $V_{u_x} = 20.71$ k
 $V_{u_y} = 0.76$ k

	PROJECT Cripple Creek & Victor	Proj No.	11021
		Calc No.	
	SUBJECT Column Load Summary	By	CCK Feb-1-2012
	LRFD Load Combinations	Check	
		Sheet	of

Column Location: K.5 , 3.2

W12x40

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	-2.44 k	-0.13 k	27.85 k
Live	-10.40 k	-0.07 k	139.82 k
Seismic X	-13.17 k	0.05 k	33.29 k
Seismic -X	13.43 k	-0.05 k	-33.92 k
Seismic Y	-1.26 k	-0.13 k	8.68 k
Seismic -Y	1.27 k	0.13 k	-8.69 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

		P_u	V_{u_x}	V_{u_y}
1	1.4D	38.99 k	-3.42 k	-0.18 k
2	1.2D+1.6L	257.13 k	-19.57 k	-0.27 k
3	1.2D+L	173.24 k	-13.33 k	-0.23 k
4	1.2D+L	173.24 k	-13.33 k	-0.23 k
5	$(1.2+0.2S_{DS})D+1.0E+L$	207.72 k	0.00 k	-0.10 k
	$(1.2+0.2S_{DS})D-1.0E+L$	140.51 k	-26.60 k	-0.36 k
6	0.9D+1.6W	25.07 k	-2.20 k	-0.12 k
	0.9D-1.6W	25.07 k	-2.20 k	-0.12 k
7	$(0.9-0.2S_{DS})D+1.0E$	57.17 k	11.34 k	0.02 k
	$(0.9-0.2S_{DS})D-1.0E$	-10.04 k	-15.26 k	-0.24 k

DESIGN VALUES

Compression $P_u = 257.13$ k
 Tension $T_u = -10.04$ k
 Shear $V_{u_x} = 26.60$ k
 $V_{u_y} = 0.36$ k



PROJECT Cripple Creek & Victor	Proj No.	11021
	Calc No.	
SUBJECT Column Load Summary	By	WChan Jun-6-2012
LRFD Load Combinations	Check	Updated 6/5/2012
From: Flotation Supports & Sampler Platform.rtd	Sheet	of

Column Location: **K.5, 4**

W12x40

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	-2.12 k	0.05 k	28.85 k
Live	-10.66 k	0.03 k	139.51 k
Seismic X	-11.33 k	-0.42 k	28.02 k
Seismic -X	11.55 k	0.42 k	-28.61 k
Seismic Y	0.86 k	0.44 k	-7.95 k
Seismic -Y	-0.87 k	-0.44 k	7.96 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

	P_u	V_{u_x}	V_{u_y}
1 1.4D	40.39 k	-2.97 k	0.07 k
2 1.2D+1.6L	257.84 k	-19.60 k	0.11 k
3 1.2D+L	174.13 k	-13.20 k	0.09 k
4 1.2D+L	174.13 k	-13.20 k	0.09 k
5 (1.2+0.2 S_{DS})D+1.0E+L	203.38 k	-1.74 k	0.53 k
(1.2+0.2 S_{DS})D-1.0E+L	146.75 k	-24.62 k	-0.35 k
6 0.9D+1.6W	25.97 k	-1.91 k	0.05 k
0.9D-1.6W	25.97 k	-1.91 k	0.05 k
7 (0.9-0.2 S_{DS})D+1.0E	52.76 k	9.73 k	0.48 k
(0.9-0.2 S_{DS})D-1.0E	-3.87 k	-13.15 k	-0.40 k

DESIGN VALUES

Compression	$P_u = 257.84$ k
Tension	$T_u = -3.87$ k
Shear	$V_{u_x} = 24.62$ k
	$V_{u_y} = 0.53$ k

FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Column Load Summary	By CCK Feb-1-2012
	LRFD Load Combinations	Check
		Sheet of

Column Location: J.8 , 3.2

W12x40

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	2.32 k	-0.13 k	28.61 k
Live	9.49 k	-0.07 k	140.31 k
Seismic X	-12.68 k	0.03 k	-38.48 k
Seismic -X	12.89 k	-0.03 k	39.13 k
Seismic Y	-2.62 k	-0.28 k	-3.21 k
Seismic -Y	2.61 k	0.28 k	3.20 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

		P_u	V_{u_x}	V_{u_y}
1	1.4D	40.05 k	3.25 k	-0.18 k
2	1.2D+1.6L	258.83 k	17.97 k	-0.27 k
3	1.2D+L	174.64 k	12.27 k	-0.23 k
4	1.2D+L	174.64 k	12.27 k	-0.23 k
5	$(1.2+0.2S_{DS})D+1.0E+L$	214.99 k	25.26 k	0.05 k
	$(1.2+0.2S_{DS})D-1.0E+L$	137.38 k	-0.31 k	-0.51 k
6	0.9D+1.6W	25.75 k	2.09 k	-0.12 k
	0.9D-1.6W	25.75 k	2.09 k	-0.12 k
7	$(0.9-0.2S_{DS})D+1.0E$	63.66 k	14.88 k	0.17 k
	$(0.9-0.2S_{DS})D-1.0E$	-13.95 k	-10.69 k	-0.39 k

DESIGN VALUES

Compression $P_u = 258.83 \text{ k}$
Tension $T_u = -13.95 \text{ k}$
Shear $V_{u_x} = 25.26 \text{ k}$
 $V_{u_y} = 0.51 \text{ k}$

FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No.	11021
		Calc No.	
	SUBJECT Column Load Summary	By	Wchan Jun-6-2012
	LRFD Load Combinations	Check	<i>Updated 6/5/2012</i>
	From: Flotation Supports & Sampler Platform.rtd	Sheet	<i>of</i>

Column Location: **J.8, 4**

W12x40

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	2.66 k	-0.07 k	30.71 k
Live	13.96 k	-0.03 k	146.05 k
Seismic X	-11.82 k	0.22 k	-35.96 k
Seismic -X	12.00 k	-0.22 k	36.61 k
Seismic Y	0.26 k	1.08 k	-1.89 k
Seismic -Y	-0.26 k	-1.08 k	1.90 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

		P_u	V_{u_x}	V_{u_y}
1	1.4D	42.99 k	3.72 k	-0.10 k
2	1.2D+1.6L	270.53 k	25.53 k	-0.13 k
3	1.2D+L	182.90 k	17.15 k	-0.11 k
4	1.2D+L	182.90 k	17.15 k	-0.11 k
5	$(1.2+0.2S_{DS})D+1.0E+L$	220.82 k	29.27 k	0.96 k
	$(1.2+0.2S_{DS})D-1.0E+L$	148.25 k	5.45 k	-1.20 k
6	0.9D+1.6W	27.64 k	2.39 k	-0.06 k
	0.9D-1.6W	27.64 k	2.39 k	-0.06 k
7	$(0.9-0.2S_{DS})D+1.0E$	62.94 k	14.28 k	1.02 k
	$(0.9-0.2S_{DS})D-1.0E$	-9.63 k	-9.54 k	-1.14 k

DESIGN VALUES

Compression	$P_u =$	270.53 k
Tension	$T_u =$	-9.63 k
Shear	$V_{u_x} =$	29.27 k
	$V_{u_y} =$	1.20 k



PROJECT Cripple Creek & Victor	Proj No. 11021
	Calc No.
SUBJECT Column Load Summary	By CCK Feb-1-2012
LRFD Load Combinations	Check
	Sheet of

Column Location: J , 3.2

W12x53

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	-1.26 k	0.07 k	32.10 k
Live	-9.38 k	0.07 k	176.69 k
Seismic X	-12.87 k	-0.03 k	39.39 k
Seismic -X	13.08 k	0.03 k	-40.05 k
Seismic Y	-3.64 k	0.34 k	17.83 k
Seismic -Y	3.64 k	-0.34 k	-17.81 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

	P_u	V_{u_x}	V_{u_y}
1 1.4D	44.94 k	-1.76 k	0.10 k
2 1.2D+1.6L	321.22 k	-16.52 k	0.20 k
3 1.2D+L	215.21 k	-10.89 k	0.15 k
4 1.2D+L	215.21 k	-10.89 k	0.15 k
5 (1.2+0.2 S_{DS})D+1.0E+L	255.97 k	2.13 k	0.50 k
(1.2+0.2 S_{DS})D-1.0E+L	176.53 k	-23.82 k	-0.18 k
6 0.9D+1.6W	28.89 k	-1.13 k	0.06 k
0.9D-1.6W	28.89 k	-1.13 k	0.06 k
7 (0.9-0.2 S_{DS})D+1.0E	66.91 k	12.00 k	0.40 k
(0.9-0.2 S_{DS})D-1.0E	-12.53 k	-13.95 k	-0.28 k

DESIGN VALUES

Compression $P_u = 321.22$ k
Tension $T_u = -12.53$ k
Shear $V_{u_x} = 23.82$ k
 $V_{u_y} = 0.50$ k

FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Column Load Summary	By CCK Feb-1-2012
	<i>LRFD Load Combinations</i>	Check
		Sheet of

Column Location: J , 4

W12x53

SEISMIC CRITERIA

$S_{DS} = 0.213$

LOADS

	F_x	F_y	F_z
Dead	-1.52 k	-0.02 k	44.02 k
Live	-9.00 k	0.01 k	244.51 k
Seismic X	-11.80 k	0.01 k	31.97 k
Seismic -X	12.00 k	-0.01 k	-32.77 k
Seismic Y	1.51 k	0.18 k	-12.42 k
Seismic -Y	-1.51 k	-0.18 k	12.41 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

	P_u	V_{u_x}	V_{u_y}
1 1.4D	61.63 k	-2.13 k	-0.03 k
2 1.2D+1.6L	444.04 k	-16.22 k	-0.01 k
3 1.2D+L	297.33 k	-10.82 k	-0.01 k
4 1.2D+L	297.33 k	-10.82 k	-0.01 k
5 (1.2+0.2 S_{DS})D+1.0E+L	331.18 k	1.11 k	0.17 k
(1.2+0.2 S_{DS})D-1.0E+L	266.44 k	-22.69 k	-0.19 k
6 0.9D+1.6W	39.62 k	-1.37 k	-0.02 k
0.9D-1.6W	39.62 k	-1.37 k	-0.02 k
7 (0.9-0.2 S_{DS})D+1.0E	69.71 k	10.70 k	0.16 k
(0.9-0.2 S_{DS})D-1.0E	4.97 k	-13.10 k	-0.20 k

DESIGN VALUES

Compression	$P_u = 444.04 \text{ k}$
Tension	$T_u = 4.97 \text{ k}$
Shear	$V_{u_x} = 22.69 \text{ k}$
	$V_{u_y} = 0.20 \text{ k}$

	PROJECT CC&V High Grade Ore	Proj No.	11021
		Calc No.	
	SUBJECT Base Plate Design	By	CCK Mar-1-2012
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		Sheet	of

BASE PLATE DESIGN

Column Location: J, 4

Reference: AISC Steel Design Guide 1, 2nd Ed.

Column Member:	W12X53		
d (in):	12.1	P_u (k):	444.04
b_f (in):	10		
t_f (in):	0.575	Concrete Length (in):	24
f'_c (ksi):	4	Concrete Width (in):	24
f_y (ksi):	36		

Required Plate Area

ϕ_c :	0.65
$A_{1(req)}$ (in ²):	100.46

Trial Base Plate Size

Δ :	1.75	
	Trial Size	Use
Length -N (in):	12	18
Width -B (in):	9	18

Areas

A_1 (in ²):	324
A_2 (in ²):	576
ϕ_c :	0.65
$\phi_c P_p$ (k):	954.72

Bearing Length

X:	0.461
λ :	0.783
m:	3.3
n:	5.0
$\lambda n'$:	2.2
l:	5.0

Minimum Plate Thickness

ϕ_b :	0.9
t_{min} (in):	1.45
Design Thickness	1 1/2

Use 18 in wide x 1.5 in thick x 18 in long 36 ksi Base Plate

FLSMIDTH	PROJECT CC&V High Grade Ore	Proj No.	11021
		Calc No.	
	SUBJECT Anchor Bolt Design	By	CCK Feb-1-2012
		Check	
		Sheet	of

ANCHOR BOLT DESIGN

Reference: ACI 318-08 Appendix D

Column Location: J.8, 4 AISC Steel Design Guide Series No 7 (2nd Edition)

Pier Width, w =	24	in	perpendicular to web
Pier Depth, d =	24	in	parallel to web
g =	2.83	in	lateral offset distance between anchor bolt and reinforcing
cover =	2	in	vertical distance from top of pier to vertical reinforcing
N _u =	11.7	kips	Net Tension ☒ Seismic Load
V _u =	29.9	kips	Net Shear ☒ Seismic Load
Anchor Material =	ASTM F1554-36		Friction Factor
n =	4		Number of Anchor Bolts
d _b =	1	in	Diameter of Anchor Bolt
F _{y,a} =	36	ksi	Yield Strength of Anchor Bolt
F _{u,a} =	58	ksi	Ultimate Strength of Anchor Bolt
F _{y,bar} =	60	ksi	Yield Strength of Reinforcing
f' _c =	4	ksi	Concrete Compressive Strength

1. Steel Strength of Anchor in Tension (ACI 318-08 Appendix D, D.5.1)

A _{se} :	0.61	in ²	φ:	0.75	
f _{uta} :	58	ksi	N _{sa} :	105.44	kips
n:	4		φN _{sa} :	79 kips	
Interaction:					0.15

2. Pull-Out Strength of Anchor in Tension (ACI 318-08 Appendix D, D.5.3)

A _{brg} :	1.00	in ²	ψ _{c,p} :	1.00	
f' _c :	4	ksi	φ:	0.75	
N _p :	32	kips	N _{pn} :	24.00	kips
n:	4		φN _{pn} :	72 kips	
Interaction:					0.16

3. Steel Strength of Anchor in Shear (ACI 318-08 Appendix D, D.6.1)

A _{se} :	0.61	in ²	φ:	0.65	
f _{uta} :	58	ksi	V _{sa} :	50.61	kips
n:	4		φV _{sa} :	33 kips	
Interaction:					0.91

4. Combined Shear and Tension Interaction (ACI 318-08 Appendix D, D.7)

N _{ua} :	11.7	kips	V _{ua} :	29.9	kips
φN _n :	72 kips	kips	φV _n :	33 kips	kips
Interaction:					1.07

	PROJECT	CC&V High Grade Ore	Proj No.	11021
			Calc No.	
	SUBJECT	Anchor Bolt Design	By	CCK Feb-1-2012
			Check	
			Sheet	of

ANCHOR BOLT DESIGN

5. Reinforcement Strength and Anchor Bolt Embedment (ACI 318-08 Appendix D, D.5.2.9 & AISC D.G.7)

Bar Size:	8	in ²			
Number of Bars:	4		l_d (in)	29.65	in
A_s :	0.79		l_e (in)	2.64	in
ϕ :	0.75		h_{ef} (in)	6.53	in
F_y :	60	ksi	Embedment:	30 in	
N_{sa} :	142.20	kips			
ϕN_{sa} :	107 kips				
					Interaction: 0.11

6. Tie Rebar Strength (ACI 318-08 Appendix D, D.6.2.9 & AISC D.G.7)

Bar Size =	4				
Spacing :	12	in			
A_s :	0.2	in ²			
b_w :	24.0	in			
d :	21.6	in			
ϕ :	0.75				
ϕV_n :	61 kips				
					Interaction: 0.49

SUMMARY: USE 4- 1 in. Anchor Bolt, Embedded 30 in.
With # 4 Ties @ 12 in. o.c.

Project Notes :

Printed: 1 FEB 2012, 3:17PM

Concrete Column

File: P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\007 Reprint Area Concrete\Flotation Area.ec6
ENERCALC, INC. 1983-2011, Build:6.12.01.12, Ver:6.11.8.31

Lic. #: KW-06000120

Licensee : flsmith centry

Description : Pedestal M.2,4

General Information

f'_c : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 145.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Load Combination 2006 IBC & ASCE 7-05

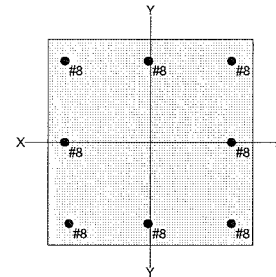
Calculations per ACI 318-08, IBC 2009, CBC 2010, ASCE 7-05

Overall Column Height = 4.0 ft
End Fixity Top Free, Bottom Fixed
ACI Code Year ACI 318-05
Brace condition for deflection (buckling) along columns :
X-X (width) axis : Unbraced Length for X-X Axis buckling = 2 ft, K = 1.0
Y-Y (depth) axis : Unbraced Length for Y-Y Axis buckling = 2 ft, K = 1.0

Column Cross Section

Column Dimensions 24.0in Square Column, Column Edge to Rebar
Edge Cover = 2.0in

Column Reinforcing : 4 - #8 bars @ corners,, 1.0 - #8 bars top & bottom
between corner bars, 1.0 - #8 bars left & right
between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 2,320.0 lbs * Dead Load Factor

AXIAL LOADS ...

Axial Load at 4.0 ft above base, D = 21.190, L = 82.050, E = 10.950 k

BENDING LOADS ...

Lat. Point Load at 4.0 ft creating My-y, D = 2.850, L = 10.140, E = 3.030 k

Lat. Point Load at 4.0 ft creating Mx-x, D = 0.090, L = 0.210, E = 0.140 k

DESIGN SUMMARY

Load Combination +1.20D+0.50Lr+1.60L+1.60H
Location of max. above base 3.973 ft

Maximum Stress Ratio **0.1919 : 1**

Ratio = $(P_u^2 + M_u^2)^{0.5} / (\phi P_n^2 + \phi M_n^2)^{0.5}$

P_u = 159.49 k $\phi * P_n$ = 826.54 k

M_u -x = -1.776 k-ft $\phi * M_n$ -x = 0.0 k-ft

M_u -y = -78.576 k-ft $\phi * M_n$ -y = 0.0 k-ft

M_u Angle = 89.0 deg

M_u at Angle = 78.596 k-ft ϕM_n at Angle = 409.64 k-ft

P_n & M_n values located at P_u - M_u vector intersection with capacity curve

Column Capacities ...

P_{nmax} : Nominal Max. Compressive Axial Capacity 2,316.11 k

P_{nmin} : Nominal Min. Tension Axial Capacity -379.20 k

ϕP_n , max : Usable Compressive Axial Capacity 1,204.38 k

ϕP_n , min : Usable Tension Axial Capacity -246.48 k

Maximum SERVICE Load Reactions . .

Top along Y-Y	k	Bottom along Y-Y	k
Top along X-X	k	Bottom along X-X	k

Maximum SERVICE Load Deflections ...

Along Y-Y 0.000162 in at 4.0 ft above base
for load combination : D+L+E

Along X-X 0.005896 in at 4.0 ft above base
for load combination : D+L+E

General Section Information . ϕ = 0.650 β = 0.850 θ = 0.80

ρ : % Reinforcing 1.097 % Rebar % Ok

Reinforcing Area 6.320 in²

Concrete Area 576.0 in²

Governing Load Combination Results

Governing Factored Load Combination	Dist. from base ft	Axial Load k		Bending Analysis k-ft								Utilization Ratio
		P_u	$\phi * P_n$	δ_x	$\delta_x * M_{ux}$	δ_y	$\delta_y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n		
+1.40D	3.97	32.91	840.56	1.000	-0.50	1.000	-15.96	88.000	15.97	405.06		0.039
+1.20D+0.50Lr+1.60L+1.60H	3.97	159.49	826.54	1.000	-1.78	1.000	-78.58	89.000	78.60	409.64		0.192

Project Notes :

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Concrete Column

File: P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\007 Reprint Area Concrete\Flotation Area.ec6
ENERCALC, INC. 1983-2011, Build:6.12.01.12, Ver:6.11.8.31

Lic. #: KW-06000120

Licensee: flsmith centry

Description: Pedestal M.2.4

Governing Load Combination Results

Governing Factored Load Combination	Dist. from base ft	Axial Load k			Bending Analysis k-ft						Utilization Ratio
		Pu	$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n	
+1.20D+1.60L+0.50S+1.60H	3.97	159.49	826.54	1.000	-1.78	1.000	-78.58	89.000	78.60	409.64	0.192
+1.20D+1.60L+0.50L	3.97	69.24	833.55	1.000	-0.85	1.000	-33.96	89.000	33.97	407.62	0.083
+1.20D+0.50L+1.60S	3.97	69.24	833.55	1.000	-0.85	1.000	-33.96	89.000	33.97	407.62	0.083
+1.20D+0.50Lr+0.50L+1.60W	3.97	69.24	833.55	1.000	-0.85	1.000	-33.96	89.000	33.97	407.62	0.083
+1.20D+0.50Lr+0.50L-1.60W	3.97	69.24	833.55	1.000	-0.85	1.000	-33.96	89.000	33.97	407.62	0.083
+1.20D+0.50L+0.50S+1.60W	3.97	69.24	833.55	1.000	-0.85	1.000	-33.96	89.000	33.97	407.62	0.083
+1.243D+0.50L+0.20S+E	3.97	81.19	749.07	1.000	-1.43	1.000	-46.57	88.000	46.59	428.82	0.109
+1.243D+0.50L+0.20S-1.0E	3.97	59.29	960.17	1.000	-0.31	1.000	-22.33	89.000	22.33	364.09	0.061
+0.8574D+E+1.60H	3.97	31.11	636.52	1.000	-0.87	1.000	-21.89	88.000	21.91	450.74	0.049
+0.8574D-1.0E+1.60H	3.97	9.21	1,122.00	1.000	0.25	1.000	2.35	84.000	2.36	285.11	0.008

Maximum Reactions - Unfactored

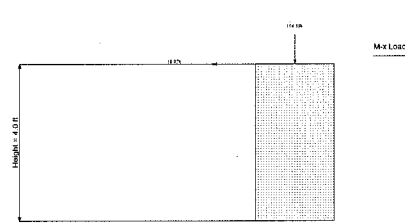
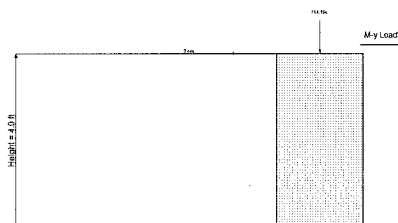
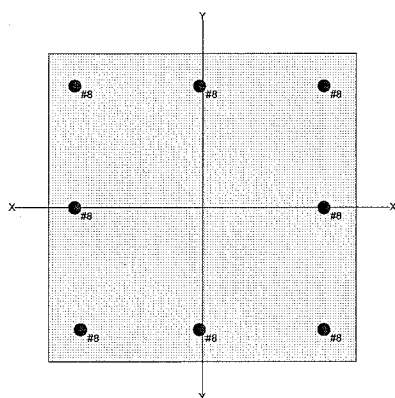
Note: Only non-zero reactions are listed.

Load Combination	Reaction along X-X Axis		Reaction along Y-Y Axis		Axial Reaction @ Base
	@ Base	@ Top	@ Base	@ Top	
D Only	0.090	0.090 k	2.850	k	23.510 k
L Only	0.210	0.210 k	10.140	k	82.050 k
E Only	0.140	0.140 k	3.030	k	10.950 k
-E Only	0.140	0.140 k	3.030	k	10.950 k
D+L	0.300	0.300 k	12.990	k	105.560 k
D+E	0.230	0.230 k	5.880	k	34.460 k
D-E Only	0.050	0.050 k	0.180	k	12.560 k
D+L+E	0.440	0.440 k	16.020	k	116.510 k
D+L-E Only	0.160	0.160 k	9.960	k	94.610 k

Maximum Deflections for Load Combinations - Unfactored Loads

Load Combination	Max. X-X Deflection			Max. Y-Y Deflection		
	Distance			Distance		
D Only	0.0010	in	4.000 ft	0.000	in	4.000 ft
L Only	0.0037	in	4.000 ft	0.000	in	4.000 ft
E Only	0.0011	in	4.000 ft	0.000	in	4.000 ft
-E Only	-0.0011	in	4.000 ft	-0.000	in	4.000 ft
D+L	0.0048	in	4.000 ft	0.000	in	4.000 ft
D+E	0.0022	in	4.000 ft	0.000	in	4.000 ft
D-E Only	-0.0001	in	4.000 ft	-0.000	in	4.000 ft
D+L+E	0.0059	in	4.000 ft	0.000	in	4.000 ft
D+L-E Only	0.0036	in	3.973 ft	0.000	in	3.973 ft

Sketches



Looking along X-X Axis

Looking along Y-Y Axis

Interaction Diagrams

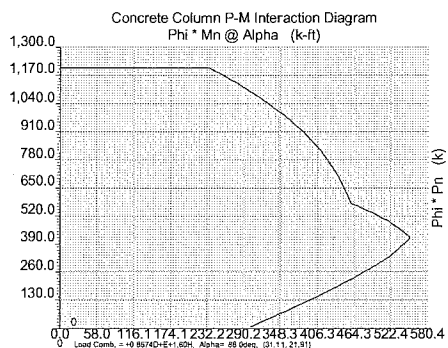
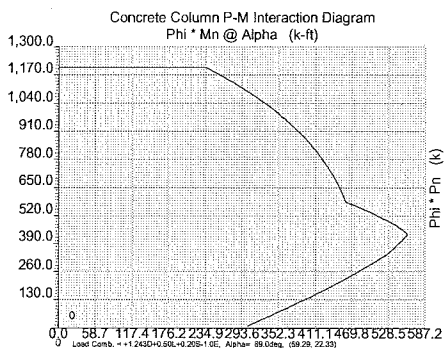
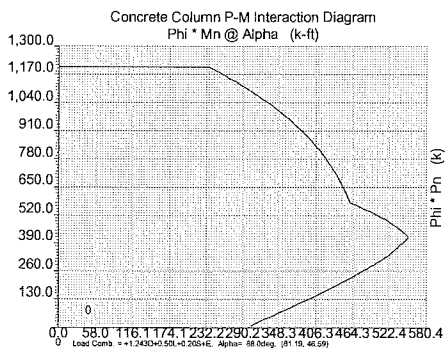
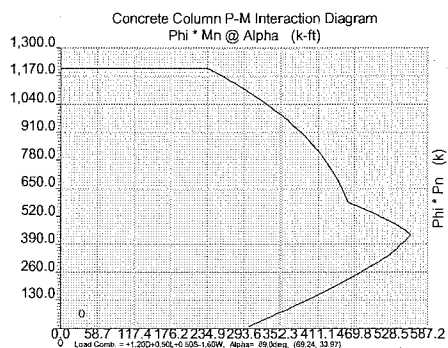
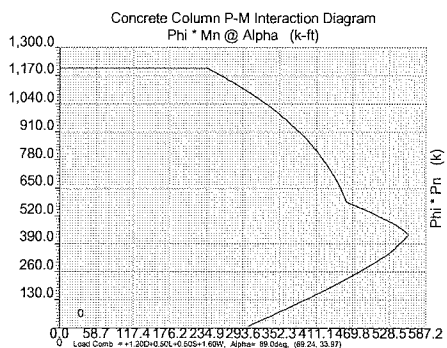
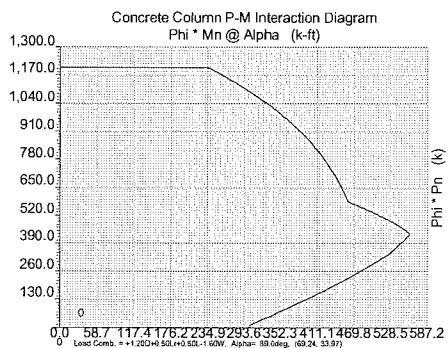
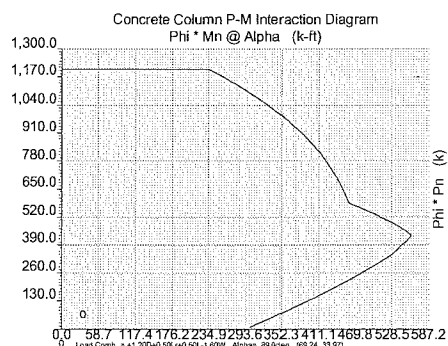
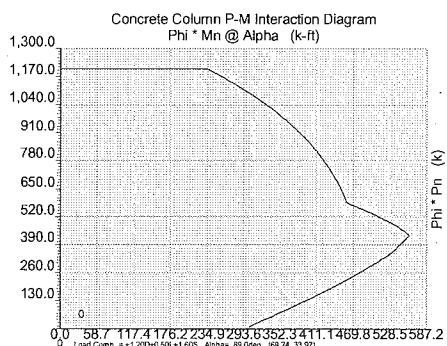
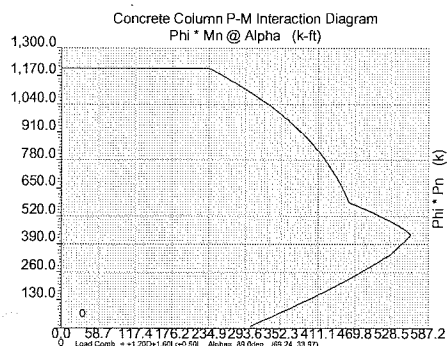
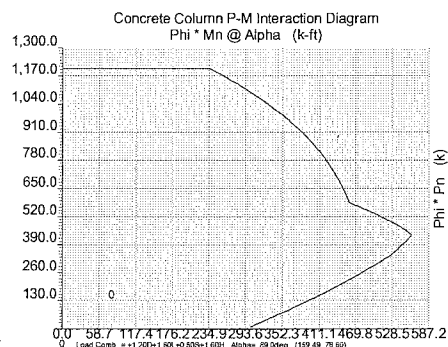
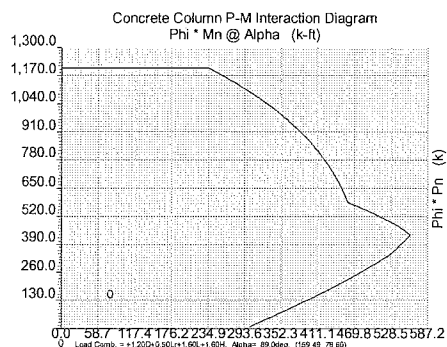
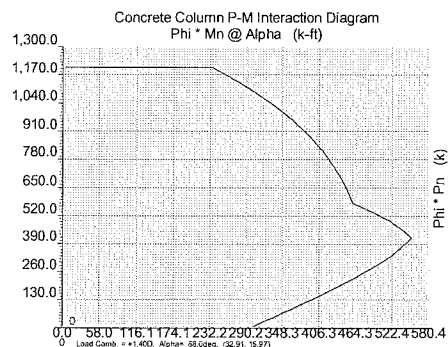
concrete Column

File: P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-007 Re grind Area Concrete\Flotation Area.ec6
ENERCALC, INC. 1983-2011, Build:6.12.01.12, Ver:6.11.8.31

Lic. # : KW-06000120

Licensee : flsmidth centry

Description : Pedestal M.2,4



Project Notes :

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Concrete Column

File: P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\007 Reprint Area Concrete\Flotation Area.ec6
ENERCALC, INC. 1983-2011, Build:6.12.01.12, Ver:6.11.8.31

Lic. # : KW-06000120

Licensee : flsmidth centry

Description : Pedestal J,4

General Information

Calculations per ACI 318-08, IBC 2009, CBC 2010, ASCE 7-05

f'c : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 145.0 pcf
 β = 0.850
fy - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

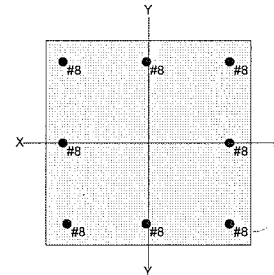
Load Combination 2006 IBC & ASCE 7-05

Overall Column Height = 4.0 ft
End Fixity Top Free, Bottom Fixed
ACI Code Year ACI 318-05
Brace condition for deflection (buckling) along columns :
X-X (width) axis : Unbraced Length for X-X Axis buckling = 2 ft, K = 1.0
Y-Y (depth) axis : Unbraced Length for Y-Y Axis buckling = 2 ft, K = 1.0

Column Cross Section

Column Dimensions 24.0in Square Column, Column Edge to Rebar
Edge Cover = 2.0in

Column Reinforcing : 4 - #8 bars @ corners,, 1.0 - #8 bars top & bottom
between corner bars, 1.0 - #8 bars left & right
between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 2,320.0 lbs * Dead Load Factor

AXIAL LOADS ...

Axial Load at 4.0 ft above base, D = 44.020, L = 244.51, E = 31.970 k

BENDING LOADS ...

Lat. Point Load at 4.0 ft creating My-y, D = -0.020, L = 0.010, E = 0.010 k

Lat. Point Load at 4.0 ft creating Mx-x, D = -1.520, L = -9.0, E = 12.0 k

DESIGN SUMMARY

Load Combination +1.20D+0.50Lr+1.60L+1.60H
Location of max. above base 3.973 ft

Maximum Stress Ratio **0.3745 : 1**

Ratio = $(P_u^2 + M_u^2)^{.5} / (\phi P_n^2 + \phi M_n^2)^{.5}$

Pu = 446.82 k $\phi * P_n = 1,204.38$ k

Mu-x = 64.896 k-ft $\phi * M_n-x = 0.0$ k-ft

Mu-y = 0.0320 k-ft $\phi * M_n-y = 0.0$ k-ft

Mu Angle = 0.0 deg

Mu at Angle = 64.896 k-ft ϕM_n at Angle = 172.73 k-ft

Pn & Mn values located at Pu-Mu vector intersection with capacity curve

Column Capacities ...

Pnmax : Nominal Max. Compressive Axial Capacity 2,316.11 k

Pnmin : Nominal Min. Tension Axial Capacity -379.20 k

ϕP_n , max : Usable Compressive Axial Capacity 1,204.38 k

ϕP_n , min : Usable Tension Axial Capacity -246.48 k

Maximum SERVICE Load Reactions ...

Top along Y-Y	k	Bottom along Y-Y	k
Top along X-X	k	Bottom along X-X	k

Maximum SERVICE Load Deflections ...

Along Y-Y -0.008288 in at 4.0 ft above base
for load combination : D+L-E Only

Along X-X -0.000110 in at 4.0 ft above base
for load combination : D-E Only

General Section Information . $\phi = 0.650$ $\beta = 0.850$ $\theta = 0.80$

ρ : % Reinforcing 1.097 % Rebar % Ok

Reinforcing Area 6.320 in²

Concrete Area 576.0 in²

Governing Load Combination Results

Governing Factored Load Combination	Dist. from base ft	Axial Load k		Bending Analysis k-ft						Utilization	
		Pu	$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n	Ratio
+1.40D	3.97	64.88	1,204.38	1.000	8.51	1.000	0.11	1.000	8.51	156.04	0.054
+1.20D+0.50Lr+1.60L+1.60H	3.97	446.82	1,204.38	1.000	64.90	1.000	0.03	0.000	64.90	172.73	0.375

Project Notes :

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concrete Column

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ENERCALC, INC. 1983-2011, Build:6.12.01.12, Ver:6.11.8.31

Lic. #: KW-06000120

Licensee : flsmith centry

Description : Pedestal J,4

Governing Load Combination Results

Governing Factored Load Combination	Dist. from base ft	Axial Load k			Bending Analysis k-ft						Utilization Ratio
		Pu	$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n	
+1.20D+1.60L+0.50S+1.60H	3.97	446.82	1,204.38	1.000	64.90	1.000	0.03	0.000	64.90	172.73	0.375
+1.20D+1.60Lr+0.50L	3.97	177.86	1,204.38	1.000	25.30	1.000	0.08	0.000	25.30	172.73	0.147
+1.20D+0.50L+1.60S	3.97	177.86	1,204.38	1.000	25.30	1.000	0.08	0.000	25.30	172.73	0.147
+1.20D+0.50Lr+0.50L+1.60W	3.97	177.86	1,204.38	1.000	25.30	1.000	0.08	0.000	25.30	172.73	0.147
+1.20D+0.50Lr+0.50L+1.60W	3.97	177.86	1,204.38	1.000	25.30	1.000	0.08	0.000	25.30	172.73	0.147
+1.20D+0.50L+0.50S+1.60W	3.97	177.86	1,204.38	1.000	25.30	1.000	0.08	0.000	25.30	172.73	0.147
+1.20D+0.50L+0.50S+1.60W	3.97	177.86	1,204.38	1.000	25.30	1.000	0.08	0.000	25.30	172.73	0.147
+1.243D+0.50L+0.20S+E	3.97	211.81	1,204.38	1.000	-22.44	1.000	0.04	0.000	22.45	127.61	0.176
+1.243D+0.50L+0.20S-1.0E	3.97	147.87	819.43	1.000	73.56	1.000	0.12	0.000	73.56	408.73	0.180
+0.8574D+E+1.60H	3.97	71.70	721.06	1.000	-42.79	1.000	0.03	0.000	42.79	432.24	0.099
+0.8574D-1.0E+1.60H	3.97	7.76	43.45	1.000	53.21	1.000	0.11	0.000	53.21	323.27	0.165

Maximum Reactions - Unfactored

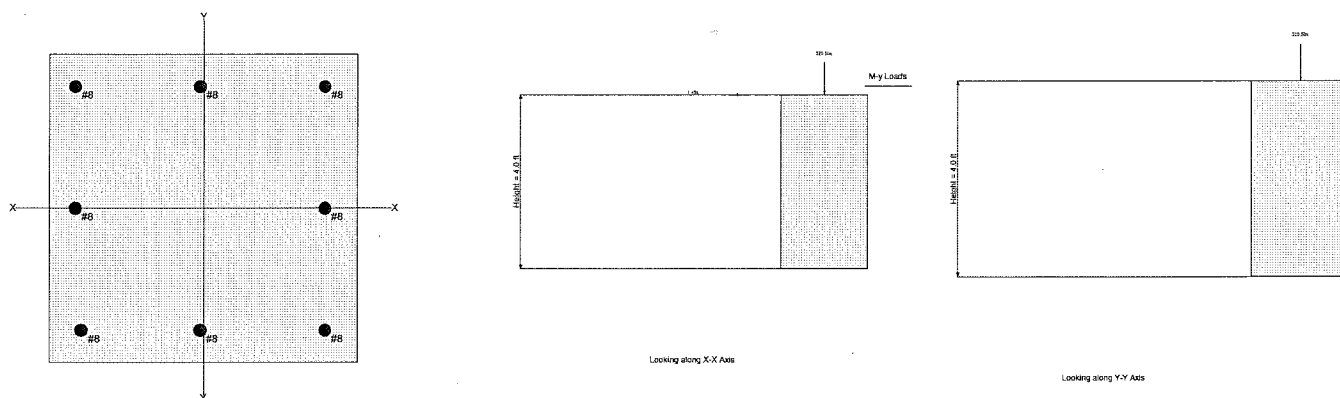
Note: Only non-zero reactions are listed.

Load Combination	Reaction along X-X Axis		Reaction along Y-Y Axis		Axial Reaction @ Base
	@ Base	@ Top	@ Base	@ Top	
D Only	1.520	1.520 k	0.020	k	46.340 k
L Only	9.000	9.000 k	0.010	k	244.510 k
E Only	12.000	12.000 k	0.010	k	31.970 k
-E Only	12.000	12.000 k	0.010	k	31.970 k
D+L	10.520	10.520 k	0.010	k	290.850 k
E	10.480	10.480 k	0.010	k	78.310 k
E Only	13.520	13.520 k	0.030	k	14.370 k
D+L+E	1.480	1.480 k	k	k	322.820 k
D+L-E Only	22.520	22.520 k	0.020	k	258.880 k

Maximum Deflections for Load Combinations - Unfactored Loads

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	-0.001	in	4.000	ft
L Only	0.0000	in	0.000	ft	-0.003	in	4.000	ft
E Only	0.0000	in	0.000	ft	0.004	in	4.000	ft
-E Only	0.0000	in	0.000	ft	-0.004	in	4.000	ft
D+L	0.0000	in	0.000	ft	-0.004	in	4.000	ft
D+E	0.0000	in	0.000	ft	0.004	in	4.000	ft
D-E Only	-0.0000	in	4.000	ft	-0.005	in	4.000	ft
D+L+E	0.0000	in	0.000	ft	0.001	in	4.000	ft
D+L-E Only	0.0000	in	0.000	ft	-0.008	in	3.973	ft

Sketches



Interaction Diagrams

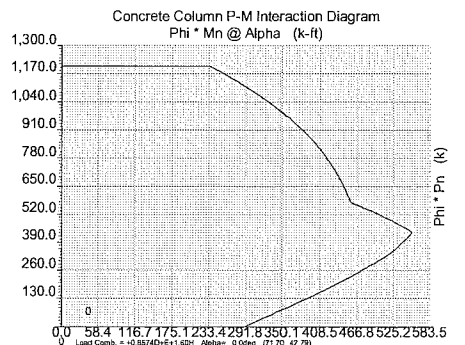
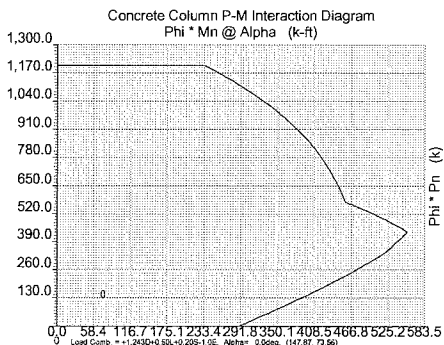
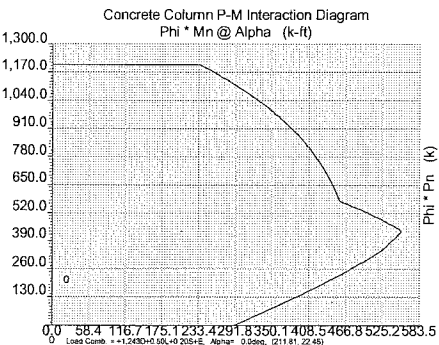
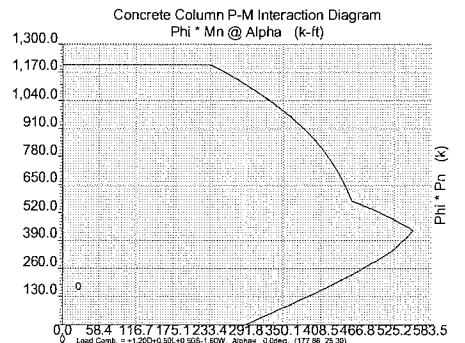
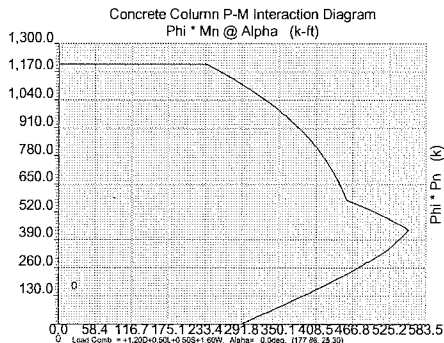
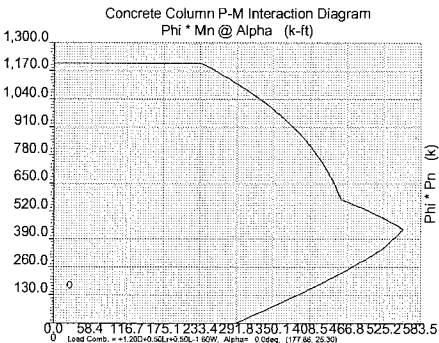
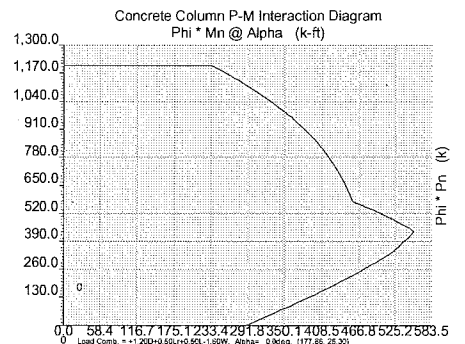
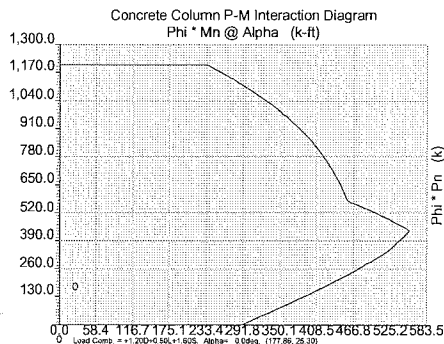
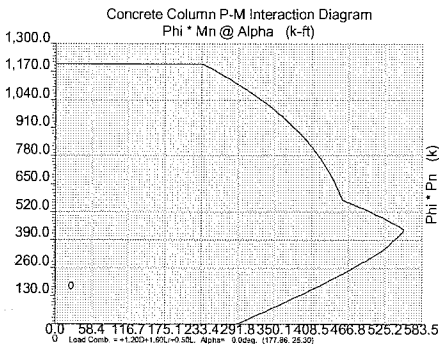
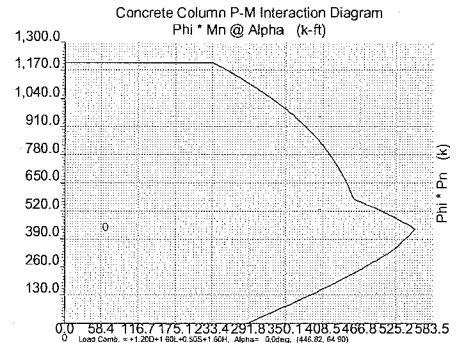
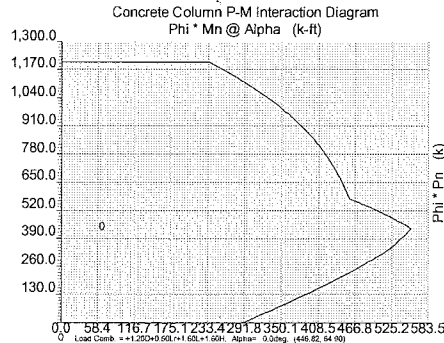
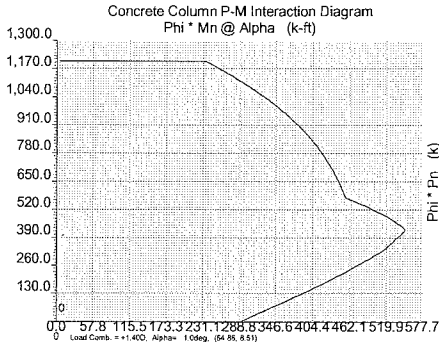
concrete Column

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ENERCALC, INC. 1983-2011, Build:6.12.01.12, Ver:6.11.8.31

Lic. # : KW-06000120

Licensee : flsmidth centry

Description : Pedestal J,4



General Footing

116 - Calculations\116.d - Arch_Civil_Struc\G-007 Regrind Area Concrete\Flotation Foundations\Flotation Area.ec6
ENERCALC, INC. 1983-2011, Build:6.12.5.17, Ver:6.11.8.31

Lic. #: KW-06000120

Licensee: flsmith centry

Description: Spot Footing M.2, 4.4

General Information

Calculations per ACI 318-05, IBC 2006, CBC 2007, ASCE 7-05

Material Properties

f'_c : Concrete 28 day strength	=	4.0 ksi
f_y : Rebar Yield	=	60.0 ksi
E_c : Concrete Elastic Modulus	=	3,605.0 ksi
Concrete Density	=	145.0 pcf
ϕ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	0.00140
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.50 : 1
Min. Sliding Safety Factor	=	1.50 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Include Pedestal Weight as DL	:	Yes

Soil Design Values

Allowable Soil Bearing	=	5.0 ksf
Increase Bearing By Footing Weight	=	Yes
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	ft
Allowable pressure increase per foot of dept	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of dept	=	ksf
when maximum length or width is greater	=	ft

Dimensions

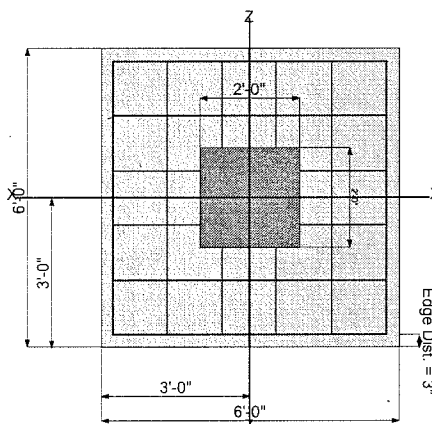
Width parallel to X-X Axis	=	6.0 ft
Length parallel to Z-Z Axis	=	6.0 ft
Footing Thickness	=	18.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	24.0 in
pz : parallel to Z-Z Axis	=	24.0 in
Height	=	48.0 in

Rebar Centerline to Edge of Concrete.
at Bottom of footing

= 3.0 in

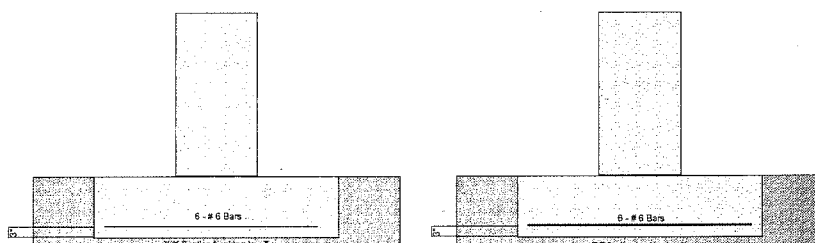


Reinforcing

Bars parallel to X-X Axis	=	6.0
Number of Bars	=	# 6
Reinforcing Bar Size	=	# 6
Bars parallel to Z-Z Axis	=	6.0
Number of Bars	=	# 6
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	=	n/a
# Bars required within zone	=	n/a
# Bars required on each side of zone	=	n/a



Applied Loads

	D	Lr	L	S	W	E	H
P : Column Load	=	2.020		2.580		0.090	k
OB : Overburden	=	0.150					ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=	-0.080		-0.10		-0.010	k
V-z	=					-0.010	k

General Footing

116 - Calculations\116.d - Arch_Civil_Struct\007 Regrind Area Concrete\Flotation Foundations\Flotation Area.ec6
ENERCALC, INC. 1983-2011, Build:6.12.5.17, Ver:6.11.8.31

Lic. #: KW-06000120

Licensee: flsmith centry

Description: Spot Footing M.2, 4.4

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.1140	Soil Bearing	0.5702 ksf	5.0 ksf	+D+L+H
PASS	134.268	Overturning - X-X	0.2275 k-ft	30.546 k-ft	0.6D-0.7E
PASS	59.242	Overturning - Z-Z	0.990 k-ft	58.650 k-ft	D+L
PASS	32.583	Sliding - X-X	0.180 k	5.865 k	D+L
PASS	433.671	Sliding - Z-Z	0.0070 k	3.036 k	0.6D-0.7E
PASS	161.619	Uplift	0.0630 k	10.182 k	+0.6D+0.70E
PASS	0.01438	Z Flexure (+X)	0.4178 k-ft	29.059 k-ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.01857	Z Flexure (-X)	0.5395 k-ft	29.059 k-ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.01647	X Flexure (+Z)	0.4787 k-ft	29.059 k-ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.01647	X Flexure (-Z)	0.4787 k-ft	29.059 k-ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.01009	1-way Shear (+X)	0.9573 psi	94.868 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.01009	1-way Shear (-X)	0.9573 psi	94.868 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.01009	1-way Shear (+Z)	0.9573 psi	94.868 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.01009	1-way Shear (-Z)	0.9573 psi	94.868 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.01361	2-way Punching	2.582 psi	189.737 psi	+1.20D+0.50Lr+1.60L+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc	+Z	Actual Soil Bearing Stress +Z	-X	-X	Actual / Allowable Ratio
X-X, +D	5.0	n/a	0.0	0.4714	0.4714	n/a	n/a	0.094
X-X, +D+L+H	5.0	n/a	0.0	0.5431	0.5431	n/a	n/a	0.109
X-X, +D+0.750Lr+0.750L+H	5.0	n/a	0.0	0.5251	0.5251	n/a	n/a	0.105
X-X, +D+0.750L+0.750S+H	5.0	n/a	0.0	0.5251	0.5251	n/a	n/a	0.105
X-X, +1.030D+0.70E+H	5.0	n/a	-0.02634	0.4883	0.4861	n/a	n/a	0.098
X-X, +1.030D-0.70E+H	5.0	n/a	0.02653	0.4826	0.4848	n/a	n/a	0.097
X-X, +D+0.750Lr+0.750L+0.750W+H	5.0	n/a	0.0	0.5251	0.5251	n/a	n/a	0.105
X-X, +D+0.750Lr+0.750L-0.750W+H	5.0	n/a	0.0	0.5251	0.5251	n/a	n/a	0.105
X-X, +D+0.750L+0.750S+0.750W+H	5.0	n/a	0.0	0.5251	0.5251	n/a	n/a	0.105
X-X, +D+0.750L+0.750S-0.750W+H	5.0	n/a	0.0	0.5251	0.5251	n/a	n/a	0.105
X-X, +1.022D+0.750Lr+0.750L+0.5250	5.0	n/a	-0.01792	0.5378	0.5362	n/a	n/a	0.108
X-X, +1.022D+0.750Lr+0.750L-0.5250	5.0	n/a	0.01801	0.5336	0.5352	n/a	n/a	0.107
X-X, +D+0.750L+0.750S+0.5250E+H	5.0	n/a	-0.01828	0.5272	0.5257	n/a	n/a	0.105
X-X, +D+0.750L+0.750S-0.5250E+H	5.0	n/a	0.01837	0.5230	0.5246	n/a	n/a	0.105
X-X, +0.5702D+0.70E+H	5.0	n/a	-0.04744	0.2716	0.2695	n/a	n/a	0.054
X-X, +0.5702D-0.70E+H	5.0	n/a	0.04806	0.2660	0.2681	n/a	n/a	0.054
Z-Z, +D	5.0	-0.3111	n/a	n/a	n/a	0.4834	0.4593	0.097
Z-Z, +D+L+H	5.0	-0.6077	n/a	n/a	n/a	0.5702	0.5159	0.114
Z-Z, +D+0.750Lr+0.750L+H	5.0	-0.5411	n/a	n/a	n/a	0.5485	0.5018	0.110
Z-Z, +D+0.750L+0.750S+H	5.0	-0.5411	n/a	n/a	n/a	0.5485	0.5018	0.110
Z-Z, +1.030D+0.70E+H	5.0	-0.3364	n/a	n/a	n/a	0.5007	0.4737	0.100
Z-Z, +1.030D-0.70E+H	5.0	-0.2857	n/a	n/a	n/a	0.4951	0.4723	0.099
Z-Z, +D+0.750Lr+0.750L+0.750W+H	5.0	-0.5411	n/a	n/a	n/a	0.5485	0.5018	0.110
Z-Z, +D+0.750Lr+0.750L-0.750W+H	5.0	-0.5411	n/a	n/a	n/a	0.5485	0.5018	0.110
Z-Z, +D+0.750L+0.750S+0.750W+H	5.0	-0.5411	n/a	n/a	n/a	0.5485	0.5018	0.110
Z-Z, +D+0.750L+0.750S-0.750W+H	5.0	-0.5411	n/a	n/a	n/a	0.5485	0.5018	0.110
Z-Z, +1.022D+0.750Lr+0.750L+0.5250	5.0	-0.5532	n/a	n/a	n/a	0.5614	0.5126	0.112
Z-Z, +1.022D+0.750Lr+0.750L-0.5250	5.0	-0.5199	n/a	n/a	n/a	0.5572	0.5115	0.111
Z-Z, +D+0.750L+0.750S+0.5250E+H	5.0	-0.5581	n/a	n/a	n/a	0.5506	0.5023	0.110
Z-Z, +D+0.750L+0.750S-0.5250E+H	5.0	-0.5241	n/a	n/a	n/a	0.5464	0.5013	0.109
Z-Z, +0.5702D+0.70E+H	5.0	-0.3566	n/a	n/a	n/a	0.2785	0.2626	0.056
Z-Z, +0.5702D-0.70E+H	5.0	-0.2651	n/a	n/a	n/a	0.2728	0.2612	0.055

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, D	None	0.0 k-ft	Infinity	OK
X-X, D+L	None	0.0 k-ft	Infinity	OK
X-X, 0.6D+0.7E	0.03850 k-ft	30.735 k-ft	798.31	OK
X-X, 0.6D-0.7E	0.2275 k-ft	30.546 k-ft	134.268	OK

General Footing

Lic. #: KW-06000120

Licensee: flsmidth centry

Description: Spot Footing M.2, 4.4

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Z-Z, D	0.440 k-ft	50.910 k-ft	115.705	OK
Z-Z, D+L	0.990 k-ft	58.650 k-ft	59.242	OK
Z-Z, 0.6D+0.7E	0.3025 k-ft	30.735 k-ft	101.603	OK
Z-Z, 0.6D-0.7E	0.4530 k-ft	30.585 k-ft	67.515	OK
Sliding Stability				All units k

Force Application Axis

Load Combination...	Sliding Force	Resisting Force	Sliding Safety Ratio	Status
X-X, D	-0.080 k	5.091 k	63.638	OK
X-X, D+L	-0.180 k	5.865 k	32.583	OK
X-X, 0.6D+0.7E	-0.0550 k	3.074 k	55.882	OK
X-X, 0.6D-0.7E	-0.0410 k	3.036 k	74.041	OK
Z-Z, D	0.0 k	5.091 k	No Sliding	OK
Z-Z, D+L	0.0 k	5.865 k	No Sliding	OK
Z-Z, 0.6D+0.7E	-0.0070 k	3.074 k	439.071	OK
Z-Z, 0.6D-0.7E	0.0070 k	3.036 k	433.671	OK
Footing Flexure				

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in ²	Gvrm. As in ²	Actual As in ²	Phi*Mn k-ft	Status
X-X, +1.40D	0.2909	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.40D	0.2909	-Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.4787	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.4787	-Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.4787	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.4787	-Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+1.60L+0.50L	0.321	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+1.60L+0.50L	0.321	-Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50L+1.60S	0.321	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50L+1.60S	0.321	-Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50Lr+0.50L+1.60W	0.321	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50Lr+0.50L+1.60W	0.321	-Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50Lr+0.50L-1.60W	0.321	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50Lr+0.50L-1.60W	0.321	-Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50L+0.50S+1.60W	0.321	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50L+0.50S+1.60W	0.321	-Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50L+0.50S-1.60W	0.321	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50L+0.50S-1.60W	0.321	-Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50L+0.20S+E	0.3236	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50L+0.20S+E	0.3284	-Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50L+0.20S-1.0E	0.3184	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +1.20D+0.50L+0.20S-1.0E	0.3136	-Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +0.90D+E+1.60H	0.1896	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +0.90D+E+1.60H	0.1944	-Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +0.90D+1.0E+1.60H	0.1844	+Z	Bottom	0.39	Bending	0.44	29.059	OK
X-X, +0.90D+1.0E+1.60H	0.1796	-Z	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.40D	0.3175	-X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.40D	0.2643	+X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.5395	-X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.4178	+X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.5395	-X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.4178	+X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+1.60Lr+0.50L	0.3557	-X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+1.60Lr+0.50L	0.2863	+X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50L+1.60S	0.3557	-X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50L+1.60S	0.2863	+X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50Lr+0.50L+1.60W	0.3557	-X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50Lr+0.50L+1.60W	0.2863	+X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50Lr+0.50L-1.60W	0.3557	-X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50Lr+0.50L-1.60W	0.2863	+X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50L+0.50S+1.60W	0.3557	-X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50L+0.50S+1.60W	0.2863	+X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50L+0.50S-1.60W	0.3557	-X	Bottom	0.39	Bending	0.44	29.059	OK

General Footing

Lic. #: KW-06000120

Licensee: flsmith centry

Description: Spot Footing M.2, 4.4

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50L+0.50S-1.60W	0.2863	+X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50L+0.20S+E	0.3631	-X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50L+0.20S+E	0.2889	+X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50L+0.20S-1.0E	0.3483	-X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +1.20D+0.50L+0.20S-1.0E	0.2837	+X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +0.90D+E+1.60H	0.2115	-X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +0.90D+E+1.60H	0.1725	+X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +0.90D-1.0E+1.60H	0.1967	-X	Bottom	0.39	Bending	0.44	29.059	OK
Z-Z, +0.90D-1.0E+1.60H	0.1673	+X	Bottom	0.39	Bending	0.44	29.059	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.5818 psi	0.5818 psi	0.5818 psi	0.5818 psi	0.5818 psi	94.868 psi	0.006132	OK
+1.20D+0.50Lr+1.60L+1.60H	0.9573 psi	0.9573 psi	0.9573 psi	0.9573 psi	0.9573 psi	94.868 psi	0.01009	OK
+1.20D+1.60L+0.50S+1.60H	0.9573 psi	0.9573 psi	0.9573 psi	0.9573 psi	0.9573 psi	94.868 psi	0.01009	OK
+1.20D+1.60Lr+0.50L	0.642 psi	0.642 psi	0.642 psi	0.642 psi	0.642 psi	94.868 psi	0.006767	OK
+1.20D+0.50L+1.60S	0.642 psi	0.642 psi	0.642 psi	0.642 psi	0.642 psi	94.868 psi	0.006767	OK
+1.20D+0.50Lr+0.50L+1.60W	0.642 psi	0.642 psi	0.642 psi	0.642 psi	0.642 psi	94.868 psi	0.006767	OK
+1.20D+0.50Lr+0.50L-1.60W	0.642 psi	0.642 psi	0.642 psi	0.642 psi	0.642 psi	94.868 psi	0.006767	OK
+1.20D+0.50L+0.50S+1.60W	0.642 psi	0.642 psi	0.642 psi	0.642 psi	0.642 psi	94.868 psi	0.006767	OK
+1.20D+0.50L+0.50S-1.60W	0.642 psi	0.642 psi	0.642 psi	0.642 psi	0.642 psi	94.868 psi	0.006767	OK
+1.20D+0.50L+0.20S+E	0.652 psi	0.652 psi	0.6574 psi	0.6466 psi	0.6574 psi	94.868 psi	0.006929	OK
+1.20D+0.50L+0.20S-1.0E	0.632 psi	0.632 psi	0.6266 psi	0.6374 psi	0.6374 psi	94.868 psi	0.006719	OK
+0.90D+E+1.60H	0.384 psi	0.384 psi	0.3894 psi	0.3786 psi	0.3894 psi	94.868 psi	0.004104	OK
+0.90D-1.0E+1.60H	0.364 psi	0.364 psi	0.3586 psi	0.3694 psi	0.3694 psi	94.868 psi	0.003894	OK

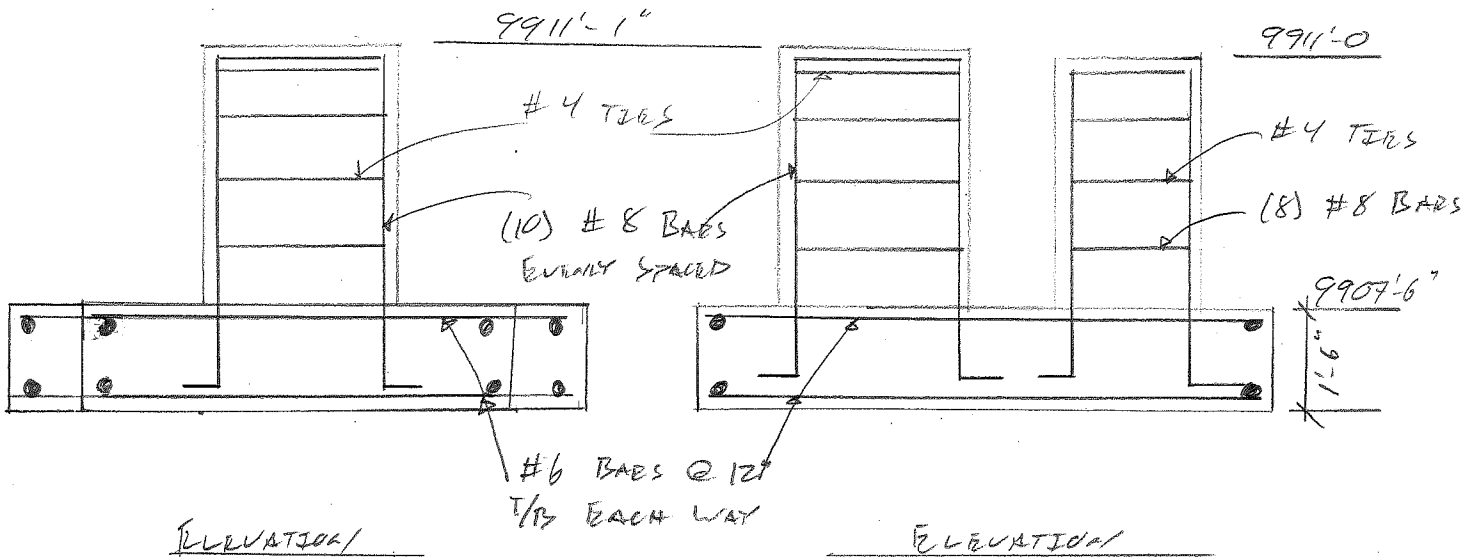
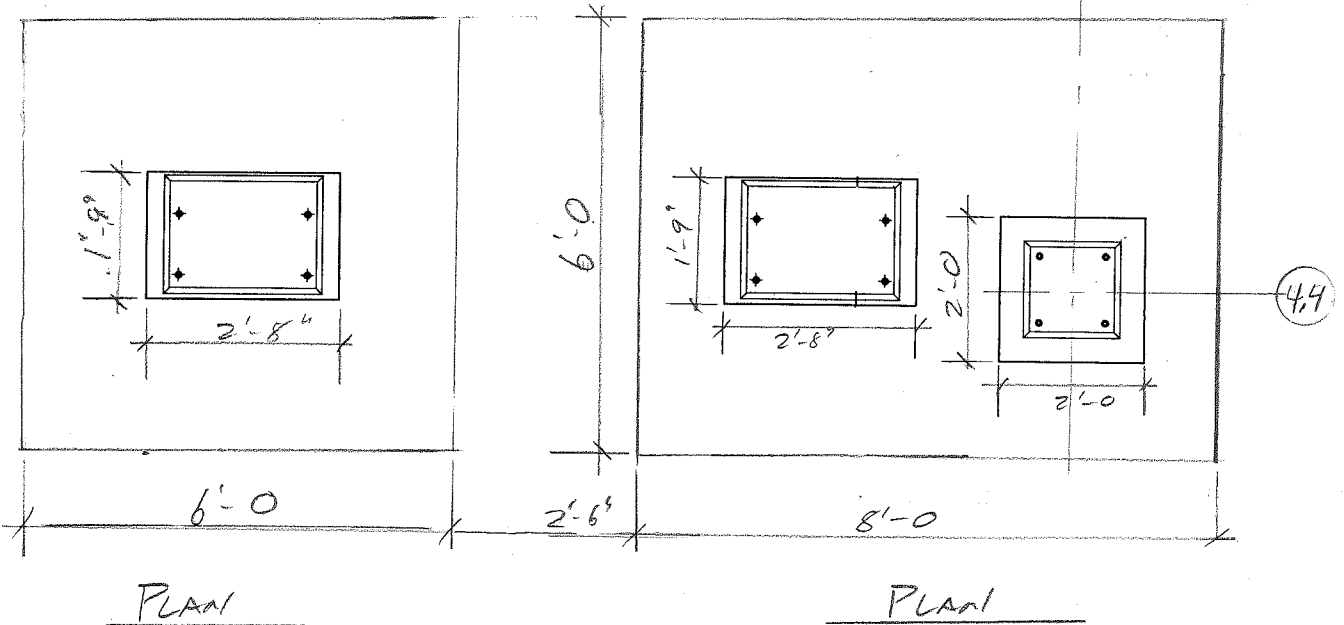
Punching Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	1.569 psi	189.737 psi	0.008269	OK
+1.20D+0.50Lr+1.60L+1.60H	2.582 psi	189.737 psi	0.01361	OK
+1.20D+1.60L+0.50S+1.60H	2.582 psi	189.737 psi	0.01361	OK
+1.20D+1.60Lr+0.50L	1.731 psi	189.737 psi	0.009125	OK
+1.20D+0.50L+1.60S	1.731 psi	189.737 psi	0.009125	OK
+1.20D+0.50Lr+0.50L+1.60W	1.731 psi	189.737 psi	0.009125	OK
+1.20D+0.50Lr+0.50L-1.60W	1.731 psi	189.737 psi	0.009125	OK
+1.20D+0.50L+0.50S+1.60W	1.731 psi	189.737 psi	0.009125	OK
+1.20D+0.50L+0.50S-1.60W	1.731 psi	189.737 psi	0.009125	OK
+1.20D+0.50L+0.20S+E	1.758 psi	189.737 psi	0.009267	OK
+1.20D+0.50L+0.20S-1.0E	1.704 psi	189.737 psi	0.008983	OK
+0.90D+E+1.60H	1.036 psi	189.737 psi	0.005458	OK
+0.90D-1.0E+1.60H	0.9816 psi	189.737 psi	0.005174	OK

FLSMIDTH	PROJECT	CCV HIGH GRADE ORE	PROJ NO.	11021
	SUBJECT	FLotation PROCESSED ORE	CALC NO.	C-007
		TRANSFER PUMP FOUNDATIONS	BY EES	DATE 6-3-12
			CHK	DATE
			SHEET	OF REV

FLotation PROCESSED ORE PUMPS





PROJECT	CC&V HIGH GRADE ORR	PROJ NO.	11021
SUBJECT	FLotation PROCESSED ORR	CALC NO.	C-007
	TRANSFER PUMP	BY ECS	DATE 5-3-12
		CHK	DATE
		SHEET	OF REV

LOADS

$$DEAD = \frac{(4801 \text{ lb})}{1} = 4,365 \# \quad \text{VERTICAL}$$

$$LIVE = 11,125 \# \quad \text{LATERAL}$$

$$\pm 13,000 \# \quad \text{VERTICAL (@ BOLTS)}$$

$$11,125 \# (1'-6") = \pm 16.7 \text{ K-FT} \quad \text{MOMENT}$$

REQUIRED MASS

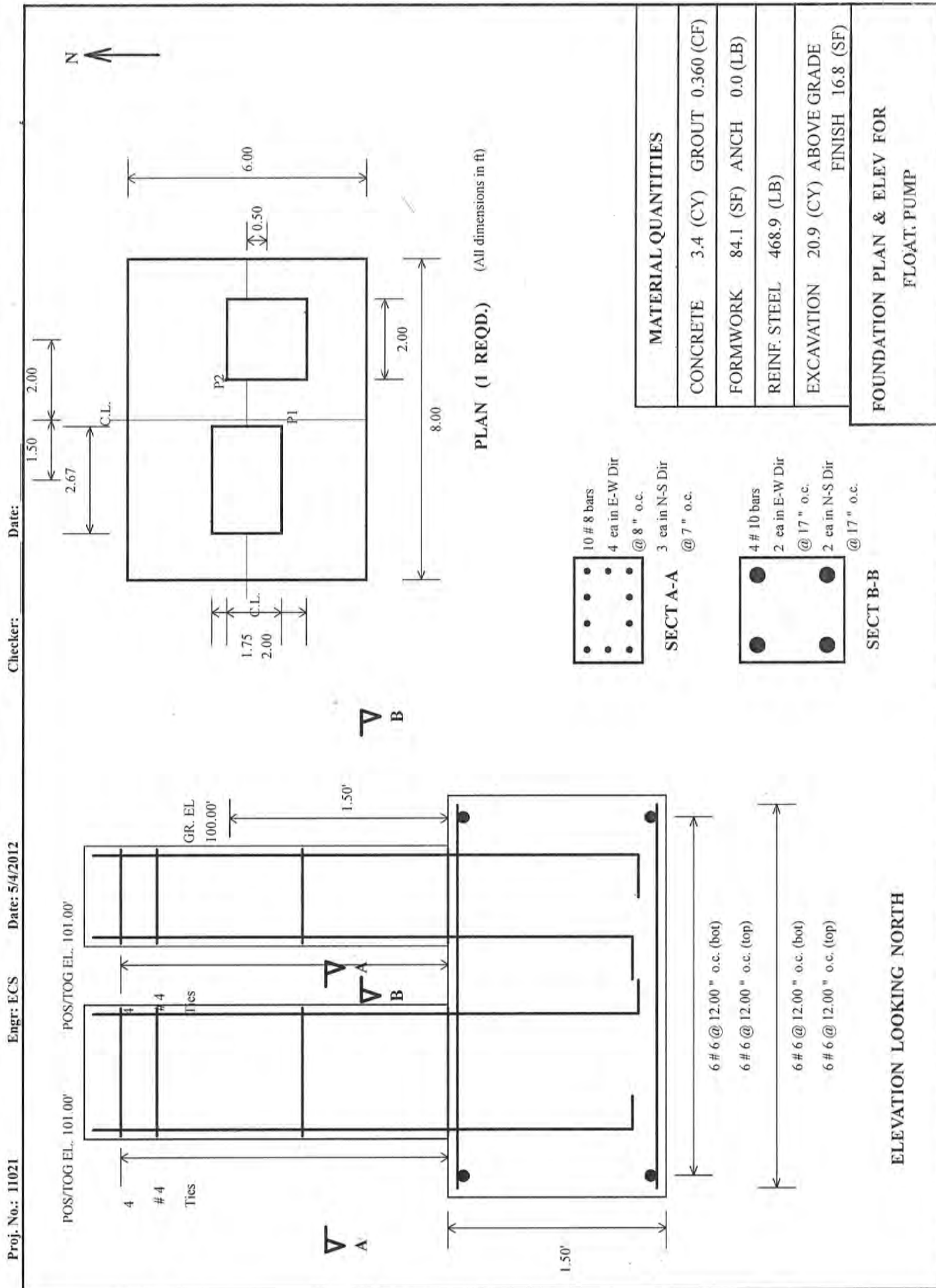
MAKE FOUNDATION 3 TIMES WEIGHT OF PUMP!

$$\text{REQUIRED CONCRETE} = (3)(2900 \#) / (150 \text{ PCF}) = 58.0 \text{ FT}^3$$

$$\text{PEDISTAL} = (1'-9") (2'-8") (3'-7") = 16.72 \text{ FT}^3$$

$$\text{FOOTING} = (6'-0") (6'-0") (1'-6") = 54 \text{ FT}^3$$

$$\text{SUM} = 70 \text{ FT}^3 \quad \underline{\underline{OK}}$$



Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/4/2012
Foundation Name	Float. Pump		Time	8:17:07 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\007 Regrind Area Concrete\Flotation Foundations\Flotation Processed Ore Transfer Pump Combined Foundation.mcs			

DETAIL REPORT FOR Float. Pump**PROJECT INFORMATION**

Project Name: CC&V High Grade Mill
Project Number: 11021
Client: CC&V
Project Location: Victor CO
Foundation Description: FOUNDATION

DESIGN CODE ACI 318 - 2008 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength (psi) 4000
 Unit Weight (pcf) 150
 Pier Concrete Cover - E-W Dir (in) 2
 Pier Concrete Cover - N-S Dir (in) 2
 Footing Side Concrete Cover - E-W Dir (in) 3
 Footing Side Concrete Cover - N-S Dir (in) 3
 Footing Top Concrete Cover (in) 2
 Footing Bottom Concrete Cover - X Dir (in) 3

SOIL PARAMETERS:

Unit Weight (pcf) 120
 Allowable Net Bearing Capacity (psf) 4000
 Bearing Capacity Method Linear Soil Pressure
 Soil Type Granular
 Passive Pressure Coefficient Kp 3.69
 Soil To Concrete Friction f 0.5
 Allowable Increase in Soil Pressure due to Short Term Loads (%)
 Wind 33.33 Earthquake 33.33 Test 20
 Erection Stability Ratio 1.25
 Operation Stability Ratio 1.25
 Test Stability Ratio 1.25
 Safety Factor against Lateral Forces 1.5

MINIMUM FOUNDATION CRITERIA:

Depth of Footing Below Grade (ft) 3
 Minimum Soil Cover (ft) 0
 Grade Elevation (ft) 100

REINFORCING STEEL PARAMETERS:

Yield Strength (ksi) 60
 Unit Weight (pcf) 490
 Modulus of Elasticity (ksi) 29000
 Pier Min Rebar Spacing (in) 3
 Footing Min Rebar Spacing (in) 6
 Footing Max Rebar Spacing (in) 18

REBAR PARAMETERS:

Max Long Bar Size 10
 Min Long Bar Size 7
 Max Tie Bar Size 4
 Min Tie Bar Size 3
 Max Ftg Bar Size 18
 Temp & Shrinkage Steel Ratio 0.0018

BUOYANCY CRITERIA:

Consider Buoyancy: No
 Consider soil for buoyancy: No
 Water table below grade (ft) 0

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/4/2012
Foundation Name	Float. Pump		Time	8:17:07 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\Flotation Foundations\Flotation Processed Ore Transfer Pump Combined Foundation.mcs			

DETAIL REPORT FOR Float. Pump**APPLIED LOADS****P1**

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	4.37	0.00	0.00	0.00	0.00
2 - Live	0.00	1.00	0.00	0.00	0.00
3 - Impact	0.00	0.00	0.00	11.13	16.68

P2

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	2.02	0.08	0.00	0.00	0.00
2 - Live	2.58	0.10	0.00	0.00	0.00
3 - Impact	0.00	0.00	0.00	0.00	0.00

UNFACTORED (ALLOWABLE) LOAD COMBINATIONS**P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead + Live	4.37	1.00	0.00	0.00	0.00
2 - Dead + 0.75Impact	4.37	0.00	0.00	8.34	12.51

P2

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead + Live	4.60	0.18	0.00	0.00	0.00
2 - Dead + 0.75Impact	2.02	0.08	0.00	0.00	0.00

FACTORED (ULTIMATE) LOAD COMBINATIONS**P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	6.11	0.00	0.00	0.00	0.00
2 - 1.2Dead + 1.6Live	5.24	1.60	0.00	0.00	0.00
3 - 1.2Dead + Live + 1.6Impact	5.24	1.00	0.00	17.80	26.69

P2

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	2.83	0.11	0.00	0.00	0.00
2 - 1.2Dead + 1.6Live	6.55	0.26	0.00	0.00	0.00
3 - 1.2Dead + Live + 1.6Impact	5.00	0.20	0.00	0.00	0.00

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/4/2012
Foundation Name	Float. Pump		Time	8:17:07 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-007 Regrind Area Concrete\Flotation Foundations\Flotation Processed Ore Transfer Pump Combined Foundation.mcs			

DETAIL REPORT FOR Float. Pump**BEARING CAPACITY - LINEAR SOIL PRESSURE METHOD**

Load Comb	Max Pressure (ksf)	All Pressure (ksf)	Ecc N/S Dir (ft)	Ecc E/W Dir (ft)	Moment N/S axis (kip-ft)	Moment E/W axis (kip-ft)	Rem
1 - Dead + Live	0.81	4.36	0.10	0.26	7.74	3.05	
2 - Dead + 0.75Impact	1.68	4.36	1.60	0.07	1.82	44.12	

STABILITY RATIO / SLIDING SAFETY FACTOR

Load Comb	S.R. N/S Dir	S.R. E/W Dir	All S.R.	Sliding FS - N/S	Sliding FS - E/W	All FS	Remarks
1 - Dead + Live	100.00	24.90	1.25	100.00	20.35	1.50	
2 - Dead + 0.75Impact	1.83	100.00	1.25	3.08	100.00	1.50	

FOOTING DESIGN INFORMATION

E-W Dim (ft)	8.00
N-S Dim (ft)	6.00
Thickness (ft)	1.50

Top Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
3. 1.2Dead + Live + 1.6Impact	6	6	12	0.44	0	0	E-W
3. 1.2Dead + Live + 1.6Impact	6	6	12	0.44	0.02	-1.01	N-S

Bottom Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
2. 1.2Dead + 1.6Live	6	6	12	0.44	0.39	0.81	E-W
3. 1.2Dead + Live + 1.6Impact	6	6	12	0.44	0.39	8.19	N-S

PUNCHING SHEAR**P1**

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
3. 1.2Dead + Live + 1.6Impact	7.34	3.24	189.74	

P2

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
3. 1.2Dead + Live + 1.6Impact	6.80	3.20	189.74	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/4/2012
Foundation Name	Float. Pump		Time	8:17:07 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\Flotation Foundations\Flotation Processed Ore Transfer Pump Combined Foundation.mcs			

DETAIL REPORT FOR Float. Pump**MAXIMUM SHEAR - E-W DIRECTION**

Load Comb	Left Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	1.17	2.20	2.19	94.87	
2 - 1.2Dead + 1.6Live	7.00	-3.04	3.01	94.87	
3 - 1.2Dead + Live + 1.6Impact	7.00	-2.37	2.36	94.87	

MAXIMUM SHEAR - N-S DIRECTION

Load Comb	Bottom Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	4.67	-2.57	1.91	94.87	
2 - 1.2Dead + 1.6Live	0.96	3.07	2.28	94.87	
3 - 1.2Dead + Live + 1.6Impact	5.04	-31.97	23.78	94.87	

PIER/BASE PLATE DESIGN INFORMATION

	P1	P2
E-W Dim (ft)	2.67	2.00
N-S Dim (ft)	1.75	2.00
Height above grade (ft)	1.00	1.00
E-W Offset (ft)	-1.50	2.00
N-S Offset (ft)	0.00	-0.50
Requested Reinf. Ratio	0.0050	0.0050
Provided Reinf. Ratio	0.0117	0.0088
Long Bar Size	8	10
Bars in E-W Dir	4	2
Bars in N-S Dir	3	2
Total Long Bars	10	4
Tie Bar Size	4	4
Total No. of Ties	4	4
Major Tie Spacing (in)	12	12

PIER ULTIMATE LOAD CAPACITIES**P1**

Load Comb	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	Rem
1 - 1.4Dead	8.56	1420.75	1.11	196.09	0.88	150.68	
2 - 1.2Dead + 1.6Live	7.34	1019.27	4.00	553.87	0.75	104.39	
3 - 1.2Dead + Live + 1.6Impact	7.34	28.77	2.50	9.80	71.19	279.01	

P2

Load Comb	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	Rem
1 - 1.4Dead	4.93	1167.89	0.54	135.57	0.54	135.57	
2 - 1.2Dead + 1.6Live	8.35	1167.89	0.92	135.57	0.92	135.57	
3 - 1.2Dead + Live + 1.6Impact	6.80	1167.89	0.75	135.57	0.75	135.57	

Dimensional Solutions FOUNDATION3D

Version 5.8.2

Date 5/4/2012

Foundation Name

Float. Pump

Time

8:17:07 AM

Designed By:

FLSmith Salt Lake City

Engineer

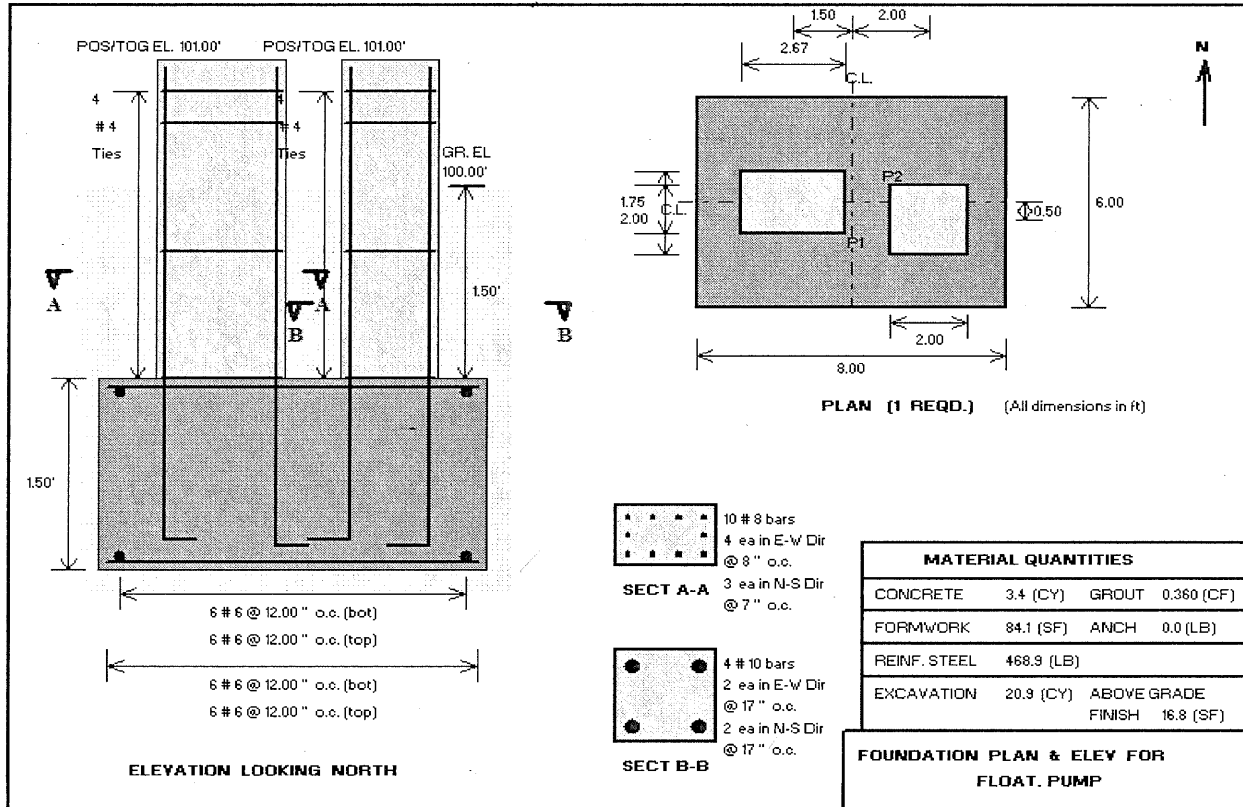
ECS

Checker

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Filename:

Flotation Foundations\Flotation Processed Ore Transfer Pump Combined Foundation.mcs

DETAIL REPORT FOR Float. Pump



Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/4/2012
Foundation Name	Float. Pump		Time	8:20:26 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\007 Re grind Area Concrete\Flotation Foundations\Flotation Processed Ore Transfer Pump Foundation.mcs			

DETAIL REPORT FOR Float. Pump**PROJECT INFORMATION**

Project Name: CC&V High Grade Mill
Project Number: 11021
Client: CC&V
Project Location: Victor CO
Foundation Description: FOUNDATION

DESIGN CODE ACI 318 - 2008 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength (psi) 4000
 Unit Weight (pcf) 150
 Pier Concrete Cover - E-W Dir (in) 2
 Pier Concrete Cover - N-S Dir (in) 2
 Footing Side Concrete Cover - E-W Dir (in) 3
 Footing Side Concrete Cover - N-S Dir (in) 3
 Footing Top Concrete Cover (in) 2
 Footing Bottom Concrete Cover - X Dir (in) 3

SOIL PARAMETERS:

Unit Weight (pcf) 120
 Allowable Net Bearing Capacity (psf) 4000
 Bearing Capacity Method Linear Soil Pressure
 Soil Type Granular
 Passive Pressure Coefficient Kp 3.69
 Soil To Concrete Friction f 0.5
 Allowable Increase in Soil Pressure due to Short Term Loads (%)
 Wind 33.33 Earthquake 33.33 Test 20
 Erection Stability Ratio 1.25
 Operation Stability Ratio 1.25
 Test Stability Ratio 1.25
 Safety Factor against Lateral Forces 1.5

MINIMUM FOUNDATION CRITERIA:

Depth of Footing Below Grade (ft) 4
 Minimum Soil Cover (ft) 0
 Grade Elevation (ft) 100

REINFORCING STEEL PARAMETERS:

Yield Strength (ksi) 60
 Unit Weight (pcf) 490
 Modulus of Elasticity (ksi) 29000
 Pier Min Rebar Spacing (in) 3
 Footing Min Rebar Spacing (in) 6
 Footing Max Rebar Spacing (in) 18

REBAR PARAMETERS:

Max Long Bar Size 10
 Min Long Bar Size 7
 Max Tie Bar Size 4
 Min Tie Bar Size 3
 Max Ftg Bar Size 18
 Temp & Shrinkage Steel Ratio 0.0018

BUOYANCY CRITERIA:

Consider Buoyancy: No
 Consider soil for buoyancy: No
 Water table below grade (ft) 0

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/4/2012
Foundation Name	Float. Pump		Time	8:20:26 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\Flotation Foundations\Flotation Processed Ore Transfer Pump Foundation.mcs			

DETAIL REPORT FOR Float. Pump**APPLIED LOADS****P1**

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	4.37	0.00	0.00	0.00	0.00
2 - Live	0.00	1.00	0.00	0.00	0.00
3 - Impact	0.00	0.00	0.00	11.13	16.68

UNFACTORED (ALLOWABLE) LOAD COMBINATIONS**P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead + Live	4.37	1.00	0.00	0.00	0.00
2 - Dead + 0.75Impact	4.37	0.00	0.00	8.34	12.51

FACTORED (ULTIMATE) LOAD COMBINATIONS**P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	6.11	0.00	0.00	0.00	0.00
2 - 1.2Dead + 1.6Live	5.24	1.60	0.00	0.00	0.00
3 - 1.2Dead + Live + 1.6Impact	5.24	1.00	0.00	17.80	26.69

BEARING CAPACITY - LINEAR SOIL PRESSURE METHOD

Load Comb	Max Pressure (ksf)	All Pressure (ksf)	Ecc N/S Dir (ft)	Ecc E/W Dir (ft)	Moment N/S axis (kip-ft)	Moment E/W axis (kip-ft)	Rem
1 - Dead + Live	0.81	4.48	0.00	0.21	5.00	0.00	
2 - Dead + 0.75Impact	3.51	4.48	2.23	0.00	0.00	54.23	

STABILITY RATIO / SLIDING SAFETY FACTOR

Load Comb	S.R. N/S Dir	S.R. E/W Dir	All S.R.	Sliding FS - N/S	Sliding FS - E/W	All FS	Remarks
1 - Dead + Live	100.00	14.59	1.25	100.00	25.11	1.50	
2 - Dead + 0.75Impact	1.35	100.00	1.25	3.01	100.00	1.50	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/4/2012
Foundation Name	Float. Pump		Time	8:20:26 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\Flotation Foundations\Flotation Processed Ore Transfer Pump Foundation.mcs			

DETAIL REPORT FOR Float. Pump**FOOTING DESIGN INFORMATION**

E-W Dim (ft)	6.00
N-S Dim (ft)	6.00
Thickness (ft)	1.50

Top Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
1.2Dead + Live + 1.6Impact	6	6	12	0.44	0	0	E-W
1.2Dead + Live + 1.6Impact	6	6	12	0.44	0.02	-1.32	N-S

Bottom Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
1.2Dead + 1.6Live	6	6	12	0.44	0.39	0.57	E-W
1.2Dead + Live + 1.6Impact	6	6	12	0.44	0.39	13.71	N-S

PUNCHING SHEAR**P1**

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
1.2Dead + Live + 1.6Impact	8.18	3.61	189.74	

MAXIMUM SHEAR - E-W DIRECTION

Load Comb	Left Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	5.50	-0.79	0.79	94.87	
2 - 1.2Dead + 1.6Live	5.50	-1.29	1.28	94.87	
3 - 1.2Dead + Live + 1.6Impact	5.50	-1.06	1.05	94.87	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/4/2012
Foundation Name	Float. Pump		Time	8:20:26 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\007 Re grind Area Concrete\Flotation Foundations\Flotation Processed Ore Transfer Pump Foundation.mcs			

DETAIL REPORT FOR Float. Pump**MAXIMUM SHEAR - N-S DIRECTION**

Load Comb	Bottom Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	5.04	-1.53	1.51	94.87	
2 - 1.2Dead + 1.6Live	5.04	-1.31	1.30	94.87	
3 - 1.2Dead + Live + 1.6Impact	5.04	-25.83	25.62	94.87	

PIER/BASE PLATE DESIGN INFORMATION

P1	
E-W Dim (ft)	2.67
N-S Dim (ft)	1.75
Height above grade (ft)	1.00
E-W Offset (ft)	0.00
N-S Offset (ft)	0.00
Requested Reinf. Ratio	0.0050
Provided Reinf. Ratio	0.0117
Long Bar Size	8
Bars in E-W Dir	4
Bars in N-S Dir	3
Total Long Bars	10
Tie Bar Size	4
Total No. of Ties	6
Major Tie Spacing (in)	12

PIER ULTIMATE LOAD CAPACITIES

P1							Rem
Load Comb	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	
1 - 1.4Dead	9.55	1420.75	1.24	196.09	0.98	150.68	
2 - 1.2Dead + 1.6Live	8.18	889.11	5.60	605.96	0.84	91.25	
3 - 1.2Dead + Live + 1.6Impact	8.18	25.45	3.50	10.89	88.99	276.87	

Dimensional Solutions FOUNDATION3D

Version 5.8.2

Date 5/4/2012

Foundation Name Float. Pump

Time 8:20:26 AM

Designed By: FLSmidth Salt Lake City

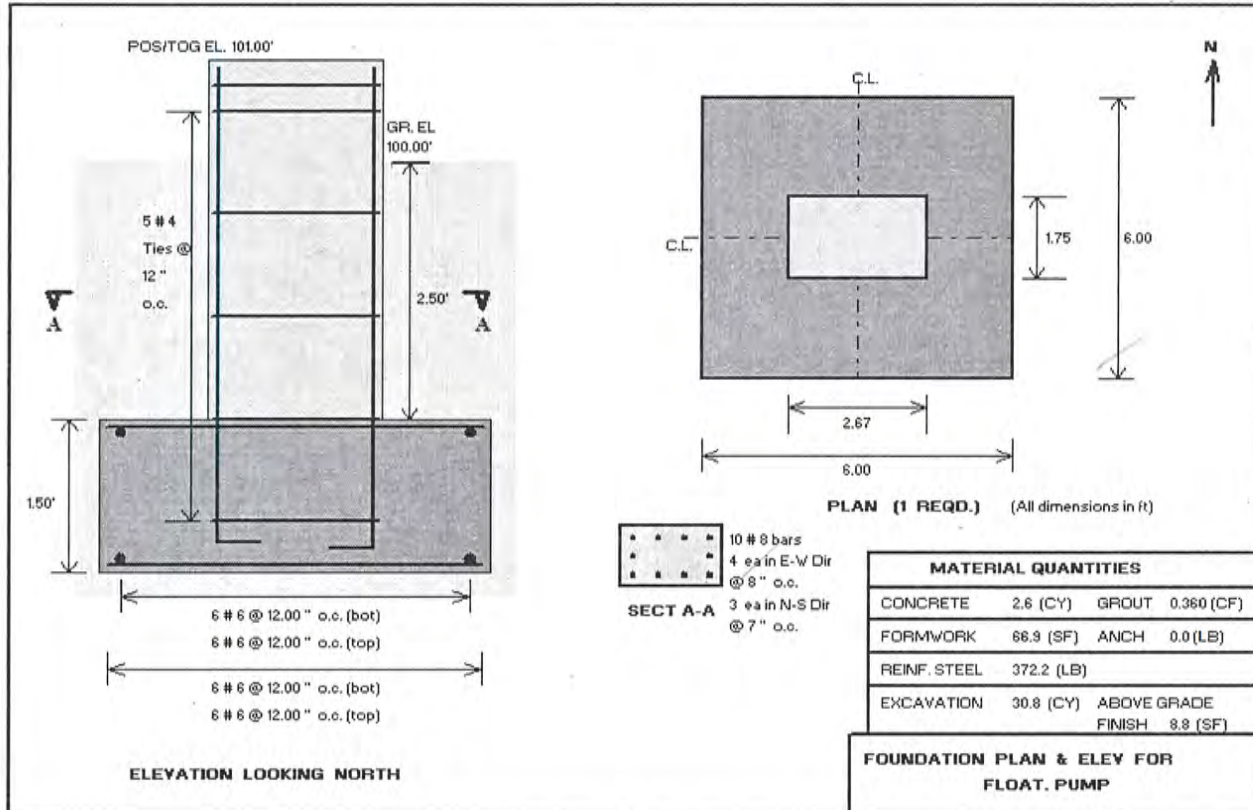
Engineer ECS

Checker

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Filename:

Flotation Foundations\Flotation Processed Ore Transfer Pump Foundation.mcs

DETAIL REPORT FOR Float. Pump

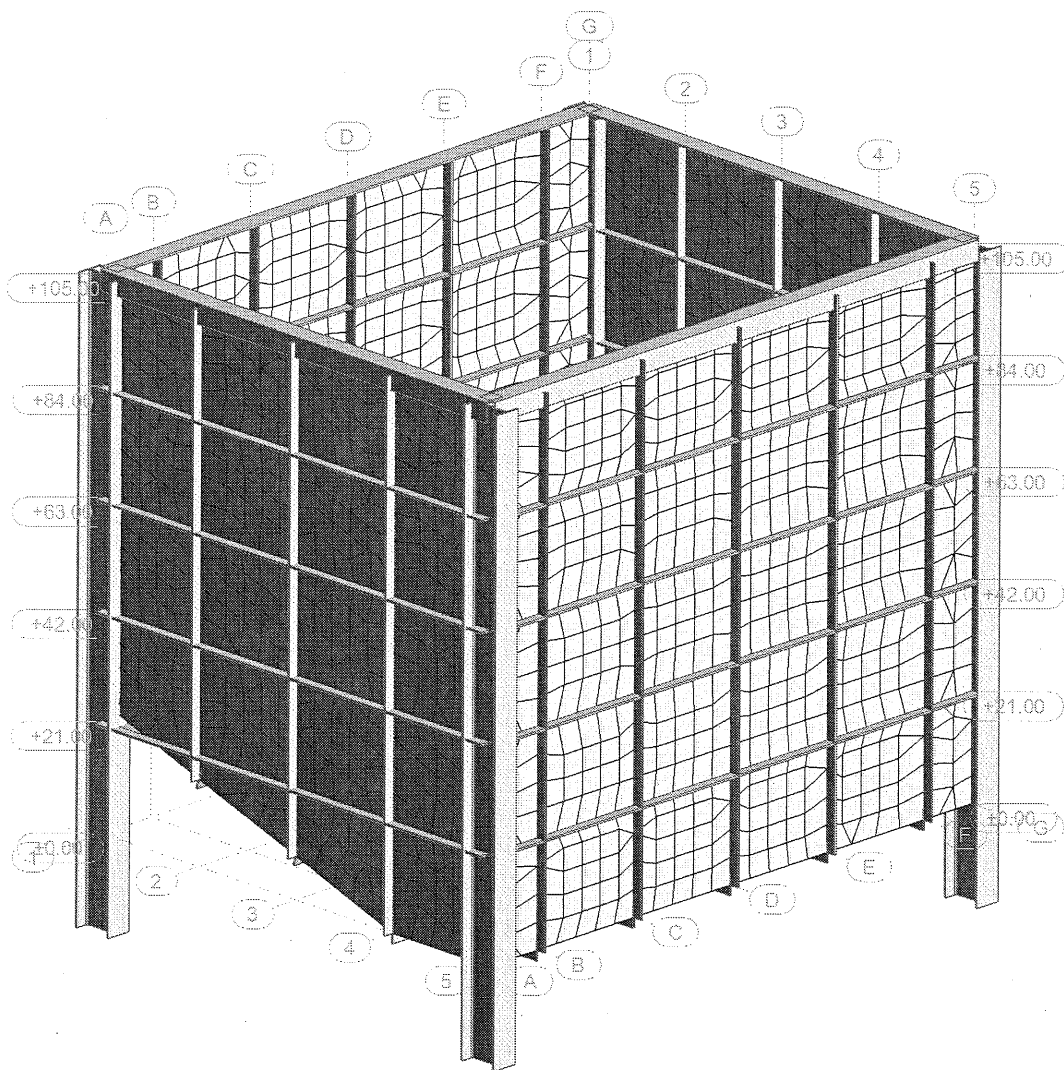
- C-007a Rev. 0 / Page 52 of 162



7158 S. FLSmidth Drive
Midvale, UT 84047-5559

Engineer: **Ed Summners**
Calc No.: **S-008** Job.: **11021**
Project: **Flotation Processed Ore Sump**
Client: **CC&V**

View - Cases: 4 (Seismic Y)

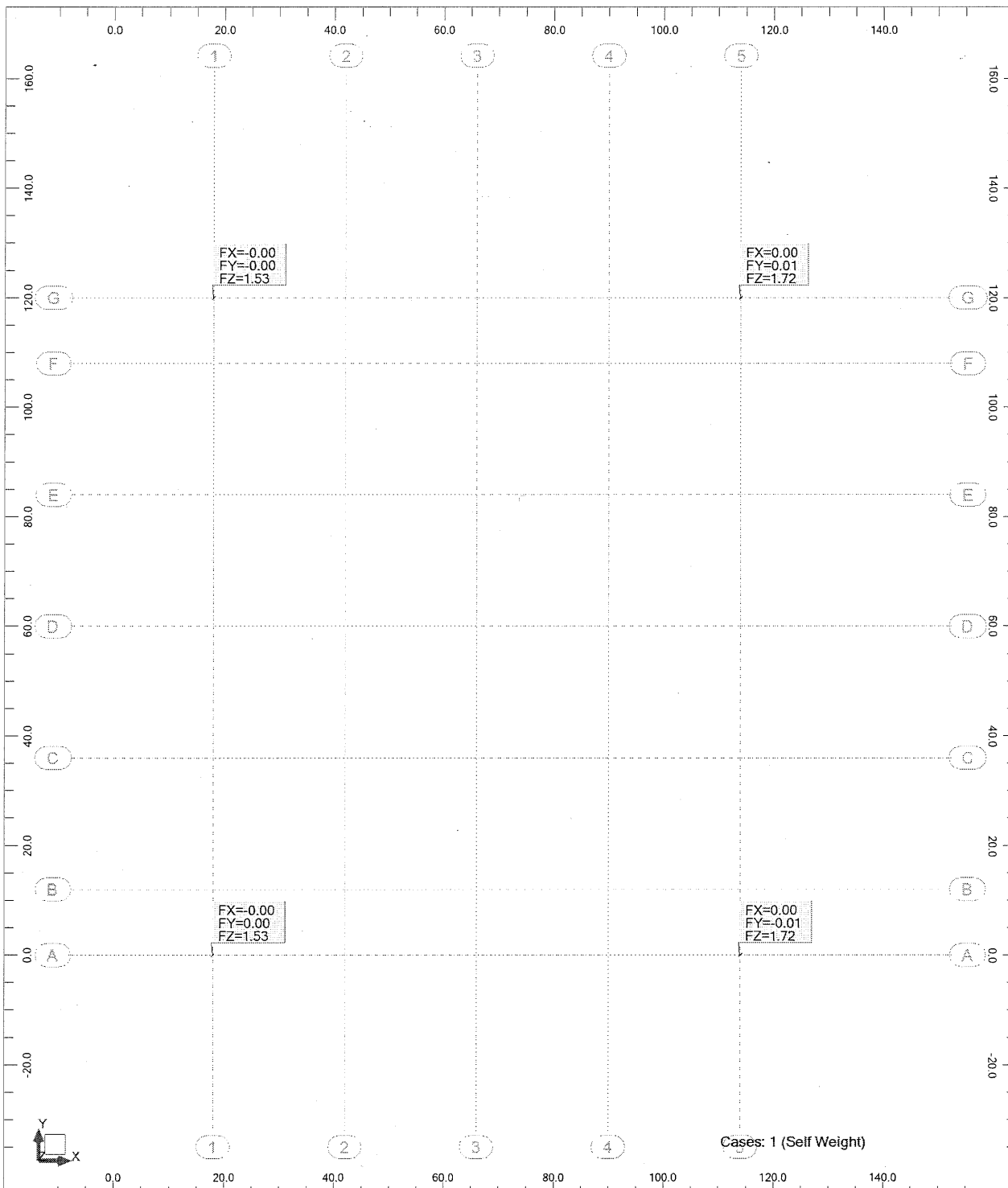




7158 S. FLSmidth Drive
Midvale, UT 84047-5559

Engineer: **Ed Summers**
Calc No.: **S-008** Job.: **11021**
Project: **Flotation Processed Ore Sump**
Client: **CC&V**

View - Reaction forces(kip), Cases: 1 (Self Weight)



Date : 24/02/12
File: **Flotation Processed Ore Sump.rtd**

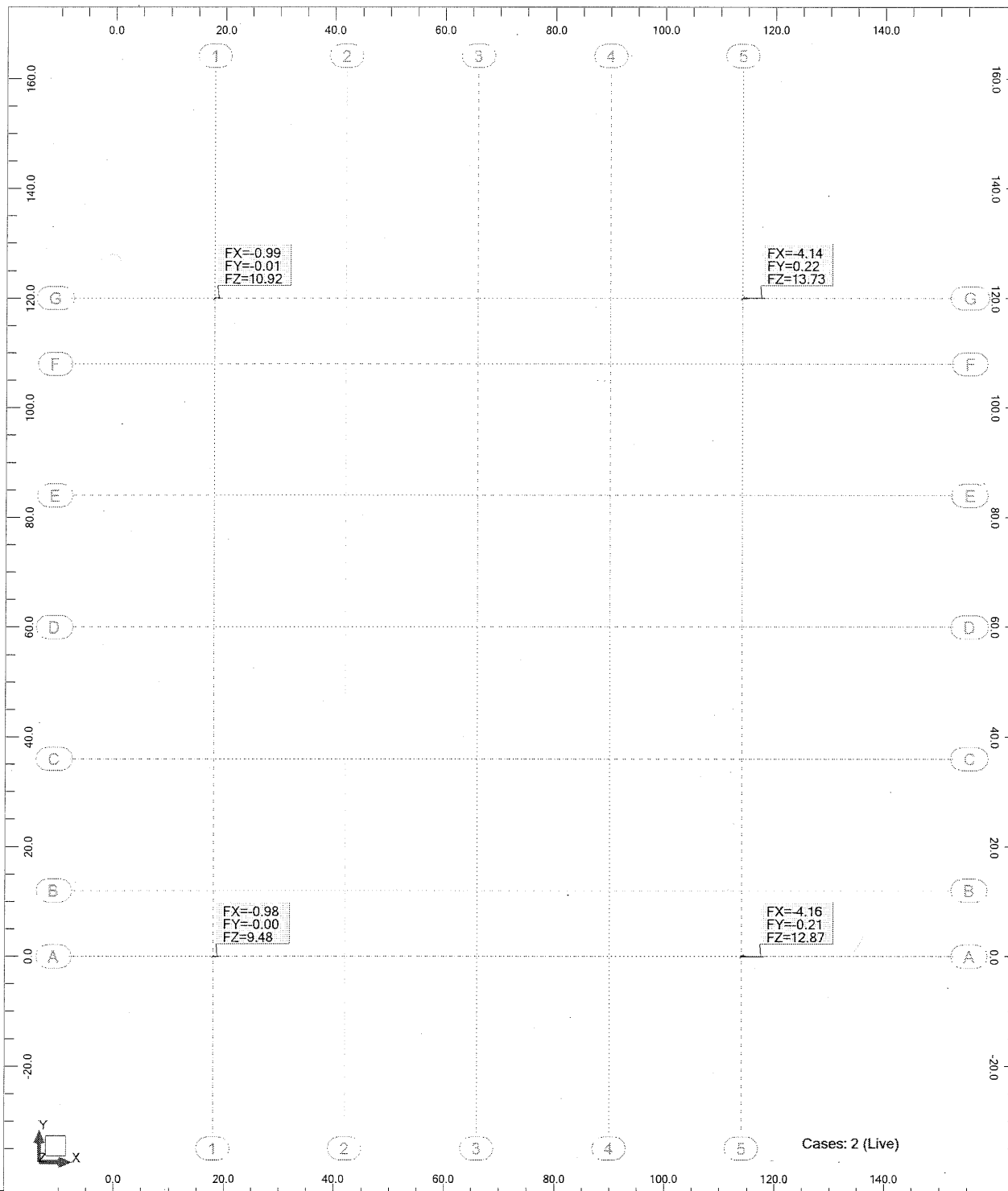
Page : **1**
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7158 S. FLSmidth Drive
Midvale, UT 84047-5559

Engineer: **Ed Summers**
Calc No.: **S-008** Job.: **11021**
Project: **Flotation Processed Ore Sump**
Client: **CC&V**

View - Reaction forces(kip), Cases: 2 (Live)



Date : 24/02/12

File: **Flotation Processed Ore Sump.rtd**

Page : **1**

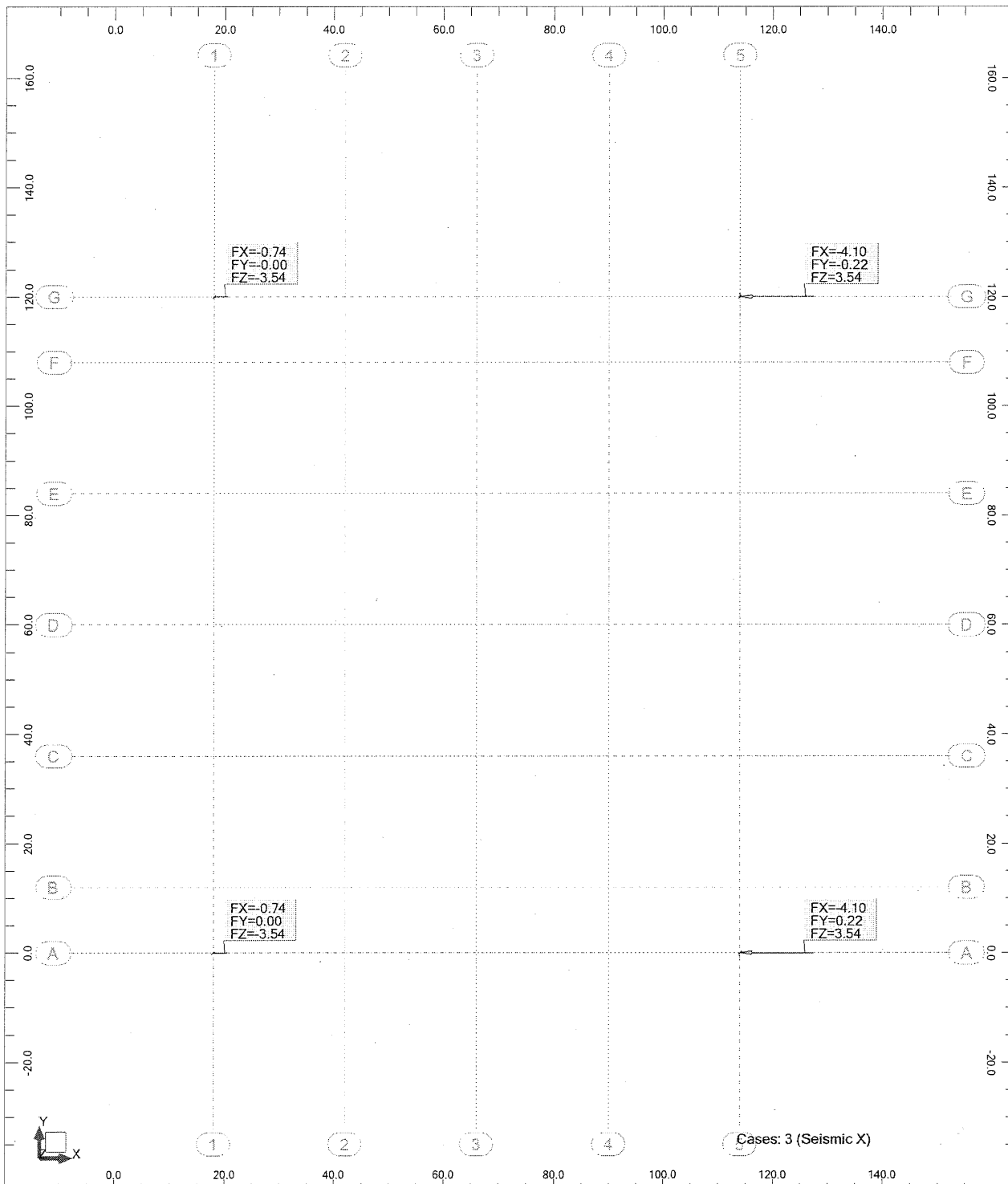
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7158 S. FLSmidth Drive
Midvale, UT 84047-5559

Engineer: **Ed Summers**
Calc No.: **S-008** Job.: **11021**
Project: **Flotation Processed Ore Sump**
Client: **CC&V**

View - Reaction forces(kip), Cases: 3 (Seismic X)



Date : 24/02/12

File: **Flotation Processed Ore Sump.rtd**

Page : **1**

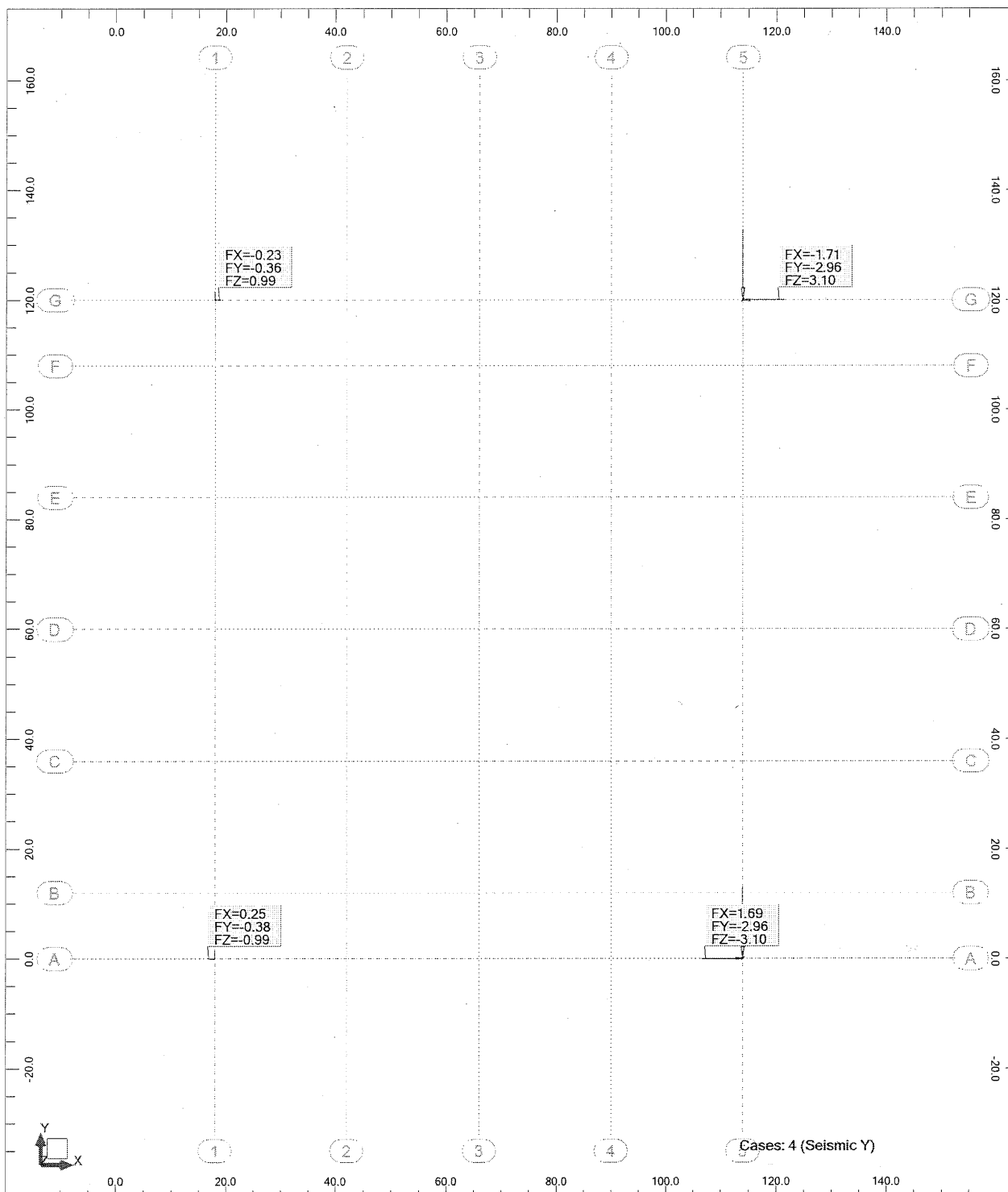
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Midvale, UT 84047-5559

Engineer: **Ed Summers**
Calc No.: **S-008** Job.: **11021**
Project: **Flotation Processed Ore Sump**
Client: **CC&V**

View - Reaction forces(kip), Cases: 4 (Seismic Y)



Date : 24/02/12

File: **Flotation Processed Ore Sump.rtd**

Page : **1**

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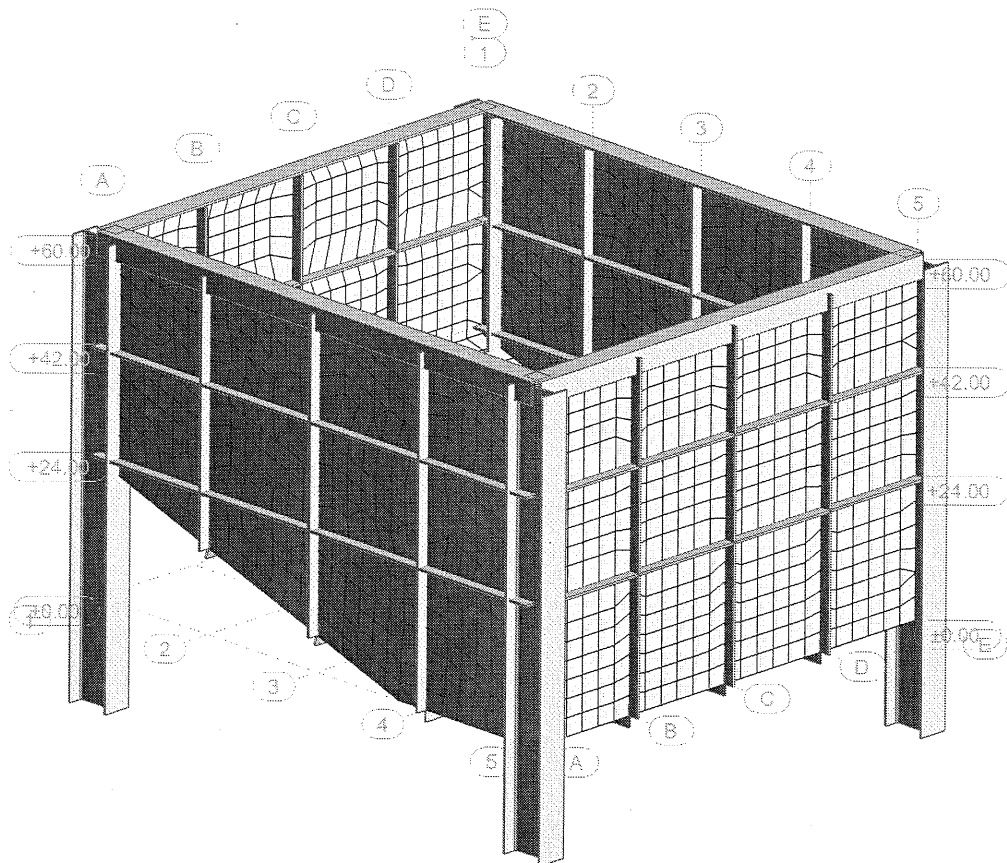
Bin Loads (e Grids K.5 & J.8)



7158 S. FLSmidth Drive
Midvale, UT 84047-5559

Engineer: **Ed Summners**
Calc No.: **S-008** Job.: **11021**
Project: **Regrind Cyclone Feed Sump**
Client: **CC&V**

View - Cases: 4 (Seismic Y)

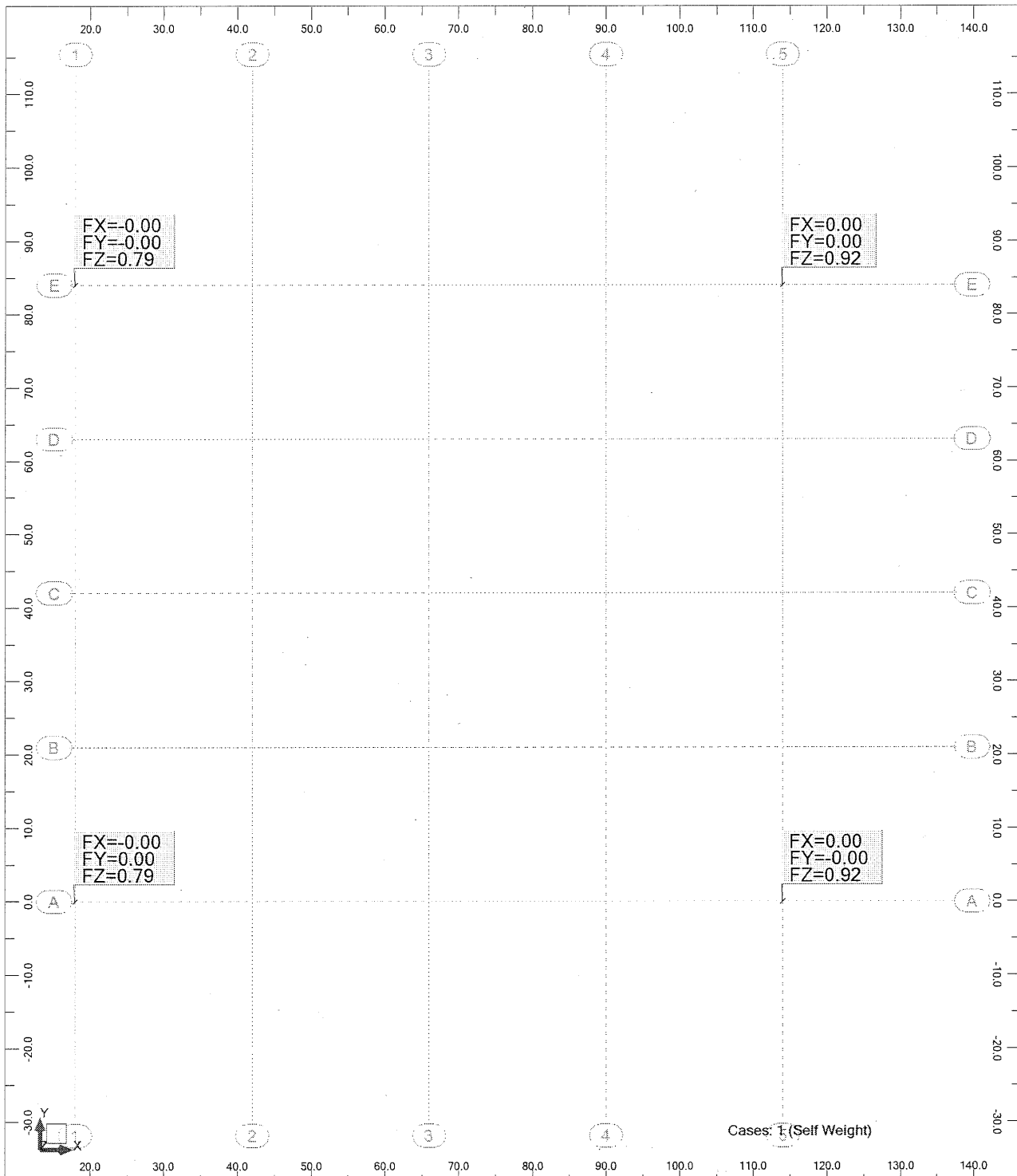




7158 S. FLSmidth Drive
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Engineer: **Ed Summers**
Calc No.: **S-008** Job.: **11021**
Project: **Regrind Cyclone Feed Sump**
Client: **CC&V**

View - Reaction forces(kip), Cases: 1 (Self Weight)



Date : 24/02/12
File: **Regrind Cyclone Feed Sump.rtd**

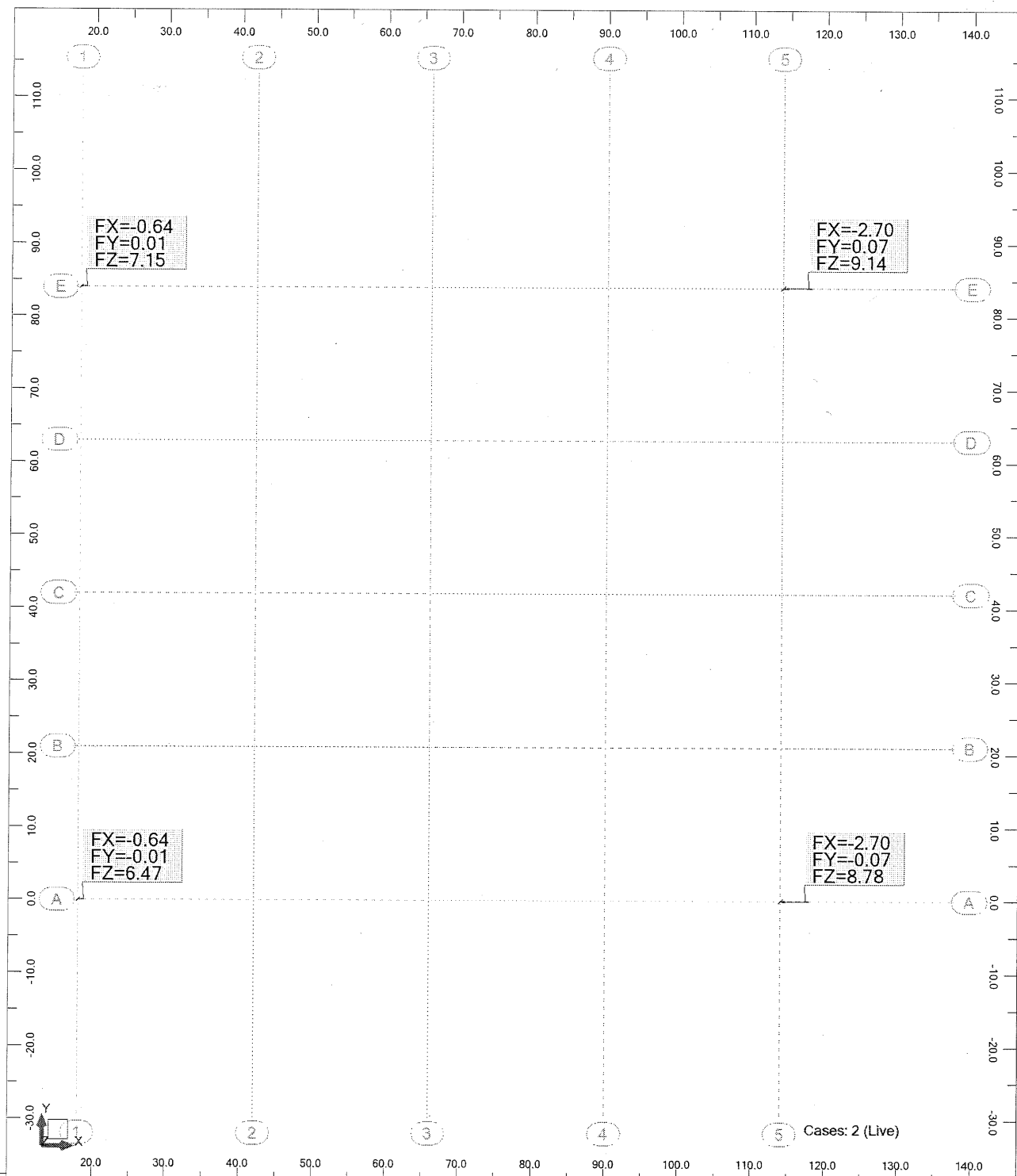
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Engineer: **Ed Summners**
Calc No.: **S-008** Job.: **11021**
Project: **Regrind Cyclone Feed Sump**
Client: **CC&V**

View - Reaction forces(kip), Cases: 2 (Live)

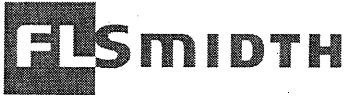


Date : 24/02/12

File: **Regrind Cyclone Feed Sump.rtd**

Page : **1**

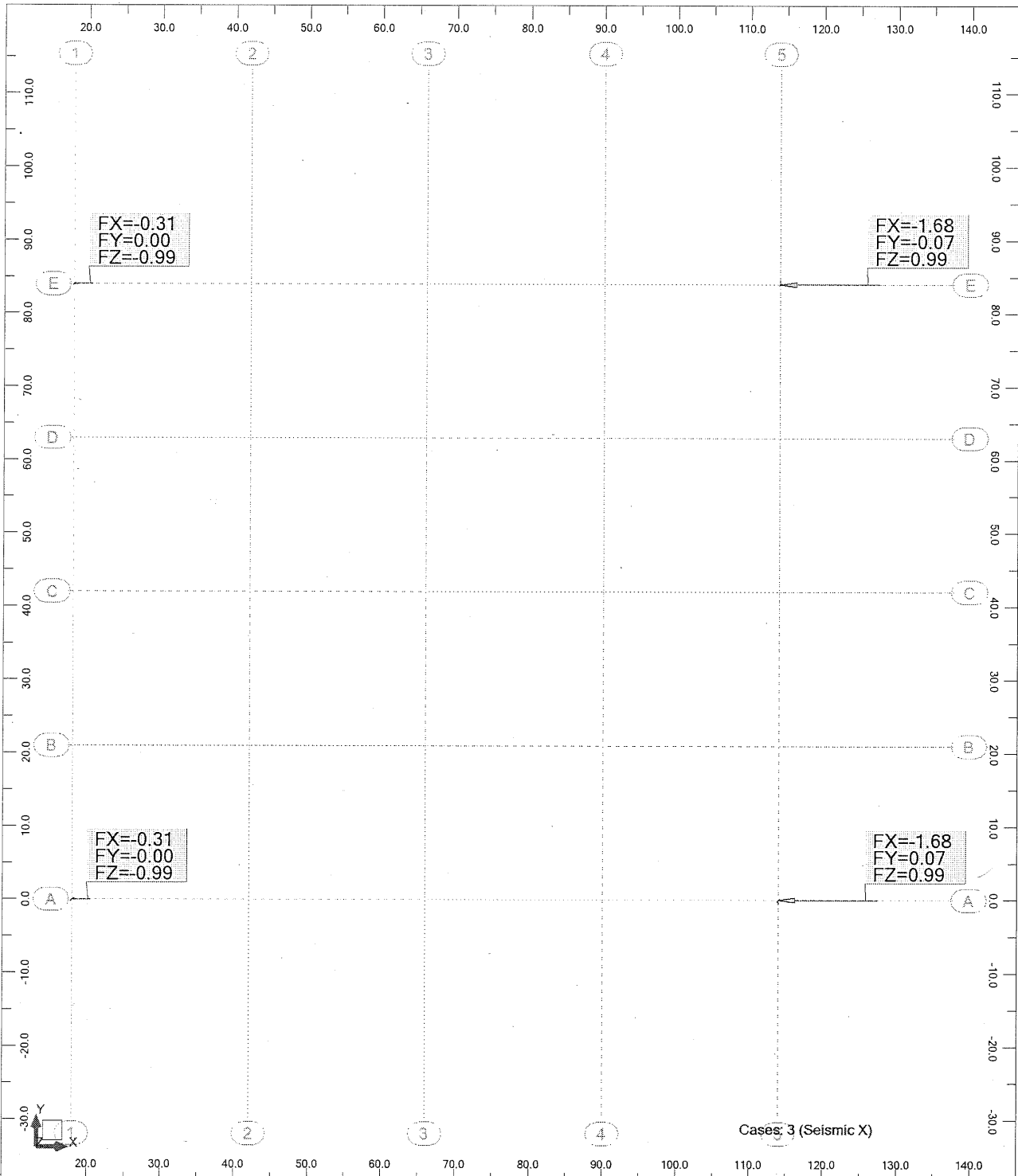
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Engineer: **Ed Summners**
Calc No.: **S-008** Job.: **11021**
Project: **Regrind Cyclone Feed Sump**
Client: **CC&V**

View - Reaction forces(kip), Cases: 3 (Seismic X)

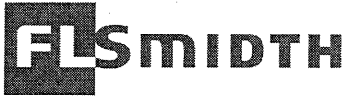


Date : 24/02/12

File: **Regrind Cyclone Feed Sump.rtd**

Page : **1**

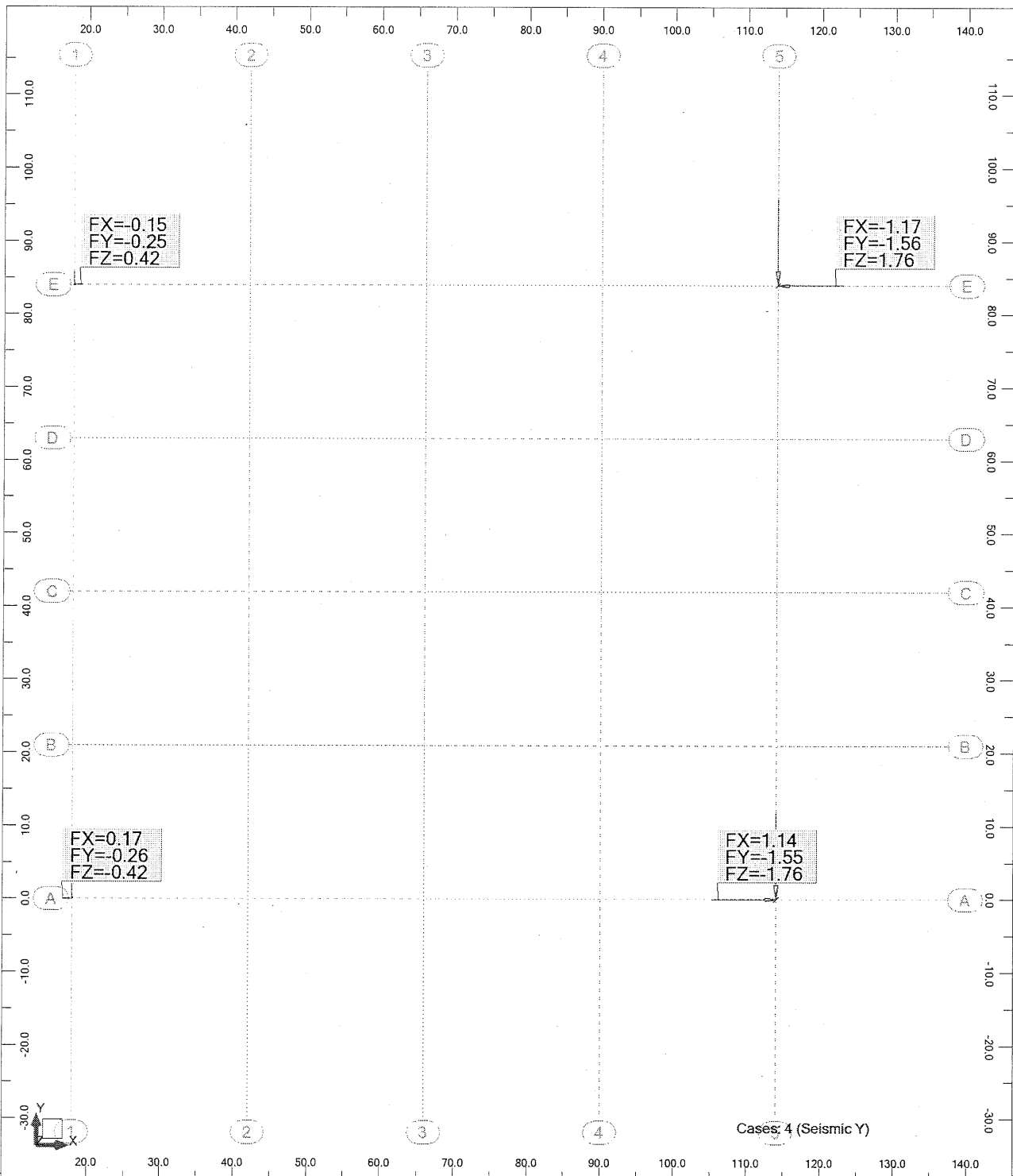
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Engineer: **Ed Summners**
Calc No.: **S-008** Job.: **11021**
Project: **Regrind Cyclone Feed Sump**
Client: **CC&V**

View - Reaction forces(kip), Cases: 4 (Seismic Y)



Date : 24/02/12

File: **Regrind Cyclone Feed Sump.rtd**

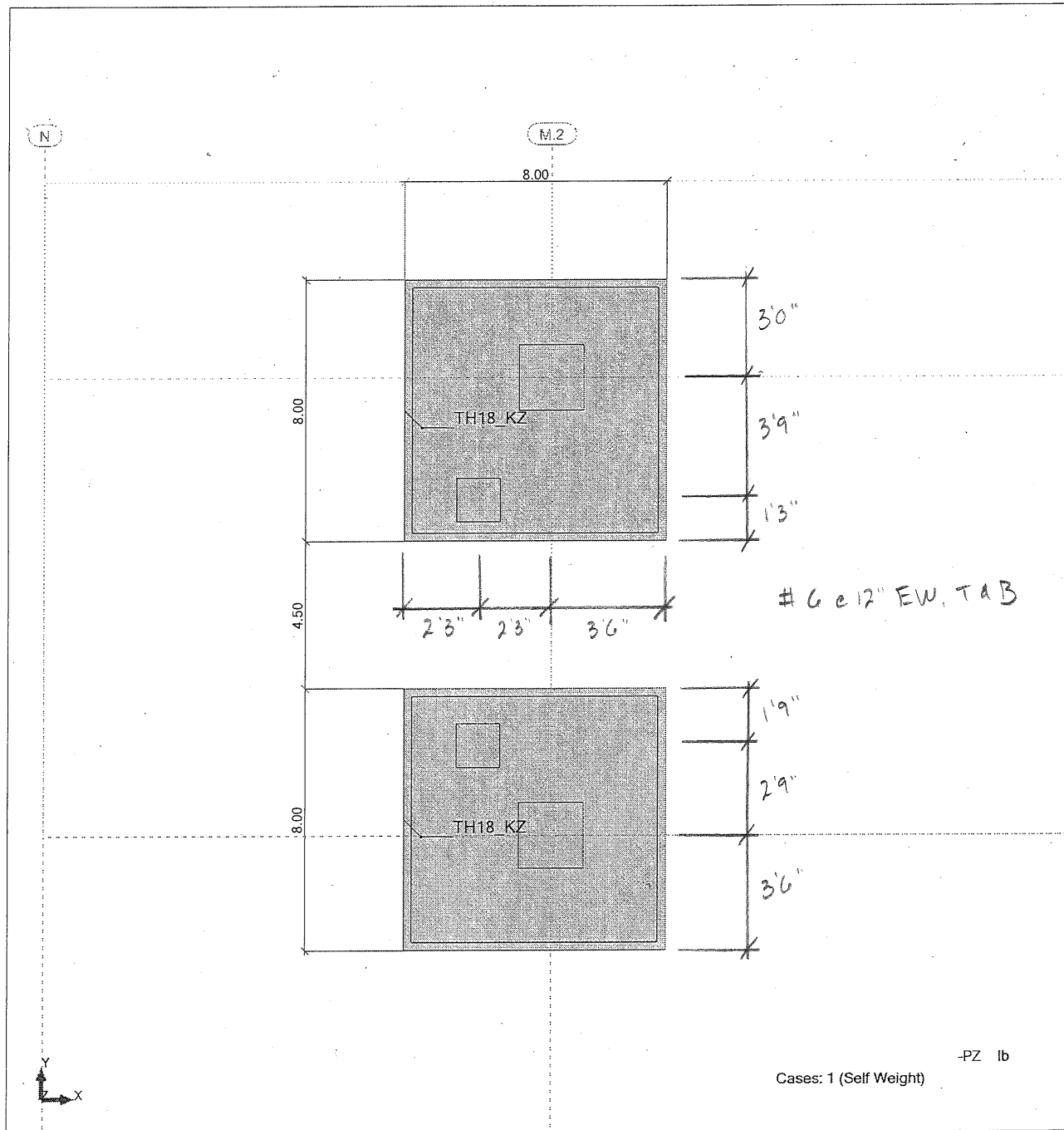
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View -



View -

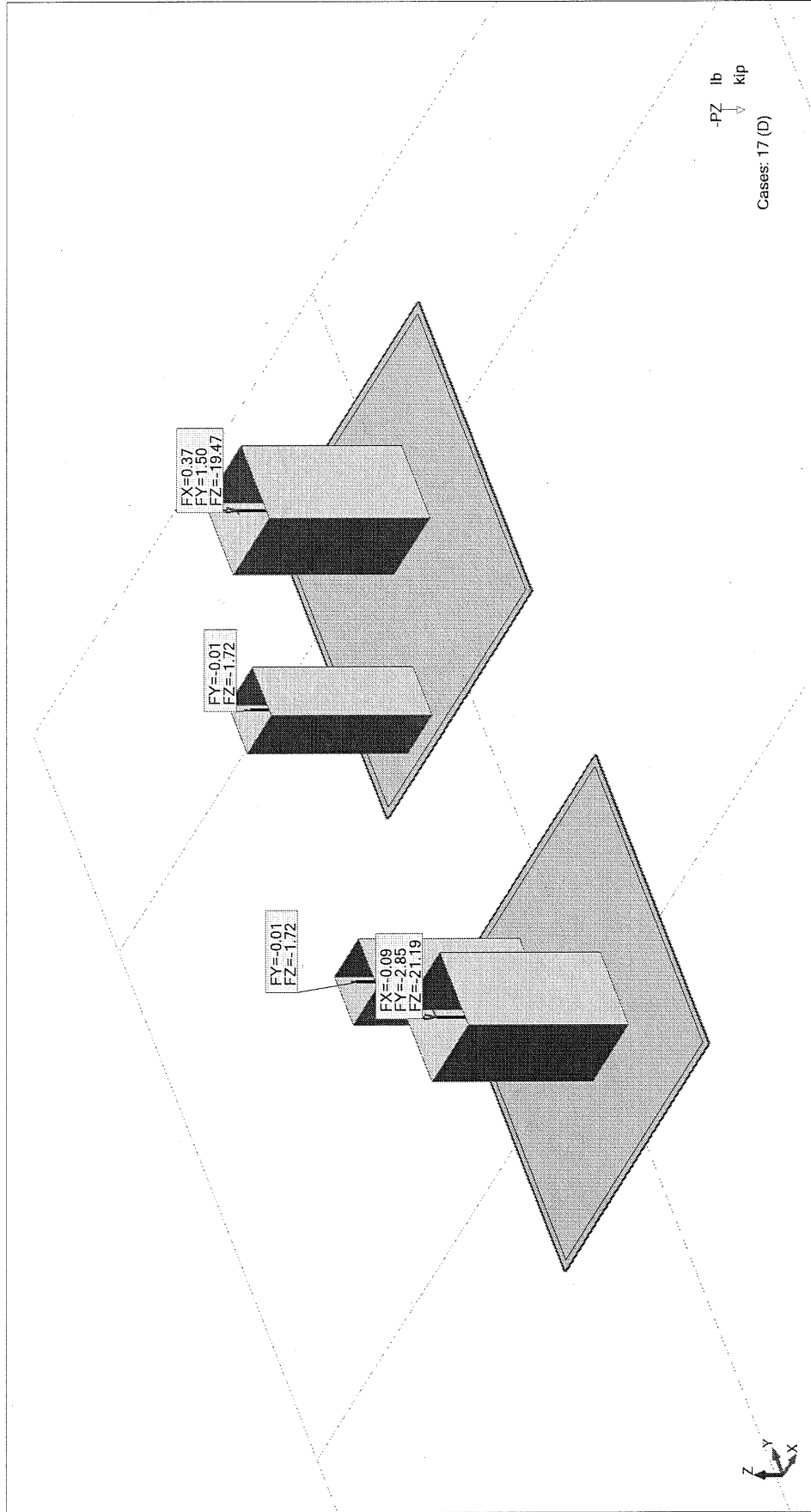




7158 S. FLSmidth Drive
Midvale, Utah 84047-5559

Engineer: Clint Karren
Calc No.: Job.:11021
Project: Flotation Combined Footing @ M.2,4
Client: CC&V High Grade Ore

View - Cases: 17 (D)

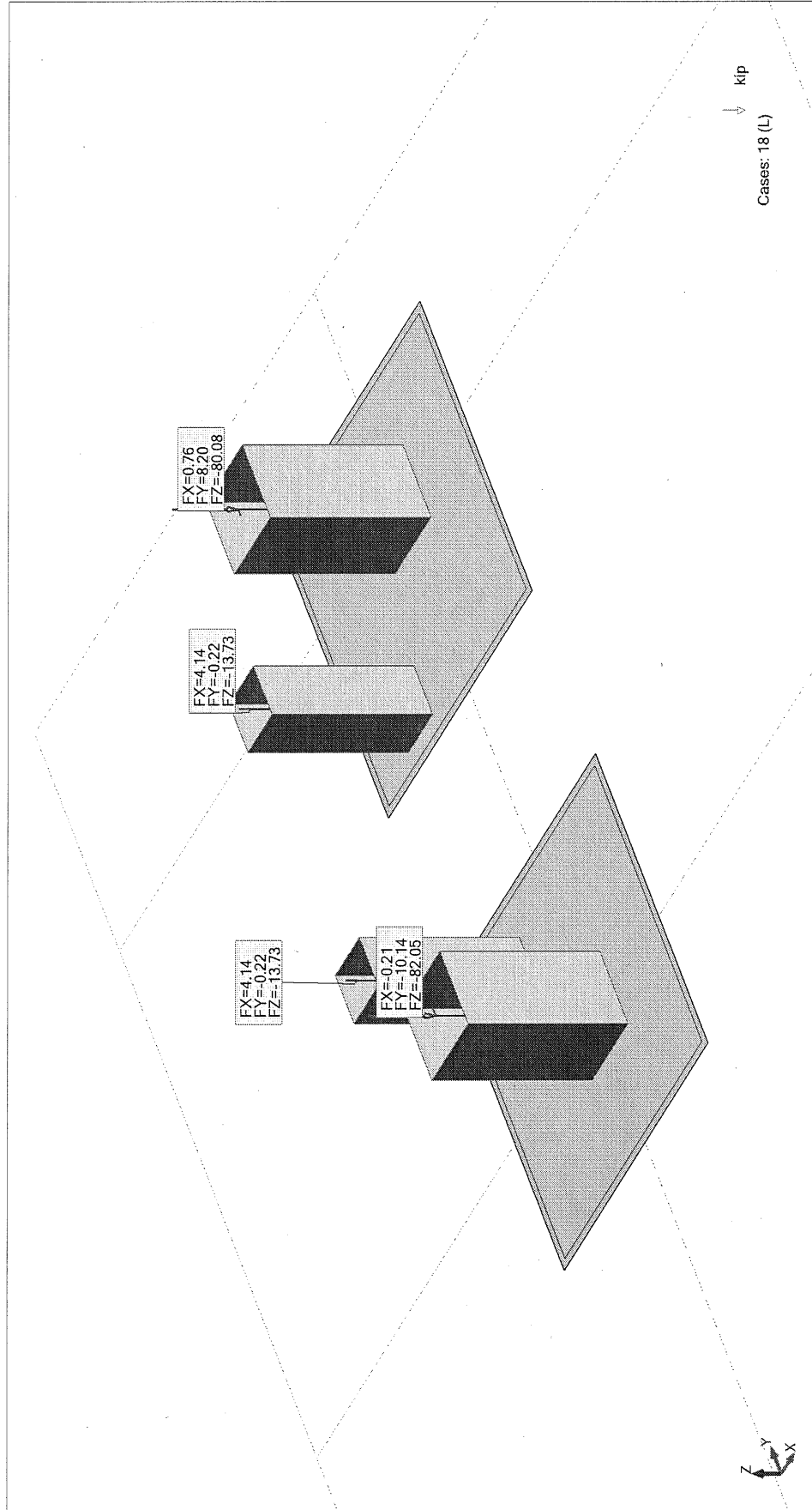




7158 S. FLSmidth Drive
Midvale, Utah 84047-5559

Engineer: Clint Karren
Calc No.: Job.: 11021
Project: Flotation Combined Footing @ M.2,4
Client: CC&V High Grade Ore

View - Cases: 18 (L)

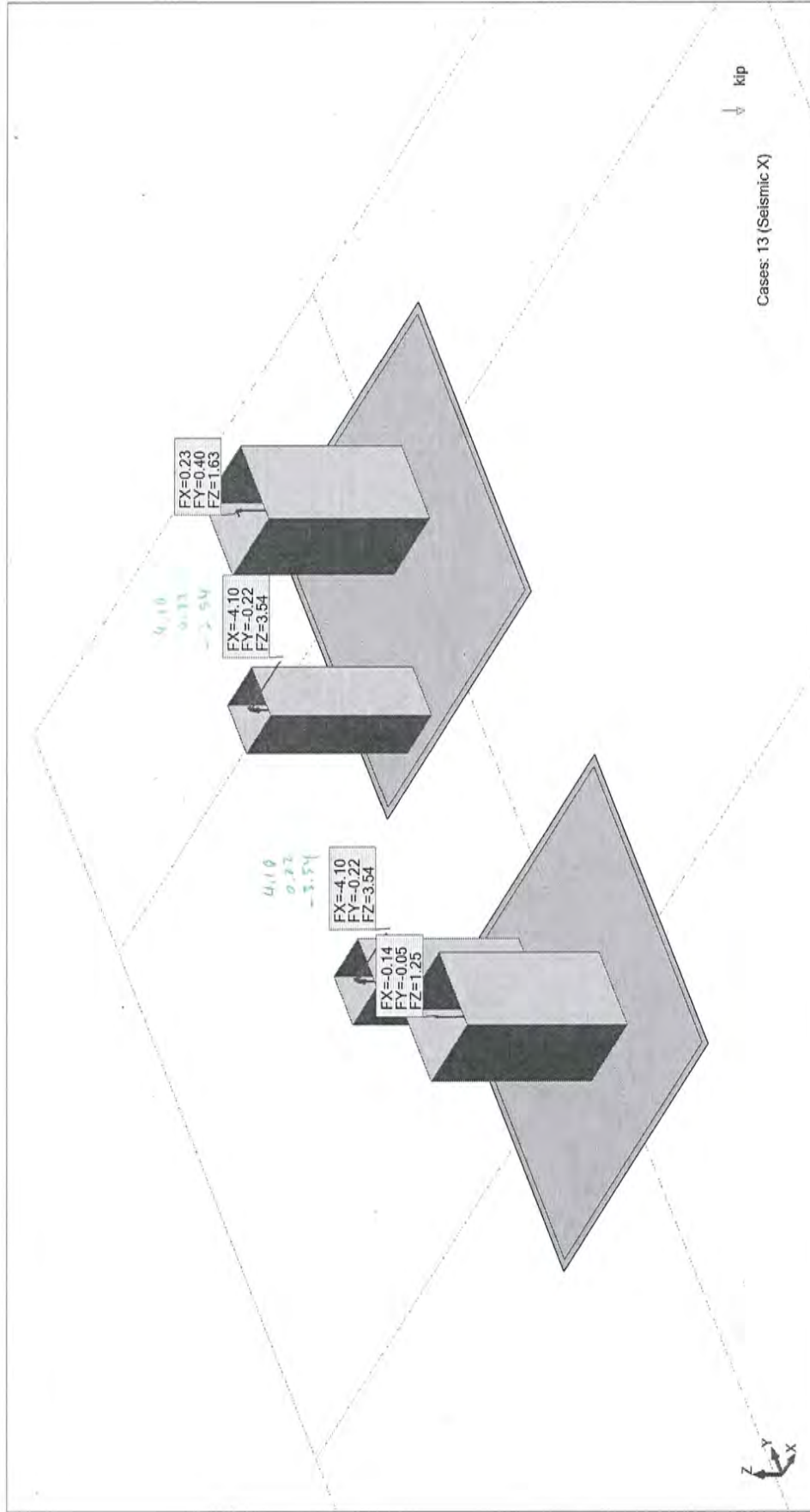




7158 S. FLSmidth Drive
Midvale, Utah 84047-5559

Engineer: Clint Karren
Calc No.: Job.:11021
Project: Flotation Combined Footing @ M.2,4
Client: CC&V High Grade Ore

View - Cases: 13 (Seismic X)



Date : 28/02/12

File: Flotation Combined Footing 2.rtd

Page : 1

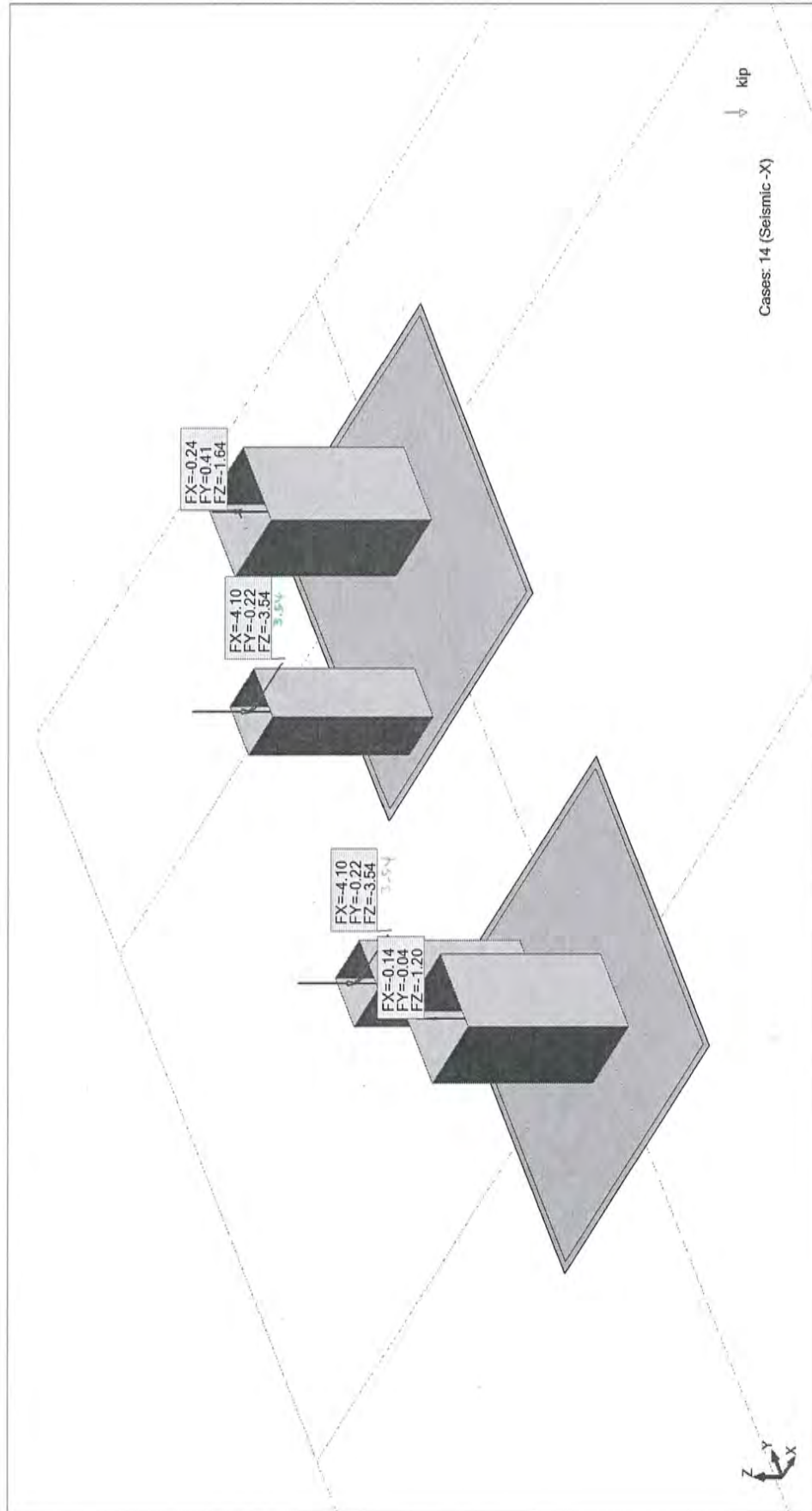
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Engineer: Clint Karren
Calc No.: Job.:11021
Project: Flotation Combined Footing @ M.2,4
Client: CC&V High Grade Ore

View - Cases: 14 (Seismic -X)



Date : 28/02/12

File: Flotation Combined Footing 2.rtd

Page : 1

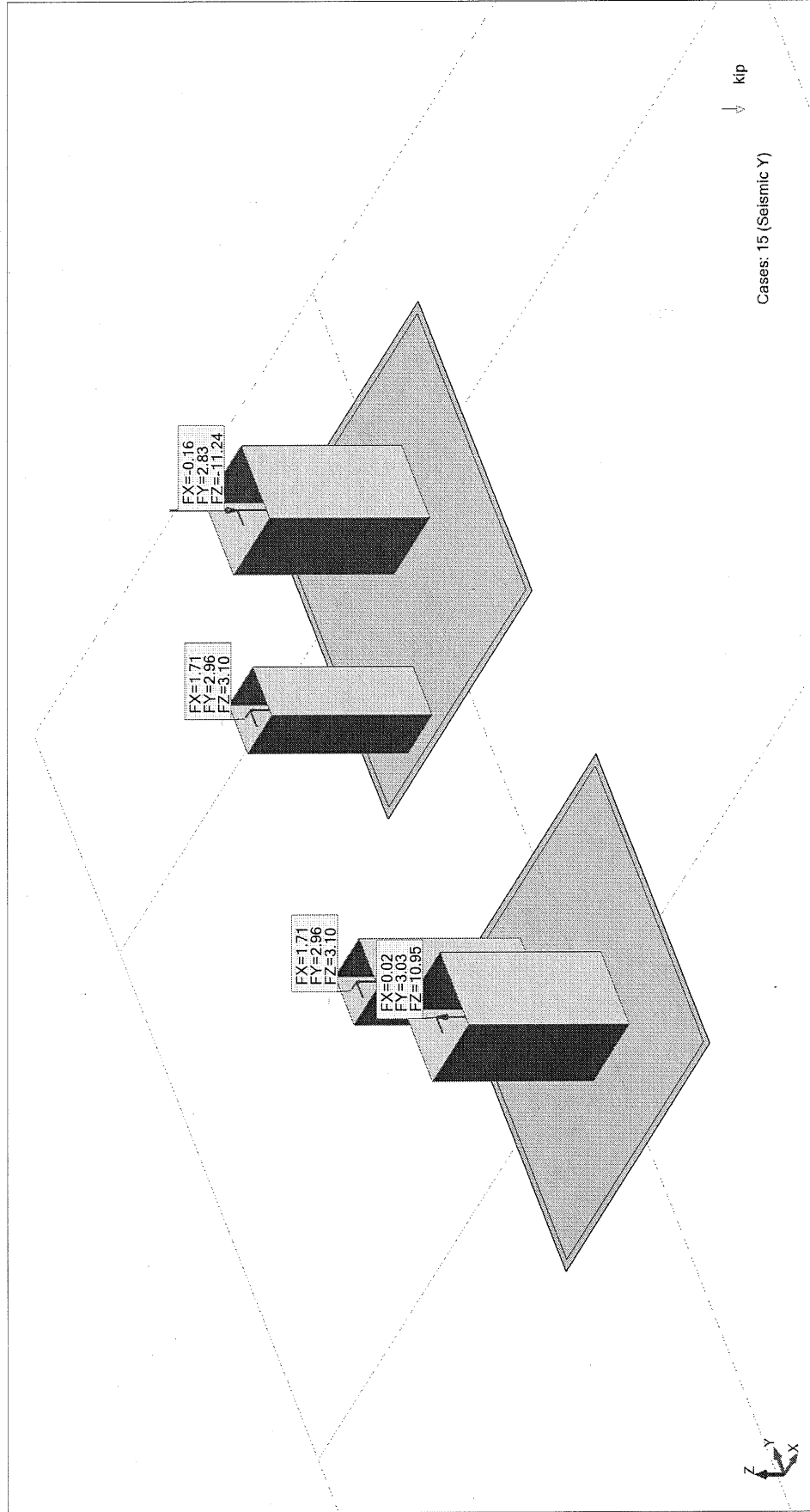
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Engineer: Clint Karren
Calc No.: Job.:11021
Project: Flotation Combined Footing @ M.2,4
Client: CC&V High Grade Ore

View - Cases: 15 (Seismic Y)

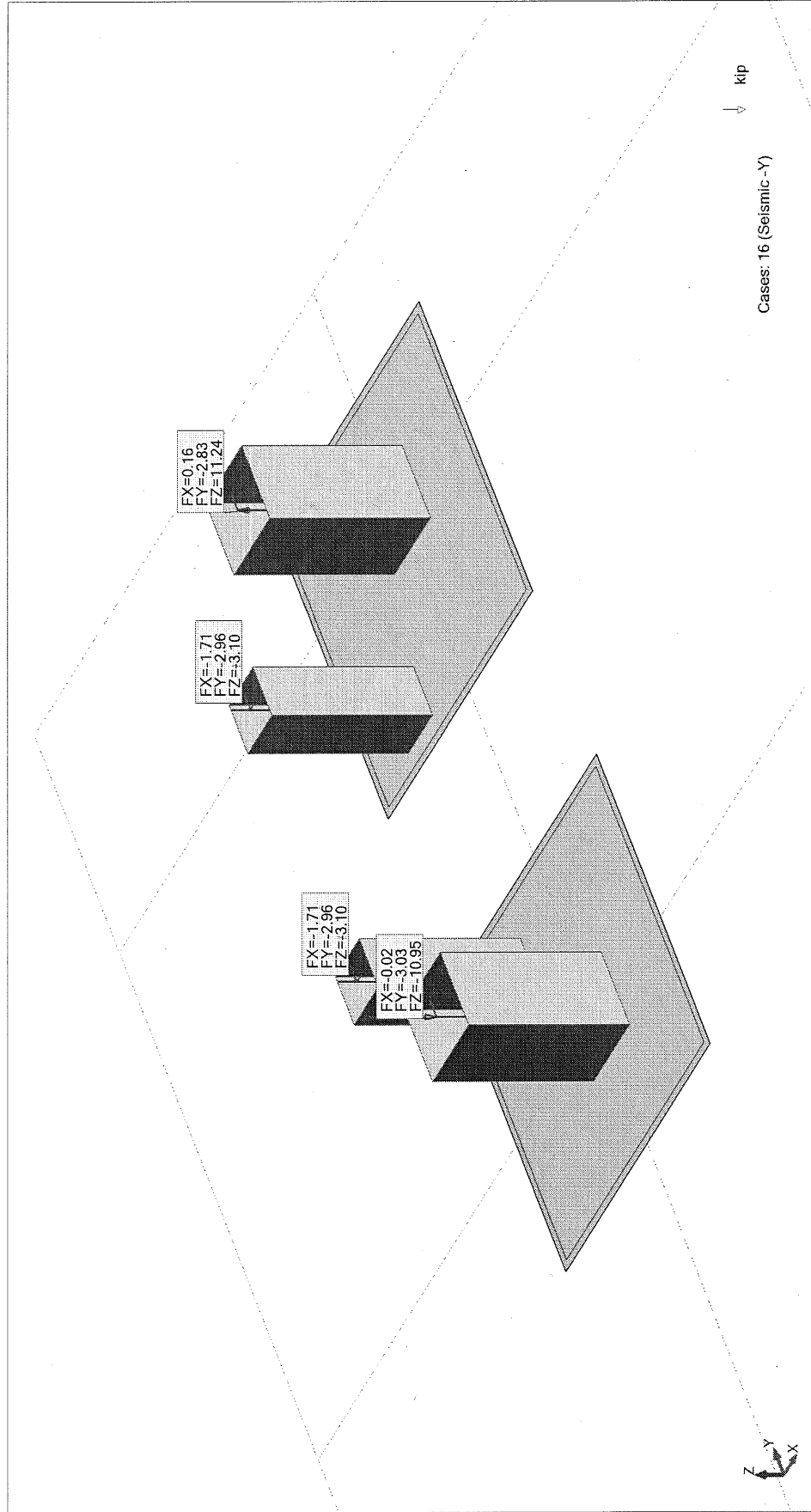




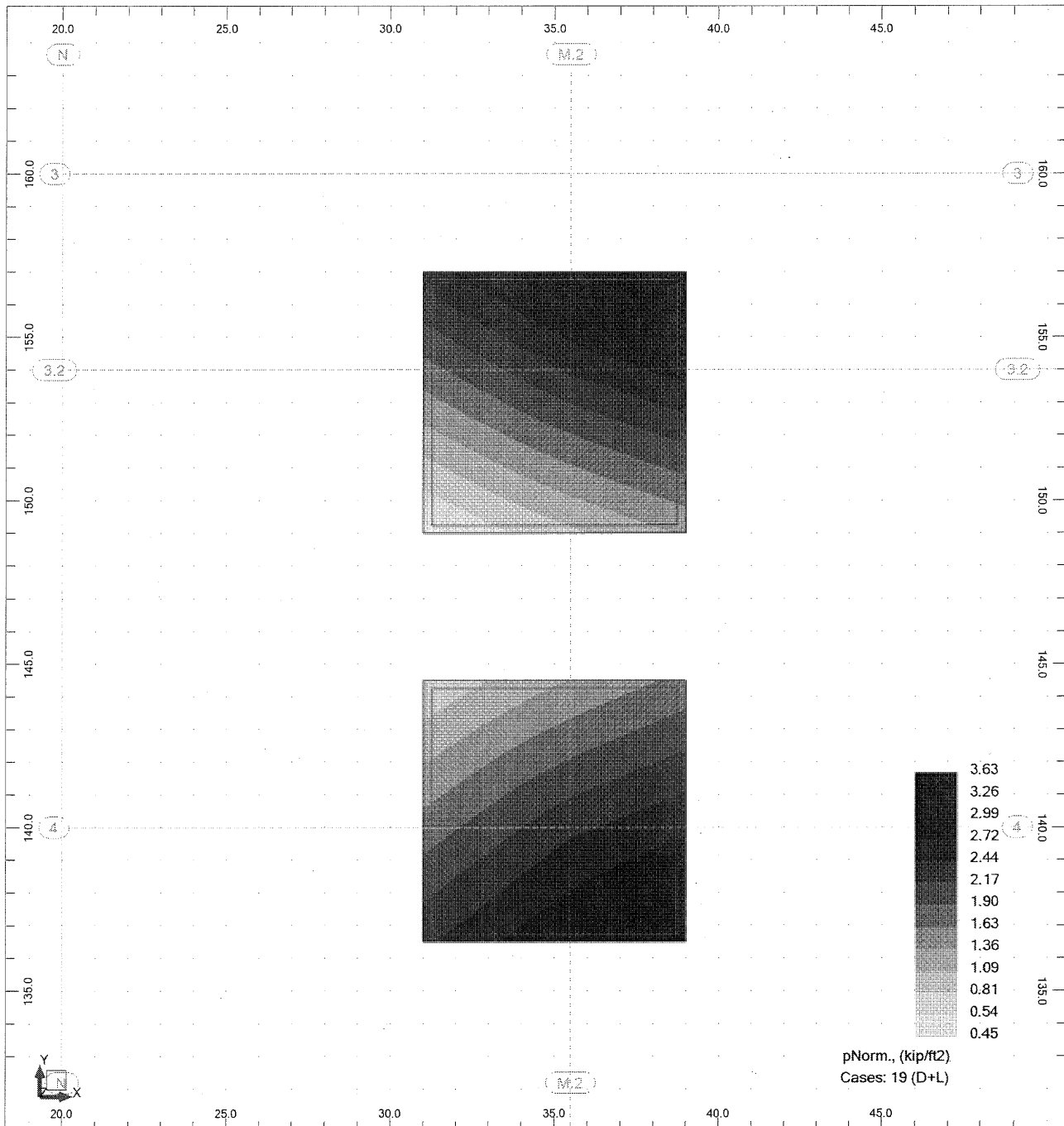
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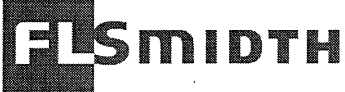
Engineer: **Clint Karren**
Calc No.: **Job.:11021**
Project: **Flotation Combined Footing @ M.2,4**
Client: **CC&V High Grade Ore**

View - Cases: 16 (Seismic -Y)



View - pNorm. (kip/ft²) Cases: 19 (D+L)





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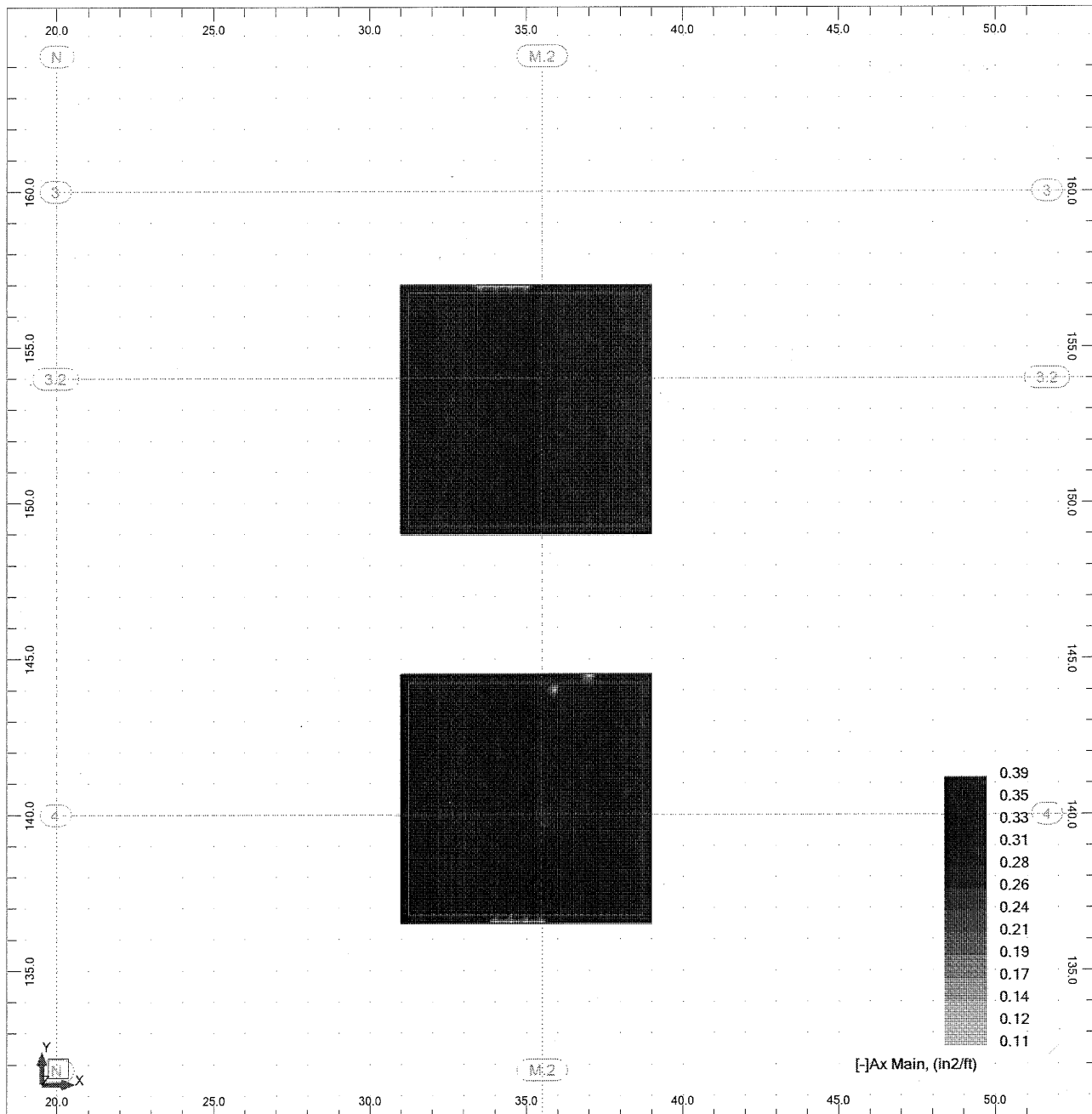
Engineer: **Clint Karren**

Calc No.: Job.: **11021**

Project: **Flotation Combined Footing @ M.2,4**

Client: **CC&V High Grade Ore**

View - [-]Ax Main (in2/ft)





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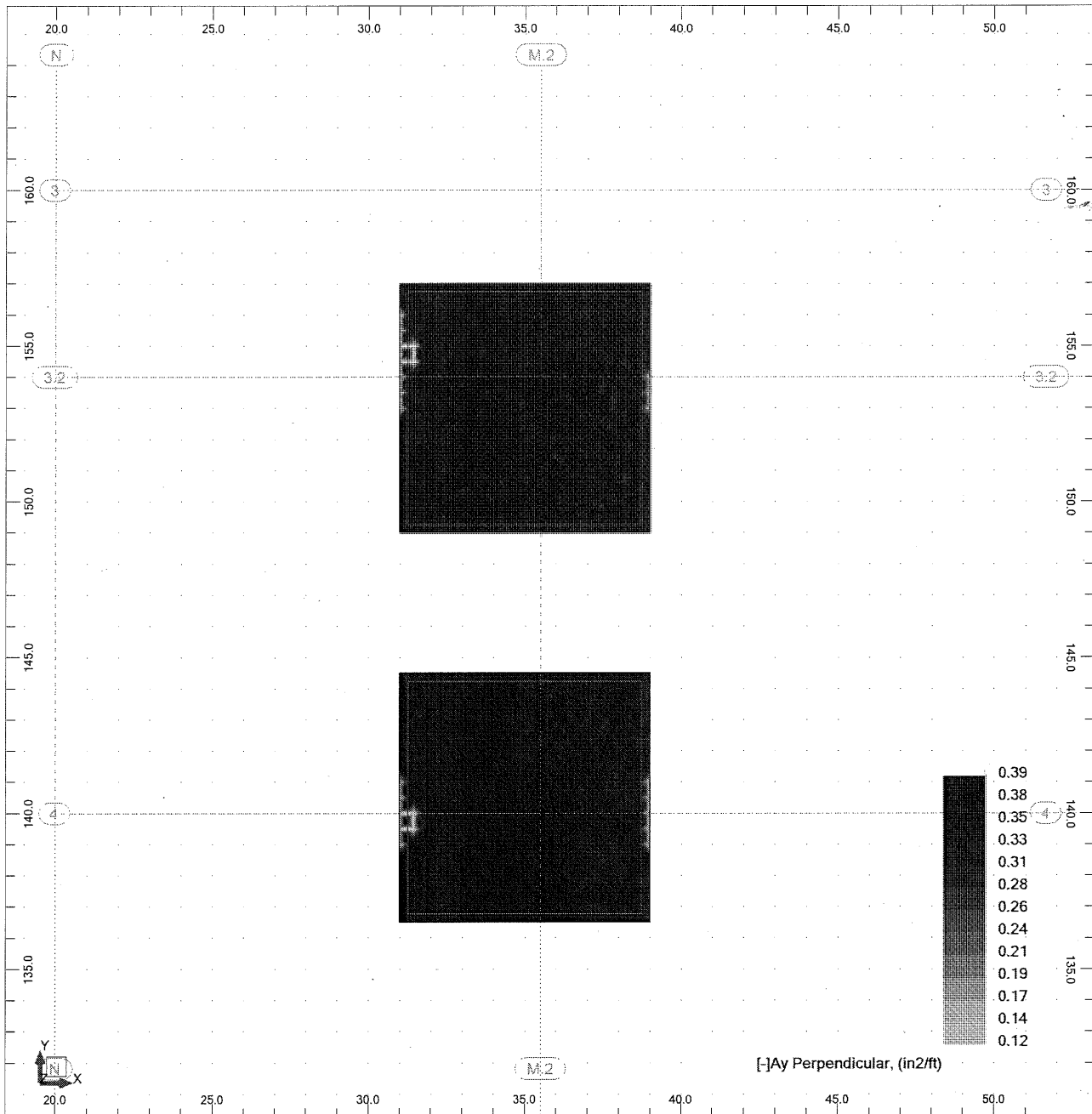
Engineer: **Clint Karren**

Calc No.: Job.: **11021**

Project: **Flotation Combined Footing @ M.2,4**

Client: **CC&V High Grade Ore**

View - [-]Ay Perpendicular (in2/ft)



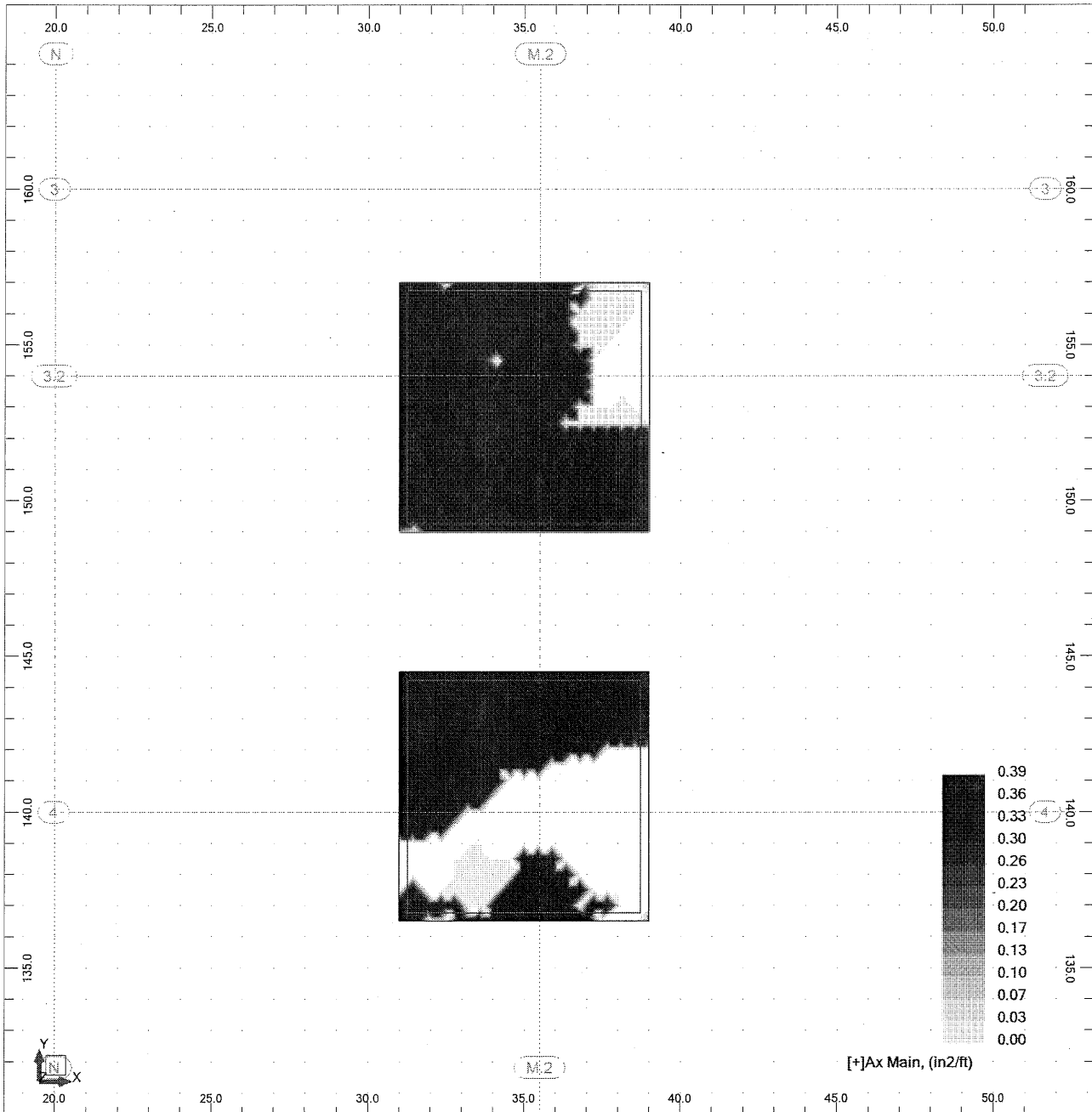
Date : 28/02/12

File: **Flotation Combined Footing 2.rtd**

Page : **1**

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View - **[+]Ax Main (in2/ft)**





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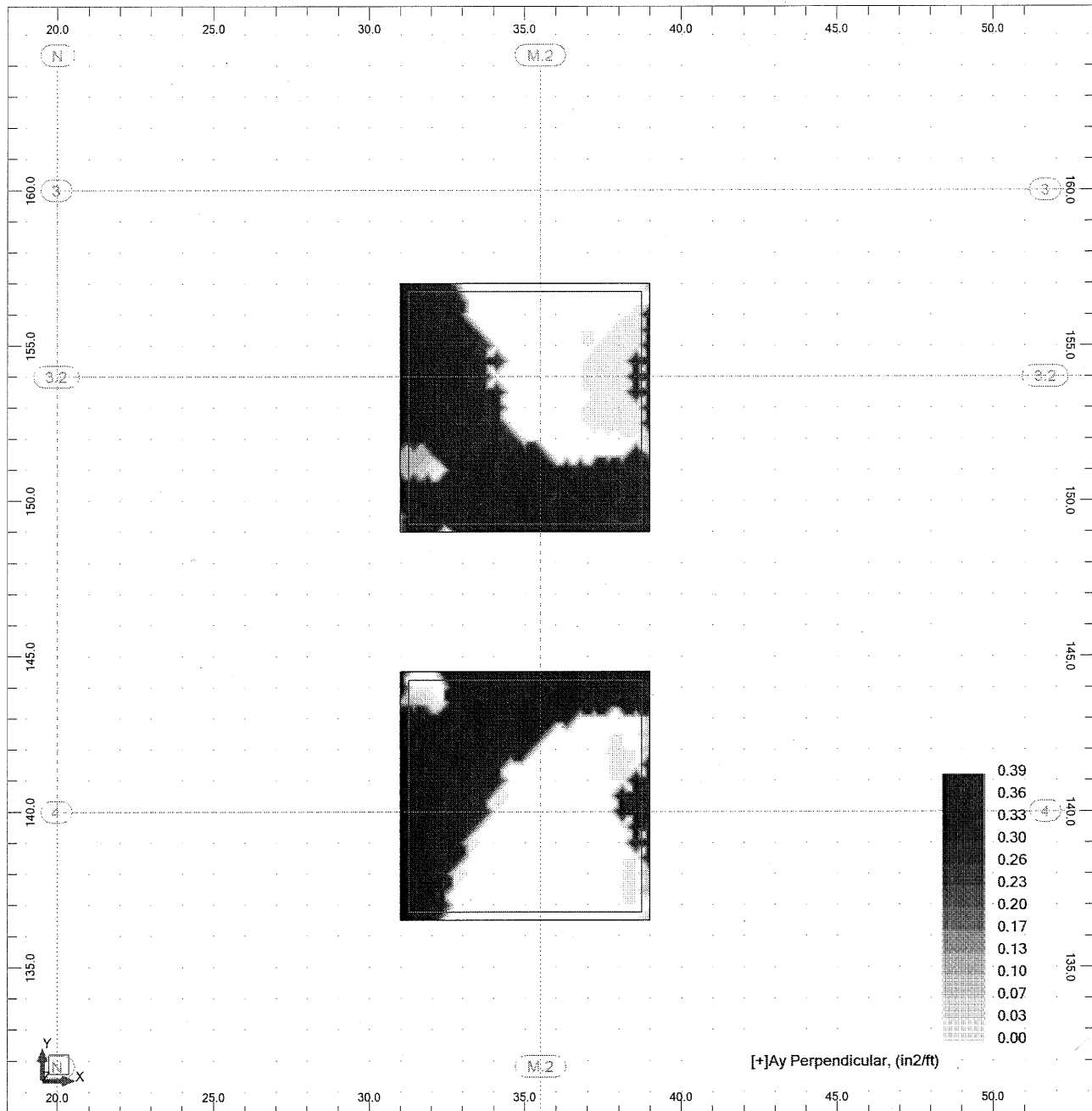
Engineer: **Clint Karren**

Calc No.: Job.: **11021**

Project: **Flotation Combined Footing @ M.2,4**

Client: **CC&V High Grade Ore**

View - **[+]*Ay* Perpendicular (in2/ft)**



Date : 28/02/12

File: **Flotation Combined Footing 2.rtd**

Page : **1**

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	PROJECT CC & V High Grade Ore		Proj No.	11021
			Calc No.	
	SUBJECT Flotation Combined Footing		By	CCK Feb-28-2012
	at M.2,4		Check	
			Sheet	of

SLIDING

Surcharge Loads

Piers	$\gamma =$	150	pcf	
	Length	1.3	2.0	ft
	Width	1.3	2.0	ft
	Height	4.0	4.0	ft
	Volume	7.1	16.0	ft ³

Footing	$\gamma =$	150	pcf	
	Length	8	ft	
	Width	8	ft	
	Thickness	1.5	ft	
	Volume	96	ft ³	

Slab	$\gamma =$	150	pcf	
	Thickness	8	in	

Soil	$\gamma =$	120	pcf	
	Thickness	8	in	

$$D_{\text{surcharge}} = 29.4 \text{ k}$$

Vertical Loads

	M.2,4	M.2,4	
D	1.7 k	21.2 k	22.9 k
L	13.7 k	82.1 k	95.8 k
S	0.0 k	0.0 k	0.0 k
W	0.0 k	0.0 k	0.0 k
E	-3.5 k	11.0 k	7.4 k

Horizontal Loads

D	0.0 k	2.9 k	2.9 k
L	4.1 k	10.1 k	14.3 k
S	0.0 k	0.0 k	0.0 k
W	0.0 k	0.0 k	0.0 k
E	4.1 k	3.0 k	7.1 k

Sliding

μ	0.5	
Soil Passive Resistance	0.42	ksf
	5.00	k
Sliding Factor of Safety	1.5	

Combination	Sliding Force	Resistance Force	Sliding Safety Ratio	
D	2.9 k	31.1 k	10.9	OK
D+L	17.1 k	79.0 k	4.6	OK
D+S	2.9 k	31.1 k	10.9	OK
D+0.75L+0.75S	13.6 k	67.1 k	4.9	OK
D+W	2.9 k	31.1 k	10.9	OK
D+0.7E	7.8 k	33.7 k	4.3	OK
D+0.75W+0.75L+0.75S	13.6 k	67.1 k	4.9	OK
D+0.525E+0.75L+0.75S	17.3 k	69.0 k	4.0	OK
0.6D+W	1.7 k	20.7 k	12.1	OK
0.6D+0.7E	6.7 k	33.7 k	5.0	OK

FLSMIDTH	PROJECT CC & V High Grade Ore	Proj No.	11021
		Calc No.	
	SUBJECT Flotation Combined Footing	By	CCK Feb-28-2012
	at M.2,4	Check	
		Sheet	of

OVERTURNING

Surcharge Loads

Pedestals	g =	150	pcf				
	Y-Location	6.25	3.50	ft			
	X-Location	2.25	4.50	ft			
	Length	1.3	2.0	ft			
	Width	1.3	2.0	ft			
	Height	4.0	4.0	ft			
	Volume	7.1	16.0	ft ³			
Footing	g =	150	pcf			Mx _{Piers} =	15.1 k-ft
	Length	8	ft			My _{Piers} =	13.2 k-ft
	Width	8	ft				
	Thickness	1.5	ft			Mx _{Footing} =	57.6 k-ft
	Volume	96	ft ³			My _{Footing} =	57.6 k-ft
Slab	g =	150	pcf			Mx _{Slab} =	25.6 k-ft
	Thickness	0.67	ft			My _{Slab} =	25.6 k-ft
Soil	g =	120	pcf			Mx _{Soil} =	20.5 k-ft
	Thickness	0.7	ft			My _{Soil} =	20.5 k-ft

Vertical Loads

	M.2,4	M.2,4					
Y-Location	5.75	3.00					
X-Location	1.75	4.00					
D	1.7 k	21.2 k		X-X ₁	X-X ₂	Y-Y ₁	Y-Y ₂
L	13.7 k	82.1 k		192.2 k-ft	228.6 k-ft	204.7 k-ft	226.7 k-ft
S	0.0 k	0.0 k		325.1 k-ft	441.2 k-ft	352.2 k-ft	441.2 k-ft
W	0.0 k	0.0 k		0.0 k-ft	0.0 k-ft	0.0 k-ft	0.0 k-ft
E	-3.5 k	11.0 k		0.0 k-ft	0.0 k-ft	0.0 k-ft	0.0 k-ft
				12.5 k-ft	46.8 k-ft	37.6 k-ft	46.8 k-ft

Horizontal Loads

Moment Arm	5.5	ft		
D	0.0 k	2.9 k		15.7 k-ft
L	4.1 k	10.1 k		78.5 k-ft
S	0.0 k	0.0 k		0.0 k-ft
W	0.0 k	0.0 k		0.0 k-ft
E	4.1 k	3.0 k		39.2 k-ft

Overturning

Overturning Factor of Safety 1.5

X-X ₁	Combination	Overturning Moment	Resistance Moment	Moment Safety Ratio	
	D	15.7 k-ft	192.2 k-ft	12.3	OK
	D+L	94.2 k-ft	517.3 k-ft	5.5	OK
	D+S	15.7 k-ft	192.2 k-ft	12.3	OK
	D+0.75L+0.75S	74.6 k-ft	436.0 k-ft	5.8	OK
	D+W	15.7 k-ft	192.2 k-ft	12.3	OK
	D+0.7E	43.1 k-ft	201.0 k-ft	4.7	OK
	D+0.75W+0.75L+0.75S	74.6 k-ft	436.0 k-ft	5.8	OK
	D+0.525E+0.75L+0.75S	95.2 k-ft	442.6 k-ft	4.7	OK
	0.6D+W	9.4 k-ft	115.3 k-ft	12.3	OK
	0.6D+0.7E	43.1 k-ft	124.1 k-ft	2.9	OK
X-X ₂	D	0.0 k-ft	228.6 k-ft	-	OK
	D+L	94.2 k-ft	669.7 k-ft	7.1	OK
	D+S	15.7 k-ft	228.6 k-ft	14.6	OK
	D+0.75L+0.75S	74.6 k-ft	559.4 k-ft	7.5	OK
	D+W	15.7 k-ft	228.6 k-ft	14.6	OK
	D+0.7E	43.1 k-ft	261.3 k-ft	6.1	OK
	D+0.75W+0.75L+0.75S	74.6 k-ft	559.4 k-ft	7.5	OK
	D+0.525E+0.75L+0.75S	95.2 k-ft	584.0 k-ft	6.1	OK
	0.6D+W	9.4 k-ft	137.1 k-ft	14.6	OK
	0.6D+0.7E	43.1 k-ft	169.9 k-ft	3.9	OK

Y-Y ₁	D	0.0 k-ft	204.7 k-ft	-	
	D+L	94.2 k-ft	556.9 k-ft	5.9	OK
	D+S	15.7 k-ft	204.7 k-ft	13.1	OK
	D+0.75L+0.75S	74.6 k-ft	468.8 k-ft	6.3	OK
	D+W	15.7 k-ft	204.7 k-ft	13.1	OK
	D+0.7E	43.1 k-ft	231.0 k-ft	5.4	OK
	D+0.75W+0.75L+0.75S	74.6 k-ft	468.8 k-ft	6.3	OK
	D+0.525E+0.75L+0.75S	95.2 k-ft	488.6 k-ft	5.1	OK
	0.6D+W	9.4 k-ft	122.8 k-ft	13.1	OK
	0.6D+0.7E	43.1 k-ft	149.1 k-ft	3.5	OK
Y-Y ₂	D	0.0 k-ft	226.7 k-ft	-	
	D+L	94.2 k-ft	667.9 k-ft	7.1	OK
	D+S	15.7 k-ft	667.9 k-ft	42.6	OK
	D+0.75L+0.75S	74.6 k-ft	557.6 k-ft	7.5	OK
	D+W	15.7 k-ft	226.7 k-ft	14.5	OK
	D+0.7E	43.1 k-ft	259.4 k-ft	6.0	OK
	D+0.75W+0.75L+0.75S	74.6 k-ft	557.6 k-ft	7.5	OK
	D+0.525E+0.75L+0.75S	95.2 k-ft	582.1 k-ft	6.1	OK
	0.6D+W	9.4 k-ft	136.0 k-ft	14.5	OK
	0.6D+0.7E	43.1 k-ft	168.8 k-ft	3.9	OK

	PROJECT	CC & V High Grade Ore	Proj No.	11021
			Calc No.	
	SUBJECT	Flotation Combined	By	CCK Feb-28-2012
		Footing @ M.2,4	Check	
		& K.5	Sheet	of

PUNCHING SHEAR

Properties	Column Loads	Load Combinations
Footing Length 8.0 ft	Dead 22.9 k	1.4D 32.1 k
Footing Width 8.0 ft	Live 95.8 k	1.2D+1.6L+0.5S 180.7 k
Thickness 18.0 in	Snow 0.0 k	1.2D+1.6S+L 123.3 k
Column Length 24.0 in	Wind 0.0 k	1.2D+1.6S+0.8W 27.5 k
Column Width 24.0 in	EQ 14.5 k	1.2D+1.6S-0.8W 27.5 k
f'_c 4000 psi		1.2D+1.6W+L+0.5S 123.3 k
d 14.5 in		1.2D-1.6W+L+0.5S 123.3 k
β_c 1.0	P_u 180.7 k	1.2D+E+L+0.2S 108.8 k
b_o 154	W_u 2.8 ksf	1.2D-E+L+0.2S 137.8 k
α_s 40		0.9D+1.6W 20.6 k
		0.9D-1.6W 20.6 k
		0.9D+E 35.1 k
		0.9D-E 6.1 k

ONE-WAY SHEAR

T_A (ft ²) 14.3	T_A (ft ²) 14.3
V_u 40.5 k	V_u 40.5 k
V_c 176.1 k	V_c 176.1 k
ΦV_c 132.1 k	ΦV_c 132.1 k
OK 0.31	OK 0.31

TWO-WAY SHEAR

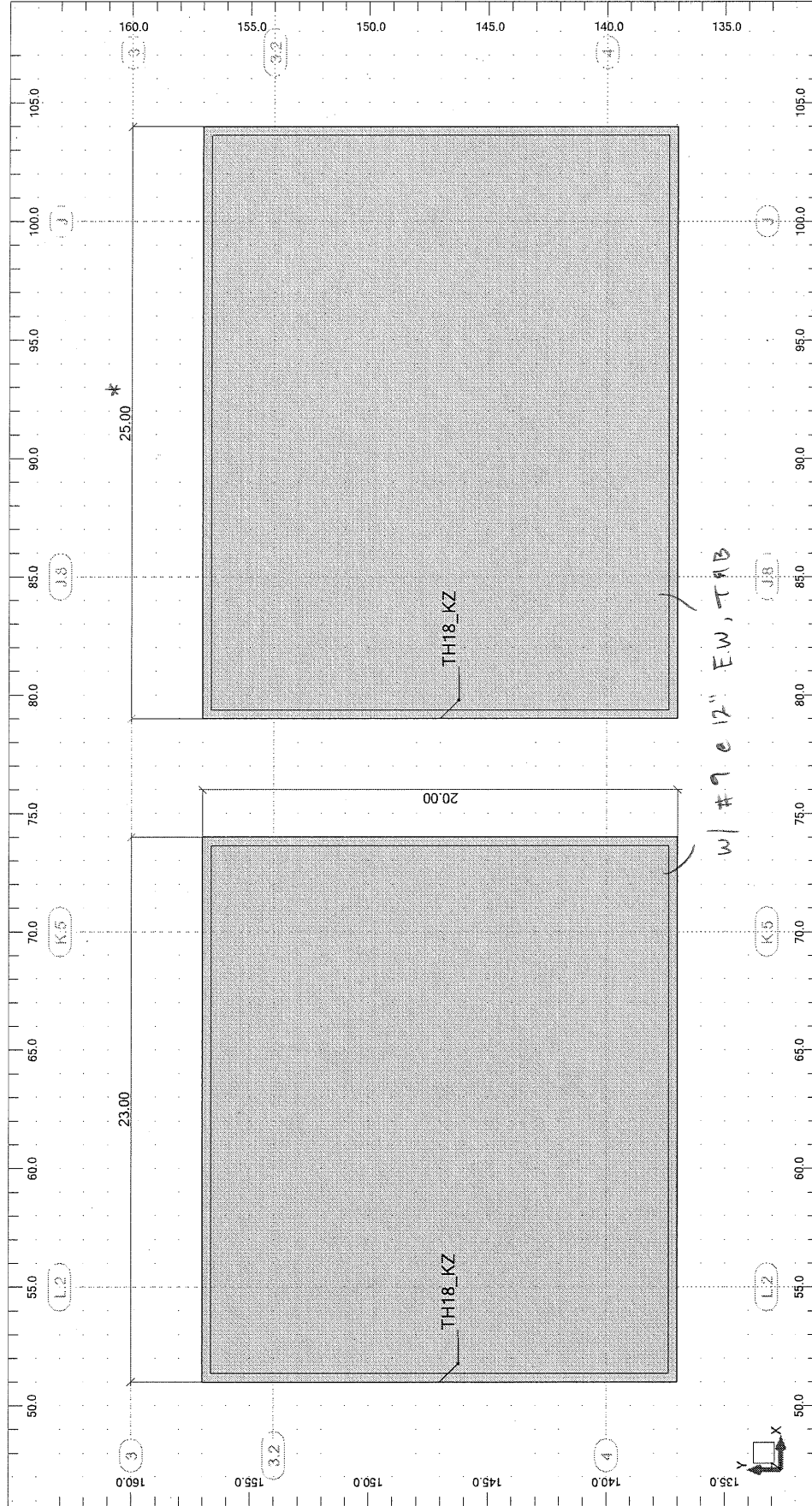
T_A (ft ²) 53.7	(a) V_c 847.4 k
V_u 151.7 k	(b) V_c 814.3 k
V_c 564.9 k	(c) V_c 564.9 k
ΦV_n 423.7 k	
OK 0.36	



7158 S. FLSmidth Drive
Midvale, Utah 84047-5559

Engineer: Clint Karren
Calc No.: Job.:11021
Project: Flotation Combined Footing
Client: CC&V High Grade Ore

View - Cases: 1 (Self Weight)



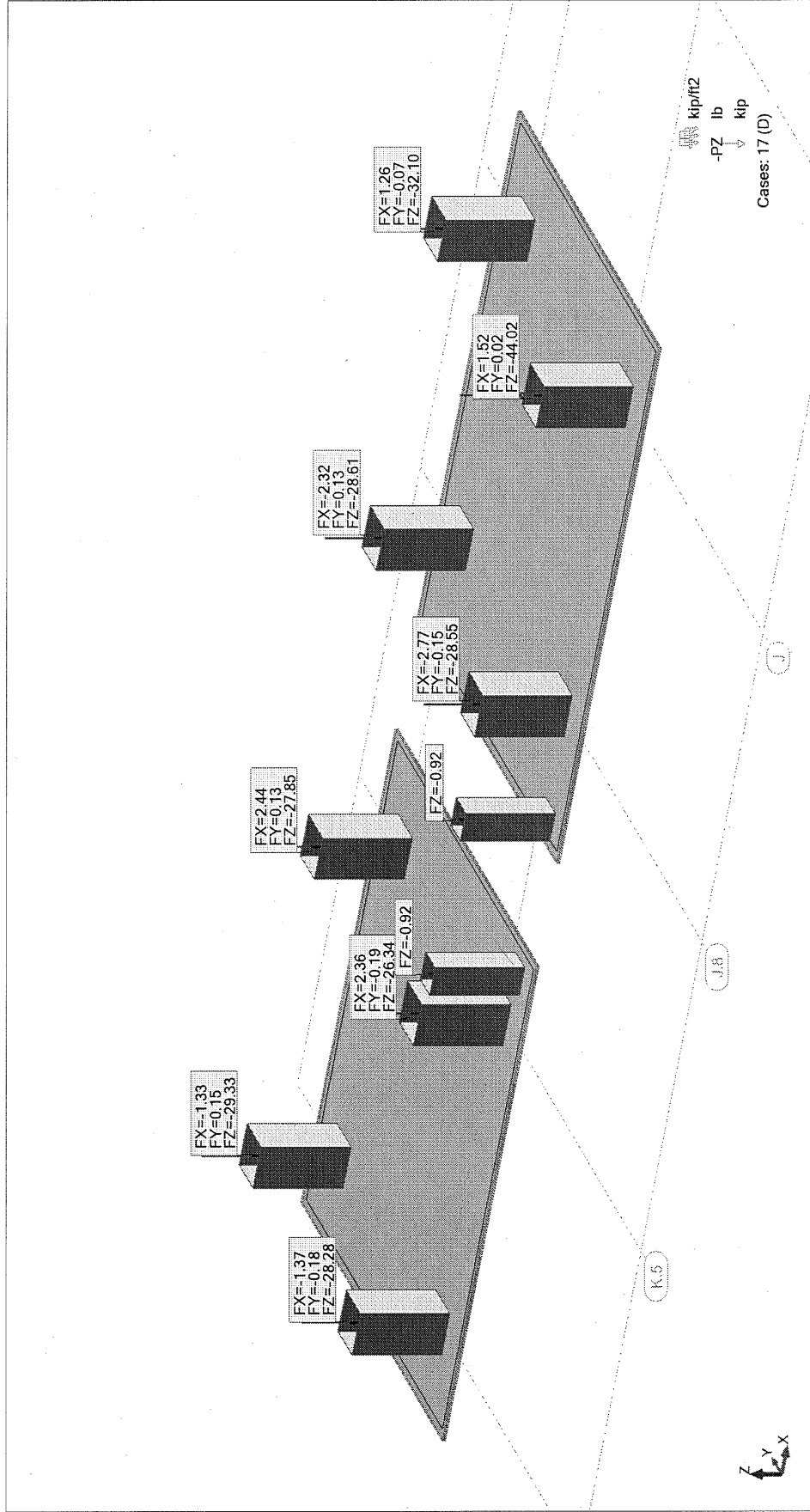
Date : 27/02/12

File: Flotation Combined Footing Rev2.rtd

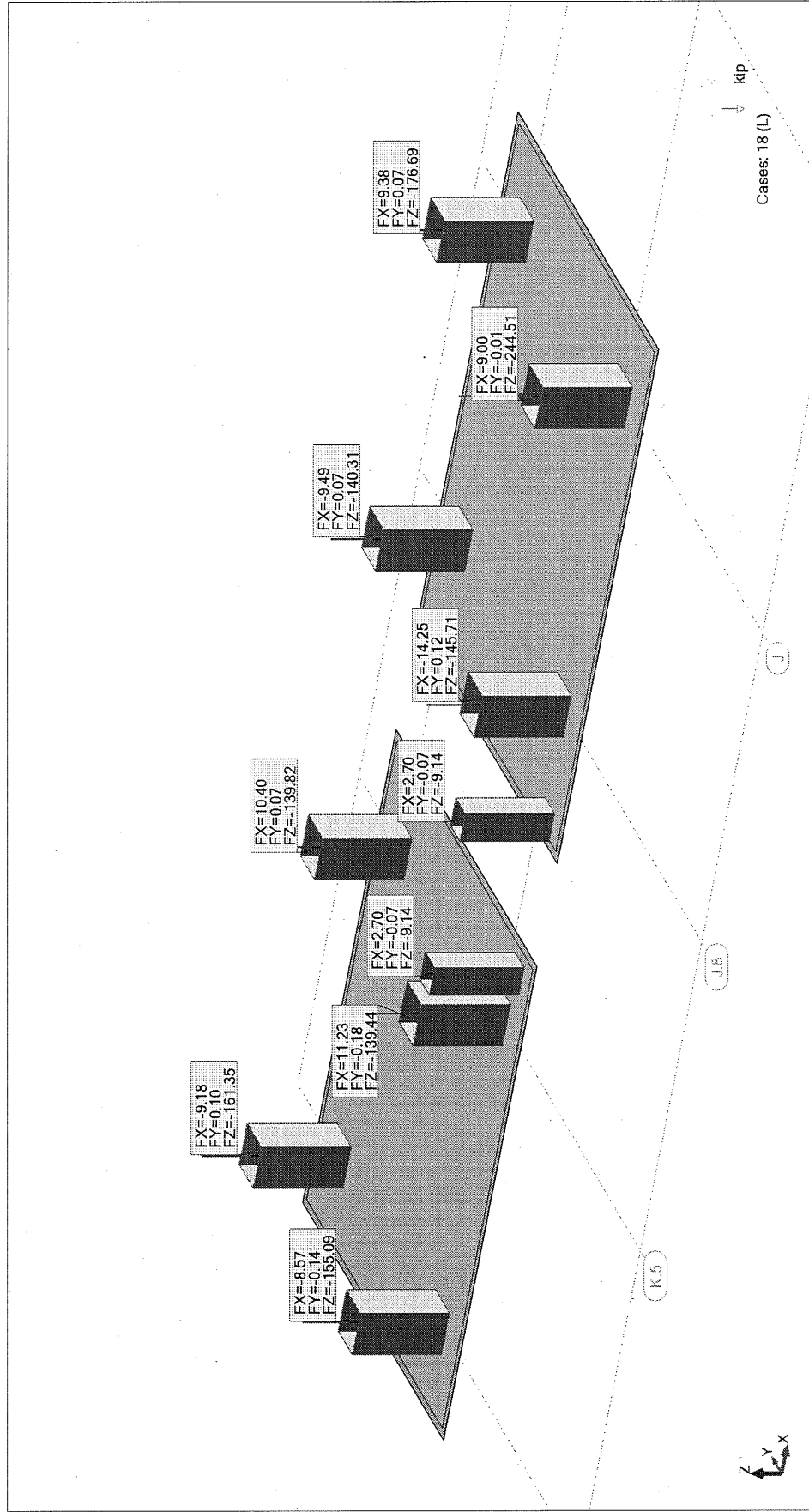
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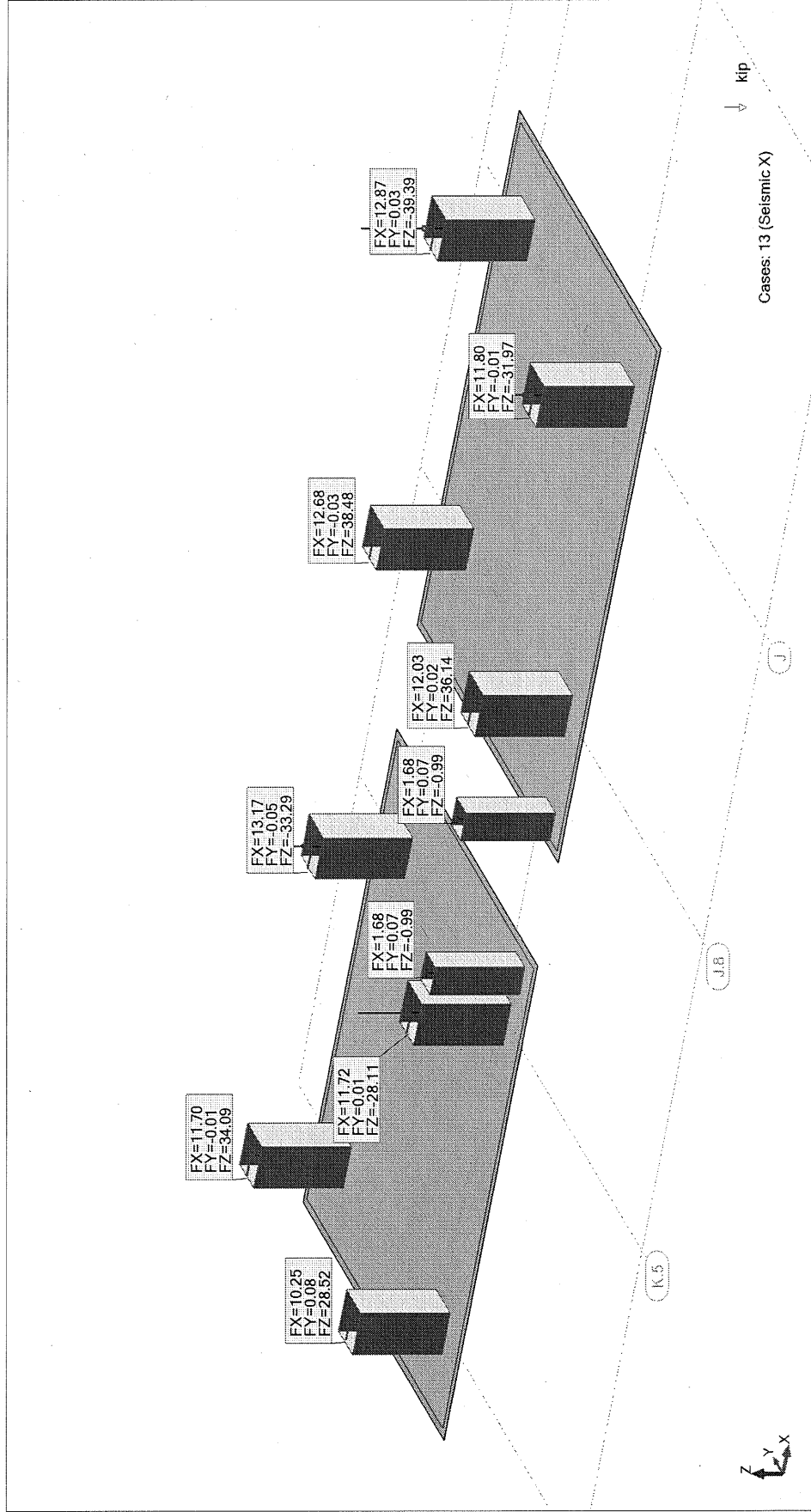
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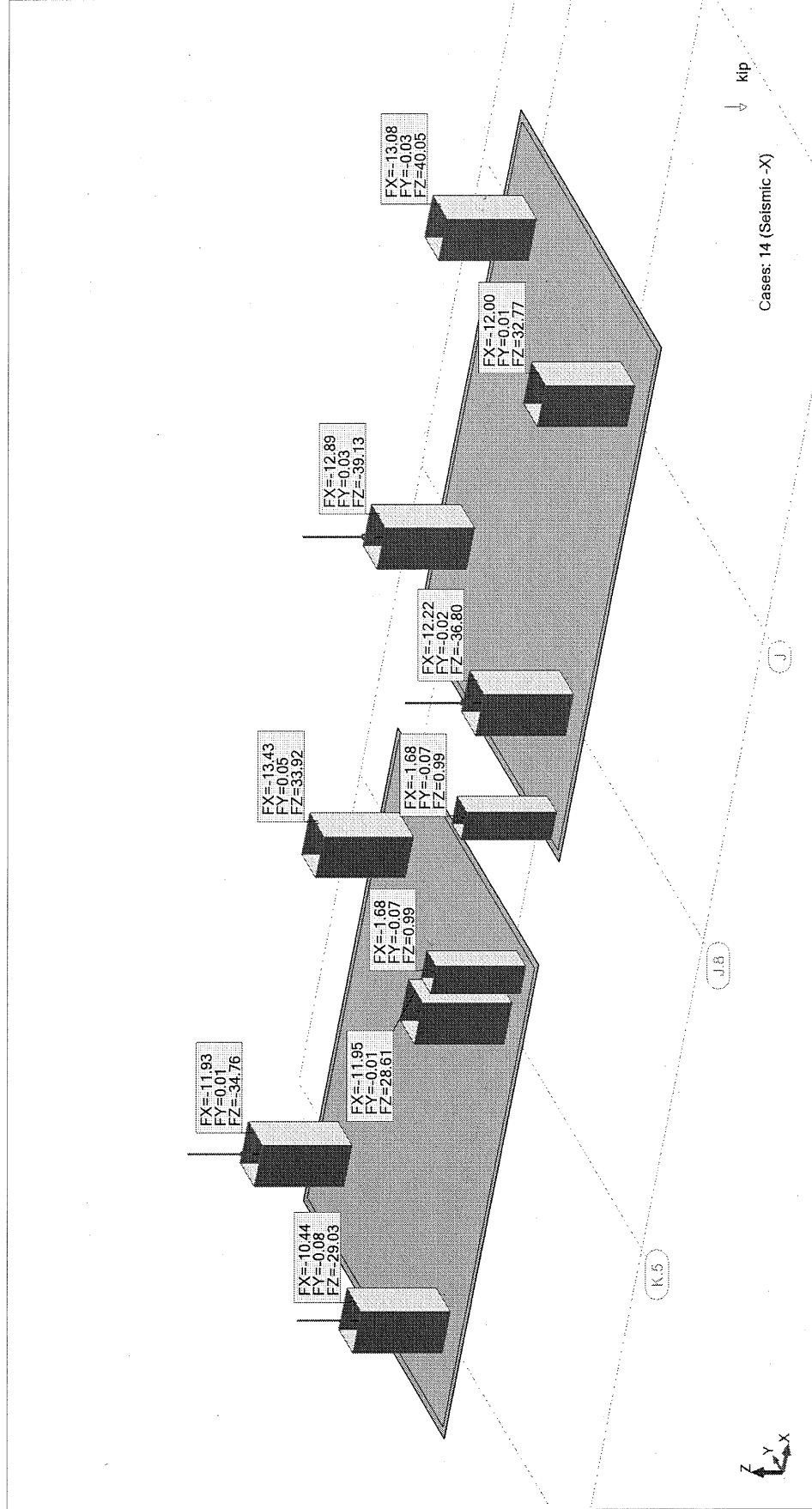
* Footing later changed from 25' to 26' to increase bearing capacity

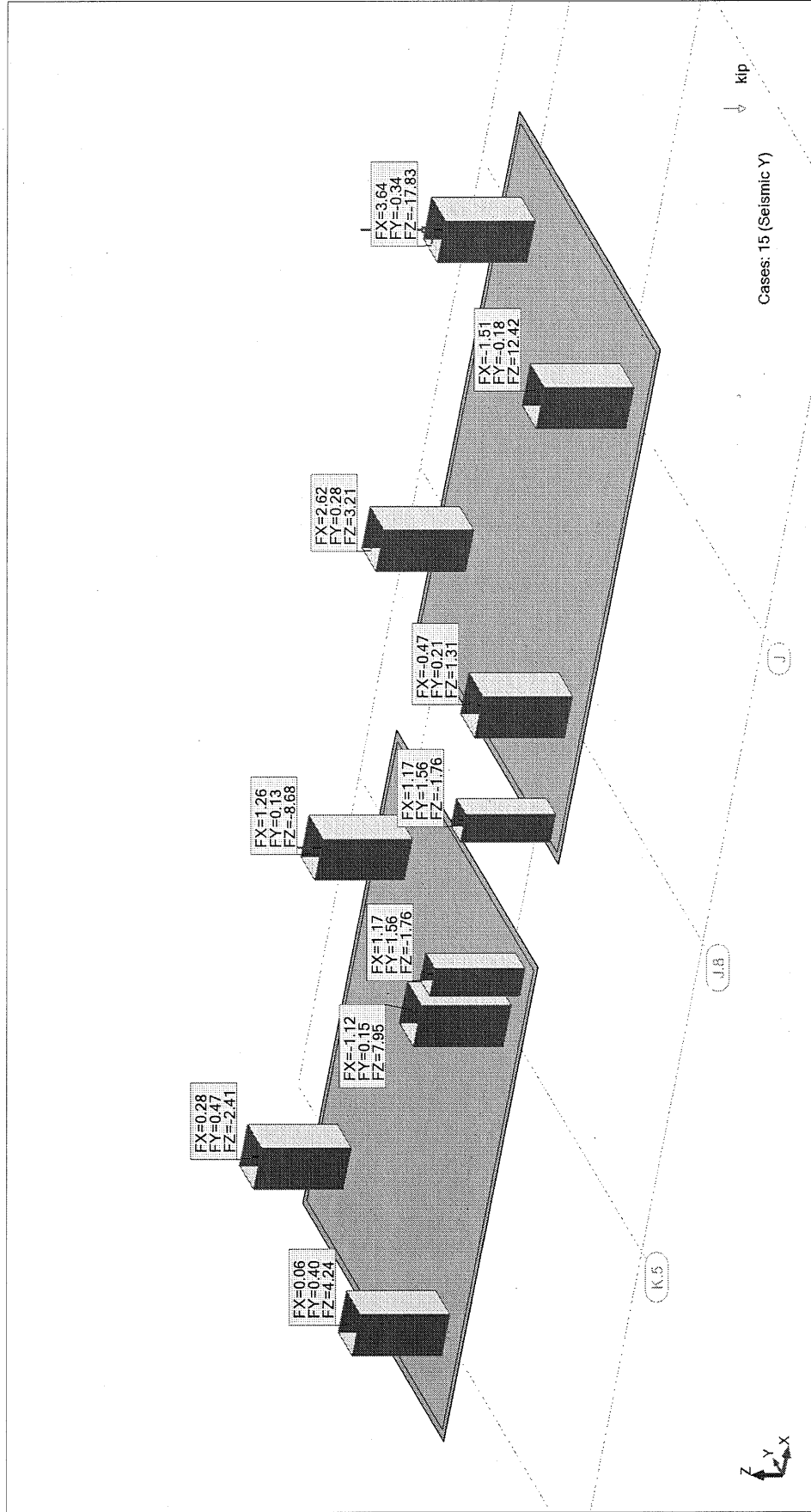


View - Cases: 18 (L)







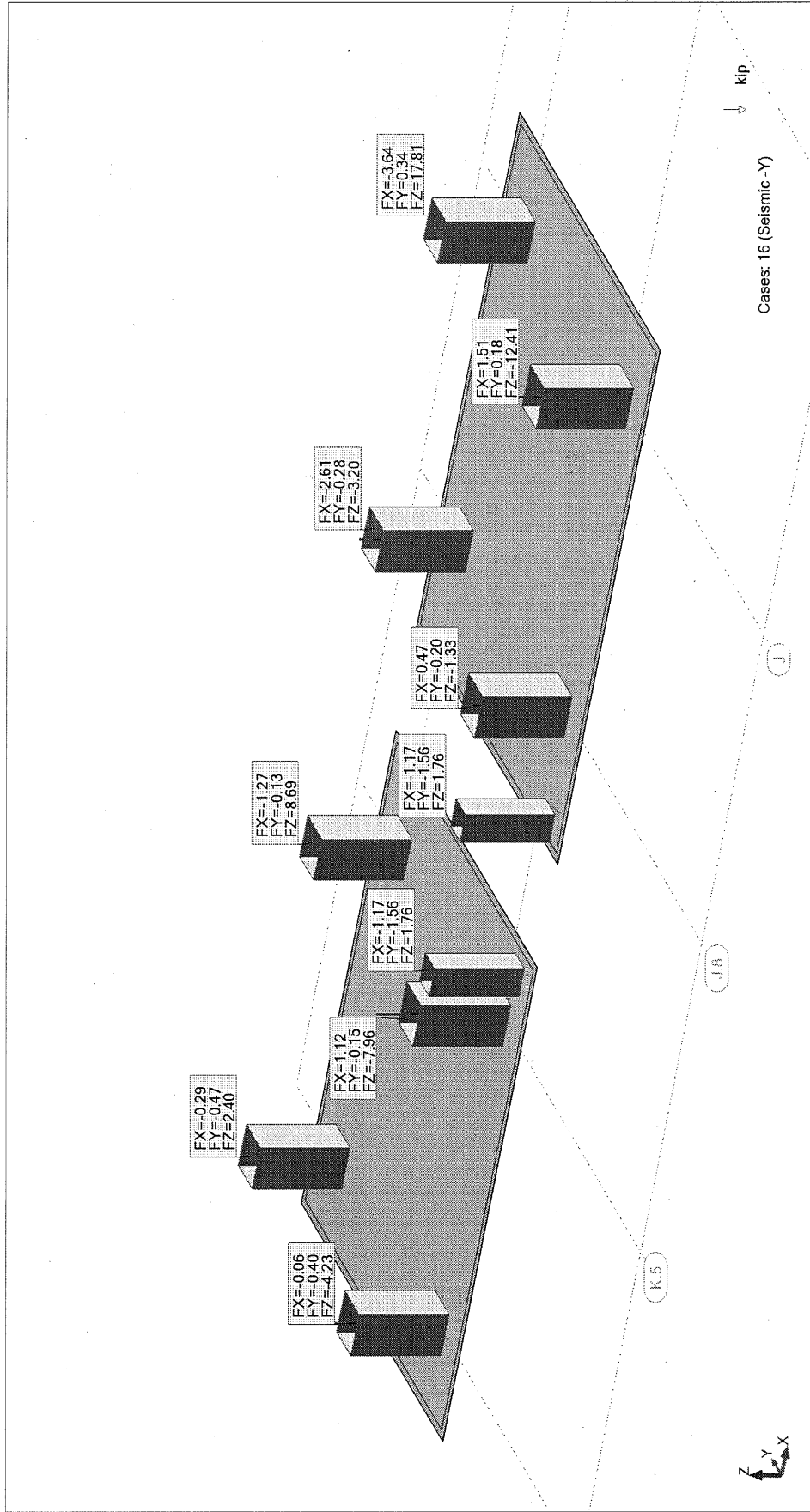




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Midvale, Utah 84047-5559

Engineer: Clint Karren
Calc No.: Job.:11021
Project: Flotation Combined Footing
Client: CC&V High Grade Ore

View - Cases: 16 (Seismic -Y)



Date : 27/02/12

File: Flotation Combined Footing Rev2.rtd

Page : 1

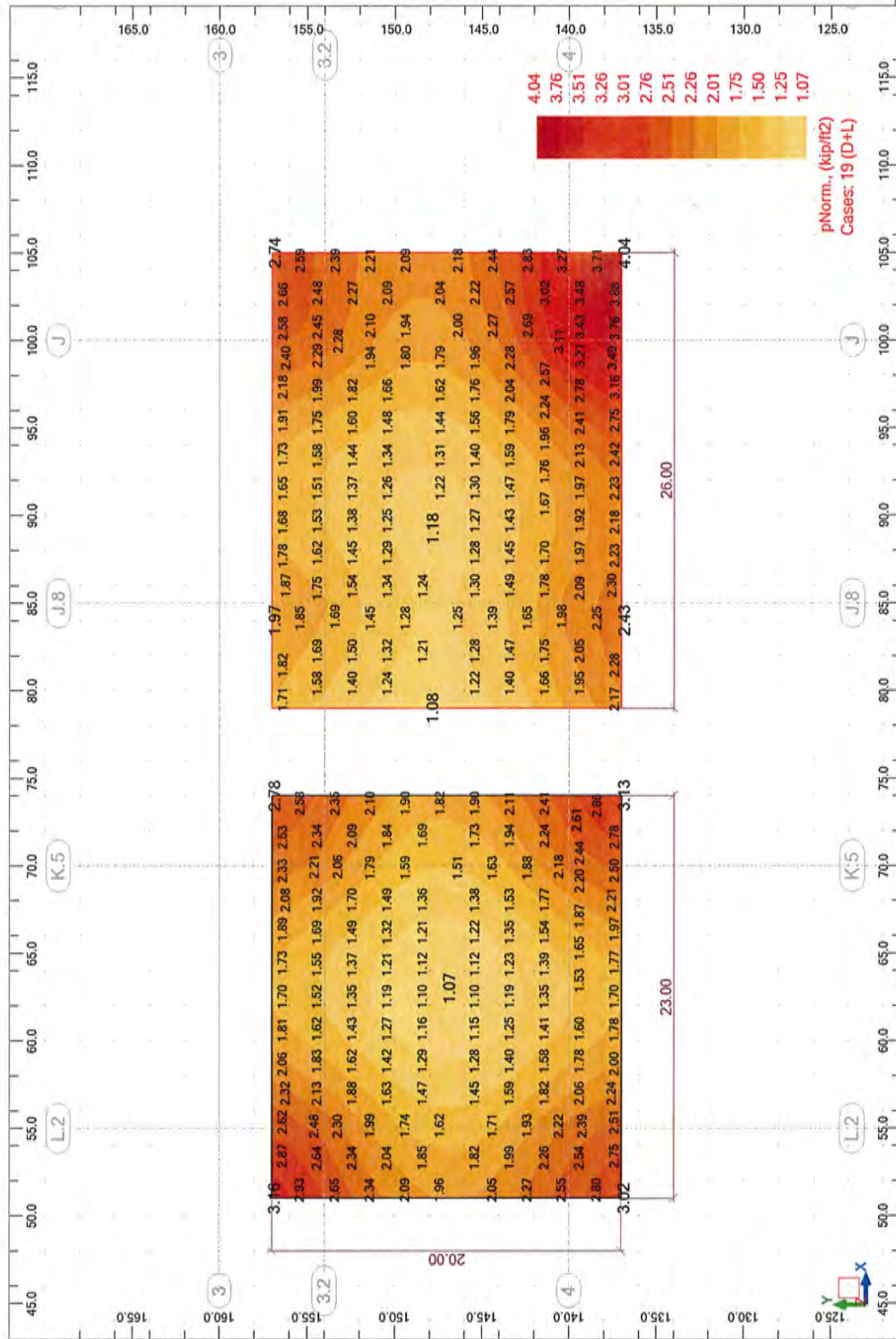
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7158 S. FLSmidth Drive
Midvale, Utah 84047-5559

Engineer: Clint Karren
Calc No.: Job.:11021
Project: Flotation Mat Foundation Rev. 2
Client: CC&V High Grade Ore

View - pNorm. (kip/ft²) Cases: 19 (D+L)

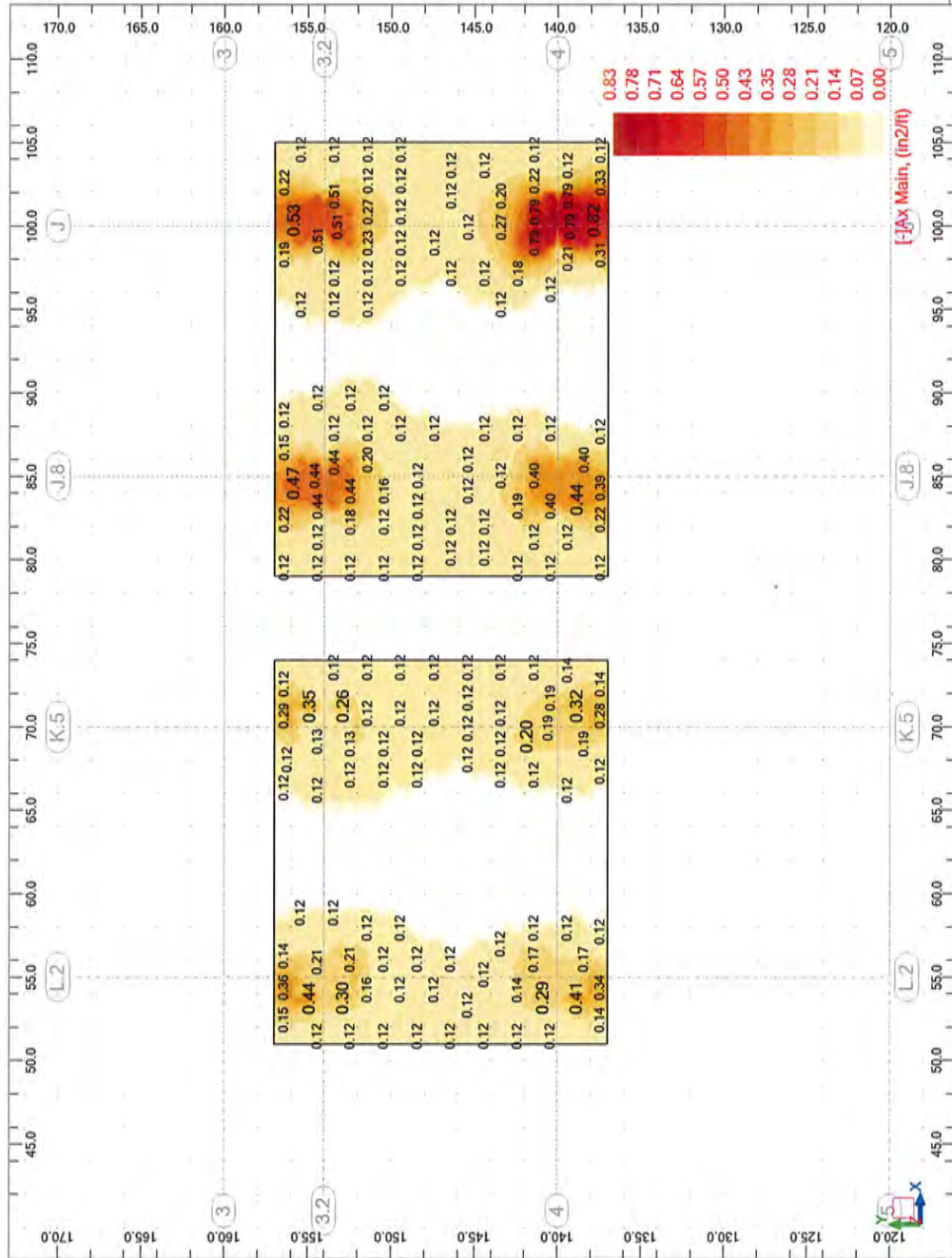




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View - [-]Ax Main (in2/ft)

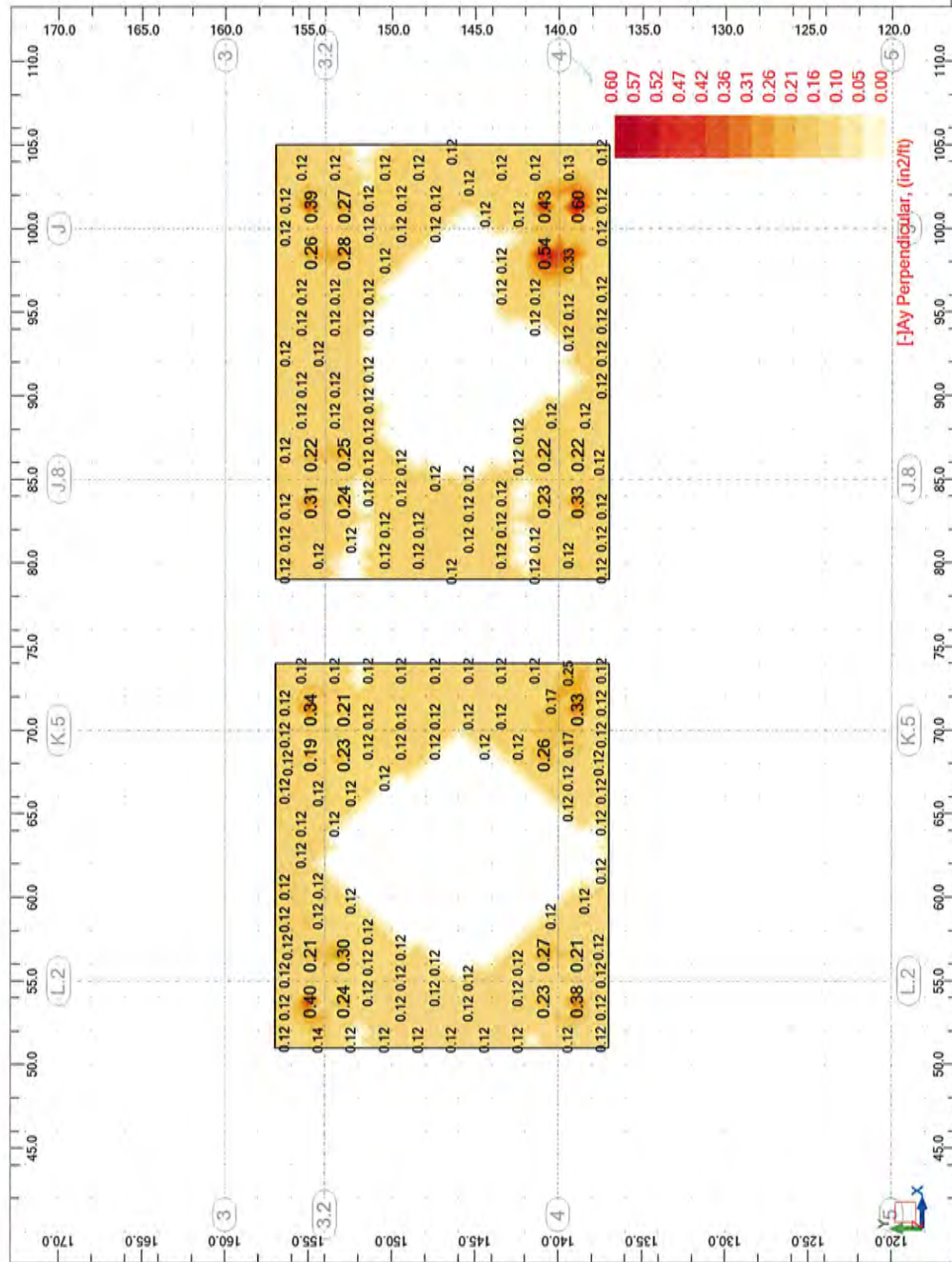




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View - (-)Ay Perpendicular (in2/ft)



Date : 02/05/12

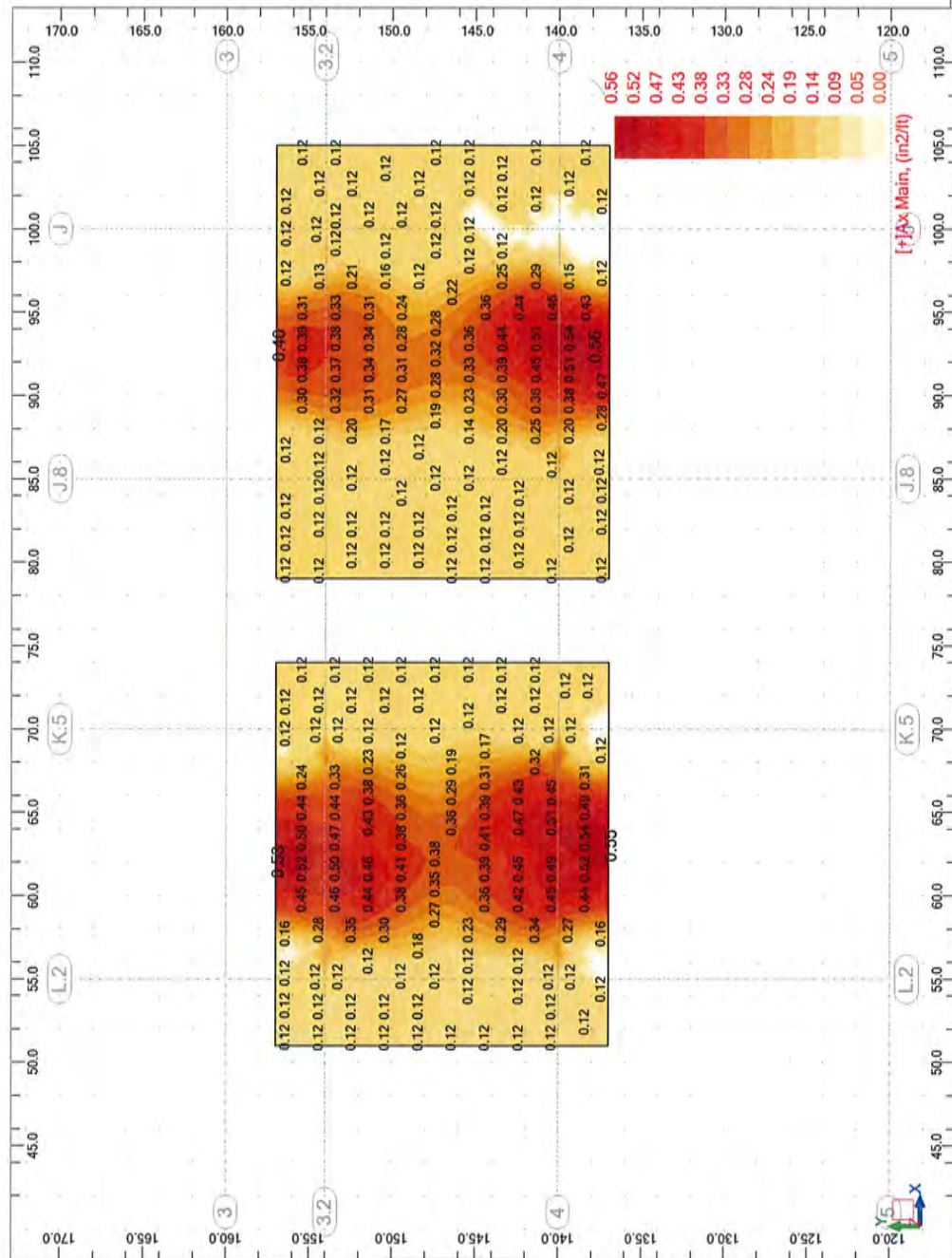
File: Flotation Mat Foundation Rev. 2.rtd

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7158 S. FLSmidth Drive
Midvale, Utah 84047-5559

View - [+]
Ax Main (in2/ft)Page : 1
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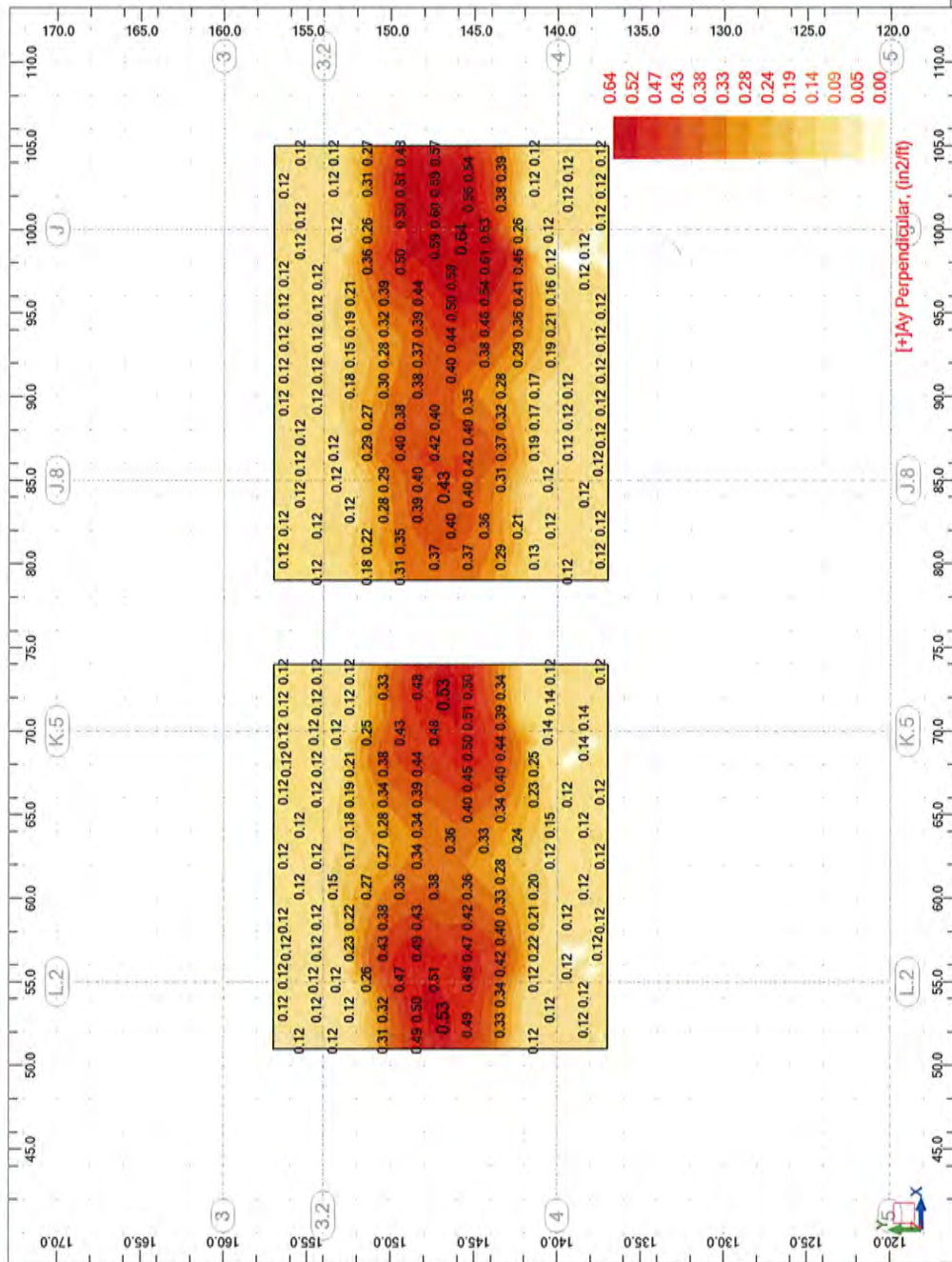
Date : 02/05/12
File: Flotation Mat Foundation Rev. 2.rtd



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Engineer: Clint Karren
Calc No.: Job.:11021
Project: Flotation Mat Foundation Rev. 2
Client: CC&V High Grade Ore

View - [x]Ay Perpendicular (in2/ft)



FLSMIDTH	PROJECT CC & V High Grade Ore	Proj No.	11021
		Calc No.	
	SUBJECT Flotation Combined Footing	By	CCK Feb-27-2012
	Along Grid J.8 and J	Check	
		Sheet	of

SLIDING

Surcharge Loads

Piers	$\gamma =$	150	pcf				
	Length	2.0	2.0	2.0	2.0	ft	
	Width	2.0	2.0	2.0	2.0	ft	
	Height	4.0	4.0	4.0	4.0	ft	
	Volume	16.0	16.0	16.0	16.0	ft ³	

Footing	$\gamma =$	150	pcf				
	Length	25	ft				
	Width	20	ft				
	Thickness	1.5	ft				
	Volume	750	ft ³				

Slab	$\gamma =$	150	pcf				
	Thickness	8	in				

Soil	$\gamma =$	120	pcf				
	Thickness	8	in				

$$D_{\text{surcharge}} = 212.1 \text{ k}$$

Vertical Loads

	J.8,3.2	J.8,4	J.3,2	J.4	
D	28.6 k	28.6 k	32.1 k	44.0 k	133.3 k
L	140.3 k	145.7 k	176.7 k	244.5 k	707.2 k
S	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
W	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
E	39.1 k	36.8 k	-40.1 k	-32.8 k	3.1 k

Horizontal Loads

D	2.3 k	2.8 k	-1.3 k	-1.5 k	2.3 k
L	9.5 k	14.3 k	-9.4 k	-9.0 k	5.4 k
S	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
W	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
E	12.9 k	12.2 k	13.1 k	12.0 k	50.2 k

Sliding

μ	0.5		
Soil Passive Resistance	0.42	ksf	
	12.50	k	
Sliding Factor of Safety	1.5		

Combination	Sliding Force	Resistance Force	Sliding Safety Ratio
D	2.3 k	185.2 k	80.2 OK
D+L	7.7 k	538.8 k	70.2 OK
D+S	2.3 k	185.2 k	80.2 OK
D+0.75L+0.75S	6.3 k	450.4 k	71.2 OK
D+W	2.3 k	185.2 k	80.2 OK
D+0.7E	37.4 k	186.3 k	5.0 OK
D+0.75W+0.75L+0.75S	6.3 k	450.4 k	71.2 OK
D+0.525E+0.75L+0.75S	32.7 k	451.2 k	13.8 OK
0.6D+W	1.4 k	116.1 k	83.8 OK
0.6D+0.7E	36.5 k	186.3 k	5.1 OK

FLSMIDTH	PROJECT CC & V High Grade Ore	Proj No.	11021
		Calc No.	
	SUBJECT Flotation Combined Footing	By	CCK Feb-27-2012
	Along Grid L.2 and K.5	Check	
		Sheet	of

SLIDING

Surcharge Loads

Piers	$\gamma =$	150	pcf				
	Length	2.0	2.0	2.0	2.0	ft	
	Width	2.0	2.0	2.0	2.0	ft	
	Height	4.0	4.0	4.0	4.0	ft	
	Volume	16.0	16.0	16.0	16.0	ft ³	

Footing	$\gamma =$	150	pcf				
	Length	23	ft				
	Width	20	ft				
	Thickness	1.5	ft				
	Volume	690	ft ³				

Slab	$\gamma =$	150	pcf				
	Thickness	8	in				

Soil	$\gamma =$	120	pcf				
	Thickness	8	in				

$$D_{\text{surcharge}} = 195.9 \text{ k}$$

Vertical Loads

	L.2,3,2	L.2,4	K.5,3,2	K.5,4	
D	29.3 k	28.3 k	27.9 k	26.3 k	111.8 k
L	161.4 k	155.1 k	139.8 k	139.4 k	595.7 k
S	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
W	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
E	-34.1 k	-28.5 k	33.3 k	28.1 k	-1.2 k

Horizontal Loads

D	1.3 k	1.4 k	-2.4 k	-2.4 k	-2.1 k
L	9.2 k	8.6 k	-10.4 k	-11.2 k	-3.9 k
S	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
W	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
E	-11.7 k	-10.3 k	-13.2 k	-11.7 k	-46.8 k

Sliding

μ	0.5		
Soil Passive Resistance	0.42	ksf	
	12.50	k	
Sliding Factor of Safety	1.5		

Combination	Sliding Force	Resistance Force	Sliding Safety Ratio
D	2.1 k	166.4 k	79.2 OK
D+L	6.0 k	464.2 k	77.6 OK
D+S	2.1 k	166.4 k	79.2 OK
D+0.75L+0.75S	5.0 k	389.7 k	77.8 OK
D+W	2.1 k	166.4 k	79.2 OK
D+0.7E	34.9 k	165.9 k	4.8 OK
D+0.75W+0.75L+0.75S	5.0 k	389.7 k	77.8 OK
D+0.525E+0.75L+0.75S	29.6 k	389.4 k	13.2 OK
0.6D+W	1.3 k	104.8 k	83.2 OK
0.6D+0.7E	34.0 k	165.9 k	4.9 OK

FLSMIDTH	PROJECT CC & V High Grade Ore	Proj No.	11021
		Calc No.	
	SUBJECT Flotation Combined Footing	By	CCK Feb-27-2012
	Along Grid J.8 & J	Check	
		Sheet	of

OVERTURNING

Surcharge Loads

Pedestals	g =	150	pcf						
	Y-Location	17.00	3.00	17.00	3.00			ft	
	X-Location	6.00	6.00	21.00	21.00			ft	
	Length	2.0	2.0	2.0	2.0			ft	
	Width	2.0	2.0	2.0	2.0			ft	
	Height	4.0	4.0	4.0	4.0			ft	
	Volume	16.0	16.0	16.0	16.0			ft ³	
Footing	g =	150	pcf						Mx _{Piers} = 96.0 k-ft
	Length	25	ft						My _{Piers} = 129.6 k-ft
	Width	20	ft						
	Thickness	1.5	ft						Mx _{Footing} = 1406.3 k-ft
	Volume	750	ft ³						My _{Footing} = 1125.0 k-ft
Slab	g =	150	pcf						Mx _{Slab} = 625.0 k-ft
	Thickness	0.67	ft						My _{Slab} = 500.0 k-ft
Soil	g =	120	pcf						Mx _{Soil} = 500.0 k-ft
	Thickness	0.7	ft						My _{Soil} = 400.0 k-ft

Vertical Loads	J.8,3.2	J.8,4	J.3,2	J.4				
Y-Location	17.00	3.00	17.00	3.00				
X-Location	6.00	6.00	21.00	21.00				
D	28.6 k	28.6 k	32.1 k	44.0 k	3877.0 k-ft	4709.5 k-ft	4096.1 k-ft	4236.8 k-ft
L	140.3 k	145.7 k	176.7 k	244.5 k	6559.7 k-ft	11120.8 k-ft	10561.3 k-ft	11120.8 k-ft
S	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k-ft	0.0 k-ft	0.0 k-ft	0.0 k-ft
W	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k-ft	0.0 k-ft	0.0 k-ft	0.0 k-ft
E	39.1 k	36.8 k	-40.1 k	-32.8 k	-3.5 k-ft	81.3 k-ft	-1073.6 k-ft	81.3 k-ft

Horizontal Loads

Moment Arm	5.5	ft			
D	2.3 k	2.8 k	-1.3 k	-1.5 k	12.7 k-ft
L	9.5 k	14.3 k	-9.4 k	-9.0 k	29.5 k-ft
S	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k-ft
W	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k-ft
E	12.9 k	12.2 k	13.1 k	12.0 k	276.0 k-ft

Overturning

Overturning Factor of Safety 1.5

X-X ₁	Combination	Overturning Moment	Resistance Moment	Moment Safety Ratio	
X-X ₁	D	12.7 k-ft	3877.0 k-ft	305.2	OK
	D+L	42.2 k-ft	10436.7 k-ft	247.4	OK
	D+S	12.7 k-ft	3877.0 k-ft	305.2	OK
	D+0.75L+0.75S	34.8 k-ft	8796.8 k-ft	252.7	OK
	D+W	12.7 k-ft	3877.0 k-ft	305.2	OK
	D+0.7E	205.9 k-ft	3874.5 k-ft	18.8	OK
	D+0.75W+0.75L+0.75S	34.8 k-ft	8796.8 k-ft	252.7	OK
	D+0.525E+0.75L+0.75S	179.7 k-ft	8794.9 k-ft	48.9	OK
	0.6D+W	7.6 k-ft	2326.2 k-ft	305.2	OK
	0.6D+0.7E	205.9 k-ft	2323.7 k-ft	11.3	OK
	0.6D+0.7E	205.9 k-ft	2882.6 k-ft	14.0	OK
X-X ₂	D	0.0 k-ft	4709.5 k-ft	-	OK
	D+L	42.2 k-ft	15830.3 k-ft	375.3	OK
	D+S	12.7 k-ft	4709.5 k-ft	370.7	OK
	D+0.75L+0.75S	34.8 k-ft	13050.1 k-ft	374.8	OK
	D+W	12.7 k-ft	4709.5 k-ft	370.7	OK
	D+0.7E	205.9 k-ft	4766.4 k-ft	23.1	OK
	D+0.75W+0.75L+0.75S	34.8 k-ft	13050.1 k-ft	374.8	OK
	D+0.525E+0.75L+0.75S	179.7 k-ft	13092.8 k-ft	72.8	OK
	0.6D+W	7.6 k-ft	2825.7 k-ft	370.7	OK
	0.6D+0.7E	205.9 k-ft	2882.6 k-ft	14.0	OK
	0.6D+0.7E	205.9 k-ft	2882.6 k-ft	14.0	OK

Y-Y ₁	D	0.0 k-ft	4096.1 k-ft	-	
	D+L	42.2 k-ft	14657.4 k-ft	347.5	OK
	D+S	12.7 k-ft	4096.1 k-ft	322.4	OK
	D+0.75L+0.75S	34.8 k-ft	12017.1 k-ft	345.2	OK
	D+W	12.7 k-ft	4096.1 k-ft	322.4	OK
	D+0.7E	205.9 k-ft	3344.5 k-ft	16.2	OK
	D+0.75W+0.75L+0.75S	34.8 k-ft	12017.1 k-ft	345.2	OK
	D+0.525E+0.75L+0.75S	179.7 k-ft	11453.4 k-ft	63.7	OK
	0.6D+W	7.6 k-ft	2457.6 k-ft	322.4	OK
	0.6D+0.7E	205.9 k-ft	1706.1 k-ft	8.3	OK
Y-Y ₂	D	0.0 k-ft	4236.8 k-ft	-	
	D+L	42.2 k-ft	15357.7 k-ft	364.1	OK
	D+S	12.7 k-ft	15357.7 k-ft	1208.8	OK
	D+0.75L+0.75S	34.8 k-ft	12577.5 k-ft	361.3	OK
	D+W	12.7 k-ft	4236.8 k-ft	333.5	OK
	D+0.7E	205.9 k-ft	4293.7 k-ft	20.8	OK
	D+0.75W+0.75L+0.75S	34.8 k-ft	12577.5 k-ft	361.3	OK
	D+0.525E+0.75L+0.75S	179.7 k-ft	12620.1 k-ft	70.2	OK
	0.6D+W	7.6 k-ft	2542.1 k-ft	333.5	OK
	0.6D+0.7E	205.9 k-ft	2599.0 k-ft	12.6	OK

FLSMIDTH	PROJECT CC & V High Grade Ore	Proj No.	11021
		Calc No.	
	SUBJECT Flotation Combined Footing	By	CCK Feb-27-2012
	Along Grid L.2 & K.5	Check	
		Sheet	of

OVERTURNING

Surcharge Loads

Pedestals	g =	150	pcf						
	Y-Location	17.00	3.00	17.00	3.00			ft	
	X-Location	4.00	4.00	19.00	19.00			ft	
	Length	2.0	2.0	2.0	2.0			ft	
	Width	2.0	2.0	2.0	2.0			ft	
	Height	4.0	4.0	4.0	4.0			ft	
	Volume	16.0	16.0	16.0	16.0			ft ³	
Footing	g =	150	pcf						Mx _{Piers} = 96.0 k-ft
	Length	23	ft						My _{Piers} = 110.4 k-ft
	Width	20	ft						
	Thickness	1.5	ft						Mx _{Footing} = 1190.3 k-ft
	Volume	690	ft ³						My _{Footing} = 1035.0 k-ft
Slab	g =	150	pcf						Mx _{Slab} = 529.0 k-ft
	Thickness	0.67	ft						My _{Slab} = 460.0 k-ft
Soil	g =	120	pcf						Mx _{Soil} = 423.2 k-ft
	Thickness	0.7	ft						My _{Soil} = 368.0 k-ft

Vertical Loads	L.2,3,2	L.2,4	K.5,3,2	K.5,4					
Y-Location	17.00	3.00	17.00	3.00					
X-Location	6.00	6.00	21.00	21.00					
D	29.3 k	28.3 k	27.9 k	26.3 k	3374.4 k-ft	3673.9 k-ft	3457.1 k-ft	3408.9 k-ft	
L	161.4 k	155.1 k	139.8 k	139.4 k	6003.5 k-ft	7697.6 k-ft	7763.1 k-ft	7697.6 k-ft	
S	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k-ft	0.0 k-ft	0.0 k-ft	0.0 k-ft	
W	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k-ft	0.0 k-ft	0.0 k-ft	0.0 k-ft	
E	-34.1 k	-28.5 k	33.3 k	28.1 k	-14.8 k-ft	-13.0 k-ft	913.7 k-ft	-13.0 k-ft	

Horizontal Loads

Moment Arm	5.5	ft			
D	1.3 k	1.4 k	-2.4 k	-2.4 k	-11.6 k-ft
L	9.2 k	8.6 k	-10.4 k	-11.2 k	-21.3 k-ft
S	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k-ft
W	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k-ft
E	-11.7 k	-10.3 k	-13.2 k	-11.7 k	-257.6 k-ft

Overturning

Overturning Factor of Safety 1.5

X-X ₁	Combination	Overtuning Moment	Resistance Moment	Moment Safety Ratio	
X-X ₁	D	11.6 k-ft	3374.4 k-ft	292.2	OK
	D+L	32.9 k-ft	9377.9 k-ft	285.1	OK
	D+S	11.6 k-ft	3374.4 k-ft	292.2	OK
	D+0.75L+0.75S	27.6 k-ft	7877.0 k-ft	285.9	OK
	D+W	11.6 k-ft	3374.4 k-ft	292.2	OK
	D+0.7E	191.9 k-ft	3364.0 k-ft	17.5	OK
	D+0.75W+0.75L+0.75S	27.6 k-ft	7877.0 k-ft	285.9	OK
	D+0.525E+0.75L+0.75S	162.8 k-ft	7869.2 k-ft	48.3	OK
	0.6D+W	6.9 k-ft	2024.6 k-ft	292.2	OK
	0.6D+0.7E	191.9 k-ft	2014.2 k-ft	10.5	OK
X-X ₂	D	0.0 k-ft	3673.9 k-ft	-	OK
	D+L	32.9 k-ft	11371.6 k-ft	345.7	OK
	D+S	11.6 k-ft	3673.9 k-ft	318.1	OK
	D+0.75L+0.75S	27.6 k-ft	9447.1 k-ft	342.8	OK
	D+W	11.6 k-ft	3673.9 k-ft	318.1	OK
	D+0.7E	191.9 k-ft	3664.8 k-ft	19.1	OK
	D+0.75W+0.75L+0.75S	27.6 k-ft	9447.1 k-ft	342.8	OK
	D+0.525E+0.75L+0.75S	162.8 k-ft	9440.3 k-ft	58.0	OK
	0.6D+W	6.9 k-ft	2204.4 k-ft	318.1	OK
	0.6D+0.7E	191.9 k-ft	2195.3 k-ft	11.4	OK

Y-Y ₁	D	0.0 k-ft	3457.1 k-ft	-	
	D+L	32.9 k-ft	11220.2 k-ft	341.1	OK
	D+S	11.6 k-ft	3457.1 k-ft	299.3	OK
	D+0.75L+0.75S	27.6 k-ft	9279.4 k-ft	336.8	OK
	D+W	11.6 k-ft	3457.1 k-ft	299.3	OK
	D+0.7E	191.9 k-ft	4096.7 k-ft	21.3	OK
	D+0.75W+0.75L+0.75S	27.6 k-ft	9279.4 k-ft	336.8	OK
	D+0.525E+0.75L+0.75S	162.8 k-ft	9759.1 k-ft	59.9	OK
	0.6D+W	6.9 k-ft	2074.2 k-ft	299.3	OK
	0.6D+0.7E	191.9 k-ft	2713.8 k-ft	14.1	OK
Y-Y ₂	D	0.0 k-ft	3408.9 k-ft	-	
	D+L	32.9 k-ft	11106.5 k-ft	337.7	OK
	D+S	11.6 k-ft	11106.5 k-ft	961.6	OK
	D+0.75L+0.75S	27.6 k-ft	9182.1 k-ft	333.2	OK
	D+W	11.6 k-ft	3408.9 k-ft	295.1	OK
	D+0.7E	191.9 k-ft	3399.8 k-ft	17.7	OK
	D+0.75W+0.75L+0.75S	27.6 k-ft	9182.1 k-ft	333.2	OK
	D+0.525E+0.75L+0.75S	162.8 k-ft	9175.3 k-ft	56.4	OK
	0.6D+W	6.9 k-ft	2045.3 k-ft	295.1	OK
	0.6D+0.7E	191.9 k-ft	2036.2 k-ft	10.6	OK

	PROJECT	CC & V High Grade Ore	Proj No.	11021
			Calc No.	
	SUBJECT	Flotation Combined	By	CCK Feb-27-2012
		Footing Along Grid L.2 & K.5	Check	
			Sheet	of

PUNCHING SHEAR

Properties		Column Loads		Load Combinations	
Footing Length	12.0 ft	Dead	44.0 k	1.4D	61.6 k
Footing Width	10.0 ft	Live	244.5 k	1.2D+1.6L+0.5S	444.0 k
Thickness	18.0 in	Snow	0.0 k	1.2D+1.6S+L	297.3 k
Column Length	24.0 in	Wind	0.0 k	1.2D+1.6S+0.8W	52.8 k
Column Width	24.0 in	EQ	32.0 k	1.2D+1.6S-0.8W	52.8 k
f'_c	4000 psi			1.2D+1.6W+L+0.5S	297.3 k
d	14.5 in			1.2D-1.6W+L+0.5S	297.3 k
β_c	1.0	P_u	444.0 k	1.2D+E+L+0.2S	265.4 k
b_o	154	W_u	3.7 ksf	1.2D-E+L+0.2S	329.3 k
α_s	40			0.9D+1.6W	39.6 k
				0.9D-1.6W	39.6 k
				0.9D+E	71.6 k
				0.9D-E	7.6 k

ONE-WAY SHEAR

T_A (ft ²)	33.5	T_A (ft ²)	37.9
V_u	124.0 k	V_u	140.3 k
V_c	264.1 k	V_c	220.1 k
ΦV_c	198.1 k	ΦV_c	165.1 k
OK	0.63	OK	0.85

TWO-WAY SHEAR

T_A (ft ²)	109.7	(a) V_c	847.4 k
V_u	406.0 k	(b) V_c	814.3 k
V_c	564.9 k	(c) V_c	564.9 k
ΦV_n	423.7 k		
OK	0.96		

CC₁V HIGH GRADE ORL

11021

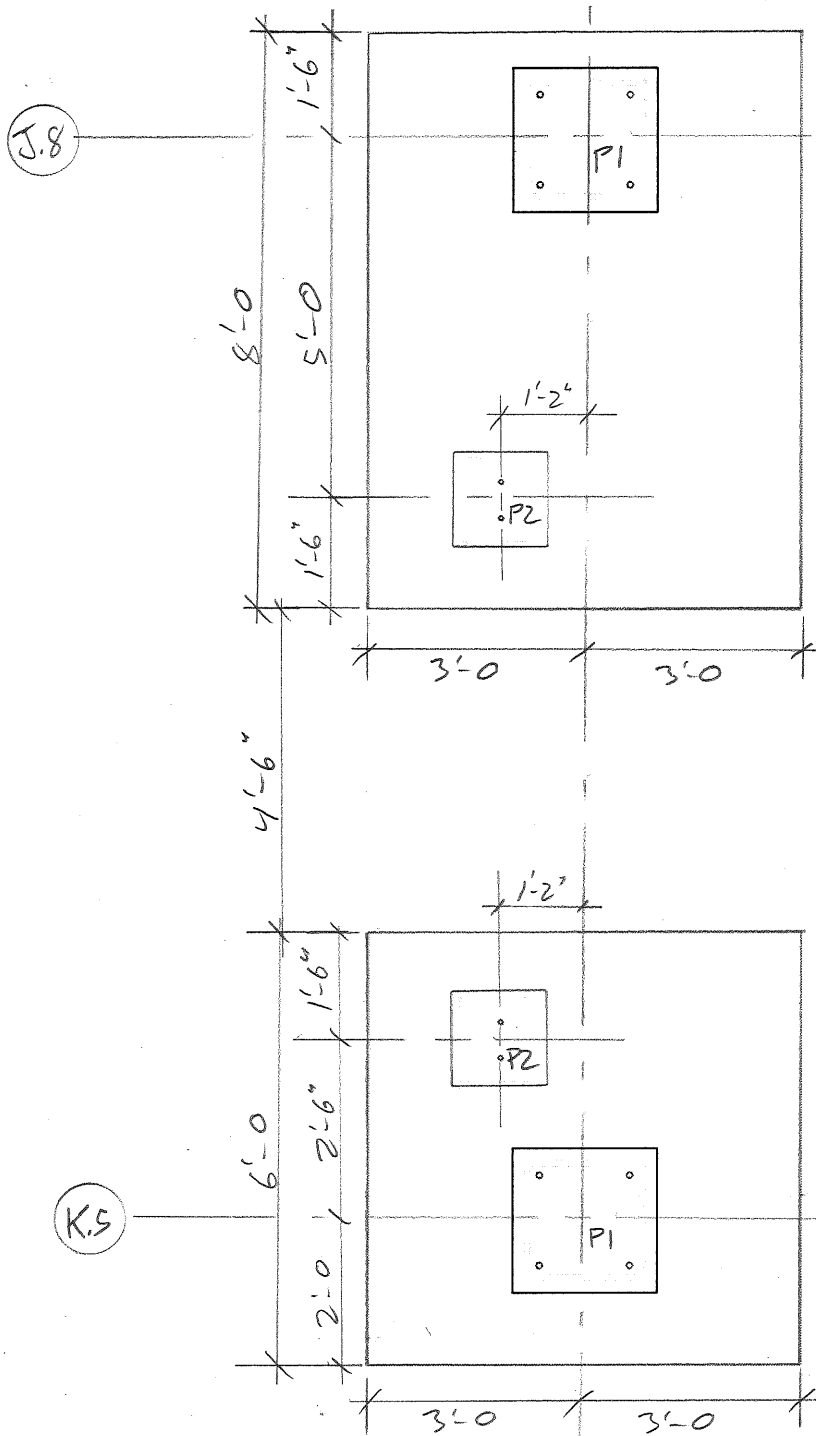
C-007

SIEVE BEAD FOUNDATION

BY: ECS 5-4-12

CHK:

4.5



SIEVE BEAD FOUNDATIONS

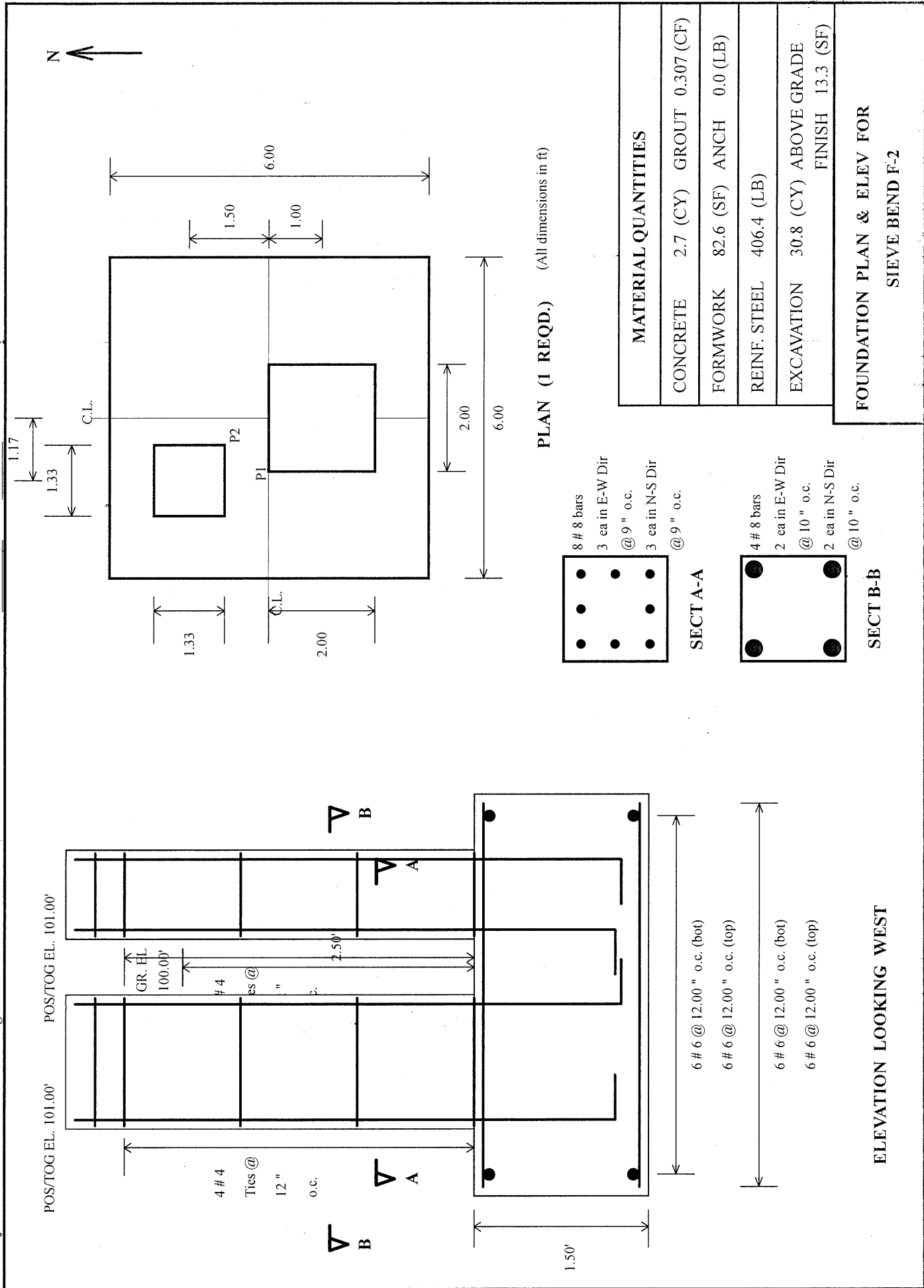
Proj. No.: 11021

Engr: ECS

Date: 5/7/2012

Checker:

Date:



FOUNDATION PLAN AND ELEVATION P:\11021\116 - CALCULATIONS\116.D - ARCH_CIVIL_STRUCT\007 REGRIND AREA CONCRETE FLOTATION FOUNDATIONS\SIEVE BEND F-1.MCS

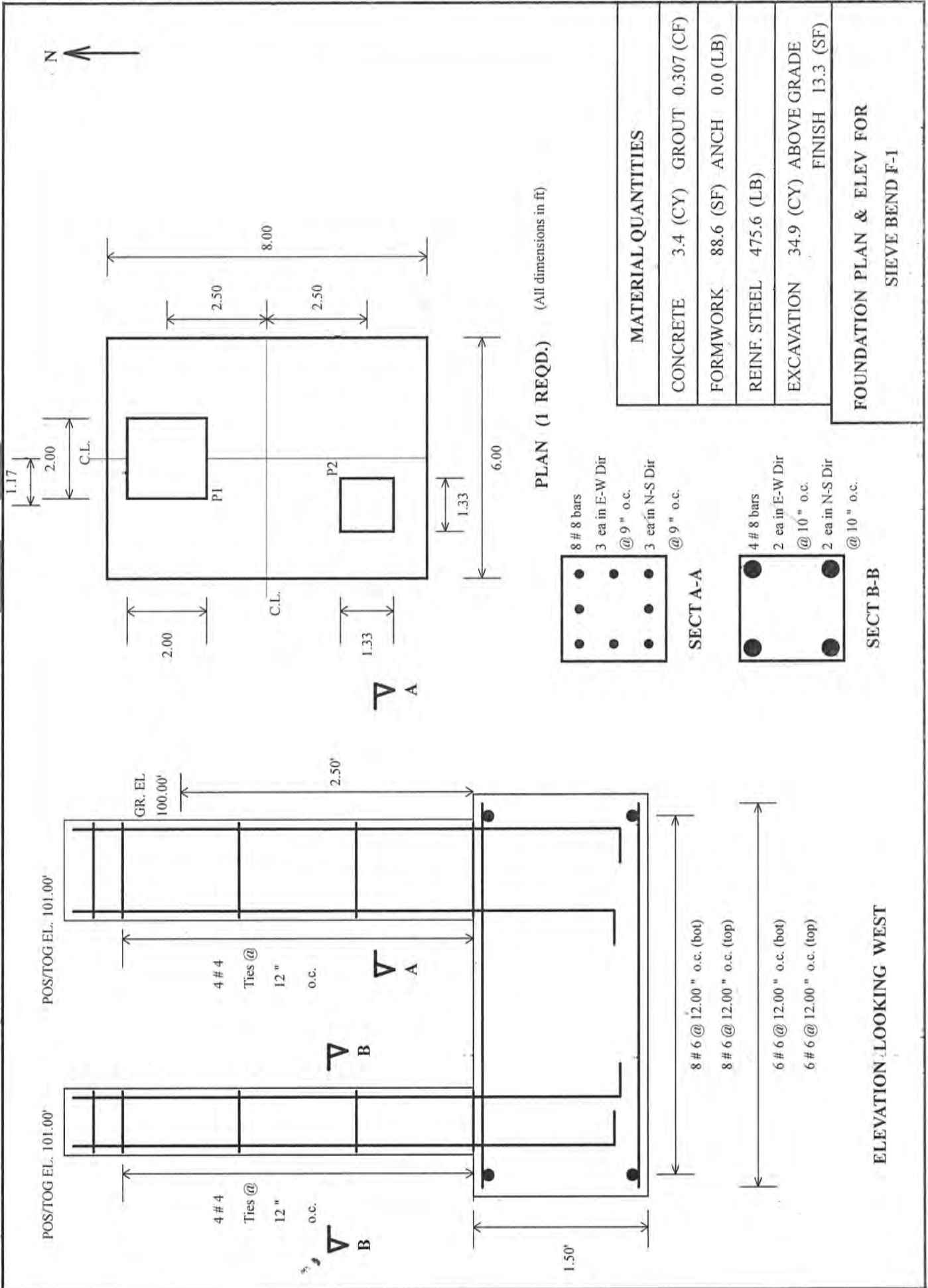
Proj. No.: 11021

Engr: ECS

Date: 5/7/2012

Checker:

Date:



Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/7/2012
Foundation Name	Sieve Bend F-1		Time	8:49:45 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\007 Regrind Area Concrete\			
Filename:	Flotation Foundations\Sieve Bend F-1.mcs			

DETAIL REPORT FOR Sieve Bend F-1**PROJECT INFORMATION**

Project Name: CC&V High Grade Mill
Project Number: 11021
Client: CC&V
Project Location: Victor CO
Foundation Description: FOUNDATION

DESIGN CODE ACI 318 - 2008 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength (psi) 4000
 Unit Weight (pcf) 150
 Pier Concrete Cover - E-W Dir (in) 2
 Pier Concrete Cover - N-S Dir (in) 2
 Footing Side Concrete Cover - E-W Dir (in) 3
 Footing Side Concrete Cover - N-S Dir (in) 3
 Footing Top Concrete Cover (in) 2
 Footing Bottom Concrete Cover - X Dir (in) 3

SOIL PARAMETERS:

Unit Weight (pcf) 120
 Allowable Net Bearing Capacity (psf) 4000
 Bearing Capacity Method Linear Soil Pressure
 Soil Type Granular
 Passive Pressure Coefficient Kp 3.69
 Soil To Concrete Friction f 0.5
 Allowable Increase in Soil Pressure due to Short Term Loads (%)
 Wind 33.33 Earthquake 33.33 Test 20
 Erection Stability Ratio 1.25
 Operation Stability Ratio 1.25
 Test Stability Ratio 1.25
 Safety Factor against Lateral Forces 1.5

MINIMUM FOUNDATION CRITERIA:

Depth of Footing Below Grade (ft) 4
 Minimum Soil Cover (ft) 0
 Grade Elevation (ft) 100

REINFORCING STEEL PARAMETERS:

Yield Strength (ksi) 60
 Unit Weight (pcf) 490
 Modulus of Elasticity (ksi) 29000
 Pier Min Rebar Spacing (in) 3
 Footing Min Rebar Spacing (in) 6
 Footing Max Rebar Spacing (in) 18

REBAR PARAMETERS:

Max Long Bar Size 10
 Min Long Bar Size 7
 Max Tie Bar Size 4
 Min Tie Bar Size 3
 Max Ftg Bar Size 18
 Temp & Shrinkage Steel Ratio 0.0018

BUOYANCY CRITERIA:

Consider Buoyancy: No
 Consider soil for buoyancy: No
 Water table below grade (ft) 0

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/7/2012
Foundation Name	Sieve Bend F-1		Time	8:49:45 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\Flotation Foundations\Sieve Bend F-1.mcs			

DETAIL REPORT FOR Sieve Bend F-1**APPLIED LOADS****P1**

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	3.17	1.16	0.00	0.00	0.00
2 - Live	2.44	0.86	0.00	0.00	0.00
3 - Earthquake X	1.20	0.88	0.00	0.00	0.00
4 - Earthquake Y	-3.69	-1.36	0.00	0.00	0.00

P2

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	1.72	0.00	0.00	0.00	0.00
2 - Live	13.73	4.14	0.00	0.22	0.00
3 - Earthquake X	3.54	4.10	0.00	2.96	0.00
4 - Earthquake Y	3.10	4.10	0.00	2.96	0.00

UNFACTORED (ALLOWABLE) LOAD COMBINATIONS**P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	3.17	1.16	0.00	0.00	0.00
2 - Dead + Live	5.61	2.02	0.00	0.00	0.00
3 - Dead + 0.7Earthquake X	4.01	1.78	0.00	0.00	0.00
4 - Dead + 0.7Earthquake Y	0.59	0.21	0.00	0.00	0.00
5 - Dead + 0.75Live + 0.525Earthquake X	5.63	2.27	0.00	0.00	0.00
6 - Dead + 0.75Live + 0.525Earthquake Y	3.06	1.09	0.00	0.00	0.00
7 - 0.6Dead + 0.7Earthquake X	2.74	1.31	0.00	0.00	0.00
8 - 0.6Dead + 0.7Earthquake Y	-0.68	-0.26	0.00	0.00	0.00

P2

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	1.72	0.00	0.00	0.00	0.00
2 - Dead + Live	15.45	4.14	0.00	0.22	0.00
3 - Dead + 0.7Earthquake X	4.20	2.87	0.00	2.07	0.00
4 - Dead + 0.7Earthquake Y	3.89	2.87	0.00	2.07	0.00
5 - Dead + 0.75Live + 0.525Earthquake X	13.88	5.26	0.00	1.72	0.00
6 - Dead + 0.75Live + 0.525Earthquake Y	13.65	5.26	0.00	1.72	0.00
7 - 0.6Dead + 0.7Earthquake X	3.51	2.87	0.00	2.07	0.00
8 - 0.6Dead + 0.7Earthquake Y	3.20	2.87	0.00	2.07	0.00

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/7/2012
Foundation Name	Sieve Bend F-1		Time	8:49:45 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\			
	Flotation Foundations\Sieve Bend F-1.mcs			

DETAIL REPORT FOR Sieve Bend F-1**FACTORED (ULTIMATE) LOAD COMBINATIONS****P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	4.44	1.62	0.00	0.00	0.00
2 - 1.2Dead + 1.6Live	7.71	2.77	0.00	0.00	0.00
3 - 1.2Dead + Live + Earthquake X	7.44	3.13	0.00	0.00	0.00
4 - 1.2Dead + Live + Earthquake Y	2.55	0.89	0.00	0.00	0.00
5 - 0.9Dead + Earthquake X	4.05	1.92	0.00	0.00	0.00
6 - 0.9Dead + Earthquake Y	-0.84	-0.32	0.00	0.00	0.00

P2

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	2.41	0.00	0.00	0.00	0.00
2 - 1.2Dead + 1.6Live	24.03	6.62	0.00	0.35	0.00
3 - 1.2Dead + Live + Earthquake X	19.33	8.24	0.00	3.18	0.00
4 - 1.2Dead + Live + Earthquake Y	18.89	8.24	0.00	3.18	0.00
5 - 0.9Dead + Earthquake X	5.09	4.10	0.00	2.96	0.00
6 - 0.9Dead + Earthquake Y	4.65	4.10	0.00	2.96	0.00

BEARING CAPACITY - LINEAR SOIL PRESSURE METHOD

Load Comb	Max Pressure (ksf)	All Pressure (ksf)	Ecc N/S Dir (ft)	Ecc E/W Dir (ft)	Moment N/S axis (kip-ft)	Moment E/W axis (kip-ft)	Rem
1 - Dead	0.81	4.48	0.21	0.09	2.71	6.55	
2 - Dead + Live	1.56	4.48	0.43	0.25	11.69	20.57	
3 - Dead + 0.7Earthquake X	1.28	5.81	0.37	0.50	17.25	12.82	
4 - Dead + 0.7Earthquake Y	0.93	5.81	0.16	0.32	9.77	5.03	
5 - Dead + 0.75Live + 0.525Earthquake X	1.52	5.81	0.20	0.44	20.35	9.09	
6 - Dead + 0.75Live + 0.525Earthquake Y	1.44	5.81	0.35	0.34	14.74	14.93	
7 - 0.6Dead + 0.7Earthquake X	0.96	5.81	0.46	0.73	16.16	10.20	
8 - 0.6Dead + 0.7Earthquake Y	0.60	5.81	0.13	0.47	8.68	2.41	

STABILITY RATIO / SLIDING SAFETY FACTOR

Load Comb	S.R. N/S Dir	S.R. E/W Dir	All S.R.	Sliding FS - N/S	Sliding FS - E/W	All FS	Remarks
1 - Dead	100.00	16.66	1.25	100.00	28.42	1.50	
2 - Dead + Live	100.00	5.23	1.25	100.00	6.66	1.50	
3 - Dead + 0.7Earthquake X	13.32	4.71	1.25	14.63	7.45	1.50	
4 - Dead + 0.7Earthquake Y	12.64	6.36	1.25	13.73	10.64	1.50	
5 - Dead + 0.75Live + 0.525Earthquake X	23.66	4.11	1.25	20.92	5.35	1.50	
6 - Dead + 0.75Live + 0.525Earthquake Y	23.04	4.60	1.25	20.10	6.12	1.50	
7 - 0.6Dead + 0.7Earthquake X	8.67	3.39	1.25	11.60	6.78	1.50	
8 - 0.6Dead + 0.7Earthquake Y	7.35	3.82	1.25	10.70	10.13	1.50	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/7/2012
Foundation Name	Sieve Bend F-1		Time	8:49:45 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\			
	Flotation Foundations\Sieve Bend F-1.mcs			

DETAIL REPORT FOR Sieve Bend F-1**FOOTING DESIGN INFORMATION**

E-W Dim (ft)	6.00
N-S Dim (ft)	8.00
Thickness (ft)	1.50

Top Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
5. 0.9Dead + Earthquake X	8	6	12	0.44	0	-0.12	E-W
2. 1.2Dead + 1.6Live	6	6	12	0.44	0.03	-1.34	N-S

Bottom Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
4. 1.2Dead + Live + Earthquake Y	8	6	12	0.44	0.39	5.05	E-W
4. 1.2Dead + Live + Earthquake Y	6	6	12	0.44	0.39	2.3	N-S

PUNCHING SHEAR**P1**

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
2. 1.2Dead + 1.6Live	5.35	3.41	189.74	

P2

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
2. 1.2Dead + 1.6Live	21.08	12.56	189.74	

MAXIMUM SHEAR - E-W DIRECTION

Load Comb	Left Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	3.67	-5.22	3.88	94.87	
2 - 1.2Dead + 1.6Live	3.67	-17.96	13.36	94.87	
3 - 1.2Dead + Live + Earthquake X	3.67	-19.68	14.64	94.87	
4 - 1.2Dead + Live + Earthquake Y	3.67	-15.07	11.21	94.87	
5 - 0.9Dead + Earthquake X	3.67	-10.14	7.54	94.87	
6 - 0.9Dead + Earthquake Y	3.67	-5.52	4.11	94.87	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/7/2012
Foundation Name	Sieve Bend F-1		Time	8:49:45 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\Flotation Foundations\Sieve Bend F-1.mcs			

DETAIL REPORT FOR Sieve Bend F-1**MAXIMUM SHEAR - N-S DIRECTION**

Load Comb	Bottom Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	7.50	-1.10	1.09	94.87	
2 - 1.2Dead + 1.6Live	0.84	6.18	6.14	94.87	
3 - 1.2Dead + Live + Earthquake X	3.33	-5.90	5.86	94.87	
4 - 1.2Dead + Live + Earthquake Y	3.33	-5.66	5.61	94.87	
5 - 0.9Dead + Earthquake X	3.33	-3.69	3.66	94.87	
6 - 0.9Dead + Earthquake Y	3.33	-3.44	3.41	94.87	

PIER/BASE PLATE DESIGN INFORMATION

	P1	P2
E-W Dim (ft)	2.00	1.33
N-S Dim (ft)	2.00	1.33
Height above grade (ft)	1.00	1.00
E-W Offset (ft)	0.00	-1.17
N-S Offset (ft)	2.50	-2.50
Requested Reinf. Ratio	0.0050	0.0050
Provided Reinf. Ratio	0.0109	0.0123
Long Bar Size	8	8
Bars in E-W Dir	3	2
Bars in N-S Dir	3	2
Total Long Bars	8	4
Tie Bar Size	4	4
Total No. of Ties	5	5
Major Tie Spacing (in)	12	12

PIER ULTIMATE LOAD CAPACITIES

P1							
Load Comb	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	Rem
1 - 1.4Dead	7.38	550.92	5.68	420.72	0.81	60.31	
2 - 1.2Dead + 1.6Live	10.23	440.69	9.69	415.83	1.13	48.97	
3 - 1.2Dead + Live + Earthquake X	9.96	362.73	10.96	397.09	1.10	40.15	
4 - 1.2Dead + Live + Earthquake Y	5.07	661.06	3.12	404.45	0.56	72.62	
5 - 0.9Dead + Earthquake X	5.94	349.35	6.73	393.31	0.65	38.76	
6 - 0.9Dead + Earthquake Y	1.05	1.06	1.11	282.00	0.12	28.97	

P2							
Load Comb	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	Rem
1 - 1.4Dead	3.71	537.51	0.33	46.19	0.33	46.19	
2 - 1.2Dead + 1.6Live	25.15	122.19	23.18	112.12	2.26	10.96	
3 - 1.2Dead + Live + Earthquake X	20.45	71.71	28.84	101.13	11.13	39.03	
4 - 1.2Dead + Live + Earthquake Y	20.01	69.68	28.84	100.42	11.13	38.76	
5 - 0.9Dead + Earthquake X	5.92	32.36	14.35	78.40	10.36	56.60	
6 - 0.9Dead + Earthquake Y	5.48	29.65	14.35	77.57	10.36	56.01	

Dimensional Solutions FOUNDATION3D

Version 5.8.2

Date 5/7/2012

Foundation Name Sieve Bend F-1

Time 8:49:45 AM

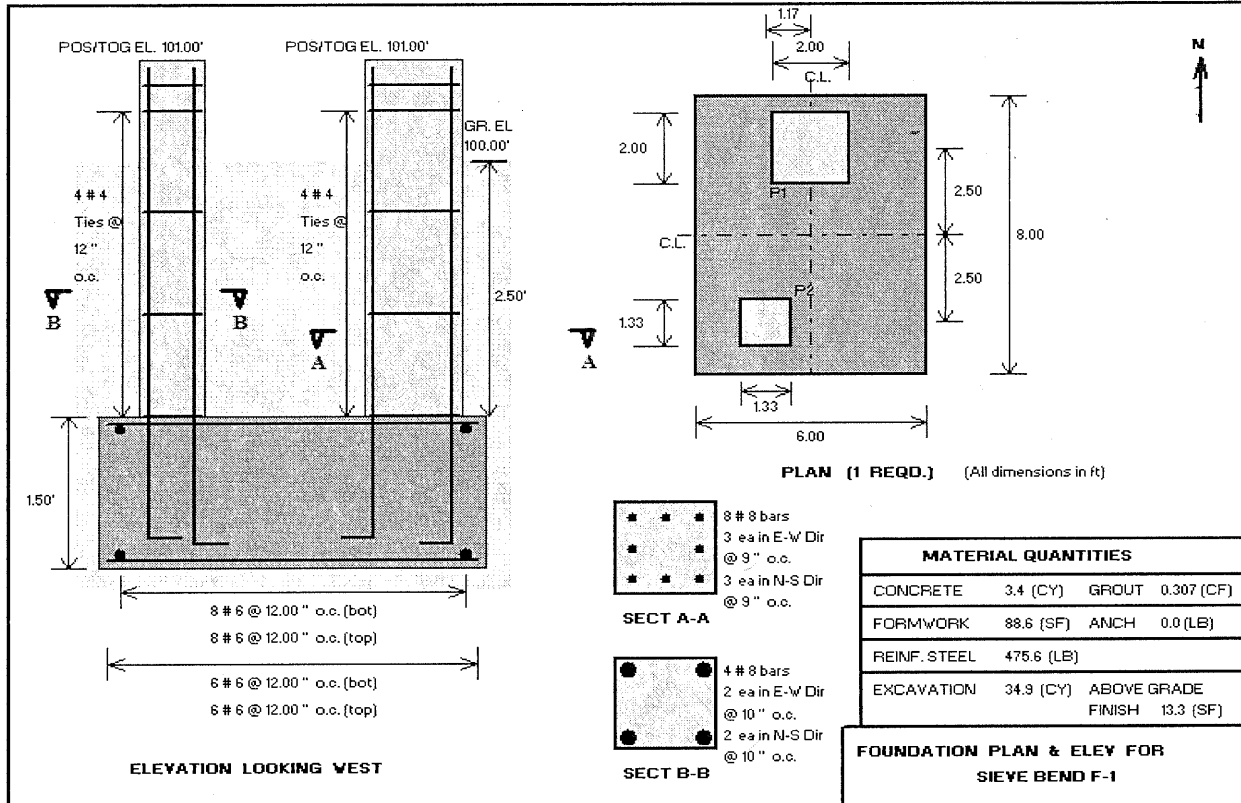
Designed By: FLSmith Salt Lake City

Engineer ECS

Checker

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Filename: Flotation Foundations\Sieve Bend F-1.mcs

DETAIL REPORT FOR Sieve Bend F-1

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/7/2012
Foundation Name	Sieve Bend F-2		Time	8:46:44 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-007 Regrind Area Concrete\Flotation Foundations\Sieve Bend F-2.mcs			

DETAIL REPORT FOR Sieve Bend F-2**PROJECT INFORMATION**

Project Name: CC&V High Grade Mill
Project Number: 11021
Client: CC&V
Project Location: Victor CO
Foundation Description: FOUNDATION

DESIGN CODE ACI 318 - 2008 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength (psi) 4000
 Unit Weight (pcf) 150
 Pier Concrete Cover - E-W Dir (in) 2
 Pier Concrete Cover - N-S Dir (in) 2
 Footing Side Concrete Cover - E-W Dir (in) 3
 Footing Side Concrete Cover - N-S Dir (in) 3
 Footing Top Concrete Cover (in) 2
 Footing Bottom Concrete Cover - X Dir (in) 3

SOIL PARAMETERS:

Unit Weight (pcf) 120
 Allowable Net Bearing Capacity (psf) 4000
 Bearing Capacity Method Linear Soil Pressure
 Soil Type Granular
 Passive Pressure Coefficient Kp 3.69
 Soil To Concrete Friction f 0.5
 Allowable Increase in Soil Pressure due to Short Term Loads (%)
 Wind 33.33 Earthquake 33.33 Test 20
 Erection Stability Ratio 1.25
 Operation Stability Ratio 1.25
 Test Stability Ratio 1.25
 Safety Factor against Lateral Forces 1.5

MINIMUM FOUNDATION CRITERIA:

Depth of Footing Below Grade (ft) 4
 Minimum Soil Cover (ft) 0
 Grade Elevation (ft) 100

REINFORCING STEEL PARAMETERS:

Yield Strength (ksi) 60
 Unit Weight (pcf) 490
 Modulus of Elasticity (ksi) 29000
 Pier Min Rebar Spacing (in) 3
 Footing Min Rebar Spacing (in) 6
 Footing Max Rebar Spacing (in) 18

REBAR PARAMETERS:

Max Long Bar Size 10
 Min Long Bar Size 7
 Max Tie Bar Size 4
 Min Tie Bar Size 3
 Max Ftg Bar Size 18
 Temp & Shrinkage Steel Ratio 0.0018

BUOYANCY CRITERIA:

Consider Buoyancy: No
 Consider soil for buoyancy: No
 Water table below grade (ft) 0

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/7/2012
Foundation Name	Sieve Bend F-2		Time	8:46:44 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\			
	Flotation Foundations\Sieve Bend F-2.mcs			

DETAIL REPORT FOR Sieve Bend F-2**APPLIED LOADS****P1**

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	3.17	1.16	0.00	0.00	0.00
2 - Live	2.44	0.86	0.00	0.00	0.00
3 - Earthquake X	1.20	0.88	0.00	0.00	0.00
4 - Earthquake Y	-3.69	-1.36	0.00	0.00	0.00

P2

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	1.72	0.00	0.00	0.00	0.00
2 - Live	13.73	4.14	0.00	0.22	0.00
3 - Earthquake X	3.54	4.10	0.00	2.96	0.00
4 - Earthquake Y	3.10	4.10	0.00	2.96	0.00

UNFACTORED (ALLOWABLE) LOAD COMBINATIONS**P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	3.17	1.16	0.00	0.00	0.00
2 - Dead + Live	5.61	2.02	0.00	0.00	0.00
3 - Dead + 0.7Earthquake X	4.01	1.78	0.00	0.00	0.00
4 - Dead + 0.7Earthquake Y	0.59	0.21	0.00	0.00	0.00
5 - Dead + 0.75Live + 0.525Earthquake X	5.63	2.27	0.00	0.00	0.00
6 - Dead + 0.75Live + 0.525Earthquake Y	3.06	1.09	0.00	0.00	0.00
7 - 0.6Dead + 0.7Earthquake X	2.74	1.31	0.00	0.00	0.00
8 - 0.6Dead + 0.7Earthquake Y	-0.68	-0.26	0.00	0.00	0.00

P2

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	1.72	0.00	0.00	0.00	0.00
2 - Dead + Live	15.45	4.14	0.00	0.22	0.00
3 - Dead + 0.7Earthquake X	4.20	2.87	0.00	2.07	0.00
4 - Dead + 0.7Earthquake Y	3.89	2.87	0.00	2.07	0.00
5 - Dead + 0.75Live + 0.525Earthquake X	13.88	5.26	0.00	1.72	0.00
6 - Dead + 0.75Live + 0.525Earthquake Y	13.65	5.26	0.00	1.72	0.00
7 - 0.6Dead + 0.7Earthquake X	3.51	2.87	0.00	2.07	0.00
8 - 0.6Dead + 0.7Earthquake Y	3.20	2.87	0.00	2.07	0.00

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/7/2012
Foundation Name	Sieve Bend F-2		Time	8:46:44 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\Flotation Foundations\Sieve Bend F-2.mcs			

DETAIL REPORT FOR Sieve Bend F-2**FACTORED (ULTIMATE) LOAD COMBINATIONS****P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	4.44	1.62	0.00	0.00	0.00
2 - 1.2Dead + 1.6Live	7.71	2.77	0.00	0.00	0.00
3 - 1.2Dead + Live + Earthquake X	7.44	3.13	0.00	0.00	0.00
4 - 1.2Dead + Live + Earthquake Y	2.55	0.89	0.00	0.00	0.00
5 - 0.9Dead + Earthquake X	4.05	1.92	0.00	0.00	0.00
6 - 0.9Dead + Earthquake Y	-0.84	-0.32	0.00	0.00	0.00

P2

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	2.41	0.00	0.00	0.00	0.00
2 - 1.2Dead + 1.6Live	24.03	6.62	0.00	0.35	0.00
3 - 1.2Dead + Live + Earthquake X	19.33	8.24	0.00	3.18	0.00
4 - 1.2Dead + Live + Earthquake Y	18.89	8.24	0.00	3.18	0.00
5 - 0.9Dead + Earthquake X	5.09	4.10	0.00	2.96	0.00
6 - 0.9Dead + Earthquake Y	4.65	4.10	0.00	2.96	0.00

BEARING CAPACITY - LINEAR SOIL PRESSURE METHOD

Load Comb	Max Pressure (ksf)	All Pressure (ksf)	Ecc N/S Dir (ft)	Ecc E/W Dir (ft)	Moment N/S axis (kip-ft)	Moment E/W axis (kip-ft)	Rem
1 - Dead	0.81	4.48	0.05	0.11	2.70	1.30	
2 - Dead + Live	1.97	4.48	0.44	0.28	11.64	17.96	
3 - Dead + 0.7Earthquake X	1.60	5.81	0.42	0.61	17.23	11.94	
4 - Dead + 0.7Earthquake Y	1.37	5.81	0.60	0.40	9.75	14.90	
5 - Dead + 0.75Live + 0.525Earthquake X	2.31	5.81	0.58	0.51	20.30	23.07	
6 - Dead + 0.75Live + 0.525Earthquake Y	2.14	5.81	0.69	0.40	14.69	25.29	
7 - 0.6Dead + 0.7Earthquake X	1.34	5.81	0.68	0.88	16.15	12.46	
8 - 0.6Dead + 0.7Earthquake Y	1.12	5.81	1.05	0.59	8.67	15.42	

STABILITY RATIO / SLIDING SAFETY FACTOR

Load Comb	S.R. N/S Dir	S.R. E/W Dir	All S.R.	Sliding FS - N/S	Sliding FS - E/W	All FS	Remarks
1 - Dead	100.00	13.40	1.25	100.00	21.98	1.50	
2 - Dead + Live	96.83	4.62	1.25	100.00	5.45	1.50	
3 - Dead + 0.7Earthquake X	8.03	3.90	1.25	13.11	5.84	1.50	
4 - Dead + 0.7Earthquake Y	6.67	5.14	1.25	12.21	8.22	1.50	
5 - Dead + 0.75Live + 0.525Earthquake X	12.13	3.61	1.25	19.08	4.36	1.50	
6 - Dead + 0.75Live + 0.525Earthquake Y	10.89	4.01	1.25	18.27	4.95	1.50	
7 - 0.6Dead + 0.7Earthquake X	5.09	2.85	1.25	10.68	5.29	1.50	
8 - 0.6Dead + 0.7Earthquake Y	3.16	3.13	1.25	9.78	7.76	1.50	

Dimensional Solutions FOUNDATION3D	Version 5.8.2	Date 5/7/2012
Foundation Name Sieve Bend F-2		Time 8:46:44 AM
Designed By: FLSmidth Salt Lake City	Engineer ECS	Checker
P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-007 Regrind Area Concrete\		
Filename:	Flotation Foundations\Sieve Bend F-2.mcs	

DETAIL REPORT FOR Sieve Bend F-2**FOOTING DESIGN INFORMATION**

E-W Dim (ft)	6.00
N-S Dim (ft)	6.00
Thickness (ft)	1.50

Top Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
5. 0.9Dead + Earthquake X	6	6	12	0.44	0	-0.16	E-W
6. 0.9Dead + Earthquake Y	6	6	12	0.44	0.03	-1.56	N-S

Bottom Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
4. 1.2Dead + Live + Earthquake Y	6	6	12	0.44	0.39	6.73	E-W
2. 1.2Dead + 1.6Live	6	6	12	0.44	0.39	0.67	N-S

PUNCHING SHEAR**P1**

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
3. 1.2Dead + Live + Earthquake X	4.03	1.89	189.74	

P2

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
2. 1.2Dead + 1.6Live	19.93	11.88	189.74	

MAXIMUM SHEAR - E-W DIRECTION

Load Comb	Left Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	3.66	-5.22	5.18	94.87	
2 - 1.2Dead + 1.6Live	3.66	-17.96	17.82	94.87	
3 - 1.2Dead + Live + Earthquake X	3.66	-19.69	19.53	94.87	
4 - 1.2Dead + Live + Earthquake Y	3.66	-15.07	14.95	94.87	
5 - 0.9Dead + Earthquake X	3.66	-10.14	10.06	94.87	
6 - 0.9Dead + Earthquake Y	3.66	-5.52	5.48	94.87	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/7/2012
Foundation Name	Sieve Bend F-2		Time	8:46:44 AM
Designed By:	FLSmith Salt Lake City	Engineer	ECS	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\Flotation Foundations\Sieve Bend F-2.mcs			

DETAIL REPORT FOR Sieve Bend F-2**MAXIMUM SHEAR - N-S DIRECTION**

Load Comb	Bottom Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	1.00	2.10	2.08	94.87	
2 - 1.2Dead + 1.6Live	5.17	-8.43	8.36	94.87	
3 - 1.2Dead + Live + Earthquake X	5.17	-8.62	8.55	94.87	
4 - 1.2Dead + Live + Earthquake Y	5.17	-8.38	8.32	94.87	
5 - 0.9Dead + Earthquake X	2.67	-5.05	5.01	94.87	
6 - 0.9Dead + Earthquake Y	2.67	-3.57	3.54	94.87	

PIER/BASE PLATE DESIGN INFORMATION

	P1	P2
E-W Dim (ft)	2.00	1.33
N-S Dim (ft)	2.00	1.33
Height above grade (ft)	1.00	1.00
E-W Offset (ft)	0.00	-1.17
N-S Offset (ft)	-1.00	1.50
Requested Reinf. Ratio	0.0050	0.0050
Provided Reinf. Ratio	0.0109	0.0123
Long Bar Size	8	8
Bars in E-W Dir	3	2
Bars in N-S Dir	3	2
Total Long Bars	8	4
Tie Bar Size	4	4
Total No. of Ties	5	5
Major Tie Spacing (in)	12	12

PIER ULTIMATE LOAD CAPACITIES

Load Comb	P1						Rem
	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	
1 - 1.4Dead	7.38	550.92	5.68	420.72	0.81	60.31	
2 - 1.2Dead + 1.6Live	10.23	440.69	9.69	415.83	1.13	48.97	
3 - 1.2Dead + Live + Earthquake X	9.96	362.73	10.96	397.09	1.10	40.15	
4 - 1.2Dead + Live + Earthquake Y	5.07	661.06	3.12	404.45	0.56	72.62	
5 - 0.9Dead + Earthquake X	5.94	349.35	6.73	393.31	0.65	38.76	
6 - 0.9Dead + Earthquake Y	1.05	1.06	1.11	282.00	0.12	28.97	

Load Comb	P2						Rem
	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	
1 - 1.4Dead	3.71	537.51	0.33	46.19	0.33	46.19	
2 - 1.2Dead + 1.6Live	25.15	122.19	23.18	112.12	2.26	10.96	
3 - 1.2Dead + Live + Earthquake X	20.45	71.71	28.84	101.13	11.13	39.03	
4 - 1.2Dead + Live + Earthquake Y	20.01	69.68	28.84	100.42	11.13	38.76	
5 - 0.9Dead + Earthquake X	5.92	32.36	14.35	78.40	10.36	56.60	
6 - 0.9Dead + Earthquake Y	5.48	29.65	14.35	77.57	10.36	56.01	

Dimensional Solutions FOUNDATION3D

Version 5.8.2

Date 5/7/2012

Foundation Name

Sieve Bend F-2

Time

8:46:44 AM

Designed By:

FLSmith Salt Lake City

Engineer

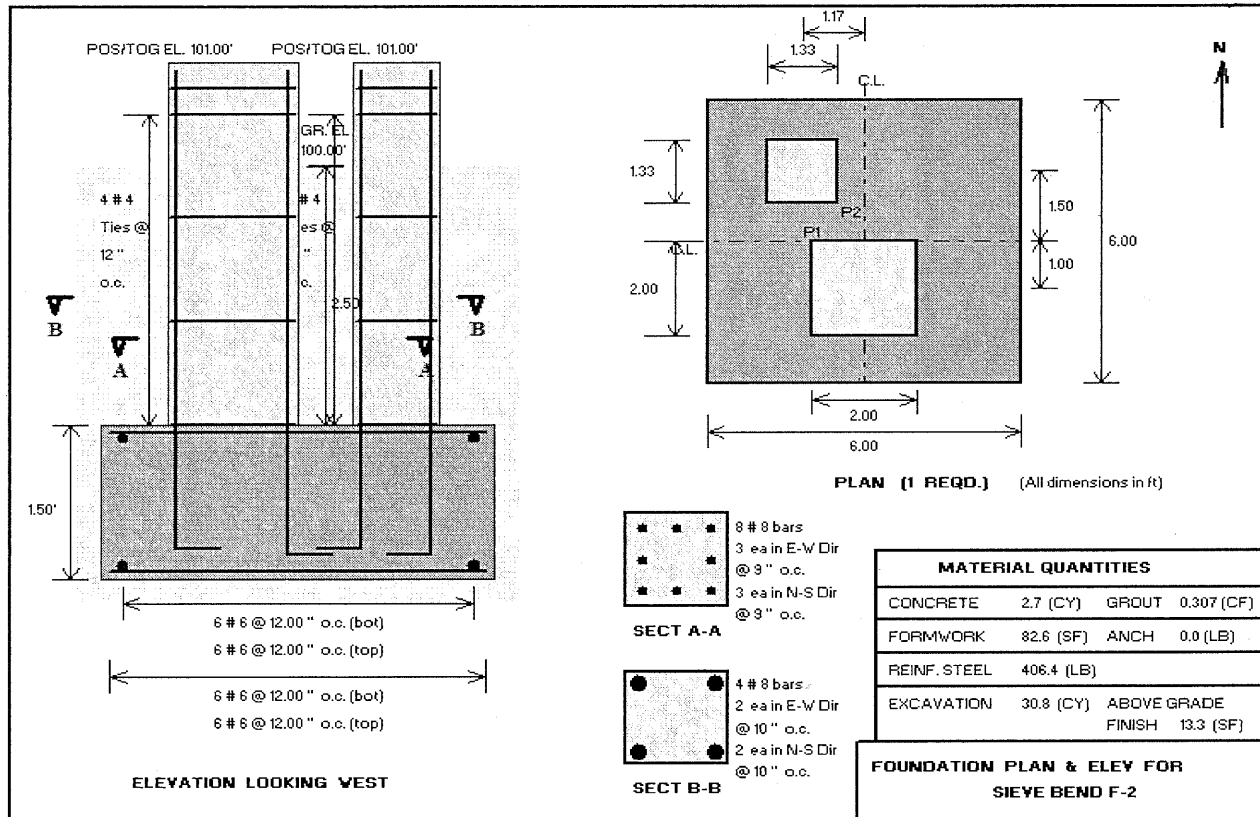
ECS

Checker

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Filename:

Flotation Foundations\Sieve Bend F-2.mcs

DETAIL REPORT FOR Sieve Bend F-2

Reactions in the coordinate system: global - Cases: 1to4
Values
1

FLotation Processed Ore Sump Reactions

Filtering	Node	Case
Full list	1to43 47to60 71to80 92to97 99to101 106to110 119to123 83 84 87 88 113 114 126 127 142to578 580 607to1004 1066to- 1493 1567to1883 1960to2458 2519to2608	1to7
Selection	21 80 201 203	1to4
Total number	2264	7
Selected number	4	4

Node/Case	FX (kip)	FY (kip)	FZ (kip)	MX (kip-ft)	MY (kip-ft)	MZ (kip-ft)
21/ 1 DEAD	0.00	0.01	1.72	0.00	0.00	0.00
21/ 2 LIVE	-4.14	0.22	13.73	0.00	-0.00	-0.00
21/ 3 EX	-4.10	-0.22	3.54	-0.00	-0.00	-0.01
21/ 4 EX	-1.71	-2.96	3.10	-0.00	-0.00	0.01
80/ 1	0.00	-0.01	1.72	-0.00	0.00	-0.00
80/ 2	-4.16	-0.21	12.87	-0.00	-0.00	0.00
80/ 3	-4.10	0.22	3.54	0.00	-0.00	0.01
80/ 4	1.69	-2.96	-3.10	-0.00	0.00	0.01
201/ 1	-0.00	-0.00	1.53	0.00	0.00	-0.00
201/ 2	-0.99	-0.01	10.92	0.00	-0.00	-0.00
201/ 3	-0.74	-0.00	-3.54	-0.00	-0.00	-0.00
201/ 4	-0.23	-0.36	0.99	-0.00	0.00	-0.00
203/ 1	-0.00	0.00	1.53	0.0	-0.00	0.00
203/ 2	-0.98	-0.00	9.48	-0.00	0.00	0.00
203/ 3	-0.74	0.00	-3.54	0.00	0.00	0.00
203/ 4	0.25	-0.38	-0.99	-0.00	0.00	-0.00

Case 1	Self Weight					
Sum of val.	-0.00	-0.00	6.51	0.00	0.00	-0.00
Sum of reac.	-0.00	-0.00	6.51	32.54	-37.28	0.00
Sum of forc.	0.00	-0.00	-6.51	-32.54	37.28	-0.00
Check val.	-0.00	-0.00	0.00	0.00	-0.00	0.00
Precision	4.57866e-004	1.19651e-014				

Case 2	Live					
Sum of val.	-10.27	-0.00	47.01	0.00	-0.00	0.00
Sum of reac.	-10.27	-0.00	47.01	246.48	-267.91	51.37
Sum of forc.	10.27	0.00	-47.01	-246.48	267.91	-51.37
Check val.	0.00	0.00	0.00	-0.00	-0.00	-0.00



7158 S. FLSmidth Drive
Midvale, UT 84047-5559

Engineer: **Ed Summmers**
Calc No.: **S-008** Job.: **11021**
Project: **Flotation Processed Ore Sump**
Client: **CC&V**

Precision	2.66867e-003	9.45835e-015				
Case 3	Seismic X					
Sum of val.	-9.67	0.00	-0.00	-0.00	-0.00	0.00
Sum of reac.	-9.67	0.00	-0.00	-0.00	-42.06	48.37
Sum of forc.	9.67	0.00	0.00	0.00	42.06	-48.37
Check val.	0.00	0.00	-0.00	-0.00	0.00	-0.00
Precision	2.08624e-004	2.31246e-012				
Case 4	Seismic Y					
Sum of val.	0.00	-6.66	0.00	-0.00	-0.00	0.01
Sum of reac.	0.00	-6.66	0.00	30.91	-0.00	-37.93
Sum of forc.	0.00	6.66	-0.00	-30.91	0.00	37.93
Check val.	0.00	0.00	0.00	-0.00	-0.00	-0.00
Precision	2.31757e-004	2.00466e-011				



7158 S. FLSmidth Drive
Midvale, UT 84047-5559

Engineer: **Clint Karren**
Calc No.: **S-008** Job.: **11021**
Project: **Flotation Supports Rev. 3**
Client: **CC&V**

Reactions in the coordinate system: global - Cases: 8to18

Values

1

STEEL BEAM PLATFORM REACTIONS

Filtering	Node	Case
Full list	1to3 9to17 19to99 102to223 7 225 226 228to270 276to280 282to290 292to-412 272 273 414 415 417to480 482to497 503to518 523to538 543to558 56-0to570 740to746 755to758 770to805 499 501 520 521 540 541 600 601 69-6 703 704 731 1472to1513 2829to2873 2189 2192 2193 2196 2197 2894to-3565	1to68
Selection	2830 2832	8to18
Total number	1362	68
Selected number	2	11

Node/Case	FX (kip)	FY (kip)	FZ (kip)	MX (kip-ft)	MY (kip-ft)	MZ (kip-ft)
2830/ 8	0.0	0.0	0.0	0.0	0.0	0.0
2830/ 9	0.0	0.0	0.0	0.0	0.0	0.0
2830/ 10	0.0	0.0	0.0	0.0	0.0	0.0
2830/ 11	0.0	0.0	0.0	0.0	0.0	0.0
2830/ 12	0.0	0.0	0.0	0.0	0.0	0.0
2830/ 13	-0.84	-0.00	-0.85	0.00	-0.00	0.0
2830/ 14	0.85	0.00	0.86	0.00	-0.00	0.0
2830/ 15	0.10	-0.01	-0.05	0.00	-0.00	0.0
2830/ 16	-0.10	0.01	0.05	-0.00	0.00	0.0
2830/ 17 (C)	0.85	0.00	2.24	-0.00	0.00	0.0
2830/ 18 (C)	0.33	0.00	0.65	-0.00	0.00	0.0
2832/ 8	0.0	0.0	0.0	0.0	0.0	0.0
2832/ 9	0.0	0.0	0.0	0.0	0.0	0.0
2832/ 10	0.0	0.0	0.0	0.0	0.0	0.0
2832/ 11	0.0	0.0	0.0	0.0	0.0	0.0
2832/ 12	0.0	0.0	0.0	0.0	0.0	0.0
2832/ 13 } Ex	-0.87	0.00	1.19	-0.00	0.00	0.0
2832/ 14 } Ex	0.88	-0.00	-1.22	0.00	-0.00	0.0
2832/ 15 } Ex	1.36	-0.01	-3.69	0.00	-0.00	0.0
2832/ 16 } Ex	-1.36	0.01	3.69	-0.00	0.00	0.0
2832/ 17 (C) DEAD	-1.16	-0.00	3.17	-0.00	-0.00	0.0
2832/ 18 (C) LIVE	-0.86	-0.00	2.44	0.00	0.00	0.0
Case 8	Snow					
Sum of val.	0.0	0.0	0.0	0.0	0.0	0.0
Sum of reac.	0.0	0.0	0.0	0.0	0.0	0.0
Sum of forc.	0.0	0.0	0.0	0.0	0.0	0.0
Check val.	0.0	0.0	0.0	0.0	0.0	0.0

Date : 04/05/12
File: **Flotation Supports Rev. 3.rtd**

Page : **1**
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7158 S. FLSmidth Drive
Midvale, UT 84047-5559

Engineer: **Clint Karren**
Calc No.: **S-008** Job.: **11021**
Project: **Flotation Supports Rev. 3**
Client: **CC&V**

Precision	0.0	0.0				
Case 9	Wind X					
Sum of val.	0.0	0.0	0.0	0.0	0.0	0.0
Sum of reac.	0.0	0.0	0.0	0.0	0.0	0.0
Sum of forc.	0.0	0.0	0.0	0.0	0.0	0.0
Check val.	0.0	0.0	0.0	0.0	0.0	0.0
Precision	0.0	0.0				
Case 10	Wind -X					
Sum of val.	0.0	0.0	0.0	0.0	0.0	0.0
Sum of reac.	0.0	0.0	0.0	0.0	0.0	0.0
Sum of forc.	0.0	0.0	0.0	0.0	0.0	0.0
Check val.	0.0	0.0	0.0	0.0	0.0	0.0
Precision	0.0	0.0				
Case 11	Wind Y					
Sum of val.	0.0	0.0	0.0	0.0	0.0	0.0
Sum of reac.	0.0	0.0	0.0	0.0	0.0	0.0
Sum of forc.	0.0	0.0	0.0	0.0	0.0	0.0
Check val.	0.0	0.0	0.0	0.0	0.0	0.0
Precision	0.0	0.0				
Case 12	Wind -Y					
Sum of val.	0.0	0.0	0.0	0.0	0.0	0.0
Sum of reac.	0.0	0.0	0.0	0.0	0.0	0.0
Sum of forc.	0.0	0.0	0.0	0.0	0.0	0.0
Check val.	0.0	0.0	0.0	0.0	0.0	0.0
Precision	0.0	0.0				
Case 13	Seismic X					
Sum of val.	-1.70	0.00	0.34	0.00	0.00	0.0
Sum of reac.	-113.60	-0.00	1.71	161.26	-1129239.05	16470.77
Sum of forc.	113.60	-0.00	-1.71	-161.26	1129239.06	-16470.77
Check val.	0.00	-0.00	-0.00	0.00	0.01	0.00
Precision	2.38614e-008	3.69974e-017				
Case 14	Seismic -X					
Sum of val.	1.73	-0.00	-0.36	0.00	-0.00	0.0
Sum of reac.	115.58	0.00	-1.92	-191.36	1148898.62	-16753.84
Sum of forc.	-115.58	0.00	1.92	191.36	-1148898.62	16753.84



7158 S. FLSmidth Drive
Midvale, UT 84047-5559

Engineer: **Clint Karren**
Calc No.: **S-008** Job.: **11021**
Project: **Flotation Supports Rev. 3**
Client: **CC&V**

Check val.	-0.00	0.00	0.00	0.00	0.01	0.00
Precision	2.05487e-008	3.75501e-017				
Case 15	Seismic Y					
Sum of val.	1.46	-0.03	-3.75	0.00	-0.00	0.0
Sum of reac.	0.00	-115.56	0.01	1148527.57	-81.15	-9192.58
Sum of forc.	-0.00	115.56	-0.01	-1148527.57	81.16	9192.58
Check val.	0.00	-0.00	-0.00	-0.00	0.01	-0.00
Precision	2.83979e-008	4.70346e-017				
Case 16	Seismic -Y					
Sum of val.	-1.46	0.03	3.74	-0.00	0.00	0.0
Sum of reac.	-0.00	115.43	-0.02	-1147236.46	81.14	9182.53
Sum of forc.	0.00	-115.43	0.02	1147236.46	-81.14	-9182.53
Check val.	-0.00	0.00	0.00	0.00	-0.01	0.00
Precision	2.42401e-008	4.71290e-017				
Case 17 (C)	D					
Sum of val.	-0.31	-0.00	5.41	-0.00	0.00	0.0
Sum of reac.	-0.00	-0.00	384.69	55360.89	-30764.91	0.00
Sum of forc.	0.00	0.00	-384.69	-55360.90	30764.94	0.00
Check val.	-0.00	-0.00	0.00	-0.01	0.03	0.00
Precision	8.40362e-007	4.46577e-013				
Case 18 (C)	L					
Sum of val.	-0.54	-0.00	3.09	-0.00	0.00	0.0
Sum of reac.	-0.00	0.00	1860.67	268278.39	-153034.44	0.01
Sum of forc.	0.00	0.00	-1860.67	-268278.46	153034.60	-0.00
Check val.	-0.00	0.00	0.00	-0.07	0.17	0.01
Precision	6.94670e-008	4.66266e-013				

- 1) DIMENSIONS SHOWN * INCLUDE COMPRESSION OF WARMAN RUBBER JOINT RING.
- 2) DIMENSIONS SHOWN • ARE GIVEN WITH WARMAN RUBBER JOINT RING UNCOMPRESSED.
- 3) DIMENSIONS SHOWN () ARE IN INCHES.
- 4) FOR ADDITIONAL PUMP DIMENSIONS, SEE OUTLINE DRAWING CSYS301.
- 5) BELT GUARD SHEAVE SIZES:
PUMP - 330 (13.0) DIA MAX.
MOTOR - 330 (13.0) DIA MAX.
SHEAVE WIDTH - 152 (6.0) MAX.
- 6) ALL MOUNTING BOLT TORQUES MUST BE VERIFIED BEFORE OPERATION AS FACTORY TORQUES CAN CHANGE DURING SHIPMENT.

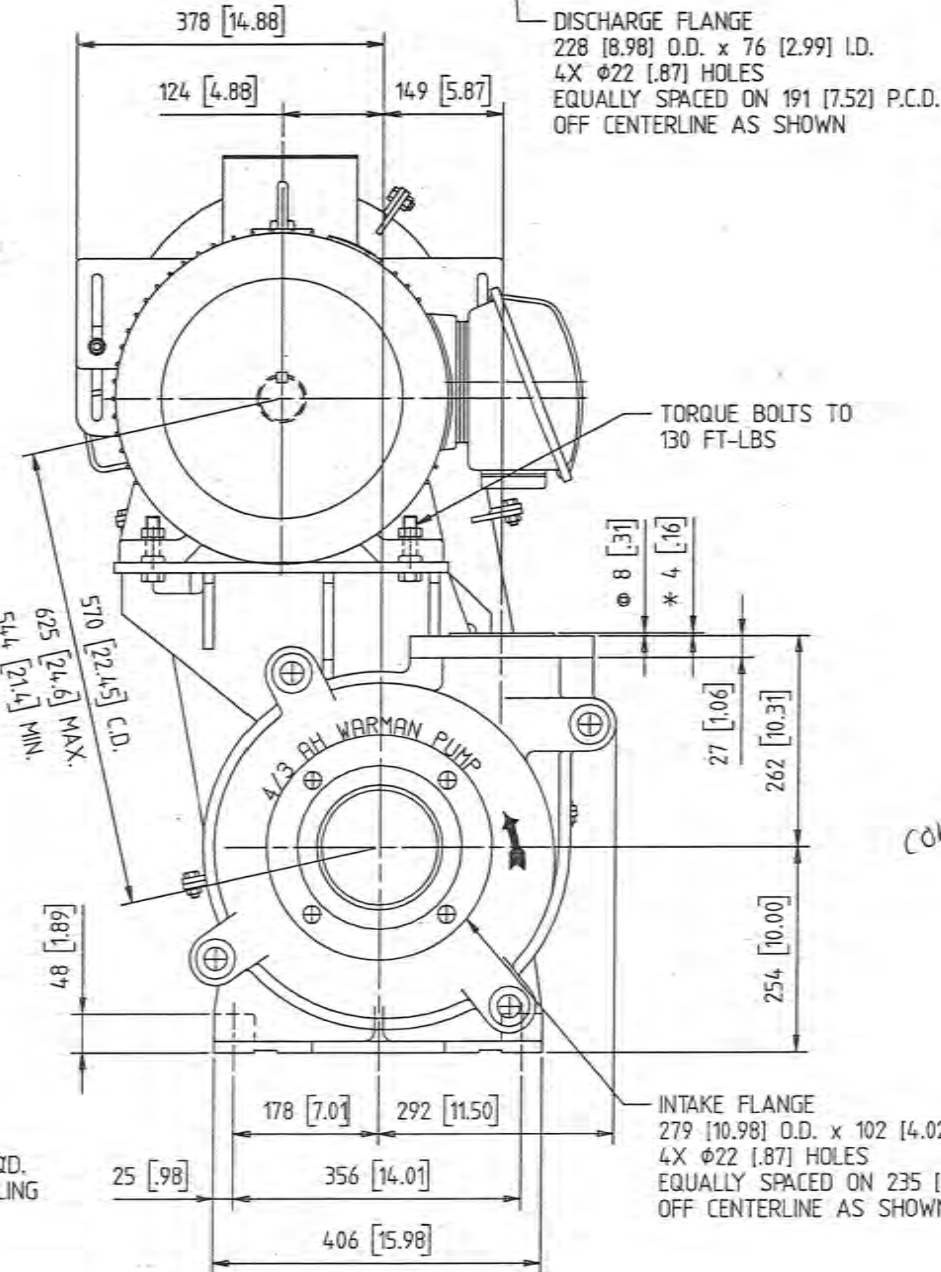
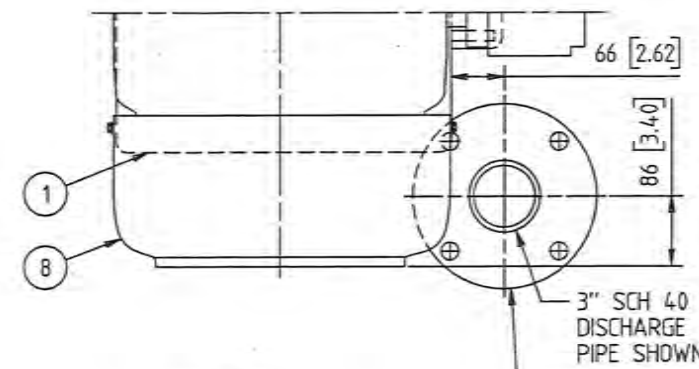
GLAND SEAL WATER REQUIRED
3-5 GPM @ 45 PSI *
(* OR 5 PSI GREATER THAN DISCHARGE PRESSURE)
.25" NPT GLAND SEAL CONNECTION
AT STUFFING BOX
FOR G.W.S. LOCATION REF. DWG. A3-370194
CLEAN SEAL FLUSH WATER WITH A RECOMMENDED
MAXIMUM 50 PPM SUSPENDED SOLIDS AND A MAXIMUM
SOLID PARTICLE SIZE OF 40 MICRONS. IF SUSPENDED
SOLIDS ARE SOFT IN NATURE, A MAXIMUM 200 PPM MAY
BE TOLERATED.

FOUNDATION BOLT LOADS AS A RESULT OF APPLYING
MAXIMUM ALLOWABLE FLANGE LOADS IN EITHER
TENSION OR COMPRESSION AS FOLLOWS:

* BOLTS = 2,125 LBF (EACH BOLT)
• BOLTS = 3,250 LBF (EACH BOLT)

SHEAR LOAD ACTING NORMAL TO SUCTION SIDE
OF PUMP = 2,875 LBF OVER (4) ANCHOR BOLTS

LIVE LOAD ASSUMED TO BE 20% EQUIPMENT WEIGHT
ACTING IN ANY DIRECTION NORMAL TO PUMP SHAFT
CENTERLINE = 375 LBS



No.	QTY.	DESCRIPTION	PART No.
1	1	MOTOR SUPPORT	ZOHG389580J
2	4	ADJUSTING BOLT	C066M389582E62
3	1	PUMP SHAFT GUARD	ZSG86779
4	1	BELTGUARD	ZBG84773
5	2	BELTGUARD SUPPORT HARDWARE	M12U1-40VU
6	8	BELTGUARD MOUNTING HARDWARE	M12H2-40VJ
7	2	BELTGUARD MOUNTING BRACKET	ZGB84778
8	1	MOTOR: 30 HP, 1800 RPM, 324T FRAME TECO, IEEE-841	ZMTT1379924-030
9	4	MOTOR HARDWARE	M16H1-70VJ
10	1	MOTOR SHEAVE	VW5V9.75X2
	1	MOTOR BUSHING	VWSK-2.125
11	1	PUMP SHEAVE	VW5V11.3X2
	1	PUMP BUSHING	VWSK-4.2MM
12	2	V-BELT	VW5VX780
13	1	COMPANION FLANGE - INTAKE	ZIF40MS
14	1	COMPANION FLANGE - DISCHARGE	ZDF40MS
TAG	1	TAG KIT - NOT SHOWN (REF. DWG. 389916)	ZTAGKITHORZGA

NOTE: STANDARD NEMA MOTOR SHOWN. ACTUAL
MOTOR MAY VARY IN SIZE AND SHAPE. BUYER
IS RESPONSIBLE TO ENSURE ADEQUATE DISCHARGE
PIPE CLEARANCE AROUND ANY OBSTRUCTIONS

WEIR MINERALS NORTH AMERICA MADISON, WISCONSIN	
☒	CERTIFIED FOR APPROVAL ONLY DRAWINGS MUST BE RETURNED WITHIN 60 WEEKS OF RECEIPT TO MAINTAIN CURRENT LEAD TIME
☐	CERTIFIED FOR CONSTRUCTION CUSTOMER INITIATED CHANGES MAY AFFECT CURRENT LEAD TIME AND/OR RESULT IN ADDITIONAL CHARGES, INCLUDING BUT NOT LIMITED TO, ENGINEERING AND/OR MATERIAL RESTOCKING CHARGES.
☐	FOR INFORMATION ONLY
CUST. ORD. NO.	186662-000 0A
WSG CO. NO.	1379924
DATE	FEB.24.2012 BY K. BREE

ANGLOGOLD -
CRIPPLE CREEK & VICTOR

S/N: MDS41719-M, MDS41720-M
EQ: 1210-647-003A, 1210-647-003B

APPLICATION: REGRIND CYCLONE FEED PUMPS		
FLOW (GPM):	612.9	
HEAD (FT):	80	
EFF (%):	73.6	POWER (BHP): 19.5 S.G.: 1.16
PUMP CURVE RPM:	1530	V-DRIVE RPM: 1540

WEIGHT	
PUMP	520
MOTOR	664
MOTOR SUPPORT	121
ADJUSTING BOLTS	18
BELTGUARD	72
V-DRIVE	35
FLANGES	37
ESTIMATED WEIGHT	1467 LBS

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in any form or by any means, and the information
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for any purpose other than the specific purpose for
which it has been provided, without the prior written
consent of the Company.

E				
D				
C				
B				
A	INITIAL RELEASE			
No.	DESCRIPTION	BY	DATE	CHK
	REVISIONS			

PRODUCT :	
WARMAN®	
Centrifugal Slurry Pumps	
APP.	A.SCHMIT
CHECK	A.SCHMIT
DRN.	A.WIRTH
DATE	FEB.24.2012
SCALE	
DESIGN CENTRE OF ORIGIN :	
MADISON	

TITLE :
4/3 CAH, CV ARRANGEMENT, 'A' DISCHARGE
30 HP, 1800 RPM, 324T FRAME MOTOR
K043CJ001M9924



DRAWING No.	REV.
1379924-020	A

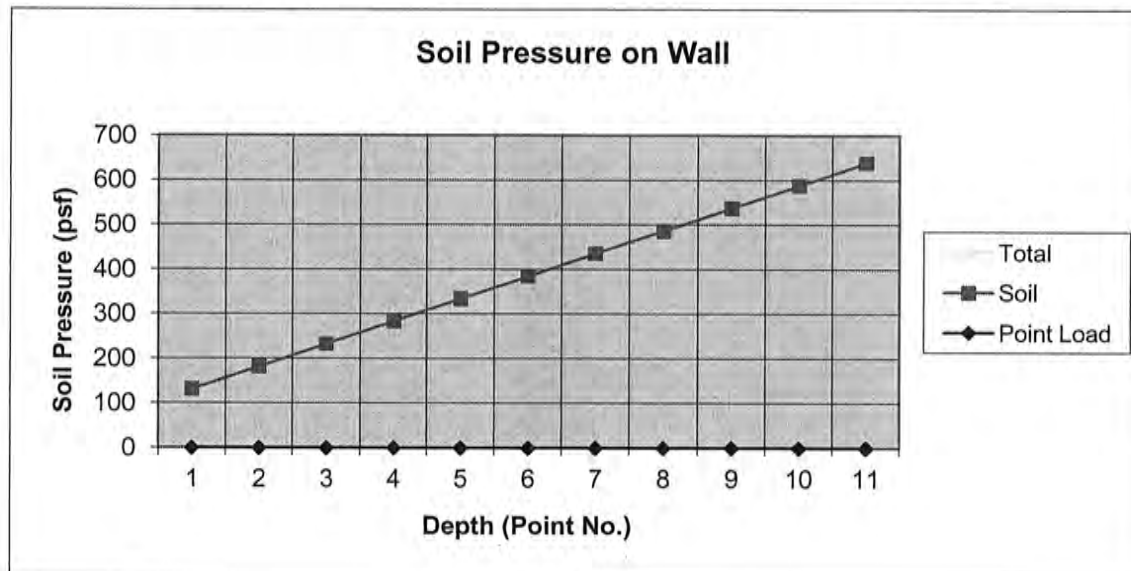
FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Gravity Circuit Retaining Wall	By CCK Feb-15-2012
		Check
		Sheet of

Pressure on retaining structure from point load ($m \leq .4$)
 REF. NAVFAC DM-7 figure 10-6

Point Load $Q_p =$ 0 kips Distance of Load from wall = 0 feet
 Wall Height $H =$ 14.5 feet $m =$ 0.000 OK
 Equiv. Fluid = 35 pcf
 Surcharge = 450 psf (300 psf = Live Load
 150 psf = Concrete Slab)

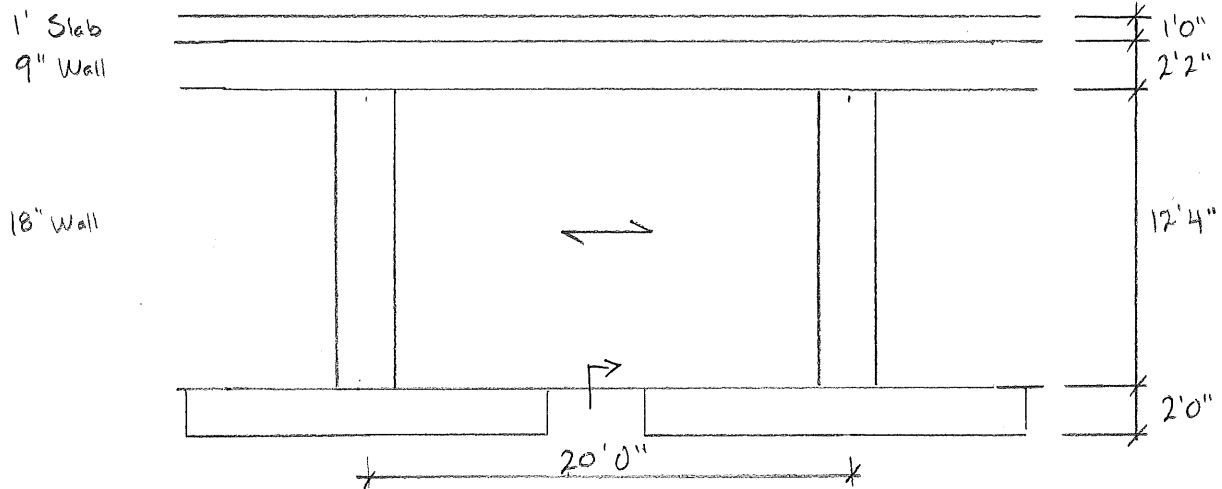
Depth (z ft.)	n	Coeff	Pressure KSF	Depth ft.	Point Pressure PSF	EFP Pressure PSF	Total Pressure PSF
0	0	0	0	0	0	131	131
1.45	0.1	0.57	0.00	1.45	0	182	182
2.9	0.2	1.40	0.00	2.9	0	233	233
4.35	0.3	1.61	0.00	4.35	0	284	284
5.8	0.4	1.37	0.00	5.8	0	334	334
7.25	0.5	1.02	0.00	7.25	0	385	385
8.7	0.6	0.72	0.00	8.7	0	436	436
10.15	0.7	0.50	0.00	10.15	0	487	487
11.6	0.8	0.35	0.00	11.6	0	537	537
13.05	0.9	0.25	0.00	13.05	0	588	588
14.5	1	0.18	0.00	14.5	0	639	639

RESULTANT FORCE in pounds (P_h) = 0 5583 5583
 RESULTANT MOMENT ARM in feet (R) = 0.00 5.67 5.67
 RESULTANT MOMENT @ BASE in foot-pounds (M_b) = 0 31670 31670
 ACI DESIGN MOMENT in foot-pounds ($M_u = 1.7M_b$) = 0 53839 53839

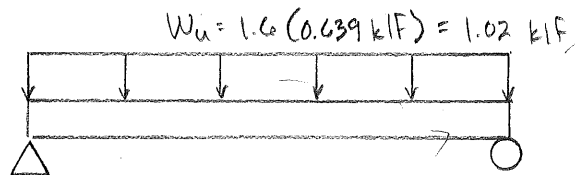


FLSMIDTH	PROJECT	CC & V High Grade Ore	PROJ NO.	11021
	SUBJECT	Retaining Wall	CALC NO.	
			BY	DATE 2-9-11
			CHK	DATE
			SHEET	OF REV

* Design Wall as One-Way Beam or Slab:



Bottom of Wall Section (Max Load):



$$M_u = \frac{wL^2}{8} = \frac{(1.02 \text{ klf})(20 \text{ ft})^2}{8} = 51.12 \text{ k-ft}$$

- See ENERCALC Calc

$$V_u = \frac{wL}{2} = \frac{(1.02 \text{ klf})(20 \text{ ft})}{2} = 10.23 \text{ k}$$

$$\phi V_c = \phi (V_c + V_s) \quad V_s = 0$$

$$= \phi 2 \sqrt{F_c} \cdot b \cdot d = 0.75(2) \sqrt{\frac{4000}{1000}} \cdot b \cdot d = 17.1 \text{ k}$$

$$\phi V_c > V_u \text{ - OK}$$

Project Notes :

Printed: 15 FEB 2012, 2:46PM

File: P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\116.d - Reprint Area Concrete\Flotation Area.ec6
ENERCALC, INC. 1983-2011, Build:6.12.01.12, Ver:6.11.8.31

Concrete Beam

Lic. # : KW-06000120

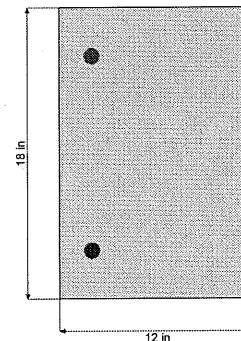
Licensee : flsmith centry

Description : Retaining Wall 18" (Horizontal)

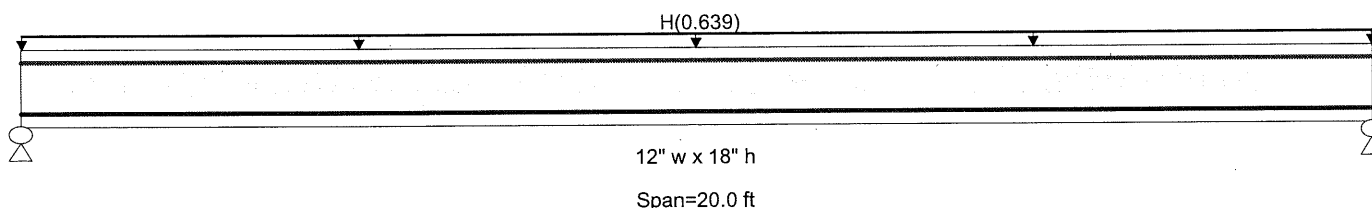
Material Properties

Calculations per ACI 318-08, IBC 2009, CBC 2010, ASCE 7-05

f'_c	=	4.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2} \cdot 7.50$	=	474.34 psi		Shear :	0.750
Ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,605.0 ksi	F_y - Stirrups	=	40.0 ksi
f_y - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2



Load Combination 2006 IBC & ASCE 7-05



Cross Section & Reinforcing Details

Rectangular Section, Width = 12.0 in, Height = 18.0 in

Span #1 Reinforcing....

1-#8 at 3.0 in from Bottom, from 0.0 to 20.0 ft in this span

1-#8 at 3.0 in from Top, from 0.0 to 20.0 ft in this span

Service loads entered. Load Factors will be applied for calculations.

Applied Loads

Load for Span Number 1

Uniform Load : $H = 0.6390$ k/ft, Tributary Width = 1.0 ft, (Lateral Earth Pressure)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.941 : 1	Maximum Deflection		
Section used for this span		Typical Section	Max Downward L+Lr+S Deflection	0.000 in	Ratio = 0 < 360
μ_u : Applied		51.120 k-ft	Max Upward L+Lr+S Deflection	0.000 in	Ratio = 0 < 360
$M_n \cdot \Phi$: Allowable		54.327 k-ft	Max Downward Total Deflection	0.167 in	Ratio = 1436
Load Combination		+1.20D+0.50Lr+1.60L+1.60H	Max Upward Total Deflection	0.000 in	Ratio = 999 < 180
Location of maximum on span		10.000 ft			
Span # where maximum occurs		Span # 1			

Vertical Reactions - Unfactored

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Overall MAXimum	6.390	6.390
H Only	6.390	6.390

Shear Stirrup Requirements

Between 0.00 to 0.58 ft, $\Phi V_c/2 < V_u \leq \Phi V_c$, Req'd Vs = Min 11.4.5.1, use stirrups spaced at 7.000 in
Between 0.62 to 19.38 ft, $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in
Between 19.42 to 19.96 ft, $\Phi V_c/2 < V_u \leq \Phi V_c$, Req'd Vs = Min 11.4.5.1, use stirrups spaced at 7.000 in

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft)		
				μ_u : Max	$\Phi \cdot M_{nx}$	Stress Ratio
Maximum BENDING Envelope						
Span # 1		1	10.000	51.12	54.33	0.94
+1.20D+0.50Lr+1.60L+1.60H						
Span # 1		1	10.000	51.12	54.33	0.94
+1.20D+1.60L+0.50S+1.60H						
Span # 1		1	10.000	51.12	54.33	0.94
+0.90D+1.60W+1.60H						
Span # 1		1	10.000	51.12	54.33	0.94
+0.90D-1.60W+1.60H						
Span # 1		1	10.000	51.12	54.33	0.94

FLSmidth Salt Lake City, Inc.
 7158 South FLSmidth Dr.
 Midvale, UT 84047

Title : CC & V HIGH GRADE
 Engineer: Clint Karren
 Project Desc.:

Job # 11021

Project Notes :

Printed: 15 FEB 2012, 2:46PM

Concrete Beam

File: P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\G-007 Regrind Area Concrete\Flotation Area.ec6
 ENERCALC, INC. 1983-2011, Build:6.12.01.12, Ver:6.11.8.31

Lic. # : KW-06000120

Licensee : flsmidth centry

Description : Retaining Wall 18" (Horizontal)

Load Combination	Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft)		
				Mu : Max	Phi*Mnx	Stress Ratio
+0.8566D+E+1.60H						
Span # 1		1	10.000	51.12	54.33	0.94
+0.8566D-1.0E+1.60H						
Span # 1		1	10.000	51.12	54.33	0.94

Overall Maximum Deflections - Unfactored Loads

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
H Only	1	0.1671	9.800		0.0000	0.000

Concrete Beam

File: P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Reprint Area Concrete\Flotation Area.ec6
ENERCALC, INC. 1983-2011, Build:6.12.01.12, Ver:6.11.8.31

Lic. #: KW-06000120

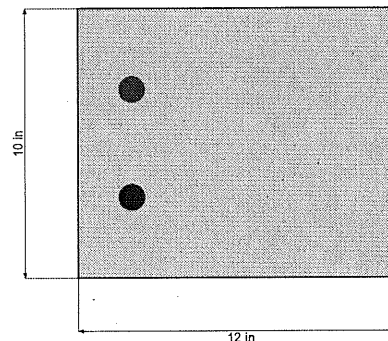
Licensee : flsmidth centry

Description : Retaining Wall 10" (Horizontal)

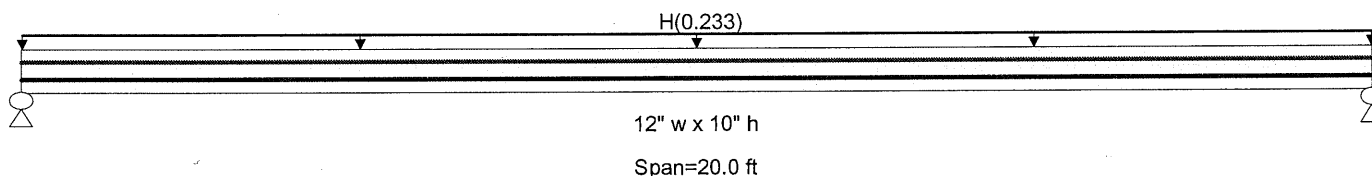
Material Properties

Calculations per ACI 318-08, IBC 2009, CBC 2010, ASCE 7-05

f'_c	=	4.0 ksi	Φ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2} \cdot 7.50$	=	474.34 psi		Shear :	0.750
Ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,605.0 ksi	F_y - Stirrups	=	40.0 ksi
f_y - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2



Load Combination 2006 IBC & ASCE 7-05



Cross Section & Reinforcing Details

Rectangular Section, Width = 12.0 in, Height = 10.0 in

Span #1 Reinforcing....

1-#8 at 3.0 in from Bottom, from 0.0 to 20.0 ft in this span

1-#8 at 3.0 in from Top, from 0.0 to 20.0 ft in this span

Service loads entered. Load Factors will be applied for calculations.

Applied Loads

Load for Span Number 1

Uniform Load : $H = 0.2330$ k/ft, Tributary Width = 1.0 ft, (Lateral Earth Pressure)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.720 : 1	Maximum Deflection		
Section used for this span		Typical Section	Max Downward L+Lr+S Deflection	0.000 in	Ratio = 0 < 360
μ_u : Applied		18.640 k-ft	Max Upward L+Lr+S Deflection	0.000 in	Ratio = 0 < 360
$M_n \cdot \Phi$: Allowable		25.887 k-ft	Max Downward Total Deflection	0.507 in	Ratio = 473
Load Combination		+1.20D+0.50Lr+1.60L+1.60H	Max Upward Total Deflection	0.000 in	Ratio = 999 < 180
Location of maximum on span		10.000 ft			
Span # where maximum occurs		Span # 1			

Vertical Reactions - Unfactored

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Overall MAXimum	2.330	2.330
H Only	2.330	2.330

Shear Stirrup Requirements

Entire Beam Span Length : $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft)		
				μ_u : Max	$\Phi \cdot M_{nx}$	Stress Ratio
MAXimum BENDING Envelope						
Span # 1		1	10.000	18.64	25.89	0.72
+0.90D+0.50Lr+1.60L+1.60H		1	10.000	18.64	25.89	0.72
+1.20D+1.60L+0.50S+1.60H		1	10.000	18.64	25.89	0.72
+0.90D+1.60W+1.60H		1	10.000	18.64	25.89	0.72
+0.90D-1.60W+1.60H		1	10.000	18.64	25.89	0.72
+0.8566D+E+1.60H		1	10.000	18.64	25.89	0.72

FLSmith Salt Lake City, Inc.
 7158 South FLSmith Dr.
 Midvale, UT 84047

Title : CC & V HIGH GRADE
 Engineer: Clint Karren
 Project Desc.:

Job # 11021

Project Notes :

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Concrete Beam

File: P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Reprint Area Concrete\Flotation Area.ec6
 ENERCALC, INC. 1983-2011, Build:6.12.01.12, Ver:6.11.8.31

Lic. # : KW-06000120

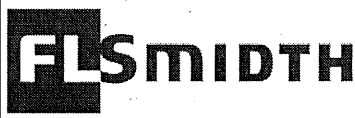
Licensee : flsmith centry

Description : Retaining Wall 10" (Horizontal)

Load Combination			Bending Stress Results (k-ft)		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
+0.8566D-1.0E+1.60H					
Span # 1	1	10.000	18.64	25.89	0.72

Overall Maximum Deflections - Unfactored Loads

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
H Only	1	0.5069	10.200		0.0000	0.000

	PROJECT	Cripple Creek & Victor	Proj No.	11021
			Calc No.	
	SUBJECT	Column Load Summary	By	CCK Feb-16-2012
		LRFD Load Combinations	Check	
			Sheet	of

Column Location: H , 2

SEISMIC CRITERIA

$$S_{DS} = 0.213$$

LOADS

	F_x	F_y	F_z
Dead	0.00 k	0.00 k	0.00 k
Live	0.00 k	0.00 k	0.00 k
Seismic X	0.00 k	0.00 k	0.00 k
Seismic -X	0.00 k	0.00 k	0.00 k
Seismic Y	0.00 k	0.00 k	0.00 k
Seismic -Y	0.00 k	0.00 k	0.00 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

		P_u	V_{u_x}	V_{u_y}
1	1.4D	0.00 k	0.00 k	0.00 k
2	1.2D+1.6L	0.00 k	0.00 k	0.00 k
3	1.2D+L	0.00 k	0.00 k	0.00 k
4	1.2D+L	0.00 k	0.00 k	0.00 k
5	$(1.2+0.2S_{DS})D+1.0E+L$	0.00 k	0.00 k	0.00 k
	$(1.2+0.2S_{DS})D-1.0E+L$	0.00 k	0.00 k	0.00 k
6	0.9D+1.6W	0.00 k	0.00 k	0.00 k
	0.9D-1.6W	0.00 k	0.00 k	0.00 k
7	$(0.9-0.2S_{DS})D+1.0E$	0.00 k	0.00 k	0.00 k
	$(0.9-0.2S_{DS})D-1.0E$	0.00 k	0.00 k	0.00 k

DESIGN VALUES

Compression	$P_u =$	0.00 k
Tension	$T_u =$	0.00 k
Shear	$V_{u_x} =$	0.00 k
	$V_{u_y} =$	0.00 k

FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Column Load Summary	By CCK May-16-2012
	<i>LRFD Load Combinations</i>	Check
	From: Flotation Supports & Sampler Platform.rtd	Sheet <i>of</i>

Column Location: H , 2.9

SEISMIC CRITERIA

$$S_{DS} = 0.213$$

LOADS

	F_x	F_y	F_z
Dead	0.00 k	0.00 k	1.97 k ✓
Live	-0.01 k	-0.01 k	2.34 k ✓
Seismic X	-0.02 k	0.00 k	-0.02 k
Seismic -X	0.02 k	0.00 k	0.03 k
Seismic Y	0.00 k	-0.01 k	0.13 k ✓
Seismic -Y	0.00 k	0.01 k	-0.13 k ✓

LRFD LOAD COMBINATIONS

Column/Footing Loads

	P_u	V_{u_x}	V_{u_y}
1 1.4D	2.76 k	0.00 k	0.00 k
2 1.2D+1.6L	6.11 k	-0.02 k	-0.02 k
3 1.2D+L	4.70 k	-0.01 k	-0.01 k
4 1.2D+L	4.70 k	-0.01 k	-0.01 k
5 (1.2+0.2 S_{DS})D+1.0E+L	4.92 k	0.01 k	0.00 k
(1.2+0.2 S_{DS})D-1.0E+L	4.66 k	-0.03 k	-0.02 k
6 0.9D+1.6W	1.77 k	0.00 k	0.00 k
0.9D-1.6W	1.77 k	0.00 k	0.00 k
7 (0.9-0.2 S_{DS})D+1.0E	1.82 k	0.02 k	0.01 k
(0.9-0.2 S_{DS})D-1.0E	1.56 k	-0.02 k	-0.01 k

DESIGN VALUES

Compression	$P_u = 6.11$ k ✓
Tension	$T_u = 1.56$ k ✓
Shear	$V_{u_x} = 0.03$ k ✓
	$V_{u_y} = 0.02$ k ✓

FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No. <i>updated</i>
	SUBJECT Column Load Summary	By CCK Jun-13-2012
	LRFD Load Combinations	Check
	From: Flotation Supports & Sampler Platform.rtd	Sheet of

Column Location: - H , 3.2

W12x40

SEISMIC CRITERIA

$$S_{DS} = 0.213$$

LOADS

	F_x	F_y	F_z
Dead	-0.30 k	0.01 k	19.14 k
Live	-1.14 k	-0.02 k	75.24 k
Seismic X	-2.08 k	0.09 k	2.41 k
Seismic -X	2.10 k	-0.09 k	-2.41 k
Seismic Y	-0.44 k	0.01 k	1.91 k
Seismic -Y	0.44 k	0.10 k	-1.91 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

	P_u	V_{u_x}	V_{u_y}
1 1.4D	26.80 k	-0.42 k	0.01 k
2 1.2D+1.6L	143.35 k	-2.18 k	-0.02 k
3 1.2D+L	98.21 k	-1.50 k	-0.01 k
4 1.2D+L	98.21 k	-1.50 k	-0.01 k
5 (1.2+0.2 S_{DS})D+1.0E+L	101.43 k	0.59 k	0.09 k
(1.2+0.2 S_{DS})D-1.0E+L	96.61 k	-3.59 k	-0.10 k
6 0.9D+1.6W	17.23 k	-0.27 k	0.01 k
0.9D-1.6W	17.23 k	-0.27 k	0.01 k
7 (0.9-0.2 S_{DS})D+1.0E	18.82 k	1.84 k	0.11 k
(0.9-0.2 S_{DS})D-1.0E	14.00 k	-2.34 k	-0.08 k

DESIGN VALUES

Compression	$P_u =$ 143.35 k
Tension	$T_u =$ 14.00 k
Shear	$V_{u_x} =$ 3.59 k
	$V_{u_y} =$ 0.11 k

FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
	SUBJECT Column Load Summary	Calc No. <i>updated</i>
	LRFD Load Combinations	By CCK <i>Jun-13-2012</i>
	From: Flotation Supports & Sampler Platform.rtd	Check
		Sheet of

Column Location: H, 4

W12x40

SEISMIC CRITERIA

$$S_{DS} = 0.213$$

LOADS

	F_x	F_y	F_z
Dead	-0.28 k	0.02 k	36.20 k
Live	-0.41 k	0.04 k	168.71 k
Seismic X	-1.60 k	-0.01 k	2.20 k
Seismic -X	1.57 k	0.01 k	-2.28 k
Seismic Y	0.20 k	0.06 k	2.57 k
Seismic -Y	-0.20 k	-0.06 k	-2.57 k

LRFD LOAD COMBINATIONS

Column/Footing Loads

	P_u	V_{u_x}	V_{u_y}
1 1.4D	50.68 k	-0.39 k	0.03 k
2 1.2D+1.6L	313.38 k	-0.99 k	0.09 k
3 1.2D+L	212.15 k	-0.75 k	0.06 k
4 1.2D+L	212.15 k	-0.75 k	0.06 k
5 (1.2+0.2 S_{DS})D+1.0E+L	216.26 k	0.81 k	0.12 k
(1.2+0.2 S_{DS})D-1.0E+L	211.12 k	-2.36 k	0.00 k
6 0.9D+1.6W	32.58 k	-0.25 k	0.02 k
0.9D-1.6W	32.58 k	-0.25 k	0.02 k
7 (0.9-0.2 S_{DS})D+1.0E	33.61 k	1.33 k	0.08 k
(0.9-0.2 S_{DS})D-1.0E	28.47 k	-1.84 k	-0.04 k

DESIGN VALUES

Compression	$P_u = 313.38$ k
Tension	$T_u = 28.47$ k
Shear	$V_{u_x} = 2.36$ k
	$V_{u_y} = 0.12$ k

FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Gravity Circuit Retaining Wall	By CCK Feb-15-2012
		Check
	H,2	Sheet of

Pressure on retaining structure from point load ($m \leq 4$)

REF. NAVFAC DM-7 figure 10-6

Point Load $Q_p =$ 0 kips
Wall Height $H =$ 16.5 feet
Equiv. Fluid $=$ 35 pcf
Surcharge $=$ 450 psf

Tributary Width of Wall $=$ 18.25 feet
Distance of Load from wall $=$ 0 feet
 $m =$ 0.000 OK

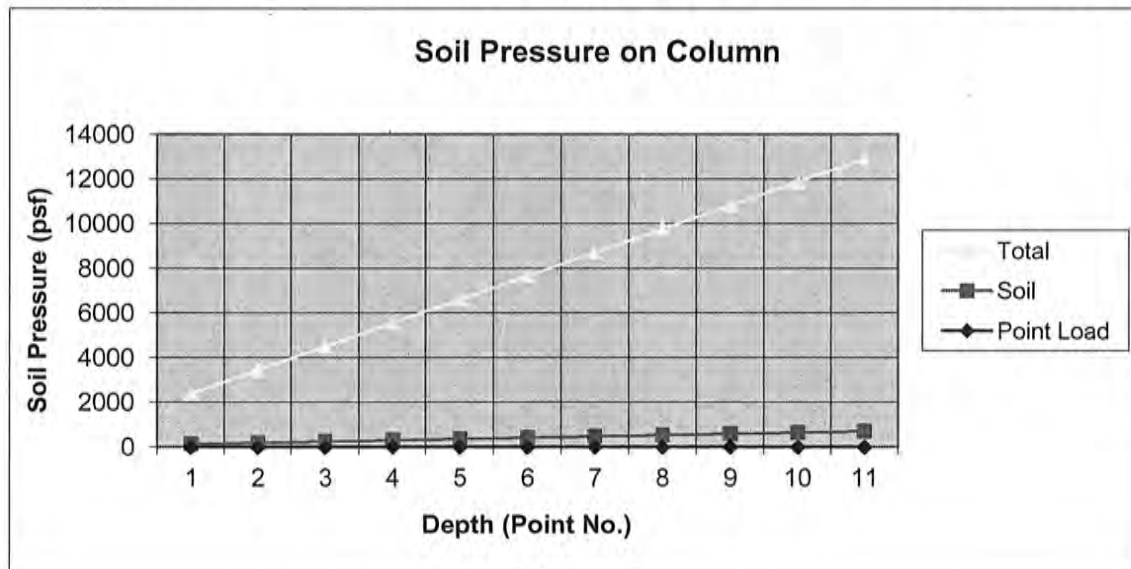
Depth (z ft.)	n	Coeff	Pressure KSF	Depth ft.	Point	EFP	Total
					Pressure PSF	Pressure PSF	Pressure LB
0	0	0	0	0	0	131	2395
1.65	0.1	0.57	0.00	1.65	0	189	3449
3.3	0.2	1.40	0.00	3.3	0	247	4503
4.95	0.3	1.61	0.00	4.95	0	305	5557
6.6	0.4	1.37	0.00	6.6	0	362	6611
8.25	0.5	1.02	0.00	8.25	0	420	7665
9.9	0.6	0.72	0.00	9.9	0	478	8719
11.55	0.7	0.50	0.00	11.55	0	536	9773
13.2	0.8	0.35	0.00	13.2	0	593	10827
14.85	0.9	0.25	0.00	14.85	0	651	11881
16.5	1	0.18	0.00	16.5	0	709	12935

2'2" $P = 3055.08$ lb

14'6" $P = 11657.42$ lb

RESULTANT FORCE in pounds (P_h) = 0 6930 **126473**
RESULTANT MOMENT ARM in feet (R) = 0.00 6.38 **6.38**
RESULTANT MOMENT @ BASE in foot-pounds (M_b) = 0 44201 806677
ACI DESIGN MOMENT in foot-pounds ($M_u = 1.7M_b$) = 0 75143 1371351 — N/A

} For Footing Overturning



FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Gravity Circuit Retaining Wall	By CCK Feb-15-2012
	H,2.9	Check
		Sheet of

Pressure on retaining structure from point load ($m \leq .4$)

REF. NAVFAC DM-7 figure 10-6

Point Load $Q_p =$ 0 kips
Wall Height $H =$ 16.5 feet
Equiv. Fluid = 35 pcf
Surcharge = 450 psf

Tributary Width of Wall = 13 feet
Distance of Load from wall = 0 feet
 $m =$ 0.000 OK

Depth (z ft.)	n	Coeff	Pressure KSF	Depth ft.	Point Pressure PSF	EFP Pressure PSF	Total Pressure LB
0	0	0	0	0	0	131	1706
1.65	0.1	0.57	0.00	1.65	0	189	2457
3.3	0.2	1.40	0.00	3.3	0	247	3208
4.95	0.3	1.61	0.00	4.95	0	305	3959
6.6	0.4	1.37	0.00	6.6	0	362	4709
8.25	0.5	1.02	0.00	8.25	0	420	5460
9.9	0.6	0.72	0.00	9.9	0	478	6211
11.55	0.7	0.50	0.00	11.55	0	536	6962
13.2	0.8	0.35	0.00	13.2	0	593	7712
14.85	0.9	0.25	0.00	14.85	0	651	8463
16.5	1	0.18	0.00	16.5	0	709	9214

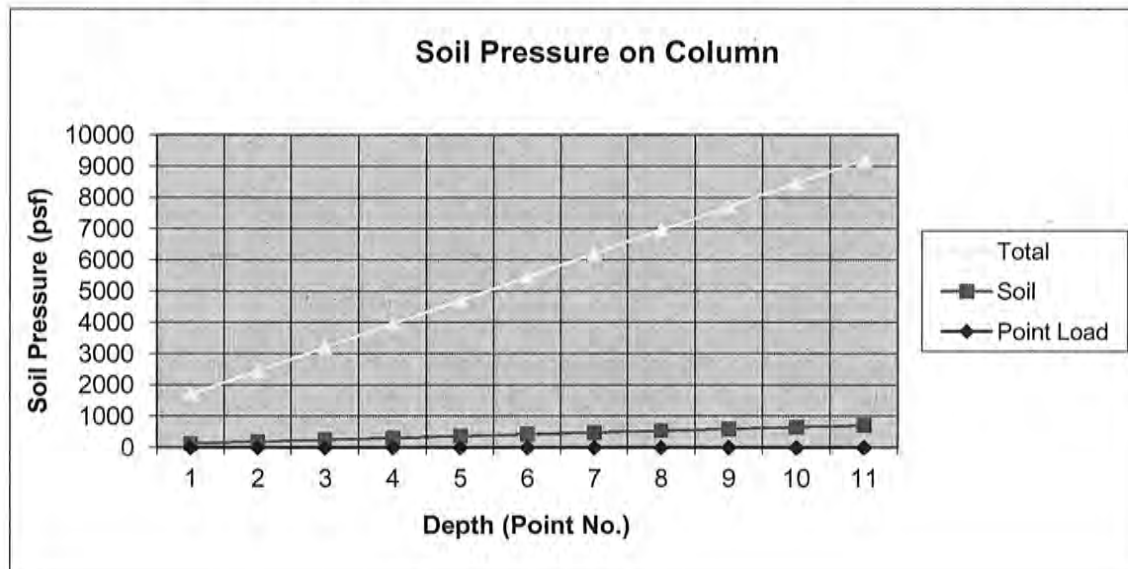
2'2" $P = 2692.16 \text{ lb}$

14'6" $P = 8303.71 \text{ lb}$

RESULTANT FORCE in pounds (P_h) = 0 6930 **90090**
RESULTANT MOMENT ARM in feet (R) = 0.00 6.38 **6.38**
RESULTANT MOMENT @ BASE in foot-pounds (M_b) = 0 44201 574619
ACI DESIGN MOMENT in foot-pounds ($M_u = 1.7M_b$) = 0 75143 976853

For Footing Overturning

N/A



FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Gravity Circuit Retaining Wall	By CCK Feb-15-2012
		Check
	H,3.2	Sheet of

Pressure on retaining structure from point load ($m \leq .4$)

REF. NAVFAC DM-7 figure 10-6

Point Load $Q_p =$ 0 kips
Wall Height $H =$ 16.5 feet
Equiv. Fluid = 35 pcf
Surcharge = 450 psf

Tributary Width of Wall = 11.75 feet
Distance of Load from wall = 0 feet
 $m =$ 0.000 OK

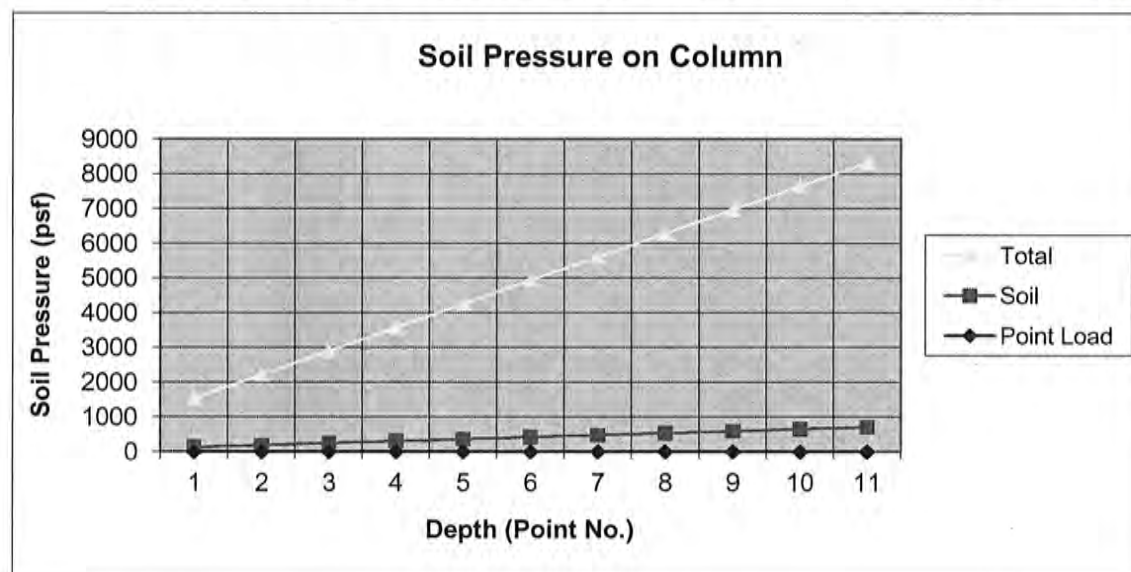
Depth (z ft.)	n	Coeff	Pressure KSF	Depth ft.	Point Pressure PSF	EFP Pressure PSF	Total Pressure LB
0	0	0	0	0	0	131	1542
1.65	0.1	0.57	0.00	1.65	0	189	2221
3.3	0.2	1.40	0.00	3.3	0	247	2899
4.95	0.3	1.61	0.00	4.95	0	305	3578
6.6	0.4	1.37	0.00	6.6	0	362	4256
8.25	0.5	1.02	0.00	8.25	0	420	4935
9.9	0.6	0.72	0.00	9.9	0	478	5614
11.55	0.7	0.50	0.00	11.55	0	536	6292
13.2	0.8	0.35	0.00	13.2	0	593	6971
14.85	0.9	0.25	0.00	14.85	0	651	7649
16.5	1	0.18	0.00	16.5	0	709	8328

2'2" $P = 2433.3$ lb

14'6" $P = 7505.18$ lb

RESULTANT FORCE in pounds (P_h) = 0 6930 **81428**
RESULTANT MOMENT ARM in feet (R) = 0.00 6.38 **6.38**
RESULTANT MOMENT @ BASE in foot-pounds (M_b) = 0 44201 519367
ACI DESIGN MOMENT in foot-pounds ($M_u = 1.7M_b$) = 0 75143 882925 N/A

} For Footing Overturning



FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Gravity Circuit Retaining Wall	By CCK Feb-15-2012
	H,4	Check
		Sheet of

Pressure on retaining structure from point load ($m \leq .4$)

REF. NAVFAC DM-7 figure 10-6

Point Load $Q_p =$ 0 kips
Wall Height $H =$ 16.5 feet
Equiv. Fluid = 35 pcf
Surcharge = 450 psf

Tributary Width of Wall = 17 feet
Distance of Load from wall = 0 feet
 $m =$ 0.000 OK

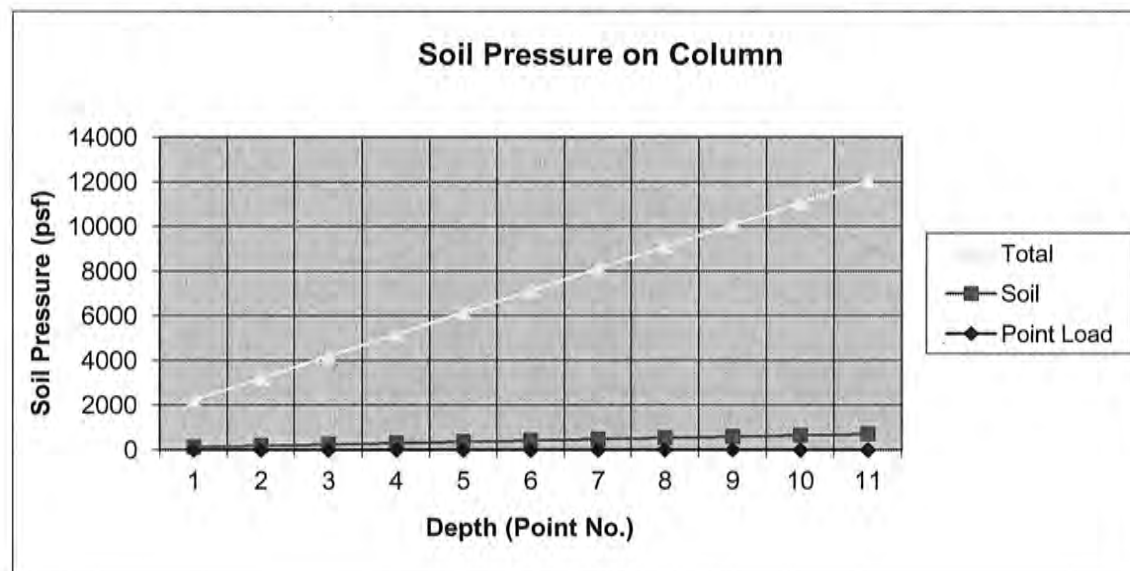
Depth (z ft.)	n	Coeff	Pressure KSF	Depth ft.	Point	EFP	Total
					Pressure PSF	Pressure PSF	Pressure LB
0	0	0	0	0	0	131	2231
1.65	0.1	0.57	0.00	1.65	0	189	3213
3.3	0.2	1.40	0.00	3.3	0	247	4195
4.95	0.3	1.61	0.00	4.95	0	305	5177
6.6	0.4	1.37	0.00	6.6	0	362	6158
8.25	0.5	1.02	0.00	8.25	0	420	7140
9.9	0.6	0.72	0.00	9.9	0	478	8122
11.55	0.7	0.50	0.00	11.55	0	536	9104
13.2	0.8	0.35	0.00	13.2	0	593	10085
14.85	0.9	0.25	0.00	14.85	0	651	11067
16.5	1	0.18	0.00	16.5	0	709	12049

2'2" $P = 3520.49$ lb

14'6" $P = 10858.7$ lb

RESULTANT FORCE in pounds (P_h) = 0 6930 **117810**
RESULTANT MOMENT ARM in feet (R) = 0.00 6.38 **6.38**
RESULTANT MOMENT @ BASE in foot-pounds (M_b) = 0 44201 751425
ACI DESIGN MOMENT in foot-pounds ($M_u = 1.7M_b$) = 0 -75143 1277423 N/A

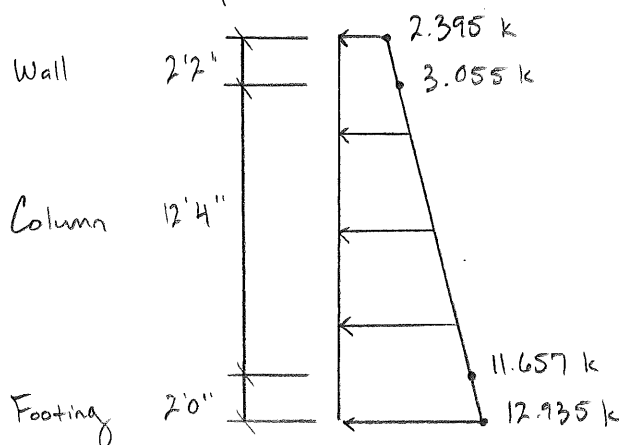
For Footing Overturning



	PROJECT	CC & V High Grade Ore	PROJ NO.	11021
	SUBJECT	Retaining Wall Columns	CALC NO.	
		Equivalent Moments	BY	DATE 2-16-11
			CHK	DATE
			SHEET	OF REV

H, 2

From Spreadsheet:



$$V = \frac{(2.395 + 11.657 \text{ k})(2'2" + 12'4")}{2} = \boxed{101.88 \text{ k}}$$

-column input

$$M = \frac{(2.395 \text{ k})(14.5')^2}{2} + \frac{(11.657 - 2.395 \text{ k})(14.5')^2}{2(3)}$$

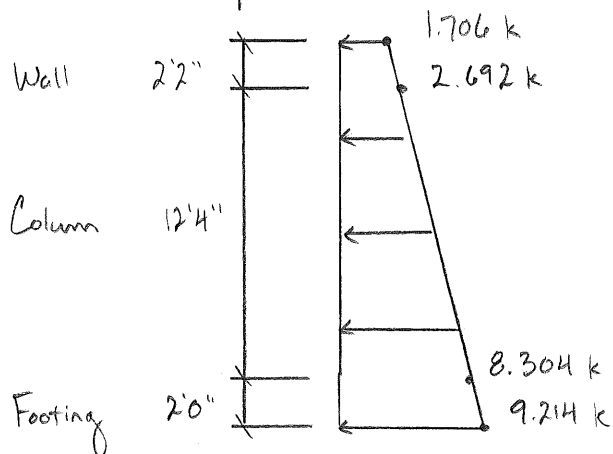
$$= 574.37 \text{ k-ft}$$

$$L = \frac{M}{V} = \frac{574.37 \text{ k-ft}}{101.88 \text{ k}} = \boxed{5.66 \text{ Ft}}$$

-column input

H, 2.9

From Spreadsheet



$$V = \frac{(1.706 + 8.304 \text{ k})(14.5')}{2} = \boxed{72.57 \text{ k}}$$

-column input

$$M = \frac{(1.706 \text{ k})(14.5')^2}{2} + \frac{(8.304 - 1.706 \text{ k})(14.5')^2}{2(3)}$$

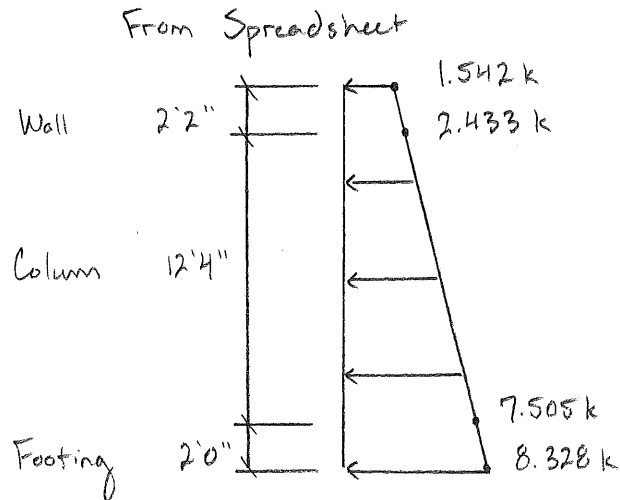
$$= 410.55 \text{ k-ft}$$

$$L = \frac{M}{V} = \frac{410.55 \text{ k-ft}}{72.57 \text{ k}} = \boxed{5.66 \text{ Ft}}$$

-column input

FLSMIDTH	PROJECT	CC & V High Grade Ore	PROJ NO.	11021
	SUBJECT	Retaining Wall Columns	CALC NO.	
		Equivalent Moments	BY	DATE 2-16-11
			CHK	DATE
			SHEET	OF REV

H, 3.2



$$V = \frac{(1.542 + 7.505 \text{ k})(14.5')}{2} = \boxed{65.59 \text{ k}}$$

-column input

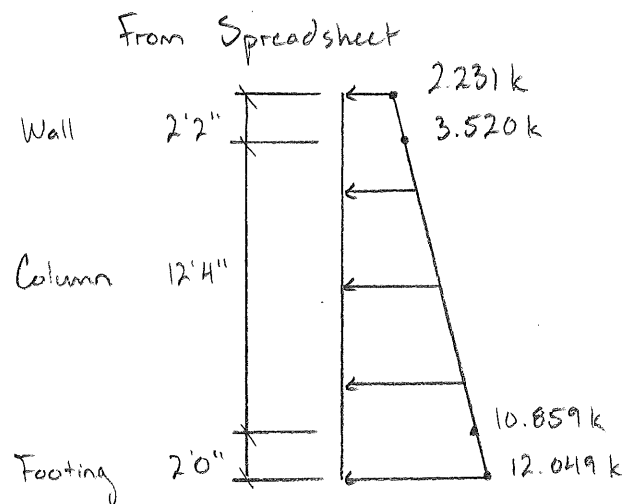
$$M = \frac{(1.542 \text{ k})(14.5')^2}{2} + \frac{(7.505 - 1.542 \text{ k})(14.5')^2}{2(3)}$$

$$= 371.06 \text{ k-ft}$$

$$L = \frac{M}{V} = \frac{371.06 \text{ k-ft}}{65.59 \text{ k}} = \boxed{5.66 \text{ ft}}$$

-column input

H, 4



$$V = \frac{(2.231 + 10.859 \text{ k})(14.5')}{2} = \boxed{94.90 \text{ k}}$$

-column input

$$M = \frac{(2.231 \text{ k})(14.5')^2}{2} + \frac{(10.859 - 2.231 \text{ k})(14.5')^2}{2(3)}$$

$$= 536.87 \text{ k-ft}$$

$$L = \frac{M}{V} = \frac{536.87 \text{ k-ft}}{94.90 \text{ k}} = \boxed{5.66 \text{ ft}}$$

-column input

Concrete Column

\\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\Flotation Foundations\Gridline H\Flotation Area Grid H.ec6
ENERCALC, INC. 1983-2011, Build:6.12.5.3, Ver:6.11.8.31

Lic. #: KW-06000120

Licensee : flsmith centry

Description : Pedestal H,2

General Information

Calculations per, ASCE 7-05

f'_c : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 145.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Load Combination 2006 IBC & ASCE 7-05

Overall Column Height = 12.333 ft
End Fixity Top Free, Bottom Fixed

Brace condition for deflection (buckling) along columns :

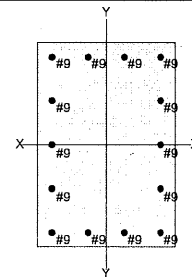
X-X (width) axis : Unbraced Length for X-X Axis buckling = 2 ft, K = 1.0

Y-Y (depth) axis : Unbraced Length for Y-Y Axis buckling = 2 ft, K = 1.0

Column Cross Section

Column Dimensions 36.0in high x 24.0in Wide, Column Edge to Rebar
Edge Cover = 2.0in

Column Reinforcing : 4 - #9 bars @ corners,, 2.0 - #9 bars top & bottom
between corner bars, 3.0 - #9 bars left & right
between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 10,729.7 lbs * Dead Load Factor

BENDING LOADS ...

Lat. Point Load at 5.660 ft creating Mx-x, H = 101.880 k

DESIGN SUMMARY

Load Combination +1.20D+0.50Lr+1.60L+1.60H
Location of max. above base 12.250 ft
Maximum Stress Ratio 0.9352 : 1
Ratio = $(P_u^2 + M_u^2)^{0.5} / (\phi P_n^2 + \phi M_n^2)^{0.5}$
 P_u = 12.876 k $\phi * P_n$ = 12.217 k
 M_{u-x} = -922.63 k-ft $\phi * M_{n-x}$ = 0.0 k-ft
 M_{u-y} = 0.0 k-ft $\phi * M_{n-y}$ = 0.0 k-ft
 M_u Angle = 0.0 deg
 M_u at Angle = 922.63 k-ft ϕM_n at Angle = 986.53 k-ft
 P_n & M_n values located at P_u - M_u vector intersection with capacity curve

Column Capacities ...

P_{nmax} : Nominal Max. Compressive Axial Capacity 3,730.0 k
 P_{nmin} : Nominal Min. Tension Axial Capacity -840.0 k
 ϕP_n , max : Usable Compressive Axial Capacity 1,939.60 k
 ϕP_n , min : Usable Tension Axial Capacity -546.0 k

Maximum SERVICE Load Reactions ..

Top along Y-Y k Bottom along Y-Y k
Top along X-X k Bottom along X-X k

Maximum SERVICE Load Deflections ...

Along Y-Y 0.08724 in at 12.333 ft above base
for load combination : H Only
Along X-X 0.0in at 0.0 ft above base
for load combination :

General Section Information . ϕ = 0.650 β = 0.850 θ = 0.80

ρ : % Reinforcing 1.620 % Rebar % Ok
Reinforcing Area 14.0 in²
Concrete Area 864.0 in²

Governing Load Combination Results

Governing Factored Load Combination	Dist. from base ft	Axial Load k		Bending Analysis k-ft						Utilization	
		Pu	ϕ * Pn	δ x	δx * Mux	δ y	δy * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.40D	12.25	15.02	1,939.60					0.000			0.008
+1.20D+0.50Lr+1.60L+1.60H	12.25	12.88	12.22	1.000	-922.63	1.000		0.000	922.63	986.53	0.935
+1.20D+1.60L+0.50S+1.60H	12.25	12.88	12.22	1.000	-922.63	1.000		0.000	922.63	986.53	0.935
+0.90D+1.60W+1.60H	12.25	9.66	12.22	1.000	-922.63	1.000		0.000	922.63	986.53	0.935
+0.90D-1.60W+1.60H	12.25	9.66	12.22	1.000	-922.63	1.000		0.000	922.63	986.53	0.935

Concrete Column

\\116.d - Arch_Civil_Struc\007 Re grind Area Concrete\Flotation Foundations\Gridline H\Flotation Area Grid H.ec6
ENERCALC, INC. 1983-2011, Build:6.12.5.3, Ver:6.11.8.31

Lic. #: KW-06000120

Licensee: flsmith centry

Description: Pedestal H,2

Governing Load Combination Results

Governing Factored Load Combination	Dist. from base ft	Axial Load k			Bending Analysis k-ft					Utilization Ratio	
		Pu	$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u		ϕM_n
+0.8574D+E+1.60H	12.25	9.20	12.22	1.000	-922.63	1.000		0.000	922.63	986.53	0.935
+0.8574D-1.0E+1.60H	12.25	9.20	12.22	1.000	-922.63	1.000		0.000	922.63	986.53	0.935

Maximum Reactions - Unfactored

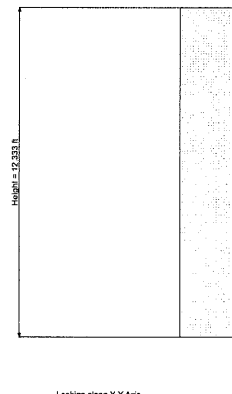
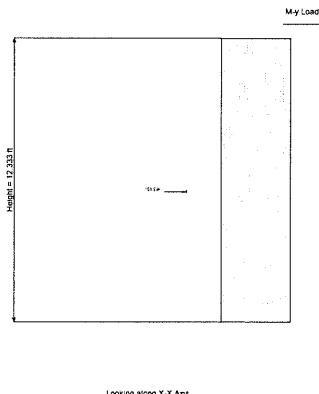
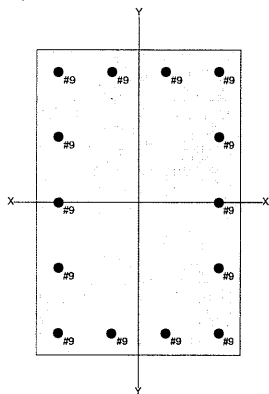
Note: Only non-zero reactions are listed.

Load Combination	Reaction along X-X Axis		Reaction along Y-Y Axis		Axial Reaction @ Base
	@ Base	@ Top	@ Base	@ Top	
H Only	101.880				

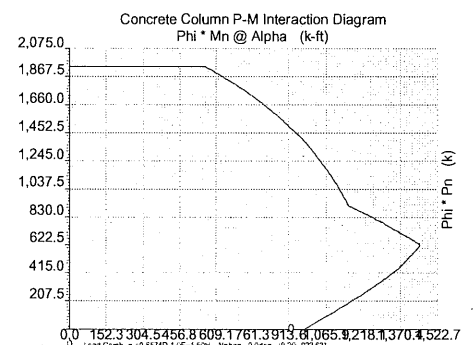
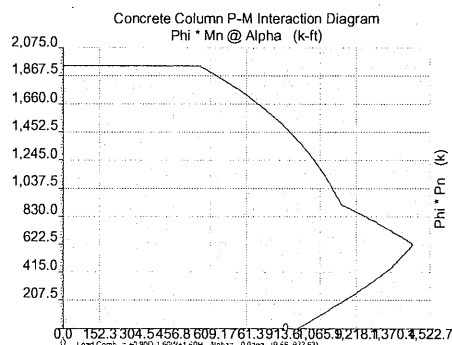
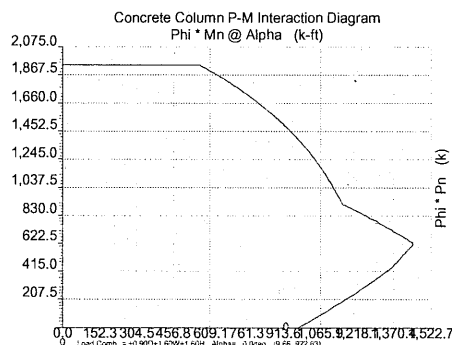
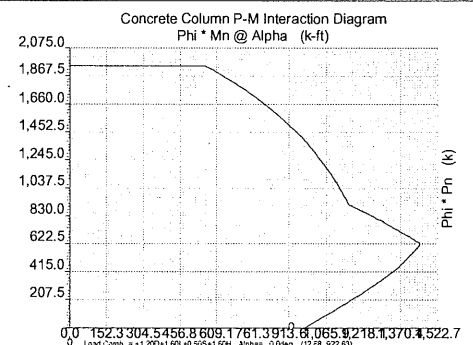
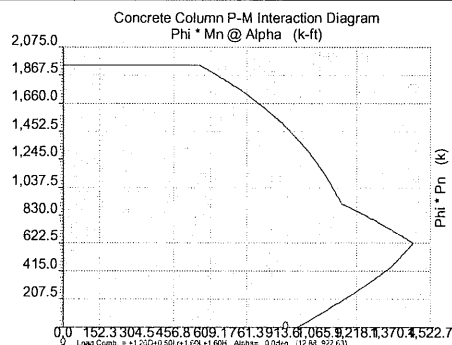
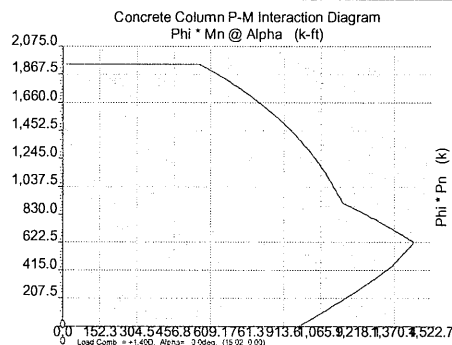
Maximum Deflections for Load Combinations - Unfactored Loads

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
H Only	0.0000 in	0.000 ft	0.087 in	12.250 ft

Sketches



Interaction Diagrams



Printed: 16 MAY 2012, 1:58PM

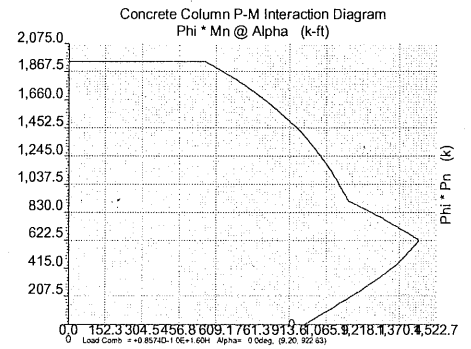
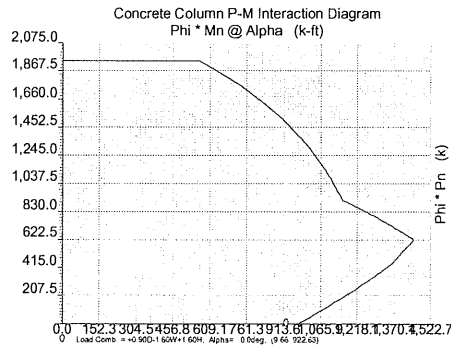
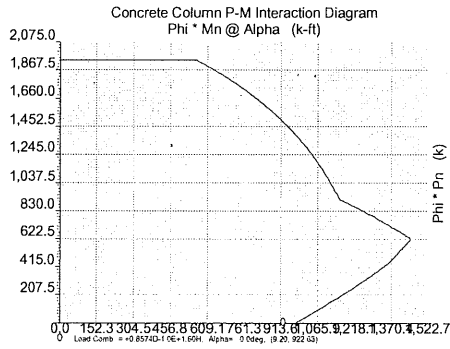
Concrete Column

\\116.d - Arch_Civil_Struct\C-007 Re grind Area Concrete\Flotation Foundations\Gridline H\Flotation Area Grid H.ec6
ENERCALC, INC. 1983-2011, Build:6.12.5.3, Ver:6.11.8.31

Lic. # : KW-06000120

Licensee : flsmidth centry

Description : Pedestal H,2



Concrete Column

\\116.d - Arch_Civil_Struc\C-007 Reprint Area Concrete\Flotation Foundations\Gridline H\Flotation Area Grid H.ec6
ENERCALC, INC. 1983-2011, Build:6.12.5.3, Ver:6.11.8.31

Lic. #: KW-06000120

Licensee: flsmith centry

Description: Pedestal H,3.2

General Information

Calculations per, ASCE 7-05

f'_c : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 145.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Load Combination 2006 IBC & ASCE 7-05

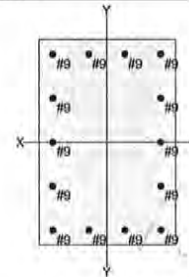
Overall Column Height = 12.333 ft
End Fixity Top Pinned, Bottom Fixed

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Unbraced Length for X-X Axis buckling = 2 ft, K = 1.0
Y-Y (depth) axis : Unbraced Length for Y-Y Axis buckling = 2 ft, K = 1.0

Column Cross Section

Column Dimensions 36.0in high x 24.0in Wide, Column Edge to Rebar
Edge Cover = 2.0in

Column Reinforcing : 4 - #9 bars @ corners,, 2.0 - #9 bars top & bottom
between corner bars, 3.0 - #9 bars left & right
between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 10,729.7 lbs * Dead Load Factor

AXIAL LOADS ...

Axial Load at 12.333 ft above base, Yecc = 5.0in, D = 20.070, L = 79.60, E = 4.430 k

BENDING LOADS ...

Lat. Point Load at 12.333 ft creating My-y, D = -0.190, L = -0.950, E = -0.130 k

Lat. Point Load at 12.333 ft creating Mx-x, D = -0.110, L = -0.340, E = -0.40 k

Lat. Point Load at 5.660 ft creating Mx-x, H = 65.590 k

DESIGN SUMMARY

Load Combination +0.8574D-1.0E+1.60H
Location of max. above base 12.250 ft
Maximum Stress Ratio 0.2299 : 1
Ratio = $(P_u^2 + M_u^2)^{.5} / (\Phi P_n^2 + \Phi M_n^2)^{.5}$
 $P_u = 21.978$ k $\Phi * P_n = 94.701$ k
 $M_u-x = -244.960$ k-ft $\Phi * M_n-x = 0.0$ k-ft
 $M_u-y = 0.0$ k-ft $\Phi * M_n-y = 0.0$ k-ft
Mu Angle = 180.0 deg
Mu at Angle = 244.960 k-ft ΦM_n at Angle = 1,065.49 k-ft
Pn & Mn values located at Pu-Mu vector intersection with capacity curve
Column Capacities ...
Pnmax : Nominal Max. Compressive Axial Capacity 3,730.0 k
Pnmin : Nominal Min. Tension Axial Capacity -840.0 k
 ΦP_n , max : Usable Compressive Axial Capacity 1,939.60 k
 ΦP_n , min : Usable Tension Axial Capacity -546.0 k

Maximum SERVICE Load Reactions ..

Top along Y-Y	k	Bottom along Y-Y	k
Top along X-X	k	Bottom along X-X	k

Maximum SERVICE Load Deflections ...

Along Y-Y 0.005540 in at 6.705 ft above base
for load combination : H Only

Along X-X 0.0 in at 0.0 ft above base
for load combination :

General Section Information . $\phi = 0.650$ $\beta = 0.850$ $\theta = 0.80$

ρ : % Reinforcing 1.620 % Rebar % Ok
Reinforcing Area 14.0 in²
Concrete Area 864.0 in²

Governing Load Combination Results

Governing Factored Load Combination	Dist. from base ft	Axial Load k		Bending Analysis k-ft							Utilization
		Pu	$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n	Ratio
+1.40D	12.25	43.12	1,939.60	1.000	-11.59	1.000	0.00	0.000	11.59	526.40	0.022

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Concrete Column

\\116.d - Arch_Civil_Struct\007 Regrind Area Concrete\Flotation Foundations\Gridline H\Flotation Area Grid H.ec6

ENERCALC, INC. 1983-2011, Build:6.12.5.3, Ver:6.11.8.31

Lic. #: KW-06000120

Licensee : flsmith centry

Description : Pedestal H,3.2

Governing Load Combination Results

Governing Factored Load Combination	Dist. from base ft	Axial Load k			Bending Analysis k-ft						Utilization Ratio
		Pu	$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n	
+1.20D+0.50Lr+1.60L+1.60H	12.25	164.32	895.25	1.000	-216.07	1.000	0.00	0.000	216.07	1,177.11	0.184
+1.20D+1.60L+0.50S+1.60H	12.25	164.32	895.25	1.000	-216.07	1.000	0.00	0.000	216.07	1,177.11	0.184
+1.20D+1.60Lr+0.50L	12.25	76.76	1,869.77	1.000	-26.35	1.000	0.00	0.000	26.35	634.75	0.041
+1.20D+0.50L+1.60S	12.25	76.76	1,869.77	1.000	-26.35	1.000	0.00	0.000	26.35	634.75	0.041
+1.20D+0.50Lr+0.50L+1.60W	12.25	76.76	1,869.77	1.000	-26.35	1.000	0.00	0.000	26.35	634.75	0.041
+1.20D+0.50Lr+0.50L-1.60W	12.25	76.76	1,869.77	1.000	-26.35	1.000	0.00	0.000	26.35	634.75	0.041
+1.20D+0.50L+0.50S+1.60W	12.25	76.76	1,869.77	1.000	-26.35	1.000	0.00	0.000	26.35	634.75	0.041
+1.20D+0.50L+0.50S-1.60W	12.25	76.76	1,869.77	1.000	-26.35	1.000	0.00	0.000	26.35	634.75	0.041
+1.243D+0.50L+0.20S+E	12.25	82.50	1,857.71	1.000	-28.53	1.000	0.00	0.000	28.53	646.15	0.044
+1.243D+0.50L+0.20S-1.0E	12.25	73.64	1,869.77	1.000	-24.88	1.000	0.00	0.000	24.88	634.75	0.039
+0.90D+1.60W+1.60H	12.25	27.72	127.68	1.000	-243.86	1.000	0.00	0.000	243.86	1,096.44	0.222
+0.90D-1.60W+1.60H	12.25	27.72	127.68	1.000	-243.86	1.000	0.00	0.000	243.86	1,096.44	0.222
+0.8574D+E+1.60H	12.25	30.84	144.49	1.000	-243.11	1.000	0.00	0.000	243.11	1,112.10	0.219
+0.8574D-1.0E+1.60H	12.25	21.98	94.70	1.000	-244.96	1.000		180.000	244.96	1,065.49	0.230

Maximum Reactions - Unfactored

Note: Only non-zero reactions are listed.

Load Combination	Reaction along X-X Axis		Reaction along Y-Y Axis		Axial Reaction @ Base
	@ Base	@ Top	@ Base	@ Top	
Only	1.017	0.907 k		0.190 k	30.800 k
Only	4.034	3.694 k		0.950 k	79.600 k
Only	0.224	0.176 k		0.130 k	4.430 k
-E Only	0.224	0.176 k		0.130 k	4.430 k
D+L	5.051	4.601 k		1.140 k	110.400 k
D+E	1.242	0.732 k		0.320 k	35.230 k
D-E Only	0.793	1.083 k		0.060 k	26.370 k
D+L+E	5.275	4.425 k		1.270 k	114.830 k
D+L-E Only	4.826	4.776 k		1.010 k	105.970 k
H Only	48.037	17.553 k		k	k

Maximum Deflections for Load Combinations - Unfactored Loads

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	-0.000	in	8.277	ft
L Only	0.0000	in	0.000	ft	-0.001	in	8.277	ft
E Only	0.0000	in	0.000	ft	-0.000	in	8.277	ft
-E Only	0.0000	in	0.000	ft	0.000	in	8.277	ft
D+L	0.0000	in	0.000	ft	-0.001	in	8.277	ft
D+E	0.0000	in	0.000	ft	-0.000	in	8.277	ft
D-E Only	0.0000	in	0.000	ft	-0.000	in	8.277	ft
D+L+E	0.0000	in	0.000	ft	-0.001	in	8.277	ft
D+L-E Only	0.0000	in	0.000	ft	-0.001	in	8.277	ft
H Only	0.0000	in	0.000	ft	0.006	in	6.705	ft

Concrete Column

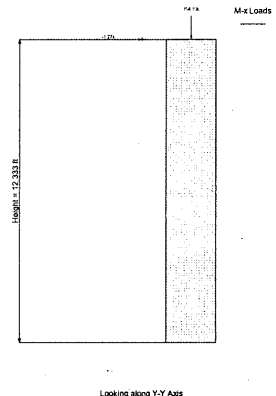
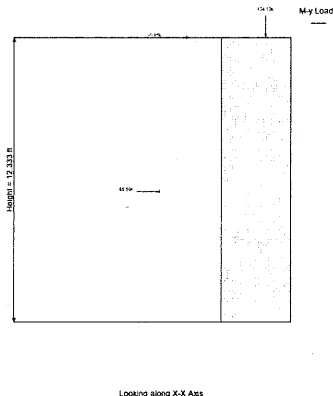
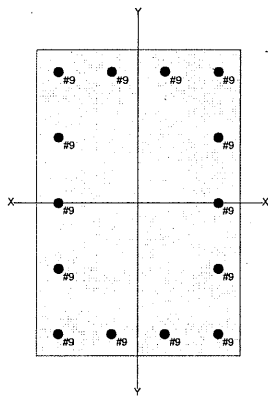
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ENERCALC, INC. 1983-2011, Build:6.12.5.3, Ver:6.11.8.31

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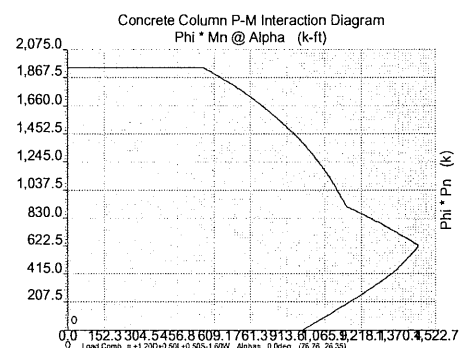
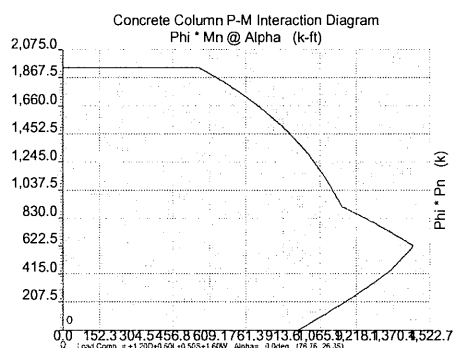
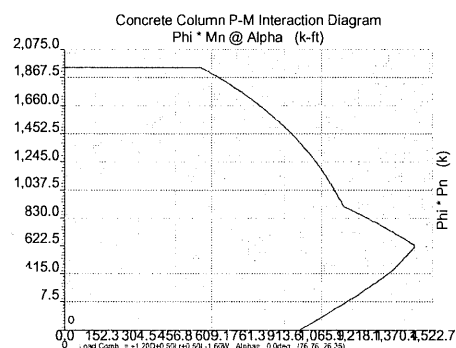
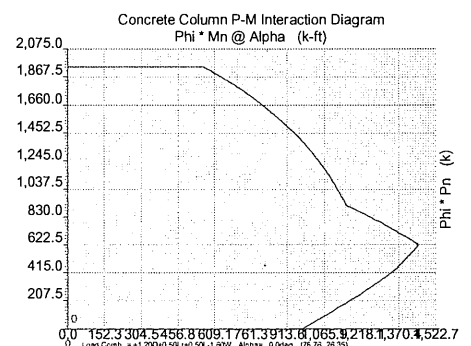
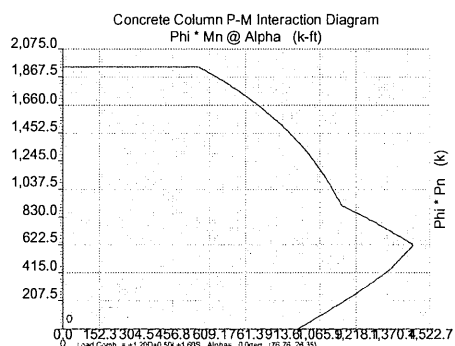
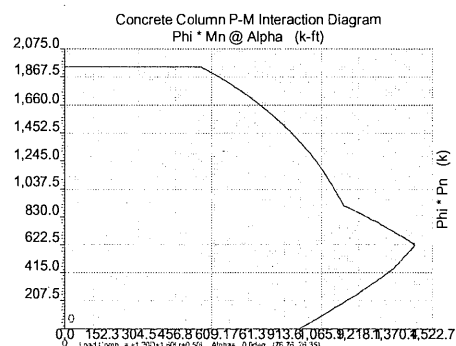
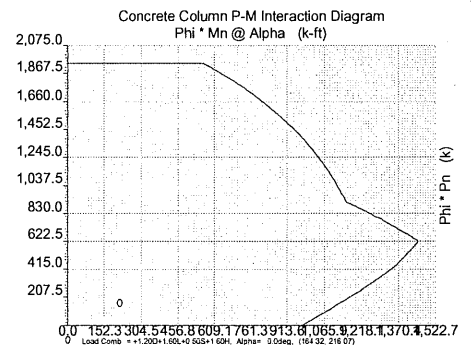
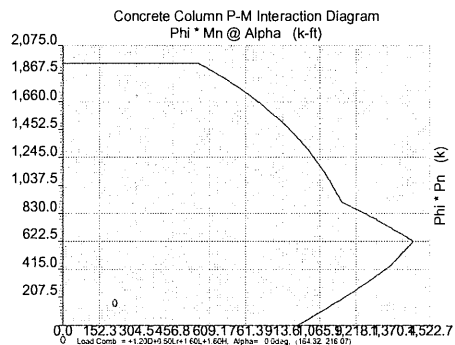
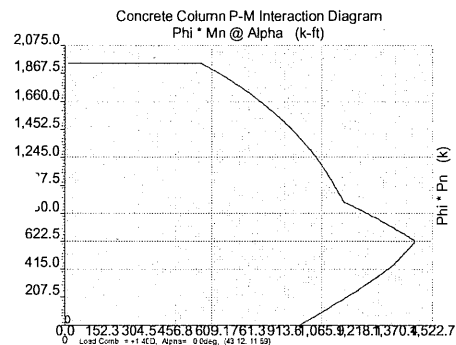
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Description : Pedestal H,3.2

Sketches



Interaction Diagrams



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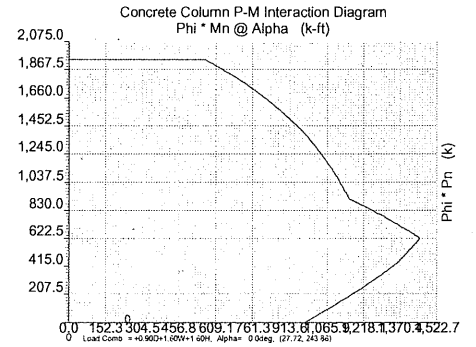
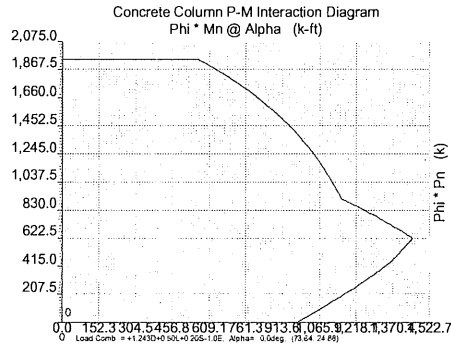
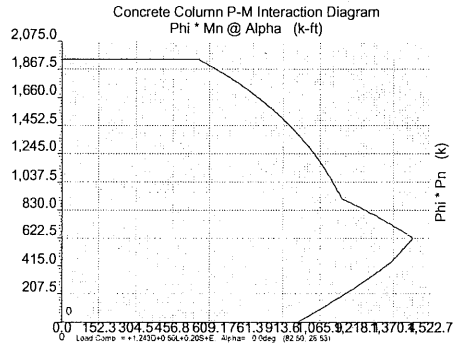
Concrete Column

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Description : Pedestal H,3.2



Concrete Column

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ENERCALC, INC. 1983-2011, Build:6.12.5.3, Ver:6.11.8.31

Lic. #: KW-06000120

Licensee : flsmith centry

Description : Pedestal H,4

General Information

Calculations per, ASCE 7-05

f'_c : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 145.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Load Combination 2006 IBC & ASCE 7-05

Overall Column Height = 12.333 ft
End Fixity Top Pinned, Bottom Fixed

Brace condition for deflection (buckling) along columns :

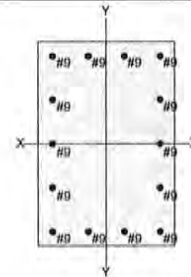
X-X (width) axis : Unbraced Length for X-X Axis buckling = 2 ft, K = 1.0

Y-Y (depth) axis : Unbraced Length for Y-Y Axis buckling = 2 ft, K = 1.0

Column Cross Section

Column Dimensions 36.0in high x 24.0in Wide, Column Edge to Rebar
Edge Cover = 2.0in

Column Reinforcing : 4 - #9 bars @ corners,, 2.0 - #9 bars top & bottom
between corner bars, 3.0 - #9 bars left & right
between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 10,729.7 lbs * Dead Load Factor

AXIAL LOADS ...

Axial Load at 12.333 ft above base, Yecc = 5.0in, D = 35.740, L = 164.250, E = 1.350 k

BENDING LOADS ...

Lat. Point Load at 12.333 ft creating My-y, D = -0.190, L = -0.550, E = -0.140 k

Lat. Point Load at 12.333 ft creating Mx-x, D = -0.110, L = -0.170, E = -0.140 k

Lat. Point Load at 5.660 ft creating Mx-x, H = 94.90 k

DESIGN SUMMARY

Load Combination +0.8574D-1.0E+1.60H
Location of max. above base 12.250 ft
Maximum Stress Ratio 0.3259 : 1
Ratio = $(P_u^2 + M_u^2)^{0.5} / (\Phi P_n^2 + \Phi M_n^2)^{0.5}$
 $P_u = 38.493$ k $\Phi * P_n = 110.954$ k
 $M_{u-x} = -352.173$ k-ft $\Phi * M_{n-x} = 0.0$ k-ft
 $M_{u-y} = 0.0$ k-ft $\Phi * M_{n-y} = 0.0$ k-ft

M_u Angle = 180.0 deg
 M_u at Angle = 352.173 k-ft ΦM_n at Angle = 1,080.78 k-ft

P_n & M_n values located at P_u - M_u vector intersection with capacity curve

Column Capacities ...

P_{nmax} : Nominal Max. Compressive Axial Capacity 3,730.0 k
 P_{nmin} : Nominal Min. Tension Axial Capacity -840.0 k
 ΦP_n , max : Usable Compressive Axial Capacity 1,939.60 k
 ΦP_n , min : Usable Tension Axial Capacity -546.0 k

Maximum SERVICE Load Reactions ..

	k	Bottom along Y-Y	k
Top along Y-Y			
Top along X-X		Bottom along X-X	

Maximum SERVICE Load Deflections ...

Along Y-Y 0.008015 in at 6.705 ft above base
for load combination : H Only

Along X-X 0.0 in at 0.0 ft above base
for load combination :

General Section Information . $\phi = 0.650$ $\beta = 0.850$ $\theta = 0.80$

ρ : % Reinforcing 1.620 % Rebar % Ok
Reinforcing Area 14.0 in²
Concrete Area 864.0 in²

Governing Load Combination Results

Governing Factored Load Combination	Dist. from base ft	Axial Load k		Bending Analysis k-ft								Utilization Ratio
		P_u	$\Phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ΦM_n		
+1.40D	12.25	65.06	1,905.60	1.000	-20.64	1.000	0.00	0.000	20.64	599.97		0.034

Concrete Column

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ENERCALC, INC. 1983-2011, Build:6.12.5.3, Ver:6.11.8.31

Lic. #: KW-06000120

Licensee : flsmith centry

Description : Pedestal H,4

Governing Load Combination Results

Governing Factored Load Combination	Dist. from base ft	Axial Load k			Bending Analysis k-ft						Utilization Ratio
		Pu	$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n	
+1.20D+0.50Lr+1.60L+1.60H	12.25	318.56	1,166.03	1.000	-294.60	1.000	0.00	0.000	294.60	1,072.69	0.275
+1.20D+1.60L+0.50S+1.60H	12.25	318.56	1,166.03	1.000	-294.60	1.000	0.00	0.000	294.60	1,072.69	0.275
+1.20D+1.60Lr+0.50L	12.25	137.89	1,822.14	1.000	-51.56	1.000	0.00	0.000	51.56	678.91	0.076
+1.20D+0.50L+1.60S	12.25	137.89	1,822.14	1.000	-51.56	1.000	0.00	0.000	51.56	678.91	0.076
+1.20D+0.50Lr+0.50L+1.60W	12.25	137.89	1,822.14	1.000	-51.56	1.000	0.00	0.000	51.56	678.91	0.076
+1.20D+0.50Lr+0.50L-1.60W	12.25	137.89	1,822.14	1.000	-51.56	1.000	0.00	0.000	51.56	678.91	0.076
+1.20D+0.50L+0.50S+1.60W	12.25	137.89	1,822.14	1.000	-51.56	1.000	0.00	0.000	51.56	678.91	0.076
+1.20D+0.50L+0.50S-1.60W	12.25	137.89	1,822.14	1.000	-51.56	1.000	0.00	0.000	51.56	678.91	0.076
+1.243D+0.50L+0.20S+E	12.25	141.22	1,822.14	1.000	-52.75	1.000	0.00	0.000	52.75	678.91	0.078
+1.243D+0.50L+0.20S-1.0E	12.25	138.52	1,822.14	1.000	-51.64	1.000	0.00	0.000	51.64	678.91	0.076
+0.90D+1.60W+1.60H	12.25	41.82	127.68	1.000	-351.57	1.000	0.00	0.000	351.57	1,096.44	0.321
+0.90D-1.60W+1.60H	12.25	41.82	127.68	1.000	-351.57	1.000	0.00	0.000	351.57	1,096.44	0.321
+0.8574D+E+1.60H	12.25	41.19	127.68	1.000	-351.61	1.000	0.00	0.000	351.61	1,096.44	0.321
+0.8574D-1.0E+1.60H	12.25	38.49	110.95	1.000	-352.17	1.000		180.000	352.17	1,080.78	0.326

Note: Only non-zero reactions are listed.

Maximum Reactions - Unfactored

Load Combination	Reaction along X-X Axis		Reaction along Y-Y Axis		Axial Reaction @ Base
	@ Base	@ Top	@ Base	@ Top	
Only	1.811	1.701 k		0.190 k	46.470 k
Only	8.324	8.154 k		0.550 k	164.250 k
E Only	0.068	0.072 k		0.140 k	1.350 k
-E Only	0.068	0.072 k		0.140 k	1.350 k
D+L	10.135	9.855 k		0.740 k	210.720 k
D+E	1.880	1.630 k		0.330 k	47.820 k
D-E Only	1.743	1.773 k		0.050 k	45.120 k
D+L+E	10.203	9.783 k		0.880 k	212.070 k
D+L-E Only	10.066	9.926 k		0.600 k	209.370 k
H Only	69.504	25.396 k		k	k

Maximum Deflections for Load Combinations - Unfactored Loads

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	-0.000	in	8.277	ft
L Only	0.0000	in	0.000	ft	-0.002	in	8.277	ft
E Only	0.0000	in	0.000	ft	-0.000	in	8.277	ft
-E Only	0.0000	in	0.000	ft	0.000	in	8.277	ft
D+L	0.0000	in	0.000	ft	-0.002	in	8.277	ft
D+E	0.0000	in	0.000	ft	-0.000	in	8.277	ft
D-E Only	0.0000	in	0.000	ft	-0.000	in	8.277	ft
D+L+E	0.0000	in	0.000	ft	-0.002	in	8.277	ft
D+L-E Only	0.0000	in	0.000	ft	-0.002	in	8.277	ft
H Only	0.0000	in	0.000	ft	0.008	in	6.705	ft

Concrete Column

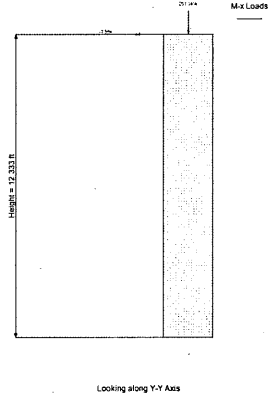
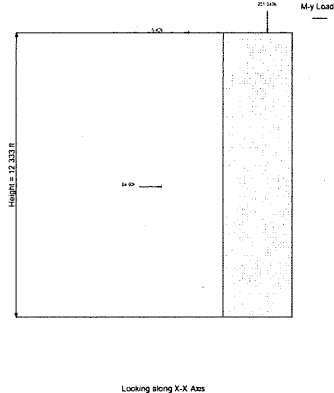
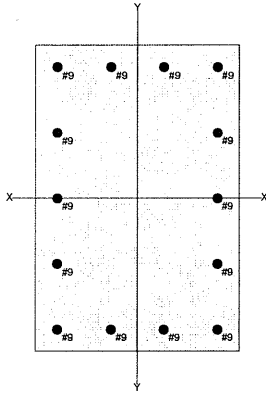
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Lic. # : KW-06000120

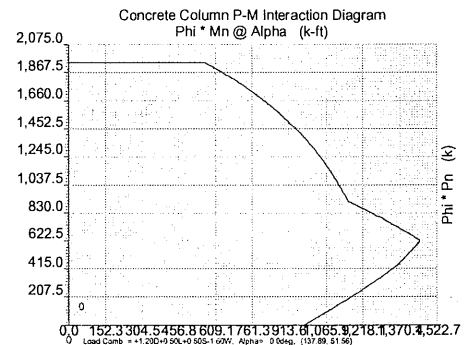
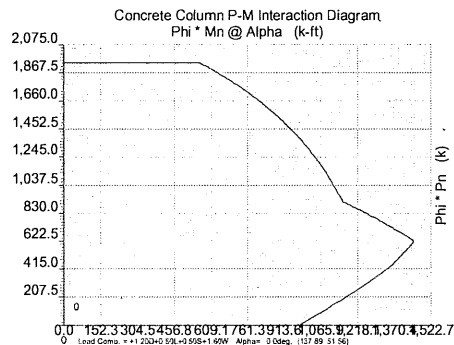
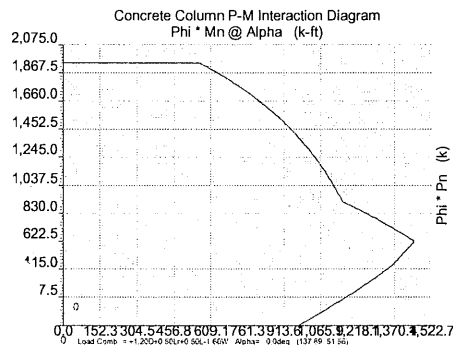
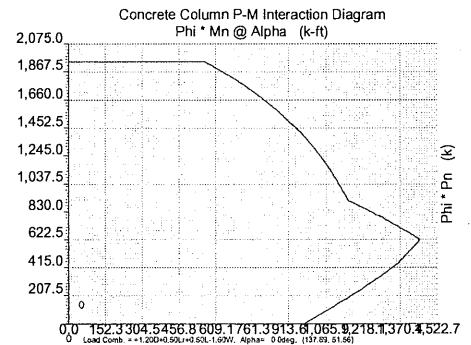
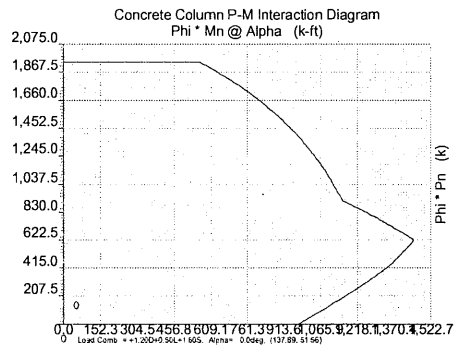
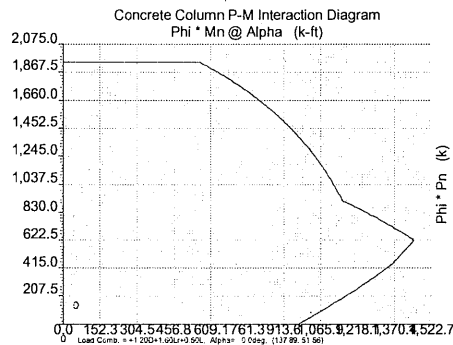
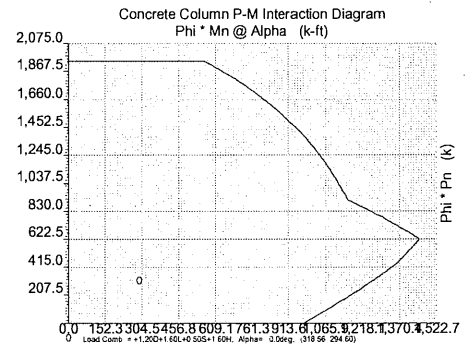
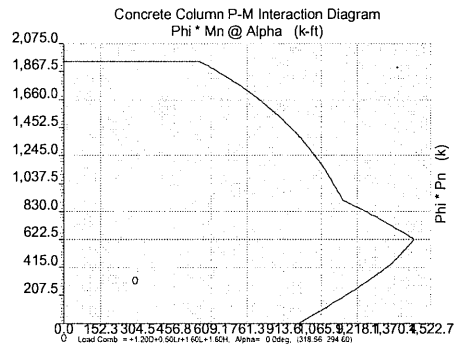
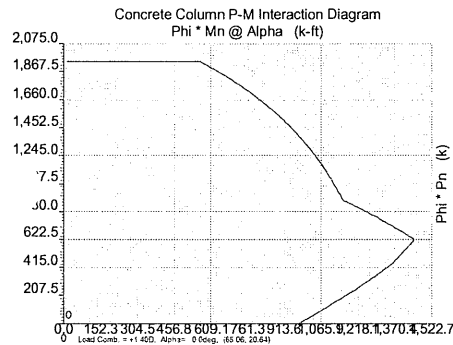
Licensee : flsmith centry

Description : Pedestal H,4

Sketches



Interaction Diagrams



Printed: 16 MAY 2012, 3:54PM

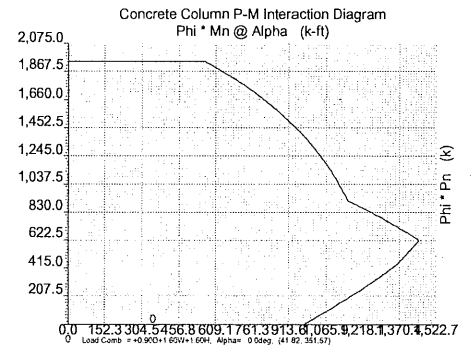
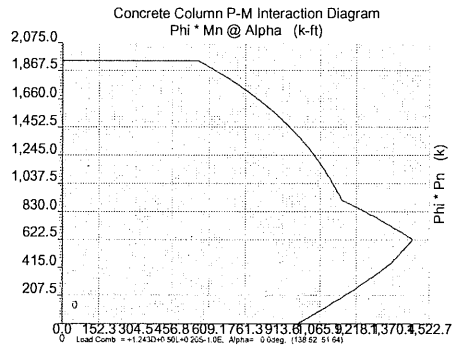
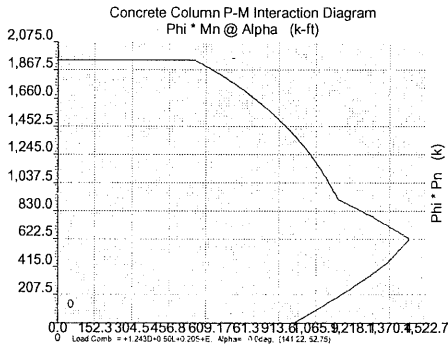
Concrete Column

\\116.d - Arch_Civil_Struct\C-007 Regrind Area Concrete\Flotation Foundations\Gridline H\Flotation Area Grid H.ec6
ENERCALC, INC. 1983-2011, Build:6.12.5.3, Ver:6.11.8.31

Lic. #: KW-06000120

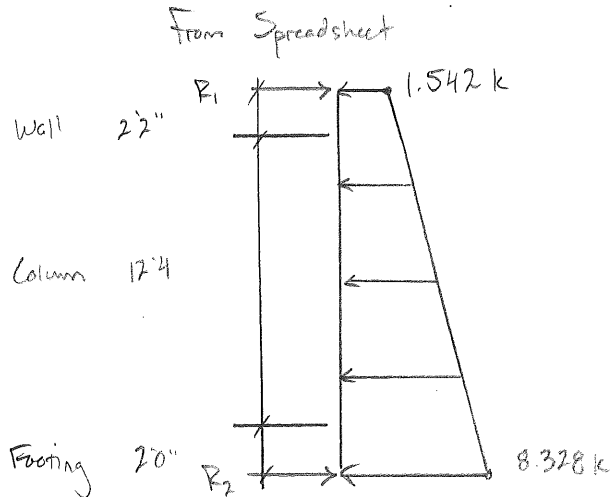
Licensee : flsmith centry

Description : Pedestal H,4



FLSMIDTH	PROJECT	CCAV High Grade Ore	PROJ NO.	11021
	SUBJECT	Retaining Wall Column & Footing	CALC NO.	
		Equivalent Moments	BY	DATE 5-17-11
			CHK	DATE
			SHEET	OF REV

H.3.2



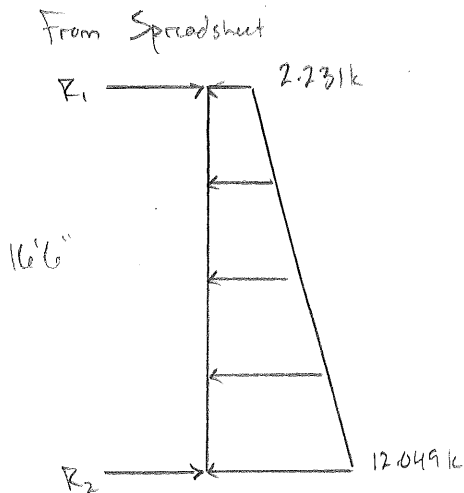
$$R_1 = \frac{3(1.542 \text{ k})(16.5')}{8} + \frac{(8.328 - 1.542)(16.5')}{2(3)} = 28.203 \text{ k}$$

$$R_2 = \frac{5(1.542)(16.5')}{8} + \frac{(8.328 - 1.542)(16.5')^2}{2(3)} = 53.225 \text{ k}$$

$$M_2 = \frac{(1.542 \text{ k})(16.5')^2}{8} + \frac{(8.328 - 1.542)(16.5')^2}{15} = 175.642 \text{ k-ft}$$

$$L = \frac{M_2}{R_2} = \frac{175.642 \text{ k-ft}}{53.225 \text{ k}} = 3.3 \text{ ft}$$

H.4



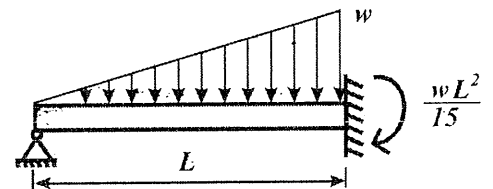
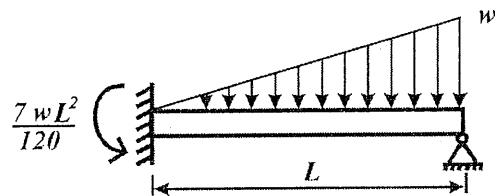
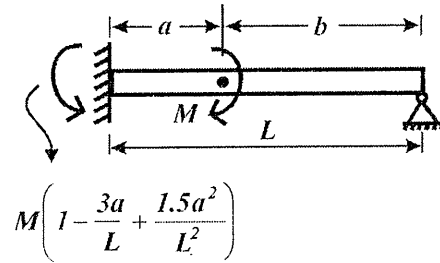
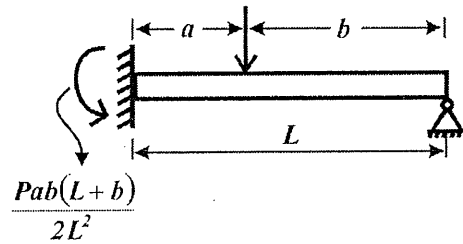
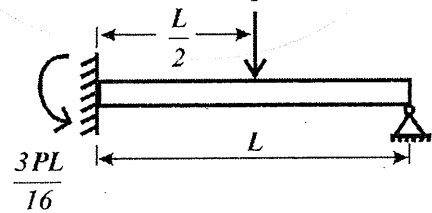
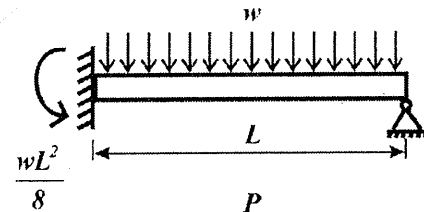
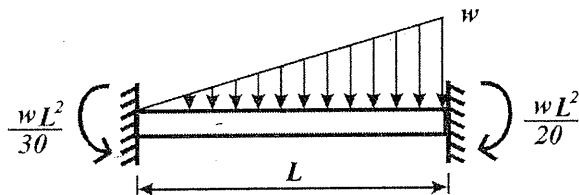
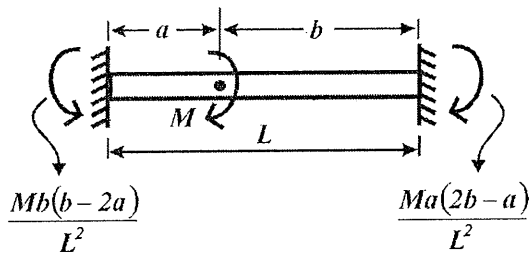
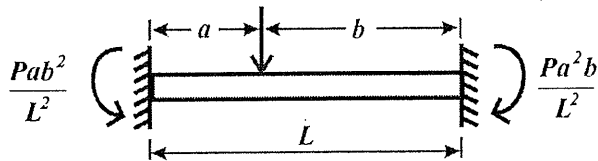
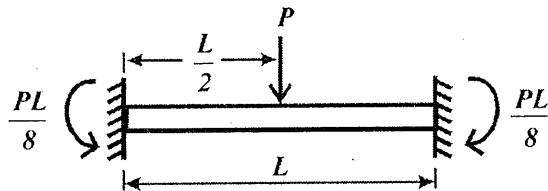
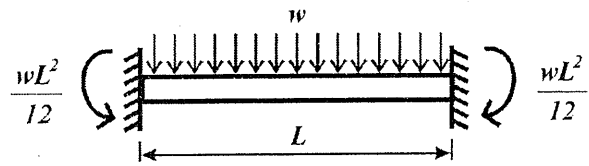
$$R_1 = \frac{3(2.231 \text{ k})(16.5')}{8} + \frac{(12.049 - 2.231)(16.5')}{2(3)} = 40.804 \text{ k}$$

$$R_2 = \frac{5(2.231 \text{ k})(16.5')}{8} + \frac{(12.049 - 2.231)(16.5')^2}{2(3)} = 77.006 \text{ k}$$

$$M_2 = \frac{(2.231)(16.5')^2}{8} + \frac{(12.049 - 2.231)(16.5')^2}{15} = 254.12 \text{ k-ft}$$

$$L = \frac{M_2}{R_2} = \frac{254.12}{77.006} = 3.3 \text{ ft}$$

Table 2.1



FLSMIDTH	PROJECT Cripple Creek & Victor	Proj No. 11021
		Calc No.
	SUBJECT Gravity Circuit Retaining Wall	By CCK May-17-2012
	<i>Passive Soil Pressure on Footing</i> H,3.2 & H,4	Check Sheet of

Pressure on retaining structure from point load ($m \leq 4$)

REF. NAVFAC DM-7 figure 10-6

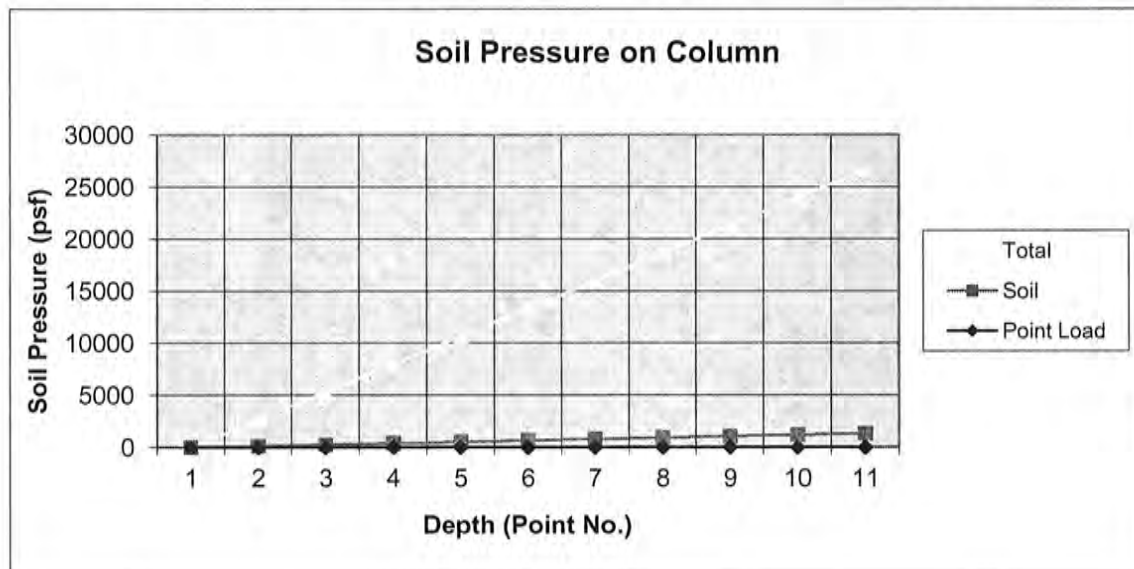
Point Load $Q_p =$ 0 kips
 Wall Height $H =$ 3.33 feet
 Equiv. Fluid $=$ 400 pcf
 Surcharge $=$ 0 psf

Tributary Width of Wall $=$ 20 feet
 Distance of Load from wall $=$ 0 feet
 $m =$ 0.000 OK

slab: 8"
soil: 8"
Ftg: 24"

Depth (z ft.)	n	Coeff	Pressure KSF	Depth ft.	Point Pressure PSF	EFP Pressure PSF	Total Pressure LB
0	0	0	0	0	0	0	0
0.333	0.1	0.57	0.00	0.333	0	133	2664
0.666	0.2	1.40	0.00	0.666	0	266	5328
0.999	0.3	1.61	0.00	0.999	0	400	7992
1.332	0.4	1.37	0.00	1.332	0	533	10656
1.665	0.5	1.02	0.00	1.665	0	666	13320
1.998	0.6	0.72	0.00	1.998	0	799	15984
2.331	0.7	0.50	0.00	2.331	0	932	18648
2.664	0.8	0.35	0.00	2.664	0	1066	21312
2.997	0.9	0.25	0.00	2.997	0	1199	23976
3.33	1	0.18	0.00	3.33	0	1332	26640

RESULTANT FORCE in pounds (P_h) = 0 2218 **44356**
 RESULTANT MOMENT ARM in feet (R) = 0.00 1.12 **1.12**
 RESULTANT MOMENT @ BASE in foot-pounds (M_b) = 0 2474 49481
 ACI DESIGN MOMENT in foot-pounds ($M_u = 1.7M_b$) = 0 4206 84118



	PROJECT Cripple Creek & Victor		Proj No.	11021
			Calc No.	
	SUBJECT Footing Loads & Overturning		By	CCK May-17-2012
	Combined Footing		Check	
	H,3,2 & H,4		Sheet	of

FOOTING LOADS & OVERTURNING

Column Width (ft)	2	Upper Slab Thickness (in)	8
Column Depth (ft)	3	Lower Slab Thickness (in)	8
Column Height (ft)	12.33	Soil Height Over Heel (ft)	14.8
Column Spacing (ft)	14.00	Soil Height Over Toe (ft)	1
Upper Wall Width (ft)	0.83	Footing Width (ft)	12
Upper Wall Height (ft)	2.17	Footing Length (ft)	20
Lower Wall Width (ft)	1.5	Footing Thickness (ft)	2.0
Lower Wall Height (ft)	12.33	Soil Density (pcf)	120
Left Wall Length (ft)	10	Concrete Density (pcf)	150
Middle Wall Length (ft)	14.00	Upper Slab Surcharge (psf)	350
Right Wall Length (ft)	20		

LOADS

	P1 Vertical	P2 Vertical	Center-Line Eccentricity (ft)	Center-Line Moment 1 (k-ft)	Center-Line Moment (k-ft)	Footing Eccentricity (ft)	Over-Turning Moment (k-ft)
Dead Loads							
Steel Frame	20.07	35.74	-0.42	-8.36	-14.89	5.58	311.61
Upper Wall	4.65	6.73	1.08	5.04	7.29	7.08	80.61
Lower Wall	27.06	41.63	0.75	20.29	31.22	6.75	463.60
Upper Slab	4.50	4.50	3.75	16.88	16.88	9.75	87.75
Lower Slab	4.50	4.50	-7.75	-34.88	-34.88	-1.75	-15.75
Column	11.10	11.10	0.00	0.00	0.00	6.00	133.20
Footing	36.00	36.00	0.00	0.00	0.00	6.00	432.00
Heel Soil	80.10	80.10	3.75	300.38	300.38	9.75	1561.95
Toe Soil	3.60	3.60	-7.75	-27.90	-27.90	-1.75	-12.60
Upper Slab Surcharge	15.75	15.75	3.75	59.06	59.06	9.75	307.13
Program Input	160.23	192.54		330.51	337.15		
Total	207.33	239.64		330.51	337.15		3349.49

Lateral Earth Loads	Lateral	Height from Bottom (ft)	Over-Turning Moment (k-ft)	Program Input	
				Shear (k)	Moment (k-ft)
Input Active Pressure	85.88	14.33	1230.88		
P1- Actual Active Pressure	53.23	3.30	175.64	31.05	464.63
P2- Actual Active Pressure	77.01	3.30	254.12	54.83	386.16
Passive Pressure	-44.36	1.12	-49.68		

1230.9 - 464.63 - 386.16 = 380

OVERTURNING

Overturning Moment	Load (k)	Moment Arm (ft)	
P1- Seismic (from frame)	0.40	14.33	5.73
P2- Seismic (from frame)	0.14	14.33	2.01
P1- Earth (Active)	53.23	3.30	175.64
P2- Earth (Active)	77.01	3.30	254.12
		0.6D+0.7E+H :	435.18
Resisting Moment			
Dead	-	-	3349.49
Seismic (from frame)	0.54	14.33	7.74
Earth (Passive)	44.36	1.12	49.68
		0.6D-0.7E+H :	2053.95
Factor of Safety			4.72

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/17/2012
Foundation Name	Combined Footing		Time	4:31:44 PM
Designed By:	FLSmidth Salt Lake City	Engineer	CCK	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Re grind Area Concrete\Flotation Foundations\Gridline H\H,3.2 & H,4 Retaining Wall.mcs			

DETAIL REPORT FOR Combined Footing**PROJECT INFORMATION**

Project Name: CC&V High Grade Mill
Project Number: 11021
Client: CC&V
Project Location: Victor CO
Foundation Description: FOUNDATION

DESIGN CODE ACI 318 - 2008 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength (psi) 4000
 Unit Weight (pcf) 150
 Pier Concrete Cover - E-W Dir (in) 2
 Pier Concrete Cover - N-S Dir (in) 2
 Footing Side Concrete Cover - E-W Dir (in) 3
 Footing Side Concrete Cover - N-S Dir (in) 3
 Footing Top Concrete Cover (in) 2
 Footing Bottom Concrete Cover - X Dir (in) 3

SOIL PARAMETERS:

Unit Weight (pcf) 120
 Allowable Net Bearing Capacity (psf) 5000
 Bearing Capacity Method Linear Soil Pressure
 Soil Type Granular
 Passive Pressure Coefficient Kp 3.69
 Soil To Concrete Friction f 0.5
 Allowable Increase in Soil Pressure due to Short Term Loads (%)
 Wind 33.33 Earthquake 33.33 Test 20
 Erection Stability Ratio 1.5
 Operation Stability Ratio 1.5
 Test Stability Ratio 1.5
 Safety Factor against Lateral Forces 1.5

MINIMUM FOUNDATION CRITERIA:

Depth of Footing Below Grade (ft) 2
 Minimum Soil Cover (ft) 0
 Grade Elevation (ft) 100

REINFORCING STEEL PARAMETERS:

Yield Strength (ksi) 60
 Unit Weight (pcf) 490
 Modulus of Elasticity (ksi) 29000
 Pier Min Rebar Spacing (in) 3
 Footing Min Rebar Spacing (in) 6
 Footing Max Rebar Spacing (in) 18

REBAR PARAMETERS:

Max Long Bar Size 10
 Min Long Bar Size 7
 Max Tie Bar Size 4
 Min Tie Bar Size 3
 Max Ftg Bar Size 18
 Temp & Shrinkage Steel Ratio 0.0018

BUOYANCY CRITERIA:

Consider Buoyancy: No
 Consider soil for buoyancy: No
 Water table below grade (ft) 0

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/17/2012
Foundation Name	Combined Footing		Time	4:31:44 PM
Designed By:	FLSmith Salt Lake City	Engineer	CCK	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-007 Re grind Area Concrete\Flotation Foundations\Gridline HH,3.2 & H,4 Retaining Wall.mcs			

DETAIL REPORT FOR Combined Footing**APPLIED LOADS****P1**

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	160.23	-0.19	0.00	-0.11	330.51
2 - Live	79.60	-0.95	0.00	-0.34	0.00
3 - Lateral Earth	0.00	0.00	0.00	-31.05	464.63
4 - Earthquake X	3.27	-0.12	0.00	-0.40	0.00
5 - Earthquake Y	4.43	-0.13	0.00	-0.05	0.00

P2

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	192.54	-0.19	0.00	-0.11	337.15
2 - Live	164.25	-0.55	0.00	-0.17	0.00
3 - Lateral Earth	0.00	0.00	0.00	-54.83	386.16
4 - Earthquake X	1.35	-0.14	0.00	-0.14	0.00
5 - Earthquake Y	0.21	-0.05	0.00	-0.04	0.00

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/17/2012
Foundation Name	Combined Footing		Time	4:31:44 PM
Designed By:	FLSmith Salt Lake City	Engineer	CCK	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\007 Regrid Area Concrete\Flotation Foundations\Gridline H\H,3.2 & H,4 Retaining Wall.mcs			

DETAIL REPORT FOR Combined Footing**UNFACTORED (ALLOWABLE) LOAD COMBINATIONS****P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	160.23	-0.19	0.00	-0.11	330.51
2 - Dead + Live + Lateral Earth	239.83	-1.14	0.00	-31.50	795.14
3 - Dead + Lateral Earth	160.23	-0.19	0.00	-31.16	795.14
4 - Dead + 0.75Live + Lateral Earth	219.93	-0.90	0.00	-31.42	795.14
5 - Dead + Lateral Earth + 0.7Earthquake X	162.52	-0.27	0.00	-31.44	795.14
6 - Dead + Lateral Earth + 0.7Earthquake Y	163.33	-0.28	0.00	-31.20	795.14
7 - Dead + 0.75Live + Lateral Earth + 0.7Earthquake X	222.22	-0.99	0.00	-31.70	795.14
8 - Dead + 0.75Live + Lateral Earth + 0.7Earthquake Y	223.03	-0.99	0.00	-31.45	795.14
9 - 0.6Dead + Lateral Earth	96.14	-0.11	0.00	-31.12	662.94
10 - 0.6Dead + Lateral Earth + 0.7Earthquake X	98.43	-0.20	0.00	-31.40	662.94
11 - 0.6Dead + Lateral Earth + 0.7Earthquake Y	99.24	-0.21	0.00	-31.15	662.94

P2

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	192.54	-0.19	0.00	-0.11	337.15
2 - Dead + Live + Lateral Earth	356.79	-0.74	0.00	-55.11	723.31
3 - Dead + Lateral Earth	192.54	-0.19	0.00	-54.94	723.31
4 - Dead + 0.75Live + Lateral Earth	315.73	-0.60	0.00	-55.07	723.31
5 - Dead + Lateral Earth + 0.7Earthquake X	193.49	-0.29	0.00	-55.04	723.31
6 - Dead + Lateral Earth + 0.7Earthquake Y	192.69	-0.23	0.00	-54.97	723.31
7 - Dead + 0.75Live + Lateral Earth + 0.7Earthquake X	316.67	-0.70	0.00	-55.17	723.31
8 - Dead + 0.75Live + Lateral Earth + 0.7Earthquake Y	315.87	-0.64	0.00	-55.10	723.31
9 - 0.6Dead + Lateral Earth	115.52	-0.11	0.00	-54.90	588.45
10 - 0.6Dead + Lateral Earth + 0.7Earthquake X	116.47	-0.21	0.00	-54.99	588.45
11 - 0.6Dead + Lateral Earth + 0.7Earthquake Y	115.67	-0.15	0.00	-54.92	588.45

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/17/2012
Foundation Name	Combined Footing		Time	4:31:44 PM
Designed By:	FLSmith Salt Lake City	Engineer	CCK	Checker
	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\007 Re grind Area Concrete\			
Filename:	Flotation Foundations\Gridline HH,3.2 & H,4 Retaining Wall.mcs			

DETAIL REPORT FOR Combined Footing**FACTORED (ULTIMATE) LOAD COMBINATIONS****P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	224.32	-0.27	0.00	-0.15	462.71
2 - 1.2Dead + 1.6Live	319.64	-1.75	0.00	-0.68	396.61
3 - 1.2Dead + 1.6Lateral Earth	192.28	-0.23	0.00	-49.81	1140.02
4 - 1.2Dead + Live	271.88	-1.18	0.00	-0.47	396.61
5 - 1.2Dead + Live + Earthquake X	275.15	-1.30	0.00	-0.87	396.61
6 - 1.2Dead + Live + Earthquake Y	276.31	-1.31	0.00	-0.52	396.61
7 - 0.9Dead + 1.6Lateral Earth	144.21	-0.17	0.00	-49.78	1040.87
8 - 0.9Dead + 1.6Lateral Earth + Earthquake X	147.48	-0.29	0.00	-50.18	1040.87
9 - 0.9Dead + 1.6Lateral Earth + Earthquake Y	148.64	-0.30	0.00	-49.83	1040.87

P2

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	269.56	-0.27	0.00	-0.15	472.01
2 - 1.2Dead + 1.6Live	493.85	-1.11	0.00	-0.40	404.58
3 - 1.2Dead + 1.6Lateral Earth	231.05	-0.23	0.00	-87.86	1022.44
4 - 1.2Dead + Live	395.30	-0.78	0.00	-0.30	404.58
5 - 1.2Dead + Live + Earthquake X	396.65	-0.92	0.00	-0.44	404.58
6 - 1.2Dead + Live + Earthquake Y	395.51	-0.83	0.00	-0.34	404.58
7 - 0.9Dead + 1.6Lateral Earth	173.29	-0.17	0.00	-87.83	921.29
8 - 0.9Dead + 1.6Lateral Earth + Earthquake X	174.64	-0.31	0.00	-87.97	921.29
9 - 0.9Dead + 1.6Lateral Earth + Earthquake Y	173.50	-0.22	0.00	-87.87	921.29

BEARING CAPACITY - LINEAR SOIL PRESSURE METHOD

Load Comb	Max Pressure (ksf)	All Pressure (ksf)	Ecc N/S Dir (ft)	Ecc E/W Dir (ft)	Moment N/S axis (kip-ft)	Moment E/W axis (kip-ft)	Rem
1 - Dead	3.54	5.24	1.49	0.52	231.62	664.51	
2 - Dead + Live + Lateral Earth	4.51	5.24	0.40	1.22	845.66	277.33	
3 - Dead + Lateral Earth	2.74	5.24	0.64	0.52	231.62	284.64	
4 - Dead + 0.75Live + Lateral Earth	4.07	5.24	0.44	1.10	692.15	279.16	
5 - Dead + Lateral Earth + 0.7Earthquake X	2.74	6.91	0.62	0.50	224.82	279.22	
6 - Dead + Lateral Earth + 0.7Earthquake Y	2.73	6.91	0.63	0.47	212.74	283.73	
7 - Dead + 0.75Live + Lateral Earth + 0.7Earthquake X	4.06	6.91	0.43	1.08	685.35	273.74	
8 - Dead + 0.75Live + Lateral Earth + 0.7Earthquake Y	4.06	6.91	0.44	1.06	673.28	278.25	
9 - 0.6Dead + Lateral Earth	1.33	5.24	0.07	0.52	138.97	18.83	
10 - 0.6Dead + Lateral Earth + 0.7Earthquake X	1.32	6.91	0.05	0.49	132.17	13.42	
11 - 0.6Dead + Lateral Earth + 0.7Earthquake Y	1.32	6.91	0.07	0.44	120.10	17.93	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/17/2012
Foundation Name	Combined Footing		Time	4:31:44 PM
Designed By:	FLSmith Salt Lake City	Engineer	CCK	Checker
	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\IC-007 Regrind Area Concrete\			
Filename:	Flotation Foundations\Gridline HH,3.2 & H,4 Retaining Wall.mcs			

DETAIL REPORT FOR Combined Footing**STABILITY RATIO / SLIDING SAFETY FACTOR**

Load	S.R.	S.R.	All	Sliding	Sliding	All	Remarks
Comb	N/S Dir	E/W Dir	S.R.	FS - N/S	FS - E/W	FS	
1 - Dead	4.02	100.00	1.50	100.00	100.00	1.50	
2 - Dead + Live + Lateral Earth	3.55	100.00	1.50	4.19	100.00	1.50	
3 - Dead + Lateral Earth	2.58	100.00	1.50	2.80	100.00	1.50	
4 - Dead + 0.75Live + Lateral Earth	3.30	100.00	1.50	3.85	100.00	1.50	
5 - Dead + Lateral Earth + 0.7Earthquake X	2.60	100.00	1.50	2.81	100.00	1.50	
6 - Dead + Lateral Earth + 0.7Earthquake Y	2.59	100.00	1.50	2.82	100.00	1.50	
7 - Dead + 0.75Live + Lateral Earth + 0.7Earthquake X	3.32	100.00	1.50	3.85	100.00	1.50	
8 - Dead + 0.75Live + Lateral Earth + 0.7Earthquake Y	3.32	100.00	1.50	3.86	100.00	1.50	
9 - 0.6Dead + Lateral Earth	2.27	100.00	1.50	1.76	100.00	1.50	
10 - 0.6Dead + Lateral Earth + 0.7Earthquake X	2.29	100.00	1.50	1.78	100.00	1.50	
11 - 0.6Dead + Lateral Earth + 0.7Earthquake Y	2.29	100.00	1.50	1.78	100.00	1.50	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/17/2012
Foundation Name	Combined Footing		Time	4:31:44 PM
Designed By:	FLSmith Salt Lake City	Engineer	CCK	Checker
	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-007 Re grind Area Concrete\			
Filename:	Flotation Foundations\Gridline HH,3.2 & H,4 Retaining Wall.mcs			

DETAIL REPORT FOR Combined Footing**FOOTING DESIGN INFORMATION**

E-W Dim (ft) 20.00
N-S Dim (ft) 12.00
Thickness (ft) 2.00

Top Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
2. 1.2Dead + 1.6Live	12	9	12	1	0.86	-69.68	E-W
9. 0.9Dead + 1.6Lateral Earth + Earthquake Y	20	9	12	1	0	0	N-S

Bottom Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
2. 1.2Dead + 1.6Live	12	9	12	1	0.52	9.94	E-W
2. 1.2Dead + 1.6Live	20	9	12	1	0.7	47.87	N-S

PUNCHING SHEAR**P1**

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
2. 1.2Dead + 1.6Live	291.93	72.98	189.74	

P2

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
2. 1.2Dead + 1.6Live	447.27	111.82	189.74	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	5/17/2012
Foundation Name	Combined Footing		Time	4:31:44 PM
Designed By:	FLSmith Salt Lake City	Engineer	CCK	Checker
	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\007 Regrind Area Concrete\			
Filename:	Flotation Foundations\Gridline HH,3.2 & H,4 Retaining Wall.mcs			

DETAIL REPORT FOR Combined Footing**MAXIMUM SHEAR - E-W DIRECTION**

Load	Left	Max	Shear	All	Rem
Comb	Dist	Shear	Stress	Stress	
	(ft)	(kips)	(psi)	(psi)	
1 - 1.4Dead	5.67	-116.60	40.49	94.87	
2 - 1.2Dead + 1.6Live	5.67	-192.35	66.79	94.87	
3 - 1.2Dead + 1.6Lateral Earth	5.67	-99.95	34.70	94.87	
4 - 1.2Dead + Live	5.67	-157.70	54.76	94.87	
5 - 1.2Dead + Live + Earthquake X	5.67	-158.33	54.98	94.87	
6 - 1.2Dead + Live + Earthquake Y	5.67	-158.24	54.94	94.87	
7 - 0.9Dead + 1.6Lateral Earth	5.67	-74.96	26.03	94.87	
8 - 0.9Dead + 1.6Lateral Earth + Earthquake X	5.67	-75.59	26.25	94.87	
9 - 0.9Dead + 1.6Lateral Earth + Earthquake Y	5.67	-75.50	26.21	94.87	

MAXIMUM SHEAR - N-S DIRECTION

Load	Bottom	Max	Shear	All	Rem
Comb	Dist	Shear	Stress	Stress	
	(ft)	(kips)	(psi)	(psi)	
1 - 1.4Dead	9.17	-207.84	43.30	94.87	
2 - 1.2Dead + 1.6Live	9.17	-269.22	56.09	94.87	
3 - 1.2Dead + 1.6Lateral Earth	9.17	-123.34	25.70	94.87	
4 - 1.2Dead + Live	9.17	-235.07	48.97	94.87	
5 - 1.2Dead + Live + Earthquake X	9.17	-235.46	49.05	94.87	
6 - 1.2Dead + Live + Earthquake Y	9.17	-236.05	49.18	94.87	
7 - 0.9Dead + 1.6Lateral Earth	2.83	80.56	16.78	94.87	
8 - 0.9Dead + 1.6Lateral Earth + Earthquake X	2.83	82.35	17.16	94.87	
9 - 0.9Dead + 1.6Lateral Earth + Earthquake Y	2.83	81.77	17.04	94.87	

Dimensional Solutions FOUNDATION3D		Version	5.8.2	Date	5/17/2012
Foundation Name	Combined Footing			Time	4:31:44 PM
Designed By:	FLSmith Salt Lake City	Engineer	CCK	Checker	
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrind Area Concrete\Flotation Foundations\Gridline H/H,3.2 & H,4 Retaining Wall.mcs				

DETAIL REPORT FOR Combined Footing

PIER/BASE PLATE DESIGN INFORMATION

	P1	P2
E-W Dim (ft)	2.00	2.00
N-S Dim (ft)	3.00	3.00
Height above grade (ft)	12.33	12.33
E-W Offset (ft)	7.00	-7.00
N-S Offset (ft)	0.00	0.00
Requested Reinf. Ratio	0.0100	0.0100
Provided Reinf. Ratio	0.0162	0.0162
Long Bar Size	9	9
Bars in E-W Dir	4	4
Bars in N-S Dir	5	5
Total Long Bars	14	14
Tie Bar Size	4	4
Total No. of Ties	10	11
Major Tie Spacing (in)	17	15

PIER ULTIMATE LOAD CAPACITIES

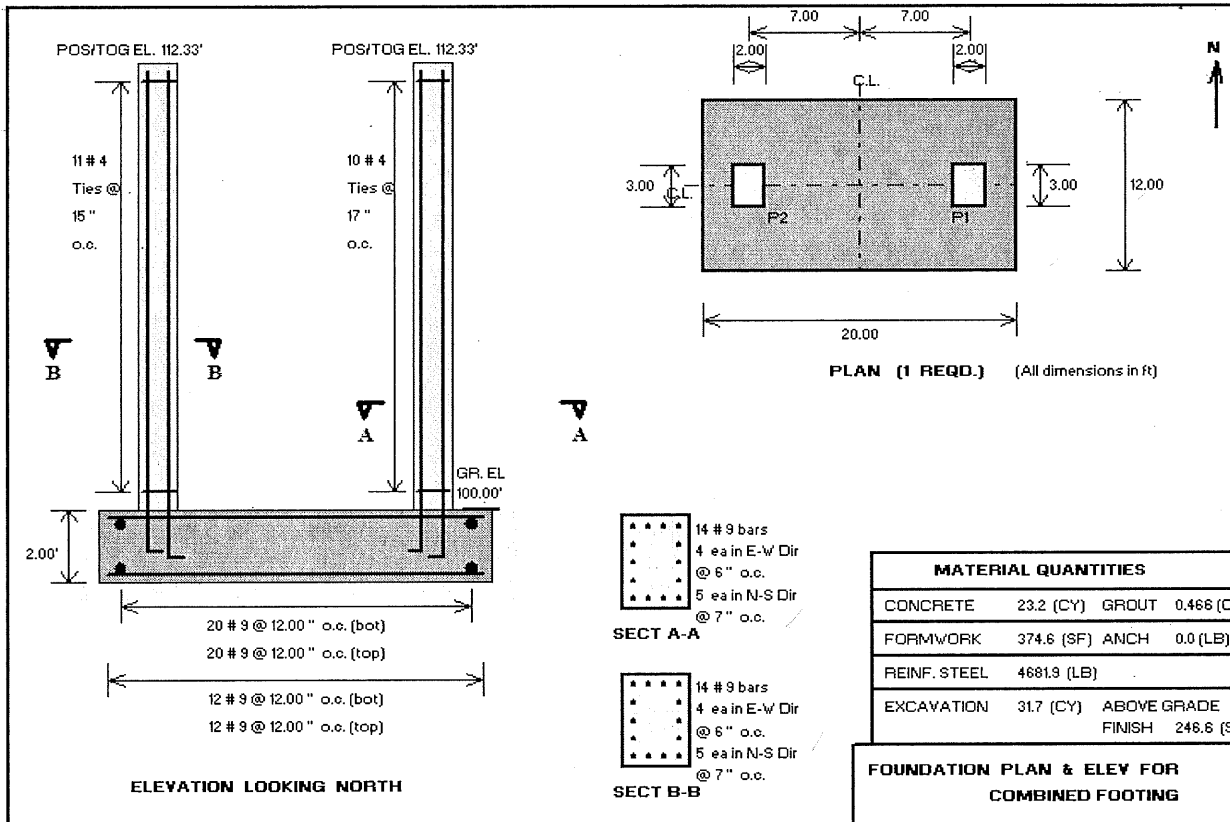
P1

Load Comb	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	Rem
1 - 1.4Dead	239.86	524.50	28.88	63.10	479.21	1047.28	
2 - 1.2Dead + 1.6Live	332.95	871.66	41.69	108.44	410.43	1069.08	
3 - 1.2Dead + 1.6Lateral Earth	205.59	370.39	24.42	44.00	543.73	979.66	
4 - 1.2Dead + Live	285.19	756.22	35.00	92.81	409.67	1086.35	
5 - 1.2Dead + Live + Earthquake X	288.46	781.42	35.45	94.96	404.73	1085.08	
6 - 1.2Dead + Live + Earthquake Y	289.62	776.76	35.61	94.30	409.34	1085.54	
7 - 0.9Dead + 1.6Lateral Earth	154.19	339.44	17.96	39.54	437.90	964.04	
8 - 0.9Dead + 1.6Lateral Earth + Earthquake X	157.46	353.02	18.36	41.19	433.08	971.05	
9 - 0.9Dead + 1.6Lateral Earth + Earthquake Y	158.62	351.69	18.51	41.06	437.60	970.35	

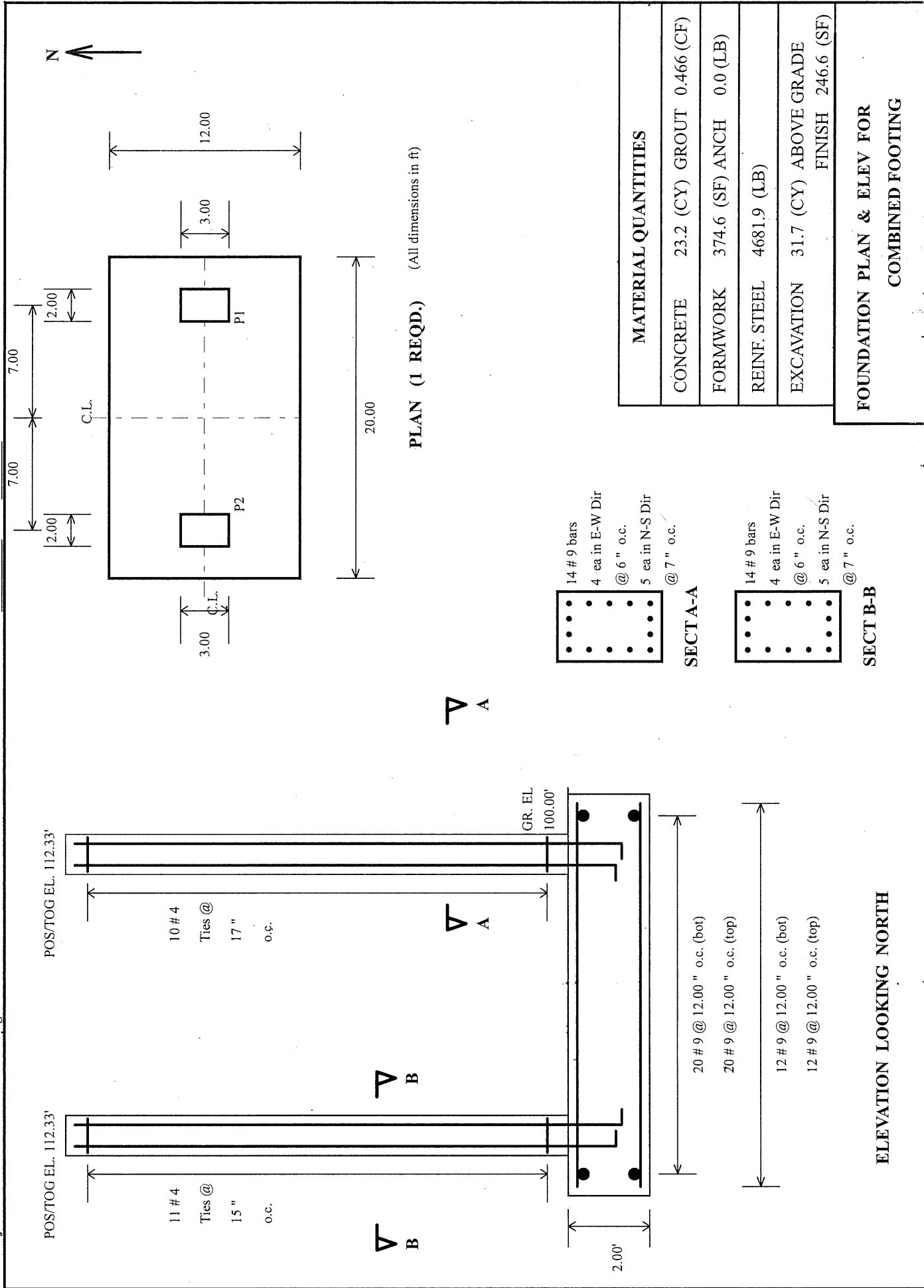
P2

Load Comb	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	Rem
1 - 1.4Dead	285.09	620.90	34.97	76.15	492.71	1072.80	
2 - 1.2Dead + 1.6Live	507.16	1132.13	68.56	153.03	435.67	970.65	
3 - 1.2Dead + 1.6Lateral Earth	244.36	1855.00	29.49	217.60	63.37	481.90	
4 - 1.2Dead + Live	408.61	983.14	52.85	127.18	429.41	1030.97	
5 - 1.2Dead + Live + Earthquake X	409.96	988.62	53.06	127.97	427.66	1029.04	
6 - 1.2Dead + Live + Earthquake Y	408.82	984.41	52.89	127.36	428.90	1030.53	
7 - 0.9Dead + 1.6Lateral Earth	183.27	1100.68	21.59	129.82	166.53	997.84	
8 - 0.9Dead + 1.6Lateral Earth + Earthquake X	184.62	1097.92	21.76	129.57	168.34	998.84	
9 - 0.9Dead + 1.6Lateral Earth + Earthquake Y	183.48	1099.18	21.62	129.66	167.04	998.41	

Dimensional Solutions FOUNDATION3D	Version 5.8.2	Date 5/17/2012
Foundation Name Combined Footing	Engineer CCK	Time 4:31:44 PM
Designed By: FLSmidth Salt Lake City	Checker	
P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-007 Regrid Area Concrete\		
Flotation Foundations\Gridline H\H,3.2 & H,4 Retaining Wall.mcs		
Filename:		

DETAIL REPORT FOR Combined Footing

Proj. No.: 11021 Engr: CCK Date: 5/17/2012 Date: 5/17/2012
 Checker:





PROJECT

CIV HIGH GRADE OVE

SUBJECT

REDIAD CYLINDER

FIELD PUMP PEDestal

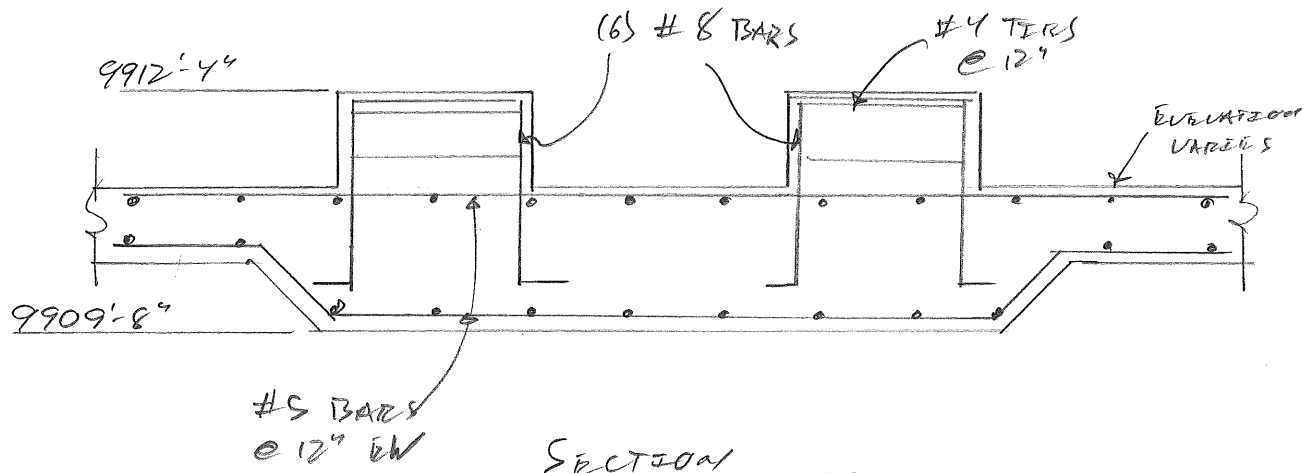
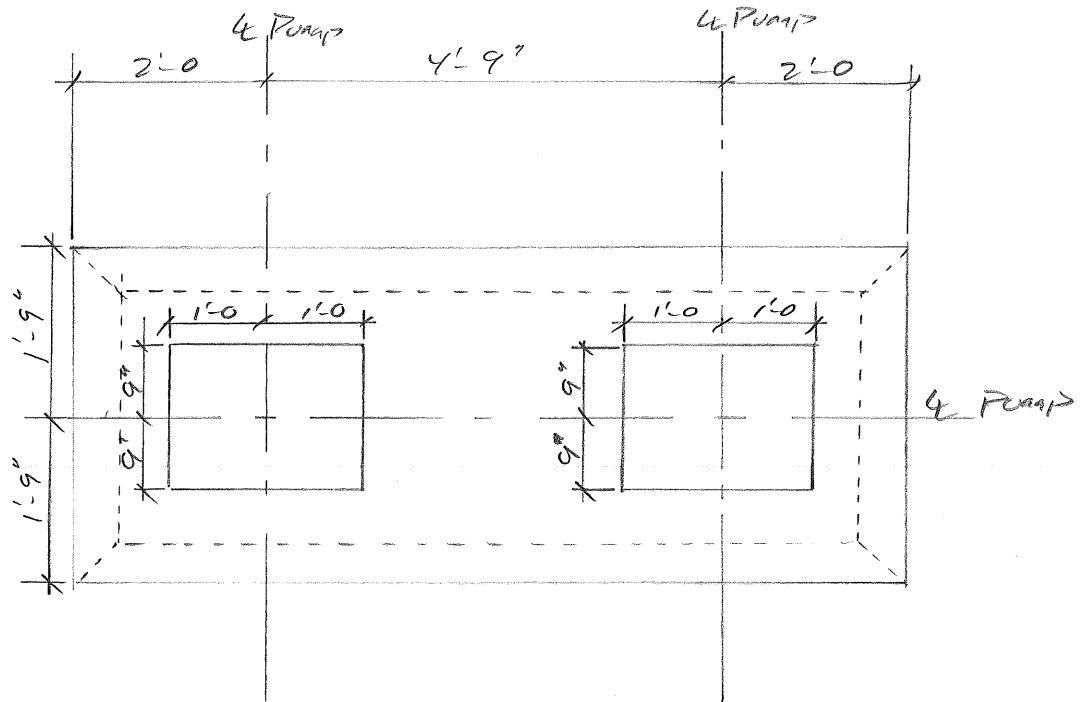
PROJ NO. 11021

CALC NO. C-007

BY ECS DATE 7-13-12

CHK DATE

SHEET OF REV



- 1) DIMENSIONS SHOWN * INCLUDE COMPRESSION OF WARMAN RUBBER JOINT RING.
- 2) DIMENSIONS SHOWN • ARE GIVEN WITH WARMAN RUBBER JOINT RING UNCOMPRESSED.
- 3) DIMENSIONS SHOWN [] ARE IN INCHES.
- 4) FOR ADDITIONAL PUMP DIMENSIONS, SEE OUTLINE DRAWING CSY5301.
- 5) BELT GUARD SHEAVE SIZES:
PUMP - 330 [13.0] DIA MAX.
MOTOR - 330 [13.0] DIA MAX.
SHEAVE WIDTH - 152 [6.0] MAX.
- 6) ALL MOUNTING BOLT TORQUES MUST BE VERIFIED BEFORE OPERATION AS FACTORY TORQUES CAN CHANGE DURING SHIPMENT.

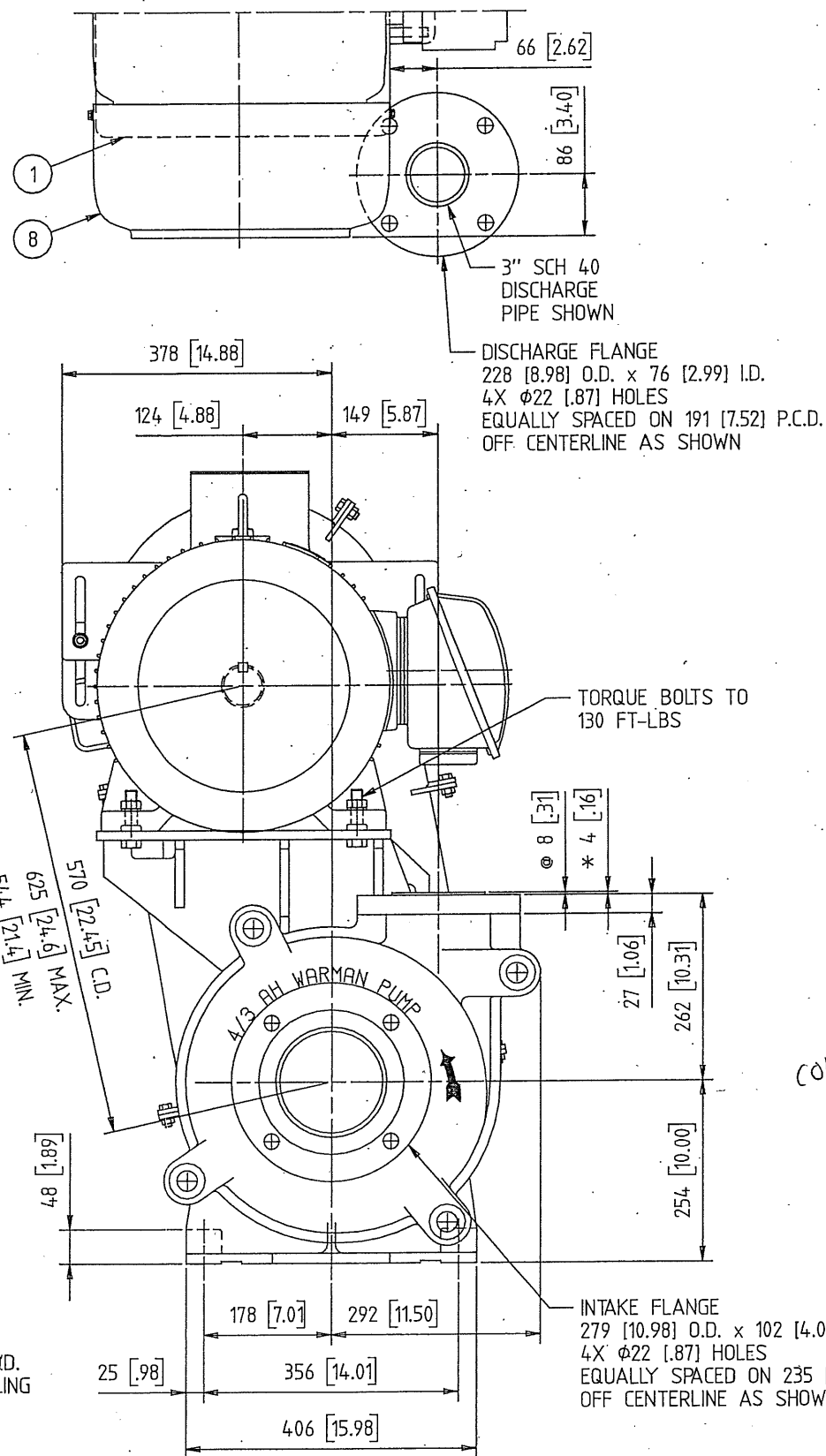
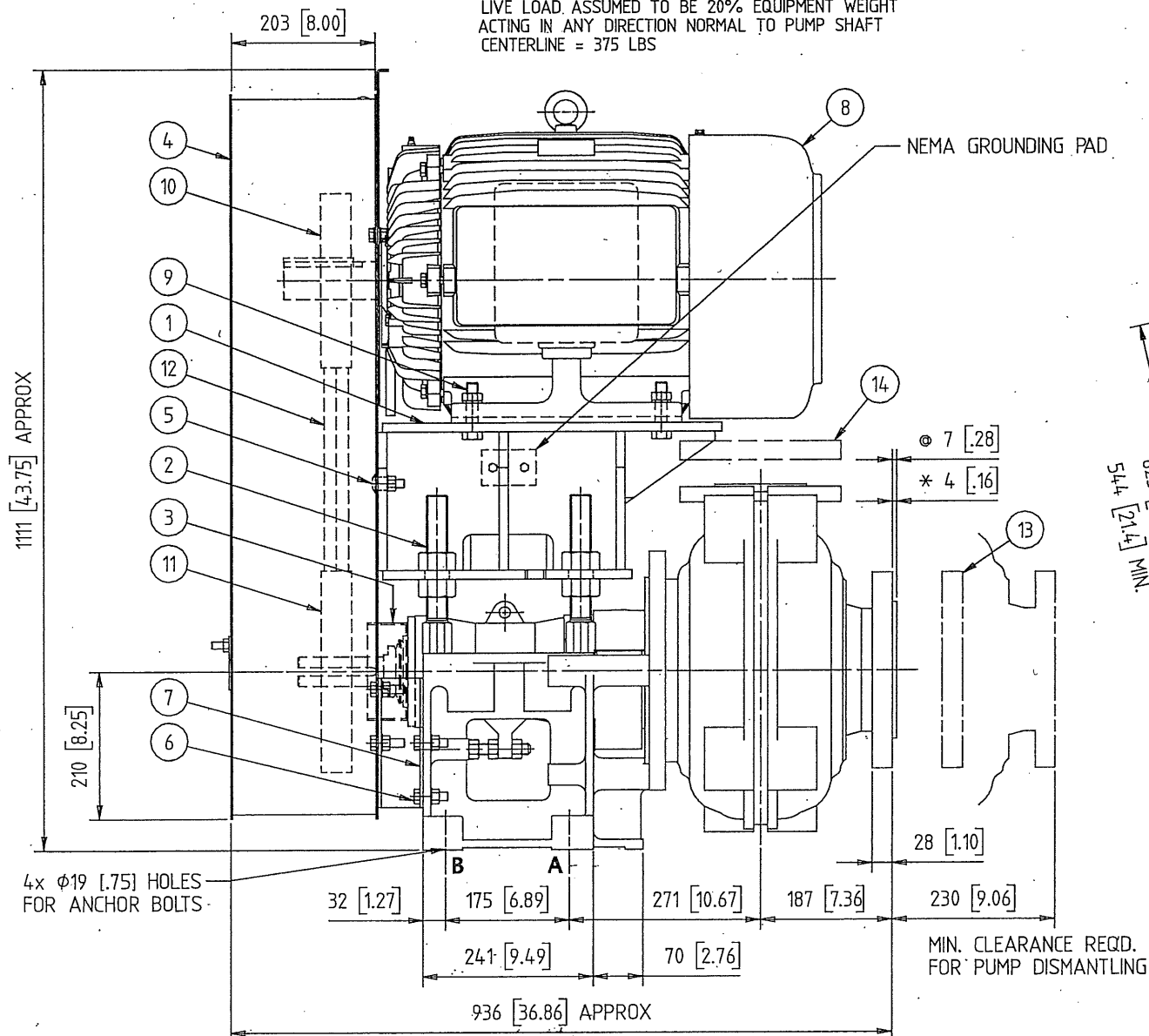
GLAND SEAL WATER REQUIRED
3-5 GPM @ 45 PSI *
(* OR 5 PSI GREATER THAN DISCHARGE PRESSURE)
.25" NPT GLAND SEAL CONNECTION
AT STUFFING BOX
FOR G.W.S. LOCATION REF. DWG. A3-370194
CLEAN SEAL FLUSH WATER WITH A RECOMMENDED
MAXIMUM 50 PPM SUSPENDED SOLIDS AND A MAXIMUM
SOLID PARTICLE SIZE OF 40 MICRONS. IF SUSPENDED
SOLIDS ARE SOFT IN NATURE, A MAXIMUM 200 PPM MAY
BE TOLERATED.

FOUNDATION BOLT LOADS AS A RESULT OF APPLYING
MAXIMUM ALLOWABLE FLANGE LOADS IN EITHER
TENSION OR COMPRESSION AS FOLLOWS:

'A' BOLTS = 2,125 LBF (EACH BOLT)
'B' BOLTS = 3,250 LBF (EACH BOLT)

SHEAR LOAD ACTING NORMAL TO SUCTION SIDE
OF PUMP = 2,875 LBF OVER (4) ANCHOR BOLTS

LIVE LOAD ASSUMED TO BE 20% EQUIPMENT WEIGHT
ACTING IN ANY DIRECTION NORMAL TO PUMP SHAFT
CENTERLINE = 375 LBS



No.	QTY.	DESCRIPTION	PART No.
1	1	MOTOR SUPPORT	ZOHG389580J
2	4	ADJUSTING BOLT	C066M389582E62
3	1	PUMP SHAFT GUARD	ZSG86779
4	1	BELTGUARD	ZBG84773
5	2	BELTGUARD SUPPORT HARDWARE	M12U1-40VU
6	8	BELTGUARD MOUNTING HARDWARE	M12H2-40VJ
7	2	BELTGUARD MOUNTING BRACKET	ZGB84778
8	1	MOTOR: 30 HP, 1800 RPM, 324T FRAME TECO, IEEE-841	ZMTT1379924-030
9	4	MOTOR HARDWARE	M16H1-70VJ
10	1	MOTOR SHEAVE	VW5V9.75X2
	1	MOTOR BUSHING	VWSK-2.125
11	1	PUMP SHEAVE	VW5V11.3X2
	1	PUMP BUSHING	VWSK-42MM
12	2	V-BELT	VW5VX780
13	1	COMPANION FLANGE - INTAKE	ZIF40MS
14	1	COMPANION FLANGE - DISCHARGE	ZDF40MS
TAG	1	TAG KIT - NOT SHOWN (REF. DWG. 389916)	ZTAGKITHORZGA

NOTE: STANDARD NEMA MOTOR SHOWN. ACTUAL
MOTOR MAY VARY IN SIZE AND SHAPE. BUYER
IS RESPONSIBLE TO ENSURE ADEQUATE DISCHARGE
PIPE CLEARANCE AROUND ANY OBSTRUCTIONS

WEIR MINERALS NORTH AMERICA MADISON, WISCONSIN	
☒ CERTIFIED FOR APPROVAL ONLY DRAWINGS MUST BE RETURNED WITHIN (2) WEEKS OF RECEIPT TO MAINTAIN CURRENT LEAD TIME	
☐ CERTIFIED FOR CONSTRUCTION CUSTOMER INITIATED CHANGES MAY AFFECT CURRENT LEAD TIME AND/OR RESULT IN ADDITIONAL CHARGES, INCLUDING BUT NOT LIMITED TO, ENGINEERING AND/OR MATERIAL RESTOCKING CHARGES.	
☐ FOR INFORMATION ONLY	
CUST. ORD. NO.	186662-000 0A
WSG. CO. NO.	1379924
DATE	FEB.24.2012 BY K. BREE

ANGLOGOLD -
CRIPPLE CREEK & VICTOR

S/N: MDS41719-M, MDS41720-M
EQ: 1210-647-003A, 1210-647-003B

APPLICATION: REGRIND CYCLONE FEED PUMPS

FLOW (GPM): 612.9	
HEAD (FT): 80	
EFF (%): 73.6	POWER (BHP): 19.5 S.G.: 1.16
PUMP CURVE RPM: 1530	V-DRIVE RPM: 1540

WEIGHT	
PUMP	520
MOTOR	664
MOTOR SUPPORT	121
ADJUSTING BOLTS	18
BELTGUARD	72
V-DRIVE	35
FLANGES	37
ESTIMATED WEIGHT	1467 LBS

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for any purpose other than the specific purpose for
which it has been provided, without the prior written
consent of the Company.

E				
D				
C				
B				
A	INITIAL RELEASE			
No.	DESCRIPTION	BY	DATE	CHK
	REVISIONS			

APP.	A.SCHMIT
CHECK	A.SCHMIT
DRN.	A.WIRTH
DATE	FEB.24.2012

PRODUCT :
WARMAN®
Centrifugal Slurry Pumps

DESIGN CENTRE OF ORIGIN :
MADISON

TITLE :
4/3 CAH, CV ARRANGEMENT, 'A' DISCHARGE
30 HP, 1800 RPM, 324T FRAME MOTOR
K043CJ001M9924



DRAWING No.

1379924-020

REV.

A