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

- Include portions of fence, wingwall seals and/or miscellaneous appurtenances to complete work

LUMP SUM

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

NOTE: Clean and seal areas of the tops and front faces (roadway) of the parapets as work is completed on the fence sections and rebuilt portions. ** Mostly areas below all fence posts.

Railings:

Total rail area, top & front faces (SF); A_{RAIL} = 2.67' x 387.20' x 2 sides = **2068.00**

Quantity estimated from damaged (15%) (SF); A'_{RAIL} = 15 = **310.00

Pier columns:

NOTE: Columns that are being patched, but do not require any additional encasement or E-glass.

Total area of patches (SF); A_C = **28.00**

Contingency add'l./overlap (SF) C = **10. 00**

Total on columns A'_C = **38. 00**

TOTAL QUANTITY OF SEALING (SY); T_{512_RAIL} = **ceiling((A'_{512} + A'_C) / 9, 1) = 39.00**

ITEM SPECIAL – URETHANE TOP COAT

*Per PN 519 – on those areas that receive glass or carbon fiber wrap.

Length of pier cap; $L_{PC} = 34.54$

Height (avg) of pier cap (ft); $h_{PC} = 3.95$

Width of pier cap (ft); $W_{PC} = 3$

Height (avg) of columns 1, 2, 4, 5 (ft); $h_C = 13.5$

Height (avg) of column 3 (ft); $h_{C3} = 11.65$

Column perimeter (ft); $C_A = 9.42$

NOTE: Consider end faces of pier caps as square (conservative):

Area PC1 of urethane top coat (SF); $A_{PC1} = 2\times (h_{PC} \times L_{PC}) + 2\times (W_{PC} \times L_{PC}) + 2\times (W_{PC} \times h_{PC})$ = **503.806**

Area PC1 of urethane top coat (SF); $A_{PC2} = 2\times (h_{PC} \times L_{PC}) + 2\times (W_{PC} \times L_{PC}) + 2\times (W_{PC} \times h_{PC})$ = **503.806**

Area PC3 of urethane top coat (SF); $A_{PC3} = 2\times (h_{PC} \times L_{PC}) + 2\times (W_{PC} \times L_{PC}) + 2\times (W_{PC} \times h_{PC})$ = **503.806**

Area PC4 of urethane top coat (SF); $A_{PC4} = 2\times (h_{PC} \times L_{PC}) + 2\times (W_{PC} \times L_{PC}) + 2\times (W_{PC} \times h_{PC})$ = **503.806**

Area PC5 of urethane top coat (SF); $A_{PC5} = 2\times (h_{PC} \times L_{PC}) + 2\times (W_{PC} \times L_{PC}) + 2\times (W_{PC} \times h_{PC})$ = **503.806**

Area C1 of E-glass system (SF); $A_{C1} = 30$

Area C2 of E-glass system (SF); $A_{C2} = 0$

Area C3 of E-glass system (SF); $A_{C3} = 2\times (h_{C3} \times C_A)$ = **219.486**

Area C4 of E-glass system (SF); $A_{C4} = 2\times (h_C \times C_A)$ = **254.340**

Area C5 of E-glass system (SF); $A_{C5} = 30$

Total area of urethane top coat (SF); $A_{GLASS} = A_{PC1} + A_{PC2} + A_{PC3} + A_{PC4} + A_{PC5} + A_{C1} + A_{C2} + A_{C3} + A_{C4} + A_{C5}$ =**3052.856**

TOTAL AREA OF URETHANE TOP COAT (SY); T_{512_UR} = ceiling ((A_{GLASS}) / 9, 1) = 340.000

ITEM 516 – BEARING DEVICE, ROCKER

REAR ABUTMENT (EA); $E_{RA} = 5$

FWD ABUTMENT (EA); $E_{FA} = 5$

TOTAL NUMBER OF ROCKERS (EA); $R_{REPL} = \text{ceiling}(E_{FA} + E_{RA}, 1) = \underline{10.000}$

ITEM 516 – REFURBISH BEARING DEVICE, AS PER PLAN

P1 (EA); $E_{P1} = 5$

P2 (EA); $E_{P2} = 5$

P3 (EA); $E_{P3} = 0$

P4 (EA); $E_{P4} = 5$

P5 (EA); $E_{P5} = 5$

TOTAL NUMBER REFURBISHED ROCKERS (EA); $R_{REF} = \text{ceiling}(E_{P1} + E_{P2} + E_{P3} + E_{P4} + E_{P5}, 1) = \underline{20.00}$

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

LUMP SUM

ITEM 516 – PREFORMED ELASTOMERIC COMPRESSION SEAL, AS PER PLAN

Compression seal used to seal wingwalls adjacent to abutments

Length of WW at ABUTS (ft); L_{WW} = **14.33**

Length of Curtain wall face (ft); L_{CUR} = **6.00**

TOTAL WINGWALL SEAL (LF); $T_{SLOPE} = 4 \times L_{WW} + 4 \times L_{CUR} =$ **82.00**

ITEM 519 – PATCHING CONCRETE STRUCTURE, AS PER PLAN

Pier caps and columns: field measured.

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

Area of P1 repairs (SF); $A_{P1} = 150 \times 1.25 = 188$

Area of P2 repairs (SF); $A_{P2} = 17 \times 1.25 = 22$

Area of P3 repairs (SF); $A_{P3} = 79 \times 1.25 = 99$

Area of P4 repairs (SF); $A_{P4} = 138 \times 1.25 = 173$

Area of P5 repairs (SF); $A_{P5} = 191 \times 1.25 = 239$

TOTAL CONCRETE PATCHING (SF); $\mathbf{P_{CONC} = ceiling(A_{P1} + A_{P2} + A_{P3} + A_{P4} + A_{P5}, 1) = \underline{721.000}}$

ITEM 519 – COMPOSITE FIBER WRAP SYSTEM

*Per PN 519 – on pier caps as required.

COMPOSITE FIBER WRAP SYSTEM: CARBON (CFRP)

Length of pier cap; L_{PC} =**34.540**

Height (avg) of pier cap (ft); h_{PC} =**3.950**

Width of pier cap (ft); W_{PC} = **3.000**

Column perimeter (SF); C_A = **9.420**

NOTE: Conservatively count end faces as rectangular.

Area of Carbon fiber wrap (typ. all piers) (SF); $A_{CF} = 2\times (h_{PC} \times L_{PC}) + 2\times (W_{PC} \times L_{PC}) + 2\times (W_{PC} \times h_{PC})$ = **503.806**

Total area of composite carbon fiber wrap (5 piers) (SF); $A_{CARBON} = 5 \times A_{CF} - (15\times 9.42)$ = **2377.730**

TOTAL AREA OF COMPOSITE FIBER WRAP (SF); T_{519_CARBON} **= ceiling(**A_{CARBON}**, 1) =** <u>**2378.000**</u>

COMPOSITE FIBER WRAP SYSTEM: E-GLASS (EGFRP)

*Per PN 519 – on columns as required.

Height (avg) of pier column(ft); h_C = 13.5

Area C1 of E-glass system (SF); A_{C1} = 30

Area C2 of E-glass system (SF); A_{C2} = 0

Area C3 of E-glass system (SF); $A_{C3} = 2\times (h_C \times C_A)$ = **254.340**

Area C4 of E-glass system (SF); $A_{C4} = 2\times (h_C \times C_A)$ = **254.340**

Area C5 of E-glass system (SF); A_{C5} = 30

Total area of E-glass system (SF); $A_{GLASS} = A_{C1} + A_{C2} + A_{C3} + A_{C4} + A_{C5}$ =**568.680**

TOTAL AREA OF COMPOSITE E-GLASS FIBER WRAP (SF); T_{519_GLASS} **= ceiling(**A_{GLASS}**, 1) =** <u>**569.000**</u>

TOTAL AREA OF COMPOSITE FIBER WRAP (SF); T_{519_FIBER} **= ceiling((**T_{519_CARBON} **+** T_{519_GLASS}**) , 1) = 2947.000**

ITEM 607 – FENCE REBUILT, TYPE CL, AS PER PLAN

Location	Lower Rails	Lower Boulevards	Tension Bands	Middle Boulevards	Middle Rails
NORTH	46	45	8	10	12
SOUTH	46	45	8	15	18
Field Totals	92	90	16	25	30
ESTIMATED TOTAL	92	90	20	30	35

46 FENCE PANELS ACROSS BRIDGE
387.18 ft – bridge limits
Therefore, each panel CL to CL post = 8'-5" = 8.42 ft

NOTE: All boulevards, tension bands and additional fence ties required to place rebuilt fence will be considered incidental to LF quantity bid for item.

From above totals, 92 + 30 = 122 EACH; 122 EA x 8.42 LF = 1027.24 LF rebuilt

TOTAL LF OF FENCE REBUILT (FT); T_{607_FR} = ceiling (1027.24) / 1, 1) = 1028.00