OHIO DEPARTMENT OF TRANSPORTATION

PLANNING & ENGINEERING DEPARTMENT, DISTRICT 4

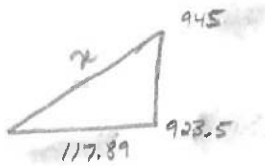
Project MAH-680-4.58 Calc By MA Date 9/12/25

Desc Retaining Wall Sealing Chk By ____ Date ____

PID/PROJ 121474

- Seal face and top of wall
- Top of wall ≈ 1.5'

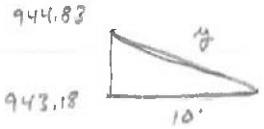
Ramp L (Market St. to I-680 WB)



$945 - 923.5 = 21.5'$

$x = \sqrt{21.5^2 + 117.89^2} = \sqrt{462.25 + 13,898.05}$

$= 119.83'$



$944.83 - 943.18 = 1.65'$

$y = \sqrt{1.65^2 + 10^2} = 10.14'$

$A_L = \underbrace{(117.89' \times 3.86')}_{\text{rectangle under triangle}} + \frac{1}{2}(117.89' \times 21.5') + (21.5' \times 21.5') + (10' \times 21.5') - \frac{1}{2}(1.65' \times 10')$

$+ \underbrace{1.5'(3.86' + 119.83' + 21.5' + 10.14')}_{\text{top of wall}}$

$= 455.06 + 1,267.32 + 462.25 + 215 - 8.25 + 232.99$

$= 2,624.37 \text{ SF}$

$\approx \boxed{292 \text{ SY}}$

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Ramp K (I-680 EB to Market St.)

$L = 404.57'$

First 227.45':

$h_{avg} \approx 21'$

$A_1 = (227.45 \times 21') + (1.5' \times 227.45') = 4776.45 + 341.18 = 5,117.63$ SF

Last 177.12':

$h_{avg} \approx 12.5'$

$A_2 = (177.12' \times 12.5') + (1.5' \times 177.12') = 2,214 + 265.68 = 2,479.68$ SF

$A_K = A_1 + A_2 = 5,117.63 + 2,479.68 = 7,597.31$ SF

$\approx$ 845 SY

Ramp N (Woodward Rd to I-680 WB between Market St. and Woodland Ave. bridges)

First 120':

$h_{avg} \approx 24.5'$ (assuming ground is 1' above footer)

$A_1 = (24.5' \times 120') + (1.5' \times 120') = 2,940 + 180 = 3,120$ SF

Next 150':

$h_{avg} \approx 25.5'$

$A_2 = (25.5' \times 150') + (1.5' \times 150') = 4,050$ SF

Last 120':

$h_{avg} \approx 21.5'$

$A_3 = (21.5' \times 120') + (1.5' \times 120') = 3,450$ SF

$A_N = A_1 + A_2 + A_3 = 10,620$ SF $= \boxed{1,180}$ SY

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Ramp M (I-680 EB to Market St.)

First 120':

$h_{avg} \approx 25'$

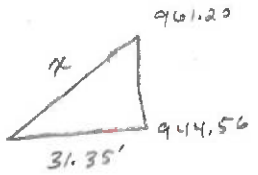
$A_1 = (25' \times 120') + (1.5' \times 120') = 530$ SF

Next 120':

$h_{avg} \approx 23'$

$A_2 = (23' \times 120') + (1.5' \times 120') = 2,940$ SF

Last 83.25'



$961.20 - 944.56 = 16.64'$

$x = \sqrt{16.64^2 + 31.35^2} = \sqrt{276.89 + 982.82} = 35.49'$

$h_{avg\ of\ rectangle} \approx 21'$

assumed exposed triangle below

top of wall

$A_3 = \frac{1}{2}(31.35 \times 16.64) + (31.35 \times 2') + (21' \times 52') + 1.5'(2' + 31.35' + 52')$

$= 260.83 + 62.70 + 1,092 + 128.03 = 1,543.56$ SF

$\approx$ 172 SY