STRUCTURE ESTIMATED QUANTITIES

Bridge No. FRA-70-1395C

S. Front Street over I-70/71

FRA-70/71-12.68/14.86
PID No. 105523

Franklin County, Ohio

Prepared For:

The Ohio Department of Transportation
District 6

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January 31, 2019
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Project: **Bridge No. FRA-70-1395C** Design: RFV
Subject: Estimated Quantities - FINAL Check: DJC
Date: 5/28/2019

ITEM 202 - STRUCTURE REMOVED, OVER 20 FOOT SPAN

area = 11616.79 sf
unit cost = $18.00 per sf

Lump sum = **$209,102**

ITEM 202 - APPROACH SLAB REMOVED

length = 25 ft
width = 60 ft

Total = **334 sy**
(+ Sidwalk Curves) **336 sy**

ITEM 202 - WEARING COURSE REMOVED

length = 190.52 ft
width = 60 ft

Total = **1271 sy**

ITEM 503 - COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN

ITEM 503 - UNCLASSIFIED EXCAVATION

Rear Abutment:
length = 156.94 ft
width = 27 ft
depth = 20.75 ft

Note:
Excavation for abutments will be taken up when the exist. abutments are removed

Forward Abutment:
length = 151.77 ft
width = 22 ft
depth = 28.5 ft

Abutment Subtotal = **6781 cy**

Piers:
length = 148 ft
width = 17 ft
depth = 11 ft
no. of ftgs per pier = 1
no. of piers = 1

Pier Subtotal = **1025 cy**

Total = **7806 cy**
unit cost = $ 40.00 per cy

Lump sum = **$312,300**

ITEM 509 - EPOXY COATED REINFORCING STEEL

Slab (parapets) =	17,185	lbs
Slab (bridge) =	182,944	lbs
Slab (east cap) =	142,393	lbs
Sidewalk =	13,199	lbs
Superstructure subtotal =	**355,721**	**lbs**
Rear Abutment =	397,665	lbs
Frwd. Abutment =	602,274	lbs
Abutment subtotal =	**999,939**	**lbs**
Pier & Footing =	104,135	lbs
Pier subtotal =	**104,135**	**lbs**
Approach slabs =	112,635	lbs
Approach slab subtotal =	**112,635**	**lbs**
Total =	**1,572,430**	**lbs**

ITEM 511 - CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK

BRIDGE

Deck:

thickness =	9.25	in
edge of deck to bridge limits =	1.25	ft
total sum of spans =	196.25	ft
total length =	198.82	
O/O of deck width =	103.25	ft
Deck Volume =	**586**	**cy**

Haunch:

t/flange width =	18	in
t/deck to t/web =	13	in
haunch thick. =	2.5	in
t/flange thick. (avg) =	1.25	in
total no. of beams =	10	
Haunch Volume (Interior Beams) =		**32 cy**
Haunch Volume (Exterior Beams) =		**6 cy**

Cantilever:

cantilever length (right) =	2.88	ft
cantilever length (left) =	2.88	ft
Cantilever Volume =	**10**	**cy**

Signal Pole Diaphragms (Bridge):

length =	10.83	ft
thickness =	3.00	ft
height =	2.80	ft
number =	3.00	each
Diaph. Volume =	**10**	**cy**

BRIDGE TOTAL = 644 cy

CAP

Deck:

thickness =	8	in
edge of deck to bridge limits =	1.25	ft
total sum of spans =	196.25	ft

total length =	198.75			
O/O of deck width =	40	ft		
Deck volume =	**196**	**cy**		

Haunch:

Middle Section

t/flange width =	18	in		
t/deck to t/web =	20.25	in		
haunch thick. =	11.08	in		
t/flange thick. (avg) =	1.17	in		
total no. of beams =	5			
haunch length =	141.25	ft		
Haunch Volume (Interior Beams) =			*34*	*cy*
Haunch Volume (Exterior Beams) =			*18*	*cy*

End Sections

t/flange width =	18	in		
t/deck to t/web =	12	in		
haunch thick. =	2.83	in		
t/flange thick. (avg) =	1.17	in		
total no. of beams =	5			
haunch length =	55	ft		
Haunch Volume (Interior Beams) =			*4*	*cy*
Haunch Volume (Exterior Beams) =			*2*	*cy*
Haunch Volume =	**58**	**cy**		

Cantilever:

cantilever length (right) =	2.00	ft		
cantilever length (left) =	2.00	ft		
Middle Section	13	cy		
End Sections	2	cy		
Cantilever Volume =	**15**	**cy**		

Slab at Ends of Span

area =	2302.59	sf		
avg. thickness =	8.50	in		
Cap End Slab Volume =	**60**	**cy**		

Signal Pole Diaphragms (East Cap):

length =	9.00	ft		
thickness =	3.00	ft		
height =	2.80	ft		
number =	1.00	each		
Diaph. Volume =	**3**	**cy**		

CAP TOTAL =	**333**	**cy**		
	Total =		**977**	**cy**

ITEM 511 - CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK (PARAPET), AS PER PLAN

area (west) =	4.42	sf		
area (east) =	4.42	sf		
length (west) =	132.04	ft		
length (east) =	144.89	ft		
pylons =	924.00	cf		
	Total =		**80**	**cy**

ITEM 511 - CLASS QC1 CONCRETE WITH QC/QA, PIER ABOVE FOOTINGS

wall area =	3238.52	sf
thickness =	3.00	ft

window area =	436.90	sf
window thickness =	2.00	ft
pedestals =	32.32	cf

Total = 393 cy

ITEM 511 - CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT NOT INCLUDING FOOTING, AS PER PLAN

Skew angle = 12.97 degrees

Rear Abutment:

Beam Seat

beam seat area (above paneling)	634.99	sf (cad)
beam seat width =	6.75	ft
lower beam seat area =	156.94	sf (cad)
lower beam seat width =	5.50	ft
Beam Seat Volume =	*5149.34*	*cf*

Backwall

backwall area =	682.99	sf (cad)
backwall thickness =	1.75	ft
approach slab thickness =	1.25	ft
abutment length =	156.94	ft
Back Wall Volume =	*1097.14*	*cf*

Additonal Volume

pedestals =	16.92	cf
end wall volumes =	191.79	cf
Rear Abutment Subtotal	**239**	**cy**

Forward Abutment:

Beam Seat

beam seat area (above paneling)	527.19	sf (cad)
beam seat width =	6.75	ft
lower beam seat area =	139.76	
lower beam seat width =	5.50	ft
Beam Seat Volume =	*4327.21*	*cf*

Backwall

backwall area =	673.50	sf (cad)
backwall thickness =	1.75	ft
approach slab thickness =	1.25	ft
abutment length =	151.77	ft
Back Wall Volume =	*1083.77*	*cf*

Additonal Volume

pedestals =	16.92	cf
end wall volumes =	105.26	cf
Forward Abutment Subtotal =	**205**	**cy**

Total = 444 **cy**

ITEM 511 - CLASS QC1 CONCRETE WITH QC/QA, FOOTING, AS PER PLAN

Pier:

height =	3	ft
width =	15	ft
length =	147.66	ft

Total = 247 cy

ITEM 511 - CLASS QC2 CONCRETE WITH QC/QA, SIDEWALK, AS PER PLAN

Sidewalk on BRIDGE:

area =	6042.46	sf
avg. thickness =	8.25	in
Sidewalk Volume =	**154**	**cy**

Sidewalk on CAP (sidewalk portion over end sections only):

area =	1526.61	sf
avg. thickness =	8.25	in
Sidewalk Volume =	**39**	**cy**

Total = 193 cy

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

Rear Abutment:	Face	2967.00	sf
	Top	863.17	sf
Forward Abutment :	Face	4546.72	sf
	Top	1012.00	sf
Pier :	Face	2649.34	sf

Total = 1,338 sy

ITEM 512 - TYPE 2 WATERPROOFING

Rear Abutment =	9.68	ft
Forward Abutment =	8.47	ft

Total = **7 sy**

ITEM 512 - SEALING OF CONCRETE SURFACES (NON-EPOXY)

west parapet =	906.90	sf	
east parapet =	1155.07	sf	
pylons =	451.87	sf	
west sidewalk =	2906.80	sf	(includes small area of sidewalk on SW abutment)
east sidewalk =	2388.40	sf	
east cap =	3539.28	sf	=====> cap total = 394 sy

Total = 1261 sy

ITEM 513 - STRUCTURAL STEEL MEMBERS, LEVEL 4

BRIDGE

Girders:

Section 1

length =	65.50	ft
weight =	225.43	lbs/ft

Section 2

volume =	43.53	cf
unit weight steel =	21327.4	lbs

Section 3

length =	67.25	ft
weight =	225.43	lbs/ft
Detail factor =	1.0	
No. of beams =	10	
Beam Subtotal =	**512,600**	**lbs**

Splices:	# of plates	length (in)	width (in)	thick (in)
Top Flange				
outside plates =	1	37	18	0.625

inside plates =	2	37	8	0.625
Bottom Flange				
outside plates =	1	44	18	0.75
inside plates =	2	44	8	0.75
Web				
plates =	2	29	22.5	0.5

Plate weight/splice = 726 lbs

Splice Bolts	# of bolts	length (in)	bolt wt.	washer wt.
Top Flange =	40	1.5	148	11.3
Bot. Flange =	48	1.5	148	11.3
Web =	48	1.5	148	11.3

* from steel manual
* washer weight is per 100 ct.

Bolt + Washer weight
Top Flange = 64 lbs
Bot. Flange = 76 lbs
Web = 76 lbs

Total weight/splice = 943 lbs
No. of splices = 20

Splice + Bolts Subtotal = 18,856 lbs

Intermediate Crossframes:

Length of Diagonals = 10.67 ft (weighted avg.)
No. of Diagonals = 2
Length of Horiz. = 10.62 ft (weighted avg.)
No. of Horiz. = 1
Angle weight / ft. = 9.80 lbs/ft

Crossframe weight = 313 lbs ==> per x-frame assembly

x-frame stiffeners? y y or n
Length = 34.000 in ==> web depth
Width = 5.000 in
Thickness = 0.375 in

Stiffener weight = 36 lbs ==> per x-frame assembly

Total Intermediate Crossframe
Assembly Weight = 349 lbs. ==> per x-frame assembly
No. of assemblies = 145

End Crossframes:

Length of Diagonals = 10.85 ft (weighted avg.)
No. of Diagonals = 2
Length of Horiz. = 10.78 ft (weighted avg.)
No. of Horiz. = 1
Angle weight / ft. = 9.80 lbs/ft

Crossframe weight = 318 lbs. ==> per x-frame assembly

x-frame stiffeners? y y or n
Length = 5.000 in ==> web depth
Width = 34.000 in
Thickness = 0.375 in

Stiffener weight = 36 lbs ==> per x-frame assembly

Total x-frame End Assembly Weight =	354	lbs ==> per x-frame assembly
No. of assemblies =	18	

Crossframe Subtotal = 57,038 lbs

Signal Support Diaphragm:

Embedded steel plate (20"x20"x1.75") =	198	lbs
Support angles (L6x4x1/2) - Length =	10.833	ft
Support angle weight per ft =	16.2	lb/ft
No. of support angles =	2	ea
No. of signal support diaphragms =	3	ea

Signal support subtotal = 1,648 lbs

BRIDGE STRUCTURAL STEEL = 590,142 lbs

CAP

Girders:

Section 1		
length =	65.50	ft
weight =	202.47	lbs/ft
Section 2		
volume =	42.49	cf
unit weight steel =	20820	lbs
Section 3		
length =	67.25	ft
weight =	202.47	lbs/ft
Detail factor =	1.0	
No. of beams =	5	

Beam subtotal = 238,500 lbs

Splices:	# of plates	length (in)	width (in)	thick (in)
Top Flange				
outside plates =	1	37	18	0.625
inside plates =	2	37	8	0.625
Bottom Flange				
outside plates =	1	44	18	0.75
inside plates =	2	44	8	0.75
Web				
plates =	2	29	22.5	0.5

Plate weight/splice = 726 lbs

Splices Bolts	# of bolts	length (in)	bolt wt.	washer wt.
Top Flange =	40	1.5	148	11.3
Bot. Flange =	48	1.5	148	11.3
Web =	48	1.5	148	11.3

* from steel manual

* washer weight is per 100 ct.

Bolt + Washer weight		
Top Flange =	64	lbs
Bot. Flange =	76	lbs
Web =	76	lbs
Total weight/splice =	943	lbs
No. of splices =	10	

Splice subtotal =	**9,428**	**lbs ==> plates + bolts**

Intermediate Crossframes:

Length of Diagonals =	8.91	ft (weighted avg.)
No. of Diagonals =	2	
Length of Horiz. =	8.82	ft (weighted avg.)
No. of Horiz. =	1	
Angle weight / ft. =	9.80	lbs/ft
Crossframe weight =	261	lbs ==> per x-frame assembly
x-frame stiffeners?	y	y or n
Length =	34.000	in ==> web depth
Width =	5.000	in
Thickness =	0.375	in
Stiffener weight =	36	lbs ==> per x-frame assembly
Total x-frame assembly weight =	297	lbs ==> per x-frame assembly
No. of assemblies =	65	

End Crossframes:

Length of Diagonals =	9.00	ft (weighted avg.)
No. of Diagonals =	2	
Length of Horiz. =	8.90	ft (weighted avg.)
No. of Horiz. =	1	
Angle weight / ft. =	9.80	lbs/ft
Crossframe weight =	264	lbs ==> per x-frame assembly
x-frame stiffeners?	y	y or n
Length =	34.000	in ==> web depth
Width =	5.000	in
Thickness =	0.375	in
Stiffener weight =	36	lbs ==> per x-frame assembly
Total x-frame assembly weight =	300	lbs ==> per x-frame assembly
No. of assemblies =	8	

Crossframe Subtotal =	**21,715**	**lbs**

Signal Support Diaphragm:

Embedded steel plate (20"x20"x1.75") =	198	lbs
Support angles (L6x4x1/2) - Length =	9.000	ft
Support angle weight per ft =	16.2	lb/ft
No. of support angles =	2	ea
No. of signal support diaphragms =	1	ea
Signal support subtotal =	**490**	**lbs**

CAP STRUCTURAL STEEL =	**270,133**	**lbs**

Total = **860,275 lbs**

ITEM 513 - WELDED STUD SHEAR CONNECTORS

Bridge	No. rows per beam =	259	
	No. per row =	3	
	No. of beams =	10	
	Number per signal support =		50
	Number of signal supports =		3
	Bridge Total =	**7920**	**ea**
Cap	No. rows per beam =	277	
	No. per row =	3	
	No. of beams =	5	
	Number per signal support =		50
	Number of signal supports =		1
	Bridge Total =	**4205**	**ea**
	Total =	**12,125**	**ea**

ITEM 514 - FIELD PAINTING STRUCTURAL STEEL, INTERMEDIATE COAT
ITEM 514 - FIELD PAINTING STRUCTURAL STEEL, FINISH COAT

Bridge	web area =	1208.53	sf
	section 1 flange area =	315.22	sf
	section 2 flange area =	334.06	sf
	section 3 flange area =	323.64	sf
	No. of beams =	10	
	Crossframes =	6958.45	sf
	Stiffeners =	827.45	sf
	Utility Supports =	564.04	sf
	Bridge Subtotal =	**30,164**	**sf**
Cap	web area =	1208.53	sf
	section 1 flange area =	311.13	sf
	section 2 flange area =	332.67	sf
	section 3 flange area =	319.44	sf
	No. of beams =	5	
	Crossframes =	2595.30	sf
	Stiffeners =	370.58	sf
	Cap Subtotal =	**13,825**	**sf**
	Total =	**43,989**	**sf**

ITEM 514 - FINAL INSPECTION REPAIR

Length =	198.75	ft
No. Girders =	15	ea
No. Crossframes =	236	ea
Total =	**32**	**ea**

ITEM 516 -STRUCTURAL EXPANSION JOINT INCLUDING ELASTOMERIC STRIP SEAL (3")

Length =	294.00	ft
Total =	**294**	**ft**

ITEM 516 -STRUCTURAL EXPANSION JOINT INCLUDING ELASTOMERIC STRIP SEAL (5")

Length =	198.82	ft

Total = 199 ft

ITEM 516 - 1" PREFORMED EXPANSION JOINT FILLER

Rear Abutment:

beam seat height =	5.33	ft
beam seat width =	6.75	ft
beam seat length =	156.94	ft
wall height =	17.65	ft
wall width =	0.83	ft
backwall height =	4.31	ft
backwall width =	1.75	ft

Forward Abutment:

beam seat height =	8.46	ft
beam seat width =	6.75	ft
beam seat length =	151.77	ft
wall height =	20.55	ft
wall width =	0.83	ft
backwall height =	4.44	ft
backwall width =	1.75	ft

Total = 398 sf

ITEM 516 - 2" PREFORMED EXPANSION JOINT FILLER

Pier:

height =	24.24	ft

Total = 73 sf

ITEM 516 - ELASTOMERIC BEARING WITH INTERNAL LAMINATES & LOAD PLATE (NEOPRENE) 10.5" x 1'-4" x 2.45" PAD WITH 11.5" x 1'-10" BEVELED PLATE, AS PER PLAN

Rear Abutment =	15	ea
Forward Abutment =	15	ea

Total = 30 ea

ITEM 516 - ELASTOMERIC BEARING WITH INTERNAL LAMINATES & LOAD PLATE (NEOPRENE) 1'-6" x 2'-0" x 3.40" PAD WITH 1'-7" x 2'-9" BEVELED PLATE, AS PER PLAN

Pier =	15	ea

Total = 15 ea

ITEM 518 - POROUS BACKFILL WITH GEOTEXTILE FABRIC

Rear Abutment:

avg. top of backwall =	753.73	
top of drilled shaft =	744.45	
height =	7.53	ft
length =	156.94	ft
thickness =	2.00	ft
area (panel footing) =	6.58	sf
Rear Abutment Subtotal =	**3,397**	**cf**

Forward Abutment:

avg. top of backwall =	757.48	
top of drilled shaft =	748.35	
height =	7.38	ft
length =	151.77	ft
thickness =	2.00	ft

area (panel footing) = 6.58 sf
Forward Abutment Subtotal = 3,238 cf

Total = 246 cy

ITEM 518 - 6" PERFORATED CORRUGATED PLASTIC PIPE

Rear Abutment:
length = 313.88 ft (inlcudes façade panel pipe)

Forward Abutment:
length = 303.54 ft (inlcudes façade panel pipe)

Total = 618 ft

ITEM 518 - 6" NON-PERFORATED CORRUGATED PLASTIC PIPE

Rear Abutment:
length = 20 ft

Forward Abutment:
length = 27 ft

Total = 47 ft

ITEM 524 - DRILLED SHAFTS, 60" DIAMETER, ABOVE BEDROCK

Rear Abutment:
length = 54.45 ft
no. of columns = 31

Forward Abutment:
length = 58.35 ft
no. of columns = 45

Total = 4,314 ft

ITEM 526 - REINFORCED CONCRETE APPROACH SLABS WITH QC/QA (T=15"), AS PER PLAN

Rear Approach Slab:
area = 3957.64 sf

Forward Approach Slab:
area = 4656.49 sf

Total = 958 sy

ITEM SPECIAL - STRUCTURE, MISC.: PERMANENT UTILITY SUPPORTS

Length of Horiz. = 10.78 ft (weighted avg.)
No. of Horiz. = 1
Angle weight / ft. = 12.80 lbs/ft
utility support weight = 138 lbs ==> per assembly

Stiffeners? y y or n
Length = 5.000 in ==> web depth
Width = 34.000 in
Thickness = 0.375 in
Stiffener weight = 36 lbs ==> per x-frame assembly

Total utility support
assembly weight = 174 lbs ==> per x-frame assembly
No. of assemblies = 29

Total Weight = 5050 lbs
Cost = $1.50 per lb

Total = $7,576.00

ITEM SPECIAL - STRUCTURE, MISC.: PRECAST FAÇADE PANELS

Rear Abutment:
area = 2769.95 sf

Forward Abutment:
area = 3261.59 sf

Total = 6,032 sf

ITEM 607 - FENCE, MISC.: WALL MOUNTED TYPE A (W/ VANDAL MESH)

Rear Abutment:
length = 4.5 ft ==> on SW knee wall extension

North end of west parapet:
length = 15.50 ft ==> north of NW end pilaster

Total = 20 ft

ITEM 625 - LIGHT POLE ANCHOR BOLTS, MISC.: COMBINATION SIGNAL POLE AND PEDESTRIAN POLE ANCHOR BOLT ASSEMBLIES EMBEDDED IN CONCRETE BRIDGE DECK

Total = 8 ea