| PROJECT | LAW-7-2.17 | | | | | PROJ. NO. | 173608714 |
|---|---|---|---|---|---|---|---|
| SUBJECT | LAW-7-0370 Final Quantities | | | | | | |
| COMP BY | ms | DATE | 3/18/2024 | CHKD. BY | bsm | DATE | 7/24/2024 |

## BRIDGE ESTIMATED QUANTITIES

| Item | | Length | Width | Height | Number | Total | |
|---|---|---|---|---|---|---|---|
| Item 507, Steel Piling, HP10x42, Furnished | | | | | | | |
| | rear abut | 80.00 | 1.00 | 1.00 | 15 | 1200 | ft |
| | fwd abut | 85.00 | 1.00 | 1.00 | 15 | 1275 | |
| | | | | | | 2475 | ft. |
| Item 507, Steel Piling, HP10x42, Driven | | | | | | | |
| | rear abut | 75.00 | 1.00 | 1.00 | 15 | 1125 | ft |
| | fwd abut | 80.00 | 1.00 | 1.00 | 15 | 1200 | |
| | | | | | | 2325 | ft. |
| Item 511, Semi-Integral Diaphragm Guide | | | | | | | |
| | | 1.00 | 1.00 | 1.00 | 2 | 2 | ea |
| Item 511, Class QS2 Concrete, Bridge Deck | | | | | | | |
| | deck | 87.00 | 45.33 | 0.71 | 1 | 103 | cu. yd. |
| | haunch | 87.00 | 1.67 | 0.35 | 5 | 10 | |
| | | 87.00 | 2.83 | 0.35 | 2 | 6 | |
| | abut diaphragm | 9.99 | 4.50 | 6.35 | 8 | 85 | |
| | | 3.78 | 4.50 | 6.35 | 4 | 16 | |
| | | | | | | 220 | cu. yd. |
| Item 511, Class QS2 Concrete, Parapets | | | | | | | |
| | | 87.00 | 4.08 | 1.00 | 2 | 26 | cu. yd. |
| Item 511, Class QS1 Concrete, Abutments including Footings | | | | | | | |
| | footing | 57.39 | 6.00 | 3.00 | 2 | 77 | cu. yd. |
| | rear ww | 11.74 | 3.50 | 3.00 | 1 | 5 | |
| | | 10.91 | 3.50 | 3.00 | 1 | 4 | |
| | fwd ww | 8.24 | 3.50 | 3.00 | 1 | 3 | |
| | | 10.57 | 3.50 | 3.00 | 1 | 4 | |
| | beam seat rear | 27.82 | 4.50 | 2.34 | 1 | 11 | |
| | | 27.20 | 4.50 | 1.93 | 1 | 9 | |
| | fwd | 55.15 | 4.50 | 1.76 | 1 | 16 | |
| | wingwall rear | 16.25 | 1.50 | 9.53 | 1 | 9 | |
| | | 6.63 | 1.50 | 5.25 | 1 | 2 | |
| | | 14.00 | 1.50 | 8.52 | 1 | 7 | |
| | | 6.00 | 1.50 | 5.50 | 1 | 2 | |
| | fwd | 13.00 | 1.50 | 7.28 | 1 | 5 | |
| | | 5.00 | 1.50 | 4.63 | 1 | 1 | |
| | | 14.00 | 1.50 | 7.92 | 1 | 6 | |
| | | 6.00 | 1.50 | 4.77 | 1 | 2 | |
| | | | | | | 162 | cu. yd. |

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PROJECT LAW-7-2.17 PROJ. NO. 173608714
SUBJECT LAW-7-0370 Final Quantities
COMP BY ms DATE 3/18/2024 CHKD. BY bsm DATE 7/24/2024

| Item | | Length | Width | Height | Number | Total | |
|---|---|---|---|---|---|---|---|
| Item 512, Sealing of Concrete Surfaces (epoxy-urethane) | | | | | | | |
| | deck | 87.00 | 19.92 | 1.00 | 2 | 385 | sq. yd. |
| | abutments | 55.15 | 1.00 | 12.75 | 2 | 156 | |
| | wingwalls | 81.00 | 1.50 | 1.00 | 4 | 54 | |
| | | 185 SF | 1.00 | 1.00 | 1 | 21 | |
| | | 147 SF | 1.00 | 1.00 | 1 | 16 | |
| | | 125 SF | 1.00 | 1.00 | 1 | 14 | |
| | | 146 SF | 1.00 | 1.00 | 1 | 16 | |
| | | | | | | 662 | sq. yd. |
| Item 515, PCIB Beam Type 4 | | 1.00 | 1.00 | 1.00 | 5 | 5 | ea |
| Item 515, Intermediate Diaphragms | | 1.00 | 1.00 | 1.00 | 12 | 12 | ea |
| Item 516, Elastomeric Bearings | | | | | | | |
| | Abutments | 1.00 | 1.00 | 1.00 | 10 | 10 | each |
| Item 516, 2" PEJF | | | | | | | |
| | abut | 4.53 | 1.00 | 6.42 | 4 | 116 | sq. ft. |
| | approach slab | 30.00 | 1.00 | 1.25 | 4 | 150 | |
| | | | | | | 266 | sq. ft. |
| Item 516, Semi-Integral Abutment Expansion Joint Seal | | | | | | | |
| | | 54.75 | 1.00 | 1.00 | 2 | 110 | ft |
| | | 3.60 | 1.00 | 1.00 | 4 | 14 | |
| | | | | | | 124 | ft |
| Item 516, Armorless Preformed Joint Seal | | | | | | | |
| | | 51.50 | 1 | 1 | 2 | 103 | ft |
| Item 518, 6" Perforated Plastic Pipe | | | | | | | |
| | | 138.50 | 1.00 | 1.00 | 1 | 139 | ft. |
| Item 518, 6" Non-Perforated Plastic Pipe | | | | | | | |
| | | 7.00 | 1.00 | 1.00 | 2 | 14 | ft. |
| Item 518, Porous Backfill with filter fabric | | | | | | | |
| | beam seat | 51.75 | 2.00 | 7.38 | 2 | 57 | cu. yd. |
| | footing | 70.62 | 1.00 | 3.00 | 2 | 16 | |
| | wingwall | 11.28 | 2.00 | 9.53 | 1 | 8 | |
| | | 8.90 | 2.00 | 8.52 | 1 | 6 | |
| | | 7.90 | 2.00 | 7.28 | 1 | 4 | |
| | | 8.90 | 2.00 | 7.92 | 1 | 5 | |
| | | | | | | 95 | cu. yd. |

| | | | | | | |
|---|---|---|---|---|---|---|
| PROJECT | LAW-7-2.17 | | | | PROJ. NO. | 173608714 |
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| COMP BY | ms | DATE | 3/18/2024 | CHKD. BY | bsm | DATE | 7/24/2024 |

| Item | Length | Width | Height | Number | Total | |
|---|---|---|---|---|---|---|
| Item 526, Approach Slabs | 30.00 | 45.33 | 1.00 | 2 | 302 | sq. yd. |
| | | | | | 302 | sq. yd. |
| Item 526, Type C Installation | | | | | | |
| rear | 51.34 | 1.00 | 1.00 | 1 | 51 | ft. |
| forward | 51.34 | 1.00 | 1.00 | 1 | 51 | |
| | | | | | 103 | ft |
| Item 611, Inlet No. 3 | | | | | | |
| | 1.00 | 1.00 | 1.00 | 3 | 3 | ea |
| Item 622, Concrete Barrier End Section, Type D | | | | | | |
| | 1.00 | 1.00 | 1.00 | 4 | 4 | ea |
| Item 622, Barrier, Misc.: Single Slope Barrier with Moment Slab | | | | | | |
| | 1.00 | 1.00 | 1.00 | 4 | 4 | ea |

## Objective:

*Reference:*

Quantity calculations for the MSE walls on the above referenced bridge.

Item 203 Ext. 20001 - Embankment, As Per Plan:

$embankment_{wall\_01} := 100\ yd^3$

$embankment_{wall\_02} := 100\ yd^3$

Item 203 Ext. 35110 - Granular Material, Type B:

$granular\_type\_b\_area_{wall\_01} := 3160\ ft^2$

$granular\_type\_b_{wall\_01} := (\text{mean}((599.39\ ft - 590.43\ ft), (598.45\ ft - 590.43\ ft)) - 17\ in) \cdot granular\_type\_b\_area_{wall\_01} = 827.842\ yd^3$

$granular\_type\_b\_area_{wall\_02} := 2205\ ft^2$

$granular\_type\_b_{wall\_02} := (\text{mean}((595.25\ ft - 587.19\ ft), (595.76\ ft - 587.19\ ft)) - 17\ in) \cdot granular\_type\_b\_area_{wall\_02} = 563.364\ yd^3$

$(\text{mean}((599.39\ ft - 590.43\ ft), (598.45\ ft - 590.43\ ft)) - 17\ in) = 7.073\ ft$

Item 512 Ext. 10050 - Sealing of Concrete Surfaces (non-epoxy):

$seal_{wall\_01} := 3847\ ft^2 + 218.5\ ft \cdot 10\ in = 447.676\ yd^2$

$seal_{wall\_02} := 3040\ ft^2 + 181\ ft \cdot 10\ in = 354.537\ yd^2$

Item 840 Ext. 20000 - Mechanically STabilized Earth Wall:

$MSE\_wall_1 := 6145.53\ ft^2$ - Area from Microstation

$MSE\_wall_2 := 4775\ ft^2$ - Area from Microstation

Item 840 Ext. 21000 - Wall Excavation:

$excavation\_area_{wall\_01} := 4710\ ft^2$

$b\_footing_{wall\_01} := 559.5\ ft - 1.5\ ft = 558\ ft$ - bottom of footing wall 2.

$ex\_ground_{wall\_01} := \text{mean}(559\ ft, 560\ ft)$ - Average Ground level at Wall 2.

$wall\_excavation_{wall\_01} := (ex\_ground_{wall\_01} - b\_footing_{wall\_01}) \cdot excavation\_area_{wall\_01} = 261.667\ yd^3$

Item 840 Ext. 21000 - Wall Excavation:

$excavation\_area_{wall\_02} := 210\ ft^2$ - Area from Microstation

$b\_footing_{wall\_02} := 557\ ft - 1.5\ ft = 555.5\ ft$ - bottom of footing wall 2.

$ex\_ground_{wall\_02} := 556\ ft$ - Average Ground level at Wall 2.

$wall\_excavation_{wall\_02} := \left(ex\_ground_{wall\_02} - b\_footing_{wall\_02}\right) \cdot excavation\_area_{wall\_02} = 3.889\ yd^3$

Item 840 Ext. 22000 - Foundation Preparation:

$MSE\_area_{wall\_01} := 4710\ ft^2 = 523.333\ yd^2$

$MSE\_area_{wall\_02} := 3608\ ft^2 = 400.889\ yd^2$

Item 840 Ext. 23000 - Select Granular Backfill:

$MSE\_sgb_{wall\_01} := 4603\ ft^2$

$MSE\_last\_strap\_area_{wall\_01} := 2872\ ft^2$ - Area from Microstation, for area for last strap at midpoint of footing for abutment.

$b\_footing_{wall\_01} = 558\ ft$

$b\_abut_{wall\_01} := 587.43\ ft$

$SGB_{wall\_01} := \left(\left(b\_abut_{wall\_01} + 1\ ft\right) - \left(b\_footing_{wall\_01} + 1\ ft\right)\right) \cdot MSE\_sgb_{wall\_01} \hookleftarrow = 5230.011\ yd^3$
$+ MSE\_last\_strap\_area_{wall\_01} \cdot \left(1.5\ ft + 0.5\ ft\right)$

$MSE\_sgb_{wall\_02} := 3608\ ft^2$

$MSE\_last\_strap\_area_{wall\_02} := 2122\ ft^2$ - Area from Microstation, for area for last strap at midpoint of footing for abutment.

$b\_footing_{wall\_02} = 555.5\ ft$

$b\_abut_{wall\_02} := 584.19\ ft$

$SGB_{wall\_02} := \left(\left(b\_abut_{wall\_02} + 1\ ft\right) - \left(b\_footing_{wall\_02} + 1\ ft\right)\right) \cdot MSE\_sgb_{wall\_02} \hookleftarrow = 3991.019\ yd^3$
$+ MSE\_last\_strap\_area_{wall\_02} \cdot \left(1.5\ ft + 0.5\ ft\right)$

Item 840 Ext. 23050 - Natural Soil:

$nat\_soil\_depth := 2\ ft$

$nat\_soil\_area_{wall\_01} := 496\ ft^2 + 532\ ft^2 = 1028\ ft^2$ - Area from Microstation

$nat\_soil\_vol_{wall\_01} := nat\_soil\_area_{wall\_01} \cdot nat\_soil\_depth = 76.148\ yd^3$

$nat\_soil\_area_{wall\_02} := 395\ ft^2 + 359\ ft^2 = 754\ ft^2$

$nat\_soil\_vol_{wall\_02} := nat\_soil\_area_{wall\_02} \cdot nat\_soil\_depth = 55.852\ yd^3$

Item 840 Ext. 25010 - 6" drainage Pipe, Perforated:

$perf\_pipe_{wall\_01} := 275\ ft$

$perf\_pipe_{wall\_02} := 245\ ft$

Item 840 Ext. 25020 - 6" drainage Pipe, Non-Perforated:

$nonperf\_pipe_{wall\_01} := 80\ ft$

$nonperf\_pipe_{wall\_02} := 35\ ft$

Item 840 Ext. 26000 - Concrete Coping:

$coping_{wall\_01} := 218.5\ ft$

$coping_{wall\_02} := 181\ ft$

Item 840 Ext. 27000 - On-Site Assistance:

Note: total of 2.5 days per bridge with MSE wall. therefore 1.25 days each wall.

Item 840 Ext. 28000 - SGB Inspection and Compaction Testing:

Lump Sum each wall.