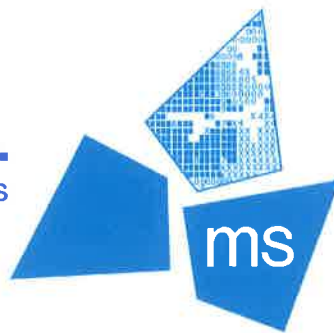


ms consultants inc.
engineers, architects, planners



job no 60-06634 ^{LA} sheet 1/2
made by CEM date 4-6-20
checked CEM date 4-8-20
office _____
project 170/I-71 PHASE CA
36" ϕ WATER MAIN THRUST
BLOCK

DESIGN DATA

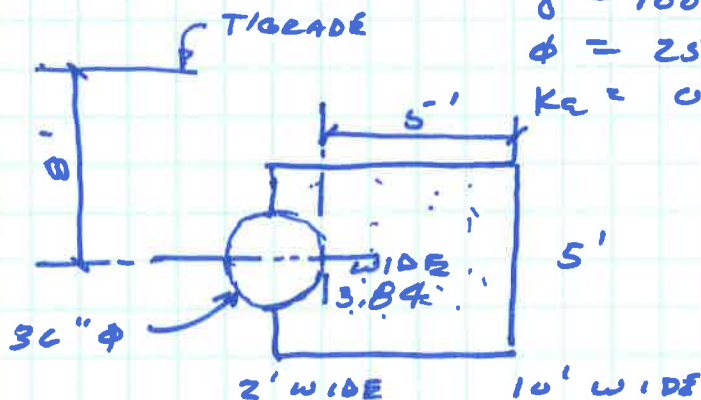
WATERLINE

36" ϕ
150 PSI

SOILS (ASSUMED)

$\gamma = 100$ PCF
 $\phi = 25^\circ$
 $K_e = 0.40$

$E_a = 2.21$ KLF
 $F_a = 1.03$ KLF



PRESSURE ON THRUST BLOCK

$$A_{\text{pipe}} = \frac{36^2 \pi}{4} = 1,018 \text{ ft}^2$$

45° BEND

$$\text{THRUST} = 2 P_A (\sin(45/2)) = 117 \text{ K}$$

WEIGHT OF THRUST BLOCK

$$W = 5 \times 5 ((3.84 + 10)/2) \times 0.145 = 25.1 \text{ KIPS}$$

2.51 KLF



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office _____
project I-70/I-70 PHASE 6A
36"Ø WATERLINE THRUST
BLOCK

DETERMINE K_v

$$K_v \tan \delta_v = \frac{(2.51 + 1.03)}{w} \frac{F_q}{d_{bot}/Block}$$
$$K_v \tan \delta_v = 0.69$$
$$K_v = 3.0 - \text{SEE ATTACHED}$$

RESIST PRESSURE/FT

$$PRESS = \frac{1}{2} \gamma d K_v - E_a$$
$$= 0.5(0.100)10.5(3.0) - 2.21$$
$$= 14.3 \text{ KLF}$$

EFFECTIVE LENGTH

$$a = (2-1) \sqrt{d_{cl} + 5} = 0.69$$
$$K = 0.24 - \text{SEE ATTACHED}$$
$$L_e = K(d + 5) + 10 = 13.7'$$

SOIL PRESSURE RESISTING THRUST

$$RESIST. PRESSURE = 14.3 \times 13.7 = 196 \text{ K}$$

$$FS = \frac{196}{117} = 1.67 \geq 1.50$$

THRUST BLOCK OKAY