



Osborn Engineering
1100 Superior Avenue - Suite 300
Cleveland, Ohio 44114

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ITEM 202 – PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN

- Include parapets, fence, and any other appurtenances to complete work as described, etc.

LUMP SUM



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ITEM 509 – EPOXY COATED REINFORCING STEEL

From plan sheet (Reinforcing Schedule) quantities:

Superstructure (Parapet) Total (lbs); $T_{SUPER} = 11536$

TOTAL WEIGHT OF REINFORCING STEEL (LB); $T = T_{SUPER} = \underline{11,536.000}$



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ITEM 509 – REINFORCING STEEL, REPLACEMENT OF EXISTING REINFORCING STEEL, AS PER PLAN

For use in variable thickness and full-depth areas of deck overlay.

1. At south end: 2 areas located near joint – 20 SF
2. Asphalt patched areas near south end: $(4' \times 4') + (2.5' \times 2.5') + (3' \times 3') = 32$ SF
3. Areas across remainder/deck: 120 SF

Assume 5 LBS/SF for reinforcement replacement –

Total = 172 SF

Deck Total (lbs); $172 \text{ SF} \times 5 \text{ LBS/SF}$ $T_{\text{DECK}} = 860$ (say 900 LBS)

TOTAL WEIGHT OF REINFORCING STEEL (LB); $T = T_{\text{DECK}} = \underline{900.000}$



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ITEM 511 – CLASS QC2 CONCRETE, BRIDGE DECK (PARAPET), AS PER PLAN

*Item includes concrete parapets atop wingwalls.

Length of parapets on bridge (ft); $L_{BR} = 259.26$
Length of parapets on wingwalls (ft); $L_{WW} = 73.65$ (total)

Height of parapet (ft); $h_{ped} = 2.667$
Width of parapet (ft); $w_{ped} = 1.0$

TOTAL VOLUME OF PARAPET CONCRETE (CU YD); $T_{PAR} = \text{ceiling}(((2 \times L_{BR} + (L_{WW})) \times h_{ped} \times w_{ped}) / 27, 1) = \underline{59.00}$



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ITEM 512 – SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)

Parapet on Bridge

Sealing perimeter parapet (ft);

$$P_{\text{rail}} = 3.5 + 1 + 3.5 = \mathbf{8.000}$$

*Includes 2" lip on outside fascia

Sealing area – on bridge (SF);

$$A_{\text{BR_rails}} = (2 \times P_{\text{rail}} \times L_{\text{BR}}) = \mathbf{4148.160}$$

Parapet on Wingwalls

Sealing perimeter WW parapets (ft);

$$P_{\text{rail_ww}} = 3.5 + 1 + 3.5 = \mathbf{8.000}$$

*Includes 2" lip on outside fascia

Sealing area – at wingwalls (SF);

$$A_{\text{WW_rails}} = (P_{\text{rail_ww}} \times L_{\text{WW}}) = \mathbf{120.000}$$

TOTAL Area at parapets (SY);

$$T_{\text{ww_rails}} = \text{ceiling}((A_{\text{ww_rails}} + A_{\text{BR_rails}}) / 9, 1) = \mathbf{471.000}$$

TOTAL QUANTITY OF SEALING (SY);

$$\mathbf{T_{512} = T_{\text{ww_rails}} = \underline{471.000}}$$



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ITEM 513 – STRUCTURAL STEEL MEMBERS, LEVEL UF, AS PER PLAN

Interior crossframe (L 3x3x5/16) (lbs/ft); $W_{INT} = 6.10$
Length/complete interior replaced (ft); $L_T = 26.50$
Length/lower L interior replaced (ft); $L_L = 8.50$
Length/cross L interior replaced (ft); $L_C = 8.83$

Number total interior replaced; $N_T = 8$
Number lower L interior replaced; $N_L = 11$
Number cross L interior replaced; $N_C = 9$

Length of interiors (ft); $L_{INT} = (N_T \times L_T) + (N_L \times L_L) + (N_C \times L_C) = 384.970$

TOTAL WEIGHT OF STRUCTURAL STEEL (lbs); $W_{ST} = \text{ceiling}(W_{INT} \times L_{INT}, 1) = 2349.000$



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ITEM 516 – BEARING DEVICE, ROCKER

FWD ABUTMENT (EA); $E_{FA} = 0.00$
REAR ABUTMENT (EA); $E_{RA} = 1.00$

TOTAL NUMBER OF ROCKERS (EA); $R_{REPL} = \text{ceiling}(E_{FA} + E_{RA}, 1) = 1.00$



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ITEM 516 – REFURBISH BEARING DEVICE, AS PER PLAN

FWD ABUTMENT (EA); $E_{FA} = 5$
REAR ABUTMENT (EA); $E_{RA} = 4$
PIER 1 (EA); $E_{P1} = 0$
PIER 2 (EA); $E_{P2} = 0$
PIER 3 (EA); $E_{P3} = 0$

TOTAL NUMBER OF ROCKERS REFURBISHED (EA); $R_{REF} = \text{ceiling}(E_{FA} + E_{RA} + E_{P1} + E_{P2} + E_{P3}, 1) = \underline{9.00}$



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ITEM 516 – JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN

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ITEM 519 – PATCHING CONCRETE STRUCTURE, AS PER PLAN

Include walks, curbs, approach slabs and portions of backwalls

Per BDM C405.2.1 – add 25% to all quantities for final.

Length of curb repairs (ft); $L_{\text{curb}} = 2.25 + 3 + 105 + 105 + 5 + 2.25 = 222.500$

Width of curb (ft); $W_{\text{curb}} = 0.5$

$$L_{\text{curb}} \times W_{\text{curb}} = 112.00 \times 1.25 = 140$$

Area of walk repairs (SF); $A_{\text{walk}} = 4+4+2+4 = 14.000 \times 1.25 = 18$

Area of approach slab repairs (SF); $A_{\text{appr}} = 4+4+2+4 = 85.000 \times 1.25 = 107$

TOTAL CONCRETE PATCHING (SF); $P_{\text{CONC}} = \text{ceiling}((L_{\text{curb}} \times W_{\text{curb}}) + A_{\text{appr}} + A_{\text{walk}}, 1) = 265.000$



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ITEM 530 – SPECIAL STRUCTURE, MISC.: BRIDGE CLEANING

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ITEM 607 – VANDAL PROTECTION FENCE, 6' STRAIGHT COATED FABRIC

Length of parapets on bridge (ft); $L_{VPF} = 294.4$

TOTAL VANDAL PROTECTION FENCE (LF); $T_{VPF} = \text{ceiling} ((2 \times L_{VPF}), 5) = 590.000$



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ITEM 848 – SURFACE PREPARATION USING HYDRODEMOLITION, AS PER PLAN

For ODOT SS848, utilize SDC with 1¾" removal

Removal area – across deck (SF); $A_{Deck} = (259.26' \times 28') = 7259.28$

TOTAL Sq Yds of deck removal (SY); $T_{Deck} = ceiling((A_{Deck}) / 9, 1) = 807.00$

TOTAL QUANTITY OF SURFACE PREP (SY); $T_{512} = T_{ww_rails} = 807.00$



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ITEM 848 – TEST SLAB

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ITEM 848 – HAND CHIPPING

For ODOT SS848, estimate variable thickness area/deck = 732 SF

And, $732 / 7280 \text{ SF (total deck)} = 0.1$ or 10% of deck area

Per SS848, 0.1(deck are in SY) requires chipping

Removal area – across deck (SY); $A_{\text{Deck}} = (0.1 \times 807 \text{ SY}) = \mathbf{81.00}$ (say 85 SY)

TOTAL Sq Yds of hand chipping (SY); $T_{\text{Deck}} = \text{ceiling}((A_{\text{Deck}}) / 9, 1) = \mathbf{85.00}$

TOTAL QUANTITY OF HAND CHIPPING (SY); $T_{848} = T_{\text{Deck}} = \mathbf{85.00}$



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ITEM 848 – SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION (1.75” THICK)

For ODOT SS848, utilize SDC with 1¾” removal and replacement -

Removal area – across deck (SF); $A_{Deck} = (259.26' \times 28') = \mathbf{7259.28}$

TOTAL Sq Yds of deck overlay (SY); $T_{Deck} = \text{ceiling}((A_{Deck}) / 9, 1) = \mathbf{807.00}$

TOTAL QUANTITY OF SDC OVERLAY (SY); $T_{848} = T_{Deck} = \mathbf{807.00}$



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ITEM 848 – SUPERPLASTICIZED DENSE CONCRETE OVERLAY (VARIABLE THICKNESS), MATERIAL ONLY

Per ODOT SS848, assume 75% of deck patching areas will require variable thickness.

Removal area – across deck (SF); $A_{Deck} = (732 \text{ SF} \times 0.75) = 549.00$

Assume some of larger patches (asphalt) will be up to 4" to 4½" deep.

Utilize 2" average depth for repairs of variable depth.

TOTAL Volume of deck variable thick overlay (CF); $V_{Deck} = 549' \times 0.167' = 91.7 \text{ CF}$

Using ODOT's comments (Stage 2) and BDM, Table 403-3,

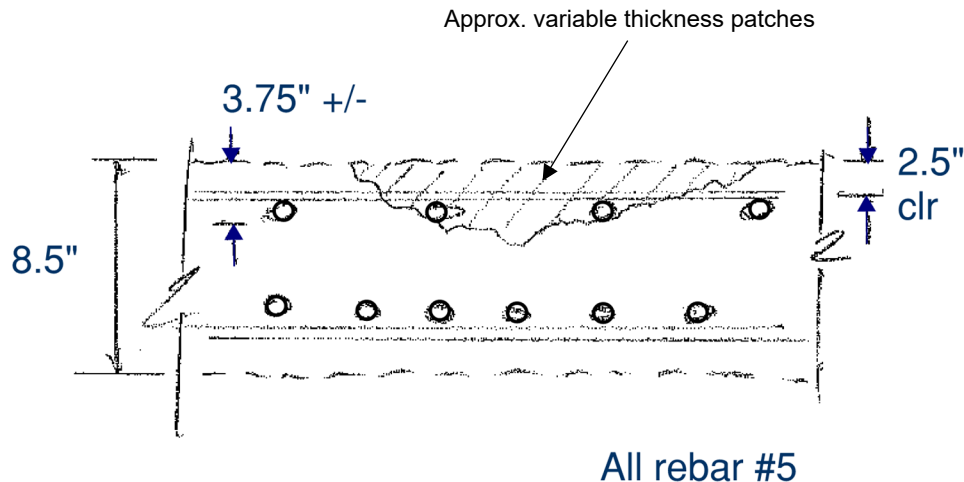
Double the amount – obtain 184 CF

TOTAL VOLUME OF VAR. THICK SDC (CU YD); $V_{SDC} = \text{ceiling}((V_{deck}) / 27, 1) = 10.00$

Use higher amount based on years that deck will sit through winter and variable temperature rise/fall.

Note that much of these areas (from previous experience and nature of asphalt patches) will expose the top mat of rebar.

Hence, contractor will most likely have replacement of steel and require additional hand chipping to expose bottom of rebar.





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ITEM 848 – FULL DEPTH REPAIR

Per ODOT SS848, provide quantity of full-depth deck patching areas.

- 2020 inspection shows 40 SF of cracks, spalls and delams on underside;
- During our site visit, the underside was in very good condition;
- Note that asphalt patched areas “may” provide full-depth holes once ready for contract.

$A_{Deck} = (260' \times 28') = 7280.00 \text{ SF}$

Areas are less than 1% of deck

TOTAL Volume of deck full-depth (CF);

$V_{Deck} = 40 \text{ SF} \times 0.7083' = 28.33 \text{ CF}$

TOTAL VOLUME OF FULL-DEPTH (CU YD);

$V_{SDC} = \text{ceiling}((V_{deck}) / 27, 1) = \underline{2.00}$



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UNDER ROADWAY QUANTITIES:

ITEM 606 – MGS BRIDGE TERMINAL ASSEMBLY, TYPE 1

Place on each corner

TOTAL NUMBER OF BTA'S (EA); **$R_{BTA} = \text{ceiling}(1) = 4.00$**

ITEM 606 – ANCHOR ASSEMBLY, MGS TYPE T

Place on each corner

TOTAL NUMBER OF ANCHOR ASSEMBLIES (EA); **$R_{BTA} = \text{ceiling}(1) = 4.00$**



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UNDER LIGHTING QUANTITIES:

ITEM 625 – REMOVE AND REERECT EXISTING LIGHT POLE, AS PER PLAN

For use at each existing light pole ON BRIDGE.

2 LIGHTS BEING REMOVED AND REERECTED – EAST ONLY

TOTAL NUMBER LIGHTS (EA); $R_L = \text{ceiling}(2, 1) = \underline{2.00}$



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ITEM 625 – STRUCTURE JUNCTION BOX

For use at each reerected light pole.

2 LIGHTS BEING REMOVED AND REERECTED

TOTAL NUMBER JUNCTION BOXES (EA); $R_L = \text{ceiling}(2, 1) = \underline{2.00}$

ITEM 625 – STRUCTURE GROUNDING SYSTEM

1 EACH - PER BDM

TOTAL GROUNDING SYSTEM (EA); $R_L = \text{ceiling}(2, 1) = \underline{1.00}$



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ITEM 625 – CONDUIT, 2”, 725.051, AS PER PLAN

The existing 2” conduit is housed in the sidewall slab below the parapet and shall remain.

Item shall include a contingency quantity as required to complete item, mostly for tie-ins at junction boxes and light poles.

EAST PARAPET = 2 poles x 20 LF (10’ on either side) = 40 LF

WEST PARAPET = 0 LF

TOTAL = 40 LF

TOTAL LENGTH CONDUIT (LF); $R_L = \text{ceiling}(\text{TOTAL}, 1) = \underline{40.00}$

ITEM 625 – CONNECTION, FUSED PULL APART

Used in base of poles to for current carrying conductors.

EAST PARAPET = 2 poles = 2 EA

WEST PARAPET = 0

TOTAL = 2 EA

TOTAL FUSED CONN (EA); $R_L = \text{ceiling}(\text{TOTAL}, 1) = \underline{2.00}$

ITEM 625 – CONNECTION, UNFUSED PULL APART

Used in base of poles to for grounding conductors.

EAST PARAPET = 2 poles = 2 EA

WEST PARAPET = 0

TOTAL = 2 EA

TOTAL UNFUSED CONN (EA); $R_L = \text{ceiling}(\text{TOTAL}, 1) = \underline{2.00}$

ITEM 625 – CONNECTION, FUSED PULL APART

Used in ground box.

EAST PARAPET = 2 poles = 2 EA

WEST PARAPET = 0

TOTAL = 2 EA

TOTAL UNFUSED PERM (EA); $R_L = \text{ceiling}(\text{TOTAL}, 1) = \underline{2.00}$



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ITEM 625 – NO. 4 AWG 2400 VOLT DISTRIBUTION CABLE

Current carrying conductors in the feeder – from pull box to pul box.

Pull Boxes:

STA 20+75 (N)

STA 17+44 (S)

TOTAL = 2075 – 1744 = 331.00

TOTAL NO. 4 AWG (LF); **R_L = ceiling(TOTAL, 1) = 331.00**

ITEM 625 – NO. 6 AWG 2400 VOLT DISTRIBUTION CABLE

Grond conductor – from pull box to pul box.

Pull Boxes:

STA 20+75 (N)

STA 17+44 (S)

TOTAL = 2075 – 1744 = 331.00

TOTAL NO. 6 AWG (LF); **R_L = ceiling(TOTAL, 1) = 331.00**

ITEM 625 – NO. 10 AWG POLE AND BRACKET

Cable that goes from junction box and up pole – taken from existing plans.

Stations from existing plans:

STA 18+24 (RT) 84 LF PROVIDED

STA 19+72 (RT) 84 LF PROVIDED

TOTAL = 84 + 84 = 168

TOTAL NO. 10 AWG (LF); **R_L = ceiling(TOTAL, 1) = 168.00**

ITEM 625 – REMOVAL OF LUMINAIRE AND REERECTION

The luminaire from each existing pole must be removed and stored per 625.21A in CMS.

EAST PARAPET = 2 poles = 2 EA

TOTAL = 2 EA

TOTAL REMOVE/REERECT LUMINAIRE (EA); **R_L = ceiling(TOTAL, 1) = 2.00**



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ITEM 625 – PULL BOX CLEANED

The pull box where the disconnect and reconnect occurs must be cleaned.

1 LOCATION

TOTAL NUMBER PULL BOXES CLEANED (EA); **$R_L = \text{ceiling}(2, 1) = 1.00$**

ITEM 625 – MAINTAIN EXISTING LIGHTING

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ITEM 625 – DISCONNECT CIRCUIT

Disconnect from existing circuit.

1 LOCATION

TOTAL NUMBER DISCONNECTIONS (EA); **$R_L = \text{ceiling}(2, 1) = 1.00$**