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

- Include parapets, fence, deck sections for expansion joints, tops/backwalls, expansion joints, guardrail and any other appurtenances to complete work as described, etc.

## LUMP SUM

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## ITEM 509 - EPOXY COATED REINFORCING STEEL

Superstructure (Parapet) Total (lbs); Backwall Total (lbs); T<sub>SUPER</sub> = **13154.00** T<sub>BACKWALL</sub> = 1043 + 1698 = **2741.000** 

TOTAL WEIGHT OF REINFORCING STEEL (LB); T = T<sub>SUPER</sub> + T<sub>BACKWALL</sub> = 15895.000

<b>Tekla</b>	Project			Job Ref.		
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ITEM 510 – DOWEL HOLES WITH	NONSHRINK, I	NONMETALLIC	GROUT			
EXPANSION JOINT REPLACEMEN	<u>1T:</u>					
Length of deck along joint (ft);		$L_{D_{EXP}} = 96.0 /$	COS(24.12) =	105.18		
2 dowels per location;		n = 2				
No. dowel holes along abut (ea);		$N_{exp jt}$ = 106 $\times$ r	n × 2= <b>424.000</b>			
PARAPET REPLACEMENT:						
No. Y501 bars along parapets (ea);		N <sub>PAR</sub> = 1530				
LIGHT PILASTERS:						
Number of locations (EA);		$L_{N_{LP}} = 3 LIGH$	TS = 3.0			
4 holes at each location						
No. dowel holes along pilasters (ea)	i,	$N_{LP} = 4 \times 3 = 1$	2.000			

TOTAL DOWEL HOLES (EA);  $T_{510} = (N_{exp jt} + N_{PAR} + N_{LP}) = \underline{1966.000}$ 

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#### ITEM 511 - CLASS QC2 CONCRETE, BRIDGE DECK

Portions of deck required to place expansion joints.

Length of deck along joint (ft); Thickness of deck (ft); Width of deck (ft); 
$$\begin{split} & L_{D\_EXP} = 96.0 \ / \ COS(24.12) = \textbf{105.183} \\ & h_{deck} = 0.75 \\ & w_{deck} = 2.0 \end{split}$$

Add additional concrete for portions of walk above deck (CY);  $T_{walk} = (4 \times 0.75 \times 9 \times 2) / 27 = 2.000$ 

TOTAL VOLUME OF DECK CONCRETE (CU YD);

 $T_{PAR} = ceiling (((2 \times L_{D_{EXP}} \times h_{deck} \times w_{deck}) / 27) + T_{walk} , 1) = \underline{14.000}$ 

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CLASS OC2 CONCRETE BRIDG		PET) AS PER	PI AN (AI TERN			
*Item includes concrete parapets a	top wingwalls	<u>i Eij, Aŭ i Ek i</u>				
tem moludes conorete parapets a	top wingwalls.					
Length of parapets on bridge/wings	s (ft);	L <sub>BR</sub> = 339.40 ·	+ 332.86 = <b>672.2</b>	260		
Height of parapet (ft);		h <sub>ped</sub> = 2.667				
Width of parapet (ft);		w <sub>ped</sub> = 1.0				
		·				
CLASS QC2 CONCRETE, BRIDG	E DECK (PARA	PET), AS PER	PLAN (ALTERN	<u>ATE 2)</u>		
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a	E DECK (PARA top wingwalls.	PET), AS PER I	PLAN (ALTERN	<u>ATE 2)</u>		
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings	E DECK (PARA top wingwalls. s (ft);	<b>PET), AS PER  </b> L <sub>BR</sub> = 339.40	PLAN (ALTERN + 332.86 = <b>672.2</b>	ATE 2) 260		
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings Height of parapet (ft);	E DECK (PARA top wingwalls. s (ft);	PET), AS PER   L <sub>BR</sub> = 339.40 · h <sub>ped</sub> = 2.667	PLAN (ALTERN + 332.86 = <b>672.2</b>	<u>ATE 2)</u> 260		
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings Height of parapet (ft); Width of parapet (ft);	E DECK (PARA top wingwalls. s (ft);	PET), AS PER   L <sub>BR</sub> = 339.40 · h <sub>ped</sub> = 2.667 w <sub>aesth</sub> = 1.3333	PLAN (ALTERN + 332.86 = <b>672.2</b> 33333333	ATE 2) 260		
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings Height of parapet (ft); Width of parapet (ft); TOTAL VOLUME OF PARAPET C	E DECK (PARA top wingwalls. s (ft); CONCRETE (CU	PET), AS PER I L <sub>BR</sub> = 339.40 ·· h <sub>ped</sub> = 2.667 w <sub>aesth</sub> = 1.3333 YD); T <sub>PAI</sub>	PLAN (ALTERN + 332.86 = <b>672.2</b> 33333333 ς <b>= ceiling ((L</b> <sub>BR</sub>	ATE 2) 260 × h <sub>ped</sub> × w <sub>aesth</sub> ) / 2	27, 1) = 89.00	0
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings Height of parapet (ft); Width of parapet (ft); TOTAL VOLUME OF PARAPET C	E DECK (PARA top wingwalls. s (ft); CONCRETE (CU	PET), AS PER   L <sub>BR</sub> = 339.40 · h <sub>ped</sub> = 2.667 w <sub>aesth</sub> = 1.3333 YD); T <sub>PAI</sub>	PLAN (ALTERN + 332.86 = <b>672.2</b> 93333333 α <b>= ceiling ((L</b> <sub>BR</sub>	ATE 2) 260 × h <sub>ped</sub> × w <sub>aesth</sub> ) / 3	27, 1) = 89.00	0
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings Height of parapet (ft); Width of parapet (ft); TOTAL VOLUME OF PARAPET C	E DECK (PARA top wingwalls. s (ft);	PET), AS PER I L <sub>BR</sub> = 339.40 ·· h <sub>ped</sub> = 2.667 w <sub>aesth</sub> = 1.3333 YD); T <sub>PAI</sub>	<u>PLAN (ALTERN</u> + 332.86 = <b>672.2</b> 33333333 <sub>R</sub> = ceiling ((L <sub>BR</sub>	ATE 2) 260 × h <sub>ped</sub> × w <sub>aesth</sub> ) / 3	27, 1) = 89.00	0
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings Height of parapet (ft); Width of parapet (ft); TOTAL VOLUME OF PARAPET C	E DECK (PARA top wingwalls. s (ft);	PET), AS PER I L <sub>BR</sub> = 339.40 ·· h <sub>ped</sub> = 2.667 w <sub>aesth</sub> = 1.3333 YD); T <sub>PAI</sub>	PLAN (ALTERN + 332.86 = <b>672.2</b> 93333333 <b>α = ceiling ((L<sub>BR</sub></b>	ATE 2) 260 × h <sub>ped</sub> × W <sub>aesth</sub> ) / 3	27, 1) = 89.00	0
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings Height of parapet (ft); Width of parapet (ft); TOTAL VOLUME OF PARAPET C	E DECK (PARA top wingwalls. s (ft);	PET), AS PER I L <sub>BR</sub> = 339.40 ·· h <sub>ped</sub> = 2.667 w <sub>aesth</sub> = 1.3333 YD); T <sub>PAR</sub>	<u>PLAN (ALTERN</u> + 332.86 = <b>672.2</b> 33333333 а <b>= ceiling ((L</b> <sub>BR</sub>	ATE 2) 260 × h <sub>ped</sub> × w <sub>aesth</sub> ) / 3	27, 1) = 89.00	0
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings Height of parapet (ft); Width of parapet (ft); TOTAL VOLUME OF PARAPET C	E DECK (PARA top wingwalls. s (ft);	PET), AS PER I L <sub>BR</sub> = 339.40 · h <sub>ped</sub> = 2.667 w <sub>aesth</sub> = 1.3333 YD); T <sub>PAI</sub>	PLAN (ALTERN + 332.86 = <b>672.2</b> 33333333 <b>α = ceiling ((L</b> <sub>BR</sub>	ATE 2) 260 × h <sub>ped</sub> × w <sub>aesth</sub> ) / 3	27, 1) = 89.00	0
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings Height of parapet (ft); Width of parapet (ft); TOTAL VOLUME OF PARAPET C	E DECK (PARA top wingwalls. s (ft);	PET), AS PER I L <sub>BR</sub> = 339.40 ·· h <sub>ped</sub> = 2.667 w <sub>aesth</sub> = 1.3333 YD); T <sub>PA</sub>	<u>PLAN (ALTERN</u> + 332.86 = <b>672.2</b> ) 3333333 , = ceiling ((L <sub>BR</sub>	ATE 2) 260 × h <sub>ped</sub> × w <sub>aesth</sub> ) / 3	27, 1) = 89.00	0
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings Height of parapet (ft); Width of parapet (ft); TOTAL VOLUME OF PARAPET C	E DECK (PARA top wingwalls. s (ft);	PET), AS PER I L <sub>BR</sub> = 339.40 ·· h <sub>ped</sub> = 2.667 w <sub>aesth</sub> = 1.3333 YD); T <sub>PAI</sub>	<u>PLAN (ALTERN</u> + 332.86 = <b>672.2</b> ;3333333 ; = ceiling ((L <sub>BR</sub>	ATE 2) 260 × h <sub>ped</sub> × w <sub>aesth</sub> ) / 3	27, 1) = 89.00	0
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings Height of parapet (ft); Width of parapet (ft); TOTAL VOLUME OF PARAPET C	E DECK (PARA top wingwalls. s (ft);	PET), AS PER I L <sub>BR</sub> = 339.40 · h <sub>ped</sub> = 2.667 w <sub>aesth</sub> = 1.3333 YD); T <sub>PAI</sub>	PLAN (ALTERN + 332.86 = <b>672.2</b> 33333333 <b>α = ceiling ((L</b> <sub>BR</sub>	ATE 2) 260 × h <sub>ped</sub> × w <sub>aesth</sub> ) / 3	27, 1) = 89.00	0
CLASS QC2 CONCRETE, BRIDG *Item includes concrete parapets a Length of parapets on bridge/wings Height of parapet (ft); Width of parapet (ft); TOTAL VOLUME OF PARAPET C	E DECK (PARA top wingwalls. s (ft);	PET), AS PER I L <sub>BR</sub> = 339.40 · h <sub>ped</sub> = 2.667 w <sub>aesth</sub> = 1.3333 YD); T <sub>PAI</sub>	PLAN (ALTERN + 332.86 = <b>672.2</b> 3333333 <b>α = ceiling ((L</b> <sub>BR</sub>	ATE 2) 260 × h <sub>ped</sub> × w <sub>aesth</sub> ) / 3	27, 1) = 89.00	0

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## ITEM 511 - CLASS QC1 CONCRETE, SUBSTRUCTURE

Portions of backwalls required to place expansion joints.

 Length of deck along joint (ft);
  $L_{D_{EXP}} = 96.0 / COS 24.12 = 105.18$  

 Thickness of BW (ft);
  $h_{BW} = 1.17$  

 Width of deck (ft);
  $w_{BW} = 1.75$ 

Add additional concrete for portions of walk at corners. Include with item:  $T_{walk} = (4 \times 1' \times 9' \times 1.75' \text{ W}) / 27 = 3 \text{ CY} (add to total below)$ 

TOTAL VOLUME OF DECK CONCRETE (CU YD);

 $T_{PAR} = ceiling (2 \times L_{D_{EXP}} \times h_{BW} \times w_{BW}) / 27, 1) = \underline{19.00}$ 

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					ł			
ITEM 512 – SEALING OF CONCE	RETE SURFACI	ES (EPOXY-URE	THANE), AS F	PER PLAN				
Parapet on Bridge								
Length parapets (ft);		L <sub>rail</sub> = 289.19 (I	RT) + 289.20 (I	LT) = 578.40	= 578.40			
Sealing perimeter parapet (ft);		P <sub>rail</sub> = 2.67(2) -	+ 1 + 1.57 + 2.3	3 (avg cantilever) :	er) = <b>10.21</b>			
*Includes cantilever on outside fas	cia							
Sealing area – on bridge (SF);		$A_{BR_{rails}} = (P_{rail})$	× L <sub>BR</sub> ) = <b>5905</b>	.46				
Parapet on Wingwalls								
Length parapets (ft);		$L_{rail_WW} = 50.2^{2}$	1 (RT) + 43.66	(LT) = 93.87				
Sealing perimeter WW parapets (f	);	P <sub>rail_ww</sub> = 2.67 ·	+ 1 + 2.67 = <b>6.</b> 3	34				
*to top existing/wingwall								
Sealing area – at wingwalls (SF);		$A_{WW_{rails}} = (P_{rai})$	<sub>il_ww</sub> × L <sub>rail_WW</sub> ) =	= 595.14				
TOTAL Area at parapets (SY);		T <sub>512 rails</sub> = ceilii	ng((A <sub>ww rails</sub> + A	<sub>BR rails</sub> ) / 9, 1) = <b>72</b>	23.00			

TOTAL Area at parapets (SY);

NOTE: To effectively seal backwalls, remove all end crossframes and replace - this will facilitate a good cleaning job and sealing of the backwalls. Replace ALL end crossframes.

Backwalls				
Average elevation/top of abutments:	FWD (north) = 767.89; REAR (sout	th) = 771.24		
Average elevation/top of abut/seats:	FWD (north) = 762.25; REAR (south) = 765.35			
*Consider from approach slab seat				
Length / backwalls (ft);	L <sub>FWD</sub> = <b>108.58</b>			
	L <sub>REAR</sub> = <b>107.08</b>			
Sealing area – backwalls (SF);	$A_{BW} = (5.64 \times L_{FWD}) + (5.89 \times L_{REAF})$	R) = <b>1243.10</b>		
TOTAL Area at parapets (SY);	T <sub>512_BW</sub> = ceiling((A <sub>BW</sub> ) / 9, 1) = <b>139.00</b>			
Breastwalls:				
Width (length) of breastwall;	W <sub>BRW_FWD</sub> = 108.58	W <sub>BRW_REAR</sub> = 107.08		
GL – avg height at breastwall;	GL = 3.25 ft			
TOTAL Area – FWD (SF)	(W <sub>BRW_FWD</sub> x GL) = 352.89 SF			
TOTAL Area – REAR (SF)	(W <sub>BRW_REAR</sub> x GL) = 348.01 SF			
TOTAL Area at breastwalls (SY);	T <sub>512_BRW</sub> = ceiling ((A-REAR + A-F)	WD) / 9, 1 <b>) = 78.00</b>		
TOTAL QUANTITY OF SEALING (SY);	$T_{512} = T_{512\_rails} + T_{512\_BW} + T_{512\_BRW}$	y = <u>940.00</u>		

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### ITEM SPECIAL – URETHANE TOP COAT

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

Length of pier cap;	$L_{PC} = 106.25$
Height (avg) of pier cap (ft);	h <sub>PC</sub> = 3.98
Width of pier cap (ft);	W <sub>PC</sub> = 3
Height (avg) of columns, P1 & P3 (ft);	h <sub>C</sub> = 14.10
Height (avg) of columns, P2 (ft);	h <sub>C2</sub> = 8.78
Column perimeter (ft);	C <sub>A</sub> = 11

NOTE: Discount faces between NB & SB pier caps; cannot access (~3" width)

Area Pier Cap 1 of urethane top coat (SF);	$A_{PC1} = 2 \times (h_{PC} \times L_{PC}) + 2 \times (W_{PC} \times L_{PC}) + 2 \times (W_{PC} \times h_{PC}) = \textbf{1507.130}$
Area pier 1 columns of urethane top coat (SF);	$A_{C1} = 3 \times (h_C \times C_A) = $ <b>465.300</b>
Area Pier Cap 2 of urethane top coat (SF);	A <sub>PC2</sub> = A <sub>PC1</sub> = <b>1507.130</b>
Area pier 2 columns of urethane top coat (SF);	$A_{C2} = 2 \times (h_{C2} \times C_A) = 193.160$
Area Pier Cap 3 of urethane top coat (SF);	A <sub>PC3</sub> = A <sub>PC1</sub> = <b>1507.130</b>
Area pier 3 columns of urethane top coat (SF);	A <sub>C3</sub> = 3×(h <sub>C</sub> × C <sub>A</sub> ) = <b>465.300</b>

Total area of urethane top coat (SF);  $A_{UTC} = A_{PC1} + A_{C1} + A_{PC2} + A_{C2} + A_{PC3} + A_{C3} = 5645.150$ 

TOTAL AREA OF URETHANE TOP COAT (SY);  $T_{512\_UR}$  = ceiling (A<sub>UTC</sub> / 9, 1) = <u>628.00</u>

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ITEM 513 – STRUCTURAL STEEL	MEMBERS, LE	EVEL UF, AS P	ER PLAN						
*All end crossframes									
Intermediate crossframe (L 3x3x5/16	6) (Ibs/ft); WINT	= 6.10							
End crossframe (L 4x4x5/16) (lbs/ft);	W <sub>ENF</sub>	o = 8.20							
Length/complete interior replaced (ft)	); H <sub>INT</sub>	= 32.22							
Length/complete end replaced (ft);	H <sub>END</sub>	= 33.55							
Length/lower $\carcel{linear}$ interior replaced (ft);	H <sub>INT</sub>	$H_{\rm INT \ L} = 10.00$							
Length/cross ∟interior replaced (ft);	H <sub>INT</sub> _	<sub>c</sub> = 11.11							
Number complete intermediate repla	ced; N <sub>int</sub> =	5							
Number complete end replaced;	N <sub>end</sub>	= 18							
Number lower $\ \ $ interior replaced;	N <sub>low</sub> :	= 61							
Number cross $\ \ $ interior replaced;	N <sub>cross</sub>	<sub>s</sub> = 0							
Gusset PLs – end crossframes: (3) 8	5" x 10" x ⅔" pla	ates;							
Unit weight of steel plates (lb/ft <sup>3</sup> );	W <sub>stl</sub> =	= 490							
Connection plate thickness (in);	$t_{pl} = 0$	0.375							
Connection plate area (in <sup>2</sup> );	A <sub>pl</sub> =	80							
Connection plate weight (lbs);	$W_{GP}$	$W_{GP} = 3 \times W_{stl} \times ((A_{pl} \times t_{pl})/1728) = 25.521$							
Length of interiors (ft);	L <sub>INT</sub> =	= ( $H_{INT} \times N_{int}$ ) + (	(H <sub>INT_L</sub> × N <sub>low</sub> ) +	- (H <sub>INT_C</sub> × N <sub>cross</sub> ) =	= 771.100				
Length of exteriors (ft);	L <sub>END</sub>	= ( $H_{END} \times N_{end}$ )	= 603.900						
Weight of steel (lbs);		$W_{ST}$ = ( $W_{INT}$ ×	L <sub>INT</sub> ) + (W <sub>END</sub> ×	$(L_{END}) + (N_{end} \times M)$	/ <sub>GP</sub> ) = 10115.	065			
TOTAL WEIGHT OF STRUCTURAL	_ STEEL (lbs);	W <sub>ST</sub> =	ceiling(W <sub>ST</sub> , 1	) = <u>10,11</u> 6.000					

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## ITEM 516 - STRUCTURAL EXPANSION JOINT INCLUDING ELASTOMERIC STRIP SEAL

REAR ABUT = 107.08' Length of EXP JT (ft);

FWD ABUT = 108.58' L<sub>EXP</sub> = 215.66 / COS 24.12 = **237.00** 

TOTAL EXPANSION JOINT (LF);  $T_{EXP} = L_{EXP} = \frac{237.00}{2}$ 

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## ITEM 516 - BEARING DEVICE, ROCKER

REAR ABUTMENT (EA); P1 (EA); P2 – P3 (EA); FWD ABUTMENT (EA);

$$E_{RA} = 11.00$$
  
 $E_{P1} = 0.00$   
 $E_{P2} = E_{P3} = 0.00$   
 $E_{FA} = 11.00$ 

TOTAL NUMBER OF ROCKERS (EA);  $R_{REPL}$  = ceiling( $E_{FA}$  +  $E_{RA}$  +  $P_{1-3}$ , 1) = <u>22.00</u>

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## ITEM 516 - RESET BEARING

REAR ABUTMENT (EA);	$E_{RA} = 0$
P1 (EA);	E <sub>P1</sub> = 0
P2 (EA);	E <sub>P2</sub> = 0
P3 (EA);	E <sub>P3</sub> = 1
FWD ABUTMENT (EA);	$E_{FA} = 0$

TOTAL NUMBER OF ROCKERS (EA);  $R_{REPL} = ceiling(E_{FA} + E_{RA} + P_{1-3}, 1) = \underline{1.00}$ 

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

LUMP SUM

	Project Job Ref.						
	E	Estimated Quantities – CUY-252-04.34				0855.000	
Cale and Francisco and a	Section				Sheet no./rev.		
Usborn Engineering		Final	Tracings			14	
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	9-20-2022	MJD	9-26-2022	MJD	12-14-2022		
		I	I		1		
ITEM 519 – COMPOSITE FIBER V	VRAP SYSTEM						
*Per PN 519 – on pier caps as requ	uired.						
COMPOSITE FIBER WRAP STST		(CFRP) - 406 250					
Length of pier cap,	L <sub>PC</sub> -	- 100.250					
Height (avg) of pier cap (it),	H <sub>PC</sub> -	- 3.900					
Width of pier cap (it),	۷۷ <sub>PC</sub>	- 3.000					
Height (avg) of columns, PT & P3 (	n, n <sub>c</sub> –	14.100					
Height (avg) of columns, P2 (It);	n <sub>c2</sub> =	= 8.780					
Column perimeter (π);	C <sub>A</sub> =	11.000					
			( 0"				
NOTE: Discount faces between NB	& SB pier caps	; cannot access	(~3" width)				
Area Diar Can 1 of urathana tan aa	at (85):	A = 0 /b				7 4 2 0	
Area Pier Cap T of urethane top co	al (SF);	$A_{PC1} = 2 \times (n_{PC})$	$\times L_{PC}$ ) + 2× (VV <sub>PC</sub> )	$_{\rm C} \times L_{\rm PC}$ ) + 2× (VV <sub>P</sub>	$_{\rm C} \times n_{\rm PC}$ ) = 150	7.130	
Area Pier Cap 2 of urethane top co	at (SF);	$A_{PC2} = A_{PC1} = 1$	507.130				
Area Pier Cap 3 of urethane top co	at (SF);	$A_{PC3} = A_{PC1} = 1$	507.130				
Total area of composite carbon fibe		A – A		. 4524 200			
Total area of composite carbon libe	er wiap (SF),	ACARBON - APC	1 <b>T A</b> PC2 <b>T A</b> PC3 -	- 4521.350			
TOTAL AREA OF COMPOSITE C		WRAP (SF).	T = (		1) = 4522 000		
			519_CARBON - V	CARBON,	1) - <u>4322.000</u>		
COMPOSITE FIBER WRAP SYST	EM: E-GLASS	(EGFRP)					
*Per PN 519 – on columns as requi	ired.						
Area pier 1 columns of urethane top	o coat (SF);	$A_{C1} = 3 \times (h_C \times$	C <sub>A</sub> ) = <b>465.300</b>				
Area pier 2 columns of urethane to	o coat (SF);	$A_{C2} = 2 \times (h_{C2} \times$	C <sub>A</sub> ) = <b>193.160</b>				
Area pier 3 columns of urethane to	o coat (SF):	$A_{C3} = 3 \times (h_C \times 0)$	C₄) = <b>465.300</b>				
Total area of composite E-glass fibe	er wrap (SF);	$A_{GLASS} = A_{C1} +$	$A_{C2} + A_{C3} = 112$	23.760			
		02.00	02 00				
TOTAL AREA OF COMPOSITE E	-GLASS FIBER	WRAP (SF);	T <sub>519 GLASS</sub> = ce	eiling(A <sub>GLASS</sub> , 1) =	= <u>1124.000</u>		
				0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0			
TOTAL AREA OF COMPOSITE FI	BER WRAP (SI	F); T <sub>519_FIBER</sub>	= ceiling((T <sub>519</sub> _	CARBON + T519_GLA	<sub>.ss</sub> ) , 1) = 5646	6.000	

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ITEM 519 – PATCHING CONCRETE STRUCTURE, AS PER PLAN Include walks, curbs, median, abutment breastwalls, piers and backwalls							
Per BDM C405.2.1 – add 25% to all quantities for Area of abutment repairs (SF);	final. A <sub>abut</sub> = 64 + 48 = <b>112.000</b> x 1.25 = 140						
Area of pier repairs (SF);	A <sub>Piers</sub> = 88 + 148 + 162 = <b>398.000</b> x 1.25 = 498						
Area of curb repairs (SF);	A <sub>curb</sub> = 52 + 39 = <b>91.000</b> x 1.25 = 114						
Area of walk repairs (SF);	A <sub>walk</sub> = 90 + 390 = <b>480.000</b> x 1.25 = 600						
TOTAL CONCRETE PATCHING (SF);	$P_{CONC} = ceiling(A_{abut} + A_{Piers} + A_{curb} + A_{walk}, 1) = \underline{1352.000}$						

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## ITEM 519 – PATCHING CONCRETE BRIDGE DECK – TYPE B

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

Area of deck repairs – field measured (ft);

A<sub>deck</sub> = 100 x 1.25 = 125

TOTAL PATCHING BRIDGE DECK (SY);

 $P_{BR} = ceiling((A_{deck}) / 9, 1) = 14.00$ 

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# ITEM 530 - SPECIAL STRUCTURE, MISC.: BRIDGE CLEANING

LUMP SUM

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## ITEM SPECIAL - STRUCTURE, MISC.: TIMBER SUB-DECKING

Place sub-decking over spans 2 & 3, plus additional 5 foot either side. Spans (ft);  $S_{deck} = 87.75 + 91.25 + 10 = 189$  ft

Spacing between girders = 94.5Therefore,  $A_{SUB}$  =  $189 \times 94.5$  = **17860.50** 

TOTAL TIMBER SUB-DECK (SF);

 $T_{SUB} = ceiling((A_{SUB}), 1) = 17861.00$ 

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#### ITEM SPECIAL - STRUCTURE, MISC.: BOTTOM OF DECK SPALL REMOVAL

Inspection shall take place in conjunction with sub-decking over spans 2 & 3, plus additional 5 foot either side. Spans (ft);  $S_{deck} = 87.75 + 91.25 + 10 = 189$  ft

Spacing between girders = 94.5Therefore,  $A_{SUB}$  =  $189 \times 94.5$  = **17860.50** 

From observations in the field and markings on underside of deck, we assume 20% will be sounded. This is per note in plans that allows Field Engineer to spot areas as needed based on structural soundness and appearance.

So, A'<sub>SUB</sub> = 17860.50 x 0.20 = 3572.10 (Use 3575 SF)

TOTAL SOUNDING & SPALL REMOVAL (SF);  $T_{SUB} = ceiling((A_{SUB}), 1) = 3575.00$ 

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		STRAIGHT COA		AS PER DI AN (/		1)		
						<u>-17</u>		
Length parapets (ft).	L = 337 82 -	- 331 28 <b>= 669</b> 1	100					
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>rail</sub> , 1) = 670.00	00				
		-						
ITEM 607 – FENCE MISC.: DEC	ORATIVE FENC	E (ALTERNATE	<u>2)</u>					
Length parapets (ft);		$L_{aesth} = 343.86$	+ 336.59 <b>= 680</b>	.450				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(L <sub>aesth</sub> , 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(Laesth, 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(Laesth, 1) = 681.	000				
TOTAL VANDAL PROTECTION	I FENCE (LF);	T <sub>VPF</sub> = ceiling	(Laesth, 1) = 681.	000				

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UNDER LIGHTING QUAI	NTITIES: RECT EXISTING	LIGHT POLE, A	S PER PLAN			
For use at each existing light pole	ON BRIDGE.					
3 LIGHTS BEING REMOVED ANI	D REERECTED	- EAST ONLY				
TOTAL NUMBER LIGHTS (EA);	R <sub>L</sub> =	ceiling(2, 1) = <u>3</u>	.00			
ITEM 625 – STRUCTURE JUNCT	ION BOX					
For use at each reerected light pol	e.					
3 LIGHTS BEING REMOVED AND	D REERECTED					
TOTAL NUMBER JUNCTION BO	XES (EA);	R∟ = ceili	ng(2, 1) = <u>3.00</u>			
ITEM 625 – STRUCTURE GROUI	NDING SYSTEM	<u>1</u>				
1 EACH - PER BDM						
TOTAL GROUNDING SYSTEM (	ΞΑ);	R <sub>L</sub> = ceiling(2, 1	) = <u>1.00</u>			
ITEM 625 – CONDUIT, 2", 725.05 The existing 2" conduit is buried of Item shall include a contingency q at each pole will also be used for t	<b>i1, AS PER PLA</b> n each end of th uantity as requir ie-ins at junction	N e bridge beyond ed to complete ite boxes and pole	he parapets. It em, mostly for t bases.	will run from end ie-ins at ends/brid	/parapet to en dge. A conting	d/parapet. ency of 10 LF
EAST PARAPET = BR LIMITS + WEST PARAPET = BR LIMITS + Contingency at pole = 10 LF x 3	2x2 = 292' + 4' : 2x2 = 292' + 4' = 30 LF	= 296 LF = 296 LF				
TOTAL = 622 LF						
TOTAL LENGTH CONDUIT (LF);	RL	= ceiling(2, 1) = <u>(</u>	<u> </u>			

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ITEM 625 - CONNECTION FUS		т					
Lised in base of poles to for current	nt carrying condu						
	In carrying cond						
RIGHT PARAPET = 2 poles = 2	EA						
LEFT PARAPET = 1 pole = 1 EA							
•							
TOTAL = 3 EA							
TOTAL FUSED CONN (FA)	R, = cei	ling(TOTAL 1) :	= 3 00				
			- <u>3.00</u>				
Lised in base of poles to for group	ding conductors						
Used in base of poles to for groun							
RIGHT PARAPET = $2 \text{ noles} = 2$	FΔ						
LEFT PARAPET = 1 pole = 1 EA							
TOTAL = 3 EA							
TOTAL UNFUSED CONN (EA);	R <sub>L</sub> =	ceiling(TOTAL,	1) = <u>3.00</u>				
ITEM 625 - CONNECTION, FUS	ED PULL APAR	т					
Used in ground box.		_					
RIGHT PARAPET = 2 poles = 2	EA						
LEFT PARAPET = 1 pole = 1 EA	ι.						
TOTAL UNFUSED PERM (EA);	R <sub>L</sub> =	ceiling(TOTAL,	1) = <u>3.00</u>				
ITEM 625 – NO. 4 AWG 2400 VO		ON CABLE					
Current carrying conductors in the	e feeder – from p	ull box to pul box	ζ.				
		·					
Pull Boxes:							
STA 71+85 (NE) AND STA 73+40	D (NW)						
STA 68+19 (SE) AND STA 67+86	6 (SW)						
TOTAL = EAST, 366 LF & WEST	, 554 LF = 920.0	00					
TOTAL NO. 4 AWG (LF);	R <sub>L</sub> = ceiling	g(TOTAL, 1) = <u>9</u> 2	20.00				

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ITEM 625 - NO 6 AWG 2400 V							
Grond conductor – from null box	to pul box	<u>N CABLE</u>					
Pull Boxes:							
STA 71+85 (NE) AND STA 73+4	40 (NW)						
STA 68+19 (SE) AND STA 67+8	86 (SW)						
TOTAL = EAST, 366 LF & WES	T, 554 LF = 920.00	)					
TOTAL NO. 6 AWG (LF);	R <sub>L</sub> = ceiling	(TOTAL, 1) = <u>92</u>	<u>20.00</u>				
ITEM 625 - NO. 10 AWG POLE	AND BRACKET						
Cable that goes from junction bo	x and up pole – tal	en from existing	g plans.				
<b>C</b> <i>J</i>							
Stations from existing plans:							
STA 68+90 (RT)		101 LF PROV	IDED				
STA 70+69 (RT)	+69 (RT) 101 LF PROVIDED						
STA 69+80 (LT)		101 LF PROV	IDED				
TOTAL = 101 + 101 + 101 = 303	3						
TOTAL NO 10 AWG (LE)	R. = ceiling	n(TOTAL 1) = 3	803.00				
ITEM 625 - REMOVAL OF LUN	IINAIRE AND REE	RECTION					
The luminaire from each existing	pole must be remo	oved and stored	per 625.21A ir	n CMS.			
PARAPET = 3 poles = 3 EA							
TOTAL = 3 FA							
TOTAL REMOVE/REERECT LU	IMINAIRE (EA);	R <sub>L</sub> = 0	ceiling(TOTAL	, 1) = <u>3.00</u>			
ITEM 625 – PULL BOX CLEAN	<u>ED</u>						
The pull box where the disconed	t and reconnect oc	curs must be cle	eaned.				
1 LOCATION							
TOTAL NUMBER PULL BOXES	CLEANED (EA);	RL	= ceiling(2, 1)	= <u>1.00</u>			
		-					

<b>Tekla</b> <sup>®</sup>	Project	Estimated Quantit	Job Ref. J20200855.000			
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ITEM 625 – MAINTAIN EXISTING	LIGHTING					
LUMP SUM						
ITEM 625 – DISCONNECT CIRCU Disconnect from existing circuit.	<u>JIT</u>					
1 LOCATION						
TOTAL NUMBER DISCONNECTI	ONS (EA);	R <sub>L</sub> = ceil	ing(2, 1) = <u>1.0</u>	<u>o</u>		
ITEM 625 – REMOVE AND REER		G LIGHT POLE. A	S PER PLAN			
		, <i>i</i>				
For use at each existing light po	DIE ON BRIDGE					
3 LIGHTS BEING REMOVED AN	D REERECTED	)				
TOTAL NUMBER LIGHTS (EA);	R <sub>L</sub> =	= ceiling(2, 1) = <u>3</u>	.00			
ITEM 625 - REMOVAL OF LUMI	NAIRE AND RE	ERECTION, AS	PER PLAN			
Item shall include all luminaires (U required to complete item.	NDERPASS), c	conduit, adjacent j	unction boxes	, supports, clamps	and all appu	rtenances
P1: NORTH FACE @ 3 EACH = 3 P2: BOTH FACES @ 3 EACH = 6 P3: SOUTH FACE @ 3 EACH = 3	<b>i</b> i					
TOTAL NUMBER LUMINAIRES (	EA);	R <sub>L</sub> = ceiling(2,	1) = <u>12.00</u>			

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			•				
UNDER ROADWAY QUA	NTITIES:						
ITEM 441 – ASPHALT CONCRET	E INTERMEDIA	<u>TE COURSE, T</u>	<u>YPE 2 (448), AS</u>	PER PLAN			
Use width between curbs at each a	<u>butment:</u>						
Length of PRJ;		$L_{PRJ} = 80$	0.0 / COS(24.12	) =87.653			
Width of PRJ – only ~1.5 reqires pa	tching (ft);	$W_{PRJ} = 1$	.5				
Depth of PRJ – STD DWG (ft);		D <sub>PRJ</sub> = 1					
		<b>T</b>					
TOTAL CY PRJ (CY);		$I_{441}$ PRJ = CeIII	$ng ((2 \times L_{PRJ}) \times V)$	$V_{PRJ} \times D_{PRJ} / 27,$	1) = <u>10.000</u>		
ITEM 606 – GUARDRAIL. TYPE M	GS						
,,,,,							
Length guardrail – northwest;	L <sub>NW</sub> = 2	5					
Length guardrail – northeast;	L <sub>NE</sub> = 2	5					
Length guardrail – southwest;	L <sub>SW</sub> = 2	5					
Length guardrail – southeast;	L <sub>SE</sub> = 50	0					
TOTAL LENGTH MGS GUARDRA	IL (FT);	$R_{BTA} = L_{NW} + L_{I}$	<sub>NE</sub> + L <sub>SW</sub> + L <sub>SE</sub> =	<u>125.000</u>			
ITEM 606 – ANCHOR ASSEMBLY	<u>, MGS TYPE E</u>						
IOTAL NUMBER OF ANCHOR AS	SEMLIES (EA)	; $R_{E} = 2$					
ITEM 606 – ANCHOR ASSEMBLY	MGS TYPE T						
THE OUT ANOTON ACCEMPET	<u>, 1100 111 E 1</u>						
TOTAL NUMBER OF ANCHOR AS	SEMLIES (EA)	: R <sub>T</sub> = 2	.00				
		, <u> </u>					
<u>ITEM 606 – MGS BRIDGE TERMIN</u>	AL ASSEMBLY	<u> </u>					
Place on each corner							
TOTAL NUMBER OF BTA'S (EA);	$R_{BTA} = e$	ceiling(1) = <u>4.0</u>	<u>o</u>				