



PID 120777, LOG-33-1782: QUANTITY CALCULATIONS

Calculated by: *Dan Grilliot, P.E., Date: 12/20/2024*

Checked by: *Lawton Gerlinger, P.E., Date: 2/10/2025*

Revised by: *Dan Grilliot, P.E., Date: 7/1/2025*

Roadway

1. Item 202-Wearing Course Removed, As Per Plan (SY)
 - a. Rear Approach Pavement STA. 97+14.80 to STA. 98+05.34, CADD Measured Area = 339 sq. yd.
 - b. Rear Approach Slab = 25 ft. x 40 ft. x (1 sq. yd./9 sq. ft.) = 111 sq. yd.
 - c. Forward Approach Slab = 25 ft. x 40 ft. x (1 sq. yd./9 sq. ft.) = 111 sq. yd.
 - d. Forward Approach Pavement STA. 100+97.88 to STA. 101+47.88, CADD Measured = 1200 sq. ft. = 133 sq. yd.
 - e. Total = 339 sq. yd. + 111 sq. yd. + 111 sq. yd. + 133.33 sq. yd. = 694.33 sq. yd. = 695 sq. yd.

Erosion Control

2. Item 832-Erosion Control (EA)
 - a. Considered Maintenance Project: \$1,000/bridge x 1 bridge = \$1,000

Pavement

3. Item 407-Tack Coat (0.085 gal/sq. yd. (GAL)
 - a. Rear Approach Pavement (1.5" asphalt) = 339 sq. yd. x 0.085 gal/sq. yd. = 28.82 gal
 - b. Rear Approach Slab (1.5" asphalt) = 111 sq. yd. x 0.085 gal/sq. yd. = 9.435 gal
 - c. Fwd. Approach Slab (2.5" asphalt, two lifts) = 111 sq. yd. x 2 applications x 0.085 gal/sq. yd. = 18.87 gal
 - d. Fwd. Approach Slab (1.5" asphalt) 133.33 sq. yd. x 0.085 gal/sq. yd. = 11.33 gal
 - e. Total = 28.82 gal + 9.435 gal + 18.87 gal + 11.33 gal = 68.46 gal = 69 gal
4. Item 441-Asphalt Concrete Surface Course, Type 1 (449), PG70-22M (CY)
 - a. Rear Approach Pavement = 339 sq. yd. x 1.5 in. x (1 yd./36 in.) = 14.13 cu. yd.
 - b. Rear Approach Slab = 111 sq. yd. x 1.5 in. x (1 yd./36 in.) = 4.63 cu. yd.
 - c. Fwd. Approach Slab = 111 sq. yd. x 2.5 in. x (1 yd./36 in.) = 7.71 cu. yd.
 - d. Fwd. Approach Pavement = 133.33 sq. yd. x 1.5 in. x (1 yd./36 in.) = 5.56 cu. yd.
 - e. Total = 14.13 cu. yd. + 4.63 cu. yd. + 7.71 cu. yd. + 5.56 cu. yd. = 32.03 cu. yd. = 32 cu. yd.

Traffic Control

5. Item 646-Edge Line, 6" (MILE)
 - a. STA. 97+09.80 to STA. 101+52.88, 0.16 mile (white)
 - b. Total = 0.16 mile
6. Item 646-Center Line (MILE)
 - a. STA. 97+09.80 to STA. 101+52.88, 0.08 mile
 - b. Total = 0.08 mile

Structure Repair (LOG-33-1782)

7. Item 202-Portions of Structure Removed, Over 20 Foot Span, As Per Plan (LS)
 - a. Lump Sum (LS)
8. Item 509-Epoxy Coated Steel Reinforcement
 - a. Abutment = 615 lbs
 - b. Parapet Rebuild = 260 lbs
 - c. Total = 875 lbs
9. Item 509-Concrete Reinforcement, Replacement of Existing Concrete Reinforcement, As Per Plan (LB)
 - a. Total = 100 lbs
10. Item 510-Dowel Holes with Nonshrink, Nonmetallic Grout (EA)
 - a. Abutments = 74 each
 - b. Parapet Rebuild = 16 each
 - c. Total = 90 each
11. Item 511-Class QC2 Concrete, Superstructure (CY)
 - a. Backwall = $1.375 \text{ ft} \times 1.25 \text{ ft} \times 56.23 \text{ ft} \times 2 \text{ ends of bridge} \times (1 \text{ cu. yd.}/27 \text{ cu. ft.}) = 7.16 \text{ cu. yd.}$
Total backwall = 7.16 cu. yd.
 - b. Deck Ends = $2.29 \text{ sq. ft. end area} \times 56.24 \text{ ft} \times 2 \text{ deck ends} \times (1 \text{ cu. yd.}/27 \text{ cu. ft.}) = 9.54 \text{ cu. yd.}$
 - c. Parapet Rebuild = $2.86 \text{ sq. ft. end area} \times ((3'-7 \frac{7}{16}") + (1'-3 \frac{3}{8}") + (2'-11") + (1'-11 \frac{7}{8}")) \times 2 \text{ bridge ends} \times (1 \text{ cu. yd.}/27 \text{ cu. ft.}) = 2.08 \text{ cu. yd.}$
 - d. Total = $7.16 \text{ cu. yd.} + 9.54 \text{ cu. yd.} + 2.08 \text{ cu. yd.} = 18.78 \text{ cu. yd.} = 19 \text{ cu. yd.}$
12. Item 513-Structural Steel, Misc.: End Crossframes and Plates (LB)
 - a. Length of end crossframe angles per bay = $(3.5 \text{ ft.} \times 4 \text{ each}) + 2.75 \text{ ft.} + 13.08 \text{ ft.} = 29.83 \text{ ft./bay} \times 4 \text{ bays} \times 2 \text{ abut.} \times 9.8 \text{ lbs/ft.} = 2338.67 \text{ lbs}$ (new 4" x 4" x 3/8" per GSD-1-19 from steel book)
 - b. Top plates of crossframe unit are included in new expansion joint armor per std. dwg. EXJ-4-87.
 - c. Bottom plate of crossframe unit is approx. 9" x 18" x 1/2" thick, 1 each/bay x 4 bays x 2 abut. x $15.3 \text{ lb/ft.} \times 1.5 \text{ ft.} = 183.6 \text{ lbs}$
 - d. Total = $2338.67 \text{ lbs} + 183.6 \text{ lbs} = 2522 \text{ lb}$
13. Item 514-Field Painting, Misc.: Field Painting of Replaced End Crossframes
 - a. Length of angles per bay: $(3.5 \text{ ft.} \times 4 \text{ each}) + 13.08 \text{ ft.} + 2.75 \text{ ft.} = 29.83 \text{ ft.}$
 - b. 4" x 4" x 3/8" angle = $16 \text{ in.}/12 = 1.333 \text{ ft. perimeter}$
 - c. Angles: $(29.83 \text{ ft./bay}) \times 1.333 \text{ ft.} \times 4 \text{ bays} \times 2 \text{ abutments} = 318.18 \text{ sq. ft.}$
 - d. Bottom plate: assumed 9" x 18" plate = $0.75 \text{ ft.} \times 1.5 \text{ ft.} \times 2 \text{ sides} \times (1 \text{ plate/bay}) \times (4 \text{ bay/abut.}) \times 2 \text{ abut.} = 18 \text{ sq. ft.}$
 - e. Total = $318.18 \text{ sq. ft.} + 18 \text{ sq. ft.} = 336.18 \text{ sq. ft.} = 336 \text{ sq. ft.}$
14. Item 516-Structural Expansion Joint Including Elastomeric Strip Seal, As Per Plan (FT)
 - a. T/T barrier = 40 ft., add 1.25 ft. min. per std. dwg. EXJ-4-87 x 2 ends, = 42.5 ft.; $\cos 40.13 = 42.5 \text{ ft./x, } x = 55.59 \text{ ft.} = 55.59 \text{ ft.} \times 2 \text{ ends} = 111.17 \text{ ft.} = 111 \text{ ft.} = \text{total}$

15. Item 516 - Joint Sealer, As Per Plan
 - a. Approach slab and turnback wingall/toe of parapet joint = 25 ft. x 4 quadrants = 100 ft.
16. Item 516-2" Deep Joint Sealer, As Per Plan (FT)
 - a. T/T parapet = 40 ft., $\cos 40.13 = 40 \text{ ft}/x$, $x = 52.32 \text{ ft.} \times 2 \text{ ends} = 104.6 \text{ ft.} = 105 \text{ ft.}$
17. Item 844-Galvanic Anode Protection, As Per Plan
 - a. 1 anode on every other longitudinal deck bar (approx. 16" spacing)
 - b. 33 longitudinal bars to put anode on per deck end x 2 deck ends = 66 anodes = total
18. Item 848-Superplasticized Dense Concrete Overlay Using Hydrodemolition, (1 3/4" thick) (SY)
 - a. T/T parapet = 40 ft.
 - b. Length to Overlay = 238.09 ft.
 - c. Total = 238.09 ft. x 40 ft. x (1 cu. yd./9 sq. ft.) = 1058.18 sq. yd. = 1058 sq. yd.
19. Item 848-Surface Preparation Using Hydrodemolition, As Per Plan (SY)
 - a. Length to hydro = used 848E10200 length - (deck end replacement length x 2 ends) = 238.09 ft. - ((2.5 ft/cos 40.13) x 2) = 231.55 ft.
 - b. T/T parapet = 40 ft.
 - c. Total = 231.55 ft. x 40 ft. x (1 cu. yd./9 sq. ft.) = 1029.11 sq. yd. = 1029 sq. yd.
20. Item 848-Superplasticized Dense Concrete Overlay (Variable Thickness), Material Only (CY)
 - a. Variable thickness = 2" (BDM 403.4.1)
 - b. Measured unsound area = 551 sq. ft.
 - c. Logan County Patch Area = 1300 sq. ft.
 - d. BDM T403-3: Variable Thickness % = without patch area = 551 sq. ft./9262 sq. ft. = 6%, use 30%; with patch area = 1851 sq. ft./9262 sq. ft. = 20%, use 40% use given history.
 - e. 9262 sq. ft. x 0.4 = 3704.8 sq. ft. x 0.17 ft. = 629.82 cu. ft.; 629.82 cu. ft. / 27 cu. ft. = 23 cu. yd.
21. Item 848-Hand Chipping (SY)
 - a. 1st overlay (BDM = 10% variable thickness) = 1851 sq. ft. / 9 = 206 sq. yd. x 0.1 = 21 sq. yd.
 - b. 2nd overlay (D7 preference = 10% hydro area) = 1029 sq. yd. x 0.1 = 103 sq. yd.
 - c. Between 1st and 2nd overlay (21 sq. yd. + 103 sq. yd.) = 124 sq. yd. / 2 = 62 sq. yd.
22. Item 848-Test Slab (LS)
 - a. Total = LUMP SUM

Maintenance of Traffic

23. Item 614-Detour Signing (LS)
 - a. Lump Sum (LS)

Incidentals

24. Item 614-Maintaining Traffic (LS)
 - a. Lump Sum (LS)
25. Item 623-Construction Layout Stakes and Surveying (LS)
 - a. Lump Sum (LS)
26. Item 624-Mobilization (LS)
 - a. Lump Sum (LS)

END OF CALCULATIONS