

BRIDGE NO: LAK-00006-04.610
 SFN: 4302044
 BRIDGE DESCRIPTION: U.S. 6 Over Chagrin River



CALCULATED BY: AMR
 CHECKED BY: JMV

DATE: 08/04/23
 DATE: 08/04/23

ESTIMATED QUANTITIES

Note to Designer: Edit Blue Text Only!

GENERAL INPUT:

Skew = 30.00 degrees

DECK:

Bridge limits = 393.33 ft
 Deck width = 33.33 ft
 Average deck width = 33.33 ft
 Slab thickness = 0.71 ft

ABUTMENTS:

	<u>REAR ABUTMENT</u>		<u>FORWARD ABUTMENT</u>	
Length of breastwall (from proposed abutment plan) =	38.88 ft		34.65 ft	
Width of breastwall =	3.00 ft		4.75 ft	
Width of approach slab =	33.33 ft		33.33 ft	
Thickness of approach slab =	1.42 ft		1.42 ft	
Proposed bottom of footing elevation =	698.3		720	
<u>Top of deck elevations at bridge limits:</u>				
Left toe of parapet elevation =	711.5		731.22	
Right toe of parapet elevation =	712.38		732.09	
Average top of deck elevation =	711.94		731.66	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Approach slab seat elevation =	710.08	710.96	729.8	730.67
Average approach slab seat elevation =		710.52		730.24
Average beam seat elevation =		704.21		723.26
Average top of slope elevation =				
	<u>Wingwall 1</u>	<u>Wingwall 2</u>	<u>Wingwall 3</u>	<u>Wingwall 4</u>
Wingwall thickness =			1.50 ft	
Overall wingwall length =	15.50 ft	15.50 ft	15.50 ft	15.50 ft

PARAPET DATA:

Perimeter of epoxy sealing standard SBR-1-20 section = 7.83 ft

ITEM	ITEM EXT.	DESCRIPTION
ITEM 202	11203	PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN
		Approximate area of deck to remove = 10724.00 ft^2
		Unit removal cost per sq ft = \$25/ft^2
		\$268,100.00
		Total cost = \$269,000
		Quantity = LS

ITEM 202	22900	APPROACH SLAB REMOVED																		
<p>Rear approach slab plan area = 750.00 ft² Forward approach slab plan area = 750.00 ft²</p> <p>Total Quantity = 167 SY</p>																				
ITEM 503	21300	UNCLASSIFIED EXCAVATION																		
<table> <thead> <tr> <th></th> <th>Plan Area</th> <th>Average Height</th> <th>Volume</th> </tr> </thead> <tbody> <tr> <td>R.A. Footing</td> <td>439.40 sq ft</td> <td>12.58</td> <td>205 cu yd</td> </tr> <tr> <td>F.A. above rock</td> <td>381.57 ft²</td> <td>3.25 ft</td> <td>46 cu yd</td> </tr> <tr> <td colspan="3">Total =</td> <td>251 cu yd</td> </tr> </tbody> </table> <p>Total Quantity = LS</p>						Plan Area	Average Height	Volume	R.A. Footing	439.40 sq ft	12.58	205 cu yd	F.A. above rock	381.57 ft ²	3.25 ft	46 cu yd	Total =			251 cu yd
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Total =			251 cu yd																	
ITEM 503	31121	SHALE EXCAVATION, AS PER PLAN																		
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ITEM 505	11100	PILE DRIVING EQUIPMENT MOBILIZATION																		
<p>Cost per substructure unit = \$5,000.00 Number of locations = 1 each Total cost = \$5,000.00</p> <p>Total Quantity = LS</p>																				
ITEM 507	00100	STEEL PILES HP10X42, FURNISHED																		
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ITEM 509	10000	EPOXY COATED STEEL REINFORCEMENT																		
<p>Superstructure total = 131510 lb Abutment total = 14471 lb Pier Total = 3055 lb</p> <p>Total Quantity = 149036 LB</p>																				
ITEM 509	30020	NO. 4 DEFORMED GFRP REINFORCEMENT																		
<p>Superstructure Total = 13022 FT</p>																				
ITEM 510	10000	DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT																		
<p>Pier 1 = 66 each Pier 2 = 66 each Pier 3 = 66 each</p> <p>Total = 198 EACH</p>																				

ITEM 511	34446	CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK
<p><u>Deck concrete:</u> Area of bridge deck = 13111.00 ft² Thickness of new deck = 0.71 ft Deck volume = 9286.96 ft³</p> <p><u>Deck haunch concrete:</u> Length of haunch = 388.47 ft Average haunch area = 0.21 ft² Number of beams = 5 each Volume of haunches = 404.66 ft³</p> <p><u>Deck overhang concrete:</u> Average overhang width = 4.00 ft Additional thickness = 0.24 ft Length of deck = 388.47 ft Number of sides = 2 each Volume of overhangs = 744.57 ft³</p> <p><u>Diaphragm:</u> <u>REAR ABUTMENT</u> Diaphragm thickness = 3.00 ft Average diaphragm height = 7.84 ft Length of diaphragm = 38.88 ft</p> <p><u>Girder deductions from diaphragm:</u> Cross section area of girder = 67.50 in² Face of diaphragm to girder end (along CL beam) = 2.31 ft Volume deduction from diaphragm per girder = 1.08 ft³ Total deduction for all girders = 5.41 ft³</p> <p><u>Diaphragm guide deduction:</u> Height of diaphragm guide = 2.00 ft Length of diaphragm guide = 4.62 ft Width of diaphragm guide = 3.00 ft Deduction for diaphragm guide = 27.71 ft³ Total net diaphragm volume = 881.22 ft³</p> <p>Total Quantity = 420 CY</p>		
ITEM 511	34450	CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK (PARAPET)
<p><u>Parapet:</u> Area of standard section = 4.08 ft² Length of standard section = 391.62 ft Number of sides = 2 each Length of standard section on rear approach slab = 4.00 ft Length of standard section on forward approach slab = 3.38 ft Volume of parapet transition on approach slab = 49.14 ft³ Number of parapet transitions on approach slabs = 4 each</p> <p>Total Quantity = 128 CY</p>		

ITEM 511	42512	CLASS QC1 CONCRETE WITH QC/QA, PIER CAP																																																																																			
Length of pier cap = 33.00 ft Width of pier cap = 3.00 ft Average height raised Pier 1 = 1.35 ft Average height raised Pier 2 = 1.40 ft Average height raised Pier 3 = 1.30 ft Total Quantity = 15 CY																																																																																					
ITEM 511	43512	CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT INCLUDING FOOTING																																																																																			
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ITEM 511	53010	CLASS QC1 CONCRETE, MISC.: CLASS QC1 CONCRETE WITH QC/QA, FILL VOIDS AT PIERS																																																																																			
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ITEM 512	10100	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)
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	<u>REAR ABUTMENT</u>	<u>FORWARD ABUTMENT</u>
Area of Breastwall to Seal =	19.44 ft ²	55.80 ft ²
Area of Seat to Seal =		98.15 ft ²
Area of Backwall to Seal =		255.55 ft ²
Area of Curtain Walls to Seal =		34.34 ft ²
Area of wingwalls to seal =	124.06 ft ²	95.09 ft ²
Wingwall thickness =		1.50 ft
Length of top and edge of wingwalls =	46.61 ft	43.31 ft
Total area per abutment =	213.41 ft ²	603.89 ft ²
Total Abutment Quantity =	91 SY	

	Pier 1	Pier 2	Pier 3
Average Column Thickness	4.13 ft	4.00 ft	4.14 ft
Column Width	3.50 ft	3.50 ft	3.50 ft
Column Height	48.00 ft	49.19 ft	51.13 ft
Number of Columns	2 each	2 each	2 each
Column Area	1464.00 ft ²	1475.70 ft ²	1561.51 ft ²
Top Strut Height	3.50 ft	3.50 ft	3.50 ft
Length	17.13 ft	17.04 ft	17.11 ft
Middle Strut Height	8.00 ft	3.50 ft	3.50 ft
Length	17.71 ft	17.77 ft	17.92 ft
Bottom Strut Height	3.50 ft	8.00 ft	8.00 ft
Length	18.54 ft	18.55 ft	18.77 ft
Strut Thickness	2.00 ft	2.00 ft	2.00 ft
Strut Area	746.52 ft ²	753.91 ft ²	760.73 ft ²
Average Cap Height	6.40 ft	6.45 ft	6.40 ft
Cap Width	33.00 ft	33.00 ft	33.00 ft
Cap Thickness	3.00 ft	3.00 ft	3.00 ft
Cap Area	637.80 ft	641.40 ft	637.80 ft
Total =	2848.32 ft ²	2871.01 ft ²	2960.04 ft ²

Total Pier Quantity = 965 SY

Parapet and edge of deck:

Average Overhang = 0.50 ft
 Parapet perimeter = 7.83 ft
 Average cantilever deck slab thickness = 0.91 ft
 Length of superstructure to be sealed = 393.33 ft

Face of R.A. Diaphragm = 264.25 ft²

Total Superstructure Quantity = 852 SY

Approach Slabs:

Length of parapet on approach slabs = 72.00 ft
 Perimeter of parapet section on approach slab = 7.83 ft

Total General Quantity = 63 SY

Total Quantity = 1971 SY

ITEM 512	10600	CONCRETE REPAIR BY EPOXY INJECTION
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Pier 1 Total = 26.00 ft
 Pier 2 Total = 9.00 ft
 Pier 3 Total = 33.00 ft

Total Quantity = 68 FT

ITEM 513	10280	STRUCTURAL STEEL MEMBERS, LEVEL 4
<u>Girders</u>		
Area		
Top Flange = 13.13 in ²		
Web = 37.13 in ²		
Bottom Flange = 13.13 in ²		
Unit weight of steel = 490 lb/ft ³		
Girder Length = 391.0 ft		
Number of Girders = 5 each		
Total Girder Weight = 421649.52 lb		
<u>Crossframes</u>		
Number of standard crossframes = 102 each		
Total length of standard crossframe = 21.03 ft		
Unit weight of L3.5x3.5x3/8 = 8.5 lb/ft		
Connection Plate Volume = 179.44 in ³		
Number of Connection Plates = 204 each		
Standard Crossframe Total Weight = 28615.57 lb		
Number of End Crossframes = 4 each		
Total Length of End Crossframe = 18.19 ft		
Unit weight of L4x4x3/8 = 9.8 lb/ft		
End Crossframe Total Weight = 713.05 lb		
<u>Splices</u>		
Outer Splice Plate Volume = 136.88 in ³		
Inner Splice Plate Volume = 66.73 in ³		
Web Splice Plate Volume = 276.77 in ³		
Weight Per Splice = 310.28 lb		
Number of Splices = 15 each		
Total Splice Weight = 4654.16 lb		
Abutment Bearing Stiffener Volume = 346.50 in ³		
Number of Abutment Bearing Stiffeners = 20 each		
Pier Bearing Stiffener Volume = 693.00 in ³		
Number of Pier Bearing Stiffeners = 30 each		
Total Bearing Stiffener Weight = 7860.42 lb		
Total Structural Steel Weight = 463493 LB		
Total Quantity = 463500 LB		
ITEM 513	20000	WELDED STUD SHEAR CONNECTORS
Number of beams = 5 each		
Number of rows of shear connectors per beam = 269 each		
Number of shear connectors per row = 3 each		
Total Quantity = 4035 EACH		

ITEM 514	00060	FIELD PAINTING STRUCTURAL STEEL, INTERMEDIATE COAT
<p>Perimeter of girder = 15.04 ft Length of girder end to be painted = 10 ft Number of Girders = 5 each</p> <p>Area of bearing stiffener = 3.21 ft² Sides to paint = 2 each Number of bearing stiffeners = 10 each</p> <p>Perimeter of end crossframe angle = 1.33 ft Length of end crossframe angles = 10.25 ft Number of Bays = 4 each</p> <p>Perimeter of intermediate crossframe angle = 1.17 ft Length of intermediate crossframe angles = 21.67 ft Area of connection plate = 3.32 ft² Number of connection plates per intermediate crossframe = 2 each Connection Plate sides to paint = 2 each Number of intermediate crossframes to be painted = 2 each</p> <p>Total Quantity = 949 SF</p>		
ITEM 514	00066	FIELD PAINTING STRUCTURAL STEEL, FINISH COAT
<p>Total Quantity = 949 SF</p>		
ITEM 514	10000	FINAL INSPECTION REPAIR
<p>Total Length of girders to be painted = 50 ft Number of crossframes to be painted = 6 each</p> <p>Total Quantity = 2 each</p>		
ITEM 516	11211	STRUCTURAL EXPANSION JOINT INCLUDING ELASTOMERIC STRIP SEAL, AS PER PLAN
<p>Toe to toe length = 34.64 ft Turned up length in parapet = 1.00 ft Number of parapets = 2 each</p> <p>Total Quantity = 37 FT</p>		
ITEM 516	13600	1" PREFORMED EXPANSION JOINT FILLER
<p>Area of Parapet = 4.08 ft² No. of Locations = 2</p> <p>WW3 = 20.33 ft² WW4 = 19.58 ft²</p> <p>Total Quantity = 49 SF</p>		

ITEM 516	13900	2" PREFORMED EXPANSION JOINT FILLER															
<p style="text-align: right;">Rear Abutment</p> <table style="width: 100%; border: none;"> <tr> <td></td> <td style="text-align: center;">Left</td> <td style="text-align: center;">Right</td> </tr> <tr> <td style="text-align: right;">Height of Diaphragm =</td> <td style="text-align: center;">8.17 ft</td> <td style="text-align: center;">7.29 ft</td> </tr> <tr> <td style="text-align: right;">Thickness of Diaphragm Along Skew =</td> <td colspan="2" style="text-align: center;">4.62 ft</td> </tr> <tr> <td style="text-align: right;">Height of Approach Slab =</td> <td colspan="2" style="text-align: center;">2.42 ft</td> </tr> <tr> <td style="text-align: right;">Length of Approach Slab =</td> <td colspan="2" style="text-align: center;">30.00 ft</td> </tr> </table> <p style="text-align: center;">Total Quantity = 216 SF</p>				Left	Right	Height of Diaphragm =	8.17 ft	7.29 ft	Thickness of Diaphragm Along Skew =	4.62 ft		Height of Approach Slab =	2.42 ft		Length of Approach Slab =	30.00 ft	
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ITEM 516	14020	SEMI-INTEGRAL ABUTMENT EXPANSION JOINT SEAL															
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	Length	Height	Overlap														
R.A. =	38 ft	15.46	6														
ITEM 516	44100	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE) (13" X 16" X 2.668" WITH A 14" X 17" X 1.5" LOAD PLATE)															
<p style="text-align: center;">Number of abutment bearings = 5 each Number of pier bearings = 0 each</p> <p style="text-align: center;">Total Quantity = 5 EACH</p>																	
ITEM 516	44200	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE) (17" X 20" X 3.273" WITH A 18" X 21" X VARIES LOAD PLATE)															
<p style="text-align: center;">Number of abutment bearings = 0 each Number of pier bearings = 10 each</p> <p style="text-align: center;">Total Quantity = 10 EACH</p>																	
ITEM 516	44400	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE) (17" X 20" X 5.087" WITH A 18" X 21" X VARIES LOAD PLATE)															
<p style="text-align: center;">Number of abutment bearings = 0 each Number of pier bearings = 5 each</p> <p style="text-align: center;">Total Quantity = 5 EACH</p>																	

ITEM 516	44400	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE) (20" X 20" X 6.546" WITH A 21" X 21" X 1.5" LOAD PLATE AND 27" X 21" X 1.5" MASONRY PLATE)
<p style="text-align: center;">Number of abutment bearings = 5 each Number of pier bearings = 0 each</p> <p style="text-align: center;">Total Quantity = 5 EACH</p>		
ITEM 518	20000	PREFABRICATED GEOCOMPOSITE DRAIN
<p style="text-align: center;">Forward Abutment Average Height = 5.50 ft Length = 47.33 ft Area = 260.32 ft²</p> <p style="text-align: center;">Total Quantity = 29 SY</p>		
ITEM 518	21200	POROUS BACKFILL WITH GEOTEXTILE FABRIC
<p style="text-align: center;"><u>REAR ABUTMENT</u></p> <p style="text-align: center;">Plan Area of Porous Backfill = 83.97 ft² Height of porous backfill = 8.60 ft Volume = 722.14 ft³</p> <p style="text-align: center;"><u>FORWARD ABUTMENT</u></p> <p style="text-align: center;">Plan Area of Porous Backfill = 87.88 ft² Height of porous backfill = 3.00 ft Volume = 263.64 ft³</p> <p style="text-align: center;">Total Quantity = 37 CY</p>		
ITEM 518	40000	6" PERFORATED CORRUGATED PLASTIC PIPE
<p style="text-align: center;">R.A. = 41.90 ft F.A. = 43.30 ft</p> <p style="text-align: center;">Total Quantity = 86 FT</p>		
ITEM 518	40010	6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS
<p style="text-align: center;">R.A. = 49.00 ft</p> <p style="text-align: center;">Total Quantity = 49 FT</p>		
ITEM 518	40011	6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS, AS PER PLAN
<p style="text-align: center;">F.A. = 38.00 ft</p> <p style="text-align: center;">Total Quantity = 38 FT</p>		
ITEM 519	11101	PATCHING CONCRETE STRUCTURE, AS PER PLAN
<p style="text-align: center;">Pier 1 Quantity = 153.81 ft² Pier 2 Quantity = 205.09 ft² Pier 3 Quantity = 351.56 ft²</p> <p style="text-align: center;">Total Quantity = 710 SF</p>		

ITEM 526	30011	REINFORCED CONCRETE APPROACH SLABS WITH QC/QA (T=17"), AS PER PLAN
<p>Rear approach plan area = 960.16 ft² Forward approach plan area = 967.18 ft²</p> <p>Total Quantity = 215 SY</p>		
ITEM 526	90020	TYPE B INSTALLATION
<p>Rear approach width = 34.64 ft Forward approach width = 34.64 ft Width = 5.00 ft</p> <p>Total Quantity = 39 SY</p>		
ITEM 601	54000	CHANNEL PROTECTION MISC.: FILL VOIDS AT PIERS
<p>Total Quantity = LS</p>		