



20ZE11203 - PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN [5]:

- AREA OF EX. DECK = 13,150-ft.<sup>2</sup> [MEASURED IN CAD]
- COST OF DECK REMOVAL =  $(\frac{\$20}{\text{ft}^2})(13,150\text{-ft.}^2) = \$ 263,000$
- ABUTMENT CONCRETE REMOVAL =
  - BACKWALLS =  $\sim (26\text{-ft.})(1.75\text{-ft.})(4.5\text{-ft.}) \cdot (2\text{-ABUT}) = 410\text{-ft.}^3$
  - WINGWALLS =  $\sim (14\text{-ft.})(1.50\text{-ft.})(4.0\text{-ft.}) \cdot (4\text{-W.W.'S}) = 336\text{-ft.}^3$
  - CHEEKWALLS =  $\sim (2.25\text{-ft.})(\frac{10}{12}\text{-ft.})(4.0\text{-ft.}) \cdot (4\text{-W.W.'S}) = 30\text{-ft.}^3$
  - RAIL. ON W.W.'S =  $\sim (15.5\text{-ft.})(1.0\text{-ft.})(1.5\text{-ft.}) \cdot (4\text{-W.W.'S}) = 93\text{-ft.}^3$
  - CURB ON W.W.'S =  $\sim (15.5\text{-ft.})(3.0\text{-ft.})(1.5\text{-ft.}) \cdot (4\text{-W.W.'S}) = 279\text{-ft.}^3$
- $1,148\text{-ft.}^3 \Rightarrow 42.5\text{-CY} \Rightarrow \text{SAY } 45\text{-CY}$
- COST OF ABUT. CONC. REMOVAL =  $(\frac{\$200}{\text{CY}})(45\text{-CY}) = \$ 9,000$
- TOTAL =  $\$ 263,000 + \$ 9,000 = \$ 272,000$ 
  - INCREASE 10%  $\Rightarrow \$300,000$  TO ACCOUNT FOR COSTS OF TAKING SURVEY SHOTS OF BOT. OF BEAMS BEFORE & AFTER DECK REMOVAL TO CALCULATE SCREED & TOP OF HAUNCH EL'S, CLEARING & PLUGGING EX. ABUT. WEEPHOLES, CROSSFRAME REMOVALS, CHEEKWALL REMOVALS W/END REPAIRS, & ROUGHENING EX. BEAM SEATS FOR SEISMIC PEDESTALS

LUMP - \$ 300,000

20ZE22900 - APPROACH SLAB REMOVED [SY]:

- AREA OF EX. APP. SLAB AT R.A. = 675-ft.<sup>2</sup> [MEASURED IN CAD]
  - AREA OF EX. APP. SLAB AT F.A. = 670-ft.<sup>2</sup> [MEASURED IN CAD]
- TOTAL = 1,345-ft.<sup>2</sup> = 149.4-SY  $\Rightarrow$  150-SY

150-SY

20ZE23500 - WEARING COURSE REMOVED [SY]:

- ASPHALT WEARING COURSE ON EX. APP. SLABS ONLY =

150-SY



503E21101 - UNCLASSIFIED EXCAVATION, AS PER PLAN: [CY]

- ABUTMENT LIMITS: 2-FT. BEHIND BACKWALL FOR EXISTING POROUS BACKFILL REMOVAL PER D12 PROVIDED NOTE TO INCLUDE PB REMOVAL W/503 & 1-FT. AROUND PROPOSED W.W.'S (SEE BCD\_WORK.DGN SCRATCH 2 FOR ABUT. PLAN VIEW LIMITS)

- REAR ABUT. PLAN AREA =  $\sim 205\text{-ft.}^2$  [MEASURED IN CAD]

- EXCAVATION DEPTH =  $[\sim 864.5 - 860.5] - 1.25\text{-ft.} = 2.75\text{-ft.}$

- REAR ABUT. TOTAL VOLUME =  $(205\text{-ft.}^2)(2.75\text{-ft.}) = 563.75\text{-ft.}^3$

- FWD. ABUT. PLAN AREA =  $\sim 215\text{-ft.}^2$  [MEASURED IN CAD]

- EXCAVATION DEPTH =  $[\sim 854 - 849] - 1.25\text{-ft.} = 3.75\text{-ft.}$

- FWD. ABUT. TOTAL VOLUME =  $(215\text{-ft.}^2)(3.75\text{-ft.}) = 806.25\text{-ft.}^3$

- PIER 3 LIMITS: (FOR INSTALLATION OF FIBER WRAP ON PIER COLUMNS TO TOP OF FOOTINGS) [ASSUME 1:1 EXCAVATION CUTS]:

- PLAN AREA AT TOP OF FTG'S =  $[30.5\text{-ft.} + 2(1\text{-ft.})] \cdot [3\text{-ft.} + 2(1\text{-ft.})] = 162.5\text{-ft.}^2$

- EXCAVATION DEPTH =  $\sim 842 - (833.57 + 3\text{-ft.}) = 5.43\text{-ft.} \Rightarrow 5.5\text{-ft.}$

- PLAN AREA AT EX. GROUND =  $[30.5\text{-ft.} + 2(1\text{-ft.}) + 2(5.5\text{-ft.})] \cdot [3\text{-ft.} + 2(1\text{-ft.}) + 2(5.5\text{-ft.})] = 696\text{-ft.}^2$

- VOLUME =  $\frac{1}{2}(162.5\text{-ft.}^2 + 696\text{-ft.}^2)(5.5\text{-ft.}) = 2,361\text{-ft.}^3$

- ABUT. VOLUME SUBTOTAL =  $563.75\text{-ft.}^3 + 806.25\text{-ft.}^3 = 1,370\text{-ft.}^3 \Rightarrow \underline{50\text{-CY}}$

- PIER VOLUME SUBTOTAL =  $2,361\text{-ft.}^3 = 87.4\text{-CY} \Rightarrow \underline{88\text{-CY}}$

- TOTAL VOLUME =  $50\text{-CY} + 88\text{-CY} = 138\text{-CY}$

**138 - CY**



509E10000 - EPOXY COATED STEEL REINFORCEMENT: [LB]

- ABUT. SUBTOTAL = 2,302-LB.(R.A.) + 2,381-LB.(F.A.) = 4,683-LB
- PIERS SUBTOTAL =  $(635 - \frac{LB.}{PIER})(5-PIERS)$  = 3,175-LB
- SUPER. SUBTOTAL = 110,373-LB.(DECK) + 22,327-LB.(RAILING) = 132,700-LB
- TOTAL = 4,683-LB. + 3,175-LB + 132,700-LB = 140,558-LB

140,558-LB.

509E25000 - UNCOATED STEEL REINFORCEMENT: [LB]

- ABUT. SUBTOTAL = 862-LB.(R.A.) + 864-LB.(F.A.) = 1,726-LB.
- PIERS SUBTOTAL =  $(202 - \frac{LB.}{PIER})(5-PIERS)$  = 1,010-LB.
- TOTAL = 1,726-LB. + 1,010-LB = 2,736-LB.

2,736-LB.

509E30020 - No. 4 DEFORMED GFRP REINFORCEMENT: [FT]

- SUPER. SUBTOTAL = 13,955'-4" (RAILING)  $\Rightarrow$  13,956-FT

13,956-FT

510E10001 - DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT, AS PER PLAN: [EACH]

- REAR ABUTMENT:
  - A601# = (66-BARS)  $(\frac{1-DOWEL HOLE}{BAR})$  = 66-EACH
  - A604# = (28-BARS)  $(\frac{1-DOWEL HOLE}{BAR})$  = 28-EACH
  - A701# = (6-BARS)  $(\frac{2-DOWEL HOLES}{BAR})$  = 12-EACH
  - A901# = (12-BARS)  $(\frac{1-DOWEL HOLE}{BAR})$  = 12-EACH

R.A. TOTAL = 118-EACH

- FWD. ABUTMENT:
  - A605# = (70-BARS)  $(\frac{1-DOWEL HOLE}{BAR})$  = 70-EACH
  - A606# = (32-BARS)  $(\frac{1-DOWEL HOLE}{BAR})$  = 32-EACH
  - A701# = (6-BARS)  $(\frac{2-DOWEL HOLES}{BAR})$  = 12-EACH
  - A901# = (12-BARS)  $(\frac{1-DOWEL HOLE}{BAR})$  = 12-EACH

F.A. TOTAL = 126-EACH



510E10001 - DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT, AS PER PLAN: [EACH] [CONT.]

• PIERS:

• P501 # =  $\left[ \left( 54 - \frac{\text{BARS}}{\text{PIER}} \right) \left( \frac{1 - \text{DOWEL HOLE}}{\text{BAR}} \right) \right] \cdot (5 - \text{PIERS}) = 270 - \text{EACH}$

• NOTE: DOWEL HOLES FOR ANCHOR RODS AT ABUTMENTS & FIXED PIER 3 BEARINGS ARE INCLUDED FOR PAYMENT W/ RESPECTIVE BEARINGS (ITEM 516)

• ABUT. SUBTOTAL = 118 - EACH (R.A.) + 126 - EACH (F.A.) = 244 - EACH

• PIERS SUBTOTAL = 270 - EACH (PIERS 1-5) = 270 - EACH

**514 - EACH**

511E34413 - CLASS QCZ CONCRETE WITH QC/QA, SUPERSTRUCTURE, AS PER PLAN: [CY]

• DECK AREA = 13,138 - ft.<sup>2</sup> [MEASURED IN CAD]

• UNIFORM DECK THICKNESS = 8.5 - in.

• UNIFORM DECK VOLUME =  $(13,138 - \text{ft.}^2) \left( \frac{8.5}{12} - \text{ft.} \right) = 9,307 - \text{ft.}^3$

• HAUNCH VOLUME: [BELOW UNIFORM DECK]

• HAUNCH LENGTH = ~433 - ft.

• HAUNCH WIDTH = 12 - in. [EX. 36WF170 & 160]

• AVG. HAUNCH THICKNESS = 4 - in. [PER NOTE 1 ON P. 21/34]

• HAUNCH VOLUME =  $\left[ \left( 433 - \frac{\text{ft.}}{\text{BEAM}} \right) \left( \frac{12}{12} - \text{ft.} \right) \left( \frac{4}{12} - \text{ft.} \right) \right] \cdot (4 - \text{BEAMS}) = 578 - \text{ft.}^3$

• OVERHANG VOLUME: [BELOW UNIFORM DECK]

• OVERHANG LENGTH = ~433 - ft.

• OVERHANG WIDTH = 3.17 - ft. -  $\frac{1}{2} \left( \frac{12}{12} - \text{ft.} \right) = 2.67 - \text{ft.}$  [AVG. OVERHANG WIDTH]

• OVERHANG THICKNESS = 4 - in. +  $(3.17 - \text{ft.} - 1' - 8'') \left( 0.021 - \frac{\text{ft.}}{\text{ft.}} \right) \left( \frac{12 - \text{in.}}{\text{ft.}} \right) = 3.62 - \text{in.} \Rightarrow 3.75 - \text{in.}$

• OVERHANG VOLUME =  $\left[ \left( 433 - \frac{\text{ft.}}{\text{OVERHANG}} \right) \left( 2.67 - \text{ft.} \right) \left( \frac{3.75}{12} - \text{ft.} \right) \right] \cdot (2 - \text{OVERHANGS}) = 723 - \text{ft.}^3$

• TOTAL VOLUME =  $9,307 - \text{ft.}^3 + 578 - \text{ft.}^3 + 723 - \text{ft.}^3$   
 $= 10,608 - \text{ft.}^3 = 392.9 - \text{ft.}^3 \Rightarrow 393 - \text{CY}$

**393 - CY**



511E34450 - CLASS QCZ CONCRETE WITH QC/QA, BRIDGE DECK (PARAPET): [CY]

- PARAPET ON BRIDGE DECK:
  - LENGTH = 433.47-ft. (LEFT PARAPET) + 432.30-ft. (RIGHT PARAPET) = 866.27-ft.
  - VOLUME = 866.27-ft.  $\left(\frac{588}{144} \text{-ft.}^2\right) = 3,537.27\text{-ft.}^3$
- PARAPET ON ABUT. BACKWALLS & APPROACH SLABS:
  - FULL-HEIGHT PORTIONS:
    - LENGTH =  $(11'-0" + 1'-4\frac{1}{8}" + 1'-5" + 11'-0") / \text{FASCIA} \cdot (2\text{-FASCIA}) = 49.52\text{-ft.}$
    - VOLUME = 49.52-ft.  $\left(\frac{588}{144} \text{-ft.}^2\right) = 202.21\text{-ft.}^3$
  - TRANSITIONS:
    - VOLUME =  $\left(1.82 - \frac{\text{CY}}{\text{TRANSITION}}\right) (4\text{-TRANSITIONS}) = 7.28\text{-CY} = 196.56\text{-ft.}^3$
- SUPER. SUBTOTAL = 3,537.27-ft.<sup>3</sup> ⇒ 131-CY
- GENERAL SUBTOTAL = 202.21-ft.<sup>3</sup> + 196.56-ft.<sup>3</sup> = 398.77-ft.<sup>3</sup> = 14.8-CY ⇒ 15-CY
- TOTAL VOLUME = 131-CY + 15-CY = 146-CY

146-CY

511E41010 - CLASS QC1 CONCRETE, PIER ABOVE FOOTINGS: [CY]

- AREA OF PIER CAP RAISED =  $(27.5\text{-ft.})(3\text{-ft.}) + \pi(1.5\text{-ft.})^2 = 89.57\text{-ft.}^2 / \text{PIER}$
- HEIGHT OF PIER CAP = 0.92-ft.
- TOTAL VOLUME =  $\left[\left(\frac{89.57\text{-ft.}^2}{\text{PIER}}\right)(0.92\text{-ft.})\right] \cdot (5\text{-PIERS}) = 412.0\text{-ft.}^3 = 15.3\text{-CY} \Rightarrow 16\text{-CY}$

16-CY

511E44110 - CLASS QC1 CONCRETE, ABUTMENT NOT INCLUDING FOOTING: [CY]

- REAR ABUT.
  - BACKWALL
    - LENGTH =  $16'-8\frac{3}{8}" + 15'-11" = 32.62\text{-ft.}$
    - WIDTH = 1.75-ft.
    - HEIGHT = ~5.00-ft.
    - VOLUME =  $(32.62\text{-ft.})(1.75\text{-ft.})(5.00\text{-ft.}) = 285.43\text{-ft.}^3$
  - SEISMIC PEDESTALS
    - VOLUME =  $[(2'-10")(2'-0")(1'-1") \cdot (2\text{-SEISMIC PEDESTALS})] = 12.28\text{-ft.}^3$



511E44110 - CLASS QC1 CONCRETE, ABUTMENT NOT INCLUDING FOOTING = [CY] [CONT.]

• REAR ABUT. [CONT.] :

• WING WALLS :

• W.W. CSA =  $(1.50\text{-ft.})(2.25\text{-ft.}) + \frac{1}{2}(1.75\text{-ft.})^2 + (1.5\text{-ft.})(5.0\text{-ft.} - \frac{15}{12}\text{-ft.} - \frac{6}{12}\text{-ft.}) = 9.8\text{-ft.}^2 \Rightarrow 10\text{-ft.}^2$

• LENGTH =  $\sim 15.0\text{-ft.}/\text{W.W.}$  [CONSERVATIVE FOR SECTION D-9 LENGTH]

• VOLUME =  $[(10\text{-ft.}^2)(\frac{15\text{-ft.}}{\text{W.W.}})] \cdot (2\text{-W.W.'S}) = 300\text{-ft.}^3$

• REAR ABUT. TOTAL =  $285.43\text{-ft.}^3 + 12.28\text{-ft.}^3 + 300\text{-ft.}^3 = 597.71\text{-ft.}^3$

• FWD. ABUT. :

• BACKWALL :

• LENGTH =  $17\text{-}8\frac{7}{8}\text{''} + 16\text{-}7\frac{3}{4}\text{''} = 34.35\text{-ft.}$

• WIDTH =  $1.75\text{-ft.}$

• HEIGHT =  $\sim 5.00\text{-ft.}$

• VOLUME =  $(34.35\text{-ft.})(1.75\text{-ft.})(5.00\text{-ft.}) = 300.57\text{-ft.}^3$

• SEISMIC PEDESTALS :

• VOLUME =  $[(2\text{-}10\text{''})(2\text{-}0\text{''})(1\text{-}1\text{''})] \cdot (2\text{-SEISMIC PEDESTALS}) = 12.28\text{-ft.}^3$

• WING WALLS :

• W.W. CSA =  $(1.50\text{-ft.})(2.25\text{-ft.}) + \frac{1}{2}(1.75\text{-ft.})^2 + (1.5\text{-ft.})(4.75\text{-ft.} - \frac{15}{12}\text{-ft.} - \frac{6}{12}\text{-ft.}) = 9.4\text{-ft.}^2 \Rightarrow 9.5\text{-ft.}^2$

• LENGTH =  $\sim 16.0\text{-ft.}/\text{W.W.}$  [CONSERVATIVE FOR SECTION J-11 LENGTH]

• VOLUME =  $[(9.5\text{-ft.}^2)(\frac{16\text{-ft.}}{\text{W.W.}})] \cdot (2\text{-W.W.'S}) = 304\text{-ft.}^3$

• FWD. ABUT. TOTAL =  $300.57\text{-ft.}^3 + 12.28\text{-ft.}^3 + 304\text{-ft.}^3 = 616.85\text{-ft.}^3$

• TOTAL VOLUME =  $597.71\text{-ft.}^3\text{(R.A.)} + 616.85\text{-ft.}^3\text{(F.A.)}$   
 $= 1,214.56\text{-ft.}^3 = 44.98\text{-ft.}^3 \Rightarrow 45\text{-CY}$

45-CY



SIZE 10100 - SEALING OF CONCRETE SURFACES (EPOXY-URETHANE): [SY]

• SUPERSTRUCTURE: (RAILING, DECK OVERHANG, 6" BOT. OF DECK)

- SEALING PERIMETER =  $\sqrt{(\frac{8}{12}\text{-ft.})^2 + (3.5\text{-ft.})^2} + (\frac{10}{12}\text{-ft.}) + 3.5\text{-ft.} + (\frac{2}{12}\text{-ft.}) + 1\text{-ft.} + (\frac{6}{12}\text{-ft.}) = 9.57\text{-ft.}$
- SEALING LENGTH =  $[11\text{-}8\frac{3}{4}\text{"}(2) + 410\text{'-}0\text{"}] + [11\text{-}4\frac{3}{4}\text{"}(2) + 410\text{'-}0\text{"}] = 866.25\text{-ft.}$
- SEALING AREA =  $(866.25\text{-ft.})(9.57\text{-ft.}) = 8,290\text{-ft.}^2$

• ABUTMENTS:

• REAR ABUT.:

- FRONT FACE: [STEM FROM TOP OF SLOPE, BEAM SEAT & BACKWALL]
- LIMITS =  $4.25\text{-ft.} + 2.0\text{-ft.} + 5.0\text{-ft.} = 11.25\text{-ft.}$
- LENGTH =  $33\text{-ft.}$
- AREA =  $(33\text{-ft.})(11.25\text{-ft.}) = 372\text{-ft.}^2$

• WINGWALLS: [ASSUME HALF OF W.W.'S SIDE FACE IS EXPOSED ABOVE GROUND & ENTIRE W.W. TOP IS SEALED]

- W.W.'S LENGTH =  $(\sim 15 - \frac{\text{ft.}}{\text{W.W.}})(2\text{-W.W.'S}) = 30\text{-ft.}$
- AREA =  $(30\text{-ft.})(1\text{'-}6\text{"}) + \frac{1}{2}(30\text{-ft.})(1\text{-ft.} + 7\text{-ft.}) = 165\text{-ft.}^2$

• FWD. ABUT.:

- FRONT FACE: [STEM FROM TOP OF SLOPE, BEAM SEAT & BACKWALL]
- LIMITS =  $3\text{-ft.} + 2.0\text{-ft.} + 5.0\text{-ft.} = 10\text{-ft.}$
- LENGTH =  $34\text{-ft.}$
- AREA =  $(34\text{-ft.})(10\text{-ft.}) = 340\text{-ft.}^2$

• WINGWALLS: [ASSUME HALF OF W.W.'S SIDE FACE IS EXPOSED ABOVE GROUND & ENTIRE W.W. TOP IS SEALED]

- W.W.'S LENGTH =  $(\sim 16 - \frac{\text{ft.}}{\text{W.W.}})(2\text{-W.W.'S}) = 32\text{-ft.}$
- AREA =  $(32\text{-ft.})(1\text{'-}6\text{"}) + \frac{1}{2}(32\text{-ft.})(1\text{-ft.} + 7\text{-ft.}) = 176\text{-ft.}^2$

• PIERS:

• PIER CAPS: [SIDES, BOTTOM & ENDS]

- AVERAGE CAP HEIGHT =  $4.35\text{-ft.}$  (PIERS 1-5)
- SIDE AREAS =  $[(27.5 - \frac{\text{ft.}}{\text{SIDE}})(4.35\text{-ft.})] \cdot (2 - \frac{\text{SIDES}}{\text{PIER}}) = 240 - \frac{\text{ft.}^2}{\text{PIER}}$
- END AREAS =  $[\pi(3\text{-ft.})(4.35 - \frac{\text{ft.}}{\text{END}})] \cdot (2 - \frac{\text{ENDS}}{\text{PIER}}) = 82 - \frac{\text{ft.}^2}{\text{PIER}}$
- BOTTOM AREA =  $(27.5\text{-ft.})(3.0\text{-ft.}) - 2[\frac{\pi}{4}(3\text{-ft.})^2] = 69 - \frac{\text{ft.}^2}{\text{PIER}}$

TOTAL =  $391 - \frac{\text{ft.}^2}{\text{PIER}}$

- PIER CAP TOTAL (PIERS 1-5) =  $(391 - \frac{\text{ft.}^2}{\text{PIER}})(5\text{-PIERS}) = 1,955\text{-ft.}^2$



SIZE 10100 - SEALING OF CONCRETE SURFACES (EPOXY-URETHANE): [SY] [CONT.]

• PIERS [CONT.]

• PIER COLUMNS :

• PIER 1 =  $[\pi(3\text{-ft.})(857.95 - 842)] \cdot (3\text{-COLUMNS}) = 451\text{-ft.}^2$

• PIER 2 =  $[\pi(3\text{-ft.})(857.05 - 839.5)] \cdot (3\text{-COLUMNS}) = 497\text{-ft.}^2$

• PIER 3 =  $[\pi(3\text{-ft.})(855.52 - 840.5)] \cdot (3\text{-COLUMNS}) = 425\text{-ft.}^2$

• PIER 4 =  $[\pi(3\text{-ft.})(853.43 - 839)] \cdot (3\text{-COLUMNS}) = 408\text{-ft.}^2$

• PIER 5 =  $[\pi(3\text{-ft.})(850.75 - 838)] \cdot (3\text{-COLUMNS}) = 361\text{-ft.}^2$

PIER COLUMNS TOTAL = 2,142-ft.}^2

• GENERAL : [SEALING OF PARAPET ON BACKWALL & APP. SLAB & 6" OF EXPOSED APP. SLAB]

• (PERIMETER) FULL =  $\sqrt{(\frac{9}{12}\text{-ft.})^2 + (3.5\text{-ft.})^2} + (\frac{10}{12}\text{-ft.}) + 3.5\text{-ft.} + (\frac{2}{12}\text{-ft.}) + (\frac{6}{12}\text{-ft.}) = 8.57\text{-ft.}$

• (LENGTH) FULL =  $(12.5\text{-ft.})(4) = 50\text{-ft.}$

• AREA FULL HEIGHT PARAPET =  $(50\text{-ft.})(8.57\text{-ft.}) = 429\text{-ft.}^2$

• (PERIMETER) TRANS. = 7.75-ft. (BUMPED UP TO ACCOUNT FOR ENDS)

• (LENGTH) TRANS =  $(14\text{-ft.})(4) = 56\text{-ft.}$

• AREA =  $(56\text{-ft.})(7.75\text{-ft.}) = 434\text{-ft.}^2$

• ABUT. SUBTOTAL =  $372\text{-ft.}^2 + 165\text{-ft.}^2 + 340\text{-ft.}^2 + 176\text{-ft.}^2 = 1,053\text{-ft.}^2 = \underline{117\text{-SY}}$

• PIERS SUBTOTAL =  $1,955\text{-ft.}^2 + 2,142\text{-ft.}^2 = 4,097\text{-ft.}^2 = 455.2\text{-SY} \Rightarrow \underline{456\text{-SY}}$

• SUPER. SUBTOTAL =  $8,290\text{-ft.}^2 = 921.1\text{-SY} \Rightarrow \underline{922\text{-SY}}$

• GENERAL SUBTOTAL =  $429\text{-ft.}^2 + 434\text{-ft.}^2 = 863\text{-ft.}^2 = 95.9 \Rightarrow \underline{96\text{-SY}}$

• TOTAL =  $117\text{-SY} + 456\text{-SY} + 922\text{-SY} + 96\text{-SY} = 1,591\text{-SY}$

1,591-SY





SIZE10600 - CONCRETE REPAIR BY EPOXY INJECTION : [FT]

- PIER 4 = 5-ft.
- PIER 5 = 6-ft.
- TOTAL = 5-ft + 6-ft = 11-ft.

11-FT

SIZE33000 - TYPE 2 WATERPROOFING : [SY]

- REAR ABUT. :
  - LENGTH = 41.27-ft. [LENGTH ALONG BACKWALL & EXISTING W.W.'S FOR HORIZ. C.I.'S]
  - AREA = (41.27-ft.) (3-ft.) = 123.81-ft.<sup>2</sup>
- FWD. ABUT. :
  - LENGTH = 45.64-ft. [LENGTH ALONG BACKWALL & EXISTING W.W.'S FOR HORIZ. C.I.'S]
  - AREA = (45.64-ft.) (3-ft.) = 136.92-ft.<sup>2</sup>
- TOTAL AREA = 123.81-ft.<sup>2</sup> + 136.92-ft.<sup>2</sup> = 260.73-ft.<sup>2</sup> = 28.97-SY => 29-SY

29-SY



SIZE 74000 - REMOVAL OF EXISTING COATINGS FROM CONCRETE SURFACES: [SY]

• ABUTMENTS:

- DO NOT NEED TO REMOVE SEALING FROM EX. BACKWALLS BECAUSE THEY ARE BEING REMOVED & REPLACED, ASSUME NO SEALING REMOVAL ON W.W.S BECAUSE THEY ARE BEING REMOVED & REPLACED ABOVE CONST. ST. [MAY BE A SMALL AREA BELOW L.S. NEAR FACE OF ABUT. ABOVE SLOPE BUT IS NEGLIGIBLE]
- REAR ABUT. : [STEM FROM TOP OF SLOPE & BEAM SEAT]
  - STEM & SEAT =  $[(4.25\text{-ft} + 2.0\text{-ft})](33\text{-ft.}) = 207\text{-ft.}^2$
- FWD. ABUT. : [STEM FROM TOP OF SLOPE & BEAM SEAT]
  - STEM & SEAT =  $[(3.0\text{-ft.} + 2.0\text{-ft.})](34\text{-ft.}) = 170\text{-ft.}^2$

• PIERS:

- PIER SEALING AREA PER SIZE 10100 MINUS PORTIONS OF PIER COLUMNS WITH EXISTING COMP. FIBER WRAP AT PIERS 1 & 5 AND MINUS AREA OF SEALING FOR PIER CAP RAISE
  - PIER 1 COLUMNS:
    - FRP AREA =  $[\pi(3\text{-ft.})(7.5\text{-ft.})] \cdot (3\text{-Columns}) = 212\text{-ft.}^2$
  - PIER 5 COLUMNS:
    - FRP AREA =  $[\pi(3\text{-ft.})(7.5\text{-ft.})] \cdot (2\text{-Columns}) = 142\text{-ft.}^2$
  - PIER CAPS:
    - SIDE AREAS =  $[(27.5 - \frac{\text{ft.}}{\text{SIDE}})(0.92\text{-ft.})] \cdot (2 - \frac{\text{SIDES}}{\text{PIER}}) = 51 - \frac{\text{ft.}^2}{\text{PIER}}$
    - END AREAS =  $[\pi(3\text{-ft.})(0.92 - \frac{\text{ft.}}{\text{END}})] \cdot (2 - \frac{\text{ENDS}}{\text{PIER}}) = 18 - \frac{\text{ft.}^2}{\text{PIER}}$
    - TOTAL =  $69 - \frac{\text{ft.}^2}{\text{PIER}}$
    - PIER CAP TOTAL (PIERS 1-5) =  $(69 - \frac{\text{ft.}^2}{\text{PIER}}) \cdot (5\text{-PIERS}) = 345\text{-ft.}^2$
- PIER TOTAL =  $4,097\text{-ft.}^2 \text{ [FROM SIZE 10100]} - [212\text{-ft.}^2 + 142\text{-ft.}^2 + 345\text{-ft.}^2] = 3,398\text{-ft.}^2$

- ABUT. SUBTOTAL =  $207\text{-ft.}^2 + 170\text{-ft.}^2 = 377\text{-ft.}^2 = 41.9\text{-SY} \Rightarrow \underline{42\text{-SY}}$
- PIERS SUBTOTAL =  $3,398\text{-ft.}^2 = 377.5\text{-SY} \Rightarrow \underline{378\text{-SY}}$
- TOTAL =  $42\text{-SY} + 378\text{-SY} = 420\text{-SY}$

420-SY



513E10201 - STRUCTURAL STEEL MEMBERS, LEVEL UF, AS PER PLAN: [LB]

- END CROSSFRAMES REPLACED AT ABUTMENTS: (NEEDS TO BE A709 GRADE 50 PER GSD-1-19 P.3/4?)
    - $L4 \times 4 \times \frac{3}{8}'' = 9.80 - \frac{16.}{ft.}$  [GUSSET PLATES INCLUDED W/ EXP. JT. ITEM]
    - ANGLE LENGTH PER BAY =  $8'-10''$  (BOT. CHORD) +  $\left(\frac{3-ft.}{DIAG.}\right) \left(\frac{4-DIAG.}{BAY}\right) = 20.83 - ft./BAY$
    - TOTAL =  $\left(9.80 - \frac{16.}{ft.}\right) \left(20.83 - \frac{ft.}{BAY}\right) \left(3 - \frac{BAYS}{ABUT.}\right) \left(2 - ABUT.\right) = 1,225 - lb.$
  - PROPOSED INTERMEDIATE CROSSFRAMES ALONG PIER 3: [PER GSD-1-96 TYPE 1]
    - $L5 \times 5 \times \frac{1}{2}'' = 16.2 - \frac{16.}{ft.}$
    - ANGLE LENGTH PER BAY =  $8'-10''$  (BOT. CHORD) +  $\sqrt{(8'-10'')^2 + (2'-6'')^2} \cdot \left(2 - \frac{DIAGONALS}{BAY}\right) = 27.19 - \frac{ft.}{BAY}$
    - TOTAL =  $\left(16.2 - \frac{16.}{ft.}\right) \left(27.19 - \frac{ft.}{BAY}\right) \left(3 - BAYS\right) = 1,322 - lb.$
  - PROPOSED INTERMEDIATE CROSSFRAMES AT PIER 5: [PER GSD-1-96 TYPE 1]
    - $L3 \times 3 \times \frac{5}{16}'' = 6.10 - \frac{16.}{ft.}$
    - ANGLE LENGTH PER BAY =  $7'-10''$  (BOT. CHORD) +  $\sqrt{(7'-10'')^2 + (2'-6'')^2} \cdot \left(2 - \frac{DIAGONALS}{BAY}\right) = 24.27 - \frac{ft.}{BAY}$
    - TOTAL =  $\left(6.10 - \frac{16.}{ft.}\right) \left(24.27 - \frac{ft.}{BAY}\right) \left(3 - BAYS\right) = 445 - lb.$
  - EX. DETERIORATED INT. CROSSFRAME REPLACED NEAR R.A. IN LEFT BAY:
    - $L3 \times 3 \times \frac{5}{16}'' = 6.10 - \frac{16.}{ft.}$
    - ANGLE LENGTH IN BAY =  $8'-2\frac{1}{4}''$  (BOT. CHORD) +  $\sqrt{(8'-2\frac{1}{4}'')^2 + (2'-6'')^2} \cdot \left(2 - \frac{DIAGONALS}{BAY}\right) = 25.31 - \frac{ft.}{BAY}$
    - TOTAL =  $\left(6.10 - \frac{16.}{ft.}\right) \left(25.31 - ft.\right) = 155 - lb.$
- [TOP FLANGE CONTINGENCY PER DIZ STAGE 3 COMMENT] [PER L&D VOL.3 1307.4.3]
- TOTAL =  $1,225 - lb. + 1,322 - lb. + 445 - lb. + 155 - lb. + 200 - lb. = 3,347 - lb. \Rightarrow 3,400 - lb$

**3,400 - LB**

\* IZEU THREE COAT PAINT SYSTEM INCLUDED WITH THIS ITEM  
[ACCOUNT FOR THIS IN UNIT COST]

513E20000 - WELDED STUD SHEAR CONNECTORS: [EACH]

- STUDS PER ROW = 3
- No. of ROWS/BEAM =  $24 + 45 + 73 + 61 + 77 + 59 + 77 + 59 + 77 + 59 + 52 + 60 + 16 + 1 = 740 - \frac{ROWS}{BEAM}$
- TOTAL =  $\left(3 - \frac{STUDS}{ROW}\right) \left(740 - \frac{ROWS}{BEAM}\right) \left(4 - BEAMS\right) = 8,880 - STUDS$

**8,880 - EACH**



516E11210 - STRUCTURAL EXPANSION JOINT INCLUDING ELASTOMERIC STRIP SEAL: [FT]

- REAR ABUT. = 32.591-ft.
- FWD. ABUT. = 34.326-ft.
- TOTAL = 66.917-ft.  $\Rightarrow$  66.92-FT. (PER L&D 1307.4.3)

66.92-FT

516E13600 - 1" PREFORMED EXPANSION JOINT FILLER: [SF]

- REAR ABUT. =  $\left[ \left( 13.5 - \frac{ft.}{w.w} \right) (1.25-ft.) \right] \cdot (2-w.w's) = 33.75-ft.^2$
- FWD. ABUT. =  $\left[ \left( 14.5 - \frac{ft.}{w.w} \right) (1.25-ft.) \right] \cdot (2-w.w's) = 36.25-ft.^2$
- TOTAL = 70.00-ft<sup>2</sup>

70 SF

516E44100 - ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)  
(15"x18"x2.668" WITH 16"x19"x VARIES LOAD PLATE): [EACH]

- EXP. BEARINGS AT PIERS 1, 2, 4 & 5
- TOTAL =  $\left( 4 - \frac{BRGS.}{PIER} \right) (4-PIERS) = 16-BRGS.$

16-EACH

516E44100 - ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)  
(15"x18"x2.668" WITH 16"x30"x VARIES LOAD PLATE): [EACH]

- FIXED BEARINGS AT PIER 3
- TOTAL =  $\left( 4 - \frac{BRGS.}{PIER} \right) (1-PIER) = 4-BRGS.$

4-EACH

516E44300 - ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)  
(12.75"x12.75"x4.232" WITH 13.75"x13.75"x1.50" LOAD PLATE): [EACH]

- REAR ABUT. EXP. BRGS. W/UNIFORM LOAD PLATE
- TOTAL =  $\left( 4 - \frac{BRGS.}{ABUT.} \right) (1-ABUT.) = 4-BRGS.$

4-EACH



516E44300 - ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)  
 (12.75" x 12.75" x 4.232" WITH 13.75" x 13.75" x VARIES LOAD PLATE): [EACH]

- FWD. ABUT. EXP. BRG.'S W/ BEVELED LOAD PLATE
- TOTAL =  $(4 - \frac{\text{BRG.'S}}{\text{ABUT.}})(1 - \text{ABUT.}) = 4 - \text{BRG.'S}$

4-EACH

516E47001 - JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN: [LS]

- NO. OF JACKING POINTS =  $(4 - \frac{\text{BEAMS}}{\text{SUBSTRUCTURE}})(7 - \text{SUBSTRUCTURES}) = 28$
- COST PER JACKING POINT = \$ 1,500
  - INCREASED FROM NORMAL OF \$1,000 BECAUSE AT PIERS WILL NEED TO JACK OFF SIDES OF CAP/USE TEMP. SUPPORTS & AT ABUTS, WILL NEED TO EXCAVATE EX. SLOPE PROTECTION TO JACK OFF FTG. TOE (MAY HAVE TO JACK OFF ABUT STEM AT REAR ABUT. AS IT IS A SPREAD FTG. WITH A ~ 7-8-ft. ABUT. STEM HEIGHT)

• TOTAL =  $(\frac{\$1,500}{\text{JACKING PT.}})(28 - \text{JACKING PT.'S}) = \$42,000 \Rightarrow \$40,000$

LUMP - \$ 40,000

518E20000 - PREFABRICATED GEOCOMPOSITE DRAIN: [SY]

- REAR ABUT.:
  - LENGTH OF PGD = 41.27-ft.  $\Rightarrow$  42-ft.
  - HEIGHT OF PGD =  $[867.15 - (\frac{15}{12}\text{-ft}) - (\frac{6}{12}\text{-ft})] - 860.50 = 4.9\text{-ft.}$
  - AREA OF PGD =  $(42\text{-ft.})(4.9\text{-ft.}) = 205.8\text{-ft.}^2$
- FWD. ABUT.:
  - LENGTH OF PGD = 45.64-ft.  $\Rightarrow$  46-ft.
  - HEIGHT OF PGD =  $[857.39 - (\frac{15}{12}\text{-ft}) - (\frac{6}{12}\text{-ft})] - 849.50 = 6.1\text{-ft.}$
  - AREA OF PGD =  $(46\text{-ft.})(6.1\text{-ft.}) = 280.6\text{-ft.}^2$
- TOTAL AREA OF PGD =  $205.8\text{-ft.}^2 + 280.6\text{-ft.}^2 = 486.4\text{-ft.}^2 = 54.04\text{-SY} \Rightarrow 55\text{-SY}$

55-SY



518E21200 - POROUS BACKFILL WITH GEOTEXTILE FABRIC: [CY]

- TOTAL PLAN AREA =  $102\text{-ft.}^2 \text{ (R.A.)} + 109\text{-ft.}^2 \text{ (F.A.)} = 211\text{-ft.}^2$  [MEASURED IN CAD]
- TOTAL VOLUME =  $(211\text{-ft.}^2)(2\text{-ft.}) = 422\text{-ft.}^3 = 15.7\text{-CY} \Rightarrow 16\text{-CY}$

16-CY

518E40000 - 6" PERFORATED CORRUGATED PLASTIC PIPE: [FT]

- TOTAL LENGTH =  $41\text{-ft. (R.A.)} + 47\text{-ft. (F.A.)} = 88\text{-ft.} \Rightarrow 90\text{-FT}$  [MEASURED IN CAD]

90-FT

518E40011 - 6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS, AS PER PLAN: [FT]

- TOTAL LENGTH =  $27\text{-ft. (R.A.)} + 2(18\text{-ft.}) \text{ (F.A.)} = 63\text{-ft.} \Rightarrow 65\text{-FT}$

65-FT

\* ITEM INCLUDES PRECAST REINF. CONC. OUTLET & TIED CONCRETE BLOCK MAT W/ TYPE I UNDERLAYMENT PER DM-1.1 FOR 3 OUTLETS [ACCOUNT FOR IN UNIT COST]

519E00100 - SPECIAL-COMPOSITE FIBER WRAP SYSTEM (SEE PROPOSAL NOTE): [SF]

PIER 1:

- CAP WEST OF CTR. COLUMN =  $2(1.75\text{-ft.})(3\text{-ft.} + 4.18\text{-ft.}) = 25.13\text{-ft.}^2$
- CAP EAST OF CTR. COLUMN =  $2(1.75\text{-ft.})(3\text{-ft.} + 4.38\text{-ft.}) = 25.83\text{-ft.}^2$
- PIER 1 TOTAL =  $50.96\text{-ft.}^2$

PIER 2:

- CAP WEST OF CTR. COLUMN =  $2(1.75\text{-ft.})(3\text{-ft.} + 4.16\text{-ft.}) = 25.06\text{-ft.}^2$
- CAP EAST OF CTR. COLUMN =  $2(1.75\text{-ft.})(3\text{-ft.} + 4.41\text{-ft.}) = 25.94\text{-ft.}^2$
- PIER 2 TOTAL =  $51.00\text{-ft.}^2$

PIER 3:

- CAP WEST OF CTR. COLUMN =  $2(1.5\text{-ft.})(3\text{-ft.} + 4.18\text{-ft.}) = 21.54\text{-ft.}^2$
- CAP EAST OF CTR. COLUMN =  $2(1.5\text{-ft.})(3\text{-ft.} + 4.49\text{-ft.}) = 22.47\text{-ft.}^2$
- COLUMNS =  $\left[ \pi(3\text{-ft.}) \left( 19.95\text{-ft.} \frac{\text{ft.}}{\text{COLUMN}} \right) \right] \cdot 3\text{-COLUMNS} = 535.80\text{-ft.}^2$
- PIER 3 TOTAL =  $579.81\text{-ft.}^2$



519E00100 - SPECIAL-COMPOSITE FIBER WRAP SYSTEM (SEE PROPOSAL NOTE): [SF] [CONT.]

PIER 4:

- CAP WEST OF CTR. COLUMN =  $2(1.75\text{-ft.})(3\text{-ft.} + 4.22\text{-ft.}) = 25.27\text{-ft.}^2$
- CAP EAST OF CTR. COLUMN =  $2(1.75\text{-ft.})(3\text{-ft.} + 4.54\text{-ft.}) = 26.39\text{-ft.}^2$
- PIER 4 TOTAL =  $51.66\text{-ft.}^2$

PIER 5:

- CAP WEST OF CTR. COLUMN =  $2(1.75\text{-ft.})(3\text{-ft.} + 4.27\text{-ft.}) = 25.45\text{-ft.}^2$
- CAP EAST OF CTR. COLUMN =  $2(1.75\text{-ft.})(3\text{-ft.} + 4.63\text{-ft.}) = 26.71\text{-ft.}^2$
- PIER 5 TOTAL =  $52.16\text{-ft.}^2$

$$\text{TOTAL} = 50.96\text{-ft.}^2 + 51.00\text{-ft.}^2 + 579.81\text{-ft.}^2 + 51.66\text{-ft.}^2 + 52.16\text{-ft.}^2$$

$$= 785.59\text{-ft.}^2 \Rightarrow 786\text{-SF}$$

786-SF

519E11101 - PATCHING CONCRETE STRUCTURE, AS PER PLAN: [SF]

- ABUT. SUBTOTAL =  $9\text{-ft.}^2(\text{R.A.}) + 4.5\text{-ft.}^2(\text{F.A.}) = 13.5\text{-ft.}^2 \Rightarrow 14\text{-SF}$
- PIERS SUBTOTAL =  $14\text{-ft.}^2(\text{P2}) + 1\text{-ft.}^2(\text{P3}) + 5\text{-ft.}^2(\text{P4}) + 8\text{-ft.}^2(\text{P5}) = 28\text{-ft.}^2 = 28\text{-SF}$
- TOTAL =  $14\text{-SF} + 28\text{-SF} = 42\text{-SF}$

42-SF

526E25011 - REINFORCED CONCRETE APPROACH SLABS WITH QC/QA (T=15"), AS PER PLAN: [SY]

$$\text{TOTAL} = \left[ \left( 25 - \frac{\text{ft.}}{\text{APP. SLAB}} \right) (30' - 4'') \right] \cdot (2\text{-APP. SLABS}) = 1,516.7\text{-ft.}^2 = 168.5\text{-SY} \Rightarrow 169\text{-SY}$$

169-SY

526E90011 - TYPE A INSTALLATION, AS PER PLAN: [FT]

$$\text{TOTAL} = 28.96\text{-ft.}(\text{R.A.}) + 30.73\text{-ft.}(\text{F.A.}) = 59.69\text{-ft.} \Rightarrow 60\text{-FT}$$

60-FT



601E20001 - CRUSHED AGGREGATE SLOPE PROTECTION, AS PER PLAN: [SY]

- PER GEN. NOTES 100-SY TO REDRESS ABUT. SLOPES AFTER ABUT. WORK COMPLETE

100-SY

607E39901 - VANDAL PROTECTION FENCE, 6' STRAIGHT, COATED FABRIC, AS PER PLAN: [FT]

• TOTAL =  $(420 - \frac{FT}{FASCIA}) (2-FASCIA) = 840-FT.$

840-FT

625E33001 - STRUCTURE GROUNDING SYSTEM, AS PER PLAN: [EACH]

- REQUIRED FOR UPF

1-EACH