



PROJECT LAW-7-2.17

PROJ. NO. 173608714

SUBJECT LAW-7-0387 Final Quantities

COMP BY ms

DATE 3/14/2024

CHKD. BY BSM

DATE 7/23/2024

BRIDGE ESTIMATED QUANTITIES

<u>Item</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>	<u>Number</u>	<u>Total</u>
Item 507, Steel Piling, HP10x42, Furnished					
rear abut	85.00	1.00	1.00	13	1105 ft
fwd abut	90.00	1.00	1.00	13	1170
					2275 ft.
Item 507, Steel Piling, HP10x42, Driven					
rear abut	80.00	1.00	1.00	13	1040 ft
fwd abut	85.00	1.00	1.00	13	1105
					2145 ft.
Item 511, Semi-Integral Diaphragm Guide					
	1.00	1.00	1.00	2	2 ea
Item 511, Class QC2 Concrete, Bridge Deck					
deck	78.00	45.58	0.71	1	93 cu. yd.
haunch	78.00	1.67	0.33	5	8
	78.00	3.13	0.33	2	6
abut diaphragm	9.14	4.00	6.35	8	69
					176 cu. yd.
Item 511, Class QC2 Concrete, Parapets					
	78.00	4.08	1.00	2	24 cu. yd.
Item 511, Class QC1 Concrete, Abutments including Footings					
footing	51.77	6.00	3.00	2	69 cu. yd.
	9.91	3.50	3.00	4	15
beam seat rear	5.88	4.00	1.50	1	1
	9.67	4.00	1.91	1	3
	9.67	4.00	2.33	1	3
	9.67	4.00	2.75	1	4
	11.83	4.00	2.74	1	5
fwd	5.17	4.00	1.48	1	1
	9.67	4.00	1.89	1	3
	9.67	4.00	2.29	1	3
	9.67	4.00	2.69	1	4
	11.83	4.00	2.66	1	5
winwall rear	14.00	1.50	7.79	1	6
	6.00	1.50	4.83	1	2
	14.00	1.50	8.09	1	6
	6.00	1.50	4.83	1	2
	14.00	1.50	9.30	1	7
	6.00	1.50	4.83	1	2
	14.00	1.50	8.00	1	6
	6.00	1.50	4.83	1	2
					148 cu. yd.



<u>Item</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>	<u>Number</u>	<u>Total</u>
Item 512, Sealing of Concrete Surfaces (epoxy-urethane)					
deck	78.00	19.94	1.00	2	346 sq. yd.
abutments	49.63	1.00	12.75	2	141
wingwalls	20.00	1.50	1.00	4	13
	101 SF	1.00	1.00	1	11
	105 SF	1.00	1.00	1	12
	98 SF	1.00	1.00	1	11
	99 SF	1.00	1.00	1	11
					544 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	4	4 ea
Item 516, Elastomeric Bearings					
Abutments	1.00	1.00	1.00	10	10 each
Item 516, 2" PEJF					
abut	4.06	1.00	6.42	4	104 sq. ft.
approach slab	20.00	1.00	1.25	4	100
					204 sq. ft.
Item 516, Semi-Integral Abutment Expansion Joint Seal					
	49.63	1.00	1.00	2	99 ft
	4.66	1.00	1.00	4	19
					118 ft
Item 518, 6" Perforated Plastic Pipe	64.51	1.00	1.00	2	129 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	46.63	2.00	5.00	2	35 cu. yd.
footing	46.63	1.00	3.00	2	10
wingwall	10.94	2.00	8.29	4	27
	9.92	1.00	3.00	4	4
					76 cu. yd.
Item 526, Approach Slabs	30.00	45.58	1.00	2	304 sq. yd.
	14.50	1.50	1.00	0	0
					304 sq. yd.



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Item 526, Type C Installation					
rear	46.29	1.00	1.00	1	46 ft.
forward	46.29	1.00	1.00	1	46
					93 ft
Item 611, Inlet No. 3	1.00	1.00	1.00	4	4 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:

$$embankment_{wall_01} := 100 \text{ yd}^3$$

$$embankment_{wall_02} := 100 \text{ yd}^3$$

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

$$granular_type_b_area_{wall_01} := 1402 \text{ ft}^2$$

$$granular_type_b_{wall_01} := (\text{mean}((583.52 \text{ ft} - 575.61 \text{ ft}), (584.79 \text{ ft} - 575.61 \text{ ft})) - 17 \text{ in}) \downarrow = 370.145 \text{ yd}^3 \\ \cdot granular_type_b_area_{wall_01}$$

$$granular_type_b_area_{wall_02} := 1952.5 \text{ ft}^2$$

$$granular_type_b_{wall_02} := (\text{mean}((586 \text{ ft} - 576.85 \text{ ft}), (584.78 \text{ ft} - 576.85 \text{ ft})) - 17 \text{ in}) \downarrow = 515.123 \text{ yd}^3 \\ \cdot granular_type_b_area_{wall_02}$$

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

$$seal_{wall_01} := 1714.08 \text{ ft}^2 + 155 \text{ ft} \cdot 10 \text{ in} = 204.805 \text{ yd}^2$$

$$seal_{wall_02} := 240.55 \text{ yd}^2 + 170 \text{ ft} \cdot 10 \text{ in} = 256.291 \text{ yd}^2$$

Item 840 Ext. 20000 - Mechanically Stabilized Earth Wall:

$$MSE_wall_1 := 3272 \text{ ft}^2$$

- Area from Microstation

$$MSE_wall_2 := 3530 \text{ ft}^2$$

- Area from Microstation

Item 840 Ext. 21000 - Wall Excavation:

$$excavation_area_{wall_01} := 434 \text{ ft}^2$$

$$b_footing_{wall_01} := 552.30 \text{ ft} - 1.5 \text{ ft} = 550.8 \text{ ft}$$

- bottom of footing wall 2.

$$ex_ground_{wall_01} := \text{mean}(558 \text{ ft}, 552 \text{ ft})$$

- Average Ground level at Wall 2.

$$wall_excavation_{wall_01} := (ex_ground_{wall_01} - b_footing_{wall_01}) \cdot excavation_area_{wall_01} = 67.511 \text{ yd}^3$$

Item 840 Ext. 21000 - Wall Excavation:

$$excavation_area_{wall_02} := 3328.36 \text{ ft}^2 \quad \text{- Area from Microstation}$$

$$b_footing_{wall_02} := 553.8 \text{ ft} - 1.5 \text{ ft} = 552.3 \text{ ft} \quad \text{- bottom of footing wall 2.}$$

$$ex_ground_{wall_02} := 564 \text{ ft} \quad \text{- Average Ground level at Wall 2.}$$

$$wall_excavation_{wall_02} := (ex_ground_{wall_02} - b_footing_{wall_02}) \cdot excavation_area_{wall_02} = 1442.289 \text{ yd}^3$$

Item 840 Ext. 22000 - Foundation Preparation:

$$MSE_area_{wall_01} := 2898.38 \text{ ft}^2 = 322.042 \text{ yd}^2$$

$$MSE_area_{wall_02} := 3328.36 \text{ ft}^2 = 369.818 \text{ yd}^2$$

Item 840 Ext. 23000 - Select Granular Backfill:

$$MSE_sgb_{wall_01} := 2809 \text{ ft}^2$$

$$MSE_last_strap_area_{wall_01} := 1546.27 \text{ ft}^2 \quad \text{- Area from Microstation, for area for last strap at midpoint of footing for abutment.}$$

$$b_footing_{wall_01} = 550.8 \text{ ft}$$

$$b_abut_{wall_01} := 572.61 \text{ ft}$$

$$SGB_{wall_01} := ((b_abut_{wall_01} + 1 \text{ ft}) - (b_footing_{wall_01} + 1 \text{ ft})) \cdot MSE_sgb_{wall_01} \downarrow + MSE_last_strap_area_{wall_01} \cdot (1.5 \text{ ft} + 0.5 \text{ ft}) = 2383.586 \text{ yd}^3$$

$$MSE_sgb_{wall_02} := 3245 \text{ ft}^2$$

$$MSE_last_strap_area_{wall_02} := 1985 \text{ ft}^2 \quad \text{- Area from Microstation, for area for last strap at midpoint of footing for abutment.}$$

$$b_footing_{wall_02} = 552.3 \text{ ft}$$

$$b_abut_{wall_02} := 573.85 \text{ ft}$$

$$SGB_{wall_02} := ((b_abut_{wall_02} + 1 \text{ ft}) - (b_footing_{wall_02} + 1 \text{ ft})) \cdot MSE_sgb_{wall_02} \downarrow + MSE_last_strap_area_{wall_02} \cdot (1.5 \text{ ft} + 0.5 \text{ ft}) = 2737.028 \text{ yd}^3$$

Item 840 Ext. 23050 - Natural Soil:

$$\text{nat_soil_depth} := 2 \text{ ft}$$

$$\text{nat_soil_area}_{\text{wall}_01} := 336.5 \text{ ft}^2 + 257.3 \text{ ft}^2 = 593.8 \text{ ft}^2 \quad \text{- Area from Microstation}$$

$$\text{nat_soil_vol}_{\text{wall}_01} := \text{nat_soil_area}_{\text{wall}_01} \cdot \text{nat_soil_depth} = 43.985 \text{ yd}^3$$

$$\text{nat_soil_area}_{\text{wall}_02} := 384.92 \text{ ft}^2 + 279.09 \text{ ft}^2 = 664.01 \text{ ft}^2$$

$$\text{nat_soil_vol}_{\text{wall}_02} := \text{nat_soil_area}_{\text{wall}_02} \cdot \text{nat_soil_depth} = 49.186 \text{ yd}^3$$

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

$$\text{perf_pipe}_{\text{wall}_01} := 204 \text{ ft}$$

$$\text{perf_pipe}_{\text{wall}_02} := 208 \text{ ft}$$

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

$$\text{nonperf_pipe}_{\text{wall}_01} := 70 \text{ ft}$$

$$\text{nonperf_pipe}_{\text{wall}_02} := 70 \text{ ft}$$

Item 840 Ext. 26000 - Concrete Coping:

$$\text{coping}_{\text{wall}_01} := 170 \text{ ft}$$

$$\text{coping}_{\text{wall}_02} := 170 \text{ ft}$$

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.