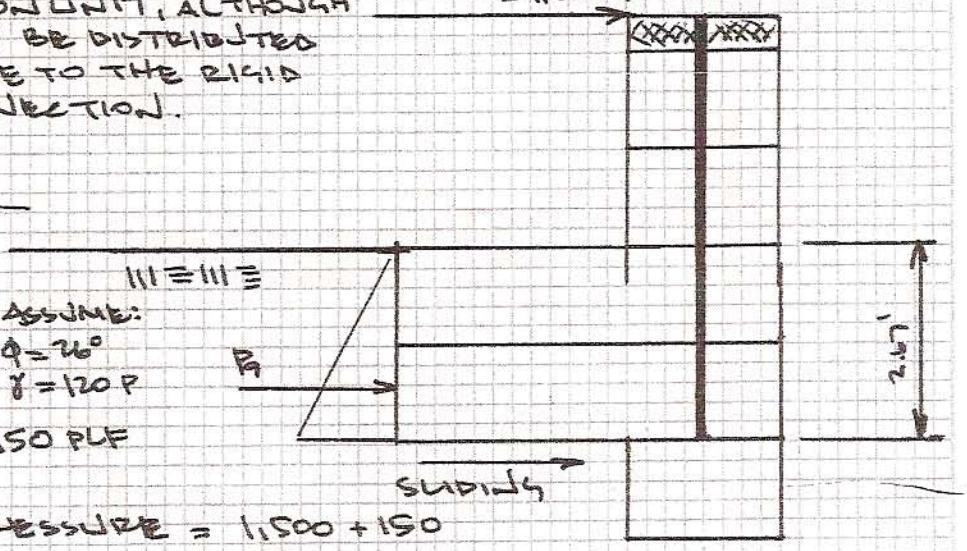
MRJ engineering

PROJECT: RECON TRAFFIC BARRIER SLIDING	PROJECT NO:	SHEET 1 OF 1
LOCATION:	BY: MRJ	DATE: 10/3/05

TO BE CONSERVATIVE, THE 6,000 LBS TRAFFIC LOADED IS DISTRIBUTED OVER ONE 4' RECON UNIT, ALTHOUGH IT WILL ACTUALLY BE DISTRIBUTED OVER SEVERAL DUE TO THE RIGID REBAR/GROUT CONNECTION.

$F_V = 6{,}000 \text{ LBS} / 4' = 1{,}500 \text{ PLF}$



- $P_q = \frac{1}{2} \gamma H^2 K_q$

FOR $\phi = 30°$, $\alpha = 90°$

$B = 0$, $\delta = \phi = 26°$

$K_q = 0.35$

ASSUME:

$\phi = 26°$

$\gamma = 120$ P

- $P_q = (0.5)(120 \text{ pcf})(2.67)^2(0.35) = 150 \text{ PLF}$

TOTAL DRIVING PRESSURE = 1,500 + 150

= 1650 PLF

TESTING RESULTS SHOW THAT THE SHEAR CAPACITY OF 24" RECON UNIT IS 6,885 PLF. FOR THE TRAFFIC BARRIER TO SLIDE IT WOULD REQUIRE THE UNITS TO SHEAR ACROSS ONE ANOTHER:

$$SF_{SLIDING} = \frac{\text{SHEAR CAPACITY}}{\text{DRIVING PRESSURE}} = \frac{6{,}885}{1{,}650} = \underline{4.17 > 1.5}$$

$\therefore$ OKAY

MRJ engineering

PROJECT: RECON TRAFFIC BARRIER SLIDING	PROJECT NO:	SHEET 1 OF 1
LOCATION: (CASE 2)	BY: MRJ	DATE: 11/5/05

TYPICALLY, THE MOMENTARY LOADING CONDITION OF A TRAFFIC IMPACT TO A BARRIER DOES NOT IMPART A SIGNIFICANT LOADING TO THE MSE WALL SYSTEM DUE TO THE INERTIAL MASS OF THE LARGELY HEAVILY REINFORCED SECTION. HOWEVER, AASHTO DESIGN CRITERIA ESTABLISHES A PSUEDO-STATIC ANALYSIS OF 10,000 LBS APPLIED OVER A 5' WIDTH FOR RIGID TRAFFIC BARRIER SYSTEMS WHICH BECOMES A 500 PLF LOADING WHEN TRANSMITTED THROUGH THE JUNCTION SLAB OVER 20' (POUR LENGTHS ARE 20' MINIMUM AND 30' MAXIMUM FOR STANDARD TRAFFIC BARRIERS). THE PROPOSED RECON SYSTEM WILL BE PLACED WITHOUT SPECIFIC COLD JOINTS, SO WE WILL ASSUME THE LOAD TO BE DISTRIBUTED OVER 20' AS PER THE AASHTO DESIGN MANUAL.

$P_q = 1/2\,\gamma H^2 K_q$

FOR $\phi = 26°$, $\sigma = 90°$

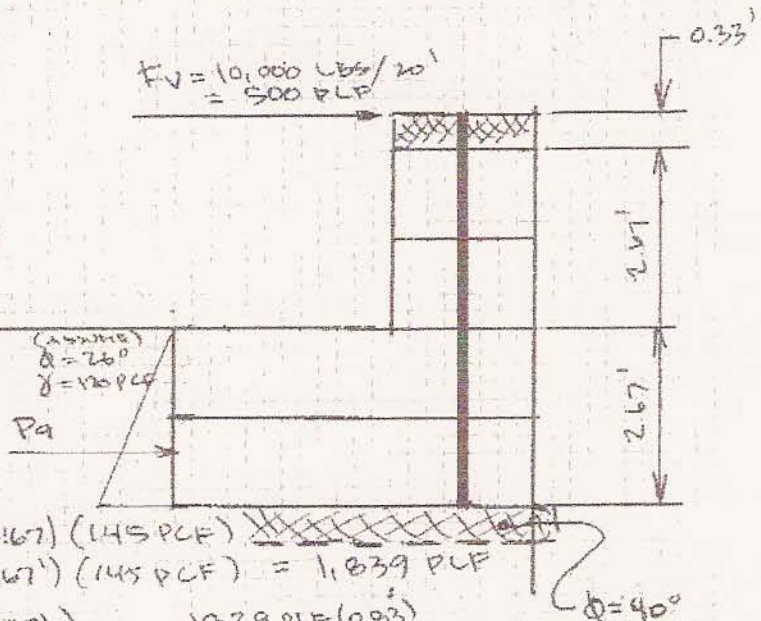
$\beta = 0$ $\delta = \phi = 26°$

$K_a = 0.35$ (COLOUMB EARTH PRESSURE THEORY)

$P_q = (0.5)(120\ PCF)(2.67')^2(0.35) = 150\ PLF$

∴ ASSUME BACKFILL ON CRUSHED STONE BASE ($\phi = 40°$)

TOTAL PRESSURE = 500 + 150 = 650 PLF



W_M: WEIGHT OF MASS = (3.75)(2.67)(145 PCF) + (1.00)(2.67')(145 PCF) = 1,839 PLF

$SF_{SLIDING} = \dfrac{W_M(\tan(90))}{\text{TOTAL PRESSURE}}$ $\dfrac{1839\ PLF(0.83)}{650\ PLF} = 2.35$

$2.35 > 1.5$

∴ OKAY