**PID 116923, DAR-47-0316 and DAR-127-3053: QUANTITY CALCULATIONS**

Calculated by: *Lawton Gerlinger, P.E., Date: 3/4/25*

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Revised by:

Roadway, Pavement, Traffic Control DAR-47

1. Item 202 Pavement Removed
   1. PV-1: 2337.50 SF from Microstation = 2205 SF/9 = 245 SY
   2. PV-2: 2310.40 SF from Microstation = 2163 SF/9 = 241 SY
      1. Total: 245 + 241 = 486 SY
2. Item 202 Guardrail Removed, APP
   1. GR-1: 150 FT
   2. GR-2: 150 FT
   3. GR-3: 150 FT
   4. GR-4: 150 FT
3. Item 204 Subgrade Compaction
   1. PV-1: 30’ x 75’ = 2250 SF/9 = 250 SY
   2. PV-2: 30’ x 75’ = 2250 SF/9 = 250 SY
      1. Total: 250 + 250 = 500 SY
4. Item 209 Linear grading
   1. 485’ + 100’ BTA round up to 600 = 6 Total Stations
5. Item 301 Asphalt Concrete Base, PG64-22, (449)
   1. PV-1: 25’ x 75’ x .5 = 937.5 CF/27 = 35 CY
   2. PV-2: 25’ x 75’ x .5 = 937.5 CF/27 = 35 CY
      1. Total: 35 + 35 = 70 CY
6. Item 304 Aggregate Base
   1. PV-1: 26’ x 75’ x .5 = 975 CF/27 = 36 CY
   2. PV-2: 26’ x 75’ x .5 = 975 CF/27 = 36 CY
      1. Total: 36 + 36 = 72 CY
7. Item 407 Tack Coat (0.055 GAL/SY)
   1. PV-1: (75’ x 24’) + (75’ x 25’) = 3675 SF/9 = 409 SY x 0.055 GAL/SY = 23 GAL
   2. PV-2: (75’ x 24’) + (75’ x 25’) = 3675 SF/9 = 409 SY x 0.055 GAL/SY = 23 GAL
      1. Total: 23 + 23 = 46 GAL
8. Item 441 Asphalt Concrete Surface Course, Type 1, (449), PG70-22M
   1. PV-1: 75’ x 30’ x 3/12 = 562.5 CF/27 = 21 CY
   2. PV-2: 75’ x 30’ x 3/12 = 562.5 CF/27 = 21 CY
      1. Total = 42 CY
9. Item 606 Guardrail, Type MGS
   1. GR-1: 75 FT
   2. GR-2: 75 FT
   3. GR-3: 75 FT
   4. GR-4: 75 FT
      1. Transition GR to tie bridge terminal assemblies to end anchors or existing guardrail.
10. Item 606 Anchor Assembly, MGS, Type E
    1. GR-1: 1 EACH
    2. GR-2: 1 EACH
    3. GR-3: 1 EACH
    4. GR-4: 1 EACH
11. Item 606 MGS Bridge Terminal Assembly, Type TST-2
    1. GR-1: 1 EACH
    2. GR-2: 1 EACH
    3. GR-3: 1 EACH
    4. GR-4: 1 EACH
       1. Each GR run needs this bridge terminal assembly. Pay length is almost 27 Feet per SCD.
12. Item 626 Barrier Reflector, Type 2 Bi-Directional
    1. Need reflectors on all new GR. 300’ GR runs. 100 foot spacing per CMS 626.03. 300/100 = 3 Reflectors per side. 6 total.
13. Item 630 Sign, flat sheet, as per plan
    1. Each sign is 24” x 4” round to 1 SF per sign. 2 signs so 2 SF.
14. Item 646 Edge Line
    1. EL-1: 0.04 Miles. CALC: STA. 166+34.54 – STA. 164+44.54 = 190 FT/5280 FT/MILE = 0.03598 MILE
    2. EL-2: 0.04 Miles.
15. Item 646 CenterLine
    1. CL-1: 0.08 Miles.

Roadway, Pavement, Traffic Control DAR-127

1. Item 202 Pavement Removed
   1. PV-1: 4251.35 SF from Microstation = 4147 SF/9 = 461 SY
   2. PV-2: 5473.90 SF from Microstation = 5265 SF/9 = 585 SY
      1. Total: 461 + 585 = 1046 SY
2. Item 202 Guardrail Removed, APP
3. GR-1: 125 FT
4. GR-2: 125 FT
5. GR-3: 125 FT
6. GR-4: 125 FT
7. Item 202 Removal Misc.: Removal of Bridge ID sign and reerection
   1. 2 Signs. Location on Site plan
8. Item 204 Subgrade Compaction
9. PV-1: 34’ x 112’ + 15’ x 44’= 4468 SF/9 = 497 SY
10. PV-2: 34’ x 136’ + 15’ x 44’ = 5284 SF/9 = 587 SY
    * 1. Total: 497 + 587 = 1084 SY
11. Item 209 Linear grading
12. 290’ round up to 300 = 3 STA per side = 6 Total Stations
13. Item 301 Asphalt Concrete Base, PG64-22, (449)
14. PV-1: 37’ x 112’ x .5 = 2072 CF/27 = 77 CY
15. PV-2: 37’ x 136’ x .5 = 2516 CF/27 = 93 CY
    * 1. Total: 77 + 93 = 170 CY
16. Item 304 Aggregate Base
17. PV-1: 38’ x 112’ x .5 + 15’ x 44’ x .5’ = 2458 CF/27 = 91 CY
18. PV-2: 38’ x 136’ x .5 + 15’ x 44’ x .5’ = 2914 CF/27 = 108 CY
    * 1. Total: 91 + 108 = 199 CY
19. Item 407 Tack Coat (0.055 GAL/SY)
20. PV-1: (112’ x 36’ x 2 applications) = 8064 SF/9 = 896 SY x 0.055 GAL/SY = 50 GAL
21. PV-2: (136’ x 36’ x 2 applications) = 9792 SF/9 = 1088 SY x 0.055 GAL/SY = 60 GAL
    * 1. Total: 50 + 60 = 110 GAL
22. Item 441 Asphalt Concrete Surface Course, Type 1, (449), PG70-22M
23. PV-1: 112’ x 36’ x 3/12 = 1008 CF/27 = 37 CY
24. PV-2: 136’ x 36’ x 3/12 = 1224 CF/27 = 45 CY
    * 1. Total = 82 CY
25. Item 601 Rock channel protection Type c
    1. Plan area of rear abutment from Microstation, 254.25 SF x 2’ depth = 508.50 CF/27 = 19 CY
    2. Plan area of forward abutment from Microstation, 256.50 SF x 2' depth = 513 CF/27 = 19 CY
       1. Total = 38 CY
26. Item 606 Guardrail, Type MGS
27. GR-1: 62.5 FT
28. GR-2: 75 FT
29. GR-3: 50 FT
30. GR-4: 37.5 FT
    * 1. Transition GR to tie bridge terminal assemblies to end anchors or existing guardrail.
31. Item 606 Anchor Assembly, MGS, Type E
32. GR-1: 1 EACH
33. GR-2: 1 EACH
34. GR-3: 1 EACH
35. GR-4: 1 EACH
36. Item 606 MGS Bridge Terminal Assembly, Type TST-2
37. GR-1: 1 EACH
38. GR-2: 1 EACH
39. GR-3: 1 EACH
40. GR-4: 1 EACH
    * 1. Each GR run needs this bridge terminal assembly. Pay length is almost 27 Feet per SCD.
41. Item 626 Barrier Reflector, Type 2 Bi-Directional
42. Need reflectors on all new GR. 300’ GR runs. 100 foot spacing per CMS 626.03. 300/100 = 3 Reflectors per side. 6 total.
43. Item 646 Edge Line
44. EL-1: 0.06 Miles. CALC: STA. 846+87.21 – STA. 843+77.21 = 310 FT/5280 FT/MILE = 0.0587 MILE
45. EL-2: 0.06 Miles.
46. Item 646 CenterLine
47. CL-1: 0.06 Miles.

Erosion Control

1. Item 832 Erosion Control
   1. 5000 EACH
2. Item 659 Seeding and Mulching
   1. **DAR-47**
      1. NW Quadrant: 102 SY
      2. SW Quadrant: 188 SY
      3. NE Quadrant: 110 SY
      4. SE Quadrant: 128 SY
         1. Total Seeding and Mulching: 102+188+110+128 = 528 SY
3. Item 659 Repair Seeding and Mulching
   1. 5% of seeding and mulching: 0.05 x 528 = 26 SY
4. Item 659 Commercial Fertilizer
   1. (1 TON/7410SY permanent) x 528 + (1 TON/11,111 SY interseeding) x 26 = 0.07 TON
5. Item 659 Water
   1. (2 x 0.0027 M. GAL/SY) x 528 + (0.0027 M. GAL/SY) x 26 = 3 M. GAL
6. Item 659 Seeding and Mulching
7. **DAR-127**
   * 1. NW Quadrant: 196 SY
     2. SW Quadrant: 200 SY
     3. NE Quadrant: 163 SY
     4. SE Quadrant: 182 SY
        1. Total Seeding and Mulching: 196+200+163+182 = 741 SY
8. Item 659 Repair Seeding and Mulching
   1. 5% of seeding and mulching: 0.05 x 528 = 37 SY
9. Item 659 Commercial Fertilizer
   1. (1 TON/7410SY permanent) x 528 + (1 TON/11,111 SY interseeding) x 26 = 0.10 TON
10. Item 659 Water
    1. (2 x 0.0027 M. GAL/SY) x 528 + (0.0027 M. GAL/SY) x 26 = 4 M. GAL

Structures: DAR-47-0316

1. Item 202 Portions of Structure Removed, Over 20 foot Span, APP
   1. Lump Sum (LS)
2. Item 202 Wearing course removed
   1. Existing asphalt on bridge deck: 32’ x 30’ + 15’ x = 960 SF/9 = 107 SY
3. Item 202 Bridge Railing Removed
   1. 37.5 FT each side (Existing Plans) = 75 FT
4. Item 503 Unclassified Excavation
   1. Lump Sum (LS)
5. Item 509 Concrete Reinforcement, replacement of existing concrete reinforcement, as per plan
   1. 50 lbs for contingency.
6. Item 509 Uncoated Steel Reinforcement
   1. Deck Edge rebar: See sheet 16. 1688 lbs
7. Item 511 Class QC2 Concrete, Superstructure, Reconstruction
   1. 1 Deck edge: 5.5 sf From Microstation, 5.5’ x 30’ x 2 deck edges = 330 CF/27 = 13 CY
8. Item 516 2” Deep Joint Sealer, APP
   1. At interface between concrete and asphalt: 32’ wide x 1/cos(18.50) = 33.74 FT x 2 approaches = 68 FT
9. Item 517 Railing (Three Steel Tube Bridge Railing)
   1. See sheet 13: 40 FT each side x 2 sides = 80 FT
10. Item 518 Steel Drip Strip
    1. [30 FT per side + (4 posts x 1.5 FT)] x 2 sides = 72 FT
11. Item 519 Patching concrete structure
    1. 16 SF at 4SF per wingwall top
12. Item 625 structure grounding system
    1. 1 EACH
13. Item 844 Galvanic Anode Protection, as per plan
    1. 39 anodes per deck edge. 78 EACH
14. Item 848 Superplasticized dense concrete overlay using hydrodemolition, 2 ¾”
    1. 32’ x 30’ = 960 SF/9 = 107 SY
15. Item 848 Surface preparation using hydrodemolition, as per plan
    1. 32’ x 30’ – (2 x 3’ x 30’) = 780 SF/9 = 87 SY
16. Item 848 Superplasticized Dense Concrete overlay (variable thickness), Material only
    1. Asphalt on top of existing deck, have to assume a percentage delaminated. 20%
       1. 20% per BDM 403-3 table use 40%. 780 SF x 2/12” x 40% = 52 CF/27 = 2 CY
17. Item 848 Hand chipping
    1. 10% of estimated variable thickness area per BDM 403.4.1. 0.4 x 780 SF x 0.1 = 31.20 SF/9 = 4 SY
18. Item 848 Test slab
    1. Lump Sum (LS)

Structures: DAR-127-3053

1. Item 202 Portions of Structure Removed, Over 20 foot Span, APP
   1. Lump Sum (LS)
2. Item 202 Approach slab removed
   1. 24’ x 15’ x 2 approach slab = 720 SF/9 = 80 SY
3. Item 202 Wearing course removed
   1. Existing asphalt on bridge deck: 44’ x 22.10’ = 972.4 SF/9 = 108 SY
   2. Existing asphalt on approach slabs: 2 x 24’ x 15’ = 720 SF/9 = 80 SY
      1. Total = 188 SY
4. Item 202 Bridge Railing Removed
   1. 25 FT each side (Existing Plans) = 50 FT
5. Item 202 Cofferdams and Excavation Bracing
   1. Lump Sum (LS)
6. Item 503 Unclassified Excavation
   1. Lump Sum (LS)
7. Item 509 Epoxy coated Steel Reinforcement
   1. Abutment and approach slab: See sheet 24. 284 + 7856 = 8140 lbs
8. Item 509 Galvanized Steel Reinforcement
   1. Bridge Slab: See sheet 24. 14943 lbs
9. Item 510 Dowel Holes with Nonshrink, Nonmetallic Grout
   1. See sheet 24. 48 abutments, 94 bridge slab = 142 Total
10. Item 511 Class QC2 Concrete, Superstructure
    1. Abutment tops: 3.58 SQ FT from section view, 47 feet is the length of each abutment top. 3.58 SF x 47 x 2 abutments = 336.5 CF
    2. Bridge slab: 63.65 SF from transverse section view, 22.10’ bridge limit. 63.65 SF x 22.10’ = 1407 CF
       1. Total = 336.5 CF + 1407 CF = 1743.50 CF/ 27 = 65 CY
11. Item 511 Class QC1 concrete, retaining/wingwall not including footing
    1. Wingwalls: 13.25 SF from wingwall section x 1.5’ x 4 wingwalls = 79.5 CF/27 = 3 CY
12. Item 516 1” Preformed Expansion Joint Filler
    1. 47’-2” x 8/12” x 2 abutment seats = 62.89 SF
    2. 1’-6” x 2.81’ x 4 wingwall/superstructure = 16.86 SF
    3. 6” x 12” x 4 approach slab and superstructure interface = 2 SF
       1. Total = 63 + 17 + 2 = 82 SF
13. Item 516 1/2” Preformed Expansion Joint Filler
    1. 6/12” x 47’-2” x 2 abutment backs = 47.17 SF, 48 SF
14. Item 516 2” Deep Joint Sealer, APP
    1. At interface between concrete and asphalt: 44’ wide x 1/cos(18) = 46.26 FT x 2 approaches = 92.5 FT
15. Item 516 Integral Abutment Expansion Joint Seal
    1. [1’+ 4.5/12 + 46.30’ + 4.5/12 + 1’] x 2 abutments = 98.1 FT
16. Item 517 Railing (Three Steel Tube Bridge Railing)
    1. 30 FT each side x 2 sides = 60 FT
17. Item 518 Porous Backfill with Geotextile Fabric
    1. 150 SF section area (1 foot below cutline) x 2’ deep x 2 abutments = 600 CF/27 = 23 CY
18. Item 518 Steel Drip Strip
    1. [20 FT per side + (3 posts x 1.5 FT)] x 2 sides = 50 FT
19. Item 526 Reinforced Concrete Approach Slabs (T=12”), APP
    1. 44 FT wide x 15 FT long x 2 = 1320 SF/9 = 147 SY

Maintenance of Traffic

1. Item 614 Detour signing
   1. Lump Sum (LS)

Incidentals

1. Item 614-Maintaining Traffic (LS)
2. Item 619-Field Office, Type B 5 (MNTH)
3. Item 623-Construction Layout Stakes and Surveying (LS)
4. Item 624-Mobilization (LS)

**END OF CALCULATIONS**

**Misc.**

Wingwall length. BDM 306.2.4 Wingwalls. Max slope behind the wingwall is 1 vertical to 2 horizontal. Wingwall elevations are approx. 909.5 feet. End of wingwalls existing ground is 906 feet. 909.5-906 = 3.5 feet vertical. Wingwalls need to be at least 7 feet in length.