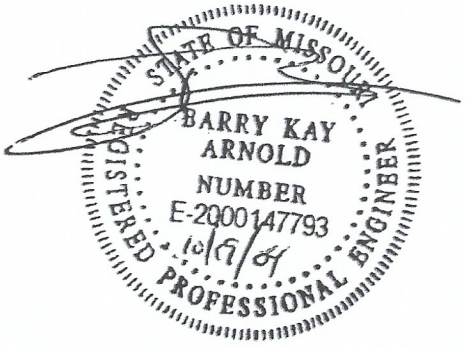
STRUCTURAL CALCULATIONS

FOR

Boman and Kemp Window Well

56" x 36" x 6'0"
Soil Pressure
45 psf/ft



Prepared by

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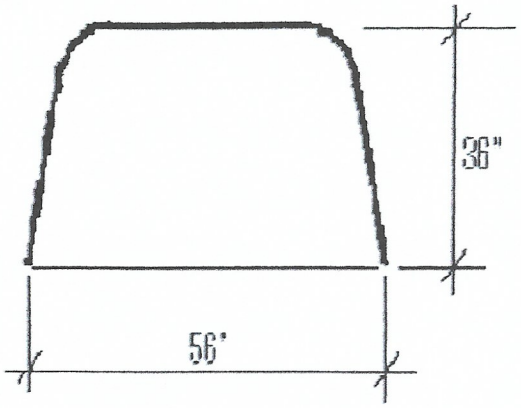
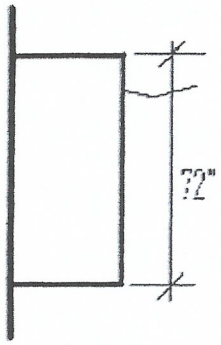
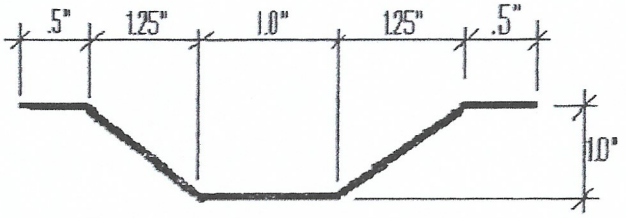
WINDOW WELL 56" x 36" x 6'-0"



Window Well Section



Window Well Section



Partial Section At Straight Elements

Section Properties	12 " width
thickness	$t_s := .043$
mom of inertia	$I_s := .088$
radius of gyr	$r := .384$
area	$a_s := .5965$
section mod	$s_s := .176$

Partial Section at Curved Elements

Section Properties	12 " width
thickness	$t_c := .043$
mom of inertia	$I_c := .0747$
radius of gyr	$r_c := .346$
area	$a_c := .625$
section mod	$s_c := .1436$

Material Properties

ASTM A572

$F_y := 42$ ksi

Stress Analysis for Soil Load of 45 psf/ft (Maximum Soil Load 270 psf)

Section forces from finite element analysis

Maximum forces in straight section $M_{z2} := 0.141$ k-ft $Ax2 := 0.60$ k

$f_{b2} := \frac{M_{z2} \cdot 12}{s_s}$ $f_{b2} = 9.614$ $F_b := .667 \cdot F_y$ $F_b = 28.014$

let $kl := 1.0 \cdot 24$ length between inflection points

$\frac{kl}{r} = 62.5$ $c_c := \sqrt{2 \cdot \pi^2 \cdot \frac{29000}{42}}$ $c_c = 116.745$ $\frac{\frac{kl}{r}}{c_c} = 0.535$

$Fa := .384 \cdot 42$ $Fa = 16.128$ $f_a := \frac{Ax2}{a_s}$ $f_a = 1.006$

Combined stresses $csr := \frac{f_a}{Fa} + \frac{f_{b2}}{F_b}$ $csr = 0.406$

Maximum soil load capacity Straight section $Maxso2 := \frac{1.0}{csr} \cdot 270$ $Maxso2 = 665.778$

Check Curved Segment

Section forces from finite element analysis with snow load of 100psf

Maximum forces in segment M23 $M_{zc2} := .077$ $A_{xc2} := 0.69$

$f_{ac} := \frac{A_{xc2}}{a_c}$ $f_{ac} = 1.104$

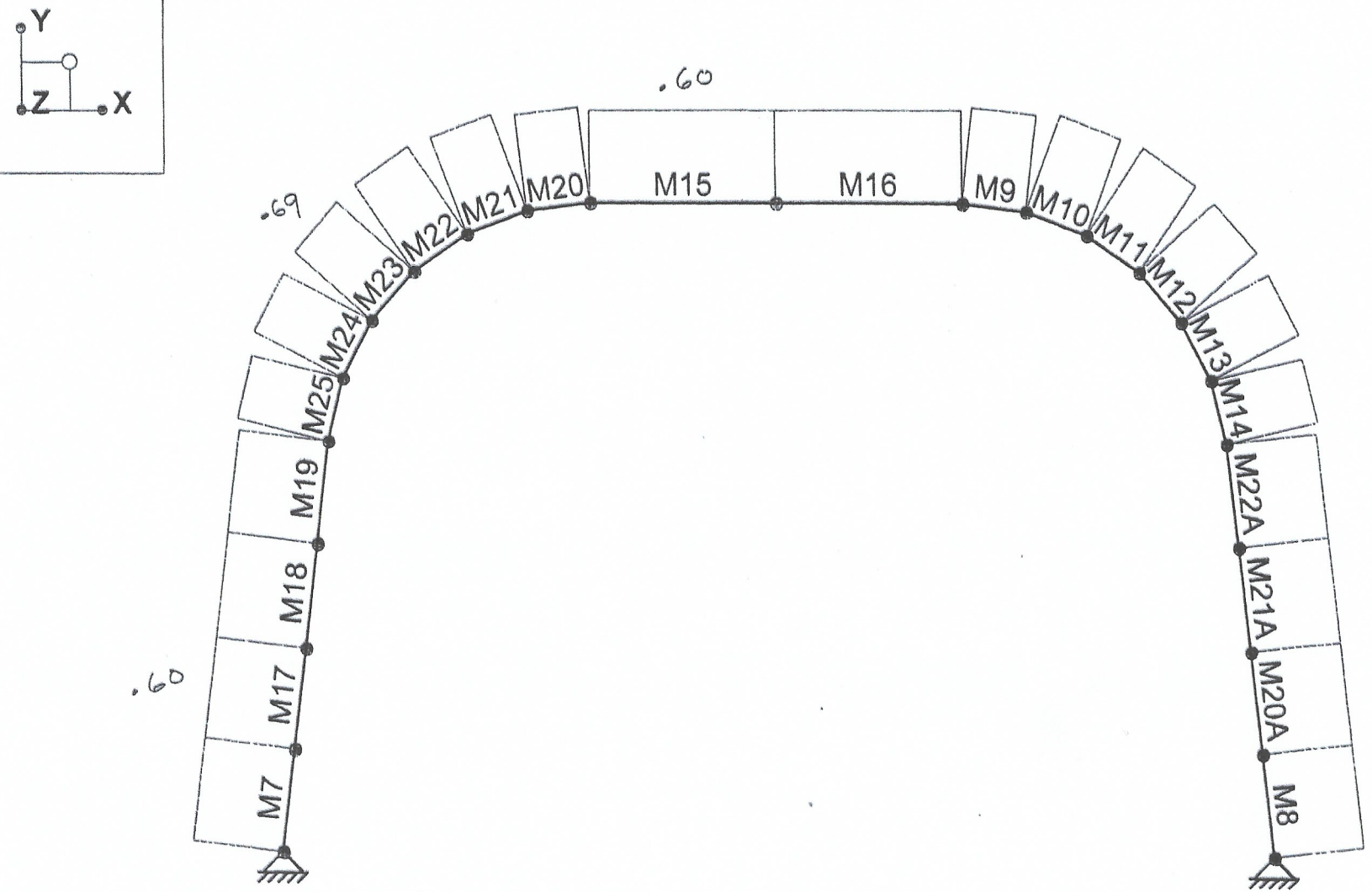
From AISI Handbook Allowable axial stress use Fy/2 when d/r < 294

$d := 26$ $\frac{d}{r_c} = 75.145$ Therefore use $F_{ac} := \frac{F_y}{2}$

$f_{bc} := \frac{M_{zc2} \cdot 12}{s_c}$ $f_{bc} = 6.435$

Combined stresses $csr_c := \frac{f_{ac}}{F_{ac}} + \frac{f_{bc}}{F_b}$ $csr_c = 0.282$

Maximum soil load capacity Curved section $Maxso1 := \frac{1.0}{csr_c} \cdot 270$ $Maxso1 = 956.559$



Results for LC 1, SOIL
Member Axial Forces (k)

SOIL LOAD 270 lb/ft²

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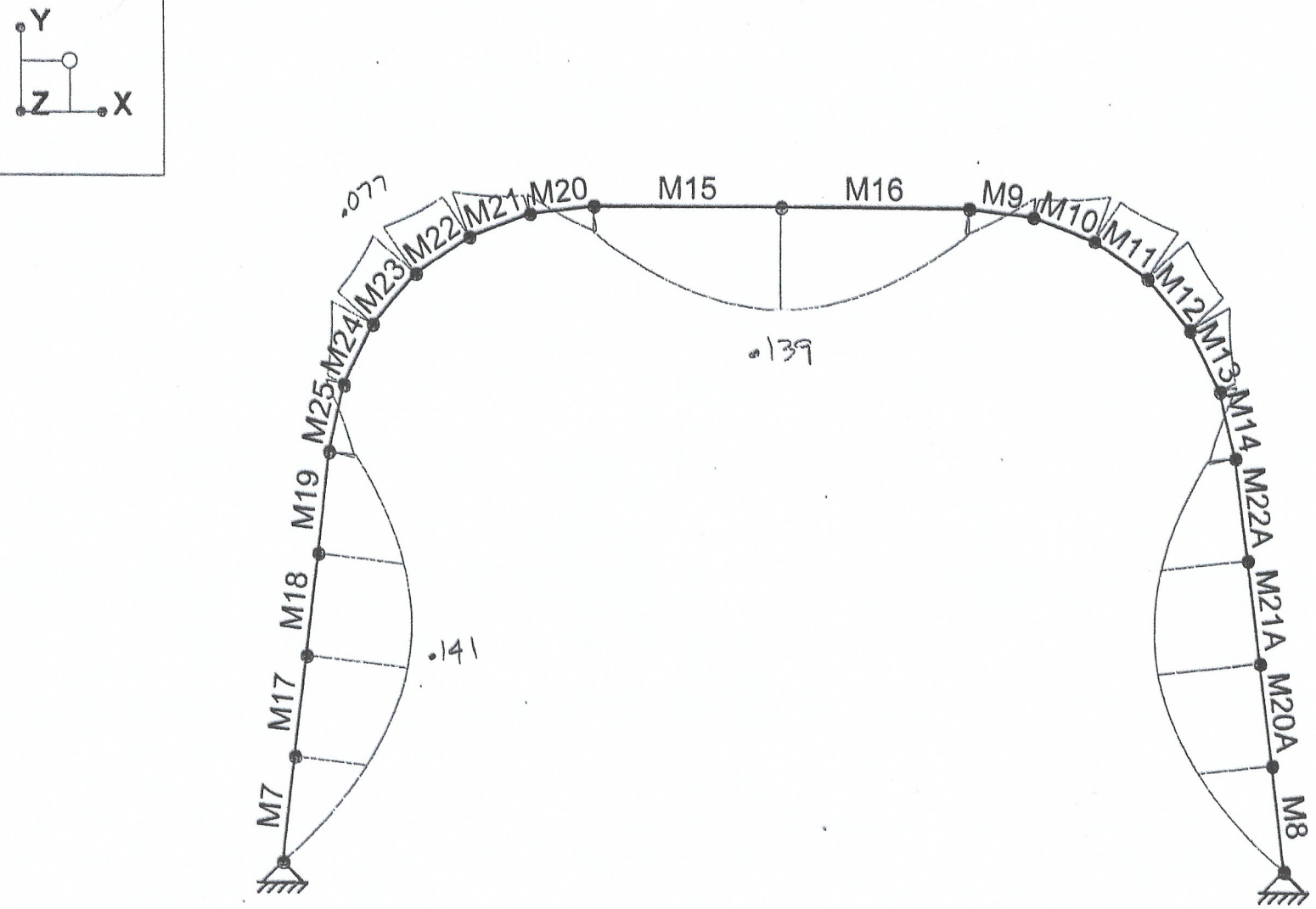
O. Kent Rich		Oct 5, 2004 at 2:09 PM
		B&K WELL 56X36.r3d



Results for LC 1, SOIL
Member z Bending Moments (k-ft)

SOIL LOAD 270 lb/ft²

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