BOUYANCY CALCULATION

SUBJECT:	STORMTROOPER	DATE:	8/9/2002
RE: DRAWING :	SWST-30	BY:	PRS
PROJECT NAME:	Sample	CHK BY:	CNE
PROJECT NO. :	02-01780	SHEET:	1 OF 1

STRUCTURE GEOMETRY

INSIDE STRUCTURE LENGTH	(L)	.....	12.000	ft
INSIDE STRUCTURE WIDTH	(W)	.....	6.000	ft
INSIDE WALL HEIGHT	(H)	.....	7.000	ft
AVG WALL THICKNESS	(tw)	.....	6.000	in
TOP SLAB THICKNESS	(ts)	.....	6.000	in
BOTTOM THICKNESS	(tb)	.....	6.000	in
NUMBER OF BAFFLES	(Nb)	.....	1.000	ea
BAFFLE WALL THICKNESS	(twb)	.....	4.000	in
DEPTH TOP SLAB TO FINISH GRADE	(dt)	.....	1.000	ft
DEPTH WATER TABLE TO FINISH GRADE	(dw)	.....	4.000	ft
CONCRETE UNIT WEIGHT	(gc)	.....	150.000	lbs/cf
MISC ITEMS (PIPE, VALVES, FITTINGS)	(ms)	.....	0.000	lbs

SOIL PROPERTIES

SOIL UNIT WEIGHT - DRY	(gs)	.....	110.000	lbs/cf
SOIL UNIT WEIGHT - WET	(gsw)	.....	57.600	lbs/cf
SOIL INTERNAL ANGLE OF FRICTION	(phi)	.....	20.000	deg
SOIL PRESSURE ANGLE	(delta)	.....	13.333	deg
SOIL COHESION	(c)	.....	0.000	lbs/sf
WATER UNIT WEIGHT	(gw)	.....	62.400	lbs/cf

CALCULATIONS

WEIGHT OF SOIL OVERBURDEN

for dw<dt: Fo=(gsw*(dt-dw)*(L+2*tw/12)*(W+2*tw/12))+(gs*dw*(L+2*tw/12)*(W+2*tw/12))

for dw>dt: Fo=gs*dt*(L+2*tw/12)*(W+2*tw/12) (Fo) ..... 10,010 lbs

WEIGHT OF STRUCTURE

TOP SLAB	(L+2*tw/12)*(W+2*tw/12)*ts*gc	.....	=	6,825.00	lbs
BOTTOM SLAB	(L+2*tw/12)*(W+2*tw/12)*tb*gc	.....	=	6,825.00	lbs
WALLS	((L+2*tw/12)*2+(W*2))*tw*H*gc	.....	=	19,950.00	lbs
BAFFLE WALLS	(W*H*Nb*twb)*gc	.....	=	2,100.00	lbs
MISC ITEMS (PIPE, VALVES, FITTINGS)		.....	=	0.00	lbs
TOTAL STRUCTURE WEIGHT	(Fs)	.....	=	35,700.00	lbs

SOIL RESISTANCE

Fp = (Pp*tan(delta) + c*Df)*p (Fp) ..... = 37,274.64 lbs

where:

Df = H+ts+tb+dt ..... 9.00 ft

p = (L+2*tw/12)*2+(W+2*tw/12)*2 ..... 40.00 ft

Pp=[1/2*(gs-gw)*(Df^2)*tan^2(45+phi/2)] ..... 3932 lbs/ft

c=cohesion

BOUYANCY FORCE

Fb=(L+2*tw/12)*(W+2*tw/12)*(H+ts+tb+dt-dw)*gw (Fb) ..... = 28,392.00 lbs

SAFETY FACTOR

SF=(Fs + Fo + Fp) / Fb (SF) ..... = **2.92** *is O.K.*

DESIGN CRITERIA

1. Structural reinforced in accordance with the "Building Code Requirements for Reinforced Concrete" American Concrete Institute (ACI 318-89 Revised 1992
2. Vehicle Load: AASHTO H-20-44 Wheel Load Per AASHTO Std Specifications for Highway Bridges AASHTO 14th Ed 1989. Use a 30% impact factor
3. Maximum soil cover including pavement shall be assumed to be 3'.
4. Concrete Compressive Strength shall be minimum 4,500 psi @ 28 days.
5. Reinforcing steel: ASTM A615, Grade 60.
6. Groundwater condition shall be assumed to be 3' below grade.
7. Total soil density is assumed as 130 pcf.

Engineer's Seal

REFERENCES:

1) FOUNDATION DESIGN & ANALYSIS , BOWLES @ 1983

2) FOUNDATION ENGINEERING HANDBOOK, WINTERKORN & FANG, @ 1975

3) ACI 318-89, AASHTO 14th ed 1989

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