POGGEMEYER
DESIGN GROUP

STRUCTURAL CALCULATIONS

FOR:

TRRAC MEDICAL OFFICE COMPLEX

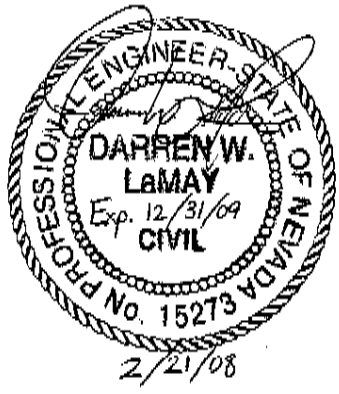
TRASH ENCLOSURE & MISC. SCREEN & RETAINING WALLS

CLARK COUNTY - NV

POGGEMEYER DESIGN GROUP, INC.
Las Vegas, Nevada

February 21, 2008

PDG JOB #06231-F



Poggemeyer Design Group, Inc. Consulting Engineers	Made By: DWL	Date: 2/20/2008	Job No.: 06231-F
	Checked by:	Date:	Sheet No.: 1
6900 Smoke Ranch Road, Ste 110, Las Vegas, NV 89128			
(702) 255-8100 Fax: (702) 255-8375	Description: **Design Criteria**		
Job Name: **TRRAC Medical Office Complex**			

Design Criteria

Code: 2006 International Building Code
Wind Design per ASCE/SEI 7-05 (Method 2)
90 mph Basic Wind Speed, Exposure C

Soils: Grisham Consulting Services, Inc.
Project No.: CS-01565
Date: January 3, 2002
Bearing Pressure = 1,500 psf with 1/3 increase allowed
Active pressure = 35 pcf
Passive pressure = 275 pcf
Friction coefficient = 0.25

Concrete: Sulfate Exposure: Severe (see Table 4.3.1 in 2006 IBC)
f'_c = 4,500 psi minimum 28-day strength
Maximum Water/Cement Ratio (by weight): 0.45
Type V cement

Rebar: ASTM A615
Grade 60 (f_y = 60,000 psi)

Steel: Square & Rect. Hollow Structural Sections (HSS): ASTM A500, Grade B (F_y = 46 ksi, F_u = 58 ksi)
Round Hollow Structural Sections (HSS): ASTM A500, Grade B (F_y = 42 ksi, F_u = 58 ksi)
Round Pipe for Chain Link Fences per ASTM F 1083-04
Plates: ASTM A36 (F_y = 36 ksi, F_u = 58 ksi)
Anchor Bolts: ASTM A307 (unless noted otherwise on plans)

Welds: Welding Process is Manual Shielded-Metal Arc
Dry E70 Electrodes (Allowable F_v = 21 ksi)

CMU: ***All CMU Wall Construction for this Project Requires Special Inspection***
Hollow CMU Grade "N" (per ASTM C90)
f'_m = 2,000 psi

Mortar: Type "S" (use Type "M" where masonry is in contact with soil)
f'_c = 2,000 psi minimum 28-day strength

Grout: f'_c = 2,000 psi minimum 28-day strength

POGGEMEYER DESIGN GROUP	Made By: DWL	Date: 2/14/2008	Job No.: 06231-F
Consulting Engineers	Checked by:	Date:	Sheet No.: 2
5960 Smoke Ranch Road, Suite 110, Las Vegas, NV 89128			
Ph: (702) 255-8100 Fax: (702) 255-8375	Description:	2006 IBC Wind Design	
Job Name: TRRAC Medical Office Complex		Covered CMU Wall Trash Enclosure	

Wind Design (ASCE 7-05)

Method 2 - Analytical Procedure (Section 6.5)

Basic Wind Speed, V =	90 mph	(Figure 6-1)
Wind Directionality Factor, K_d =	0.85	(Table 6-4)
Occupancy Category =	I	(Table 1-1)
Importance Factor, I =	0.87	(Table 6-1)
Exposure Category =	C	(Section 6.5.6.3)
Velocity Pressure Coefficient, K_z =	0.85 (0 to 15 ft)	(Table 6-3)
	0.90 (15.1 to 20 ft)	
	0.94 (20.1 to 25 ft)	
	0.98 (25.1 to 30 ft)	
Topographic Factor, K_{zt} =	1.0	(Section 6.5.7)
Gust Effect Factor, G =	0.85	(considered a rigid structure since its fundamental frequency is >= 1 Hz)

Velocity Pressure: $q_z = 0.00256(K_z)(K_{zt})(K_d)(V^2)(I)$ (Section 6.5.10)

0 to 15 ft:	q_z or q_h =	13.03 psf
15.1 to 20 ft:	q_z or q_h =	13.80 psf
20.1 to 25 ft:	q_z or q_h =	14.41 psf
25.1 to 30 ft:	q_z or q_h =	15.03 psf

Velocity Pressure, q =	q_z or q_h psf		(Section 6.5.12.2.1)
External Pressure Coefficient, C_p =	0.8 windward wall		(Figure 6-6)
External Pressure Coefficient, C_p =	-0.5 leeward wall		(Figure 6-6)
External Pressure Coefficient, C_p =	-1.3 windward roof		(Figure 6-6)
Internal Velocity Pressure, q_i =	q_h or q_z psf		(Section C6.5.12)
Enclosure Classification =	Partially Enclosed		(Figure 6-5 & Section 6.2)
	$A_o > 1.10A_{oi}$	⟹ True	
	A_o =	80.94 ft^2	
	A_{oi} =	51.80 ft^2	
	$1.10A_{oi}$ =	56.98 ft^2	
Internal Pressure Coef't, (GC_{pi}) =	0.55		(Figure 6-5)
Internal Pressure Coef't, (GC_{pi}) =	-0.55		(Figure 6-5)

Design Wind Pressure: $p = qGC_p - q_i(GC_{pi})$ (Section 6.5.12.2.1)

0 to 15 ft:	p =	**16.03 psf**	**windward wall**
0 to 15 ft:	p =	**-12.71 psf**	**leeward wall**
0 to 15 ft:	p =	**-21.57 psf**	**windward roof**

Note: Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.

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Wind Directionality Factor, K_d

Table 6-4

Structure Type	Directionality Factor K_d*
Buildings	
Main Wind Force Resisting System	(0.85)
Components and Cladding	0.85
Arched Roofs	0.85
Chimneys, Tanks, and Similar Structures	
Square	0.90
Hexagonal	0.95
Round	0.95
Solid Signs	0.85
Open Signs and Lattice Framework	0.85
Trussed Towers	
Triangular, square, rectangular	0.85
All other cross sections	0.95

*Directionality Factor K_d has been calibrated with combinations of loads specified in Section 2. This factor shall only be applied when used in conjunction with load combinations specified in 2.3 and 2.4.

loads exceed the specified allowable stresses for the materials of construction.

1.7 LOAD TESTS

A load test of any construction shall be conducted when required by the authority having jurisdiction whenever there is reason to question its safety for the intended occupancy or use.

1.8 CONSENSUS STANDARDS AND OTHER REFERENCED DOCUMENTS

This section lists the consensus standards and other documents which are adopted by reference within this chapter:

OSHA
Occupational Safety and Health Administration
200 Constitution Avenue, NW
Washington, DC 20210

29 CFR 1910.1200 Appendix A with Amendments as of February 1, 2000.
Section 1.2
OSHA Standards for General Industry, 29 CFR (Code of Federal Regulations) Part 1910.1200 Appendix A, United States Department of Labor, Occupational Safety and Health Administration, Washington DC, 2003.

TABLE 1-1 OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES FOR FLOOD, WIND, SNOW, EARTHQUAKE, AND ICE LOADS

Nature of Occupancy	Occupancy Category
Buildings and other structures that represent a low hazard to human life in the event of failure, including, but not limited to: • Agricultural facilities • Certain temporary facilities • Minor storage facilities	I
All buildings and other structures except those listed in Occupancy Categories I, III, and IV	II
Buildings and other structures that represent a substantial hazard to human life in the event of failure, including, but not limited to: • Buildings and other structures where more than 300 people congregate in one area • Buildings and other structures with daycare facilities with a capacity greater than 150 • Buildings and other structures with elementary school or secondary school facilities with a capacity greater than 250 • Buildings and other structures with a capacity greater than 500 for colleges or adult education facilities • Health care facilities with a capacity of 50 or more resident patients, but not having surgery or emergency treatment facilities • Jails and detention facilities Buildings and other structures, not included in Occupancy Category IV, with potential to cause a substantial economic impact and/or mass disruption of day-to-day civilian life in the event of failure, including, but not limited to: • Power generating stations[a] • Water treatment facilities • Sewage treatment facilities • Telecommunication centers Buildings and other structures not included in Occupancy Category IV (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, hazardous waste, or explosives) containing sufficient quantities of toxic or explosive substances to be dangerous to the public if released. Buildings and other structures containing toxic or explosive substances shall be eligible for classification as Occupancy Category II structures if it can be demonstrated to the satisfaction of the authority having jurisdiction by a hazard assessment as described in Section 1.5.2 that a release of the toxic or explosive substances does not pose a threat to the public.	III
Buildings and other structures designated as essential facilities, including, but not limited to: • Hospitals and other health care facilities having surgery or emergency treatment facilities • Fire, rescue, ambulance, and police stations and emergency vehicle garages • Designated earthquake, hurricane, or other emergency shelters • Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response • Power generating stations and other public utility facilities required in an emergency • Ancillary structures (including, but not limited to, communication towers, fuel storage tanks, cooling towers, electrical substation structures, fire water storage tanks or other structures housing or supporting water, or other fire-suppression material or equipment) required for operation of Occupancy Category IV structures during an emergency • Aviation control towers, air traffic control centers, and emergency aircraft hangars • Water storage facilities and pump structures required to maintain water pressure for fire suppression • Buildings and other structures having critical national defense functions Buildings and other structures (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, or hazardous waste) containing highly toxic substances where the quantity of the material exceeds a threshold quantity established by the authority having jurisdiction. Buildings and other structures containing highly toxic substances shall be eligible for classification as Occupancy Category II structures if it can be demonstrated to the satisfaction of the authority having jurisdiction by a hazard assessment as described in Section 1.5.2 that a release of the highly toxic substances does not pose a threat to the public. This reduced classification shall not be permitted if the buildings or other structures also function as essential facilities.	IV

[a] Cogeneration power plants that do not supply power on the national grid shall be designated Occupancy Category II

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Importance Factor, I (Wind Loads)

Table 6-1

Category	Non-Hurricane Prone Regions and Hurricane Prone Regions with V = 85-100 mph and Alaska	Hurricane Prone Regions with V > 100 mph
I	(0.87)	0.77
II	1.00	1.00
III	1.15	1.15
IV	1.15	1.15

Note:

1. The building and structure classification categories are listed in Table 1-1.

Velocity Pressure Exposure Coefficients, K_h and K_z

Table 6-3

Height above ground level, z		Exposure (Note 1)			
		B		C	D
ft	(m)	Case 1	Case 2	Cases 1 & 2	Cases 1 & 2
0-15	(0-4.6)	0.70	0.57	0.85	1.03
20	(6.1)	0.70	0.62	0.90	1.08
25	(7.6)	0.70	0.66	0.94	1.12
30	(9.1)	0.70	0.70	0.98	1.16
40	(12.2)	0.76	0.76	1.04	1.22
50	(15.2)	0.81	0.81	1.09	1.27
60	(18)	0.85	0.85	1.13	1.31
70	(21.3)	0.89	0.89	1.17	1.34
80	(24.4)	0.93	0.93	1.21	1.38
90	(27.4)	0.96	0.96	1.24	1.40
100	(30.5)	0.99	0.99	1.26	1.43
120	(36.6)	1.04	1.04	1.31	1.48
140	(42.7)	1.09	1.09	1.36	1.52
160	(48.8)	1.13	1.13	1.39	1.55
180	(54.9)	1.17	1.17	1.43	1.58
200	(61.0)	1.20	1.20	1.46	1.61
250	(76.2)	1.28	1.28	1.53	1.68
300	(91.4)	1.35	1.35	1.59	1.73
350	(106.7)	1.41	1.41	1.64	1.78
400	(121.9)	1.47	1.47	1.69	1.82
450	(137.2)	1.52	1.52	1.73	1.86
500	(152.4)	1.56	1.56	1.77	1.89

Notes:

1. **Case 1:** a. All components and cladding.
   b. Main wind force resisting system in low-rise buildings designed using Figure 6-10.

   Case 2: a. All main wind force resisting systems in buildings except those in low-rise buildings designed using Figure 6-10.
   b. All main wind force resisting systems in other structures.

2. The velocity pressure exposure coefficient K_z may be determined from the following formula:

   For 15 ft. $\leq z \leq z_g$ For $z < 15$ ft.

   $K_z = 2.01\ (z/z_g)^{2/\alpha}$ $K_z = 2.01\ (15/z_g)^{2/\alpha}$

   Note: z shall not be taken less than 30 feet for Case 1 in exposure B.

3. α and z_g are tabulated in Table 6-2.
4. Linear interpolation for intermediate values of height z is acceptable.
5. Exposure categories are defined in 6.5.6.

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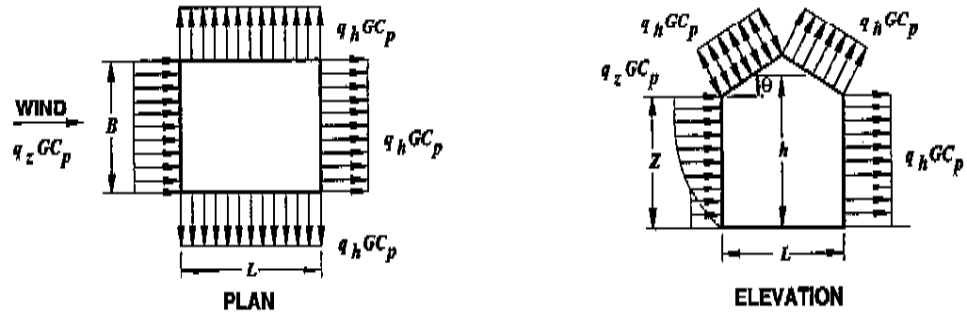
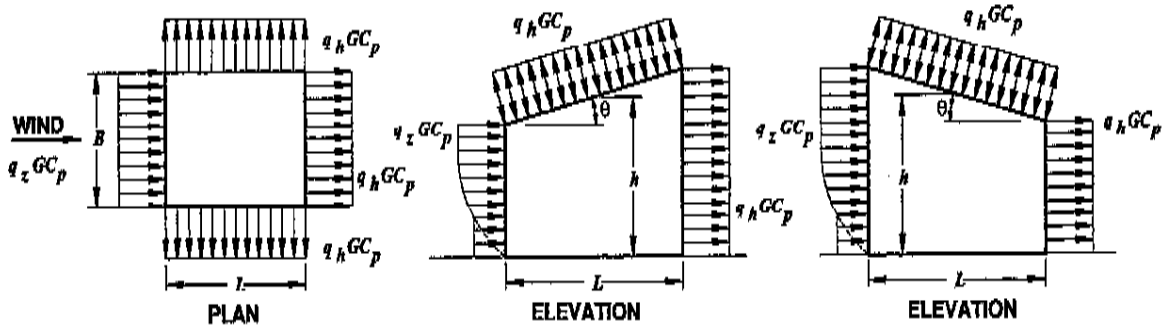
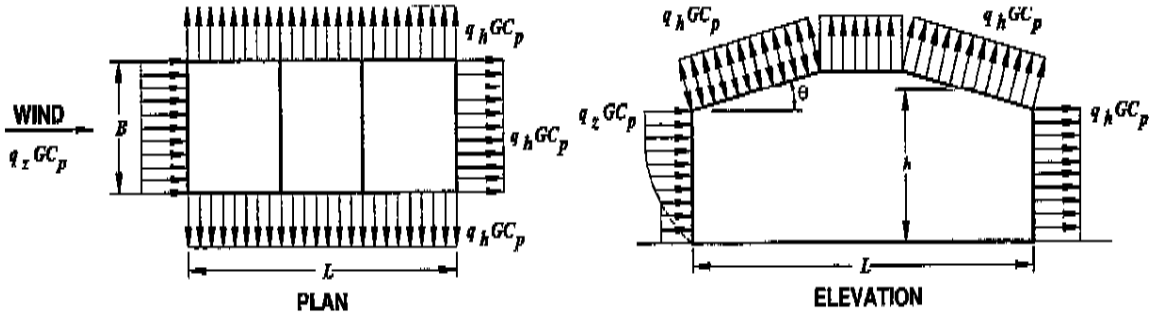
Main Wind Force Resisting System – Method 2		All Heights
Figure 6-6	External Pressure Coefficients, C_p	Walls & Roofs
Enclosed, Partially Enclosed Buildings		



GABLE, HIP ROOF



MONOSLOPE ROOF (NOTE 4)



MANSARD ROOF (NOTE 8)

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Main Wind Force Resisting System – Method 2		All Heights
Figure 6-6 (con't)	External Pressure Coefficients, C_p	**Walls & Roofs**
Enclosed, Partially Enclosed Buildings		

Wall Pressure Coefficients, C_p

Surface	L/B	C_p	Use With
Windward Wall	All values	(0.8)	q_z
Leeward Wall	0-1	(-0.5)	q_h
	2	-0.3	
	≥4	-0.2	
Side Wall	All values	-0.7	q_h

Roof Pressure Coefficients, C_p, for use with q_h

Wind Direction	h/L	Windward Angle, θ (degrees) 10	15	20	25	30	35	45	≥60#	Leeward Angle, θ (degrees) 10	15	≥20
Normal to ridge for θ ≥ 10°	≤0.25	-0.7 -0.18	-0.5 0.0*	-0.3 0.2	-0.2 0.3	-0.2 0.3	0.0* 0.4	0.4	0.01 θ	-0.3	-0.5	-0.6
	0.5	-0.9 -0.18	-0.7 -0.18	-0.4 0.0*	-0.3 0.2	-0.2 0.2	-0.2 0.3	0.0* 0.4	0.01 θ	-0.5	-0.5	-0.6
	≥1.0	-1.3** -0.18	-1.0 -0.18	-0.7 -0.18	-0.5 0.0*	-0.3 0.2	-0.2 0.2	0.0* 0.3	0.01 θ	-0.7	-0.6	-0.6

Normal to ridge for 0 < 10 and Parallel to ridge for all θ		Horiz distance from windward edge	C_p
	≤ 0.5	0 to h/2	-0.9, -0.18
		h/2 to h	-0.9, -0.18
		h to 2 h	-0.5, -0.18
		> 2h	-0.3, -0.18
	≥ 1.0	0 to h/2	(-1.3**), -0.18
		> h/2	-0.7, -0.18

*Value is provided for interpolation purposes.

**Value can be reduced linearly with area over which it is applicable as follows

Area (sq ft)	Reduction Factor
≤ 100 (9.3 sq m)	(1.0)
200 (23.2 sq m)	0.9
≥ 1000 (92.9 sq m)	0.8

Notes:

1. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
2. Linear interpolation is permitted for values of *L/B*, *h/L* and θ other than shown. Interpolation shall only be carried out between values of the same sign. Where no value of the same sign is given, assume 0.0 for interpolation purposes.
3. Where two values of C_p are listed, this indicates that the windward roof slope is subjected to either positive or negative pressures and the roof structure shall be designed for both conditions. Interpolation for intermediate ratios of h/L in this case shall only be carried out between C_p values of like sign.
4. For monoslope roofs, entire roof surface is either a windward or leeward surface.
5. For flexible buildings use appropriate G_f as determined by Section 6.5.8.
6. Refer to Figure 6-7 for domes and Figure 6-8 for arched roofs.
7. Notation:
   B: Horizontal dimension of building, in feet (meter), measured normal to wind direction.
   L: Horizontal dimension of building, in feet (meter), measured parallel to wind direction.
   h: Mean roof height in feet (meters), except that eave height shall be used for θ ≤ 10 degrees.
   z: Height above ground, in feet (meters).
   G: Gust effect factor.
   q_z,q_h: Velocity pressure, in pounds per square foot (N/m^2), evaluated at respective height.
   θ: Angle of plane of roof from horizontal, in degrees.
8. For mansard roofs, the top horizontal surface and leeward inclined surface shall be treated as leeward surfaces from the table.
9. Except for MWFRS's at the roof consisting of moment resisting frames, the total horizontal shear shall not be less than that determined by neglecting wind forces on roof surfaces.

#For roof slopes greater than 80°, use C_p = 0.8

L/B = 7.833/12 = 0.65 or 12/7.833 = 1.53

h/L = 7.917/12 = 0.66 or 7.917/7.833 = 1.01

θ = 3.991° Area = 84 ft^2 < 100

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Main Wind Force Res. Sys. / Comp and Clad. – Method 2		All Heights
Figure 6-5	Internal Pressure Coefficient, GC_{pi}	**Walls & Roofs**
Enclosed, Partially Enclosed, and Open Buildings		

Enclosure Classification	GC_{pi}
Open Buildings	0.00
Partially Enclosed Buildings	+0.55 -0.55
Enclosed Buildings	+0.18 -0.18

Notes:

1. Plus and minus signs signify pressures acting toward and away from the internal surfaces, respectively.
2. Values of GC_{pi} shall be used with q_z or q_h as specified in 6.5.12.
3. Two cases shall be considered to determine the critical load requirements for the appropriate condition:
   (i) a positive value of GC_{pi} applied to all internal surfaces
   (ii) a negative value of GC_{pi} applied to all internal surfaces

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Title : TRRAC Medical Office Complex
Job # : 06231-F Dsgnr: DWL
Description....
6'-2" Tall CMU Trash Enclosure Wall (wind)

Date: FEB 14,2008

This Wall in File: j:\06231 trrac med prof ofc bldg\structural

Retain Pro 2007 , 4-Sep-2007, (c) 1989-2007
www.retainpro.com/support for latest release
Registration # : RP-1163715 2007007

Cantilevered Retaining Wall Design

Code: IBC 03 & 06

Criteria

Retained Height	=	1.33 ft
Wall height above soil	=	6.17 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	17.0 psf

Vertical component of active lateral soil pressure options:
USED for Soil Pressure.
NOT USED for Sliding Resistance.
USED for Overturning Resistance.

Soil Data

Allow Soil Bearing	=	2,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	35.0 psf/ft
Toe Active Pressure	=	35.0 psf/ft
Passive Pressure	=	275.0 psf/ft
Soil Density, Heel	=	130.00 pcf
Soil Density, Toe		110.00 pcf
Footing||Soil Friction	=	0.250
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	1.17 ft
Heel Width	=	1.83
Total Footing Width	=	3.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

*Design Summary

Wall Stability Ratios

Overturning	=	3.49 OK
Sliding	=	3.95 OK
Total Bearing Load	=	1,331 lbs
...resultant ecc.	=	4.06 in
Soil Pressure @ Toe	=	744 psf OK
Soil Pressure @ Heel	=	144 psf OK
Allowable	=	2,000 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	873 psf
ACI Factored @ Heel	=	168 psf
Footing Shear @ Toe	=	5.2 psi OK
Footing Shear @ Heel	=	1.3 psi OK
Allowable	=	85.0 psi

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	160.7 lbs
less 100% Passive Force	= -	309.4 lbs
less 100% Friction Force	= -	325.3 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Load Factors

Building Code	IBC 03 & 0
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

Top Stem

Stem OK

Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Masonry
Thickness	=	8.00
Rebar Size	=	# 5
Rebar Spacing	=	32.00
Rebar Placed at	=	Center

Design Data

fb/FB + fa/Fa	=	0.674
Total Force @ Section	lbs =	131.6
Moment....Actual	ft-# =	476.1
Moment.....Allowable	=	706.9
Shear.....Actual	psi =	3.2
Shear.....Allowable	psi =	29.7
Wall Weight	=	78.0
Rebar Depth 'd'	in =	3.75
LAP SPLICE IF ABOVE	in =	26.83
LAP SPLICE IF BELOW	in =	
HOOK EMBED INTO FTG	in =	6.25

Masonry Data

f'm	psi =	2,000
Fs	psi =	24,000
Solid Grouting	=	Yes
Use Full Stresses	=	No
Modular Ratio 'n'	=	16.11
Short Term Factor	=	1.330
Equiv. Solid Thick.	in =	7.60
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	
Fy	psi =	

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Cantilevered Retaining Wall Design

Code: IBC 03 & 06

Footing Design Results

		Toe	Heel
Factored Pressure	=	873	168 psf
Mu' : Upward	=	683	242 ft-#
Mu' : Downward	=	229	401 ft-#
Mu: Design	=	454	159 ft-#
Actual 1-Way Shear	=	5.17	1.27 psi
Allow 1-Way Shear	=	85.00	85.00 psi
Toe Reinforcing	=	None Spec'd	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings
Toe: Not req'd, Mu < S * Fr
Heel: Not req'd, Mu < S * Fr
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

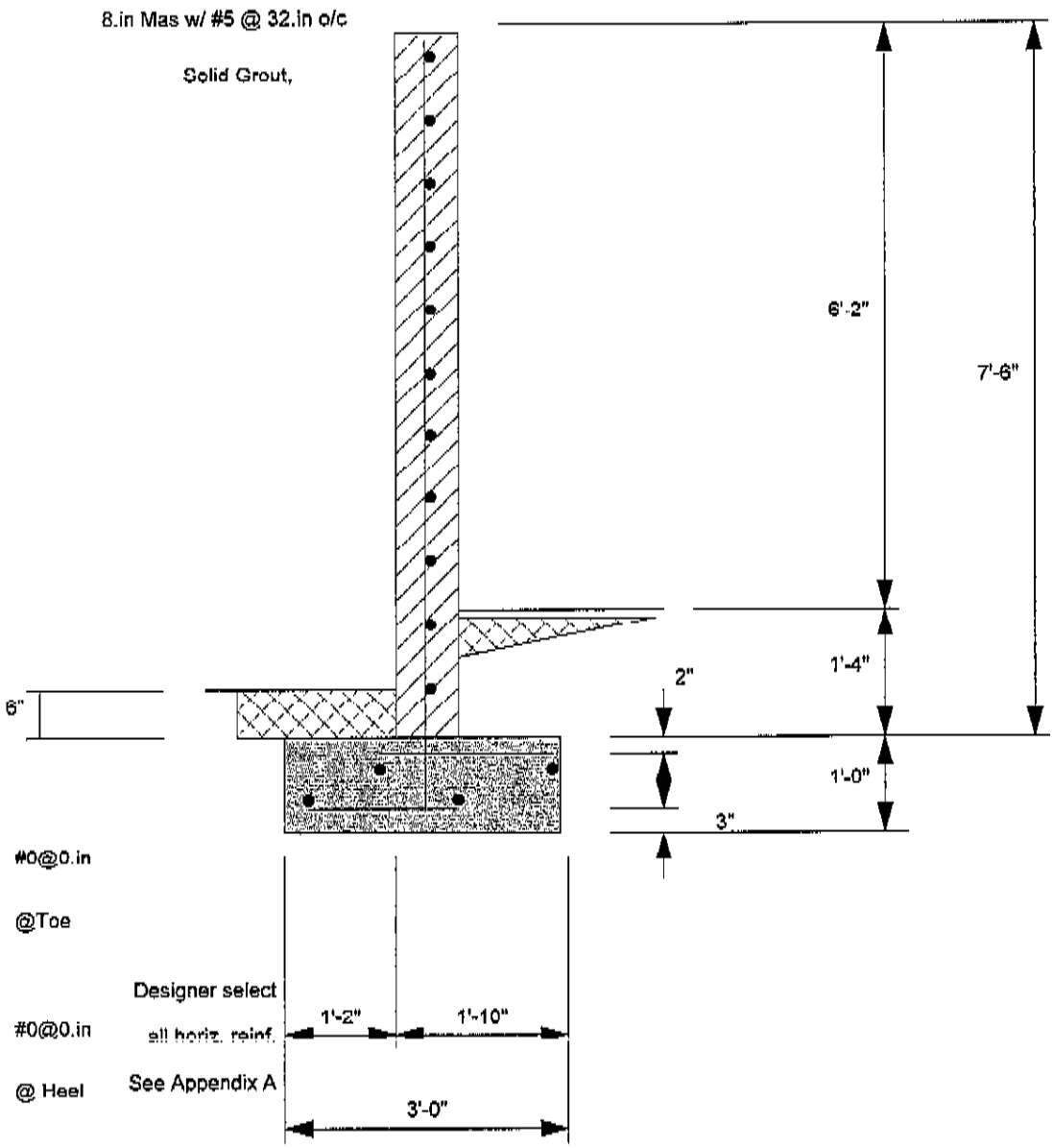
		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#			.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	95.3	0.78	74.1	Soil Over Heel	=	202.1	2.42	488.5
Toe Active Pressure	=	-39.4	0.50	-19.7	Sloped Soil Over Heel	=			
Surcharge Over Toe	=				Surcharge Over Heel	=			
Adjacent Footing Load	=				Adjacent Footing Load	=			
Added Lateral Load	=				Axial Dead Load on Stem	=		0.00	
Load @ Stem Above Soil	=	104.8	5.42	567.9	Soil Over Toe	=	64.2	0.58	37.5
					Surcharge Over Toe	=			
					Stem Weight(s)	=	585.0	1.50	877.7
					Earth @ Stem Transitions	=			
Total	=	160.7	O.T.M. =	622.2	Footing Weight	=	450.0	1.50	675.0
					Key Weight	=			
					Vert. Component	=	30.2	3.00	90.5
						Total =	1,331.5 lbs	R.M.=	2,169.1

Resisting/Overturning Ratio = 3.49

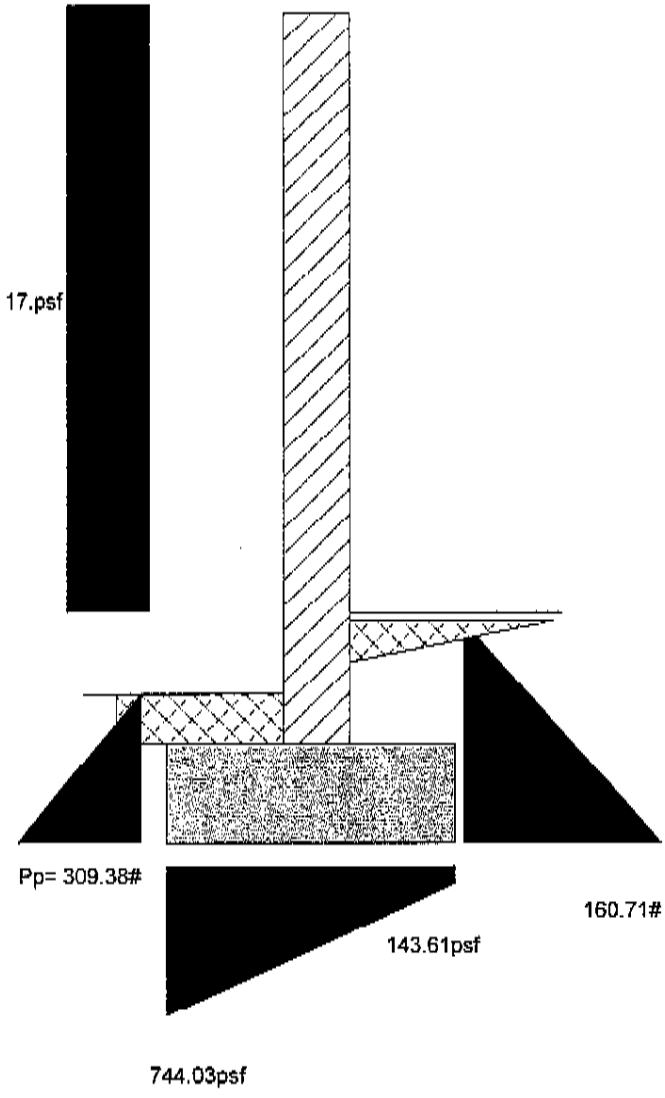
Vertical Loads used for Soil Pressure = 1,331.5 lbs

Vertical component of active pressure used for soil pressure

DESIGNER NOTES:


8.in Mas w/ #5 @ 32.in o/c
Solid Grout,
6'-2"
7'-6"
1'-4"
2"
6"
1'-0"
3"
#0@0.in
@Toe
Designer select
#0@0.in
all horiz. reinf.
@ Heel
See Appendix A
1'-2"
1'-10"
3'-0"

13



ENGINEERS PLANNERS SURVEYORS
POGGEMEYER DESIGN GROUP
[redacted] Las Vegas, Nevada 89128 (702) 255-8100

CLIENT
PROJECT TRRAC
WIND UPLIFT FOR TRASH ENCLOSURE
ENGINEER DWL JOB NO. 06231-F
DATE 14 FEB 2008 SHEET NO. 14

WIND UPLIFT LOAD:

METAL COVERING DEAD LOAD = 2 psf

ROOF WIND UPLIFT LOAD = 22 psf

$\therefore$ NET UPLIFT = 22 - 2 = 20 psf

CRITICAL CONNECTION DESIGN:

TRIBUTARY AREA = $\frac{11.67'}{2}\left(\frac{7.17'}{2}\right)$ = 20.9 ft²

$\therefore$ UPLIFT = 20(20.9) = 418 lbs < 2,265 lbs $\therefore$ O.K.

⇒ USE 5/8" DIA., A307, ALL-THREAD ROD EMBEDDED 7½". DRILL AND EPOXY USING SIMPSON SET OR HILTI HIT HY150 (SEE FOLLOWING TWO SHEETS)

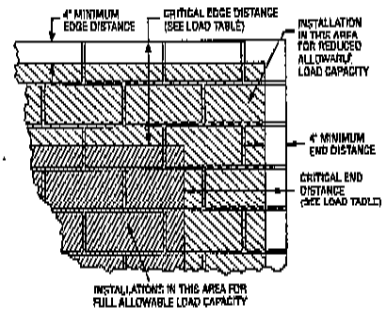
Tension and Shear Loads for Threaded Rod Anchors in 8-inch Lightweight, Medium-Weight and Normal-Weight Grout Filled CMU

*See page 7 for an explanation of the load table icons

Rod Dia. in. (mm)	Drill Bit Dia. in.	Min. Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical End Dist. in. (mm)	Critical Spacing Dist. in. (mm)	8-inch Grout Filled CMU Allowable Loads Based on CMU Strength			
						Tension		Shear	
						Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)
Anchor Installed Anywhere on the Face of the CMU Wall (See Figure 1)									
1/2 (12.7)	5/8	4 1/4 (108)	17 (432)	17 (432)	17 (432)	6,496 (28.9)	1,625 (7.2)	6,766 (30.1)	1,690 (7.5)
5/8 (15.9)	3/4	5 (127)	20 (508)	20 (508)	20 (508)	8,232 (36.6)	2,060 (9.2)	13,670 (60.8)	3,420 (15.2)
3/4 (19.1)	7/8	6 3/4 (171)	27 (686)	27 (686)	27 (686)	15,656 (69.6)	3,915 (17.4)	17,578 (78.2)	4,395 (19.5)

1. Threaded rods must comply with ASTM A 307 minimum.
2. Values for 8-inch wide CMU Grade N, Type II concrete masonry units conforming to UBC Standard 21-4 or ASTM C90. The masonry units, when grouted, must be fully grouted with grout complying with UBC Section 2103.4, or IBC Section 2103.12. Mortar is prepared in accordance with Section 2103.3 of the UBC and UBC Standard 21-15, or IBC Section 2103.8. The minimum specified compressive strength of masonry, f'm, at 28 days is 1,500 psi.
3. Embedment depth is measured from the outside face of the concrete masonry unit.
4. Allowable loads may be increased 33⅓% for short-term loading due to wind forces or seismic forces where permitted by code.
5. Refer to In-Service Temperature Sensitivity chart for allowable load adjustment for temperature.
6. The tabulated allowable loads are based on a safety factor of 4.0 for installations under the UBC. For installations under the IBC and IRC, use a safety factor of 5.0 (multiply the tabulated allowable loads by 0.80).
7. Refer to allowable load adjustment factors for end distance, edge distance and spacing on page 34.

Figure 1

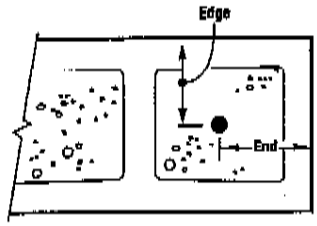


Shaded Area = Placement for Full and Reduced Allowable Load Capacity in Grout-Filled CMU

Tension and Shear Loads for Threaded Rod Anchors in 6 and 8-inch Lightweight, Medium-Weight and Normal-Weight Grout Filled CMU Anchor Installed in Cell Opening (Top of Wall) See Figure 3

Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	Min. Spacing Dist. in. (mm)	6 and 8-inch Grout Filled CMU Allowable Loads Based on CMU Strength			
						Tension		Shear	
						Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)
Allowable Tension and Shear Values EXCLUDING Earthquake Loads[1]									
5/8 (15.9)	3/4	5 (127)	3 (76)	3 1/2 (89)	20 (508)	12,579 (55.9)	3,140 (14.0)	9,530 (42.4)	2,380 (10.6)
3/4 (19.1)	7/8	5 (127)	3 (76)	3 1/2 (89)	20 (508)	•	3,140 (14.0)	•	2,380 (10.6)
7/8 (22.2)	1	12 (305)	2 (51)	3 7/8 (98)	48 (1,219)	8,908 (39.6)	2,225 (9.9)	•	•
Allowable Tension and Shear Values INCLUDING Earthquake Loads[2]									
5/8 (15.9)	3/4	5 (127)	3 (76)	3 1/2 (89)	20 (508)	6,500 (28.9)	1,625 (7.2)	6,780 (30.2)	1,695 (7.5)
3/4 (19.1)	7/8	5 (127)	3 (76)	3 1/2 (89)	20 (508)	•	1,625 (7.2)	•	1,695 (7.5)

Figure 3



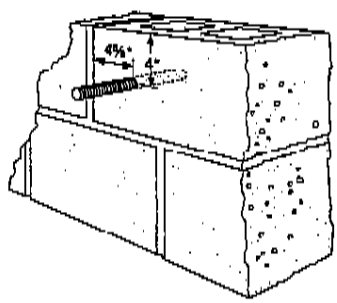
Anchor installed in cell opening (top of wall)

1. Allowable Tension and Shear Values EXCLUDING Earthquake Loads may not be increased for wind forces.
2. Allowable Tension and Shear Values INCLUDING Earthquake Loads may be increased 33⅓% for wind forces or seismic forces where permitted by code.
3. Also see notes 1-3 and 5-7 below.

Tension and Shear Loads for Threaded Rod Anchors in Lightweight, Medium-Weight and Normal-Weight Hollow CMU

Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	6 and 8-inch Hollow CMU Allowable Loads Based on CMU Strength			
					Tension		Shear	
					Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)
Anchor Installed in Face Shell w/ Simpson ETS (Carbon Steel) Screen Tube (See Figure 4)								
5/8 (15.9)	7/8	3 1/2 (88.9)	4 (101.6)	4 5/8 (117.5)	881 (3.9)	220 (1.0)	1,440 (6.4)	360 (1.6)
3/4 (19.1)	1	3 1/2 (88.9)	4 (101.6)	4 5/8 (117.5)	•	220 (1.0)	•	360 (1.6)

Figure 4



Anchor installed in face shell w/screen tube in hollow cell

1. Threaded rods must comply with ASTM A 307 minimum.
2. Values for 6 and 8-inch wide CMU Grade N, Type II concrete masonry units conforming to UBC Standard 21-4 or ASTM C90. The masonry units, when grouted, must be fully grouted with grout complying with UBC Section 2103.4, or IBC Section 2103.12. Mortar is prepared in accordance with Section 2103.3 of the UBC and UBC Standard 21-15, or IBC Section 2103.8. The minimum specified compressive strength of masonry, f'm, at 28 days is 1,500 psi.
3. Embedment depth is measured from the outside face of the concrete masonry unit for installations through a face shell.
4. Allowable loads may not be increased for short-term loading due to wind forces or seismic forces.
5. Refer to In-Service Temperature Sensitivity chart for allowable load adjustment for temperature.
6. The tabulated allowable loads are based on a safety factor of 4.0 for installations under the UBC. For installations under the IBC and IRC, use a safety factor of 5.0 (multiply the tabulated allowable loads by 0.80).
7. Anchors must be spaced a minimum distance of four times the anchor embedment.
8. Screen tubes not for use with SET1.7KT or SET1.7KTA.

4.2.5 HIT-ICE/HIT HY 150 Adhesive Anchor

16

INTO

HIT-ICE/HY 150 Allowable Loads for Threaded Rods in Grout-Filled Concrete Masonry Units (ASTM C 90 Block)[1, 2, 3, 4]

Anchor Diameter in.	(mm)	Embedment Depth in.	(mm)	Distance from Edge in.	(mm)	Tension[5] lb	(kN)	Shear lb (kN)[5] HAS-E		HAS Super		HAS SS	
3/8	(9.5)	3-1/2	(88.9)	4	(101.6)	1550	(6.9)	1360	(6.0)	2020	(9.0)	1875	(8.3)
				≥12	(304.8)								
1/2	(12.7)	4-1/4	(108)	4	(101.6)	1785	(7.9)	2020	(9.0)	2020	(9.0)	2020	(9.0)
				≥12	(304.8)			2420	(10.8)	4170	(18.5)	3335	(14.8)
5/8	(15.9)	5	(127)	4	(101.6)	2265	(10.1)	2020	(9.0)	2020	(9.0)	2020	(9.0)
				≥12	(304.8)			3780	(16.8)	5625	(25.0)	5215	(23.2)
3/4	(19.1)	6-5/8	(168.3)	4	(101.6)	3740	(16.6)	2020	(9.0)	2020	(9.0)	2020	(9.0)
				≥12	(304.8)			5445	(24.2)	5625	(25.0)	5625	(25.0)

HIT-ICE/HY 150 Ultimate Loads for Threaded Rods in Grout-Filled Concrete Masonry Units (ASTM C 90 Block)[1, 2, 3, 4]

Anchor Diameter in.	(mm)	Embedment Depth in.	(mm)	Distance from Edge in.	(mm)	Tension lb (kN)[5] HAS-E		HAS Super		HAS SS (304SS)		Shear lb (kN)[5] HAS-E		HAS Super		HAS SS	
3/8	(9.5)	3-1/2	(88.9)	4	(101.6)	6005	(26.7)	6200	(27.6)	6200	(27.6)	3605	(16.0)	6210	(27.6)	4970	(22.1)
				≥12	(304.8)												
1/2	(12.7)	4-1/4	(108)	4	(101.6)	7140	(31.8)	7140	(31.8)	7140	(31.8)	6405	(28.5)	8075	(35.9)	8075	(35.9)
				≥12	(304.8)									11040	(49.1)	8835	(39.3)
5/8	(15.9)	5	(127)	4	(101.6)	9060	(40.3)	9060	(40.3)	9060	(40.3)	8075	(35.9)	8075	(35.9)	8075	(35.9)
				≥12	(304.8)							10010	(44.2)	17260	(76.8)	13805	(61.4)
3/4	(19.1)	6-5/8	(168.3)	4	(101.6)	14970	(66.6)	14970	(66.6)	14970	(66.6)	8075	(44.2)	8075	(35.9)	8075	(35.9)
				≥12	(304.8)							14415	(64.1)	22500	(100.1)	16800	(75.2)

1 Values are for lightweight, medium weight or normal weight concrete masonry units conforming to ASTM C 90 with 2000 psi grout conforming to ASTM C 476.

2 Embedment depth is measured from the outside face of the concrete masonry unit.

3 Values are for anchors located in the grouted cell, head joint, bed joint, "T" joint, cross web or any combination of the above.

4 Values for edge distances between 4 inches and 12 inches can be calculated by linear interpolation.

5 Loads are based on the lesser of bond strength, steel strength or base material strength.

ENGINEERS PLANNERS SURVEYORS
POGGEMEYER DESIGN GROUP
[redacted] Las Vegas, Nevada 89128 (702) 255-8100

CLIENT
PROJECT TRRAC
TRASH ENCLOSURE GATE POST FDN
ENGINEER DWL JOB NO. 06231-F
DATE 14 FEB 2008 SHEET NO. 17

DESIGN STRUCTURAL GATE FRAME MEMBERS:

CANTILEVER FOR EACH GATE ≅ 5.33'
TOTAL GATE HEIGHT = 5'-8"
AREA OF EACH GATE = 31 ft²
PERIMETER GATE FRAME ≅ 5.5 #/lin. ft of tube
16ga. STEEL INFILL PANEL ≅ (5.67')(1')(0.00654')(490) ≅ 19 #/ft
CONC'D LL ON GATE = 250#

→ MOMENT FROM DL + LL:

DIST. DL ON EACH CANT'D HORIZ. GATE FRAME MEMBER:

$w = 5.5 + 19/2 = 15\ \#/ft = 1.25\ \#/in$

CONC'D DL AT END:

$P_{DL} = 5.5(5.67')/2 = 16\#$

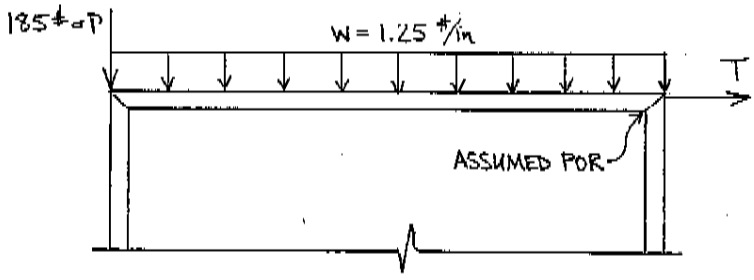
CONC'D LL AT END:

$P_{LL} = 250/2 = 125\#$

$M_{MAX} = \frac{wl^2}{2} + P_{DL}l + P_{LL}l = \frac{1.25(64)^2}{2} + 16(64) + 125(64) = 11,584\ lbs \cdot in$

→ $S_{REQ'D} = \frac{11,584}{0.6(46,000)} = 0.420\ in^3$ ∴ USE HSS 2 x 2 x ¼ ($S = 0.745\ in^3$) FOR PERIMETER GATE FRAME

DESIGN CRITICAL CORNER WELDS OF FRAME:



$\Sigma M = 185(64) + 1.25\left(\frac{64^2}{2}\right) - T(1.5) = 0$

→ $T = 9,600\ lbs$

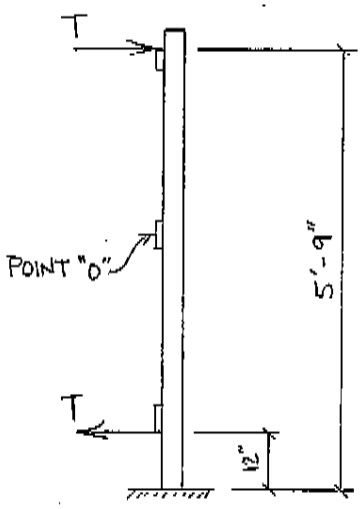
¼" GROOVE WELD (E70 ELECTRODE) IS GOOD FOR 930# (4)(4")
= 14,880 lbs > 9,600 lbs

∴ O.K. IF FULL-PEN. WELD

ENGINEERS PLANNERS SURVEYORS
POGGEMEYER DESIGN GROUP
[redacted] Las Vegas, Nevada 89128 (702) 255-8100

CLIENT
PROJECT
ENGINEER DWL JOB NO. 06231-F
DATE 15 FEB 2008 SHEET NO. 18

EMBEDDED HINGE POST DESIGN FOR GATES:



DETERMINE VALUE OF "T":

$$(\circlearrowleft+)\ \Sigma M_o = 185(64) + 1.25\left(\frac{64^2}{2}\right) - T(28.5") - T(28.5") = 0$$

$$\Rightarrow T = 253\#$$

DEMAND ON EMBEDDED POST:

$$M = 253(57") = 14{,}421 \text{ lbs} \cdot \text{in}$$

$$\Rightarrow S_{REQ'D} = \frac{14{,}421}{0.6(42{,}000)} = 0.572 \text{ in}^3$$

∴ USE THE FOLLOWING CONFIGURATION TO SATISFY THE COMPOSITE GATE HINGE ASSEMBLY TOLERANCES:
TUBE "A" IS A HSS 5.500 x 0.375 ($S = 6.84 \text{ in}^3$)
TUBES "B" & "C" ARE HSS 6.125 x 0.250 ($S = 6.12 \text{ in}^3$)

Poggemeyer Design Group, Inc.
6960 Smoke Ranch Road, Suite 110
Las Vegas, NV 89128

Title : TRRAC Medical Office Complex Job # 06231-F
Dsgnr: DWL Date: 11:37AM, 15 FEB 08
Description :

Scope :

19

Pole Embedment in Soil

Description Trash Enclosure Gate Post Foundation

General Information

Allow Passive	275.00 pcf	Applied Loads...	
Max Passive	1,000.00 psf	Point Load	485.00 lbs
Load duration factor	1.000	distance from base	5.750 ft
Pole is Circular			
Diameter	24.000 in	Distributed Load	0.00 #/ft
No Surface Restraint		distance to top	5.750 ft
		distance to bottom	0.000 ft

Summary

Moments @ Surface...

Point load	2,788.75 ft-#	Total Moment	2,788.75 ft-#
Distributed load	0.00	Total Lateral	485.00 lbs

Without Surface Restraint...

Required Depth	**4.000 ft**
Press @ 1/3 Embed...	
Actual	365.19 psf
Allowable	366.01 psf

POGGEMEYER DESIGN GROUP Consulting Engineers	Made By: DWL	Date: 2/20/2008	Job No.: 06231-F
	Checked by:	Date:	Sheet No.: 20
6960 Smoke Ranch Road, Suite 110, Las Vegas, NV 89128			
Ph: (702) 255-8100 Fax: (702) 255-8375	Description: 2006 IBC Wind Design		
Job Name: TRRAC Medical Office Complex	Continuous Freestanding Screen Walls		

Wind Design (ASCE 7-05)

Design Wind Loads on Solid Freestanding Walls and Solid Signs (Section 6.5.14)

Basic Wind Speed, V =	90 mph	(Figure 6-1)
Wind Directionality Factor, K_d =	0.85	(Table 6-4)
Occupancy Category =	II	(Table 1-1)
Importance Factor, I =	1.00	(Table 6-1)
Exposure Category =	B	(Section 6.5.6.3)
Velocity Pressure Coefficient, K_z =	0.70 (0 to 15 ft)	(Table 6-3)
	0.70 (15.1 to 20 ft)	
	0.70 (20.1 to 25 ft)	
	0.70 (25.1 to 30 ft)	
Topographic Factor, K_{zt} =	1.0	(Section 6.5.7)
Gust Effect Factor, G =	0.85	(considered a rigid structure since its fundamental frequency is >= 1 Hz)

Velocity Pressure: $q_h = 0.00256(K_z)(K_{zt})(K_d)(V^2)(I)$ (Section 6.5.10)

0 to 15 ft:	q_h =	12.34 psf
15.1 to 20 ft:	q_h =	12.34 psf

s = vertical dimension of the wall in feet
h = vertical height to top of the wall in feet
B = horizontal dimension of the wall in feet = 24
For freestanding CMU walls: s/h = 1

Net Force Coefficient, C_f =	1.43 Case A & B for 8'-0" < s <= 15'-8"	(Figure 6-20)
Net Force Coefficient, C_f =	1.38 Case A & B for s <= 8'-0"	(Figure 6-20)
	For continuous CMU screen walls with control joints at 24' o.c., the values shown for C_f are worst case conditions for Load Cases A & B.	
Net Force Coefficient, C_f =	2.60 Case C for 8'-0" <= s <= 12'-0"	(Figure 6-20)
Net Force Coefficient, C_f =	2.90 Case C for 6'-0" <= s < 8'-0"	(Figure 6-20)
Net Force Coefficient, C_f =	3.10 Case C for 4'-9" <= s < 6'-0"	(Figure 6-20)
Net Force Coefficient, C_f =	3.30 Case C for 4'-0" <= s < 4'-9"	(Figure 6-20)

For Case C where s/h > 0.8, C_f shall be multiplied by the following reduction factor: 0.8

POGGEMEYER DESIGN GROUP Consulting Engineers	Made By: DWL	Date: 2/20/2008	Job No.: 06231-F
	Checked by:	Date:	Sheet No.: 21
6960 Smoke Ranch Road, Suite 110, Las Vegas, NV 89128			
Ph: (702) 255-8100 Fax: (702) 255-8375	Description: 2006 IBC Wind Design		
Job Name: TRRAC Medical Office Complex	Continuous Freestanding Screen Walls		

Design Wind Force: $F = q_h G C_f A_s$ (Section 6.5.14)

Case A & B:	**0 to 15 ft:**	$F =$	**15.00 A_s psf**	**for 8'-0" < s <= 15'-8"**
Case A & B:	**15.1 to 20 ft:**	$F =$	**15.00 A_s psf**	**for 8'-0" < s <= 15'-8"**
Case A & B:		$F =$	**14.47 A_s psf**	**for s <= 8'-0"**
Case C:		$F =$	**21.81 A_s psf**	**for 8'-0" <= s <= 12'-0"**
Case C:		$F =$	**24.33 A_s psf**	**for 6'-0" <= s < 8'-0"**
Case C:		$F =$	**26.01 A_s psf**	**for 4'-9" <= s < 6'-0"**
Case C:		$F =$	**27.69 A_s psf**	**for 4'-0" <= s < 4'-9"**

Only Case A & B is required for screen walls over 12'-0" in height since B/s < 2 when control joints are spaced at 24' o.c.

ALLOW. SOIL BEARING W/ 15 INCHES OF EMBEDMENT = 1500 PSF

" " " W/ 30 " " " = 2,500 PSF

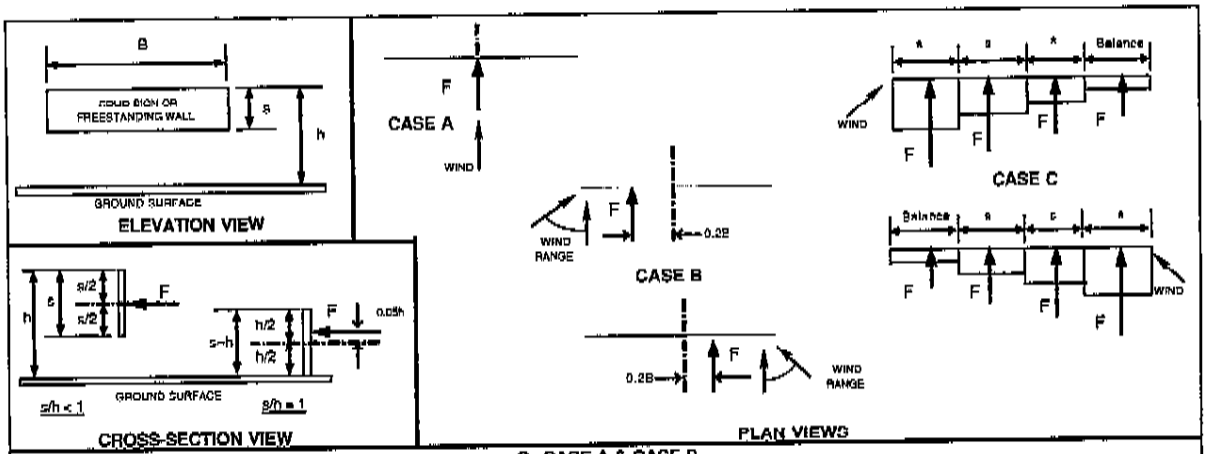
DESIGN MIN. FOOTING EMBEDMENT = 24 INCHES

$\therefore$ ALLOW. SOIL BEARING $= 1500 + \left(\frac{2500-1500}{30"-15"}\right)(24'-9")$

$= 2,100$ PSF

ALLOW. SOIL BEARING $= 1.33(2100) = 2,800$ PSF
FOR WIND OR SEISMIC

Other Structures – Method 2		All Heights
Figure 6-20	Force Coefficients, C_f	Solid Freestanding Walls & Solid Signs



C_f, CASE A & CASE B

Clearance Ratio, s/h	Aspect Ratio, B/s											
	≤ 0.05	0.1	0.2	0.5	1	2	4	5	10	20	30	≥ 45
1	1.80	1.70	1.65	1.55	1.45	1.40	1.35	1.35	1.30	1.30	1.30	1.30
0.9	1.85	1.75	1.70	1.60	1.55	1.50	1.45	1.45	1.40	1.40	1.40	1.40
0.7	1.90	1.85	1.75	1.70	1.65	1.60	1.60	1.55	1.55	1.55	1.55	1.55
0.5	1.95	1.85	1.80	1.75	1.75	1.70	1.70	1.70	1.70	1.70	1.70	1.75
0.3	1.95	1.90	1.85	1.80	1.80	1.80	1.80	1.80	1.80	1.85	1.85	1.85
0.2	1.95	1.90	1.85	1.80	1.80	1.80	1.80	1.80	1.85	1.90	1.90	1.95
≤ 0.10	1.95	1.90	1.85	1.85	1.80	1.80	1.85	1.85	1.85	1.90	1.90	1.95

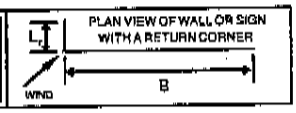
C_f, CASE C

Region (horizontal distance from windward edge)	Aspect Ratio, B/s								
	2	3	4	5	6	7	8	9	10
0 to s	2.25	2.60	2.90	3.10*	3.30*	3.40*	3.55*	3.65*	3.75*
s to 2s	1.50	1.70	1.90	2.00	2.15	2.25	2.30	2.35	2.45
2s to 3s		1.15	1.30	1.45	1.55	1.65	1.70	1.75	1.85
3s to 10s			1.10	1.05	1.05	1.05	1.05	1.00	0.95

Region (horizontal distance from windward edge)	Aspect Ratio, B/s	
	13	≥ 45
0 to s	4.00*	4.30*
s to 2s	2.60	2.55
2s to 3s	2.00	1.95
3s to 4s	1.50	1.85
4s to 5s	1.35	1.85
5s to 10s	0.90	1.10
>10s	0.55	0.55

*Values shall be multiplied by the following reduction factor when a return corner is present:

L_r/s	Reduction Factor
0.3	0.90
1.0	0.75
≥ 2	0.60



Notes:

1. The term "signs" in notes below also applies to "freestanding walls".
2. Signs with openings comprising less than 30% of the gross area are classified as solid signs. Force coefficients for solid signs with openings shall be permitted to be multiplied by the reduction factor $(1 - (1 - \varepsilon)^{1.5})$.
3. To allow for both normal and oblique wind directions, the following cases shall be considered:
   For s/h < 1:
   CASE A: resultant force acts normal to the face of the sign through the geometric center.
   CASE B: resultant force acts normal to the face of the sign at a distance from the geometric center toward the windward edge equal to 0.2 times the average width of the sign.
   For B/s ≥ 2, CASE C must also be considered:
   CASE C: resultant forces act normal to the face of the sign through the geometric centers of each region.
   For s/h = 1:
   The same cases as above except that the vertical locations of the resultant forces occur at a distance above the geometric center equal to 0.05 times the average height of the sign.
4. For CASE C where s/h > 0.8, force coefficients shall be multiplied by the reduction factor (1.8 - s/h).
5. Linear interpolation is permitted for values of s/h, B/s and L_r/s other than shown.
6. Notation:
   B: horizontal dimension of sign, in feet (meters);
   h: height of the sign, in feet (meters);
   s: vertical dimension of the sign, in feet (meters);
   ε: ratio of solid area to gross area;
   L_r: horizontal dimension of return corner, in feet (meters)

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : TRRAC MEDICAL
Job # : 06231C Dsgnr: MSZ
Description....
Screen Wall

Page: 23
Date: FEB 20,2008

This Wall in File: C:\Program Files\RP2007\RP2005\trrac me

Cantilevered Retaining Wall Design

Code: IBC 03 & 06

Criteria

Retained Height	=	1.00 ft
Wall height above soil	=	5.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	26.0 psf

Vertical component of active lateral soil pressure options:
NOT USED for Soil Pressure.
NOT USED for Sliding Resistance.
NOT USED for Overturning Resistance.

Soil Data

Allow Soil Bearing	=	2,800.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	35.0 psf/ft
Toe Active Pressure	=	35.0 psf/ft
Passive Pressure	=	270.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe		0.00 pcf
Footing||Soil Friction	=	0.250
Soil height to ignore for passive pressure	=	6.00 in

Footing Dimensions & Strengths

Toe Width	=	1.17 ft
Heel Width	=	1.83
Total Footing Width	=	3.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	1.58 ft

f'c = 4,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Earth Pressure Seismic Load

Design Kh	=	0.200 g
Kae for seismic earth pressure	=	0.418
Ka for static earth pressure	=	0.277
Difference: Kae - Ka	=	0.141
Added seismic base force		22.0 lbs

Using Mononobe-Okabe / Seed-Whitman procedure

Stem Weight Seismic Load

F_p / W_p Weight Multiplier	=	0.200 g	Added seismic base force 66.5 lbs

*Design Summary

Wall Stability Ratios

Overturning	=	1.92 OK
Sliding	=	3.51 OK
Total Bearing Load	=	1,046 lbs
...resultant ecc.	=	8.71 in
Soil Pressure @ Toe	=	901 psf OK
Soil Pressure @ Heel	=	0 psf OK
Allowable	=	2,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,081 psf
ACI Factored @ Heel	=	0 psf
Footing Shear @ Toe	=	5.2 psi OK
Footing Shear @ Heel	=	2.7 psi OK
Allowable	=	107.5 psi

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	216.5 lbs
less 100% Passive Force	= -	506.3 lbs
less 100% Friction Force	= -	261.6 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Load Factors

Building Code	IBC 03 & 0
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.300
Seismic, E	1.000

Stem Construction

		Top Stem	2nd
		Stem OK	Stem OK
Design Height Above Ftg	ft =	2.67	0.00
Wall Material Above "Ht"	=	Masonry	Masonry
Thickness	=	8.00	8.00
Rebar Size	=	# 4	# 4
Rebar Spacing	=	32.00	16.00
Rebar Placed at	=	Center	Center
Design Data			
fb/FB + fa/Fa	=	0.399	0.495
Total Force @ Section	lbs =	123.5	202.0
Moment....Actual	ft-# =	205.6	657.7
Moment.....Allowable	ft-# =	515.0	1,328.0
Shear.....Actual	psi =	2.1	3.4
Shear.....Allowable	psi =	38.7	51.5
Wall Weight	psf =	78.0	78.0
Rebar Depth 'd'	in =	3.75	3.75
LAP SPLICE IF ABOVE	in =	24.79	24.79
LAP SPLICE IF BELOW	in =	24.79	
HOOK EMBED INTO FTG	in =		6.00
Masonry Data			
f'm	psi =	1,500	1,500
Fs	psi =	24,000	24,000
Solid Grouting	=	Yes	Yes
Use Full Stresses	=	Yes	Yes
Modular Ratio 'n'	=	25.78	25.78
Short Term Factor	=	1.000	1.330
Equiv. Solid Thick.	in =	7.60	7.60
Masonry Block Type	=	Medium Weight	
Masonry Design Method	=	ASD	
Concrete Data			
f'c	psi =		
Fy	psi =		

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : TRRAC MEDICAL
Job # : 06231C Dsgnr: MSZ Date: FEB 20,2008
Description....
Screen Wall

This Wall in File: C:\Program Files\RP2007\RP2005\trrac me

Cantilevered Retaining Wall Design

Code: IBC 03 & 06

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,081	0 psf
Mu' : Upward	=	778	22 ft-#
Mu' : Downward	=	277	277 ft-#
Mu: Design	=	500	255 ft-#
Actual 1-Way Shear	=	5.19	2.70 psi
Allow 1-Way Shear	=	107.52	107.52 psi
Toe Reinforcing	=	# 4 @ 18.00 in	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings
Toe: Not req'd, Mu < S * Fr
Heel: Not req'd, Mu < S * Fr
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#			.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	70.0	0.67	46.7	Soil Over Heel	=	128.3	2.42	310.1
Toe Active Pressure	=	-70.0	0.67	-46.7	Sloped Soil Over Heel	=			
Surcharge Over Toe	=				Surcharge Over Heel	=			
Adjacent Footing Load	=				Adjacent Footing Load	=			
Added Lateral Load	=				Axial Dead Load on Stem	=		0.00	
Load @ Stem Above Soil	=	130.0	4.50	585.0	Soil Over Toe	=		0.58	
Seismic Earth Load	=	22.0	1.20	26.4	Surcharge Over Toe	=			
Seismic Stem Self Wt	=	66.5	4.00	265.8	Stem Weight(s)	=	468.0	1.50	702.2
					Earth @ Stem Transitions	=			
Total	=	218.5	O.T.M. =	877.3	Footing Weight	=	450.0	1.50	675.0
					Key Weight	=		1.58	
					Vert. Component	=			
					Total	=	1,046.3 lbs	R.M.=	1,687.2

Resisting/Overturning Ratio = **1.92**

Vertical Loads used for Soil Pressure = 1,046.3 lbs

Vertical component of active pressure NOT used for soil pressure

DESIGNER NOTES:

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : TRRAC MEDICAL
Job # : 06231C Dsgnr: MSZ
Description....
5'-6" High Wall

Page: 25
Date: FEB 20,2008

This Wall In File: C:\Program Files\RP2007\RP2005\trrac me

Cantilevered Retaining Wall Design

Code: IBC 03 & 06

Criteria

Retained Height	=	5.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Vertical component of active lateral soil pressure options:
NOT USED for Soil Pressure.
NOT USED for Sliding Resistance.
NOT USED for Overturning Resistance.

Soil Data

Allow Soil Bearing	=	2,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	35.0 psf/ft
Toe Active Pressure	=	35.0 psf/ft
Passive Pressure	=	270.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe		0.00 pcf
Footing||Soil Friction	=	0.250
Soil height to ignore for passive pressure	=	6.00 in

Footing Dimensions & Strengths

Toe Width	=	0.00 ft
Heel Width	=	3.25
Total Footing Width	=	3.25
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 4,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel	=	0.0 psf
NOT Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Design Kh = 0.200 g

Using Mononobe-Okabe / Seed Whitman procedure

Kae for seismic earth pressure	=	0.418
Ka for static earth pressure	=	0.277
Difference: Kae - Ka	=	0.141

Added seismic base force 198.3 lbs

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.200 g

Added seismic base force 60.9 lbs

*Design Summary

Wall Stability Ratios

Overturning	=	1.72 OK
Sliding	=	1.33 Ratio < 1.5!
Total Bearing Load	=	2,337 lbs
...resultant ecc.	=	11.48 in
Soil Pressure @ Toe	=	2,331 psf OK
Soil Pressure @ Heel	=	0 psf OK
Allowable	=	2,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	2,798 psf
ACI Factored @ Heel	=	0 psf
Footing Shear @ Toe	=	0.0 psi OK
Footing Shear @ Heel	=	8.1 psi OK
Allowable	=	107.5 psi

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	819.2 lbs
less 100% Passive Force	= -	506.3 lbs
less 100% Friction Force	= -	584.3 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	138.2 lbs NG

Load Factors

Building Code	IBC 03 & 0
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.300
Seismic, E	1.000

Stem Construction

		Top Stem	2nd
Design Height Above Ftg	ft =	Stem OK 2.67	Stem OK 0.00
Wall Material Above "Ht"	=	Masonry	Masonry
Thickness	=	8.00	8.00
Rebar Size	=	# 4	# 5
Rebar Spacing	=	16.00	16.00
Rebar Placed at	=	Edge	Edge
Design Data			
fb/FB + fa/Fa	=	0.113	0.463
Total Force @ Section	lbs =	156.2	618.6
Moment....Actual	ft-# =	159.9	1,303.9
Moment.....Allowable	ft-# =	1,420.5	2,814.2
Shear.....Actual	psi =	2.2	10.0
Shear.....Allowable	psi =	38.7	51.5
Wall Weight	psf =	78.0	78.0
Rebar Depth 'd'	in =	5.25	5.25
LAP SPLICE IF ABOVE	in =	26.09	40.77
LAP SPLICE IF BELOW	in =	26.09	
HOOK EMBED INTO FTG	in =		6.00
Masonry Data			
f'm	psi =	1,500	1,500
Fs	psi =	24,000	24,000
Solid Grouting	=	Yes	Yes
Use Full Stresses	=	Yes	Yes
Modular Ratio 'n'	=	25.78	25.78
Short Term Factor	=	1.000	1.330
Equiv. Solid Thick.	in =	7.60	7.60
Masonry Block Type	=	Medium Weight	
Masonry Design Method	=	ASD	
Concrete Data			
f'c	psi =		
Fy	psi =		

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : TRRAC MEDICAL
Job # : 06231C Dsgnr: MSZ
Description....
5'-6" High Wall

Date: FEB 20,2008

This Wall in File: C:\Program Files\RP2007\RP2005\trrac me

Cantilevered Retaining Wall Design

Code: IBC 03 & 06

Footing Design Results

		Toe	Heel
Factored Pressure	=	2,798	0 psf
Mu' : Upward	=	0	0 ft-#
Mu' : Downward	=	0	0 ft-#
Mu: Design	=	0	1,818 ft-#
Actual 1-Way Shear	=	0.00	8.07 psi
Allow 1-Way Shear	=	0.00	107.52 psi
Toe Reinforcing	=	# 5 @ 16.00 in	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings
Toe: Not req'd, Mu < S * Fr
Heel: Not req'd, Mu < S * Fr
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#			.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	630.0	2.00	1,260.0	Soil Over Heel	=	1,420.8	1.96	2,782.5
Toe Active Pressure	=	-70.0	0.67	-46.7	Sloped Soil Over Heel	=			
Surcharge Over Toe	=				Surcharge Over Heel	=			
Adjacent Footing Load	=				Adjacent Footing Load	=			
Added Lateral Load	=				Axial Dead Load on Stem	=		0.00	
Load @ Stem Above Soil	=				Soil Over Toe	=			
Seismic Earth Load	=	198.3	3.60	713.7	Surcharge Over Toe	=			
Seismic Stem Self Wt	=	60.9	3.75	228.4	Stem Weight(s)	=	429.0	0.33	143.0
					Earth @ Stem Transitions	=			
Total	=	819.2	O.T.M. =	2,155.5	Footing Weight	=	487.5	1.63	792.2
Resisting/Overturning Ratio			=	**1.72**	Key Weight	=			
					Vert. Component	=			
					Total	=	2,337.3 lbs	**R.M.=**	3,717.7

Vertical Loads used for Soil Pressure = 2,337.3 lbs

Vertical component of active pressure NOT used for soil pressure

DESIGNER NOTES:

* RESISTING/SLIDING RATIO OF 1.33 IS O.K. PER I.B.C. SECTION 1806.1, > 1.1

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : TRRAC MEDICAL
Job # : 06231C Dsgnr: MSZ
Description....
6'-0" High Wall

Page: 27
Date: FEB 20,2008

This Wall in File: C:\Program Files\RP2007\RP2005\trrac me

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Registration # : RP-1163715 2007007

Cantilevered Retaining Wall Design

Code: IBC 03 & 06

Criteria

Retained Height	=	5.50 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Vertical component of active lateral soil pressure options.
NOT USED for Soil Pressure.
NOT USED for Sliding Resistance.
NOT USED for Overturning Resistance.

Soil Data

Allow Soil Bearing	=	2,800.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	35.0 psf/ft
Toe Active Pressure	=	35.0 psf/ft
Passive Pressure	=	270.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe		0.00 pcf
Footing||Soil Friction	=	0.250
Soil height to ignore for passive pressure	=	6.00 in

Footing Dimensions & Strengths

Toe Width	=	0.00 ft
Heel Width	=	3.50
Total Footing Width	=	3.50
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Earth Pressure Seismic Load

Design Kh	=	0.200 g
Kae for seismic earth pressure	=	0.418
Ka for static earth pressure	=	0.277
Difference: Kae - Ka	=	0.141
Added seismic base force		232.7 lbs

Using Mononobe-Okabe / Seed-Whitman procedure

Stem Weight Seismic Load

F_p / W_p Weight Multiplier	=	0.200 g
Added seismic base force		66.5 lbs

*Design Summary

Wall Stability Ratios

Overturning	=	1.70 OK
Sliding	=	1.22 Ratio < 1.5!
Total Bearing Load	=	2,707 lbs
...resultant ecc.	=	12.50 in
Soil Pressure @ Toe	=	2,548 psf OK
Soil Pressure @ Heel	=	0 psf OK
Allowable	=	2,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	3,058 psf
ACI Factored @ Heel	=	0 psf
Footing Shear @ Toe	=	0.0 psi OK
Footing Shear @ Heel	=	9.1 psi OK
Allowable	=	76.0 psi

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	968.5 lbs
less 100% Passive Force	= -	506.3 lbs
less 100% Friction Force	= -	676.8 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	269.7 lbs NG

Load Factors

Building Code	IBC 03 & 0
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.300
Seismic, E	1.000

Stem Construction

		Top Stem	2nd
Design Height Above Ftg	ft =	Stem OK 2.67	Stem OK 0.00
Wall Material Above "Ht"	=	Masonry	Masonry
Thickness	=	8.00	8.00
Rebar Size	=	# 4	# 5
Rebar Spacing	=	16.00	16.00
Rebar Placed at	=	Edge	Edge
Design Data			
fb/FB + fa/Fa	=	0.142	0.609
Total Force @ Section	lbs =	221.1	744.9
Moment....Actual	ft-# =	268.5	1,713.8
Moment.....Allowable	ft-# =	1,889.2	2,814.2
Shear.....Actual	psi =	3.2	12.1
Shear.....Allowable	psi =	51.5	51.5
Wall Weight	psf =	78.0	78.0
Rebar Depth 'd'	in =	5.25	5.25
LAP SPLICE IF ABOVE	in =	26.09	40.77
LAP SPLICE IF BELOW	in =	26.09	
HOOK EMBED INTO FTG	in =		8.25
Masonry Data			
f'm	psi =	1,500	1,500
Fs	psi =	24,000	24,000
Solid Grouting	=	Yes	Yes
Use Full Stresses	=	Yes	Yes
Modular Ratio 'n'	=	25.78	25.78
Short Term Factor	=	1.330	1.330
Equiv. Solid Thick.	in =	7.60	7.60
Masonry Block Type	=	Medium Weight	
Masonry Design Method	=	ASD	
Concrete Data			
f'c	psi =		
Fy	psi =		

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : TRRAC MEDICAL
Job # : 06231C Dsgnr: MSZ
Description....
6'-0" High Wall

Date: FEB 20,2008

This Wall in File: C:\Program Files\RP2007\RP2005\trrac me

Cantilevered Retaining Wall Design

Code: IBC 03 & 06

Footing Design Results

		Toe	Heel
Factored Pressure	=	3,058	0 psf
Mu' : Upward	=	0	0 ft-#
Mu' : Downward	=	0	0 ft-#
Mu: Design	=	0	2,423 ft-#
Actual 1-Way Shear	=	0.00	9.10 psi
Allow 1-Way Shear	=	0.00	76.03 psi
Toe Reinforcing	=	# 5 @ 16.00 in	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings
Toe: Not req'd, Mu < S * Fr
Heel: #4@ 11.75 in, #5@ 18.25 in, #6@ 25.75 in, #7@ 35.25 in, #8@ 46.25 in, #9@ 4
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#			.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	739.4	2.17	1,602.0	Soil Over Heel	=	1,714.2	2.08	3,571.2
Toe Active Pressure	=	-70.0	0.67	-46.7	Sloped Soil Over Heel	=			
Surcharge Over Toe	=				Surcharge Over Heel	=			
Adjacent Footing Load	=				Adjacent Footing Load	=			
Added Lateral Load	=				Axial Dead Load on Stem	=		0.00	
Load @ Stem Above Soil	=				Soil Over Toe	=			
Seismic Earth Load	=	232.7	3.90	907.4	Surcharge Over Toe	=			
Seismic Stem Self Wt	=	66.5	4.00	265.8	Stem Weight(s)	=	468.0	0.33	156.0
					Earth @ Stem Transitions	=			
Total	=	968.5	O.T.M. =	2,728.6	Footing Weight	=	525.0	1.75	918.0
Resisting/Overturning Ratio			=	**1.70**	Key Weight	=			
					Vert. Component	=			
					Total	=	2,707.2 lbs	R.M.=	4,645.9

Vertical Loads used for Soil Pressure = 2,707.2 lbs

Vertical component of active pressure NOT used for soil pressure

DESIGNER NOTES:

* RESISTING/SLIDING OF 1.22 IS O.K. PER I.B.C. SECTION 1806.1, > 1.1

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : TRRAC MEDICAL
Job # : 06231C Dsgnr: MSZ
Description....
6-6" High Wall

Page: 29
Date: FEB 20,2008

This Wall in File: C:\Program Files\RP2007\RP2005\trrac me

Cantilevered Retaining Wall Design

Code: IBC 03 & 06

Criteria

Retained Height	=	6.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Vertical component of active lateral soil pressure options:
NOT USED for Soil Pressure.
NOT USED for Sliding Resistance.
NOT USED for Overturning Resistance.

Soil Data

Allow Soil Bearing	=	2,667.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	35.0 psf/ft
Toe Active Pressure	=	35.0 psf/ft
Passive Pressure	=	270.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe		0.00 pcf
Footing||Soil Friction	=	0.250
Soil height to ignore for passive pressure	=	6.00 in

Footing Dimensions & Strengths

Toe Width	=	0.00 ft
Heel Width	=	4.00
Total Footing Width	=	4.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 4,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Earth Pressure Seismic Load

Design Kh	=	0.200 g
Kae for seismic earth pressure	=	0.418
Ka for static earth pressure	=	0.277
Difference: Kae - Ka	=	0.141
Added seismic base force		269.8 lbs

Using Mononobe-Okabe / Seed Whitman procedure

Stem Weight Seismic Load

F_p / W_p Weight Multiplier	=	0.200 g
Added seismic base force		72.0 lbs

*Design Summary

Wall Stability Ratios

Overturning	=	1.92 OK
Sliding	=	1.18 Ratio < 1.5!
Total Bearing Load	=	3,307 lbs
...resultant ecc.	=	12.72 in
Soil Pressure @ Toe	=	2,345 psf OK
Soil Pressure @ Heel	=	0 psf OK
Allowable	=	2,667 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	2,814 psf
ACI Factored @ Heel	=	0 psf
Footing Shear @ Toe	=	0.0 psi OK
Footing Shear @ Heel	=	8.1 psi OK
Allowable	=	107.5 psi

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	1,129.3 lbs
less 100% Passive Force	= -	506.3 lbs
less 100% Friction Force	= -	826.8 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	361.0 lbs NG

Load Factors

Building Code	IBC 03 & 0
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.300
Seismic, E	1.000

Stem Construction

		Top Stem	2nd
Design Height Above Ftg	ft =	Stem OK 2.67	Stem OK 0.00
Wall Material Above "Ht"	=	Masonry	Masonry
Thickness	=	8.00	8.00
Rebar Size	=	# 4	# 5
Rebar Spacing	=	16.00	8.00
Rebar Placed at	=	Edge	Edge
fb/FB + fa/Fa	=	0.222	0.628
Total Force @ Section	lbs =	297.5	882.7
Moment....Actual	ft-# =	418.7	2,201.9
Moment.....Allowable	ft-# =	1,889.2	3,503.8
Shear.....Actual	psi =	4.5	15.1
Shear.....Allowable	psi =	51.5	51.5
Wall Weight	psf =	78.0	78.0
Rebar Depth 'd'	in =	5.25	5.25
LAP SPLICE IF ABOVE	in =	26.09	40.77
LAP SPLICE IF BELOW	in =	26.09	
HOOK EMBED INTO FTG	in =		6.00

Masonry Data

f'm	psi =	1,500	1,500
Fs	psi =	24,000	24,000
Solid Grouting	=	Yes	Yes
Use Full Stresses	=	Yes	Yes
Modular Ratio 'n'	=	25.78	25.78
Short Term Factor	=	1,330	1.330
Equiv. Solid Thick.	in =	7.60	7.60
Masonry Block Type	=	Medium Weight	
Masonry Design Method	=	ASD	

Concrete Data

f'c	psi =
Fy	psi =

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Title : TRRAC MEDICAL
Job # : 06231C Dsgnr: MSZ
Description....
6-6" High Wall

Date: FEB 20,2008

This Wall in File: C:\Program Files\RP2007\RP2005\trrac me

Cantilevered Retaining Wall Design

Code: IBC 03 & 06

Footing Design Results

		Toe	Heel
Factored Pressure	=	2,814	0 psf
Mu' : Upward	=	0	0 ft-#
Mu' : Downward	=	0	0 ft-#
Mu: Design	=	0	3,149 ft-#
Actual 1-Way Shear	=	0.00	8.12 psi
Allow 1-Way Shear	=	0.00	107.52 psi
Toe Reinforcing	=	# 5 @ 16.00 in	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings
Toe: Not req'd, Mu < S * Fr
Heel: Not req'd, Mu < S * Fr
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	857.5	2.33	2,000.8	Soil Over Heel	2,200.0	2.33	5,133.3
Toe Active Pressure	=	-70.0	0.67	-46.7	Sloped Soil Over Heel			
Surcharge Over Toe	=				Surcharge Over Heel			
Adjacent Footing Load	=				Adjacent Footing Load			
Added Lateral Load	=				Axial Dead Load on Stem		0.00	
Load @ Stem Above Soil	=				Soil Over Toe			
Seismic Earth Load	=	269.8	4.20	1,133.3	Surcharge Over Toe			
Seismic Stem Self Wt	=	72.0	4.25	306.0	Stem Weight(s)	507.0	0.33	169.0
					Earth @ Stem Transitions			
Total	=	1,129.3	O.T.M. =	3,393.5	Footing Weight	600.0	2.00	1,200.0
Resisting/Overturning Ratio			=	**1.92**	Key Weight			
					Vert. Component			
Vertical Loads used for Soil Pressure =		3,307.0 lbs			**Total** =	3,307.0 lbs	R.M.=	6,502.3

Vertical component of active pressure NOT used for soil pressure

DESIGNER NOTES:

* RESISTING/SLIDING OF 1.18 IS O.K. PER I.B.C. SECTION 1806.1 > 1.1