



29 North Park Street, Mansfield, OH 44902

Phone: 419-524-0074

Fax: 419-524-1812

CALCULATION SHEET

JOB NO. 21394 (119034) SHEET NO. 1 OF 9

SUBJECT CUY-71-1640 Estimated Quantities

CALCULATED BY dlr DATE 6/2021

CHECKED BY dht DATE 6/2021

REVISED BY _____ DATE _____

Bridge CUY-71-1640 (SFN 1805223) - IR 71 over Norfolk Southern Railway

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

Lump Sum

ITEM 202 - APPROACH SLAB REMOVED

Skew = 24°24'50" = 0.426103 radians

Rear $((81+0.5/12)+(78+11.8125/12))*\text{COS}(\text{Skew})*25.00$ 3643 SF

Forward $((78+1/12)+(84+4.1875/12))*\text{COS}(\text{Skew})-2*(1+10/12))*25.00$ 3606 SF

7249 SF

÷ 9 SF / SY = **806 SY**

ITEM 202 - WEARING COURSE REMOVED

Fwd Left $((78+1/12)*\text{COS}(\text{Skew})-((1+10/12)+(3+6/12)/2))*25.00$ 1688 SF

Fwd Right $((84+4.1875/12)*\text{COS}(\text{Skew})-((1+10/12)+(3+6/12)/2)+0.5*(25/60))*25.00$ 1836 SF

3524 SF

÷ 9 SF / SY = **392 SY**

ITEM 503 - UNCLASSIFIED EXCAVATION

Lump Sum

ITEM 509 - EPOXY COATED REINFORCING STEEL

Abutments 12,306 LB

Superstructure 8,831 LB

21,137 LB



29 North Park Street, Mansfield, OH 44902

Phone: 419-524-0074

Fax: 419-524-1812

CALCULATION SHEET

JOB NO. 21394 (119034) SHEET NO. 2 OF 9

SUBJECT CUY-71-1640 Estimated Quantities

CALCULATED BY dlr DATE 6/2021

CHECKED BY dht DATE 6/2021

REVISED BY _____ DATE _____

Bridge CUY-71-1640 (SFN 1805223) - IR 71 over Norfolk Southern Railway

ITEM 510 - DOWEL HOLES WITH NON-SHRINK, NON-METALLIC GROUT

Abutments - 1 dowel hole @ 12"

Rear Left	33 + 24 + 19 (Phase 1 + Phase 2 + Phase 3)	76 EA	
Rear Right	34 + 25 + 21 (Phase 1 + Phase 2 + Phase 3)	80 EA	
Fwd Left	32 + 24 + 20 (Phase 1 + Phase 2 + Phase 3)	76 EA	
Fwd Right	37 + 25 + 22 (Phase 1 + Phase 2 + Phase 3)	84 EA	
		<hr/>	316 EA

316 EA

Superstructure - 3 dowel holes @ 14"

Rear Left	28 + 19 + 19 (Phase 1 + Phase 2 + Phase 3)	198 EA	
Rear Right	28 + 21 + 20 (Phase 1 + Phase 2 + Phase 3)	207 EA	
Fwd Left	28 + 19 + 19 (Phase 1 + Phase 2 + Phase 3)	198 EA	
Fwd Right	31 + 21 + 19 (Phase 1 + Phase 2 + Phase 3)	213 EA	
		<hr/>	816 EA

Superstructure Median Barrier - 1 dowel hole @ 12"

Rear Left	3 (Phase 1)	3 EA	
Rear Right	2 (Phase 1)	2 EA	
Fwd Left	2 (Phase 1)	2 EA	
Fwd Right	3 (Phase 1)	3 EA	
		<hr/>	10 EA

Superstructure Parapet - 1 dowel hole @ 12"±

Rear Left	3 (Phase 3)	3 EA	
Rear Right	2 (Phase 3)	2 EA	
Fwd Left	2 (Phase 3)	2 EA	
Fwd Right	3 (Phase 3)	3 EA	
		<hr/>	10 EA

836 EA

1,152 EA



RICHLAND ENGINEERING LTD

A WALLACE PANCHER GROUP COMPANY

29 North Park Street, Mansfield, OH 44902

Phone: 419-524-0074

Fax: 419-524-1812

CALCULATION SHEET

JOB NO. 21394 (119034) SHEET NO. 3 OF 9

SUBJECT CUY-71-1640 Estimated Quantities

CALCULATED BY dlr DATE 6/2021

CHECKED BY dht DATE 6/2021

REVISED BY _____ DATE _____

Bridge CUY-71-1640 (SFN 1805223) - IR 71 over Norfolk Southern Railway

ITEM 511 - CLASS QC2 CONCRETE, SUPERSTRUCTURE

Abutment Parapet

Section C Area = $(18 \times 3 + 0.5 \times (18 + 11) \times 10 + 0.5 \times (11 + 8) \times 29) / 144 = 3.295$ SF

Section D Area = $(18 \times 3 + 0.5 \times (18 + 14.5) \times 5 + 14.5 \times 24) / 144 = 3.356$ SF

Section E Area = $(18 \times 3 + 0.5 \times (18 + 14.5) \times 2.5 + 14.5 \times 26.5) / 144 = 3.326$ SF

Section F Area = $(18 \times 4 + 10 \times 28) / 144 = 2.444$ SF

Rear Left, Fwd Right - length * average end areas

Section C to Section D - 2 @ $6.714' \times (3.295 \text{ SF} + 3.356 \text{ SF}) / 2 = 44.7$ CF

Section D to Section E - 2 @ $2.500' \times (3.356 \text{ SF} + 3.326 \text{ SF}) / 2 = 16.7$ CF

Section E to Section F - 2 @ $1.500' \times (3.326 \text{ SF} + 2.444 \text{ SF}) / 2 = 8.7$ CF

70.0 CF

Rear Right, Fwd Left - length * average end areas

Section C to Section D - 2 @ $6.943' \times (3.295 \text{ SF} + 3.356 \text{ SF}) / 2 = 46.2$ CF

Section D to Section E - 2 @ $2.500' \times (3.356 \text{ SF} + 3.326 \text{ SF}) / 2 = 16.7$ CF

Section E to Section F - 2 @ $1.500' \times (3.326 \text{ SF} + 2.444 \text{ SF}) / 2 = 8.7$ CF

71.5 CF

5.2 CY

Superstructure Parapet

Area = $(24 \times 3 + 0.5 \times (24 + 17) \times 10 + 0.5 \times (17 + 14) \times 30.5 + 2 \times 10.25) / 144 = 5.349$ SF

Avg Length = $4.000' - 4" / 12 / \cos(\text{skew}) = 3.634$ ft long

Vol. = 4 locations 3.634 ft long * 5.349 SF =

77.8 CF

2.9 CY

219.3 CF

$\div 27 \text{ CF} / \text{CY} = \boxed{9 \text{ CY}}$



29 North Park Street, Mansfield, OH 44902

Phone: 419-524-0074
Fax: 419-524-1812

CALCULATION SHEET

JOB NO. 21394 (119034) SHEET NO. 4 OF 9
SUBJECT CUY-71-1640 Estimated Quantities
CALCULATED BY dlr DATE 6/2021
CHECKED BY dht DATE 6/2021
REVISED BY _____ DATE _____

Bridge CUY-71-1640 (SFN 1805223) - IR 71 over Norfolk Southern Railway

ITEM 511 - CLASS QC SCC CONCRETE, SUPERSTRUCTURE, AS PER PLAN (WITH STEEL FIBERS)

Abutment backwall below approach slab seat - T = 1.5'

Rear Left	$1.5 * (13 / \cos(6)) * (0.94 + 1.44) / 2$	25.5 CF
	$1.5 * (33 + 7.0625 / 12 - 13 / \cos(6)) * (1.44 + 1.20) / 2$	38.2 CF
	$1.5 * (23 + 2.4375 / 12) * (1.22 + 0.97) / 2$	38.1 CF
	$1.5 * (22 + 2.375 / 12) * (1.16 + 0.94) / 2$	35.0 CF
skew = 0.44040 R	$1.5 * (1.75 * \tan(\text{skew}) - 1.8333 / \cos(\text{skew})) * 0.94$	-1.7 CF
Rear Right	$1.5 * (33 + 3.8125 / 12) * (0.98 + 1.26) / 2$	56.0 CF
	$1.5 * (24 + 8.5 / 12) * (0.99 + 1.25) / 2$	41.5 CF
	$1.5 * (23 + 11.1875 / 12) * (0.94 + 2 * 1.11 + 1.03) / 4$	37.6 CF
skew = 0.43459 R	$-1.5 * (1.75 * \tan(\text{skew}) + 1.8333 / \cos(\text{skew})) * 1.03$	-4.4 CF
Fwd Left	$1.5 * (13 / \cos(6)) * (0.94 + 1.47) / 2$	25.8 CF
	$1.5 * (32 + 4.5625 / 12 - 13 / \cos(6)) * (1.47 + 1.26) / 2$	37.1 CF
	$1.5 * (22 + 11.875 / 12) * (1.19 + 0.98) / 2$	37.4 CF
	$1.5 * (23 + 7.5 / 12) * (1.13 + 0.94) / 2$	36.7 CF
skew = 0.42150 R	$-1.5 * (1.75 * \tan(\text{skew}) + 1.8333 / \cos(\text{skew})) * 0.94$	-3.9 CF
Fwd Right	$1.5 * (36 + 9.5625 / 12) * (0.99 + 1.24) / 2$	61.5 CF
	$1.5 * (24 + 7.1875 / 12) * (1.02 + 1.24) / 2$	41.7 CF
	$1.5 * (22 + 2.55 / 12) * (0.97 + 1.02) / 2$	33.2 CF
skew = 0.44040 R	$1.5 * (1.75 * \tan(\text{skew}) - 1.8333 / \cos(\text{skew})) * 1.02$	-1.8 CF
		<hr/>
		533.4 CF

Abutment backwall above approach slab seat - T = 1.0' H = 1.25'

Rear Left	$1.0 * 1.25 * (33.5885 + 23.2031 + 22.1979 - 1.2020)$	97.2 CF
Rear Right	$1.0 * 1.25 * (33.3177 + 24.7083 + 23.9323 - 2.8335)$	98.9 CF
Fwd Left	$1.0 * 1.25 * (32.3802 + 22.9896 + 23.6250 - 2.7938)$	95.3 CF
Fwd Right	$1.0 * 1.25 * (36.7969 + 24.5990 + 22.2125 - 1.2020)$	103.0 CF
		<hr/>
		394.4 CF

Top of Wing Wall - T=1.8333'

Rear Left	$1.8333 * (10 + 8.5625 / 12) * (715.24 - 713.05)$	43.0 CF
Rear Right	$1.8333 * (10 + 11.3125 / 12) * (716.08 - 713.80)$	45.7 CF
Fwd Left	$1.8333 * (10 + 11.3125 / 12) * (713.07 - 710.88)$	43.9 CF
Fwd Right	$1.8333 * (10 + 8.5625 / 12) * (713.45 - 711.40)$	40.3 CF
		<hr/>
		173.0 CF

41.4 CY

Median Barrier

Area = $2 * (20.5 * 3 + 0.5 * (20.5 + 11.5) * 13 + 0.5 * (11.5 + 8.5) * 17 + 8.5 * 18) / 144 =$	8.229 SF
Length on Abut. = $1.0' / \cos(\text{Skew}) =$	1.098 ft long
Length on Super. = $4.000' - 4'' / 12 / \cos(\text{skew}) =$	3.634 ft long
Rear Abut. - Length * Area =	$1.098' * 8.229 \text{ SF} =$ 9.0 CF
Rear Super. - Length * Area =	$3.634' * 8.229 \text{ SF} =$ 29.9 CF
Fwd Super. - Length * Area =	$3.634' * 8.229 \text{ SF} =$ 29.9 CF
Fwd Abut. - Length * Area =	$1.098' * 8.229 \text{ SF} =$ 9.0 CF
	<hr/>
	77.9 CF



29 North Park Street, Mansfield, OH 44902

Phone: 419-524-0074
 Fax: 419-524-1812

CALCULATION SHEET

JOB NO. 21394 (119034) SHEET NO. 5 OF 9
 SUBJECT CUY-71-1640 Estimated Quantities
 CALCULATED BY dlr DATE 6/2021
 CHECKED BY dht DATE 6/2021
 REVISED BY _____ DATE _____

Bridge CUY-71-1640 (SFN 1805223) - IR 71 over Norfolk Southern Railway

ITEM 511 - CLASS QC SCC CONCRETE, SUPERSTRUCTURE, AS PER PLAN (WITH STEEL FIBERS) - continued

Superstructure

blockout area =	$(16*10+18.5*6)/144 =$	1.882 SF		
Rear Left - Length * Area =	79.440' * 1.882 SF =		149.5 CF	
Rear Right - Length * Area =	81.695' * 1.882 SF =		153.7 CF	
Fwd Left - Length * Area =	78.744' * 1.882 SF =		148.2 CF	
Fwd Right - Length * Area =	84.857' * 1.882 SF =		159.7 CF	
			<hr/>	
			611.1 CF	24.8 CY
			<hr/>	
			1789.8 CF	
			<hr/>	
			÷ 27 CF / CY =	67 CY

ITEM 511 - CLASS QC1 CONCRETE, ABUTMENT

Bottom of Wing Wall - T=1.8333'

Rear Left	$1.8333*(10+8.5625/12)*(713.05-708.55)$	88.4 CF	
Rear Right	$1.8333*(10+11.3125/12)*(713.80-712.35)$	29.1 CF	
Fwd Left	$1.8333*(10+11.3125/12)*(710.88-706.35)$	90.9 CF	
Fwd Right	$1.8333*(10+8.5625/12)*(711.40-709.58)$	35.7 CF	
		<hr/>	
			244.1 CF

Below Abutment Seat

Rear Left: $1.75*(2.9844+1.75*\tan(\text{skew})/2)*(713.05-708.55)$	26.7 CF
$1.5*(2.9844+1.75*\tan(\text{skew})-1.8333/\cos(\text{skew}))*(713.05-708.55)$	12.0 CF
$0.5*1.4740*2.3229*(713.05-708.55)$	7.7 CF
Rear Right: $1.75*(0.9115+2.0469+1.75*\tan(\text{skew})/2)*(713.80-712.35)$	8.5 CF
Fwd Left: $1.75*(0.9115+4.1875-1.75*\tan(\text{skew})/2)*(710.88-706.35)$	37.3 CF
$1.5*(0.9115+4.1875-1.8333/\cos(\text{skew})-$	13.4 CF
$1.4896*(0.9115+4.1875-1.8333/\cos(\text{skew})-$	11.0 CF
Fwd Right: $1.75*(3.3542+1.75*\tan(\text{skew})/2)*(711.40-709.58)$	12.0 CF
$1.5*(3.3542+1.75*\tan(\text{skew})-$	6.8 CF
	<hr/>
	135.6 CF
	<hr/>
	379.7 CF
	<hr/>
	÷ 27 CF / CY =
	15 CY



29 North Park Street, Mansfield, OH 44902

Phone: 419-524-0074
Fax: 419-524-1812

CALCULATION SHEET

JOB NO. 21394 (119034) SHEET NO. 6 OF 9
SUBJECT CUY-71-1640 Estimated Quantities
CALCULATED BY dlr DATE 6/2021
CHECKED BY dht DATE 6/2021
REVISED BY _____ DATE _____

Bridge CUY-71-1640 (SFN 1805223) - IR 71 over Norfolk Southern Railway

ITEM 512 - SEALING OF CONCRETE SURFACES (EPOXY-URETHANE), AS PER PLAN

Abutment Parapet

Section C Perimeter = $(3+\sqrt{10^2+7^2})+\sqrt{(29^2+3^2)}+8+42+4)/12 =$ 8.197 FT
Section D Perimeter = $(3+\sqrt{5^2+3.5^2})+24+14.5+32+4)/12 =$ 6.967 FT
Section E Perimeter = $(3+\sqrt{2.5^2+3.5^2})+26.5+14.5+32+4)/12 =$ 7.025 FT
Section F Perimeter = $(4+8+28+10+32+4)/12 =$ 7.167 FT
End Area = $(4*8+10*32)/144 =$ 2.44 SF

Rear Left, Fwd Right - length * average end areas

Section C to Section D - 2 @	6.714'*(8.197 FT + 6.967 FT)	/ 2 =	101.8 SF
Section D to Section E - 2 @	2.500'*(6.967 FT + 7.025 FT)	/ 2 =	35.0 SF
Section E to Section F - 2 @	1.500'*(6.967 FT + 7.025 FT)	/ 2 =	21.0 SF
Parapet End - 2 @	2.44 SF		4.9 SF
			162.7 SF

Rear Right, Fwd Left - length * average end areas

Section C to Section D - 2 @	6.943'*(8.197 FT + 6.967 FT)	/ 2 =	105.3 SF
Section D to Section E - 2 @	2.500'*(6.967 FT + 7.025 FT)	/ 2 =	35.0 SF
Section E to Section F - 2 @	1.500'*(6.967 FT + 7.025 FT)	/ 2 =	21.0 SF
Parapet End - 2 @	2.44 SF		4.9 SF
			166.1 SF

Exposed Wing Wall Face

Use length = parapet length + abutment seat length

Rear Left	$(10.7135+1.6302)*(715.24-(708.80+1.00))/2$	33.6 SF
Rear Right	$(10.9427+1.8177)*(716.08-(708.80+1.00))/2$	40.1 SF
Fwd Left	$(10.9427+1.8177)*(713.07-(706.60+1.00))/2$	34.9 SF
Fwd Right	$(10.7135+1.6302)*(713.67-(706.60+1.00))/2$	37.5 SF
		146.0 SF

New concrete on face of abutments + 6" overlap onto existing concrete or to ground line

Rear Left	$(2.9844+0.5)*(713.05-(708.8+1.00))$	11.3 SF
Rear Right	$(2.0469+\sqrt{(0.9115^2-0.3854^2)}+0.5)*(713.80-712.35+0.5)$	6.6 SF
Fwd Left	$(4.1875+\sqrt{(0.9115^2-0.3854^2)}+0.5)*(710.88-(706.60+1.00))$	18.1 SF
Fwd Right	$(3.3542+0.5)*(711.40-709.58+0.5)$	8.9 SF
		44.9 SF

Median Barrier

Perimeter = $2*(3+\sqrt{13^2+9^2})+\sqrt{(17^2+3^2)}+18+8.5)/12 =$	10.429 FT	
Bridge Limits = Sta 941+39.18 - Sta 939+91.73 =	147.450 FT	
Abut. Length = $1.000 / \text{COS}(\text{RADIANS}(24+(24+50/60)/60)) =$	1.098 FT	
Abut. Area = 2 * Abut. Length * Perimeter =		22.9 SF 60.3 SY
Super. Length = (Bridge Limits) - 2 * (Abut. Length) =	145.254 FT	
Super. Area = Super. Length * Perimeter =		1514.9 SF 458.7 SY
Appr. Length =	25.000 FT	
Appr. Area = 2 * Appr. Length * Perimeter =		521.5 SF 57.9 SY



29 North Park Street, Mansfield, OH 44902

Phone: 419-524-0074
 Fax: 419-524-1812

CALCULATION SHEET

JOB NO. 21394 (119034) SHEET NO. 7 OF 9
 SUBJECT CUY-71-1640 Estimated Quantities
 CALCULATED BY dlr DATE 6/2021
 CHECKED BY dht DATE 6/2021
 REVISED BY _____ DATE _____

Bridge CUY-71-1640 (SFN 1805223) - IR 71 over Norfolk Southern Railway

ITEM 512 - SEALING OF CONCRETE SURFACES (EPOXY-URETHANE), AS PER PLAN - continued

Superstructure Parapet

Perimeter = $(3+\sqrt{10^2+7^2})+\sqrt{30.5^2+3^2}+14+33.25+2+10.25+2)/12 = 8.946$ FT

Area = 2 sides * Super. Length * Perimeter = 2598.9 SF

Blockout area on face of slab (+6" overlap onto existing)

sealing area = $((16+6)*10+(18.5+6)*(6+6))/144 = 3.569$ SF

Area = 4 sealing areas =

14.3 SF	
5192 SF	
÷ 9 SF / SY =	577 SY

ITEM 512 - REMOVAL OF EXISTING COATINGS FROM CONCRETE SURFACES, AS PER PLAN

Exposed Wing Wall Face Use length = parapet length + abutment seat length

Rear Right $(10.9427+1.8177)*(2.55/6.28)*2.55$ 13.2 SF

Fwd Right $(10.7135+1.6302)*(1.98/6.07)*1.98$ 8.0 SF

21.2 SF

6" overlap adjacent to new concrete on face of abutments or to ground line

Rear Left $0.5*(713.05-(708.8+1.00))$ 1.6 SF

Rear Right $(2.0469+\sqrt{0.9115^2-0.3854^2})+(713.80-712.35)+0.5)*0.5$ 2.4 SF

Fwd Left $0.5*(710.88-(706.60+1.00))$ 1.6 SF

Fwd Right $(3.3542+(711.40-709.58)+0.5)*0.5$ 2.8 SF

8.5 SF 3.3 SY

Median Barrier

Perimeter = $2*(3+\sqrt{13^2+9^2})+\sqrt{17^2+3^2}+18+8.5)/12 = 10.429$ FT

Bridge Limits = Sta 941+39.18 - Sta 939+91.73 = 147.45 FT

Abut. Length = $1.000 / \text{COS}(\text{RADIANS}(24+(24+50/60)/60)) = 1.098$ FT

Super. Length = (Bridge Limits) - (Abut. Length) - 2 ends new @ 4' = 137.25 FT

Super. Area = Super. Length * Perimeter = 1431.4 SF

Superstructure Parapet

Perimeter = $(3+\sqrt{10^2+7^2})+\sqrt{30.5^2+3^2}+14+33.25+2+10.25+2)/12 = 8.946$ FT

Area = 2 sides * Super. Length * Perimeter = 2455.8 SF

Blockout area on face of slab (6" overlap onto existing)

blockout area = $((16)*10+(18.5)*(6))/144 = 1.882$ SF

sealing area = $((16+6)*10+(18.5+6)*(6+6))/144 = 3.569$ SF

Area = 4 * (sealing area - blockout area) =

6.8 SF	
3924 SF	
÷ 9 SF / SY =	436 SY



29 North Park Street, Mansfield, OH 44902

Phone: 419-524-0074
Fax: 419-524-1812

CALCULATION SHEET

JOB NO. 21394 (119034) SHEET NO. 8 OF 9
SUBJECT CUY-71-1640 Estimated Quantities
CALCULATED BY dlr DATE 6/2021
CHECKED BY dht DATE 6/2021
REVISED BY _____ DATE _____

Bridge CUY-71-1640 (SFN 1805223) - IR 71 over Norfolk Southern Railway

ITEM 516 - STRUCTURAL EXPANSION JOINT INCLUDING ELASTOMERIC STRIP SEAL

Measure toe to toe of barrier along CL joint plus 1.25' into each barrier

Rear Left	$(31+5.5625/12)+(23+2.5/12)+(20+11.9375/12)+2*1.25$	78.17 FT
Rear Right	$(31+7.9375/12)+(24+7.5625/12)+(21+1.1875/12)+2*1.25$	79.89 FT
Fwd Left	$(31+2.1875/12)+(22+11.875/12)+(20+10/12)+2*1.25$	77.51 FT
Fwd Right	$(34+10.8125/12)+(24+7.1875/12)+(21+2.125/12)+2*1.25$	83.18 FT

319 FT

ITEM 516 - 1/2" PREFORMED EXPANSION JOINT FILLER

Under abutment backwall for relocated abutment joint

Skew = 24°24'50" =	0.426103 Radians	
Rear abutment	$1.5*((2.5*TAN(Skew)+1.0*TAN(Skew)))/2-5.25/12 =$	0.6 SF
Forward abutment	$1.5*((2.5*TAN(Skew)+1.0*TAN(Skew)))/2-3.6875/12 =$	0.8 SF

Under superstructure median joint

Length on Superstructure =	$4.000' - 4"/12/\cos(\text{skew}) =$	3.634 FT
Width on Superstructure =	2 IN =	0.167 FT
2 ends * Length * Width =	2 * 3.634 FT * 0.167 FT	1.3 SF

Median Barrier at Bridge Ends

Area =	$2*(20.5*3+0.5*(20.5+11.5)*13+0.5*(11.5+8.5)*17+8.5*18)/144 =$	8.229 SF
Total Skewed Area =	2 ends * Area / cos(skew) =	18.1 SF

21 SF

ITEM 516 - 1" PREFORMED EXPANSION JOINT FILLER

below Appr Slab seat	Width = $1.5'/\cos(\text{RADIANS}(24+(24+50/60)/60)) =$	1.647 FT
above Appr Slab seat	Width = $1.0'/\cos(\text{RADIANS}(24+(24+50/60)/60)) =$	1.098 FT
Rear	$(714.20-713.22)*\text{Width}$	1.6 SF
Forward	$(711.90-710.91)*\text{Width}$	1.6 SF
Above Approach Slab Seat - 2 @	Height = 1.250 FT x Width = 1.098 FT	2.7 SF
Abutment Median Barrier - 2 @	Height = 4.250 FT x Width = 1.098 FT	9.3 SF
Approach Slab Edges	Height = 15" = 1.25 FT	
2 edges @	$(10+11.3125/12)+0.5 : 22.89 \text{ FT} * 1.25 \text{ FT}$	28.7 SF
2 edges @	$(10+8.5625/12)+0.5 = 22.43 \text{ FT} * 1.25 \text{ FT}$	28.1 SF
2 medians @	25.00 = 50.00 FT * 1.25 FT	62.5 SF
Appr. Slab Median Barrier - 2 @	Height = 4.250 FT x Length = 25.00 FT	212.5 SF
		331.8 SF

348 SF

ITEM 516 - 2" PREFORMED EXPANSION JOINT FILLER

Median Barrier at Approach Slab Ends

Area =	$2*(20.5*3+0.5*(20.5+11.5)*13+0.5*(11.5+8.5)*17+8.5*18)/144 =$	8.229 SF
Total Skewed Area =	2 ends * Area / cos(Skew) =	18.1 SF

19 SF



29 North Park Street, Mansfield, OH 44902

Phone: 419-524-0074
 Fax: 419-524-1812

CALCULATION SHEET

JOB NO. 21394 (119034) SHEET NO. 9 OF 9

SUBJECT CUY-71-1640 Estimated Quantities

CALCULATED BY dlr DATE 6/2021

CHECKED BY dht DATE 6/2021

REVISED BY DATE

Bridge CUY-71-1640 (SFN 1805223) - IR 71 over Norfolk Southern Railway

ITEM 516 - 2" DEEP JOINT SEALER

Approach Slab Edges = Length of Wing Wall Parapet less 1' (plus skew) top of backwall plus 6" curb
 2 edges @ (10 + 11.3125/12) - 1.00 / COS(Skew) + 0.5 = 20.69 FT
 2 edges @ (10 + 8.5625/12) - 1.00 / COS(Skew) + 0.5 = 20.23 FT

41 FT

ITEM 518 - POROUS BACKFILL WITH GEOTEXTILE FABRIC

Length = (left & right expansion joints - 4 parapet extension @1.25')
 + 3.5' median barrier / cos(Skew)
 - 2 ends at 1.0' half-width / cos(Skew)
 + 2 (wingwall length - (1.5' backwall + 1.0' halfwidth) / cos(Skew))

Width = 2.00 FT

Height = 1.25 FT average

Rear Length = 170.87 FT Volume = 427.2 CF

Forward Length = 173.49 FT Volume = 433.7 CF

Wingwalls below seat elevation - average corner wedge 1.5'x1.5'/2 = 1.13 SF

Rear Left - (2.00*((10+8.5625/12)+(1+7.3125/12)-3.25/cos(skew))-1.13)*(713.05-708.55) 73.5 CF

Rear Right - (2.00*((10+11.3125/12)+(1+9.8125/12)-3.25/cos(skew))-1.13)*(713.80-712.35) 25.0 CF

Fwd Left - (2.00*((10+11.3125/12)+(1+9.6875/12)-3.25/cos(skew))-1.13)*(710.88-706.35) 78.1 CF

Fwd Right - (2.00*((10+8.5625/12)+(1+7.3125/12)-3.25/cos(skew))-1.13)*(711.40-709.58) 29.7 CF

1067.3 CF

÷ 27 CF / CY = **40 CY**

ITEM 518 - 6" PERFORATED CORRUGATED PLASTIC PIPE

Length = length of Porous Backfill calculated above

Rear Length = 170.87 FT

Forward Length = 173.49 FT

345 FT

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

Rear Abutment - 1.00+1.00+1.83+1.00+14.17 = 19.00 FT

Forward Abutment - 1.00+1.00+1.83+1.00+14.33 = 19.16 FT

39 FT

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

Rear Left ((33+1.5/12)+(23+2.4375/12)+(20+10.8125/12))*COS(Skew)*25.00 1758 SF

Rear Right ((33+9.0625/12)+(24+8.2/12)+(21+0.3125/12))*COS(Skew)*25.00 1809 SF

Fwd Left ((32+9.875/12)+(22+11.875/12)+(20+8.875/12))*COS(Skew)*25.00 1743 SF

Fwd Right ((37+1.625/12)+(24+7.1875/12)+(20+10.9375/12))*COS(Skew)*25.00 1881 SF

7191 SF

÷ 9 SF / SY = **800 SY**

ITEM 601 - DUMPED ROCK FILL, TYPE D

280 CY