



PID 106374, MOT-4/444-21.99/00.23L: QUANTITY CALCULATIONS

Calculated by: *Dan Grilliot, P.E., Date: 2/22/2023*

Checked by: *Lawton Gerlinger, P.E., Date: 3/27/2023*

Revised by: *Dan Grilliot, P.E., Date: 8/8/2023*

Roadway

1. Item 201-Clearing and Grubbing (LS)
 - a. *Areas as designated in plan set.*
2. Item 202-Pavement Removed (SY)
 - a. *S.B. S.R. 444 STA. 22+80.85 to STA. 23+05.85, CADD measured 827.94 sq. ft. x (1 sq. yd./9 sq. ft.) = 91.99 sq. yd. = 92 sq. yd.*
 - b. *S.B. S.R. 444 STA. 23+05.85 to STA. 23+30.85, CADD measured 100.34 sq. ft. Lt. side of Rear Appr. Slab, CADD measured 95.17 sq. ft. Rt. side of Rear Appr. Slab, total = 195.51 sq. ft. x (1 sq. yd./9 sq. ft.) = 21.72 sq. yd. = 22 sq. yd.*
 - c. *Total = 114 sq. yd.*
3. Item 202-Curb Removed (FT)
 - a. *STA. 23+05 to STA. 23+30 = 25 ft.*
4. Item 202-Guardrail Removed (FT)
 - a. *STA. 22+70.93 to STA. 23+33.34 = 62.5 ft.*
 - b. *STA. 22+72.89 to STA. 23+10.39 = 37.5 ft.*
 - c. *Total = 100 ft.*
5. Item 202-Removal Misc.: Removal of Bridge ID Sign and Reerection (EA)
 - a. *MOT-444-0023L Rear Abutment Guardrail = 1 each*
6. Item 204-Subgrade Compaction (SY)
 - a. *Full Depth Pavement Section, S.B. S.R. 444 STA. 22+80.85 to STA. 23+10.85, 18" beyond pavement surface (both sides), CADD measured 1079.14 sq. ft. x (1 sq. yd./9 sq. ft.) = 119.90 sq. yd. = 120 sq. yd.*
 - b. *Approach Slab S.B. S.R. 444 STA. 23+10.85 to STA. 23+30.85, CADD measured 650 sq. ft. x (1 sq. yd./9 sq. ft.) = 72.22 sq. yd. = 73 sq. yd.*
 - c. *Total = 193 sq. yd.*
7. Item 606-Guardrail, Type 5 (FT)
 - a. *Subsummary STA. 22+70.93 to STA. 23+33.34 = 62.5 ft.*
 - b. *Subsummary STA. 22+72.89 to STA. 23+10.39 = 37.5 ft.*
 - c. *Total = 100 ft.*

Erosion Control

8. Item 659-Seeding and Mulching (SY)
 - a. *MOT-444-0023L Rear Abutment NW Quadrant = 1821 sq. ft.*
 - b. *MOT-4/444-2199/0023L Rear Abutment between bridges = 984 sq. ft.*
 - c. *MOT-4-2199 Rear Abutment SW Quadrant = 3366 sq. ft.*
 - d. *MOT-444-0023L Fwd. Abutment NE Quadrant = 2311 sq. ft.*

- e. MOT-4/444-2199/0023L Fwd. Abutment between bridges = 1016 sq. ft.
 - f. MOT-4-2199 Fwd. Abutment SE Quadrant = 2565 sq. ft.
 - g. Painting Equipment Setup under bridge behind portable barrier = 2400 sq. ft.
 - h. Total = 14463 sq. ft. x (1 sq. yd./9 sq. ft.) = 1607 sq. yd.
9. Item 659-Repair Seeding and Mulching (SY)
- a. 5% of permanent per Designer Note
 - b. Total = 1607 sy * 0.05 = 80 sq. yd.
10. Item 659-Commercial Fertilizer (TON)
- a. Rates per Designer Note
 - b. Perm seed total = 1607 sy x 1 ton/7410sy = 0.22 ton
11. Item 659-Water (MGAL)
- a. Rates per Designer Note
 - b. Perm seed total = 1607 sy x 0.0027Mgal/sy x 2 applications = 8.68 Mgal = 9 Mgal
12. Item 832-Erosion Control (EA)
- a. Considered Maintenance Project: \$1,000/bridge x 2 bridges = \$2,000

Pavement

13. Item 254-Pavement Planing, Asphalt Concrete, 1½" Depth (SY)
- a. Rear Approach S.B. S.R. 444 STA. 22+30.85 to STA. 22+80.85, CADD measured 1734.32 sq. ft. x (1 sq. yd./9 sq. ft.) = 192.70 sq. yd. = 193 sq. yd.
 - b. On Ex. Appr. Slab S.B. S.R. 444 STA. 23+05.85 to STA. 23+30.85, CADD measured 599.9 sq. ft. x (1 sq. yd./9 sq. ft.) = 66.66 sq. yd. = 67 sq. yd.
 - c. Fwd. Approach S.B. S.R. 444 STA. 26+74.65 to STA. 27+24.65, CADD measured 1575.81 sq. ft. x (1 sq. yd./9 sq. ft.) = 175.09 sq. yd. = 175 sq. yd.
 - d. Rear Approach N.B. S.R. 444 STA. 22+35.75 to STA. 22+85.75, CADD measured 1583 sq. ft. x (1 sq. yd./9 sq. ft.) = 175.89 sq. yd. = 176 sq. yd.
 - e. Fwd. Approach N.B. S.R. 444 STA. 26+29.55 to STA. 26+79.55, CADD measured 1663.88 sq. ft. x (1 sq. yd./9 sq. ft.) = 184.88 sq. yd. = 185 sq. yd.
 - f. Total = 796 sq. yd.
14. Item 302-Asphalt Concrete Base, PG64-22 (449) (8" thick) (CY)
- a. Rear Approach S.B. S.R. 444 STA. 22+80.85 to STA. 23+10.85 (4" beyond surface Rt. Side), CADD measured 994.70 sq. ft. x 8 in. x (1 ft./12 in.) x (1 cu. yd./27 cu. ft.) = 24.56 cu. yd. = 25 cu. yd.
 - b. Total = 25 cu. yd.
15. Item 304-Aggregate Base (6" thick) (CY)
- a. Rear Approach S.B. S.R. 444 STA. 22+80.85 to STA. 23+10.85, CADD measured 1008.58 sq. ft. x 6 in. x (1 ft./12 in.) x (1 cu. yd./27 cu. yd.) = 18.68 cu. yd. = 19 cu. yd.
 - b. Appr. Slab S.B. S.R. 444 STA. 23+10.85 to STA. 23+30.85, CADD measured 650 sq. ft. x 6 in. x (1 ft./12 in.) x (1 cu. yd./27 cu. ft.) = 12 cu. yd.
 - c. Total = 19 cu. yd. + 12 cu. yd. = 31 cu. yd.
16. Item 407-Non-Tracking Tack Coat (GAL)
- a. Rear Approach Full Depth S.B. S.R. 444 STA. 22+80.85 to STA. 23+10.85 (rate = 0.055 gal/sq. yd.), CADD measured 988.40 sq. ft. x (1 sq. yd./9 sq. ft.) x 0.055 gal/sq. yd. x 3 applications = 18.12 gal = 19 gal
 - b. Rear Approach Resurfacing S.B. S.R. 444 STA. 22+30.85 to STA. 22+80.85 (rate = 0.085 gal/sq. yd.), CADD measured 1729.87 sq. ft. x (1 sq. yd./9 sq. ft.) x 0.085 gal/sq. yd. = 16.34 gal = 17 gal
 - c. Fwd. Approach Resurfacing S.B. S.R. 444 STA. 26+74.65 to STA. 27+24.65 (rate = 0.085 gal/sq. yd.), CADD measured 1575.81 sq. ft. x (1 sq. yd./9 sq. ft.) x 0.085 gal/sq. yd. = 14.88 gal = 15 gal
 - d. Rear Approach N.B. S.R. 444 STA. 22+35.75 to STA. 22+85.75 (rate = 0.085 gal/sq. yd.), CADD measured 1583 sq. ft. x (1 sq. yd./9 sq. ft.) x 0.085 gal/sq. yd. = 14.95 gal = 15 gal
 - e. Fwd. Approach N.B. S.R. 444 STA. 26+29.55 to STA. 26+79.55 (rate = 0.085 gal/sq. yd.) CADD measured 1663.88 sq. ft. x (1 sq. yd./9 sq. ft.) x 0.085 gal/sq. yd. = 15.71 gal = 16 gal
 - f. Total = 82 gal
17. Item 441-Asphalt Concrete Surface Course, Type 1 (449), PG70-22M (CY)
- a. Rear Approach Resurfacing S.B. S.R. 444 STA. 22+30.85 to STA. 22+80.85 (1 ½" thick) CADD measured 1729.87 sq. ft. x 1.5 in. x (1 ft./12 in.) x 1 cu. yd./27 cu. ft.) = 8 cu. yd

- b. Rear Approach Full Depth S.B. S.R. 444 STA. 22+80.85 to STA. 23+10.85 (3" thick) CADD measured 988.40 sq. ft. x 3 in. x (1 ft./12 in.) x (1 cu. yd./27 cu. ft.) = 9.15 cu. yd. = 10 cu. yd.
 - c. Fwd. Approach Resurfacing S.B. S.R. 444 STA. 26+74.65 to STA. 27+24.65 (1 ½" thick) CADD measured 1575.81 sq. ft. x 1.5 in. x (1 ft./12 in.) x (1 cu. yd./27 cu. ft.) = 7.3 cu. yd. = 8 cu. yd.
 - d. Rear Approach Resurfacing N.B. S.R. 444 STA. 22+35.75 to STA. 22+85.75 (1 ½" thick) CADD measured 1583 sq. ft. x 1.5 in. x (1 ft./12 in.) x (1 cu. yd./27 cu. ft.) = 7.33 cu. yd. = 8 cu. yd.
 - e. Fwd. Approach Resurfacing N.B. S.R. 444 STA. 26+29.55 to STA. 26+79.55 (1 ½" thick) CADD measured 1663.88 sq. ft. x 1.5 in. x (1 ft./12 in.) x (1 cu. yd./27 cu. ft.) = 7.7 cu. yd. = 8 cu. yd.
 - f. Total = 42 cu. yd.
18. Item 609-Curb, Type 4-C (FT)
- a. STA. 23+05 to STA. 23+30 LT. = 25 ft.

Traffic Control

- 19. Item 621-Raised Pavement Marker Removed (EA)
 - a. 27 each (as listed on subsummary for locations)
- 20. Item 626-Barrier Reflector, Type 2 (One-Way) (EA)
 - a. STA. 22+70.93 to STA. 23+22.24 LT. = 2 each
 - b. STA. 22+72.89 to STA. 23+10.39 LT. = 2 each
 - c. Total = 4 each
- 21. Item 646-Edge Line, 6" (MILE)
 - a. STA. 19+46 to STA. 20+78, 0.03 mile (white)
 - b. STA. 21+21 to STA. 31+08, 0.17 mile (white)
 - c. STA. 21+24 to STA. 40+05, 0.36 mile (yellow)
 - d. STA. 16+80 to STA. 17+32, 0.01 mile, (white)
 - e. STA. 20+47 to STA. 26+88, 0.12 mile, (white)
 - f. STA. 19+80 to STA. 29+45, 0.18 mile, (yellow)
 - g. Total = 0.87 mile
- 22. Item 646-Lane Line, 6" (MILE)
 - a. STA. 21+81 to STA. 47+97, 0.5 mile
 - b. STA. 19+78 to STA. 30+43, 0.2 mile
 - c. Total = 0.70 mile
- 23. Item 646-Channelizing Line, 12" (FT)
 - a. STA. 20+78 to STA. 21+81, 103 ft.
 - b. STA. 21+36 to STA. 21+81, 45 ft.
 - c. STA. 17+32 to STA. 19+78, 246 ft.
 - d. STA. 18+32 to STA. 19+78, 146 ft.
 - e. Total = 540 ft.
- 24. Item 646-Dotted Line, 6" (FT)
 - a. STA. 34+23 to STA. 35+89, 166 ft.
 - b. STA. 26+39 to STA. 28+23, 184 ft.
 - c. Total = 350 ft.

Structure Repair (MOT-4-2199)

- 25. Item 202-Portions of Structure Removed, Over 20 Foot Span, As Per Plan (LS)
 - a. Lump Sum (LS)
- 26. Item 509-Concrete Reinforcement, Replacement of Existing Concrete Reinforcement, As Per Plan (LB)
 - a. Total = 100 lbs
- 27. Item 509-Uncoated Steel Reinforcement (LB)
 - a. Abutments = 846 lbs
 - b. Parapet Rebuild = 306 lbs
 - c. Total = 1152 lbs
- 28. Item 510-Dowel Holes with Nonshrink, Nonmetallic Grout (EA)
 - a. Abutments = 124 each

- b. Parapet Rebuild = 0 each
 - c. Total = 124 each
29. Item 511-Class QC2 Concrete, Superstructure (CY)
- a. Backwall = $1.20833 \text{ ft.} \times 1.724 \text{ ft.} \times 29.36 \text{ ft.} \times 2 \text{ ends of bridge} \times (1 \text{ cu. yd./}27 \text{ cu. ft.}) = 4.53 \text{ cu. yd.}$
 $+ 1.7083 \text{ ft.} \times 1.724 \text{ ft.} \times (7.03 \text{ ft.} + 7.03 \text{ ft.}) \times 2 \text{ ends of bridge} \times (1 \text{ cu. yd./}27 \text{ cu. ft.}) = 3.07 \text{ cu. yd.,}$
 Total backwall = 7.60 cu. yd.
 - b. Deck Ends = $7.75 \text{ in} \times 44.65 \text{ ft.} \times 2.5 \text{ ft.} \times (1 \text{ ft./}12 \text{ in.}) (1 \text{ cu. yd./}27 \text{ cu. ft.}) 2 \text{ deck ends} = 5.34 \text{ cu. yd.}$
 - c. Parapet on Ends of Bridge = $(\text{CADD measured} = 4.45 \text{ sq. ft.}) \times (\text{lengths of parapet replacement on one end of bridge} = 3.0625 \text{ ft.} + 1.84375 \text{ ft.} + 3.052 \text{ ft.} + 2.09 \text{ ft.}) \times 2 \text{ bridge ends} \times (1 \text{ cu. yd./}27 \text{ cu. ft.}) = 3.31 \text{ cu. yd.}$
 - d. Total = 16.25 cu. yd. = 17 cu. yd.
30. Item 512-Concrete Repair by Epoxy Injection (FT)
- a. Rear Abutment = 4 ft.
 - b. Fwd. Abutment = 11 ft.
 - c. Total = 15 ft.
31. Item 513-Structural Steel for Rehabilitation (LB)
- a. From Item 514E00050 calculations, length of end crossframe angles = 8 each $\times 24.72 \text{ ft./unit} = 197.76 \text{ ft.} \times 9.8 \text{ lb/sq.ft. (new } 4'' \times 4'' \times 3/8'' \text{ per GSD-1-19 from steel book)} = 1938 \text{ lb}$
 - b. Top plates of crossframe unit are included in new expansion joint armor.
 - c. Bottom plate of crossframe unit is approx. $10'' \times 14''$, 8 each $\times 19.83 \text{ lb/plate} = 158.66 \text{ lb}$
 - d. $10'' \text{ wide plate} \times 1/2'' \text{ thick} = 17 \text{ lb/ft., } 17 \text{ lb/ft.} \times 14 \text{ in.} \times (1 \text{ ft./}12 \text{ in.}) = 19.83 \text{ lb}$
 - e. Total = $1938 \text{ lb} + 158.66 \text{ lb} = 2097 \text{ lb}$
32. Item 514-Surface Preparation of Existing Structural Steel (SF)
- a. Beams (Section #1 without splice plate)— $W36 \times 260$ perimeter to paint = $(36.25'' - 1 \ 7/16'') \times (2 \text{ sides}) + (16.5'' - 13/16'') \times (2) + 16.5'' = 9.792 \text{ ft.,}$ Beam Length = Assume beam is 6" longer past the bearings at the end of the beam, $(0 \text{ ft.} - 65.583 \text{ ft.} = 65.583 \text{ ft., } 85.417 \text{ ft.} - 159.583 \text{ ft.} = 74.166 \text{ ft., } 179.417 \text{ ft.} - 253.583 \text{ ft.} = 74.166 \text{ ft., } 273.417 \text{ ft.} - 339 \text{ ft.} = 65.583 \text{ ft.,}$ Total = 279.498 ft.; Beam Lines = 5, Total Beam Section #1 to be Painted = $9.792 \text{ ft.} \times 279.498 \text{ ft.} \times 5 \text{ beam lines} = 13684.22 \text{ sq. ft.}$
 - b. Beams (Section #2 with splice plate $9'-10'' \times 18'' \times 3/4''$)— $W36 \times 260$ perimeter to paint = $(36.25'' - 1 \ 7/16'') \times (2 \text{ sides}) + (16.5'' - 13/16'') \times (2) + 18'' + (2 \times 3/4'') + (2 \times 3/4'') = 31.375 \text{ in.} + 69.625 \text{ in.} + 18 \text{ in.} + 1.5 \text{ in.} + 1.5 \text{ in.} = 122 \text{ in.} = 10.17 \text{ ft.,}$ Beam Length = Assume beam is 6" longer past the bearings at the end of the beam, $(65.583 \text{ ft.} - 85.417 \text{ ft.} = 19.834 \text{ ft., } 159.583 \text{ ft.} - 179.417 \text{ ft.} = 19.834 \text{ ft., } 253.583 \text{ ft.} - 273.417 \text{ ft.} = 19.834 \text{ ft.,}$ Total = 59.502 ft.; Beam Lines = 5, Total Beam Section #2 to be Painted = $10.17 \text{ ft.} \times 59.502 \text{ ft.} \times 5 \text{ beam lines} = 3025.68 \text{ sq. ft.}$
 - c. Total Beams = 16709.90 sq. ft.
 - d. Intermediate Crossframes—Crossframe unit length = $(8.4303 \text{ ft.} \times 2 \text{ each}) + 7.9583 \text{ ft.} = 24.819 \text{ ft.,}$ $3'' \times 3'' \times 5/16''$ perimeter = 1 ft., # crossframe units = 136 each, $24.819 \text{ ft.} \times 1 \text{ ft.} \times 136 \text{ each} = 3375.38 \text{ sq. ft.}$
 - e. End Crossframes—Crossframe unit length = $(4.273 \text{ ft.} \times 2) + (3.22 \text{ ft.} \times 2) + 9.734375 \text{ ft.} = 24.72 \text{ ft.,}$ # crossframe units = 8 each, $4'' \times 4'' \times 5/16''$ perimeter = 1.33 ft., Total End Crossframes = $24.72 \text{ ft.} \times 1.33 \text{ ft.} \times 8 \text{ each} = 263.02 \text{ sq. ft.}$
 - f. End Crossframe Plates say top plates $12'' \times 16'' = 1 \text{ ft.} \times 1.333 \text{ ft.} = 1.333 \text{ sq. ft.,}$ say bottom plates $10'' \times 14'' = 0.833 \text{ ft.} \times 1.167 \text{ ft.} = 0.972 \text{ sq. ft.;}$ $(1.333 \text{ sq. ft.} \times 2 \text{ plates}) + (0.972 \text{ sq. ft.} \times 1 \text{ plate}) = 3.64 \text{ sq. ft.} \times 2 \text{ sides} = 7.28 \text{ sq. ft./crossframe unit;}$ 8 each $\times 7.28 \text{ sq. ft.} = 58.24 \text{ sq. ft.}$
 - g. Total End Crossframes = 321.26 sq. ft.
 - h. Scuppers—Scupper approx. length to be painted $36.25 \text{ in.} - 1.4375 \text{ in.} = 34.8125 \text{ in.} = 2.901 \text{ ft.,}$ $9'' \times 5 \ 1/16''$ scupper surface area = $(9 \text{ in.} \times 2) + (5 \ 1/16 \text{ in.} \times 2) = 28.125 \text{ in.} = 2.34375 \text{ ft.,}$ # of scuppers = 8 each/quadrant $\times 4 \text{ quadrants} = 32 \text{ each,}$ $2.901 \text{ ft./scupper} \times 2.34375 \text{ ft.} \times 32 \text{ scuppers} = 217.58 \text{ sq. ft.}$
 - i. Bearings at Piers = $2 \text{ sq. ft.} \times 5 \text{ bearings/pier} \times 3 \text{ piers} = 30 \text{ sq. ft.}$
 - j. Total = Beams + Intermediate Crossframes + End Crossframes + Scuppers + Bearings = $20654.12 \text{ sq. ft.} = 20654 \text{ sq. ft.}$
33. Item 514-Field Painting of Existing Structural Steel, Prime Coat (SF)
- a. Same as Surface Preparation of Existing Structural Steel = 20654 sq. ft.
34. Item 514-Field Painting Structural Steel, Intermediate Coat (SF)
- a. Same as Surface Preparation of Existing Structural Steel = 20654 sq. ft.

35. Item 514-Field Painting Structural Steel, Finish Coat (SF)
 - a. Same as Surface Preparation of Existing Structural Steel = 20654 sq. ft.
36. Item 514-Grinding Fins, Tears, Slivers on Existing Structural Steel (MNHR)
 - a. Per 2020 BDM section 404.1.11 1 min./ft. beam/girder to be painted, 339 ft * 5 beam lines * (1 min./ft.) * (1 hr./60 min.) = 28.25 hr. = 29 hr.
37. Item 514-Final Inspection Repair (EA)
 - a. Per CMS 514.21: 1 location per 300 ft. of beam length, 2.5% of all crossframe assemblies, 339 ft. * 5 beam lines * (1 each/300 ft.) + (0.025) * (136 intermediate crossframe units + 8 end crossframe units) = 5.65 each + 3.6 each = 9.25 each = 9 each = total
38. Item 514-Field Painting, Misc.: Zinc Rich Primer (SF)
 - a. From framing plan sheet in plans: 1 sq. ft. + 2 sq. ft. + 1 sq. ft. + 2 sq. ft. + 1 sq. ft. + 2 sq. ft. + 2 sq. ft. + 2 sq. ft. + 4 sq. ft. + 4 sq. ft. + 1 sq. ft. + 1 sq. ft. = 23 sq. ft.
39. Item 516-Structural Expansion Joint Including Elastomeric Strip Seal (FT)
 - a. T/T barrier = 32.5 ft., add 1.25 ft. min. per std. dwg. EXJ-4-87 x 2 ends, = 35 ft.; $\cos 35.1666 = 35 \text{ ft}/x$, $x = 42.81 \text{ ft.} = 43 \text{ ft.} \times 2 \text{ ends} = 86 \text{ ft.} = \text{total}$
40. Item 516-2" Deep Joint Sealer, As Per Plan (FT)
 - a. T/T parapet = 32.5 ft., $\cos 35.1666 = 32.5 \text{ ft}/x$, $x = 39.76 \text{ ft.} \times 2 \text{ ends} = 79.51 \text{ ft.} = 80 \text{ ft.}$
41. Item 516-Elastomeric Bearing with Internal Laminates and Load Plate (Neoprene) As Per Plan (Bearing: 11"x13"x3.48", Load Plate: 12"x14"x1.5") (EA)
 - a. 1 bearing/beam end * 5 beams * 2 beam ends/beam = 10 each = total
42. Item 516-Jacking and Temporary Support of Superstructure, As Per Plan (LS)
 - a. Lump Sum (LS)
43. Item 519-Patching Concrete Structure, As Per Plan (SF)
 - a. Lt. Parapet = 129 sq. ft. + 18 sq. ft. + 172 sq. ft. + 18 sq. ft. + 12 sq. ft. + 258 sq. ft. + 37 sq. ft. = 644 sq. ft.
 - b. Rt. parapet = 75 sq. ft. Two areas measured 20 sq. ft. and 10 sq. ft. during deck condition survey in March 2021.
 - c. Total = 719 sq. ft.
44. Item 844-Concrete Patching with Galvanic Anode Protection, As Per Plan (SF)
 - a. Rear Abutment = 2 sq. ft. + 1 sq. ft. + 1 sq. ft. + 1 sq. ft. + 8 sq. ft. + 6 sq. ft. + 11 sq. ft. + 2 sq. ft. + 6 sq. ft. + 2 sq. ft. + 7 sq. ft. + 4 sq. ft. = 51 sq. ft.
 - b. Fwd. Abutment = 5 sq. ft. + 4 sq. ft. + 8 sq. ft. + 4 sq. ft. + 2 sq. ft. + 2 sq. ft. + 4 sq. ft. = 29 sq. ft.
 - c. Total = 80 sq. ft.
45. Item 848-Superplasticized Dense Concrete Overlay Using Hydrodemolition, (2 3/4" thick) (SY)
 - a. T/T parapet = 32.5 ft.
 - b. Length to Overlay = 343.80 - (1.20833 ft x 2 walls each end) - (0.417 ft. (5" joint channel assumed) x 2 ends) = 340.55 ft.
 - c. Total = 340.55 ft x 32.5 ft. x (1 cu. yd./9 sq. ft.) = 1229.76 sq. yd. = 1230 sq. yd.
46. Item 848-Surface Preparation Using Hydrodemolition, As Per Plan (SY)
 - a. Length to hydro = used 848E10200 length - (deck end replacement length x 2 ends) = 340.55 ft. - (2.5 ft x 2) = 335.55 ft.
 - b. T/T parapet = 32.5 ft.
 - c. Total = 335.55 ft. x 32.5 ft. x (1 cu. yd./9 sq. ft.) = 1211.7 sq. yd. = 1212 sq. yd.
47. Item 848-Superplasticized Dense Concrete Overlay (Variable Thickness), Material Only (CY)
 - a. 7/6/2021 measured unsound area = 3409 sq. ft. = 378.78 sq. yd.; Overlay deck area = 1229.76 sq. yd.; % unsound = 378.78 sq. yd./1229.76 sq. yd. = 31%
 - b. 4/11/2023 measured unsound area = 1123 sq. ft. = 124.78 sq. yd.; Overlay deck area = 1229.76 sq. yd.; % unsound = 124.78 sq. yd./1229.76 sq. yd. = 10%
 - c. 10/18/2022 BR86; Wearing Surface (WS) = CS2 + CS3 = 1984 + 312 = 2296 sq. ft. (21%); Floor CS2 + CS3 = 498 + 490 = 998 sq. ft. (8%)
 - d. Therefore, use % measured unsound = (31% + 21%) / 2 = 26% < 70%, ok, to cover cracked area variable depth
 - e. BDM T403-3: % variable thickness = 55%
 - f. BDM variable area = 0.55 x 10905 sq. ft. = 5998 sq. ft.

- g. BDM Factors
 - h. 2nd generation overlay, MF = 1.15
 - i. Sale date = 1/25/2024 (1 winter), MF = 1.0
 - j. D7 Factors (8/7/2018 policy)
 - k. 1st overlay (SDC), MF = 1.0
 - l. High measured unsound area %, MF = 1.0 - due to inconsistencies with DCS measurements
 - m. Adjusted Variable Area = 5998 sq. ft. x 1.15 = 6898 sq. ft. (63%)
 - n. BDM 403.4.1 Variable Depth = 2"
 - o. Plan Variable Depth = 1" + 0.75" + 0.75" = 2.5", use (2nd overlay & transverse bars on top)
 - p. Variable Volume = 6898 sq. ft. x (2.5 in./12) = 1437 cu. ft. / 27 = 53 cu. yd.
48. Item 848-Hand Chipping (SY)
- a. 2020 BDM 403.4.1 handchipping area = 10% of variable thickness area
 - b. D7 Factors (8/7/2018) policy):
 - c. Asphalt/green patch, MF = 1.0
 - d. 2nd overlay minimum area = 10% of hydro area
 - e. Area = 0.1 x 6898 sq. ft. = 690 sq. ft. = 6% < 10%, not good
 - f. -use area = 0.1 x 10905 sq. ft. = 1091 sq. ft / 9 = 121 sq. yd.
49. Item 848-Test Slab (LS)
- a. Total = LUMP SUM
50. Item 848-Existing Concrete Overlay Removed, (2" Thick) (SY)
- a. Does not include deck end rebuilds. Same area as the hydro as Item 848E20001 = 1212 sq. yd. = total
51. Item 848-Removal of Debonded or Deteriorated Existing Variable Thickness Concrete Overlay (SY)
- a. D7 (8/7/2018 policy) = 50% of handchipping area
 - b. 0.5 x 1091 sq. ft. = 546 sq. ft. / 9 = 61 sq. yd.

Structure Repair (MOT-444-0023L)

52. Item 202-Portions of Structure Removed, Over 20 Foot Span, As Per Plan (LS)
- a. Lump Sum (LS)
53. Item 202-Approach Slab Removed (SY)
- a. Rear Approach Slab = 24 ft. wide x 25 ft. long x (1 sq. yd./9 sq. ft.) = 66.67 sq. yd. = 67 sq. yd.
54. Item 503-Cofferdams and Excavation Bracing (LS)
- a. Total = LUMP SUM
55. Item 503-Unclassified Excavation (LS)
- a. Total = LUMP SUM
56. Item 509-Concrete Reinforcement, Replacement of Existing Concrete Reinforcement, As Per Plan (LB)
- a. Total = 100 lbs
57. Item 509-Uncoated Steel Reinforcement (LB)
- a. Abutments = 1619 lbs
 - b. Parapet Rebuild = 308 lbs
 - c. Rear Approach Slab = 9497 lbs
 - d. Total = 11424 lbs
58. Item 510-Dowel Holes with Nonshrink, Nonmetallic Grout (EA)
- a. Abutments = 162 each
 - b. Parapet Rebuild = 0 each
 - c. Total = 162 each
59. Item 511-Class QC2 Concrete, Superstructure (CY)
- a. Same quantity as MOT-4-2199 = 17 cu. yd. = total
60. Item 511-Class Qc1 Concrete, Abutment Not Including Footing 1.70833 ft. wide x 125.58 sq. ft. x (1 cu. yd./27 cu. ft.) = 7.95 cu. yd. = 8 cu. yd. = total
61. Item 512-Concrete Repair by Epoxy Injection (FT)
- a. Rear Abutment = 2 ft.
 - b. Fwd. Abutment = 0 ft.
 - c. Total = 2 ft.
62. Item 513-Structural Steel for Rehabilitation (LB)

- a. Same quantity as MOT-4-2199 = 2097 lb
63. Item 514-Surface Preparation of Existing Structural Steel (SF)
- a. Same quantity as MOT-4-2199 = 20654 sq. ft.
64. Item 514-Field Painting of Existing Structural Steel, Prime Coat (SF)
- a. Same as Surface Preparation of Existing Structural Steel = 20654 sq. ft.
65. Item 514-Field Painting Structural Steel, Intermediate Coat (SF)
- a. Same as Surface Preparation of Existing Structural Steel = 20654 sq. ft.
66. Item 514-Field Painting Structural Steel, Finish Coat (SF)
- a. Same as Surface Preparation of Existing Structural Steel = 20654 sq. ft.
67. Item 514-Grinding Fins, Tears, Slivers on Existing Structural Steel (MNHR)
- a. Per 2020 BDM section 404.1.11 1 min./ft. beam/girder to be painted, 339 ft * 5 beam lines * (1 min./ft.) * (1 hr./60 min.) = 28.25 hr. = 29 hr.
68. Item 514-Final Inspection Repair (EA)
- a. Per CMS 514.21: 1 location per 300 ft. of beam length, 2.5% of all crossframe assemblies, 339 ft. * 5 beam lines * (1 each/300 ft.) + (0.025) * (136 intermediate crossframe units + 8 end crossframe units) = 5.65 each + 3.6 each = 9.25 each = 9 each = total
69. Item 514-Field Painting, Misc.: Zinc Rich Primer (SF)
- a. From framing plan sheet in plans: 12 sq. ft. + 1 sq. ft. + 1 sq. ft. + 1 sq. ft. + 1 sq. ft. + 1 sq. ft. + 1 sq. ft. + 1 sq. ft. + 1 sq. ft. + 3 sq. ft. = 23 sq. ft.
70. Item 516-Structural Expansion Joint Including Elastomeric Strip Seal (FT)
- a. T/T barrier = 32.5 ft., add 1.25 ft. min. per std. dwg. EXJ-4-87 x 2 ends, = 35 ft.; $\cos 35.1666 = 35 \text{ ft}/x$, $x = 42.81 \text{ ft.} = 43 \text{ ft.} \times 2 \text{ ends} = 86 \text{ ft.} = \text{total}$
71. Item 516-1" Preformed Expansion Joint Filler
- a. Between edge of approach slab and parapet/footer = (1.0833 ft. x 20 ft. x 2 edges) = 43.33 sq. ft.
- b. Between end of parapet transition and prop. curb type 4-C = (0.5 ft. x 1.333 ft. x 2 curbs) = 1.33 sq. ft.
- c. Total = 44.66 sq. ft. = 45 sq. ft.
72. Item 516-2" Deep Joint Sealer, As Per Plan (FT)
- a. T/T parapet = 32.5 ft., $\cos 35.1666 = 32.5 \text{ ft}/x$, $x = 39.76 \text{ ft.} \times 2 \text{ ends} = 79.51 \text{ ft.} = 80 \text{ ft.}$
73. Item 516-Elastomeric Bearing with Internal Laminates and Load Plate (Neoprene) As Per Plan (Bearing: 11"x13"x3.48", Load Plate: 12"x14"x1.5") (EA)
- a. 1 bearing/beam end * 5 beams * 2 beam ends/beam = 10 each = total
74. Item 516-Jacking and Temporary Support of Superstructure, As Per Plan (LS)
- a. Lump Sum (LS)
75. Item 518-Porous Backfill with Geotextile Fabric (CY)
- a. Length $\cos 35.166 = 32.5 \text{ ft}/x$, $x = 39.76 \text{ ft.}$
- b. Avg. height = 3.5 ft. x 2 ft. wide x 39.76 ft x (1 cu. yd./27 cu. ft.) = 10.31 cu. yd. = 11 cu. yd = total
76. Item 519-Patching Concrete Structure, As Per Plan (SF)
- a. Lt. Parapet = 30 sq. ft. + 45 sq. ft. + 3 sq. ft. + 3 sq. ft. + 5 sq. ft. + 45 sq. ft. + 18 sq. ft. + 36 sq. ft. + 18 sq. ft. + 3 sq. ft. + 208 sq. ft. = 414 sq. ft.
- b. Rt. parapet = 0 sq. ft.
- c. Total = 414 sq. ft.
77. Item 526-Reinforced Concrete Approach Slabs (T=13"), As Per Plan
- a. 32.5 ft. x 20 ft. x (1 sq. yd./9 sq. ft.) = 72.2 sq. yd. = 73 sq. yd. = total
78. Item 844-Concrete Patching with Galvanic Anode Protection, As Per Plan (SF)
- a. Rear Abutment = 2 sq. ft.
- b. Fwd. Abutment = 8 sq. ft. + 6 sq. ft. + 5 sq. ft. + 3 sq. ft. + 8 sq. ft. + 2 sq. ft. + 4 sq. ft. + 2 sq. ft. + 4 sq. ft. = 42 sq. ft.
- c. Total = 44 sq. ft.
79. Item 848-Superplasticized Dense Concrete Overlay Using Hydrodemolition, (2 3/4" thick)
- a. T/T parapet = 32.5 ft.
- b. Length to Overlay = 343.80 - (1.20833 ft x 2 walls each end) - (0.417 ft. (5" joint channel assumed) x 2 ends) = 340.55 ft.
- c. Total = 340.55 ft x 32.5 ft. x (1 cu. yd./9 sq. ft.) = 1229.76 sq. yd. = 1230 sq. yd.
80. Item 848-Surface Preparation Using Hydrodemolition, As Per Plan

- a. Length to hydro = used 848E10200 length - (deck end replacement length x 2 ends) = 340.55 ft. - (2.5 ft x 2) = 335.55 ft.
 - b. T/T parapet = 32.5 ft.
 - c. Total = 335.55 ft. x 32.5 ft. x (1 cu. yd./9 sq. ft.) = 1211.7 sq. yd. = 1212 sq. yd.
81. Item 848-Superplasticized Dense Concrete Overlay (Variable Thickness), Material Only (CY)
- a. 7/6/2021 measured unsound area = 3086 sq. ft. = 342.89 sq. yd.; Overlay deck area = 1229.76 sq. yd.; % unsound = 342.89 sq. yd./1229.76 sq. yd. = 28%
 - b. 4/11/2023 measured unsound area = 1568 sq. ft. = 174.22 sq. yd.; Overlay deck area = 1229.76 sq. yd.; % unsound = 174.22 sq. yd./1229.76 sq. yd. = 14%
 - c. 10/18/2022 BR86; Wearing Surface (WS) = CS2 + CS3 = 175 + 400 = 575 sq. ft. (5%); Floor CS2 + CS3 = 277 + 195 = 472 sq. ft. (4%)
 - d. Therefore, use % measured unsound = (28% + 14%) / 2 = 21% < 70%, ok, to cover cracked area variable depth
 - e. BDM T403-3: % variable thickness = 47.5%
 - f. BDM variable area = 0.475 x 10905 sq. ft. = 5180 sq. ft.
 - g. BDM Factors
 - h. 2nd generation overlay, MF = 1.15
 - i. Sale date = 1/25/2024 (1 winter), MF = 1.0
 - j. D7 Factors (8/7/2018 policy)
 - k. 1st overlay (SDC), MF = 1.0
 - l. High measured unsound area %, MF = 1.0 - due to inconsistencies with DCS measurements
 - m. Adjusted Variable Area = 5180 sq. ft. x 1.15 = 5957 sq. ft. (55%)
 - n. BDM 403.4.1 Variable Depth = 2"
 - o. Plan Variable Depth = 1" + 0.75" + 0.75" = 2.5", use (2nd overlay & transverse bars on top)
 - p. Variable Volume = 5957 sq. ft. x (2.5 in./12) = 1241 cu. ft. / 27 = 46 cu. yd.
82. Item 848-Hand Chipping (SY)
- a. 2020 BDM 403.4.1 handchipping area = 10% of variable thickness area
 - b. D7 Factors (8/7/2018) policy):
 - c. Asphalt/green patch, MF = 1.0
 - d. 2nd overlay minimum area = 10% of hydro area
 - e. Area = 0.1 x 5957 sq. ft. = 596 sq. ft. = 5% < 10%, not good
 - f. -use area = 0.1 x 10905 sq. ft. = 1091 sq. ft. / 9 = 121 sq. yd.
83. Item 848-Existing Concrete Overlay Removed, (2" Thick) (SY)
- a. Does not include deck end rebuilds. Same area as the hydro as Item 848E20001 = 1212 sq. yd. = total
84. Item 848-Removal of Debonded or Deteriorated Existing Variable Thickness Concrete Overlay (SY)
- a. D7 (8/7/2018 policy) = 50% of handchipping area
 - b. 0.5 x 1091 sq. ft. = 546 sq. ft. / 9 = 61 sq. yd.

Maintenance of Traffic

85. Item 614-Law Enforcement Officer with Patrol Car for Assistance (HOUR)
- a. Following are estimates for each and discussion with Area Construction Engineer
 - b. MOT-4-2199 Phase 1 NB setup/teardown = 16 hr.
 - c. MOT-444-0023L Phase 1 SB setup/teardown = 16 hr.
 - d. MOT-4-2199 Phase 2 SB setup/teardown = 16 hr.
 - e. MOT-444-0023L Phase 2 SB setup/teardown = 16 hr.
 - f. Painting Nighttime ramp closures = 396 hr.
 - g. Painting lane closures for falsework installation = 40 hr
 - h. Total = 500 hr.
86. Item 614-Increased Barrier Delineation (FT)
- a. To be used on the tapered portable barrier runs
 - b. S.R. 444 STA. 20+73 to STA. 27+04 = 140 ft.
 - c. S.R. 444 STA. 22+64 to STA. 28+89 = 120 ft.
 - d. S.R. 444 STA. 20+09 to STA. 28+23 = 200 ft.
 - e. S.R. 444 STA. 21+81 to STA. 29+53 = 200 ft.

- f. S.R. 444 STA. 22+64 to STA. 28+35 = 60 ft.
 - g. Total = 720 ft.
87. Item 614-Work Zone Impact Attenuator, 24" Wide Hazards, (Unidirectional) (EA)
- a. S.R. 444 STA. 20+73 to STA. 27+04 = 1 each
 - b. S.R. 444 STA. 22+64 to STA. 28+89 = 1 each
 - c. S.R. 444 STA. 20+09 to STA. 28+23 = 1 each
 - d. S.R. 444 STA. 21+81 to STA. 29+53 = 1 each
 - e. S.R. 444 STA. 22+64 to STA. 28+35 = 1 each
 - f. Total = 5 each
88. Item 614-Detour Signing (LS)
- a. Lump Sum (LS)
89. Item 614-Asphalt Concrete for Maintaining Traffic (CY)
- a. Estimate 15 cu. yd. for any pavement patching of existing pavement.
90. Item 614-Barrier Reflector, Type 1 (One Way) (EA)
- a. S.R. 444 STA. 20+73 to STA. 27+04 = 11 each
 - b. S.R. 444 STA. 22+64 to STA. 28+89 = 12 each
 - c. S.R. 444 STA. 20+09 to STA. 28+23 = 14 each
 - d. S.R. 444 STA. 21+81 to STA. 29+53 = 13 each
 - e. S.R. 444 STA. 22+64 to STA. 28+35 = 12 each
 - f. Total = 62 each
91. Item 614-Object Marker, One Way (EA)
- a. S.R. 444 STA. 20+73 to STA. 27+04 = 14 each
 - b. S.R. 444 STA. 22+64 to STA. 28+89 = 14 each
 - c. S.R. 444 STA. 20+09 to STA. 28+23 = 18 each
 - d. S.R. 444 STA. 21+81 to STA. 29+53 = 17 each
 - e. S.R. 444 STA. 22+64 to STA. 28+35 = 13 each
 - f. Total = 76 each
92. Item 614-Portable Changeable Message Sign, As Per Plan (SNMT)
- a. Placed at ramps to be closed—2 PCMS signs * 4 months = 8 sign months
 - b. For painting operation ramp closures = 2 PCMS signs * 1 month = 2 sign months
 - c. Total = 10 sign months
93. Item 614-Work Zone Edge Line, Class I, 6", 740.06, Type 1 (MILE)
- a. S.R. 444 STA. 16+80 to STA. 29+12 = 0.24 mile
 - b. S.R. 444 STA. 16+80 to STA. 27+04 = 0.20 mile
 - c. S.R. 444 STA. 19+46 to STA. 31+08 = 0.22 mile
 - d. S.R. 444 STA. 19+46 to STA. 37+79 = 0.35 mile
 - e. S.R. 444 STA. 18+70 to STA. 30+43 = 0.23 mile
 - f. S.R. 444 STA. 19+80 to STA. 29+45 = 0.19 mile
 - g. S.R. 444 STA. 19+45 to STA. 34+95 = 0.30 mile
 - h. S.R. 444 STA. 21+24 to STA. 40+05 = 0.36 mile
 - i. S.R. 444 STA. 35+89 to STA. 47+97 = 0.23 mile
 - j. S.R. 444 STA. 34+23 to STA. 34+95 = 0.02 mile
 - k. S.R. 444 STA. 19+46 to STA. 22+64 = 0.06 mile
 - l. S.R. 444 STA. 19+46 to STA. 35+75 = 0.31 mile
 - m. Total = 2.71 mile
94. Item 614-Work Zone Dotted Line, Class I, 6", 740.06, Type 1 (FT)
- a. S.R. 444 STA. 27+04 to STA. 28+23 = 120 ft.
 - b. S.R. 444 STA. 34+95 to STA. 39+15 = 420 ft.
 - c. Total = 540 ft.
95. Item 622-Portable Barrier, Unanchored (FT)
- a. S.R. 444 STA. 20+73 to STA. 27+04 = 640 ft.
 - b. S.R. 444 STA. 22+64 to STA. 28+89 = 630 ft.
 - c. S.R. 444 STA. 20+09 to STA. 28+23 = 820 ft.
 - d. S.R. 444 STA. 21+81 to STA. 29+53 = 780 ft.

- e. S.R. 444 STA. 22+64 to STA. 28+35 = 570 ft.
- f. Total = 3440 ft.

Incidentals

- 96. Item 614-Maintaining Traffic (LS)
 - a. Lump Sum (LS)
- 97. Item 619-Field Office, Type B (MNTH)
 - a. Begin to End Construction Date = 7 months
- 98. Item 623-Construction Layout Stakes and Surveying (LS)
 - a. Lump Sum (LS)
- 99. Item 624-Mobilization (LS)
 - a. Lump Sum (LS)

END OF CALCULATIONS