

ITEM 202E11003- STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN (LS)

$$QTY = LS$$

ITEM 202E22900- APPROACH SLAB REMOVED (SY)

$$w_{ex_approach} := 2 \cdot (15 \text{ ft} + 0.875 \text{ in}) \cdot \cos(21.7333 \text{ deg}) \quad l_{ex_approach} := 15 \text{ ft}$$

$$QTY_{rem_approach} := 2 \cdot w_{ex_approach} \cdot l_{ex_approach} = 93.3433 \text{ yd}^2$$

ITEM 202E23500- WEARING COURSE REMOVED (SY)

$$w_{ex_bridge} := 2 \cdot (15 \text{ ft} + 11.5 \text{ in}) \quad l_{ex_bridge} := 4724.56 \text{ ft} - 4515.94 \text{ ft}$$

$$QTY_{rem_wear} := w_{ex_bridge} \cdot l_{ex_bridge} = 739.8283 \text{ yd}^2$$

ITEM 503E11100- COFFERDAMS AND EXCAVATION BRACING (LS)

$$QTY = LS$$

ITEM 503E21300- UNCLASSIFIED EXCAVATION (LS)

$$QTY = LS$$

below calculations used for estimate

$$elev_{BOF_RA} := 761.99 \text{ ft} \quad elev_{AS_RA} := 779.02 \text{ ft} \quad elev_{TOS_RA} := 767.21 \text{ ft}$$

$$elev_{BOF_FA} := 766.26 \text{ ft} \quad elev_{AS_FA} := 784.35 \text{ ft} \quad elev_{TOS_FA} := 771.33 \text{ ft}$$

$$w_{exc_footing} := \frac{(42 \text{ ft} + 8 \text{ in} + 1 \text{ ft} + 1 \text{ ft})}{\cos(20 \text{ deg})} = 47.5333 \text{ ft}$$

$$h_{exc_abut_RA} := 769.33 \text{ ft} - elev_{BOF_RA}$$

$$l_{exc_abut_RA} := \frac{(21 \text{ ft} + 2.75 \text{ in} + 2 \text{ ft}) + (17 \text{ ft} + 11.125 \text{ in} + 2 \text{ ft}) + (6.917 \text{ ft} + 2 \text{ ft})}{3}$$

$$A_{exc_MSE_RA} := (769.33 \text{ ft} - elev_{BOF_RA}) \cdot 24.5 \text{ ft}$$

$$V_{exc_RA} := w_{exc_footing} \cdot \left((h_{exc_abut_RA} \cdot l_{exc_abut_RA}) + A_{exc_MSE_RA} \right) = 540.8862 \text{ yd}^3$$

$$A_{exc_MSE_FA} := 3 \text{ ft} \cdot (35 \text{ ft} + 3.125 \text{ in})$$

$$V_{exc_FA} := w_{exc_footing} \cdot A_{exc_MSE_FA} = 186.227 \text{ yd}^3$$

$$QTY_{exc} := V_{exc_RA} + V_{exc_FA} = 727.1132 \text{ yd}^3$$

ITEM 505E11100- PILE DRIVING EQUIPMENT MOBILIZATION (LS)

$$QTY = LS$$

ITEM 507E00600- 14" CAST-IN-PLACE REINFORCED CONCRETE PILES, DRIVEN (FT)

$$l_{pile_RA} := 50 \text{ ft} \quad l_{pile_FA} := 50 \text{ ft}$$

$$n_{pile_RA} := 19 \quad n_{pile_FA} := 20$$

$$QTY_{pile_driven} := (l_{pile_RA} \cdot n_{pile_RA}) + (l_{pile_FA} \cdot n_{pile_FA}) = 1950 \text{ ft}$$

ITEM 507E00650- 14" CAST-IN-PLACE REINFORCED CONCRETE PILES, FURNISHED (FT)

$$l_{pile_RA} = 50 \text{ ft} \quad l_{pile_FA} = 50 \text{ ft}$$

$$n_{pile_RA} := 19 \quad n_{pile_FA} := 20$$

$$QTY_{pile_furnish} := ((l_{pile_RA} + 5 \text{ ft}) \cdot n_{pile_RA}) + ((l_{pile_FA} + 5 \text{ ft}) \cdot n_{pile_FA}) = 2145 \text{ ft}$$

ITEM 509E10000- EPOXY COATED REINFORCING STEEL (LB)

see separate calculations

$$reinf_{sub} := 24753 \text{ lbf}$$

$$reinf_{super} := 7055 \text{ lbf} + 42204 \text{ lbf} = 49259 \text{ lbf}$$

$$reinf_{rail} := 9080 \text{ lbf}$$

$$QTY_{reinf} := reinf_{sub} + reinf_{super} + reinf_{rail} = 83092 \text{ lbf}$$

ITEM 509E30020- NO. 4 GFRP DEFORMED BARS (FT)

$$GFRP_{rail} := (88 \cdot 30 \text{ ft}) + (22 \cdot 26.0833 \text{ ft}) + (16 \cdot 11.0833 \text{ ft}) = 3391.1654 \text{ ft}$$

$$GFRP_{approach} := (112 \cdot 10.0833 \text{ ft}) + (44 \cdot 16.9167 \text{ ft}) + (16 \cdot 6.4167 \text{ ft}) + (48 \cdot 10 \text{ ft}) + (24 \cdot 6.3333 \text{ ft}) + (24 \cdot 5.0833 \text{ ft}) = 2730.33 \text{ ft}$$

$$QTY_{gfrp} := GFRP_{rail} + GFRP_{approach} = 6121.4954 \text{ ft}$$

ITEM 511E33500- SEMI-INTEGRAL DIAPHRAGM GUIDE (EACH)

$$QTY = 2$$

ITEM 511E53014- CLASS QC3 CONCRETE, MISC.: SUPERSTRUCTURE (CY)

$$A_{diaph} := (37 \text{ ft} + 2.25 \text{ in}) \cdot (4 \text{ ft} + 9 \text{ in})$$

$$t_{deck} := 8.5 \text{ in}$$

$$h_{diaph} := 779.95 \text{ ft} - 771.40 \text{ ft} - t_{deck} - 3.25 \text{ in}$$

$$V_{diaph} := A_{diaph} \cdot h_{diaph} = 49.5302 \text{ yd}^3$$

$$A_{WF72_{49}} := 1166.3 \text{ in}^2 \quad l_{WF72_{49}} := 3 \text{ ft} + 4.3125 \text{ in}$$

$$V_{WF72_{49}} := A_{WF72_{49}} \cdot l_{WF72_{49}} = 1.0077 \text{ yd}^3$$

$$V_{guide} := 3 \text{ ft} \cdot 4.75 \text{ ft} \cdot 2 \text{ ft} = 1.0556 \text{ yd}^3$$

$$V_{bearing} := (4.85 \text{ in} \cdot 2.25 \text{ in} \cdot 1.25 \text{ in}) + (20 \text{ in}^2 \cdot 8.85 \text{ in}) + (3.333 \text{ in} \cdot 1.083 \text{ in} \cdot 1.75 \text{ in}) = 0.0042 \text{ yd}^3$$

$$QTY_{QC3_{diaph}} := (2 \cdot V_{diaph}) - (8 \cdot (V_{WF72_{49}} + V_{bearing})) - (2 \cdot V_{guide}) = 88.8538 \text{ yd}^3$$

ITEM 511E53014- CLASS QC3 CONCRETE, MISC.: BRIDGE DECK (CY)

$$t_{deck} = 8.5 \text{ in} \quad w_{deck} := 35 \text{ ft} + 4 \text{ in}$$

$$t_{haunch} := 4 \text{ in} \quad w_{beam} := 4 \text{ ft} + 1 \text{ in} \quad w_{overhang} := 1 \text{ ft} + 8 \text{ in}$$

$$l_{deck} := 4677.05 \text{ ft} - 4535.05 \text{ ft} = 142 \text{ ft}$$

$$A_{deck} := t_{deck} \cdot w_{deck} = 25.0278 \text{ ft}^2$$

$$A_{haunch} := (t_{haunch} \cdot 4 \cdot w_{beam}) + (t_{haunch} \cdot 2 \cdot w_{overhang}) = 6.5556 \text{ ft}^2$$

$$QTY_{QC3_{deck}} := l_{deck} \cdot (A_{deck} + A_{haunch}) = 166.1049 \text{ yd}^3$$

ITEM 511E53014- CLASS QC3 CONCRETE, MISC.: BRIDGE DECK (PARAPET) (CY)

$$l_{\text{parapet}} := l_{\text{deck}} + 2 \cdot (10 \text{ ft} + 5 \text{ ft} + 11 \text{ in}) \quad A_{\text{parapet}} := \frac{1}{2} \cdot (10 \text{ in} + 1.5 \text{ ft}) \cdot 3.5 \text{ ft}$$

$$l_{\text{parapet_trans}} := 10 \text{ ft} \quad A_{\text{parapet_trans}} := \frac{1}{2} \cdot (1 \text{ ft} + 1.5 \text{ ft}) \cdot \left(\frac{3.5 \text{ ft} + 2.67 \text{ ft}}{2} \right)$$

$$l_{\text{parapet_DD}} := 2 \text{ ft} + 6 \text{ in} \quad A_{\text{parapet_DD}} := ((1 \text{ ft} + 2.5 \text{ in}) \cdot (2 \text{ ft} + 8 \text{ in})) + (0.5 \cdot 3.5 \text{ in} \cdot 4 \text{ in})$$

$$l_{\text{parapet_EE}} := 1 \text{ ft} + 6 \text{ in} \quad A_{\text{parapet_EE}} := (10 \text{ in} \cdot (2 \text{ ft} + 8 \text{ in})) + (4 \text{ in} \cdot 8 \text{ in})$$

$$V_{\text{parapet}} := l_{\text{parapet}} \cdot A_{\text{parapet}}$$

$$V_{\text{parapet_trans}} := 2 \cdot l_{\text{parapet_trans}} \cdot A_{\text{parapet_trans}}$$

$$V_{\text{parapet_DD}} := 2 \cdot l_{\text{parapet_DD}} \cdot A_{\text{parapet_DD}}$$

$$V_{\text{parapet_EE}} := 2 \cdot l_{\text{parapet_EE}} \cdot A_{\text{parapet_EE}}$$

$$QTY_{\text{QC3_parapet}} := 2 \cdot (V_{\text{parapet}} + V_{\text{parapet_trans}} + V_{\text{parapet_DD}} + V_{\text{parapet_EE}}) = 60.0468 \text{ yd}^3$$

ITEM 511E53014- CLASS QC3 CONCRETE, MISC.: ABUTMENT INCLUDING FOOTING (CY)

$$h_{\text{foot}} := 3 \text{ ft} \quad A_{\text{foot_RA}} := 525.72 \text{ ft}^2 \quad A_{\text{foot_FA}} := 598 \text{ ft}^2$$

$$h_{\text{abut}} := (771.40 \text{ ft} - 761.99 \text{ ft} - 3 \text{ ft}) = 6.41 \text{ ft} \quad A_{\text{abut}} := 160 \text{ ft}^2$$

$$w_{\text{wing}} := 1 \text{ ft} + 6 \text{ in}$$

$$A_{\text{wing1}} := ((779.63 \text{ ft} - 761.99 \text{ ft} - 3 \text{ ft}) \cdot 21.5 \text{ ft}) + \left(\frac{1}{2} \cdot (4 \text{ ft} + 778.75 \text{ ft} - 771.40 \text{ ft}) \cdot 7 \text{ ft} \right) = 354.48 \text{ ft}^2$$

$$A_{\text{wing2}} := ((779.30 \text{ ft} - 761.99 \text{ ft} - 3 \text{ ft}) \cdot 16.5 \text{ ft}) + \left(\frac{1}{2} \cdot (4.5 \text{ ft} + 780.3 \text{ ft} - 771.40 \text{ ft}) \cdot 7 \text{ ft} \right) = 283.02 \text{ ft}^2$$

$$A_{\text{wing3}} := ((783.75 \text{ ft} - 766.26 \text{ ft} - 3 \text{ ft}) \cdot 22 \text{ ft}) + \left(\frac{1}{2} \cdot (4 \text{ ft} + 784.65 \text{ ft} - 775.68 \text{ ft}) \cdot 7 \text{ ft} \right) = 364.18 \text{ ft}^2$$

$$A_{\text{wing4}} := ((784.15 \text{ ft} - 766.26 \text{ ft} - 3 \text{ ft}) \cdot 23.5 \text{ ft}) + \left(\frac{1}{2} \cdot (4 \text{ ft} + 785.13 \text{ ft} - 775.68 \text{ ft}) \cdot 8 \text{ ft} \right) = 403.72 \text{ ft}^2$$

$$QTY_{\text{QC3_abut}} := (h_{\text{foot}} \cdot A_{\text{foot_RA}}) + (h_{\text{foot}} \cdot A_{\text{foot_FA}}) + (2 \cdot h_{\text{abut}} \cdot A_{\text{abut}}) + w_{\text{wing}} \cdot (A_{\text{wing1}} + A_{\text{wing2}} + A_{\text{wing3}} + A_{\text{wing4}}) = 278.9054 \text{ yd}^3$$

ITEM 512E10100- SEALING OF CONCRETE SURFACES (EPOXY-URETHANE) (SY)

$$elev_{TOS_RA} := 761.99 \text{ ft} \quad elev_{TOS_FA} := 771.33 \text{ ft}$$

$$l_{wing1} := 28 \text{ ft} + 6 \text{ in} \quad l_{wing2} := 23 \text{ ft} + 6 \text{ in} \quad l_{wing3} := 29 \text{ ft} \quad l_{wing4} := 31 \text{ ft} + 6 \text{ in}$$

$$A_{seal_w1} := \frac{1}{2} \cdot (w_{wing} + 1 \text{ ft} + 779.63 \text{ ft} - elev_{TOS_RA}) \cdot l_{wing1} = 286.995 \text{ ft}^2$$

$$A_{seal_w2} := \frac{1}{2} \cdot (w_{wing} + 1 \text{ ft} + 779.30 \text{ ft} - elev_{TOS_RA}) \cdot l_{wing2} = 232.7675 \text{ ft}^2$$

$$A_{seal_w3} := \frac{1}{2} \cdot (w_{wing} + 1 \text{ ft} + 783.75 \text{ ft} - elev_{TOS_FA}) \cdot l_{wing3} = 216.34 \text{ ft}^2$$

$$A_{seal_w4} := \frac{1}{2} \cdot (w_{wing} + 1 \text{ ft} + 785.15 \text{ ft} - elev_{TOS_FA}) \cdot l_{wing4} = 257.04 \text{ ft}^2$$

$$A_{seal_wing_total} := A_{seal_w1} + A_{seal_w2} + A_{seal_w3} + A_{seal_w4} = 110.3492 \text{ yd}^2$$

$$l_{abut} := 19 \text{ ft} + 7.375 \text{ in} + 17 \text{ ft} + 10.625 \text{ in}$$

$$A_{seal_abut} := l_{abut} \cdot \left((771.40 \text{ ft} - elev_{TOS_RA}) + (775.68 \text{ ft} - elev_{TOS_FA}) \right) = 57.3333 \text{ yd}^2$$

$$P_{WF72_49_partial} := 5 \text{ in} + 17.76 \text{ in} + 4.24 \text{ in} + 46.5 \text{ in} + 2.83 \text{ in} + 15.65 \text{ in} + 5.5 \text{ in} + 40 \text{ in} + 5.5 \text{ in}$$

$$A_{seal_super} := l_{deck} \cdot (2 \text{ in} + t_{deck} + t_{haunch} + w_{overhang} + P_{WF72_49_partial}) = 233.3533 \text{ yd}^2$$

$$l_{parapet} := l_{deck} + 2 \cdot (10 \text{ ft} + 5 \text{ ft} + 11 \text{ in}) \quad p_{parapet} := 3.5 \text{ ft} + 10 \text{ in} + \sqrt{(8 \text{ in})^2 + (3.5 \text{ ft})^2}$$

$$l_{parapet_trans} := 10 \text{ ft} \quad p_{parapet_trans} := \left(\frac{3.5 \text{ ft} + 2.67 \text{ ft}}{2} \right) + 1 \text{ ft} + \sqrt{(3.083 \text{ ft})^2 + (6 \text{ in})^2}$$

$$l_{parapet_DD} := 2 \text{ ft} + 6 \text{ in} \quad p_{parapet_DD} := 2 \text{ ft} + 8 \text{ in} + 1 \text{ ft} + 4 \text{ in} + 2 \text{ ft} + 4 \text{ in} + 5 \text{ in}$$

$$l_{parapet_EE} := 1 \text{ ft} + 6 \text{ in} \quad p_{parapet_EE} := 2 \text{ ft} + 8 \text{ in} + 10 \text{ in} + 2 \text{ ft} + 8 \text{ in} + 8 \text{ in}$$

$$A_{seal_parapet} := (l_{parapet} \cdot p_{parapet}) + 2 \cdot (l_{parapet_trans} \cdot p_{parapet_trans}) + 2 \cdot (l_{parapet_DD} \cdot p_{parapet_DD}) + 2 \cdot (l_{parapet_EE} \cdot p_{parapet_EE}) = 174.561 \text{ yd}^2$$

$$QTY_{seal} := A_{seal_wing_total} + A_{seal_abut} + 2 \cdot (A_{seal_super} + A_{seal_parapet}) = 983.5111 \text{ yd}^2$$

ITEM 512E10300- SEALING CONCRETE BRIDGE DECKS WITH HMWM RESING (SY)

$$l_{deck} = 142 \text{ ft} \quad l_{approach} := 30 \text{ ft}$$

$$QTY_{HMWM} := (2 \cdot 2 \text{ ft}) \cdot (l_{deck} + 2 \cdot l_{approach}) = 89.7778 \text{ yd}^2$$

ITEM 515E15130- DRAPED STRAND PRESTRESSED CONCRETE BRIDGE I-BEAM MEMBERS, LEVEL 3, TYPE WF72-49, 139'-8" (EACH)

$$QTY_{beam} := 4$$

ITEM 515E20000- INTERMEDIATE DIAPHRAGMS (EACH)

$$QTY = 9$$

below calculations used for estimate

$$Y_{steel} := 490 \frac{lb}{ft^3} \quad n_{XF} := 9$$

$$web_{WF72_49} := 3 \text{ ft} + 10.5 \text{ in} \quad t_{web} := 8 \text{ in}$$

$$W_{bent_plate} := Y_{steel} \cdot (0.5 \text{ in} \cdot web_{WF72_49} \cdot (6 \text{ in} + 1 \text{ ft})) = 118.6719 \text{ lb}$$

$$S_{beam} := 9 \text{ ft} + 4 \text{ in} - (0.5 \cdot t_{web})$$

$$w_{angle_64} := 10.3 \frac{lb}{ft} \quad w_{angle_66} := 14.9 \frac{lb}{ft}$$

$$l_{angle_64} := \sqrt{S_{beam}^2 + web_{WF72_49}^2}$$

$$W_{XF} := (w_{angle_66} \cdot S_{beam}) + (2 \cdot w_{angle_64} \cdot l_{angle_64}) = 335.9544 \text{ lb}$$

$$QTY_{steel} := n_{XF} \cdot (2 \cdot W_{bent_plate} + W_{XF}) = 5159.6832 \text{ lb}$$

ITEM 516E10010- ARMORLESS PREFORMED JOINT SEAL (FT)

$$QTY_{joint_seal} := 2 \cdot \frac{32 \text{ ft}}{\cos(20 \text{ deg})} = 68.1074 \text{ ft}$$

ITEM 516E13600- 1" PREFORMED EXPANSION JOINT FILLER (SF)

$$QTY_{PEJF_1} := 4 \cdot A_{parapet} = 16.3333 \text{ ft}^2$$

ITEM 516E13900- 2" PREFORMED EXPANSION JOINT FILLER (SF)

$$t_{as} := 17 \text{ in} \quad w_{diaph} := 4 \text{ ft} + 9 \text{ in}$$

$$A_{PEJF2_w1} := ((779.63 \text{ ft} - 771.40 \text{ ft}) \cdot w_{diaph})$$

$$A_{PEJF2_w2} := ((779.30 \text{ ft} - 771.40 \text{ ft}) \cdot w_{diaph})$$

$$A_{PEJF2_w3} := ((783.75 \text{ ft} - 775.68 \text{ ft}) \cdot w_{diaph})$$

$$A_{PEJF2_w4} := ((785.15 \text{ ft} - 775.68 \text{ ft}) \cdot w_{diaph})$$

$$QTY_{PEJF_2} := A_{PEJF2_w1} + A_{PEJF2_w2} + A_{PEJF2_w3} + A_{PEJF2_w4} = 159.9325 \text{ ft}^2$$

ITEM 516E14020- SEMI-INTEGRAL ABUTMENT EXPANSION JOINT SEAL (FT)

$$l_{abut} = 37.5 \text{ ft}$$

$$h_{wing1} := 779.63 \text{ ft} - 771.40 \text{ ft} \quad h_{wing2} := 779.30 \text{ ft} - 771.40 \text{ ft}$$

$$h_{wing3} := 783.75 \text{ ft} - 775.68 \text{ ft} \quad h_{wing4} := 785.15 \text{ ft} - 775.68 \text{ ft}$$

$$QTY_{exp_joint} := 2 \cdot l_{abut} + h_{wing1} + h_{wing2} + h_{wing3} + h_{wing4} = 108.67 \text{ ft}$$

ITEM 516E44201- ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN (26"x14"x3.10" BEARING with 27"x15"x1.75" LOAD PLATE AND

HP PEDESTAL ASSEMBLY (EACH)

$$QTY_{bearing} := 2 \cdot QTY_{beam} = 8$$

ITEM 518E40000- 6" PERFORATED CORRUGATED PLASTIC PIPE (FT)

$$l_{pcpp_abut} := (24 \text{ ft} + 21.5 \text{ ft}) - 2 \cdot \left(\frac{8.5 \text{ ft}}{\cos(20 \text{ deg})} \right) = 27.409 \text{ ft}$$

$$w_{footing} := (6.75 \text{ ft} \cdot \cos(20 \text{ deg})) = 6.3429 \text{ ft}$$

$$l_{pcpp_w1} := 17 \text{ ft} + 11.125 \text{ in} - w_{footing} \quad l_{pcpp_w2} := 24 \text{ ft} + 2.75 \text{ in} - w_{footing}$$

$$l_{pcpp_w3} := 23 \text{ ft} + 5.125 \text{ in} - w_{footing} \quad l_{pcpp_w4} := 21 \text{ ft} + 2.75 \text{ in} - w_{footing}$$

$$QTY_{PCPP} := (2 \cdot l_{pcpp_abut}) + l_{pcpp_w1} + l_{pcpp_w2} + l_{pcpp_w3} + l_{pcpp_w4} = 116.2588 \text{ ft}$$

ITEM 518E40010- 6" NON-PERFORATED CORRUGATED PLASTIC PIPE (FT)

$$QTY_{NPCPP} := (61 \text{ ft} + 58 \text{ ft} + 48 \text{ ft} + 63 \text{ ft}) - 2 \cdot (l_{pcpp_abut} \cdot \cos(20 \text{ deg})) = 178.488 \text{ ft}$$

ITEM 523E20000- DYNAMIC LOAD TESTING (EACH)

$$QTY = 4$$

ITEM 526E30010- REINFORCED CONCRETE APPROACH SLABS WITH QC/QA (T=17") (SY)

$$w_{approach} := 32 \text{ ft} \quad l_{approach} := 30 \text{ ft}$$

$$QTY_{RC_approach} := 2 \cdot w_{approach} \cdot l_{approach} = 213.3333 \text{ yd}^2$$

ITEM 526E90030- TYPE C INSTALLATION (FT)

$$w_{approach} = 24 \text{ ft} + 4 \text{ in}$$

$$QTY_{typeC} := 2 \cdot \frac{w_{approach}}{\cos(20 \text{ deg})} = 68.1074 \text{ ft}$$

ITEM 530E00200- SPECIAL - STRUCTURE; TEMPORARY STRUCTURE SUPPORT

$$QTY = LS$$

ITEM 601E20000- CRUSHED AGGREGATE SLOPE PROTECTION (SY)

$$w_{SP} := 35 \text{ ft} + 4 \text{ in} + 3 \text{ ft} + 3 \text{ ft}$$

$$l_{SP_RA} := 36.09 \text{ ft} \quad l_{SP_FA} := 32.62 \text{ ft}$$

$$QTY_{RCP} := w_{SP} \cdot (l_{SP_RA} + l_{SP_FA}) = 315.557 \text{ yd}^2$$

ITEM 867E00101-TEMPORARY WIRE FACE MECHANICALLY STABILIZED EARTH WALL, AS PER PLAN (LS)

QTY = LS

below calculations used for; additional backfill estimate

$w_{bkfl} := 2 \text{ ft}$

$l_{abut_S2} := 21.5 \text{ ft}$

$h_{bkfl_RA} := (elev_{AS_RA} - t_{as} - elev_{BOF_RA})$ $h_{bkfl_FA} := elev_{AS_FA} - t_{as} - elev_{BOF_FA}$

$V_{bkfl_abut} := w_{bkfl} \cdot l_{abut_S2} \cdot (h_{bkfl_RA} + h_{bkfl_FA}) = 1388.3267 \text{ ft}^3$

$A_{bkfl_w1} := ((779.63 \text{ ft} - 761.99 \text{ ft} - 3 \text{ ft}) \cdot (21.5 \text{ ft} - 6.75 \text{ ft})) + \left(\frac{1}{2} \cdot (4 \text{ ft} + 778.75 \text{ ft} - 771.40 \text{ ft}) \cdot 7 \text{ ft}\right)$

$A_{bkfl_w2} := ((779.30 \text{ ft} - 761.99 \text{ ft} - 3 \text{ ft}) \cdot (16.5 \text{ ft} - 6.75 \text{ ft})) + \left(\frac{1}{2} \cdot (4.5 \text{ ft} + 780.3 \text{ ft} - 771.40 \text{ ft}) \cdot 7 \text{ ft}\right)$

$A_{bkfl_w3} := ((783.75 \text{ ft} - 766.26 \text{ ft} - 3 \text{ ft}) \cdot (22 \text{ ft} - 6.75 \text{ ft})) + \left(\frac{1}{2} \cdot (4 \text{ ft} + 784.65 \text{ ft} - 775.68 \text{ ft}) \cdot 7 \text{ ft}\right)$

$A_{bkfl_w4} := ((785.15 \text{ ft} - 766.26 \text{ ft} - 3 \text{ ft}) \cdot (23.5 \text{ ft} - 6.75 \text{ ft})) + \left(\frac{1}{2} \cdot (4 \text{ ft} + 785.13 \text{ ft} - 775.68 \text{ ft}) \cdot 8 \text{ ft}\right)$

$V_{bkfl_wing_S2} := w_{bkfl} \cdot (A_{bkfl_w2} + A_{bkfl_w4})$

$QTY_{bkfl_S2} := V_{bkfl_abut} + V_{bkfl_wing_S2} = 88.9291 \text{ yd}^3$