The Mannik & Smith Group
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SAN-19-17.15
SFN: 7201346

Job Number: 102932
Calc'd By: DRH 12/1/2020
Checked By: RJS 12/2/2020

ESTIMATED QUANTITIES

ODOT0072 - STATE ROUTE 19 OVER MUDDY CREEK

Units and Definitions

$\gamma_{conc} := 150pcf$ $\quad dollars := 1$ $\quad \gamma_{steel} := 490pcf$ $\quad cy := yd^3$ $\quad pcy := \frac{lbf}{cy}$ $\quad ton := 2kip$

Bridge Data

$span_1 := 38.98ft$ *Span 1 Length (Brg/Brg)*

$span_2 := 38.98ft$ *Span 2 Length (Brg/Brg)*

$span_3 := 38.98ft$ *Span 3 Length (Brg/Brg)*

$L_{Bridge} := 123.021ft$ *Bridge Limits*

$w_{bridge} := 44.4167 \cdot ft$ *Bridge width (O/O Deck):*
(Including 1/2" Fit-up between beams)

$Skew := 10deg$ *Skew of Bridge*

$n_{Abuts} := 2$ *Number of Abutments*

$n_{Piers} := 2$ *Number of Piers*

$n_{spans} := 3$ *Number of Spans*

Legend

INPUTS ***IMPORTANT VALUES*** ***FINAL VALUE***

ITEM 202E11203 - PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN ***LUMP***

$Rem_{Deck.Cost} := 15 \frac{dollars}{ft^2}$ *Removal Cost of Deck*

$Rem_{Sub.Cost} := 200 \frac{dollars}{yd^3}$ *Removal Cost of Substructure (Above Average Complex)*

$Rem_{Steel.Cost} := 250 \frac{dollars}{ton}$ *Removal Cost of Structural Steel*

Substructure Removal *Values measured from Microstation and Existing Plans*

Piers:

No Removal of Existing Piers

Abutments:

$A_{Rear.Stem.Rem} := 155.17 ft^2$ *Face Area of Rear Abutment Stem to be Removed*

$A_{Rear.Left.Wing.Rem} := 30.38 ft^2$ *Face Area of Left Rear Wingwall to be Removed*

$A_{Rear.Right.Wing.Rem} := 33.16 ft^2$ *Face Area of Right Rear Wingwall to be Removed*

$A_{Fwd.Stem.Rem} := 155.17 ft^2$ *Face Area of Forward Abutment Stem to be Removed*

$A_{Fwd.Left.Wing.Rem} := 33.16 ft^2$ *Face Area of Left Forward Wingwall to be Removed*

$A_{Fwd.Right.Wing.Rem} := 30.65 ft^2$ *Face Area of Right Forward Wingwall to be Removed*

$w_{Ex.Stem} := 2.25 ft$ *Width of Existing Abutment Stem*

$w_{Ex.Wing} := 1.50 ft$ *Width of Existing Wingwall*

$V_{RA.Removal} := w_{Ex.Stem} \cdot A_{Rear.Stem.Rem} + w_{Ex.Wing} \cdot (A_{Rear.Left.Wing.Rem} + A_{Rear.Right.Wing.Rem})$ $V_{RA.Removal} = 16.46 \cdot yd^3$

$V_{FA.Removal} := w_{Ex.Stem} \cdot A_{Fwd.Stem.Rem} + w_{Ex.Wing} \cdot (A_{Fwd.Left.Wing.Rem} + A_{Fwd.Right.Wing.Rem})$ $V_{RA.Removal} = 16.46 \cdot yd^3$

$V_{Sub.Removal} := V_{RA.Removal} + V_{FA.Removal}$ $V_{Sub.Removal} = 32.94 \cdot yd^3$

Deck Removal *Values From Exist. Plans*

$w_{Ex.Bridge} := 44.25 ft$ *Width of Existing Bridge*

$L_{Ex.Bridge} := 121.18 ft$ *Length of Existing Bridge*

$A_{Super.Removal} := w_{Ex.Bridge} \cdot L_{Ex.Bridge}$ $A_{Super.Removal} = 5362.22 \cdot ft^2$ *Area of Bridge*

Total Removal Cost

$Total_{202.Struc.Removal} := Ceil(V_{Sub.Removal} \cdot Rem_{Sub.Cost} + A_{Super.Removal} \cdot Rem_{Deck.Cost}, 10000)$

$Total_{202.Struc.Removal} = 90000.00 \cdot dollars$

ITEM 202E22900 - APPROACH SLAB REMOVED **SY**

$w_{Ex.Appr} := 44.25\,ft$ *Width of Exist. Approach Slab*

$L_{Ex.Appr} := 25.00\,ft$ *Length of Exist Approach Slab*

$A_{Appr} := w_{Ex.Appr} \cdot L_{Ex.Appr}$ $A_{Appr} = 1106.25 \cdot ft^2$

$Total_{202.Appr.Removal} := Ceil\left(2A_{Appr}, yd^2\right)$ $Total_{202.Appr.Removal} = 246.00 \cdot yd^2$

ITEM 202E23500 - WEARING COURSE REMOVED **SY**

$Total_{202.Wearing.Removal} := Ceil\left(A_{Super.Removal} + 2 \cdot A_{Appr}, yd^2\right)$ $Total_{202.Wearing.Removal} = 842.00 \cdot yd^2$

ITEM 503E21100 - UNCLASSIFIED EXCAVATION **CY**

Pile Encasement excavation is paid for with Item 507 - Pile Encasment

Abutments: Values From CSUB.dgn Basemap

$A_{Excav} := 15.54\,ft^2$ *Section Area of Abutment Excavation*

$L_{Excav} := 60.25\,ft$ *Length of Abutment Excavation (Out to Out of wingwalls)*

$V_{Abut.Excav} := A_{Excav} \cdot L_{Excav}$ $V_{Abut.Excav} = 34.68 \cdot yd^3$

$Total_{503.Excavation} := Ceil\left(2 \cdot V_{Abut.Excav}, yd^3\right)$ $Total_{503.Excavation} = 70.00 \cdot yd^3$

ITEM 507E71200 - SPECIAL - PILE ENCASEMENT **FT**

$n_{Piers} = 2.00$ *Number of Piers*

$n_{Columns} := 8$ *Number of Columns per Pier*

$h_{Encasement} := 6.00\,ft$ *Height of Pile Encasement*

$Total_{507.Encasement} := Ceil\left(n_{Piers} \cdot n_{Columns} \cdot h_{Encasement}, ft\right)$ $Total_{507.Encasement} = 96.00\ ft$

ITEM 509E10001 - EPOXY COATED REINFORCING STEEL, AS PER PLAN **LB**

$Total_{Abut.Steel} := 4236\,lbf$

$Total_{Super.Steel} := 28295\,lbf$

$Total_{509.Reinf.Steel} := Total_{Abut.Steel} + Total_{Super.Steel}$ $Total_{509.Reinf.Steel} = 32531.00\ lbf$

ITEM 509E20001 - REINFORCING STEEL, REPLACEMENT OF EXISTING REINFORCING STEEL, AS PER PLAN **LB**

$Total_{509.Replace.Reinf.Steel} := 50\,lbf$ $Total_{509.Replace.Reinf.Steel} = 50.00\ lbf$

ITEM 510E10000 - DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT ***EACH***

$n_{RA.Dowels} := 102$ *Number of Dowels in Rear Abutment Footing*

$n_{FA.Dowels} := 102$ *Number of Dowels in Fwd Abutment Footing*

$Total_{510.Dowels} := (n_{RA.Dowels} + n_{FA.Dowels})$ $Total_{510.Dowels} = 204.00$

ITEM 511E31611 - CLASS QC2 CONCRETE, SUPERSTRUCTURE, AS PER PLAN ***CY***

Deck

$t_{Deck} := 8.30in$ *Average Deck Thickness including additional haunch thickness (From Deck Elevation Calculations File*

$w_{bridge} = 44.42\ ft$ *Width of Bridge*

$L_{Bridge} = 123.02\ ft$ *Length of Bridge*

$V_{Deck.Conc} := t_{Deck} \cdot w_{bridge} \cdot L_{Bridge}$ $V_{Deck.Conc} = 139.98 \cdot yd^3$

Diaphragm Over Piers

$d_{notch} := 5in$ *Depth of Notch in beam per PSBD-2-07 for 17" box beams*

$w_{notch} := 1.25ft$ *Width of Notch in beam per PSBD-2-07*

$d_{gap} := 17in$ *Depth of Gap between Beams (Depth of beams)*

$w_{gap} := 6in$ *Width of Gap between Beams*

$V_{Pier.Dia} := \left[2\left(d_{notch} \cdot w_{notch}\right) + \left(d_{gap} \cdot w_{gap}\right)\right] \cdot \frac{w_{bridge}}{\cos(Skew)}$ $V_{Pier.Dia} = 2.92 \cdot yd^3$

Diaphragm Over Abutments

$A_{Abut.Dia} := 1.83ft^2$ *Section Area of Abutment Diaphragm*

$V_{Abut.Dia} := A_{Abut.Dia} \cdot \frac{w_{bridge}}{\cos(Skew)}$ $V_{Abut.Dia} = 3.06 \cdot yd^3$

$Total_{511.Super} := Ceil\left(V_{Deck.Conc} + n_{Piers} \cdot V_{Pier.Dia} + n_{Abuts} \cdot V_{Abut.Dia}, yd^3\right)$ $Total_{511.Super} = 152.00 \cdot yd^3$

ITEM 511E45711 - CLASS QC1 CONCRETE, ABUTMENT, AS PER PLAN ***CY***

$w_{Wing} := 1.50ft$ *Width of Wingwall*

$w_{Stem} := 2.25ft$ *Width of Abutment Stem*

Rear Abutment:

$A_{RA.Stem} := 156.00ft^2$ *Face Area of Rear Abutment Stem*

$A_{Rear.Left.Sloped.Wing} := 16.18ft^2$ *Face Area of Sloped Portion of Left Rear Wingwall*

$A_{Rear.Right.Sloped.Wing} := 16.03ft^2$ *Face Area of Sloped Portion of Right Rear Wingwall*

$A_{Rear.Left.Level.Wing} := 4.30ft^2$ *Plan Area of Level Portion of Left Rear Wingwall*

$A_{Rear.Right.Level.Wing} := 4.70ft^2$ *Plan Area of Level Portion of Right Rear Wingwall*

$h_{Rear.Left.Wing} := 5.47ft$ *Maximum Height of Left Rear Wingwall*

$h_{Rear.Right.Wing} := 5.44ft$ *Maximum Height of Right Rear Wingwall*

$$V_{Rear.Abut} := A_{RA.Stem} \cdot w_{Stem} + w_{Wing} \cdot \left(A_{Rear.Left.Sloped.Wing} + A_{Rear.Right.Sloped.Wing}\right) \cdots + h_{Rear.Left.Wing} \cdot A_{Rear.Left.Level.Wing} + h_{Rear.Right.Wing} \cdot A_{Rear.Right.Level.Wing}$$

$V_{Rear.Abut} = 16.61 \cdot yd^3$

Forward Abutment:

$A_{FA.Stem} := 156.01ft^2$ *Face Area of Forward Abutment Stem*

$A_{Fwd.Left.Sloped.Wing} := 16.03ft^2$ *Face Area of Sloped Portion of Left Fwd Wingwall*

$A_{Fwd.Right.Sloped.Wing} := 16.18ft^2$ *Face Area of Sloped Portion of Right Fwd Wingwall*

$A_{Fwd.Left.Level.Wing} := 4.70ft^2$ *Plan Area of Level Portion of Left Fwd Wingwall*

$A_{Fwd.Right.Level.Wing} := 4.30ft^2$ *Plan Area of Level Portion of Right Fwd Wingwall*

$h_{Fwd.Left.Wing} := 5.44ft$ *Maximum Height of Left Fwd Wingwall*

$h_{Fwd.Right.Wing} := 5.47ft$ *Maximum Height of Right Fwd Wingwall*

$$V_{Fwd.Abut} := A_{FA.Stem} \cdot w_{Stem} + w_{Wing} \cdot \left(A_{Fwd.Left.Sloped.Wing} + A_{Fwd.Right.Sloped.Wing}\right) \cdots + h_{Fwd.Left.Wing} \cdot A_{Fwd.Left.Level.Wing} + h_{Fwd.Right.Wing} \cdot A_{Fwd.Right.Level.Wing}$$

$V_{Fwd.Abut} = 16.61 \cdot yd^3$

Total Abument Concrete:

$$Total_{511.Abutment} := Ceil\left(V_{Rear.Abut} + V_{Fwd.Abut}, yd^3\right)$$

$Total_{511.Abutment} = 34.00 \cdot yd^3$

ITEM 512E10100 - SEALING OF CONCRETE SURFACES (EPOXY-URETHANE) ***SY***

Abutment Sealing *(Areas Measured from CSUB.dgn Basemap)*

Rear Abutment:

Stem:

$A_{Rear.Face.Stem} := 144.66ft^2$ *Front Face of Cap and Stem Between Ground Line and Abutment Seat including the face of wingwalls*

Wingwalls:

$A_{Wing.Side} := 3.25ft^2$ *Interior Face Area of Wingwall on Beam Seat Side*

$A_{Ext.Wing.Side} := 4.13ft^2$ *Side Face Area of Wingwall End*

$A_{Left.Rear.Wing.Top} := 9.54ft^2$ *Plan Area of Left Rear Wing Sealing Area*

$A_{Right.Rear.Wing.Top} := 9.93ft^2$ *Plan Area of Right Rear Wing Sealing Area*

$L_{Left.Rear.Wing} := 6.49ft$ *Length of Left Rear Wingwall Top*

$L_{Right.Rear.Wing} := 6.49ft$ *Length of Right Rear Wingwall Top*

$h_{Back.Wing.Seal} := 6.00in$ *Height of Sealing on Backside of Wingwall*

$w_{Wing} = 1.50\ ft$ *Width of the Wingwall*

$w_{Stem.Side} := 0.75ft$ *Width of exposed side of stem*

$h_{Stem.Side} := 1.95ft$ *Height of exposed side of stem*

$A_{Wing.Rear.1.Back} := L_{Left.Rear.Wing} \cdot h_{Back.Wing.Seal}$ $A_{Wing.Rear.1.Back} = 3.24 \cdot ft^2$

$A_{Wing.Rear.2.Back} := L_{Right.Rear.Wing} \cdot h_{Back.Wing.Seal}$ $A_{Wing.Rear.2.Back} = 3.24 \cdot ft^2$

$$A_{RA.Seal} := A_{Rear.Face.Stem} + 2 \cdot A_{Wing.Side} + 2 \cdot A_{Ext.Wing.Side} + A_{Left.Rear.Wing.Top} + A_{Right.Rear.Wing.Top} \cdots + A_{Wing.Rear.1.Back} + A_{Wing.Rear.2.Back} + 2 \cdot \left(w_{Stem.Side} \cdot h_{Stem.Side}\right)$$

$A_{RA.Seal} = 188.30 \cdot ft^2$

Forward Abutment:

Stem:

$A_{Fwd.Face.Stem} := 124.27ft^2$ *Front Face of Cap and Stem Between Ground Line and Abutment Seat including the face of wingwalls*

Wingwalls:

$A_{Wing.Side} = 3.25 \cdot ft^2$ *Interior Face Area of Wingwall on Beam Seat Side*

$A_{Ext.Wing.Side} = 4.13 \cdot ft^2$ *Side Face Area of Wingwall End*

$A_{Left.Fwd.Wing.Top} := 9.93ft^2$ *Plan Area of Left Rear Wing Sealing Area*

$A_{Right.Fwd.Wing.Top} := 9.54ft^2$ *Plan Area of Right Rear Wing Sealing Area*

$L_{Left.Fwd.Wing} := 6.49ft$ *Length of Left Fwd Wingwall Top*

$L_{Right.Fwd.Wing} := 6.49ft$ *Length of Right Fwd Wingwall Top*

$h_{Back.Wing.Seal} = 0.50\ ft$ *Height of Sealing on Backside of Wingwall*

$w_{Wing} = 1.50\ ft$ *Width of the Wingwall*

$A_{Wing.Fwd.1.Back} := L_{Left.Fwd.Wing} \cdot h_{Back.Wing.Seal}$ $A_{Wing.Fwd.1.Back} = 3.24 \cdot ft^2$

$A_{Wing.Fwd.2.Back} := L_{Right.Fwd.Wing} \cdot h_{Back.Wing.Seal}$ $A_{Wing.Fwd.2.Back} = 3.24 \cdot ft^2$

$$A_{FA.Seal} := A_{Fwd.Face.Stem} + 2 \cdot A_{Wing.Side} + 2 \cdot A_{Ext.Wing.Side} + A_{Left.Fwd.Wing.Top} + A_{Right.Fwd.Wing.Top} \cdots + A_{Wing.Fwd.1.Back} + A_{Wing.Fwd.2.Back} + 2 \cdot (w_{Stem.Side} \cdot h_{Stem.Side})$$

$A_{FA.Seal} = 167.91 \cdot ft^2$

$Total_{Abut.Seal} := Ceil(A_{RA.Seal} + A_{FA.Seal}, yd^2)$ $Total_{Abut.Seal} = 360.00 \cdot ft^2$

Pier Sealing *(Measured from CSUB.dgn Basemap)*

$A_{Pier.Face} := 119.66ft^2$ *Area of Pier Face*

$A_{Pier.End} := 6.35ft^2$ *Area of Pier End*

$L_{Pier} := 44.833ft$ *Length of Pier*

$w_{Pier} := 2.5ft$ *Width of Pier*

$A_{Pier.Underside} := L_{Pier} \cdot w_{Pier}$ $A_{Pier.Underside} = 112.08 \cdot ft^2$ *Area of Underside of Pier Cap*

$A_{Pier.Seal} := 2 \cdot A_{Pier.Face} + 2 \cdot A_{Pier.End} + A_{Pier.Underside}$ $A_{Pier.Seal} = 364.10 \cdot ft^2$ *Area of Pier Sealing*

$Total_{Pier.Seal} := Ceil(2 \cdot A_{Pier.Seal}, yd^2)$ $Total_{Pier.Seal} = 729.00 \cdot ft^2$

Superstructure Sealing *(Measured from CSUPER.dgn Basemap)*

$P_{Super.Seal} := 2.53ft$ *Perimeter of Sealing around Beam*

$L_{Bridge} = 123.02\ ft$ *Length of Bridge*

$Total_{Super.Seal} := Ceil\left[2\cdot\left(P_{Super.Seal}\right)\cdot L_{Bridge}, yd^2\right]$ $Total_{Super.Seal} = 630.00\cdot ft^2$

Total Epoxy Sealing

$Total_{512.Epoxy} := \left(Total_{Abut.Seal} + Total_{Pier.Seal} + Total_{Super.Seal}\right)$ $Total_{512.Epoxy} = 191.00\cdot yd^2$

ITEM 512E10601 - CONCRETE REPAIR BY EPOXY INJECTION, AS PER PLAN ***FT***

$L_{Crack.Repair} := 23.0ft$ *Length of Crack Repair including Contingency From Plans*

$Total_{512.Epoxy.Injection} := Ceil\left(L_{Crack.Repair}, ft\right)$ $Total_{512.Epoxy.Injection} = 23.00\ ft$

ITEM 512E33000 - TYPE 2 WATERPROOFING ***SY***

$w_{Type.2} := 3.00ft$ *Width of Type 2 Waterproofing*

$h_{CJ.Type.2} := 5.01ft$ *Height of Const.Joint*

$Total_{512.Type.2} := Ceil\left[2\left(w_{Type.2}\cdot h_{CJ.Type.2}\right), yd^2\right]$ $Total_{512.Type.2} = 4.00\cdot yd^2$

ITEM 512E74000 - REMOVAL OF EXISTING COATINGS FROM CONCRETE SURFACES ***SY***

$Total_{512.Seal.Removed} := Total_{Pier.Seal}$ $Total_{512.Seal.Removed} = 81.00\cdot yd^2$

ITEM 515E12030 - PRESTRESSED CONCRETE COMPOSITE BOX BEAM BRIDGE MEMBERS, LEVEL 1, CB17-48 (40'-0" LONG) ***EACH***

$n_{CB17.48.Beams} := 33$

$Total_{515.CB17.48.Beams} := n_{CB17.48.Beams}$ $Total_{515.CB17.48.Beams} = 33.00$

ITEM 516E13600 - 1" PREFORMED EXPANSION JOINT FILLER ***SF***

$h_{1in.PEJF.Edge} := 2.12ft$ *Height of PEJF at Joint between Deck and Wingwall*

$w_{1in.PEJF.Edge} := 1.50ft$ *Width of PEJF at Joint between Deck and Wingwall*

$Total_{516.Joint.Fill.1in} := Ceil\left(4\cdot h_{1in.PEJF.Edge}\cdot w_{1in.PEJF.Edge}, ft^2\right)$ $Total_{516.Joint.Fill.1in} = 13.00\cdot ft^2$

ITEM 516E14020 - SEMI-INTEGRAL ABUTMENT EXPANSION JOINT SEAL ***FT***

$w_{bridge} = 44.42\ ft$

$L_{Joint.Seal} := \frac{w_{bridge}}{\cos(Skew)} + 3.00ft$ $L_{Joint.Seal} = 48.10\ ft$

$Total_{516.Joint.Seal} := Ceil\left(2L_{Joint.Seal}, ft\right)$ $Total_{516.Joint.Seal} = 97.00\ ft$

ITEM 516E41100 - 1/8" PREFORMED BEARING PAD ***EACH***

$n_{Beams} := 11$ *Number of Beams per span*

$n_{Pads.Beam} := 2$ *Number of Pads per Beam End*

$n_{spans} = 3.00$ *Number of Spans*

$Total_{516.Bearing.Shims} := 2n_{Beams} \cdot n_{Pads.Beam} \cdot n_{spans}$ $Total_{516.Bearing.Shims} = 132.00$

ITEM 516E43100 - ELASTOMERIC BEARING WITH INTERNAL LAMINATES ONLY (NEOPRENE) (6"X9"X1") ***EACH***

$Total_{516.Bearing} := Total_{516.Bearing.Shims}$ $Total_{516.Bearing} = 132.00$

ITEM 517E70000 - RAILING (TWIN STEEL TUBE) ***FT***

$L_{Bridge.Railing} := 126.44ft$ *Length of Bridge Railing*

$Total_{517.Railing} := Ceil(2 \cdot L_{Bridge.Railing}, ft)$ $Total_{517.Railing} = 253.00\ ft$

ITEM 518E21200 - POROUS BACKFILL WITH GEOTEXTILE FABRIC ***CY***

$A_{Porous.Fill} := 425.05ft^2$ *Face Area of Porous Backfill*

$w_{Porous.Fill} := 2.00ft$ *Width of Porous Backfill*

$Total_{518.Backfill} := Ceil\left(2 \cdot A_{Porous.Fill} \cdot w_{Porous.Fill}, yd^3\right)$ $Total_{518.Backfill} = 63.00 \cdot yd^3$

ITEM 518E22300 - SPECIAL - STEEL DRIP STRIP ***FT***

$L_{Bridge} = 123.02\ ft$ *Length of Bridge*

$Total_{518.Drip.Strip} := Ceil(2 \cdot L_{Bridge}, ft)$ $Total_{518.Drip.Strip} = 247.00\ ft$

ITEM 518E40000 - 6" PERFORATED CORRUGATED PLASTIC PIPE ***FT***

$L_{Perf.Pipe} := 58.25ft$ *Length of Perforated Pipe*

$Total_{518.Perf.Pipe} := Ceil(2 \cdot L_{Perf.Pipe}, ft)$ $Total_{518.Perf.Pipe} = 117.00\ ft$

ITEM 518E40010 - 6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS ***FT***

$L_{RA.Non.Perf.Pipe} := 18.50ft$ *Length of Rear Abutment Non-Perforated Pipe*

$L_{FA.Non.Perf.Pipe} := 13.50ft$ *Length of Forward Abutment Non-Perforated Pipe*

$Total_{518.Non.Perf.Pipe} := Ceil(2 \cdot L_{RA.Non.Perf.Pipe} + 2 \cdot L_{FA.Non.Perf.Pipe}, ft)$ $Total_{518.Non.Perf.Pipe} = 64.00\ ft$

ITEM 519E11101 - PATCHING CONCRETE STRUCTURES, AS PER PLAN **SF**

$A_{Patching} := 49.00\,ft^2$ *Area of Patching from Plans including Contingency*

$Total_{519.Patching} := Ceil\left(A_{Patching}, ft^2\right)$ $Total_{519.Patching} = 49.00 \cdot ft^2$

ITEM 526E25000 - REINFORCED CONCRETE APPROACH SLAB (T=15") **SY**

Dimensions from Site Plan

$L_{Appr.Slab} := 25.00\,ft$ *Length of Approach Slab*

$w_{Appr.Slab} := w_{bridge}$ *Width of Approach Slab*

$A_{Appr.Slab} := L_{Appr.Slab} \cdot w_{Appr.Slab}$ $A_{Appr.Slab} = 123.38 \cdot yd^2$

$Total_{526.Appr.Slab} := Ceil\left(2 \cdot A_{Appr.Slab}, yd^2\right)$ $Total_{526.Appr.Slab} = 247.00 \cdot yd^2$

ITEM 526E90010 -TYPE A INSTALLATION **FT**

$n_{Abuts} = 2.00$

$L_{Joint} := \frac{w_{bridge}}{\cos(Skew)}$ $L_{Joint} = 45.10\ ft$

$Total_{526.Type.A.Install} := Ceil\left(n_{Abuts} \cdot L_{Joint}, ft\right)$ $Total_{526.Type.A.Install} = 91.00\ ft$

ITEM 601E32211 - ROCK CHANNEL PROTECTION, TYPE C WITH AGGREGATE FILTER, AS PER PLAN **CY**

$A_{RA.RCP} := 69.67\,ft^2$ *Profile Area of RCP at Rear Abutment from Profile View*

$A_{FA.RCP} := 75.03\,ft^2$ *Profile Area of RCP at Fwd. Abutment from Profile View*

$w_{RCP} := 48.00\,ft$ *Width of Slope Protection*

$V_{RA.RCP} := A_{RA.RCP} \cdot w_{RCP}$ $V_{RA.RCP} = 123.86 \cdot yd^3$

$V_{FA.RCP} := A_{FA.RCP} \cdot w_{RCP}$ $V_{FA.RCP} = 133.39 \cdot yd^3$

$Total_{601.RCP} := Ceil\left(V_{RA.RCP} + V_{FA.RCP}, yd^3\right)$ $Total_{601.RCP} = 258.00 \cdot yd^3$

SUMMARY

$Total_{202.Struc.Removal} = 90000.00 \cdot dollars$

$Total_{202.Appr.Removal} = 246.00 \cdot yd^2$

$Total_{202.Wearing.Removal} = 842.00 \cdot yd^2$

$Total_{503.Excavation} = 70.00 \cdot yd^3$

$Total_{507.Encasement} = 96.00\ ft$

$Total_{509.Reinf.Steel} = 32531.00\ lbf$

$Total_{509.Replace.Reinf.Steel} = 50.00\ lbf$

$Total_{510.Dowels} = 204.00$

$Total_{511.Super} = 152.00 \cdot yd^3$

$Total_{511.Abutment} = 34.00 \cdot yd^3$

$Total_{512.Epoxy} = 191.00 \cdot yd^2$

$Total_{512.Epoxy.Injection} = 23.00\ ft$

$Total_{512.Type.2} = 4.00 \cdot yd^2$

$Total_{512.Seal.Removed} = 81.00 \cdot yd^2$

$Total_{515.CB17.48.Beams} = 33.00$

$Total_{516.Joint.Fill.1in} = 13.00 \cdot ft^2$

$Total_{516.Joint.Seal} = 97.00\ ft$

$Total_{516.Bearing.Shims} = 132.00$

$Total_{516.Bearing} = 132.00$

$Total_{517.Railing} = 253.00\ ft$

$Total_{518.Backfill} = 63.00 \cdot yd^3$

$Total_{518.Drip.Strip} = 247.00\ ft$

$Total_{518.Perf.Pipe} = 117.00\ ft$

$Total_{518.Non.Perf.Pipe} = 64.00\ ft$

$Total_{519.Patching} = 49.00 \cdot ft^2$

$Total_{526.Appr.Slab} = 247.00 \cdot yd^2$

$Total_{526.Type.A.Install} = 91.00\ ft$

$Total_{601.RCP} = 258.00 \cdot yd^3$