



PID 114842, MOT-75-23.71: QUANTITY CALCULATIONS

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Roadway

1. Item 201-Clearing and Grubbing (LS)
 - a. *Site visit confirmed Montgomery County clearing limits. Left in contract in case needed by Contractor.*
- ~~2. Item 201-Tree Removed, 4"-12" (EA)~~
 - ~~a. Total = 3ea (from field visit notes)~~
 - b. Site visit confirmed removal limits. Removed item.*
3. Item 202-Structure Removed, As Per Plan (LS)
 - a. Railroad rails: 2ea @ 270' = 540'
 - b. Railroad ties: 270' / 2' = 135spa = 136ea. 8"x8"x8.5'
 - c. Railroad hardware: Base plate at every tie. 136ea * 2ea = 272ea
 - d. Railroad ballast: 270' * 14' * 1.25' = 4,725cf = 175cy
 - e. Aluminum railing: (from exist plans) = 477'
 - f. Superstructure concrete: (from exist plans) = 194cy
 - g. Substructure concrete: 3,151cf+4,024cf = 7,175cf = 266cy
 - h. Structural steel: (from exist plans) = 453,100#
4. Item 202-Concrete Barrier Removed (FT)
 - a. Total = 48' (field measured) x2ea = 96'
5. Item 202-Guardrail Removed (FT)
 - a. SB: 39'+194.5' = 233.5' (field measured) -12.5' (Type B AA) = 221'
 - b. NB: 39'+196.5' = 235.5' (field measured) -12.5' (Type B AA) = 223'
 - c. Total = 223' x2ea = 446'
6. Item 202-Anchor Assembly Removed, Type B (EA)
 - a. Total = 2ea
7. Item 202-Fence Removed (FT)
 - a. SB: 31'+100'+31' = 162' -20' = 142'
 - b. NB: 23'+102'+28' = 153' -20' = 133'
 - c. Total = 162'+153'-315' = 142'+133' = 275'
8. Item 202-Vandal Protection Fence Removed (FT)
 - a. Total = 18'+20'+18' = 56' x2ea = 112ea
9. Item 203-Excavation (CY)
 - a. Excavation for the abut removal is included with 202 for payment.
 - b. SB, in front of abut: 1/2x4.75'x42' = 99.75sf x20' = 1,995cf
 - c. SB, sides (3:1): 1/2x99.75sf x25' = 1,247cf x2ea = 2,494cf
 - d. SB, behind abut: 1/2x8.5'x17.75' = 75.43sf x20' = 1,509cf

- e. SB, sides (2:1): $1/2 \times 75.43 \text{sf} \times 15' = 566 \text{cf}$ $x2ea = 1,131 \text{cf}$
 - f. SB, wingwalls: $-(98 \text{cf} + 76 \text{cf} + 5.68' \times 12.42' \times 3.75' \times 2ea) = -703 \text{cf}$
 - i. SB, total = $1995 + 2494 + 1509 + 1131 - 703 = 6,426 \text{cf} = 238 \text{cy}$
 - g. NB, in front of abut: $1/2 \times 3' \times 34' = 51 \text{sf}$ $x20' = 1,020 \text{cf}$
 - h. NB, sides (3:1): $1/2 \times 51 \text{sf} \times 20' = 510 \text{cf}$ $x2ea = 1,020 \text{cf}$
 - i. NB, behind abut: $1/2 \times 7.5' \times 14.5' = 54.38 \text{sf}$ $x20' = 1,088 \text{cf}$
 - j. NB, sides (2:1): $1/2 \times 54.38 \text{sf} \times 20' = 544 \text{cf}$ $x2ea = 1,088 \text{cf}$
 - k. NB, wingwalls: $-(90 \text{cf} + 70 \text{cf} + 4.10' \times 11.42' \times 3.58' \times 2ea) = -496 \text{cf}$
 - i. NB, total = $1020 + 1020 + 1088 + 1088 - 496 = 3,720 \text{cf} = 138 \text{cy}$
 - l. Total = $238 + 138 = 376 \text{cy}$
10. Item 607-Fence, Type 47 (FT)
- a. Total = $2ea @ 102' = 204'$
11. Item 607-Fence Rebuilt, Type 47 (FT)
- a. Total = $12'$ (1 location between posts)
- ~~12. Item 607-Fence Line Seeding and Mulching (FT)~~
- ~~a. Total = $2ea @ 102' = 204'$~~
 - ~~b. Site visit confirmed removal limits. Removed item.~~

Erosion Control

13. Item 659-Seeding and Mulching (SY)
- a. Calculate max Earth Disturbed Area & check if under 1.0acre threshold.
 - i. SB, 2:1 = $112' \times 30.75' (2.24/2) = 3,857 \text{sf}$
 - ii. SB, 3:1 = $112' \times 53.5' (3.16/3) = 6,312 \text{sf}$
 - iii. SB, GR = $2.5' + 223' + 12.5' + 48' + 2.5' = 289' - 112' = 177' \times 24' (\text{max}) = 4,248 \text{sf}$
 - 1. SB, total = $3857 + 6312 + 4248 = 14,417 \text{sf}$
 - iv. NB, 2:1 = $114' \times 33.25' (2.24/2) = 4,245 \text{sf}$
 - v. NB, 3:1 = $114' \times 46.5' (3.16/3) = 5,584 \text{sf}$
 - vi. NB, GR = $289' - 114' = 175' \times 24' (\text{max}) = 4,200 \text{sf}$
 - 1. NB, total = $4245 + 5584 + 4200 = 14,029 \text{sf}$
 - vii. Total Max EDA = $14417 + 14029 = 28,446 \text{sf} = 0.7 \text{acre} < 1.0 \text{acre}$, OK
 - b. Calculate Project EDA
 - i. SB, 2:1 = $31' \times 2.24/2 = 35' \times 50' = 1,750 \text{sf}$
 - ii. SB, 3:1 = $48' - 1.25' + 2' = 48.75' \times 3.16/3 = 51' \times 70' = 3,570 \text{sf}$
 - iii. SB, barrier = $2.5' + 223' + 12.5' + 48' + 2.5' = 289' \times 5' = 1,445 \text{sf}$
 - 1. SB, total = $1750 + 3570 + 1445 = 6,765 \text{sf} = 752 \text{sy}$
 - iv. NB, 2:1 = $33' \times 2.24/2 = 37' \times 40' = 1,480 \text{sf}$
 - v. NB, 3:1 = $41' - 1.25' + 2' = 41.75' \times 3.16/3 = 44' \times 60' = 2,640 \text{sf}$
 - vi. NB, barrier = SB = $1,445 \text{sf}$
 - 1. NB, total = $1480 + 2640 + 1445 = 5,565 \text{sf} = 618 \text{sy}$
 - vii. Total Project EDA = $752 + 618 = 1,370 \text{sy} = 0.3 \text{acre}$
 - c. Estimate Project EDA
 - i. Should be less than Project EDA, say = 0.2acre
 - d. Total EDA = $0.3 + 0.2 = 0.5 \text{acre} < 0.7 \text{acre}$, OK
 - e. Total perm seeding = total EDA = $0.5 \text{acre} = 2,420 \text{sy}$
14. Item 659-Repair Seeding and Mulching (SY)
- a. 5% of permanent per Designer Note
 - b. Total = $2420 \text{sy} \times 0.05 = 121 \text{sy}$
15. Item 659-Inter-Seeding (SY)
- a. 5% of permanent per Designer Note
 - b. Total = $2420 \text{sy} \times 0.05 = 121 \text{sy}$
16. Item 659-Commercial Fertilizer (TON)
- a. Rates per Designer Note
 - b. Perm seed total = $2420 \text{sy} \times 1 \text{ton} / 7410 \text{sy} = 0.33 \text{ton}$
 - c. Inter-seed total = $121 \text{sy} \times 20\# / 1000 \text{sf} \times 1 \text{ton} / 2000\# \times 9 \text{sf} / \text{sy} = 0.01 \text{ton}$

- d. $Total = 0.33 + 0.01 = 0.34 \text{ ton}$
- 17. Item 659-Lime (ACRE)
 - a. $Total = Perm \text{ seed} = 0.5 \text{ acre}$
- 18. Item 659-Water (MGAL)
 - a. Rates per Designer Note
 - b. $Perm \text{ seed total} = 2420 \text{ sy} * 0.0027 \text{ Mgal/sy} * 2 \text{ ea} = 13 \text{ Mgal}$
 - c. $Inter\text{-seed total} = 121 \text{ sy} * 0.0027 \text{ Mgal/sy} * 2 \text{ ea} = 0.7 \text{ Mgal}$
 - d. $Total = 13 + 0.7 = 14 \text{ Mgal}$
- 19. Item 832-Erosion Control (EA)
 - a. From TEC Estimate Spreadsheet = \$6,000

Maintenance of Traffic

- 20. Item 614-Law Enforcement Officer with Patrol Car for Assistance (HOUR)
 - a. ~~Total = 30hrs (Benchmarked off of PID 86767)~~
 - b. $Total = 150 \text{ hrs (input from Construction)}$
- 21. Item 614-Work Zone Impact Attenuator, 24" Wide Hazards, (Unidirectional), As Per Plan (EA)
 - a. $Total = 2 \text{ ea.}$
- 22. Item 614-Barrier Reflector, Type 1 (EA)
 - a. TEM 605-19.2: Max spa = 50'
 - b. $Total = PB = 240' / 50' = 5 \text{ spa} = 6 \text{ ea} \times 2 \text{ ea} = 12 \text{ ea}$
- 23. Item 614-Object Marker, One Way (EA)
 - a. TEM 605-19.2: Max spa = 50'
 - b. $Total = PB = 240' / 50' = 5 \text{ spa} = 6 \text{ ea} \times 2 \text{ ea} = 12 \text{ ea}$
- 24. Item 614-Portable Changeable Message Sign (EA)
 - a. $Total = 2 \text{ ea (2 signs for 1mth each)}$
- 25. Item 616-Water
 - a. Rates per Designer Note, Lower used for small project.
 - b. $Total = Excavation = 138 \text{ cy} \times 0.002 \text{ Mgal/cy} = 0.3 \text{ Mgal}$
- 26. Item 622-Portable Barrier, Unanchored (FT)
 - a. L&D Vol1, F600-1: LC = 30'
 - b. L&D Vol1, F602-1: Length of Need
 - i. $L1 = 25' - \text{to accommodate grading}$
 - ii. $L2 = 1'$
 - iii. $LR = 415'$
 - iv. $LH = 10.5' + 20' + 2' + 4' = 18.2'$
 - v. $a:b = 20:1$
 - vi. $LON: X = [18.2' + (1/20)25' - 1'] / [(1/20) + (18.2' / 415')] = 196' \sim \text{Exist.}$
 - vii. $Flared \text{ Barrier Offset: } Y = 18.2' - 196'(18.2' / 415') = 9.6' \sim 12' - 2.5' = 9.5', \text{ OK}$
 - c. Stop PB at ex. Dwall to minimize conflicts with expected crane outriggers.
 - i. $Flared \text{ PB length} = 196' - 25' - 25' (\text{atten.}) - 10' (1 \text{ str. segment for atten.}) = 136', \text{ use } 140'$
 - 1. $Actual \text{ Y} = 1' + 140'(1/20) = 8', > 5' \ \& \ < 9.5', \text{ OK}$
 - ii. $PB \text{ length} = 10' + 140' + 25' + 20' + 15' = 210'$
 - d. $Total \text{ PB} = 210' \times 2 \text{ ea} = 420'$

Incidentals

- 27. Item 614-Maintaining Traffic (LS)
- 28. Item 623-Construction Layout Stakes and Surveying (LS)
- 29. Item 624-Mobilization (LS)

END OF CALCULATIONS