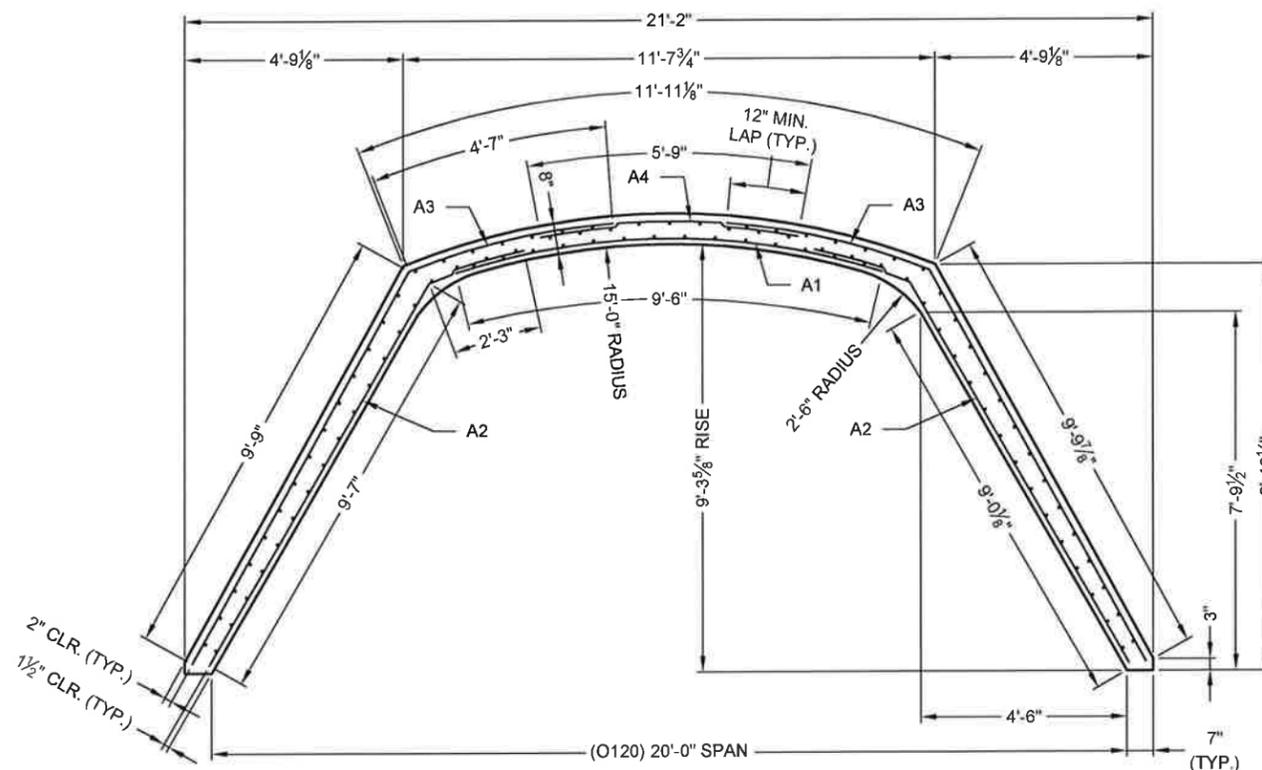


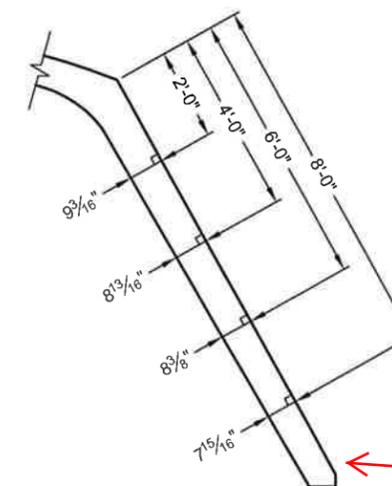


- NOTES:
1. MINIMUM 28-DAY CONCRETE COMPRESSIVE STRENGTH SHALL BE 5000 PSI.
  2. OVERLAP LENGTH SHALL BE MEASURED FROM LAST CROSSWIRE
  3. DIMENSIONS SHOWN ARE FOR FORM SYSTEM O-100 SERIES.
  4. MINIMUM YIELD STRENGTH FOR WELDED WIRE FABRIC SHALL BE 65,000 PSI.
  5. REINFORCING SHALL BE LIMITED TO A MAXIMUM OF THREE LAYERS OF REINFORCING (WWF OR BARS) PER AREA (A1, A2, A3 OR A4).
  6. ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER.
  7. SPACING OF LONGITUDINAL REINFORCEMENT MUST BE A MAXIMUM OF 8" O.C. FOR MULTIPLE LAYERS OF MESH, ONLY THE OUTER MOST LAYER (A1A OR A3A) MUST BE A MAXIMUM OF 8" O.C.
  8. SPACING OF A2 & A4 CIRCUMFERENTIAL REINFORCEMENT SHALL BE 2" MIN. TO 4" MAX. SPACING OF A1 & A3 CIRCUMFERENTIAL REINFORCEMENT SHALL BE 2".

when will curing method/procedure be submitted?  
what is stripping/moving strengths?



**PRECAST UNIT REINFORCEMENT**



assume same thickness down here?

**INCREMENTAL ARCH LEG THICKNESSES**

WEIGHT OF REQUIRED REINFORCEMENT = 118.0 LBS/FT

SHEET NO.	CIRCUMFERENTIAL AREA REQ'D (IN <sup>2</sup> /FT)	LONGITUDINAL AREA REQ'D (IN <sup>2</sup> /FT)	MESH SIZE	LENGTH (FT)	CIRCUMFERENTIAL AREA SUPL'D (IN <sup>2</sup> /FT)	LONGITUDINAL AREA SUPL'D (IN <sup>2</sup> /FT)
1	A1 = 0.30	0.13		9'-6"		
2	A2 = 0.48	0.13		11'-10"		
3	A3 = 0.36	0.13		14'-4"		
4	A4 = 0.24	0.13		5'-9"		
5						

DESIGN LOADING: HL-93 COVER = 2'-0" MIN. \ 13'-0" MAX.

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**CONSPAN**  
-SERIES-  
FABRICATION DRAWING

US ROUTE 2  
BRIDGE NO. 126  
TOWN OF LUNENBURG  
ESSEX COUNTY, VERMONT



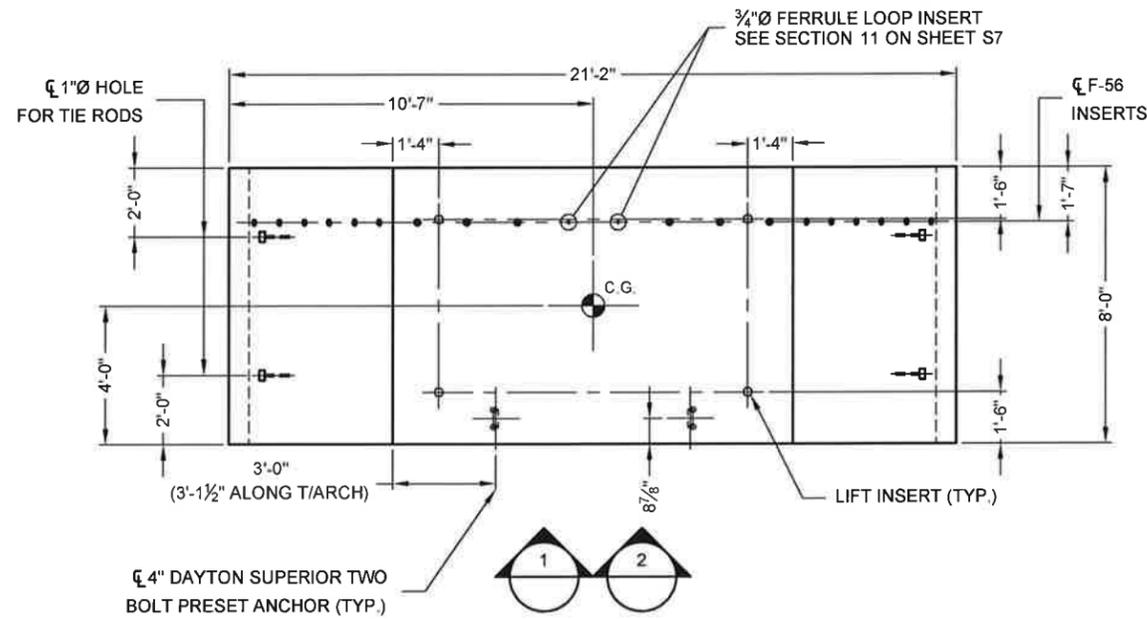
PROJECT No. 468920	SEQ. No. 010	DATE 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO.: S2 OF S22		

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HEADWALL		ARCH UNIT		
CONCRETE	REINF. STEEL	CONCRETE	REINF. STEEL	WWF
28-DAY: 5000 PSI	60,000 PSI UNCOATED	28-DAY: 5000 PSI	60,000 PSI UNCOATED	65,000 PSI UNCOATED

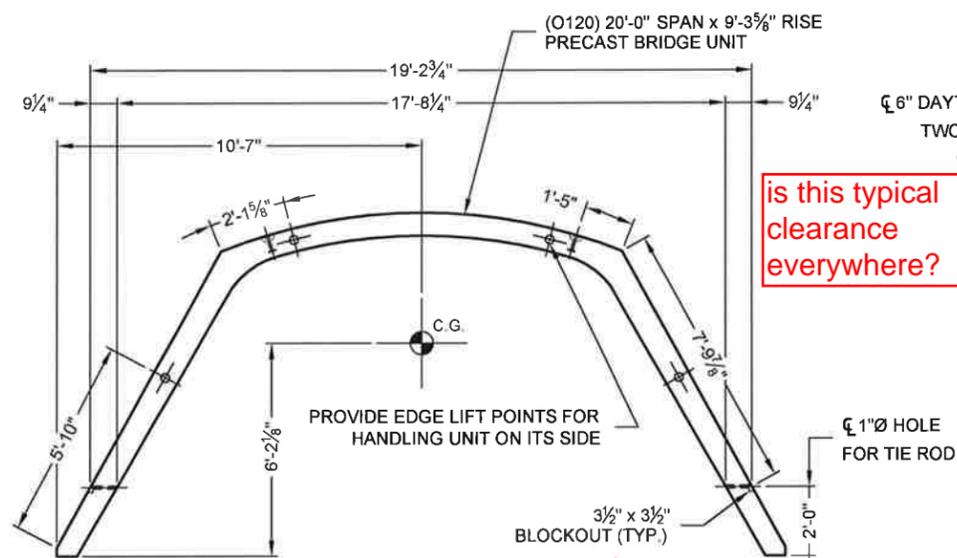
WHEREVER THE REINFORCING IS CUT FOR THE PLACEMENT OF LIFT HOLES OR OTHER BLOCKOUTS, REINFORCING BARS OR WIRES OF EQUIVALENT CROSS-SECTIONAL AREA SHALL BE PLACED SYMMETRICALLY AROUND THE HOLE. AT LEAST ONE BAR MUST BE ON EACH SIDE OF THE HOLE, AND THE DEVELOPMENT LENGTH OF THE BAR MUST BE ACHIEVED ON EITHER SIDE OF THE CUT.

- NOTES:
- ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER
  - ELEVATION IS LOOKING AT BACK FACE OF HEADWALL
  - SEE SHEET S4 FOR HEADWALL C.G. & LIFT POINTS
  - HEADWALL TO BE CAST AGAINST BRIDGE UNIT
  - BRIDGE UNITS MUST BE GROUTED OR BRACED WHEN SETTING PRECAST HEADWALLS
  - SEE SHEET S2 FOR BRIDGE UNIT DIMENSIONS
  - INSTALL TIE RODS BEFORE UNIT IS SET UPRIGHT & LEAVE IN PLACE UNTIL UNIT IS GROUTED INTO FINAL POSITION



PLAN - C1

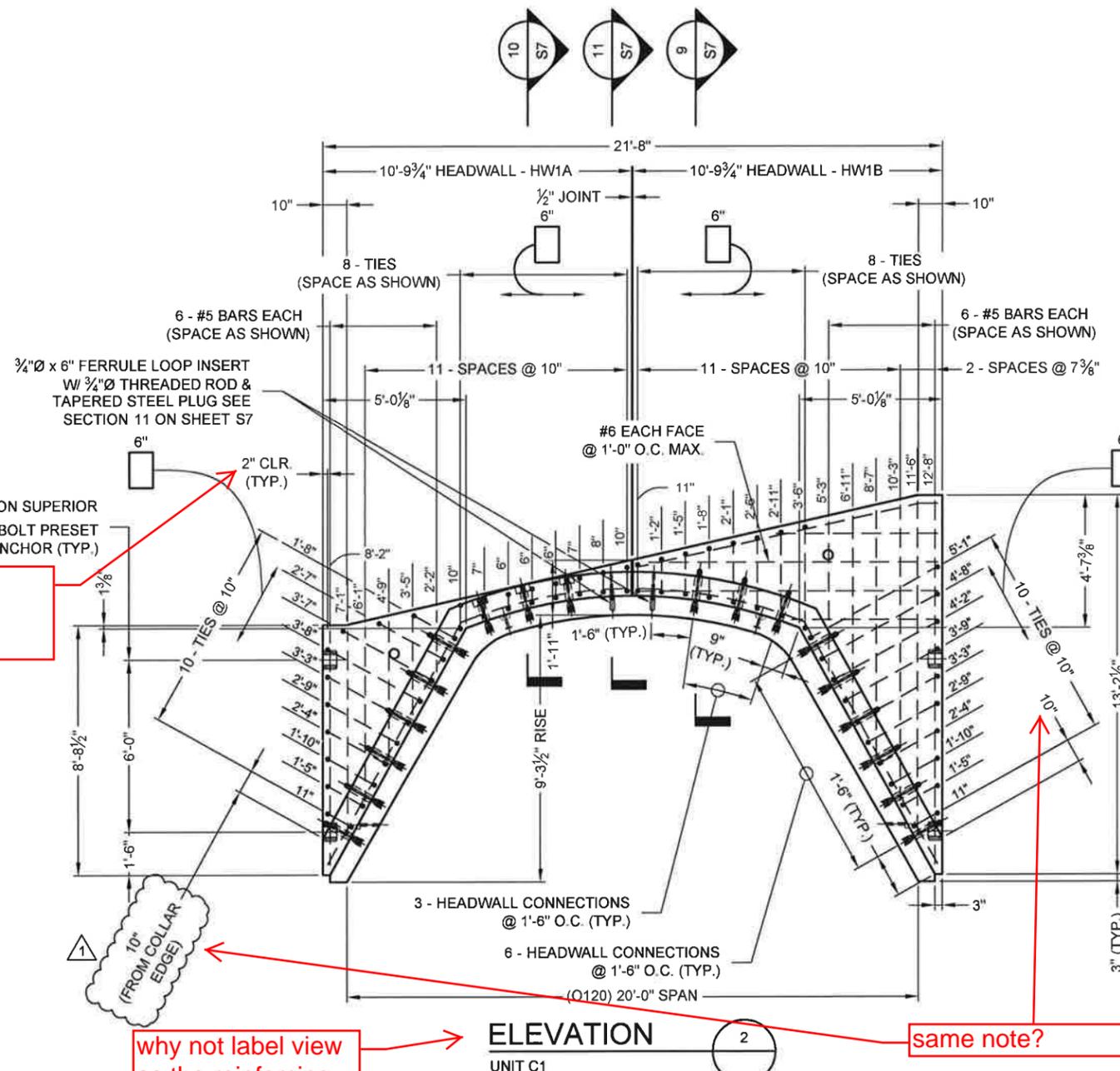
TOTAL WEIGHT = 13.1 TONS



ELEVATION

is this typical clearance everywhere?

is there a figure detail for this block out?



ELEVATION UNIT C1

why not label view as the reinforcing layout?

same note?

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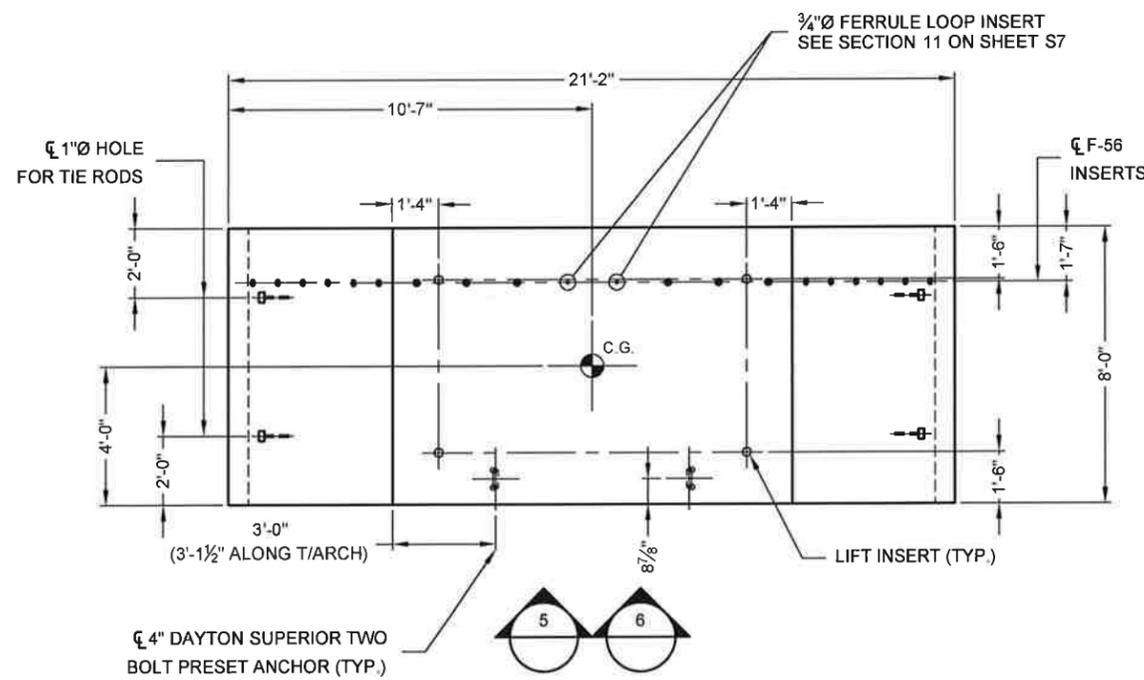
**CONSPAN**  
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DRAWING

US ROUTE 2  
BRIDGE NO. 126  
TOWN OF LUNENBURG  
ESSEX COUNTY, VERMONT

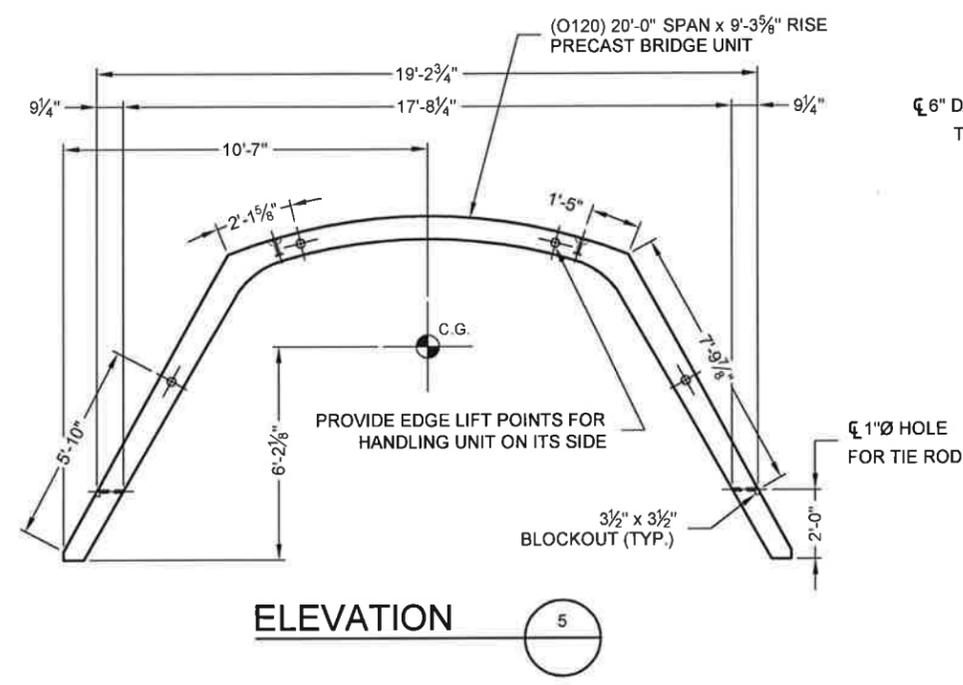
PROJECT No.	SEQ. No.	DATE
468920	010	12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO. S3		OF S22



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**PLAN - C2**  
TOTAL WEIGHT = 13.1 TONS

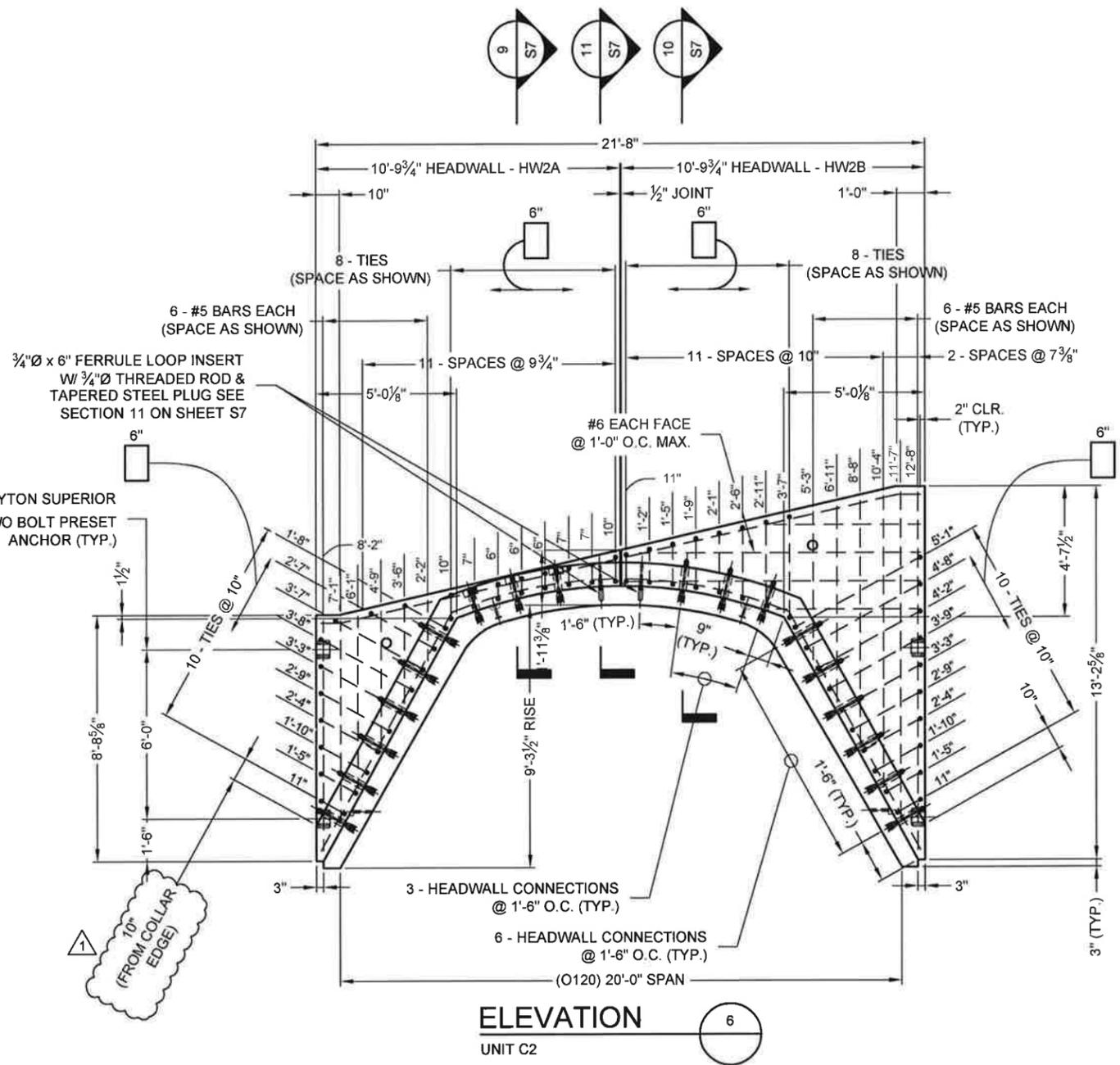


**ELEVATION**

HEADWALL		ARCH UNIT		
CONCRETE	REINF. STEEL	CONCRETE	REINF. STEEL	WWF
28-DAY: 5000 PSI	60,000 PSI UNCOATED	28-DAY: 5000 PSI	60,000 PSI UNCOATED	65,000 PSI UNCOATED

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- NOTES:**
- ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER
  - ELEVATION IS LOOKING AT BACK FACE OF HEADWALL
  - SEE SHEET S6 FOR HEADWALL C.G. & LIFT POINTS
  - HEADWALL TO BE CAST AGAINST BRIDGE UNIT
  - BRIDGE UNITS MUST BE GROUTED OR BRACED WHEN SETTING PRECAST HEADWALLS
  - SEE SHEET S2 FOR BRIDGE UNIT DIMENSIONS
  - INSTALL TIE RODS BEFORE UNIT IS SET UPRIGHT & LEAVE IN PLACE UNTIL UNIT IS GROUTED INTO FINAL POSITION



**ELEVATION**  
UNIT C2

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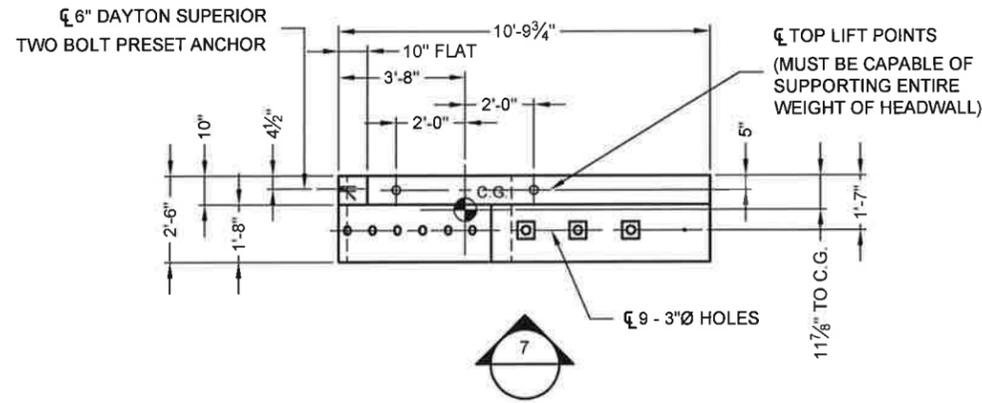
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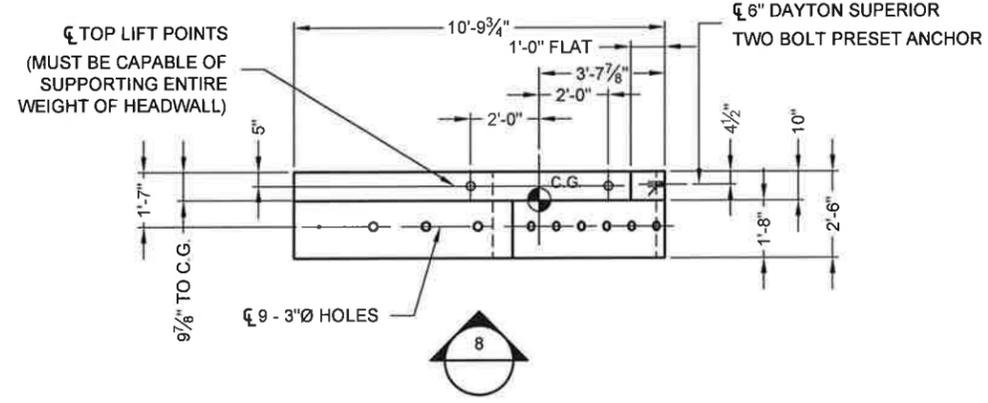
US ROUTE 2  
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PROJECT No: 468920	SEQ. No: 010	DATE: 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO.: S5 OF S22		

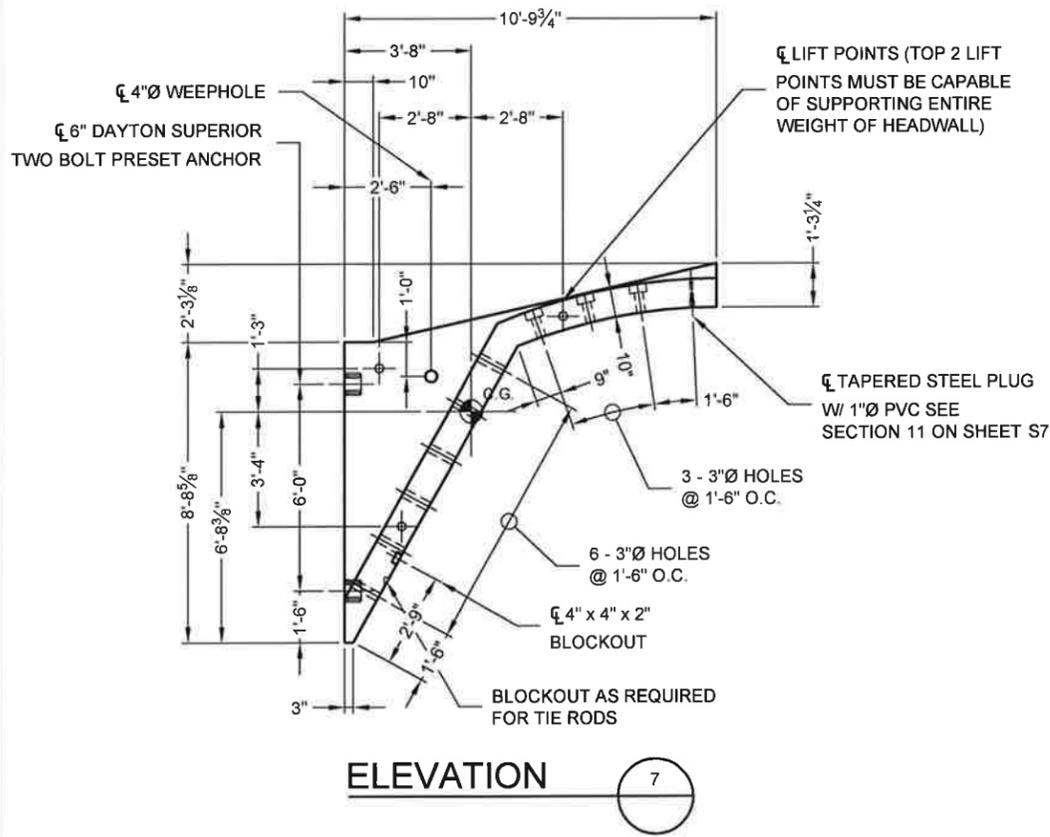
NOTES:  
 - ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER  
 - ELEVATION IS LOOKING AT BACK FACE OF HEADWALL  
 - HEADWALL TO BE CAST AGAINST BRIDGE UNIT  
 - BRIDGE UNITS MUST BE GROUTED OR BRACED WHEN SETTING PRECAST HEADWALLS  
 - HEADWALL WILL NOT HANG LEVEL. ADJUST CABLE LENGTHS AS REQUIRED



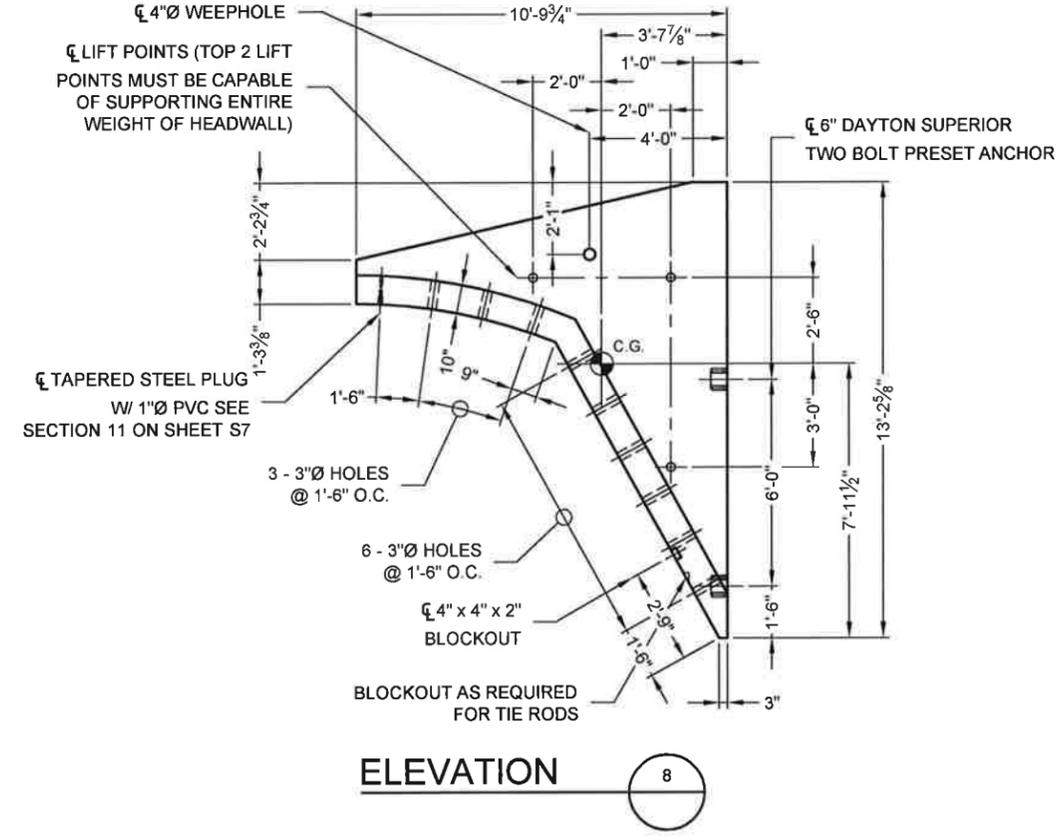
**PLAN - HW2A**  
 TOTAL WEIGHT = 3.6 TONS



**PLAN - HW2B**  
 TOTAL WEIGHT = 5.2 TONS



**ELEVATION** 7



**ELEVATION** 8

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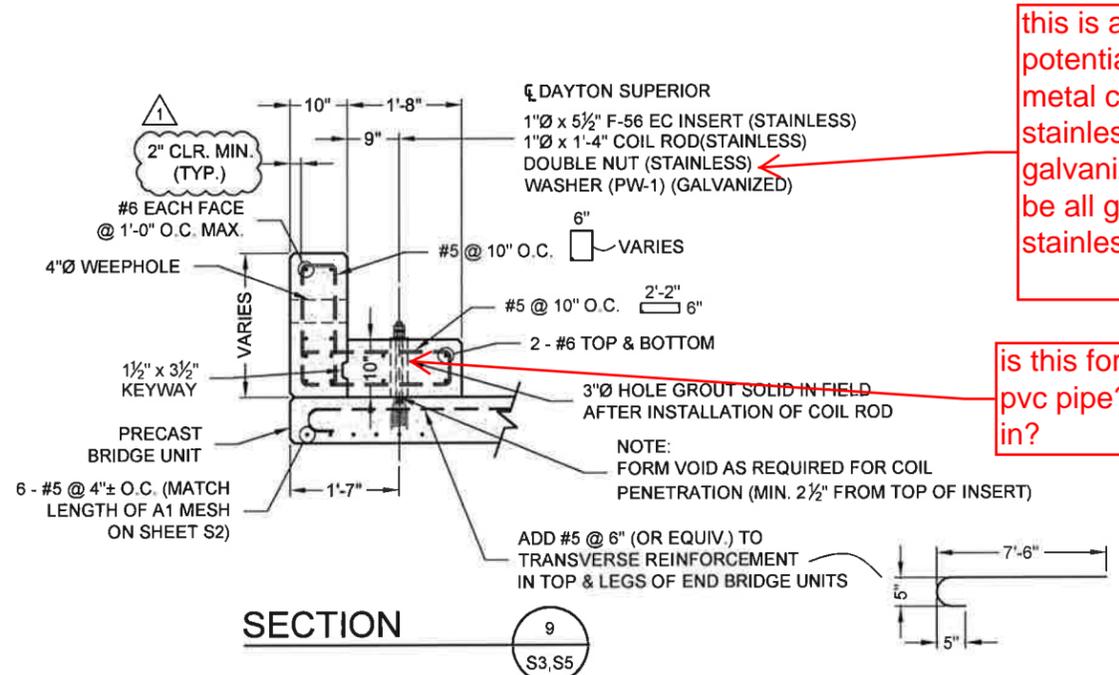
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 BRIDGE NO. 126  
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 ESSEX COUNTY, VERMONT

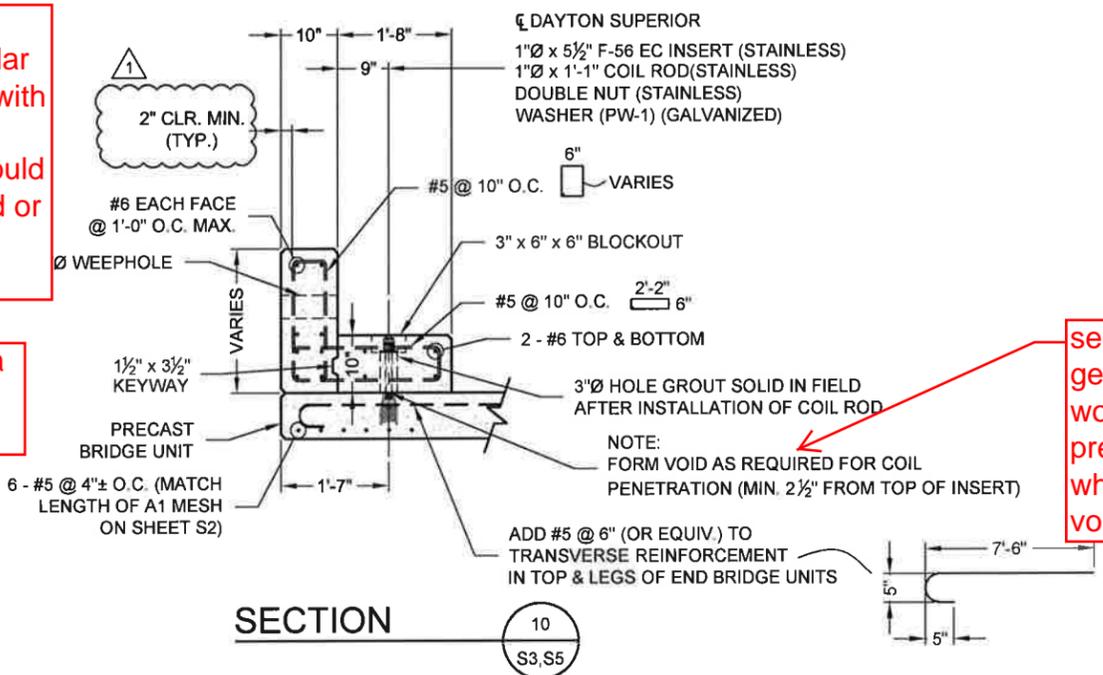
PROJECT No: 468920	SEQ No: 010	DATE: 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO: S6 OF S22		

**NOTES:**  
 - ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER  
 - HEADWALL TO BE CAST AGAINST BRIDGE UNIT  
 - BRIDGE UNITS MUST BE GROUTED OR BRACED WHEN SETTING PRECAST HEADWALLS



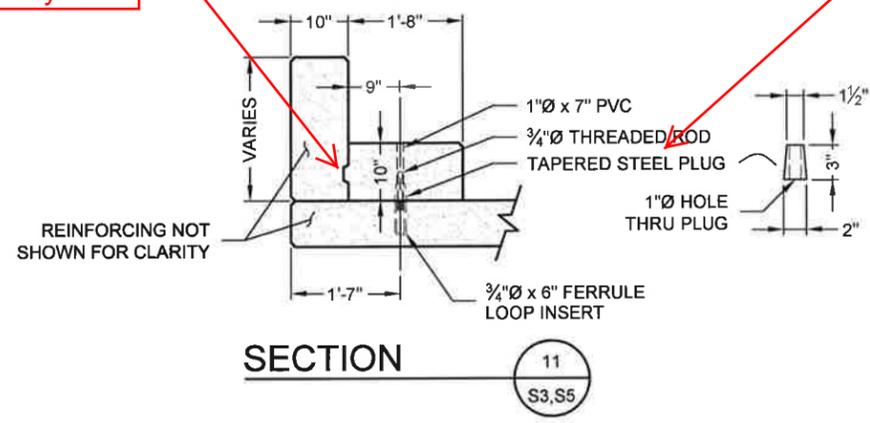
this is a big potential dissimilar metal condition with stainless and galvanized. Should be all galvanized or stainless

is this formed by a pvc pipe? is it left in?

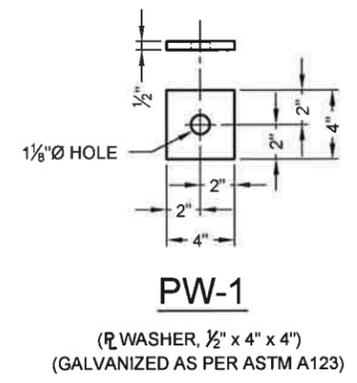


seems kind of general type wording. Shouldn't precaster know what dimension void is needed?

any dimensions for this shear key?



plain steel? not worried of water seepage under head wall and eventually causing that plug to rust?



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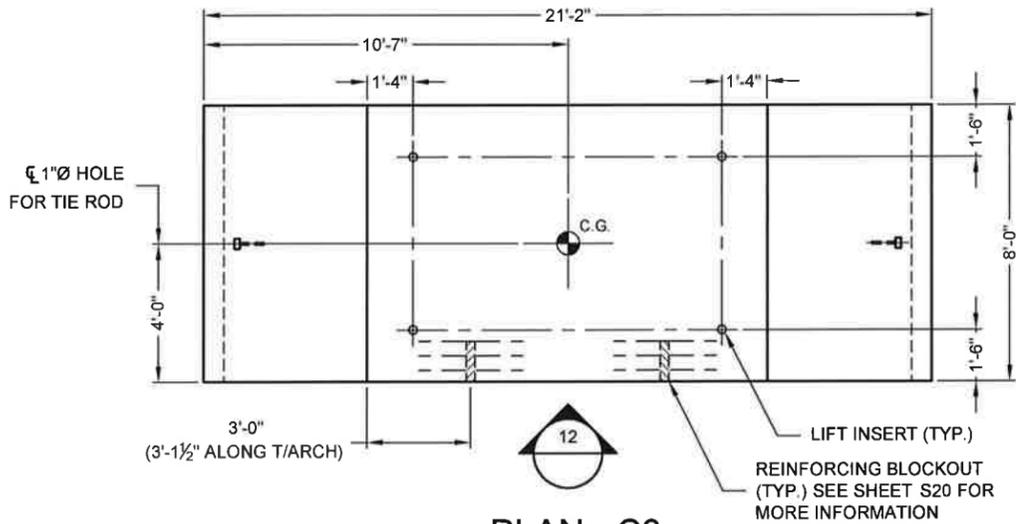
US ROUTE 2  
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 TOWN OF LUNENBURG  
 ESSEX COUNTY, VERMONT

PROJECT No. 468920	SEQ. No. 010	DATE 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET No.: S7 OF S22		

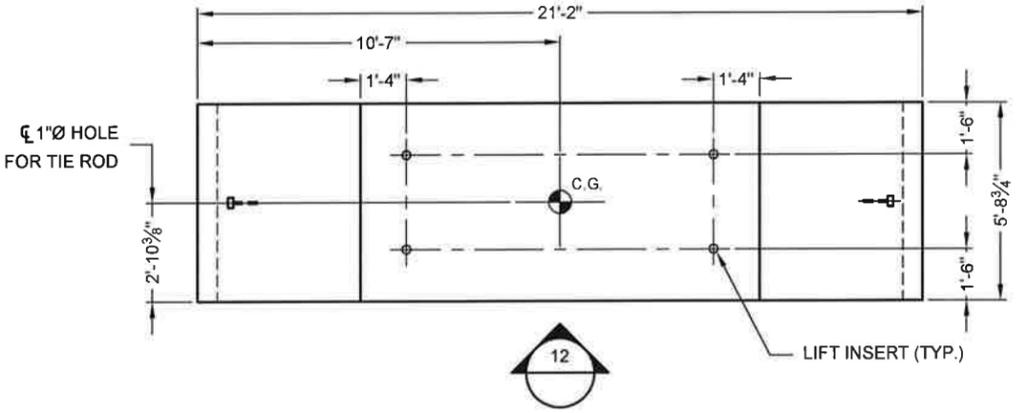
NOTES:  
 - ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER  
 - SEE SHEET S2 FOR BRIDGE UNIT DIMENSIONS  
 - INSTALL TIE RODS BEFORE UNIT IS SET UPRIGHT & LEAVE IN PLACE UNTIL UNIT IS GROUTED INTO FINAL POSITION  
 - MANUFACTURER SHALL MARK END OF UNIT C3 WITH REINFORCING BLOCKOUT PRIOR TO SHIPPING.

ARCH UNIT		
CONCRETE	REINF. STEEL	WWF
28-DAY: 5000 PSI	60,000 PSI UNCOATED	65,000 PSI UNCOATED

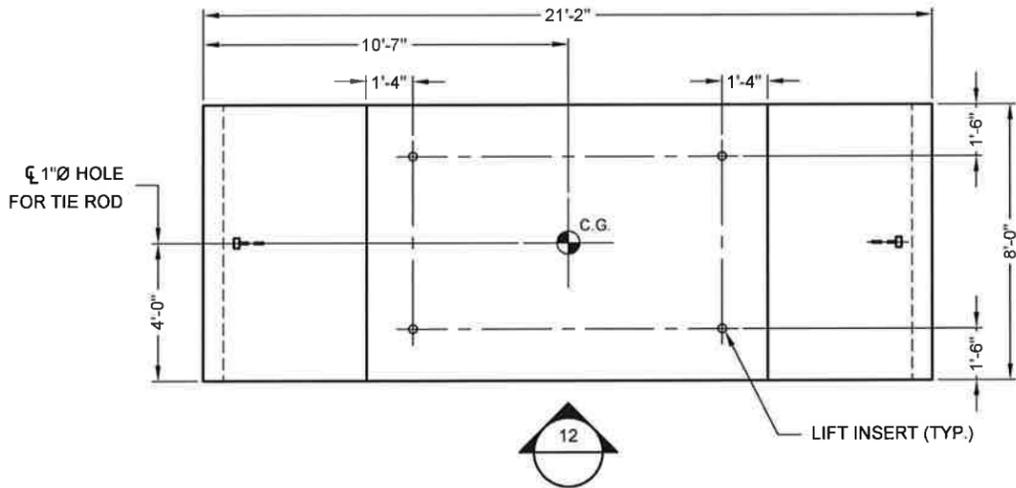
WHEREVER THE REINFORCING IS CUT FOR THE PLACEMENT OF LIFT HOLES OR OTHER BLOCKOUTS, REINFORCING BARS OR WIRES OF EQUIVALENT CROSS-SECTIONAL AREA SHALL BE PLACED SYMMETRICALLY AROUND THE HOLE. AT LEAST ONE BAR MUST BE ON EACH SIDE OF THE HOLE, AND THE DEVELOPMENT LENGTH OF THE BAR MUST BE ACHIEVED ON EITHER SIDE OF THE CUT.



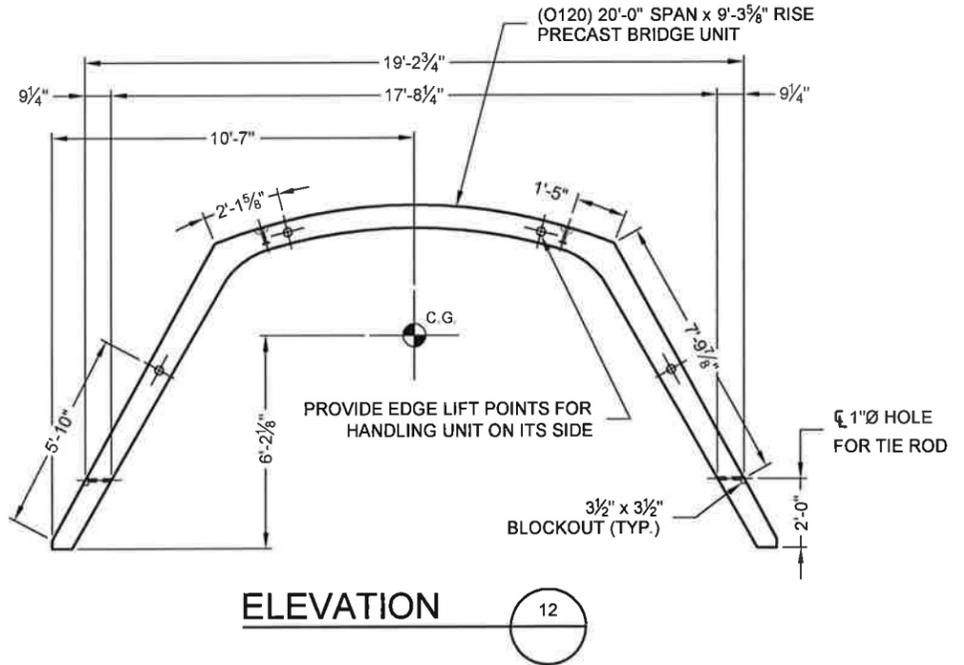
**PLAN - C3**  
 TOTAL WEIGHT = 13.1 TONS



**PLAN - C4**  
 TOTAL WEIGHT = 9.4 TONS



**PLAN - C5**  
 TOTAL WEIGHT = 13.1 TONS



**ELEVATION**

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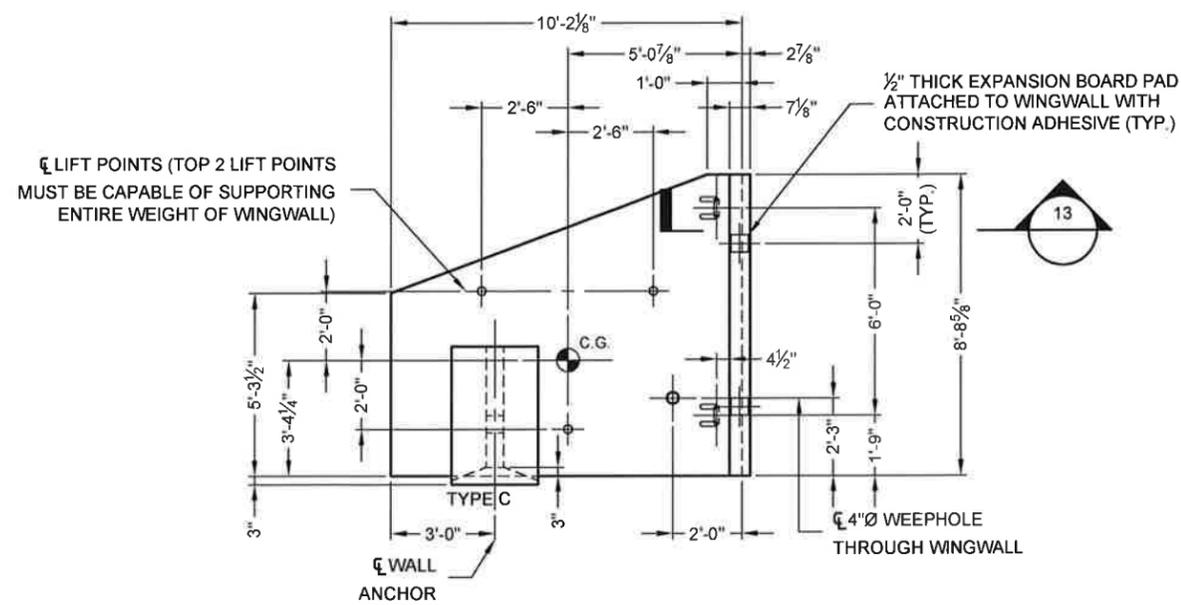
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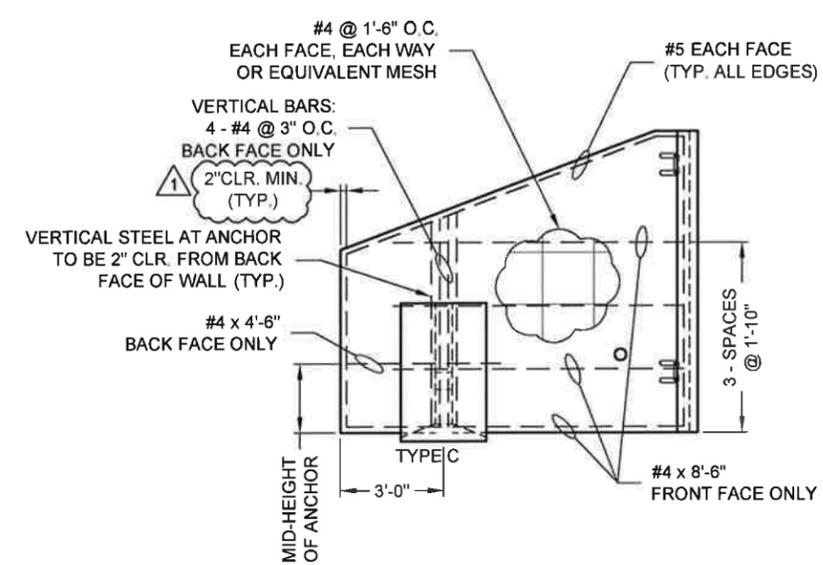
US ROUTE 2  
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PROJECT No: 468920	SEQ. No: 010	DATE: 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO.: S8 OF S22		

NOTES:  
 - ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER  
 - ELEVATION IS LOOKING AT BACK FACE OF WINGWALL  
 - BACK FACE DENOTES ANCHOR SIDE OF WINGWALL  
 - WINGWALL WILL NOT HANG LEVEL. ADJUST CABLE LENGTHS AS REQUIRED



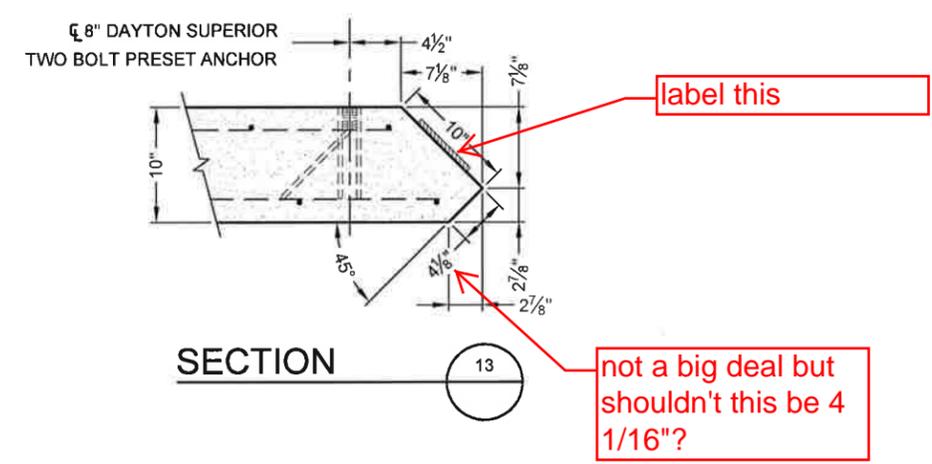
**WINGWALL - WW1**  
 TOTAL WEIGHT = 5.5 TONS



**REINFORCING DETAIL - WW1**  
 (FOR ANCHOR REINFORCING SEE SHEET S17)

WINGWALL		
CONCRETE	REINF. STEEL	WWF
28-DAY: 5000 PSI	60,000 PSI UNCOATED	65,000 PSI UNCOATED

WHEREVER THE REINFORCING IS CUT FOR THE PLACEMENT OF LIFT HOLES OR OTHER BLOCKOUTS, REINFORCING BARS OR WIRES OF EQUIVALENT CROSS-SECTIONAL AREA SHALL BE PLACED SYMMETRICALLY AROUND THE HOLE. AT LEAST ONE BAR MUST BE ON EACH SIDE OF THE HOLE, AND THE DEVELOPMENT LENGTH OF THE BAR MUST BE ACHIEVED ON EITHER SIDE OF THE CUT.



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US ROUTE 2  
 BRIDGE NO. 126  
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 ESSEX COUNTY, VERMONT

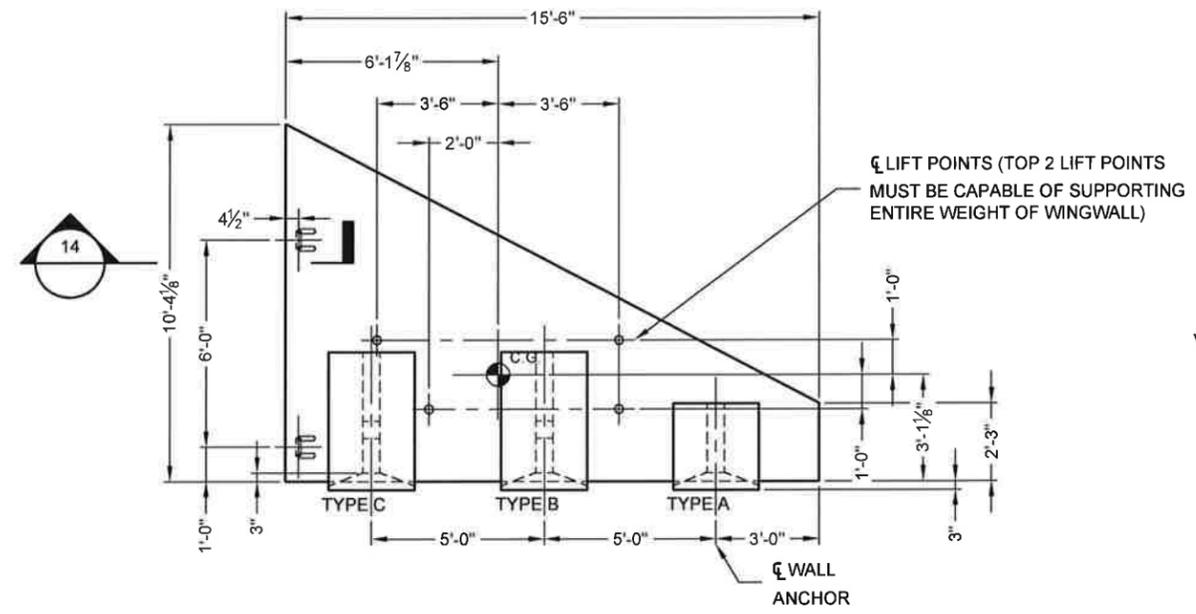
PROJECT No: 468920	SEQ. No.: 010	DATE: 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO.: S9 OF S22		

Design calculations were not provided for these vertical bars in the design calculations, please provide.

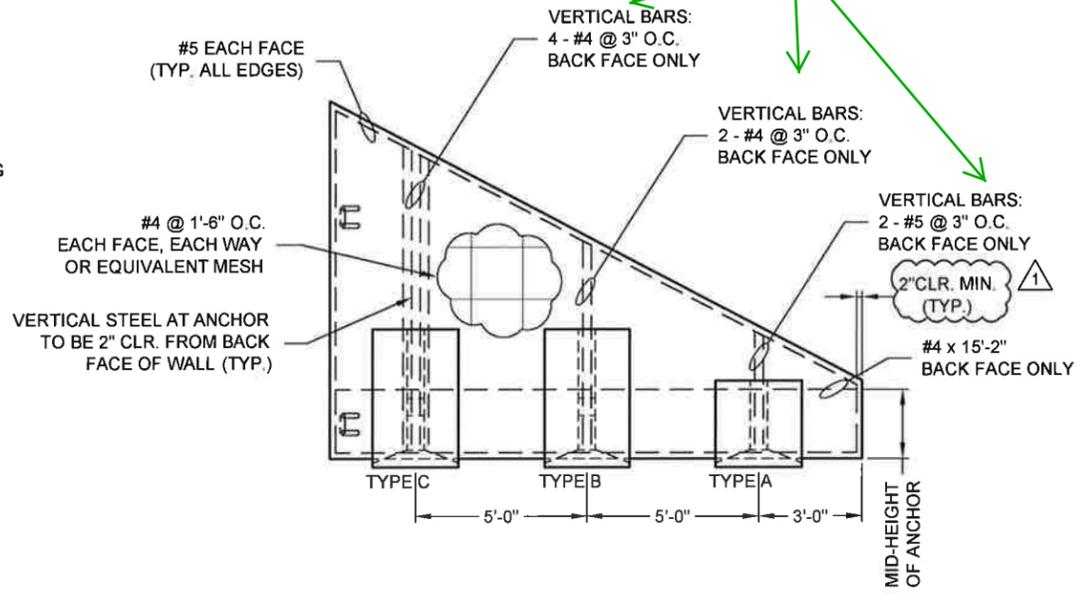
NOTES:  
 - ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER  
 - ELEVATION IS LOOKING AT BACK FACE OF WINGWALL  
 - BACK FACE DENOTES ANCHOR SIDE OF WINGWALL  
 - WINGWALL WILL NOT HANG LEVEL, ADJUST CABLE LENGTHS AS REQUIRED

WINGWALL		
CONCRETE	REINF. STEEL	WWF
28-DAY: 5000 PSI	60,000 PSI UNCOATED	65,000 PSI UNCOATED

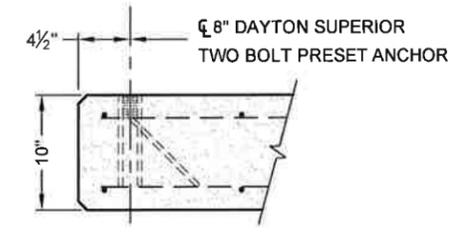
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**WINGWALL - WW2A**  
 TOTAL WEIGHT = 8.2 TONS



**REINFORCING DETAIL - WW2A**  
 (FOR ANCHOR REINFORCING SEE SHEET S16 & S17)



**SECTION** 14

I:\MERLIN\PROJECTS\ACTIVE\68920\68920-10-CON\_SPAN\_O\_SERIES\DRAWINGS\FABRICATION\PRE-468920-010-CON-FAB-C.DWG 3/16/2016 9:20 AM

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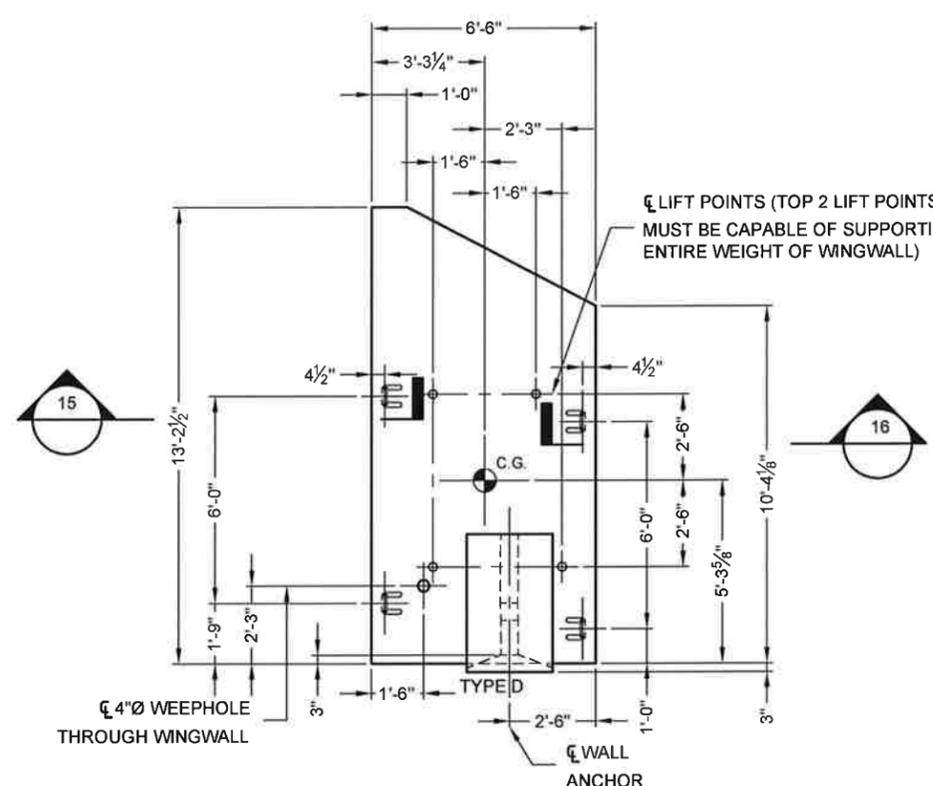
MARK	DATE	REVISION DESCRIPTION	BY
1	3/16/2016	REVISIONS PER REVIEW COMMENTS	KDK

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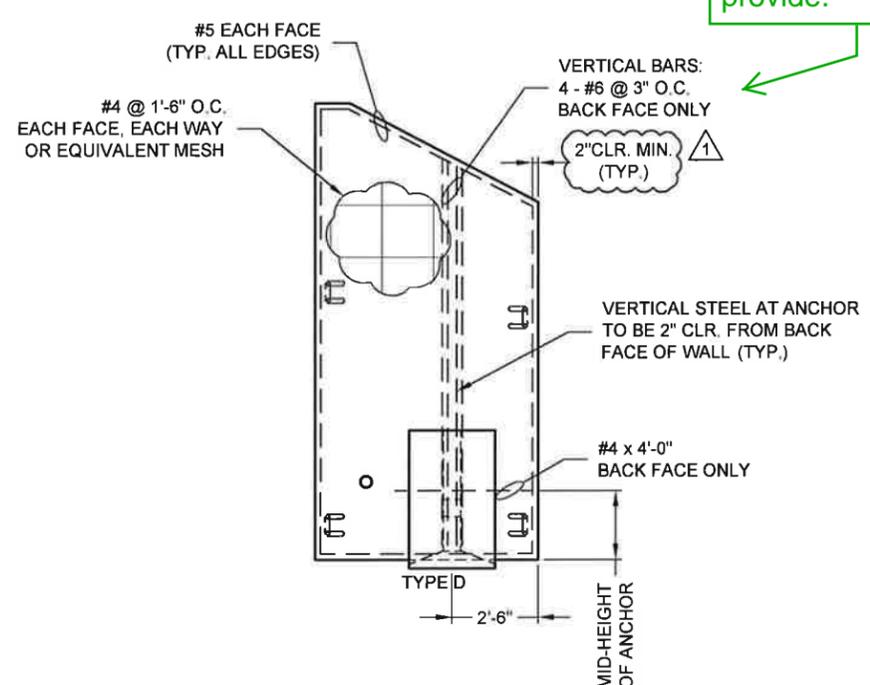
**CONSPAN**  
 -SERIES  
 FABRICATION DRAWING

US ROUTE 2  
 BRIDGE NO. 126  
 TOWN OF LUNENBURG  
 ESSEX COUNTY, VERMONT

PROJECT No: 468920	SEQ. No: 010	DATE: 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO.: S10 OF S22		



**WINGWALL - WW2B**  
TOTAL WEIGHT = 5.9 TONS



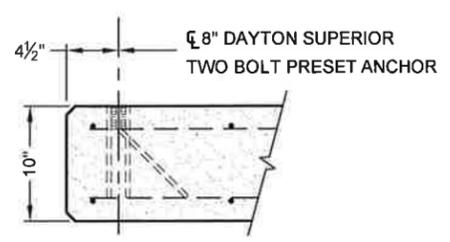
**REINFORCING DETAIL - WW2B**  
(FOR ANCHOR REINFORCING SEE SHEET S17)

Design calculations were not provided for these vertical bars in the design calculations, please provide.

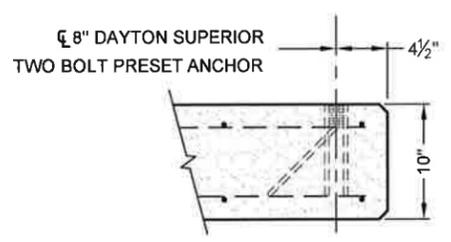
- NOTES:
- ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER
  - ELEVATION IS LOOKING AT BACK FACE OF WINGWALL
  - BACK FACE DENOTES ANCHOR SIDE OF WINGWALL
  - WINGWALL WILL NOT HANG LEVEL, ADJUST CABLE LENGTHS AS REQUIRED

WINGWALL		
CONCRETE	REINF. STEEL	WWF
28-DAY: 5000 PSI	60,000 PSI UNCOATED	65,000 PSI UNCOATED

WHEREVER THE REINFORCING IS CUT FOR THE PLACEMENT OF LIFT HOLES OR OTHER BLOCKOUTS, REINFORCING BARS OR WIRES OF EQUIVALENT CROSS-SECTIONAL AREA SHALL BE PLACED SYMMETRICALLY AROUND THE HOLE. AT LEAST ONE BAR MUST BE ON EACH SIDE OF THE HOLE, AND THE DEVELOPMENT LENGTH OF THE BAR MUST BE ACHIEVED ON EITHER SIDE OF THE CUT.



**SECTION 15**



**SECTION 16**

I:\MERLIN\PROJECTS\ACTIVE\468920\468920-10-COM\_SPAN\_O\_SERIES\DRAWINGS\FABRICATION\PRE-468920-010-CO-FAB-C.DWG 3/15/2016 9:20 AM

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1	3/16/2016	REVISIONS PER REVIEW COMMENTS	KDK

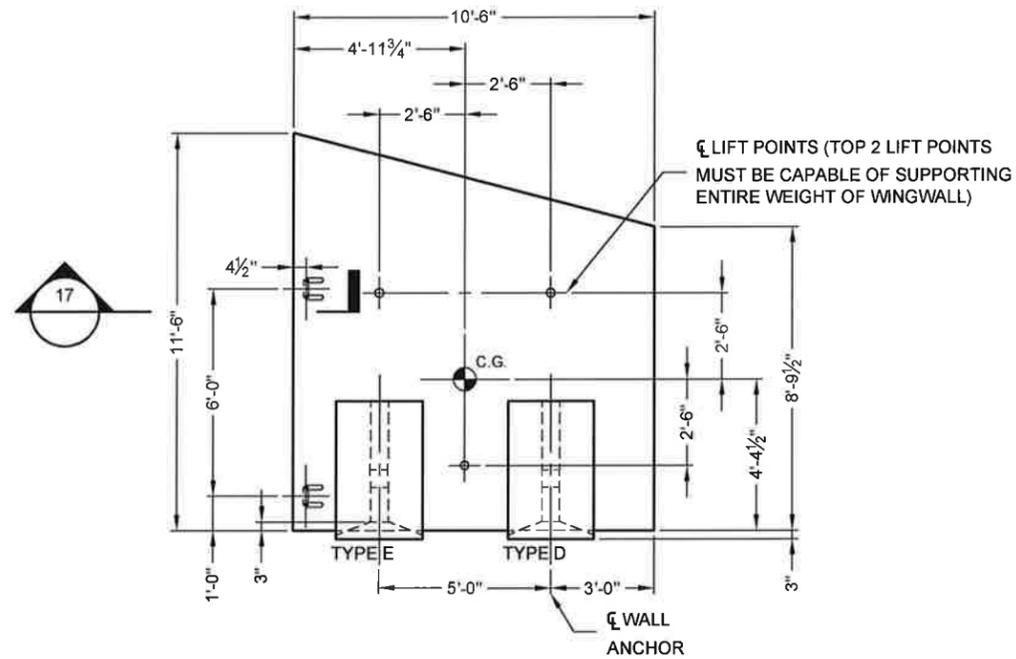
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**CONSPAN**  
SERIES  
FABRICATION  
DRAWING

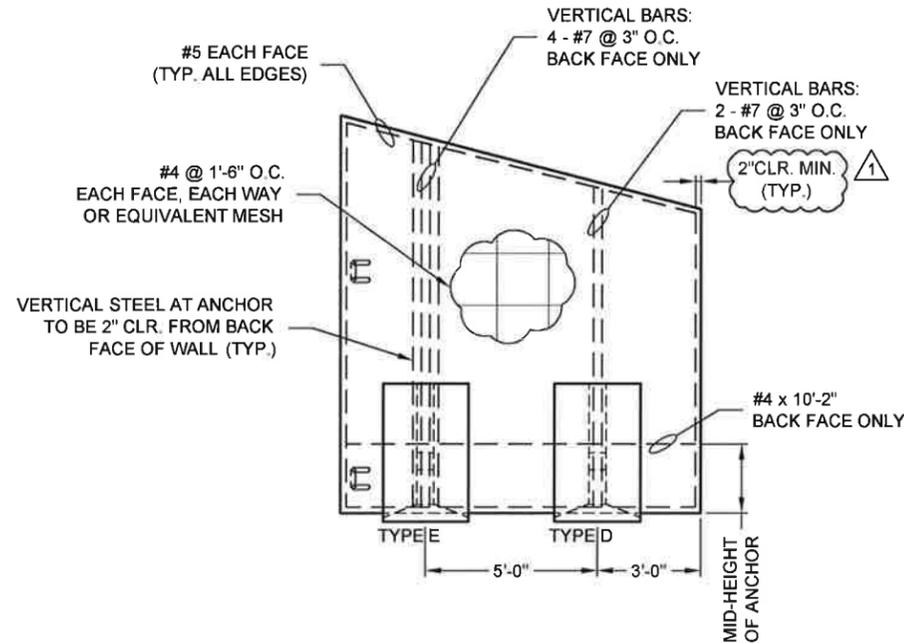
US ROUTE 2  
BRIDGE NO. 126  
TOWN OF LUNENBURG  
ESSEX COUNTY, VERMONT

PROJECT No: 468920	SEQ. No: 010	DATE: 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO.: <b>S11</b> OF <b>S22</b>		

NOTES:  
 - ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER  
 - ELEVATION IS LOOKING AT BACK FACE OF WINGWALL  
 - BACK FACE DENOTES ANCHOR SIDE OF WINGWALL  
 - WINGWALL WILL NOT HANG LEVEL. ADJUST CABLE LENGTHS AS REQUIRED



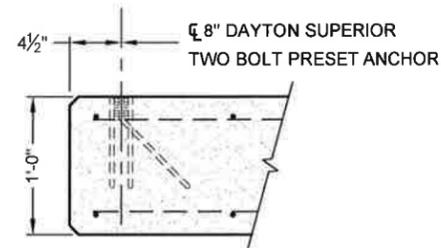
**WINGWALL - WW3A**  
 TOTAL WEIGHT = 10.2 TONS



**REINFORCING DETAIL - WW3A**  
 (FOR ANCHOR REINFORCING SEE SHEET S18)

WINGWALL		
CONCRETE	REINF. STEEL	WWF
28-DAY: 5000 PSI	60,000 PSI UNCOATED	65,000 PSI UNCOATED

WHEREVER THE REINFORCING IS CUT FOR THE PLACEMENT OF LIFT HOLES OR OTHER BLOCKOUTS, REINFORCING BARS OR WIRES OF EQUIVALENT CROSS-SECTIONAL AREA SHALL BE PLACED SYMMETRICALLY AROUND THE HOLE. AT LEAST ONE BAR MUST BE ON EACH SIDE OF THE HOLE, AND THE DEVELOPMENT LENGTH OF THE BAR MUST BE ACHIEVED ON EITHER SIDE OF THE CUT.



**SECTION** 17

I:\MERLIN\PROJECTS\ACTIVE\668920-10-CONV\_SPAN\_O\_SERIES\DRAWINGS\FABRICATION\PRE-468920-010-CC-FAB-C.DWG 3/16/2016 9:20 AM

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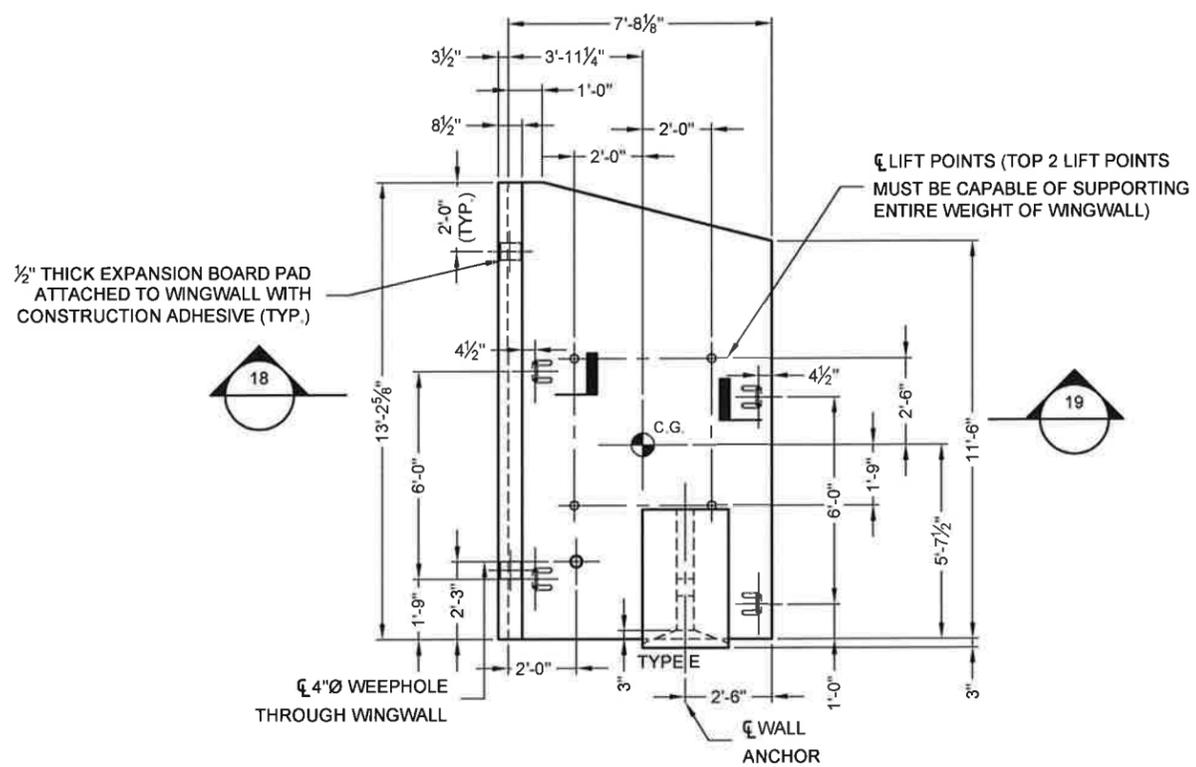
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 SERIES  
 FABRICATION  
 DRAWING

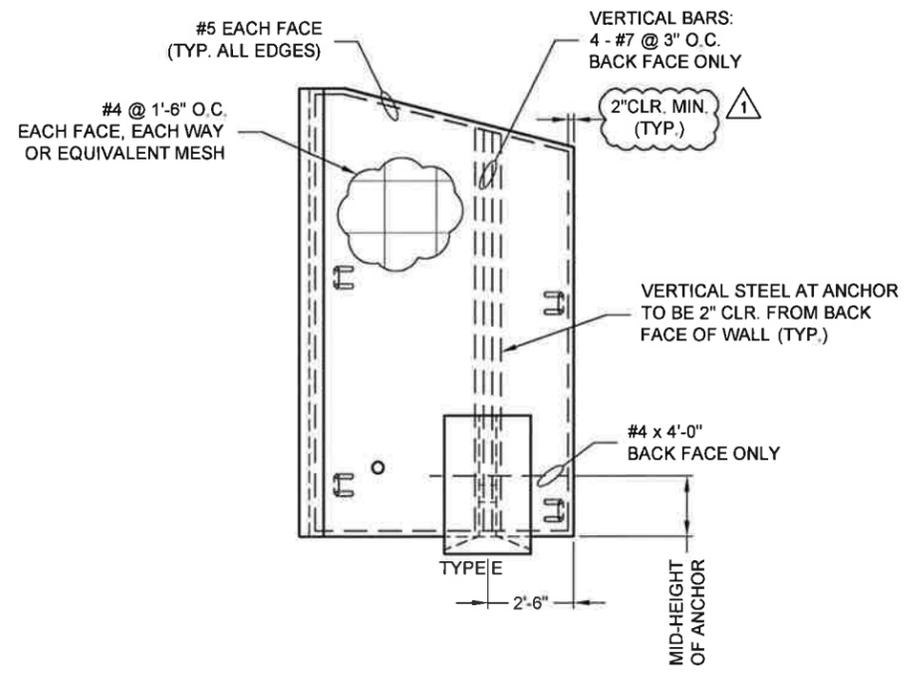
US ROUTE 2  
 BRIDGE NO. 126  
 TOWN OF LUNENBURG  
 ESSEX COUNTY, VERMONT

PROJECT No: 468920	SEQ. No.: 010	DATE: 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO.: S12 OF S22		

NOTES:  
 - ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER  
 - ELEVATION IS LOOKING AT BACK FACE OF WINGWALL  
 - BACK FACE DENOTES ANCHOR SIDE OF WINGWALL  
 - WINGWALL WILL NOT HANG LEVEL. ADJUST CABLE LENGTHS AS REQUIRED



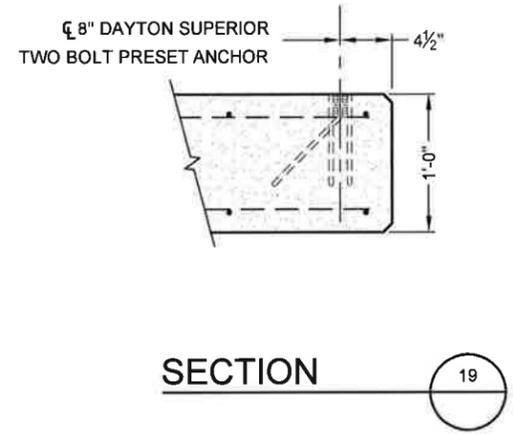
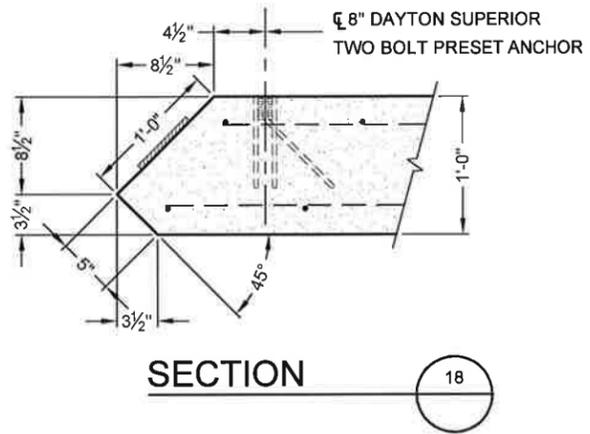
**WINGWALL - WW3B**  
 TOTAL WEIGHT = 8.3 TONS



**REINFORCING DETAIL - WW3B**  
 (FOR ANCHOR REINFORCING SEE SHEET S18)

WINGWALL		
CONCRETE	REINF. STEEL	WWF
28-DAY: 5000 PSI	60,000 PSI UNCOATED	65,000 PSI UNCOATED

WHEREVER THE REINFORCING IS CUT FOR THE PLACEMENT OF LIFT HOLES OR OTHER BLOCKOUTS, REINFORCING BARS OR WIRES OF EQUIVALENT CROSS-SECTIONAL AREA SHALL BE PLACED SYMMETRICALLY AROUND THE HOLE. AT LEAST ONE BAR MUST BE ON EACH SIDE OF THE HOLE, AND THE DEVELOPMENT LENGTH OF THE BAR MUST BE ACHIEVED ON EITHER SIDE OF THE CUT.



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1	3/16/2016	REVISIONS PER REVIEW COMMENTS	KDK

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**CONSPAN**  
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 FABRICATION  
 DRAWING

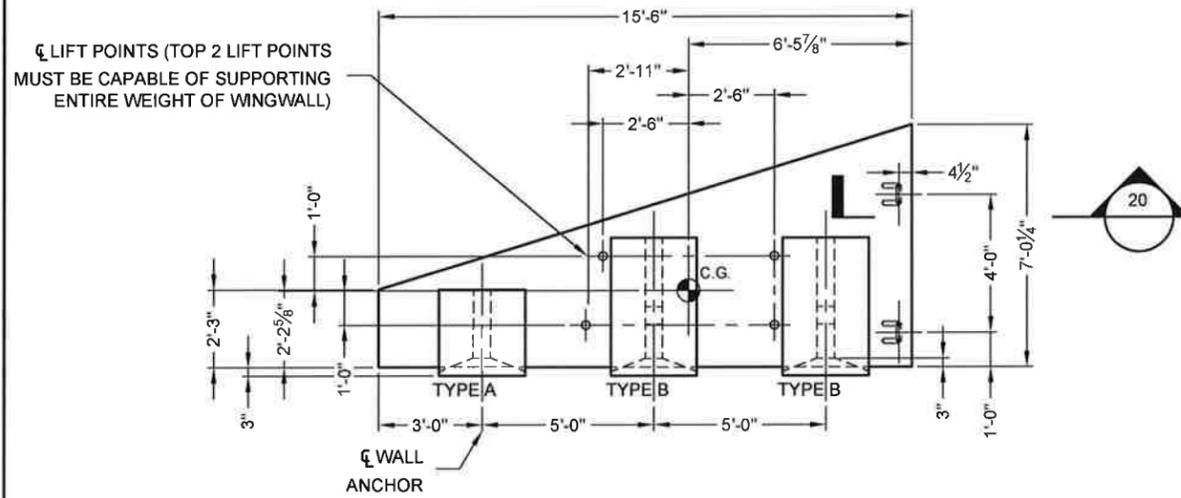
US ROUTE 2  
 BRIDGE NO. 126  
 TOWN OF LUNENBURG  
 ESSEX COUNTY, VERMONT

PROJECT No: 468920	SEQ. No: 010	DATE: 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO.: S13 OF S22		

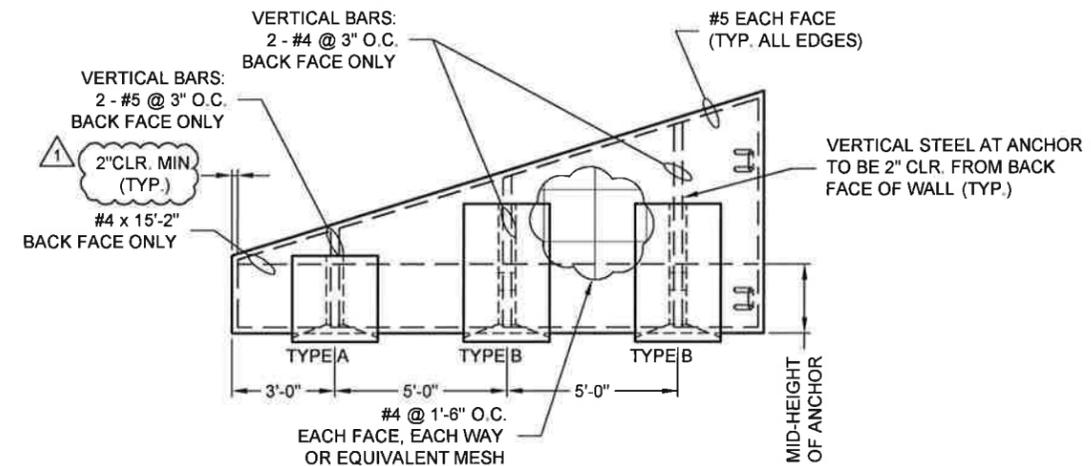
NOTES:  
 - ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER  
 - ELEVATION IS LOOKING AT BACK FACE OF WINGWALL  
 - BACK FACE DENOTES ANCHOR SIDE OF WINGWALL  
 - WINGWALL WILL NOT HANG LEVEL. ADJUST CABLE LENGTHS AS REQUIRED

WINGWALL		
CONCRETE	REINF. STEEL	WWF
28-DAY: 5000 PSI	60,000 PSI UNCOATED	65,000 PSI UNCOATED

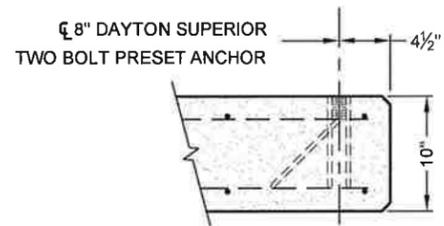
WHEREVER THE REINFORCING IS CUT FOR THE PLACEMENT OF LIFT HOLES OR OTHER BLOCKOUTS, REINFORCING BARS OR WIRES OF EQUIVALENT CROSS-SECTIONAL AREA SHALL BE PLACED SYMMETRICALLY AROUND THE HOLE. AT LEAST ONE BAR MUST BE ON EACH SIDE OF THE HOLE, AND THE DEVELOPMENT LENGTH OF THE BAR MUST BE ACHIEVED ON EITHER SIDE OF THE CUT.



**WINGWALL - WW4A**  
 TOTAL WEIGHT = 6.5 TONS



**REINFORCING DETAIL - WW4A**  
 (FOR ANCHOR REINFORCING SEE SHEET S16)



**SECTION**

I:\MERLIN\PROJECTS\ACTIVE\468920\10-COIN\_SPAN\_O\_SERIES\DRAWINGS\FABRICATION\PRE-468920-10-CO-FAB-C.DWG 3/16/2016 9:20 AM

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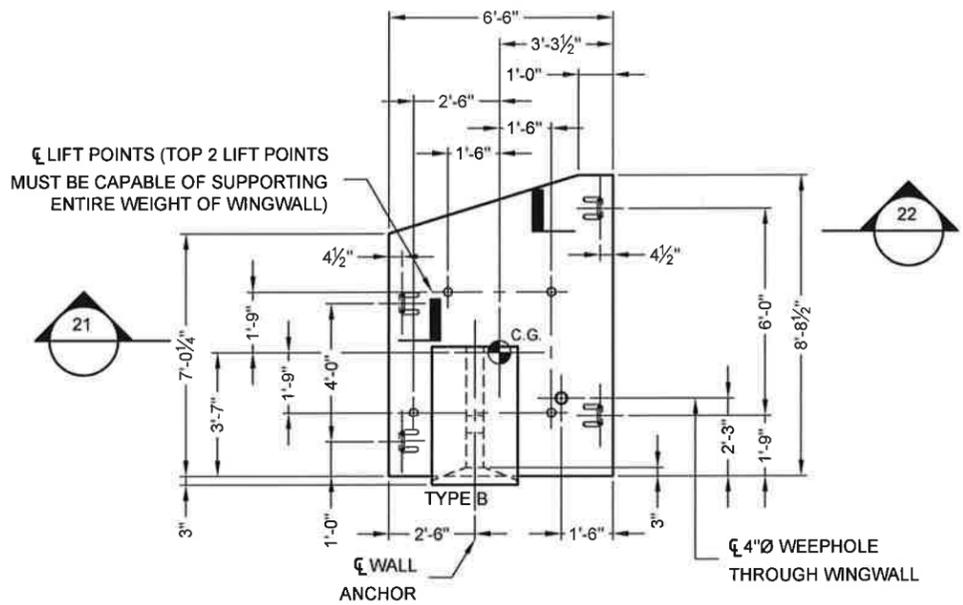
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 DRAWING

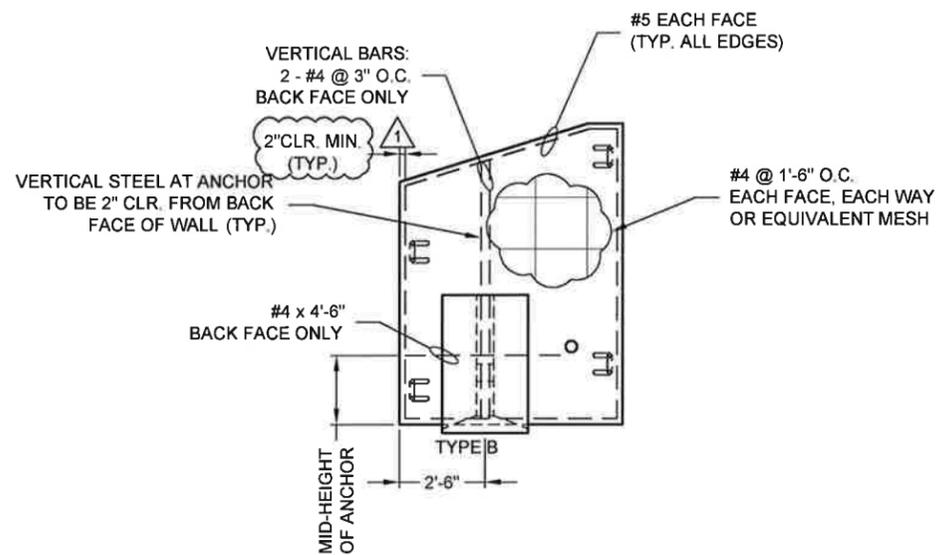
US ROUTE 2  
 BRIDGE NO. 126  
 TOWN OF LUNENBURG  
 ESSEX COUNTY, VERMONT

PROJECT No: 468920	SEQ. No.: 010	DATE: 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO.: S14 OF S22		

**NOTES:**  
 - ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER  
 - ELEVATION IS LOOKING AT BACK FACE OF WINGWALL  
 - BACK FACE DENOTES ANCHOR SIDE OF WINGWALL  
 - WINGWALL WILL NOT HANG LEVEL. ADJUST CABLE LENGTHS AS REQUIRED



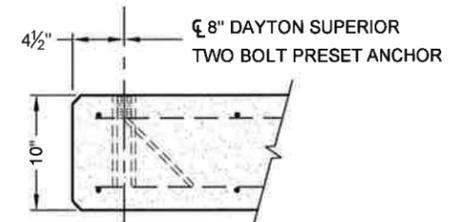
**WINGWALL - WW4B**  
 TOTAL WEIGHT = 4.0 TONS



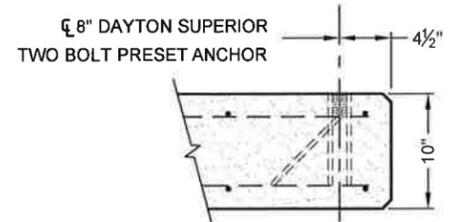
**REINFORCING DETAIL - WW4B**  
 (FOR ANCHOR REINFORCING SEE SHEET S16)

WINGWALL		
CONCRETE	REINF. STEEL	WWF
28-DAY: 5000 PSI	60,000 PSI UNCOATED	65,000 PSI UNCOATED

WHEREVER THE REINFORCING IS CUT FOR THE PLACEMENT OF LIFT HOLES OR OTHER BLOCKOUTS, REINFORCING BARS OR WIRES OF EQUIVALENT CROSS-SECTIONAL AREA SHALL BE PLACED SYMMETRICALLY AROUND THE HOLE. AT LEAST ONE BAR MUST BE ON EACH SIDE OF THE HOLE, AND THE DEVELOPMENT LENGTH OF THE BAR MUST BE ACHIEVED ON EITHER SIDE OF THE CUT.



**SECTION 21**



**SECTION 22**

I:\MERLIN\PROJECTS\ACTIVE\468920-10-CON\_SPAN\_O\_SERIES\DRAWINGS\FABRICATION\PRE-468920-10-CON-FAB-C.DWG 3/16/2016 9:20 AM

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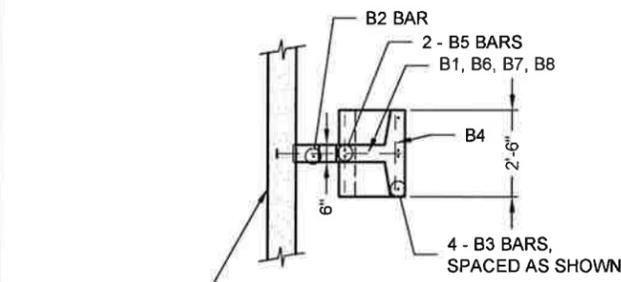
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**CONSPAN**  
 -SERIES  
 FABRICATION  
 DRAWING

US ROUTE 2  
 BRIDGE NO. 126  
 TOWN OF LUNENBURG  
 ESSEX COUNTY, VERMONT

PROJECT No: 468920	SEQ. No: 010	DATE: 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO.: <b>S15</b> OF <b>S22</b>		

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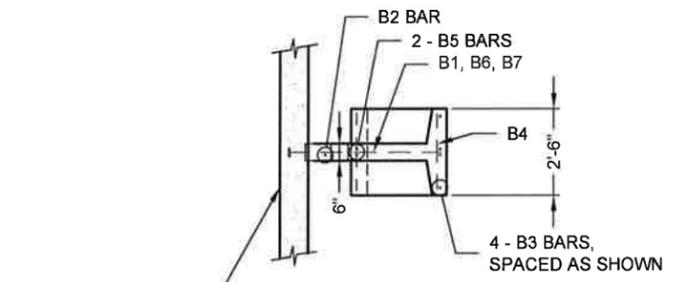


**PLAN - TYPE A**

FRONT FACE OF PRECAST WALL

BAR LIST - TYPE A						
MARK	QTY.	SIZE	A	TYPE	LENGTH	FINISH
B1	3	#6	3'-0"	3	---	EPOXY*
B2	1	#5	---	STR.	1'-8"	BLACK
B3	4	#5	---	STR.	2'-6"	BLACK
B4	6	#5	---	STR.	2'-2"	BLACK
B5	2	#5	2'-2"	2	---	BLACK
B6	1	#5	2'-2"	1	---	BLACK
B7	1	#5	2'-6"	1	---	BLACK
B8	1	#5	2'-9"	1	---	BLACK

NOTE: "STR." DENOTES STRAIGHT BAR. STANDARD CLEARANCE = 2"

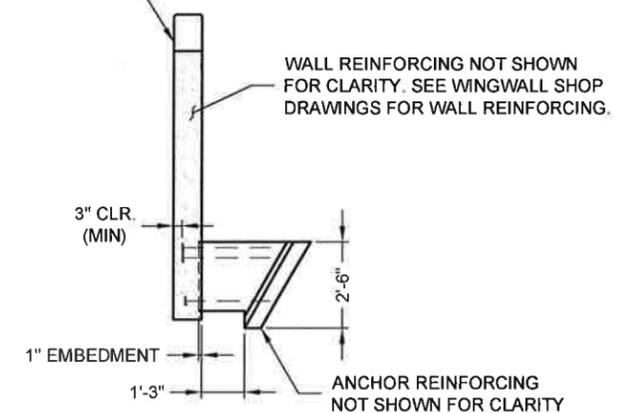


**PLAN - TYPE B**

FRONT FACE OF PRECAST WALL

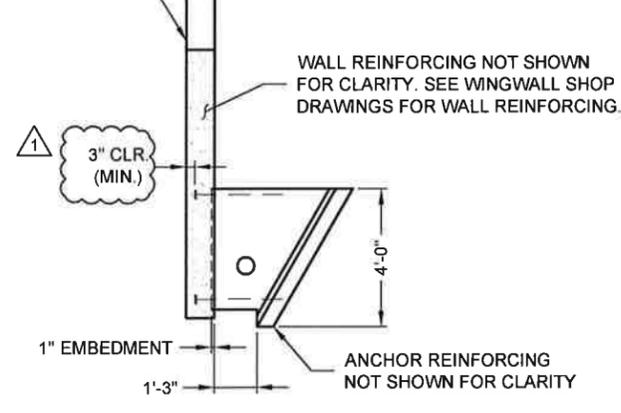
BAR LIST - TYPE B						
MARK	QTY.	SIZE	A	TYPE	LENGTH	FINISH
B1	2	#6	3'-0"	3	---	EPOXY*
B2	1	#5	---	STR.	3'-2"	BLACK
B3	4	#5	---	STR.	4'-3"	BLACK
B4	7	#5	---	STR.	2'-2"	BLACK
B5	2	#5	3'-8"	2	---	BLACK
B6	1	#5	2'-2"	1	---	BLACK
B7	1	#5	3'-7"	1	---	BLACK

NOTE: "STR." DENOTES STRAIGHT BAR. STANDARD CLEARANCE = 2"



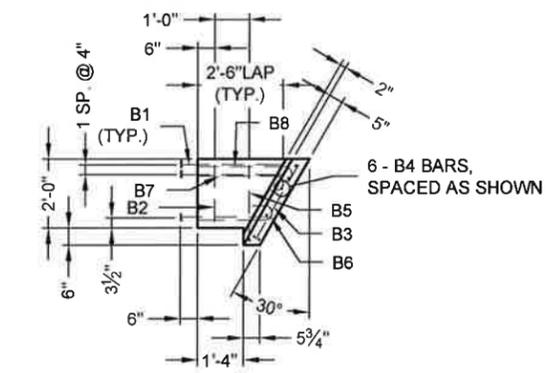
**SECTION - TYPE A**

10" THICK WINGWALL



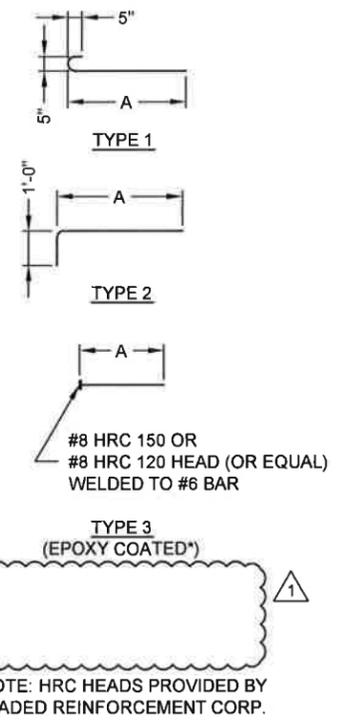
**SECTION - TYPE B**

10" THICK WINGWALL

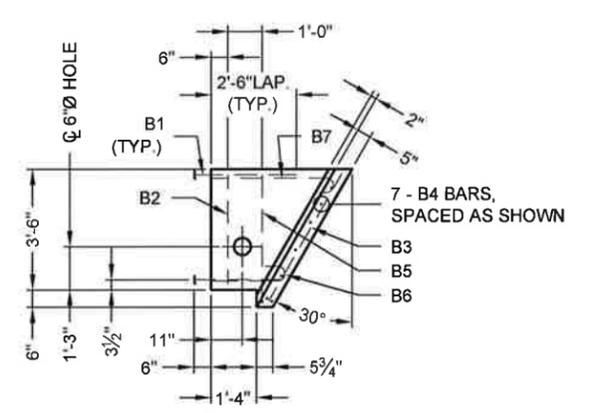


**PRECAST ANCHOR TYPE A**

TOTAL WEIGHT = .428 TONS



\*NOTE: HRC HEADS PROVIDED BY HEADED REINFORCEMENT CORP.



**PRECAST ANCHOR TYPE B**

TOTAL WEIGHT = .765 TONS

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1	3/16/2016	REVISIONS PER REVIEW COMMENTS	KDK

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**CONSPAN**  
SERIES  
FABRICATION DRAWING

US ROUTE 2  
BRIDGE NO. 126  
TOWN OF LUNENBURG  
ESSEX COUNTY, VERMONT

PROJECT No:	SEQ. No:	DATE:
468920	010	12/8/2015
DESIGNED:	DRAWN:	
KDK	TRL	
CHECKED:	APPROVED:	
JDR	PAC	
SHEET NO:		
S16 OF S22		

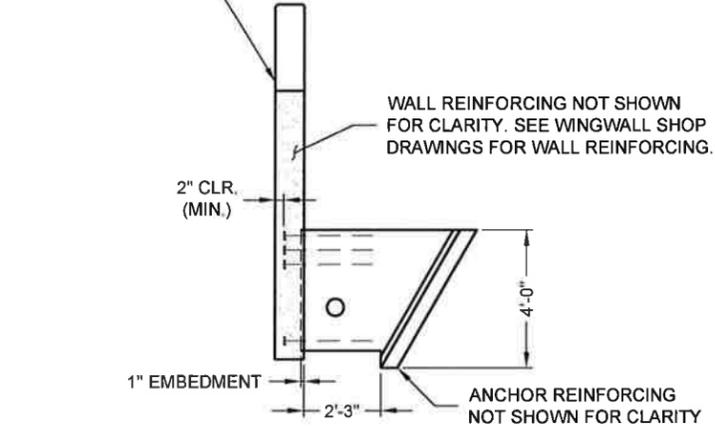
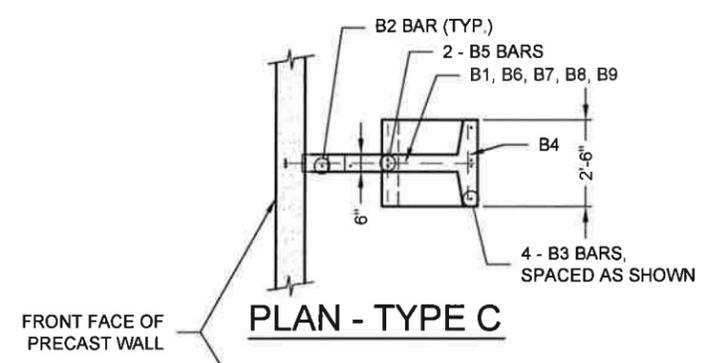
surface should be roughened to give mechanical bond between wall surface and fillet material. what is being used as the "fillet material"?

BAR LIST - TYPE C						
MARK	QTY.	SIZE	A	TYPE	LENGTH	FINISH
B1	4	#6	3'-0"	3	---	EPOXY*
B2	2	#5	---	STR.	3'-2"	BLACK
B3	4	#5	---	STR.	4'-3"	BLACK
B4	7	#5	---	STR.	2'-2"	BLACK
B5	2	#5	3'-8"	2	---	BLACK
B6	1	#5	3'-2"	1	---	BLACK
B7	1	#5	4'-2"	1	---	BLACK
B8	1	#5	4'-5"	1	---	BLACK
B9	1	#5	4'-8"	1	---	BLACK

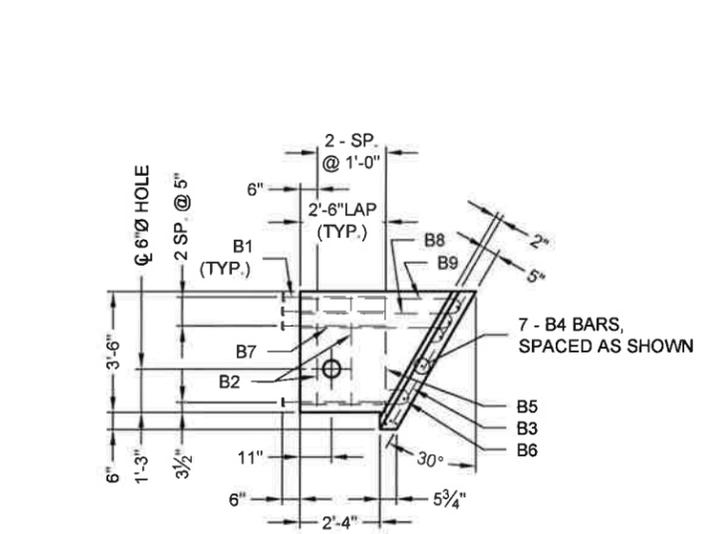
NOTE: "STR." DENOTES STRAIGHT BAR. STANDARD CLEARANCE = 2"

BAR LIST - TYPE D						
MARK	QTY.	SIZE	A	TYPE	LENGTH	FINISH
B1	7	#6	3'-0"	3	---	EPOXY*
B2	3	#5	---	STR.	3'-2"	BLACK
B3	4	#5	---	STR.	4'-3"	BLACK
B4	9	#5	---	STR.	2'-2"	BLACK
B5	2	#5	3'-8"	2	---	BLACK
B6	1	#5	4'-2"	1	---	BLACK
B7	1	#5	4'-8"	1	---	BLACK
B8	1	#5	4'-10"	1	---	BLACK
B9	1	#5	5'-1"	1	---	BLACK
B10	1	#5	5'-3"	1	---	BLACK
B11	1	#5	5'-5"	1	---	BLACK
B12	1	#5	5'-8"	1	---	BLACK

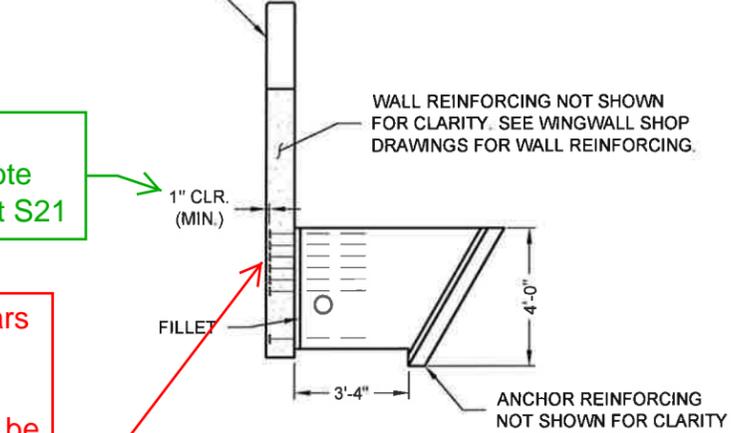
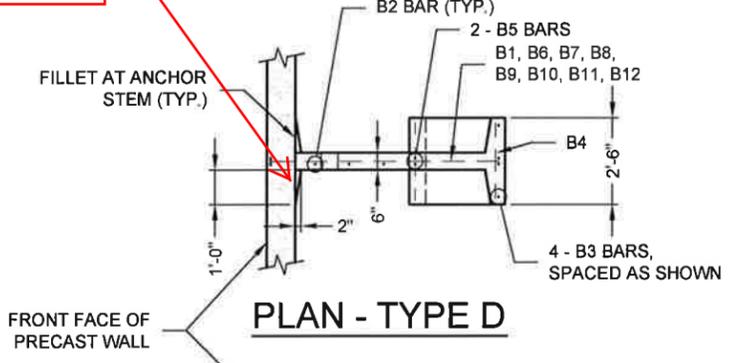
NOTE: "STR." DENOTES STRAIGHT BAR. STANDARD CLEARANCE = 2"



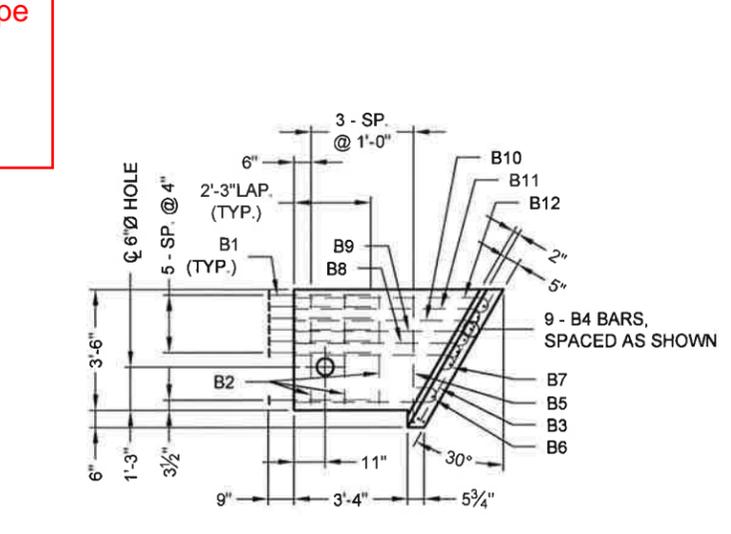
SECTION - TYPE C  
10" THICK WINGWALL



PRECAST ANCHOR TYPE C  
TOTAL WEIGHT = .896 TONS



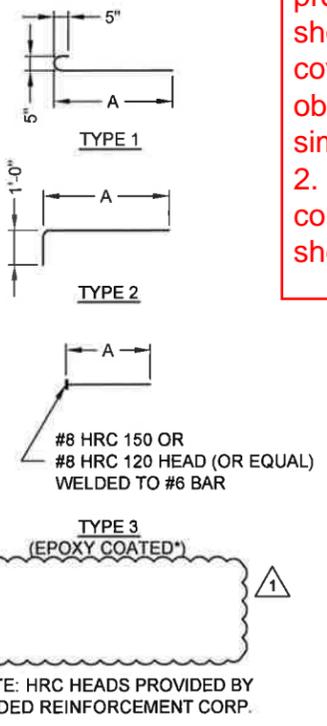
SECTION - TYPE D  
10" THICK WINGWALL WW2B



PRECAST ANCHOR TYPE D  
TOTAL WEIGHT = 1.028 TONS

Violates clear specified in note 4.2.3 on sheet S21

Could extra L bars be put in so that the button head protrusion could be shortened so more cover could be obtained? Bars similar to the Type 2. Same comments for sheet 18



\*NOTE: HRC HEADS PROVIDED BY HEADED REINFORCEMENT CORP.

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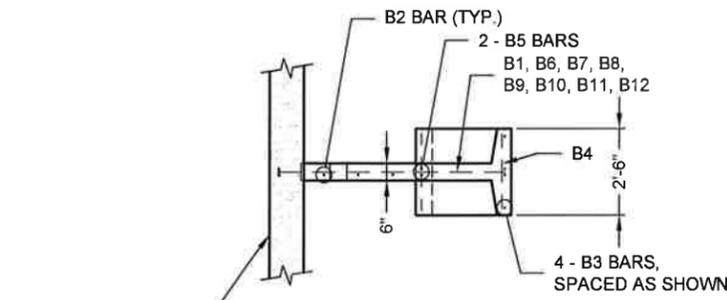
MARK	DATE	REVISION DESCRIPTION	BY
1	3/16/2016	REVISIONS PER REVIEW COMMENTS	KDK

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**CONSPAN**  
-SERIES-  
FABRICATION DRAWING

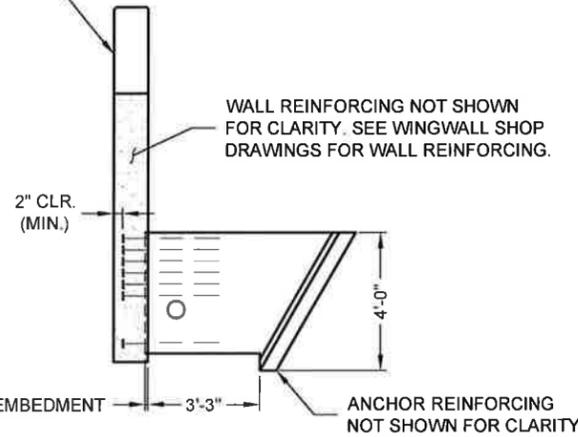
US ROUTE 2  
BRIDGE NO. 126  
TOWN OF LUNENBURG  
ESSEX COUNTY, VERMONT

PROJECT No:	SEQ. No.:	DATE:
468920	010	12/8/2015
DESIGNED:	DRAWN:	
KDK	TRL	
CHECKED:	APPROVED:	
JDR	PAC	
SHEET NO.:		
S17 OF S22		



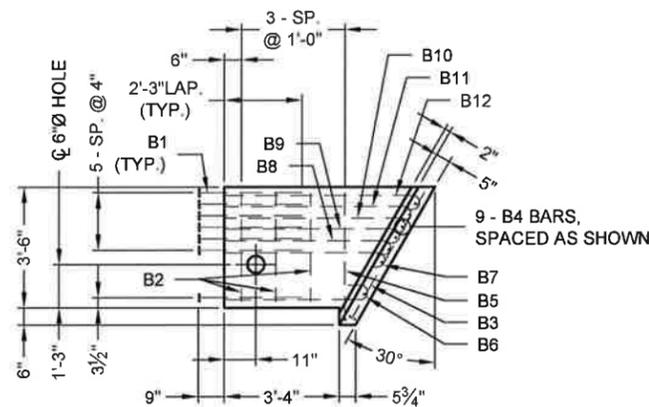
**PLAN - TYPE D**

FRONT FACE OF PRECAST WALL



**SECTION - TYPE D**

12" THICK WINGWALL WW3A



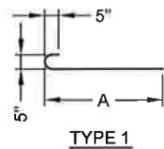
**PRECAST ANCHOR TYPE D**

TOTAL WEIGHT = 1.028 TONS

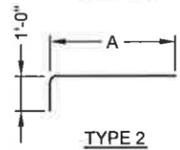
BAR LIST - TYPE D						
MARK	QTY.	SIZE	A	TYPE	LENGTH	FINISH
B1	7	#6	3'-0"	3	---	EPOXY*
B2	3	#5	---	STR.	3'-2"	BLACK
B3	4	#5	---	STR.	4'-3"	BLACK
B4	9	#5	---	STR.	2'-2"	BLACK
B5	2	#5	3'-8"	2	---	BLACK
B6	1	#5	4'-2"	1	---	BLACK
B7	1	#5	4'-8"	1	---	BLACK
B8	1	#5	4'-10"	1	---	BLACK
B9	1	#5	5'-1"	1	---	BLACK
B10	1	#5	5'-3"	1	---	BLACK
B11	1	#5	5'-5"	1	---	BLACK
B12	1	#5	5'-8"	1	---	BLACK

NOTE: "STR." DENOTES STRAIGHT BAR. STANDARD CLEARANCE = 2"

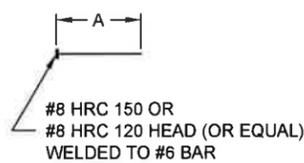
Violates clear specified in note 4.2.3 on sheet S21



TYPE 1

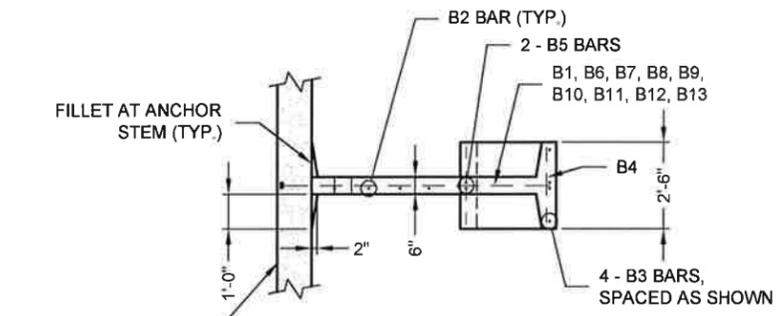


TYPE 2



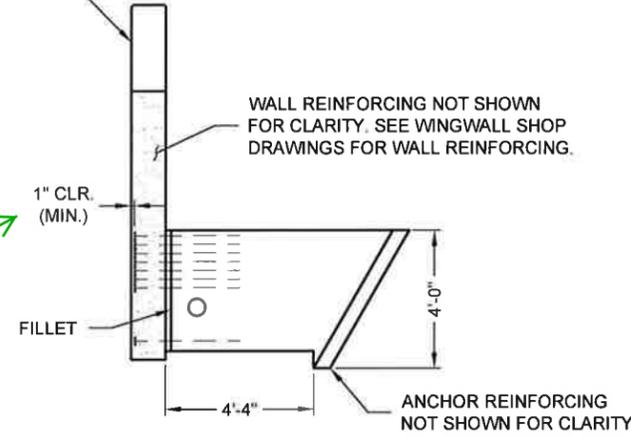
TYPE 3 (EPOXY COATED)

\*NOTE: HRC HEADS PROVIDED BY HEADED REINFORCEMENT CORP.



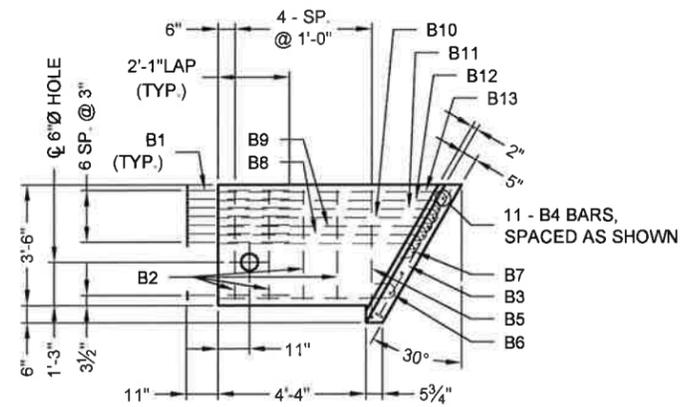
**PLAN - TYPE E**

FRONT FACE OF PRECAST WALL



**SECTION - TYPE E**

12" THICK WINGWALL



**PRECAST ANCHOR TYPE E**

TOTAL WEIGHT = 1.159 TONS

BAR LIST - TYPE E						
MARK	QTY.	SIZE	A	TYPE	LENGTH	FINISH
B1	8	#6	3'-0"	3	---	EPOXY*
B2	4	#5	---	STR.	3'-2"	BLACK
B3	4	#5	---	STR.	4'-3"	BLACK
B4	11	#5	---	STR.	2'-2"	BLACK
B5	2	#5	3'-8"	2	---	BLACK
B6	1	#5	5'-2"	1	---	BLACK
B7	1	#5	5'-9"	1	---	BLACK
B8	1	#5	5'-11"	1	---	BLACK
B9	1	#5	6'-1"	1	---	BLACK
B10	1	#5	6'-3"	1	---	BLACK
B11	1	#5	6'-5"	1	---	BLACK
B12	1	#5	6'-6"	1	---	BLACK
B13	1	#5	6'-8"	1	---	BLACK

NOTE: "STR." DENOTES STRAIGHT BAR. STANDARD CLEARANCE = 2"

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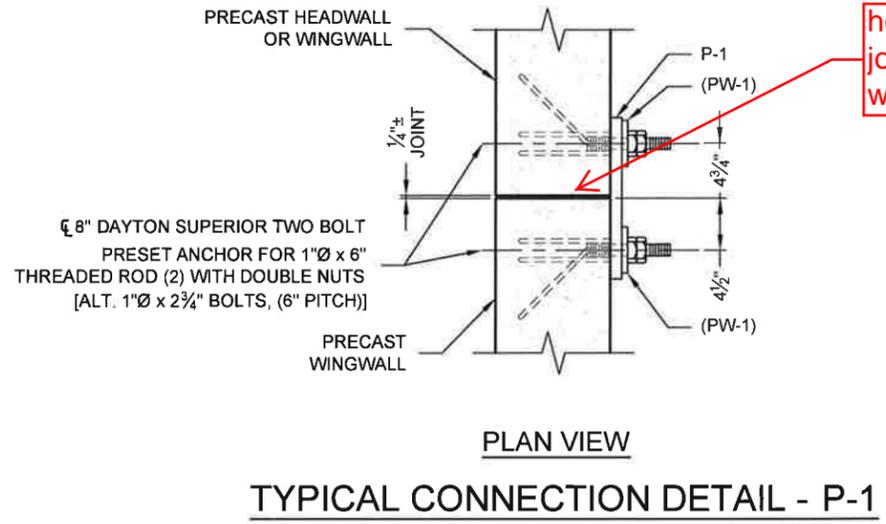
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DRAWING

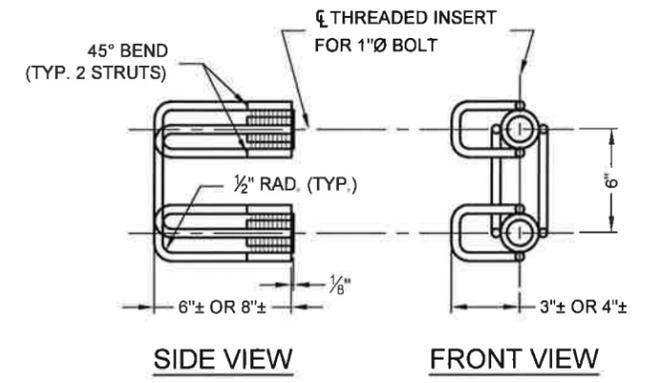
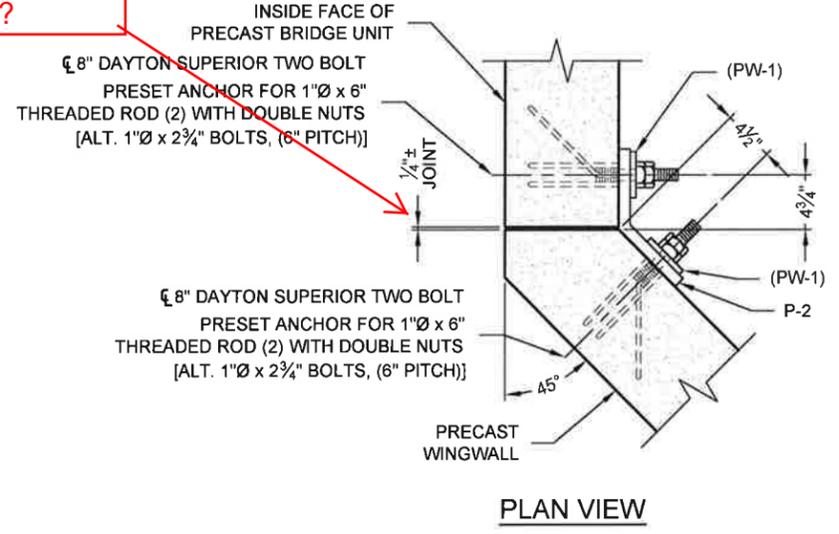
US ROUTE 2  
BRIDGE NO. 126  
TOWN OF LUNENBURG  
ESSEX COUNTY, VERMONT

PROJECT No:	SEQ. No:	DATE:
468920	010	12/8/2015
DESIGNED:	DRAWN:	
KDK	TRL	
CHECKED:	APPROVED:	
JDR	PAC	
SHEET NO:		
S18 OF S22		

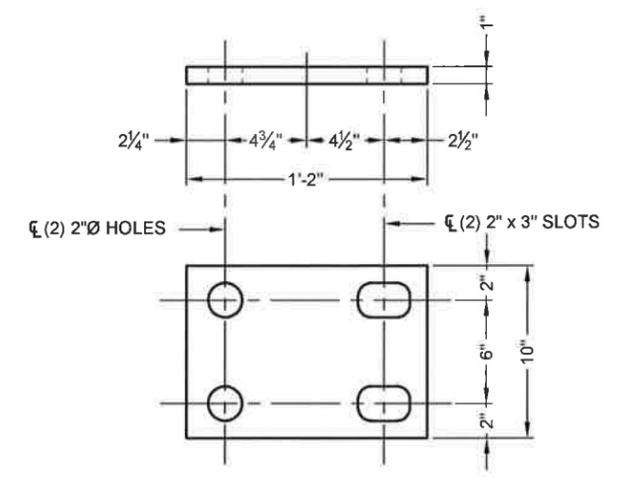
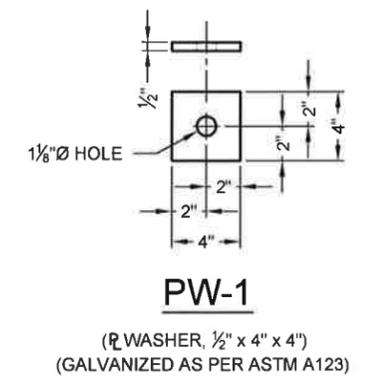
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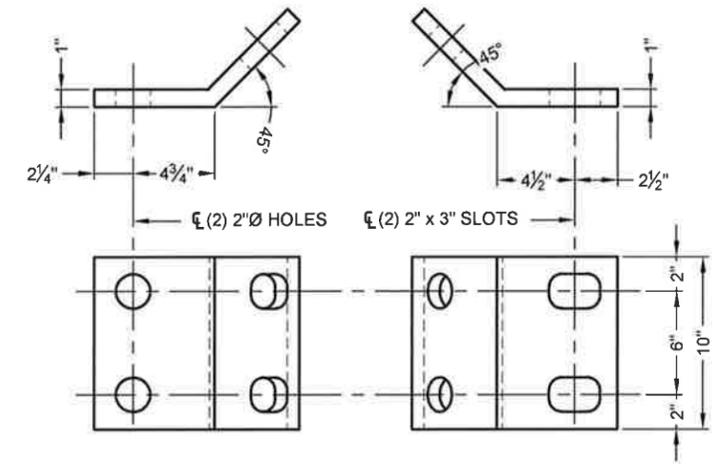
how are these joints being made water tight?



**DAYTON SUPERIOR TWO BOLT PRESET ANCHOR**



**PLATE P-1**  
TOTAL REQUIRED = 10  
(4) PW-1 REQ'D. PER PLATE



**P-2**  
(R, 1" x 14" x 10")  
(GALVANIZED AS PER ASTM A123)

**PLATE P-2**  
TOTAL REQUIRED = 4  
(4) PW-1 REQ'D. PER PLATE

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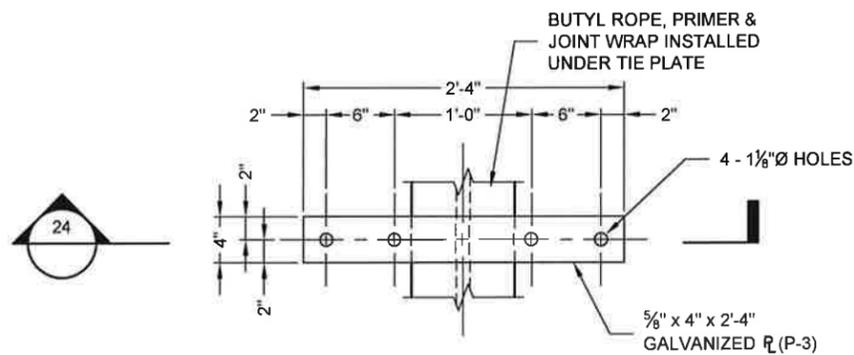
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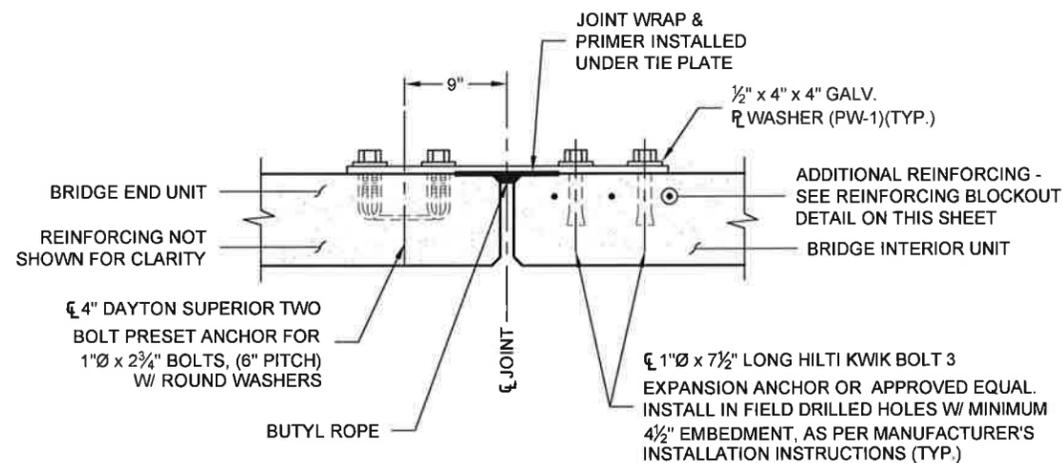
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DRAWING

US ROUTE 2  
BRIDGE NO. 126  
TOWN OF LUNENBURG  
ESSEX COUNTY, VERMONT

PROJECT No: 468920	SEQ. No.: 010	DATE: 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO.: S19 OF S22		

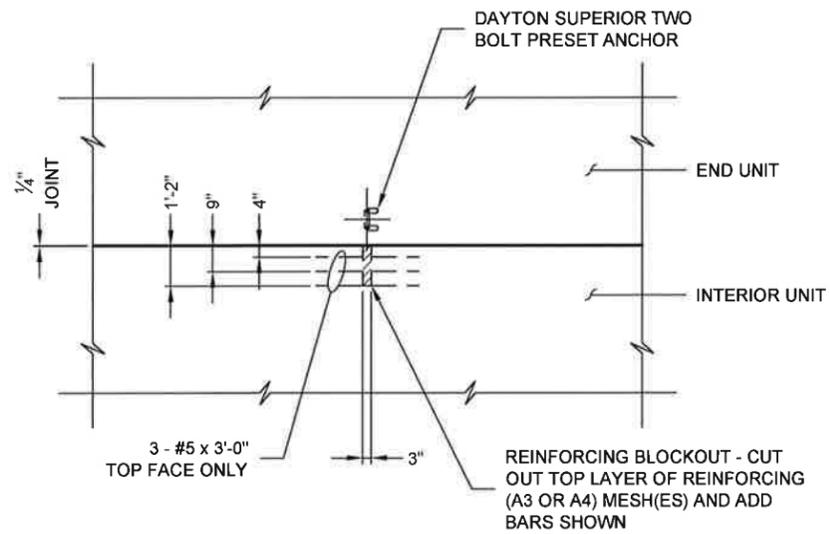


**DETAIL** 23  
S1

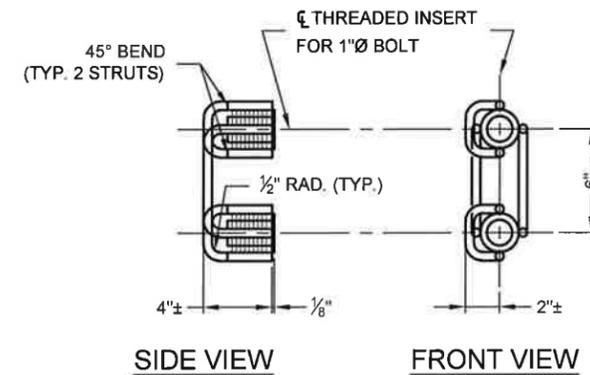


**SECTION** 24

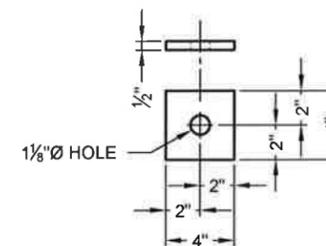
**PLATE P-3**  
TOTAL REQUIRED = 4  
(4) PW-1 REQ'D. PER PLATE



**REINFORCING BLOCKOUT DETAIL**



**DAYTON SUPERIOR TWO BOLT PRESET ANCHOR**



**PW-1**  
(PL WASHER, 1/2" x 4" x 4")  
(GALVANIZED AS PER ASTM A123)

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US ROUTE 2  
BRIDGE NO. 126  
TOWN OF LUNENBURG  
ESSEX COUNTY, VERMONT

PROJECT No.: 468920	SEQ. No.: 010	DATE: 12/8/2015
DESIGNED: KDK	DRAWN: TRL	
CHECKED: JDR	APPROVED: PAC	
SHEET NO.: S20 OF S22		



# SPECIFICATIONS FOR MANUFACTURE AND INSTALLATION OF CON/SPAN® O-SERIES BRIDGE SYSTEMS (CONT'D)

**11. MARKING**  
EACH BRIDGE UNIT SHALL BE CLEARLY MARKED BY WATERPROOF PAINT. THE FOLLOWING SHALL BE SHOWN ON THE INSIDE OF THE VERTICAL LEG OF THE BRIDGE SECTION:  
BRIDGE SPAN x BRIDGE RISE  
DATE OF MANUFACTURE  
NAME OR TRADEMARK OF THE MANUFACTURER

**12. INSTALLATION PREPARATION**  
TO ENSURE CORRECT INSTALLATION OF THE PRECAST CONCRETE BRIDGE SYSTEM, CARE AND CAUTION MUST BE EXERCISED IN FORMING THE SUPPORT AREAS FOR BRIDGE UNITS, HEADWALL, AND WINGWALL ELEMENTS. EXERCISING SPECIAL CARE WILL FACILITATE THE RAPID INSTALLATION OF THE PRECAST COMPONENTS.

**12.1. FOOTINGS**  
DO NOT OVER EXCAVATE FOUNDATIONS UNLESS DIRECTED BY SITE SOIL ENGINEER TO REMOVE UNSUITABLE SOIL.

THE SITE SOILS ENGINEER SHALL CERTIFY THAT THE BEARING CAPACITY MEETS OR EXCEEDS THE FOOTING DESIGN REQUIREMENTS, PRIOR TO THE CONTRACTOR POURING OF THE FOOTINGS.

THE BRIDGE UNITS AND WINGWALLS SHALL BE INSTALLED ON EITHER PRECAST OR CAST-IN-PLACE CONCRETE FOOTINGS. THE SIZE AND ELEVATION OF THE FOOTINGS SHALL BE AS DESIGNED BY THE ENGINEER. A KEYWAY SHALL BE FORMED IN THE TOP SURFACE OF THE BRIDGE FOOTING AS SPECIFIED ON THE PLANS. NO KEYWAY IS REQUIRED IN THE WINGWALL FOOTINGS, UNLESS OTHERWISE SPECIFIED ON THE PLANS.

THE FOOTINGS SHALL BE GIVEN A SMOOTH FLOAT FINISH AND SHALL REACH A COMPRESSIVE STRENGTH OF 2,000 PSI BEFORE PLACEMENT OF THE BRIDGE AND WINGWALL ELEMENTS. BACKFILLING SHALL NOT BEGIN UNTIL THE FOOTING HAS REACHED THE FULL DESIGN COMPRESSIVE STRENGTH.

THE FOOTING SURFACE SHALL BE CONSTRUCTED IN ACCORDANCE WITH GRADES SHOWN ON THE PLANS. WHEN TESTED WITH A 10'-0" STRAIGHT EDGE, THE SURFACE SHALL NOT VARY MORE THAN 1/4" IN 10'-0".

IF A PRECAST CONCRETE FOOTING IS USED, THE CONTRACTOR SHALL PREPARE A 4" THICK BASE LAYER OF COMPACTED GRANULAR MATERIAL THE FULL WIDTH OF THE FOOTING PRIOR TO PLACING THE PRECAST FOOTING.

THE FOUNDATIONS FOR PRECAST CONCRETE BRIDGE ELEMENTS AND WINGWALLS MUST BE CONNECTED BY REINFORCEMENT TO FORM ONE MONOLITHIC BODY. EXPANSION JOINTS SHALL NOT BE USED.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONSTRUCTION OF THE FOUNDATIONS PER THE PLANS AND SPECIFICATIONS.

**13. INSTALLATION**

**13.1. GENERAL** - THE INSTALLATION OF THE PRECAST CONCRETE ELEMENTS SHALL BE AS EXPLAINED IN THE PUBLICATION CON/SPAN BRIDGE SYSTEMS INSTALLATION HANDBOOK

**13.1.1. LIFTING** - IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT A CRANE OF THE CORRECT LIFTING CAPACITY IS AVAILABLE TO HANDLE THE PRECAST CONCRETE UNITS. THIS CAN BE ACCOMPLISHED BY USING THE WEIGHTS GIVEN FOR THE PRECAST CONCRETE COMPONENTS AND BY DETERMINING THE LIFTING REACH FOR EACH CRANE UNIT. SITE CONDITIONS MUST BE CHECKED WELL IN ADVANCE OF SHIPPING TO ENSURE PROPER CRANE LOCATION AND TO AVOID ANY LIFTING RESTRICTIONS. THE LIFT ANCHORS OR HOLES PROVIDED IN EACH UNIT ARE THE ONLY MEANS TO BE USED TO LIFT THE ELEMENTS. THE PRECAST CONCRETE ELEMENTS MUST NOT BE SUPPORTED OR RAISED BY OTHER MEANS THAN THOSE GIVEN IN THE MANUALS AND DRAWINGS WITHOUT WRITTEN APPROVAL FROM CONTECH® ENGINEERED SOLUTIONS.

**13.1.2. CONSTRUCTION EQUIPMENT WEIGHT RESTRICTIONS** - IN NO CASE SHALL EQUIPMENT OPERATING IN EXCESS OF THE DESIGN LOAD (HL-93) BE PERMITTED OVER THE BRIDGE UNITS UNLESS APPROVED BY CONTECH® ENGINEERED SOLUTIONS.

**13.1.2.1. IN THE IMMEDIATE AREA OF THE BRIDGE UNITS, THE FOLLOWING RESTRICTIONS FOR THE USE OF HEAVY CONSTRUCTION MACHINERY DURING BACKFILLING OPERATIONS APPLY:**

- NO CONSTRUCTION EQUIPMENT SHALL CROSS THE BARE PRECAST CONCRETE BRIDGE UNIT.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF 4" OVER THE CROWN OF THE BRIDGE, CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 10 TONS MAY CROSS THE BRIDGE.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF 1'-0" OVER THE CROWN OF THE BRIDGE, CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 30 TONS MAY CROSS THE BRIDGE.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED THE DESIGN COVER, OR 2'-0" MINIMUM, OVER THE CROWN OF THE PRECAST CONCRETE BRIDGE, CONSTRUCTION EQUIPMENT WITHIN THE DESIGN LOAD LIMITS FOR THE ROAD MAY CROSS THE PRECAST CONCRETE BRIDGE.

**13.2. LEVELING PADS/SHIMS** - THE BRIDGE UNITS AND WINGWALLS SHALL BE SET ON HARDBOARD SHIMS CONFORMING TO ASTM D1037 OR PLASTIC SHIMS (DAYTON SUPERIOR P-80, P-81 OR APPROVED EQUAL) MEASURING 5" x 5" MINIMUM, UNLESS SHOWN OTHERWISE ON THE PLANS. A MINIMUM GAP OF 1/2" SHALL BE PROVIDED BETWEEN THE FOOTING AND THE BOTTOM OF THE BRIDGE'S

VERTICAL LEGS OR THE BOTTOM OF THE WINGWALL. ALSO, A SUPPLY OF 1/2", 3/4" AND 1" THICK HARDBOARD OR PLASTIC SHIMS FOR VARIOUS SHIMMING PURPOSES SHALL BE ON SITE.

**13.3. PLACEMENT OF BRIDGE UNITS** - THE BRIDGE UNITS SHALL BE PLACED AS SHOWN ON THE ENGINEER'S PLAN DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE. THE JOINT WIDTH BETWEEN ADJACENT PRECAST UNITS SHALL NOT EXCEED 1/4".

**13.4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE STRUCTURE SPAN DURING ALL PHASES OF INSTALLATION.** DUE TO THE ARCH SHAPE, BRIDGE ELEMENTS WILL TEND TO SPREAD UNDER SELF-WEIGHT. IT IS IMPERATIVE THAT ANY LATERAL SPREADING OF THE BRIDGE ELEMENTS BE AVOIDED DURING AND AFTER THEIR PLACEMENT. GENERALLY, HORIZONTAL CABLE TIES OR TIE RODS ARE SHIPPED IN THE LARGER BRIDGE ELEMENTS TO ASSIST IN PREVENTING THIS SPREADING. CABLE TIES/TIE RODS SHALL NOT BE REMOVED UNTIL BRIDGE UNITS ARE GROUTED AND GROUT HAS CURED. IT IS RECOMMENDED THAT TEMPORARY HARDWOOD BLOCKS BE USED IN CONJUNCTION WITH THE CABLE TIES/TIE RODS TO MAINTAIN SPAN. IF, HOWEVER, DUE TO SITE RESTRICTIONS, THESE CABLE TIES/TIE RODS MUST BE REMOVED PRIOR TO PLACEMENT OF THE BRIDGE ELEMENTS, THE CONTRACTOR MUST NOTIFY CONTECH (MANUFACTURER) AND REQUEST A SUGGESTED INSTALLATION PROCEDURE.

IN ADDITION, IF THE CABLE TIES/TIE RODS MUST BE REMOVED PRIOR TO SETTING ARCH UNITS, THE FOLLOWING QUALITY CONTROL PROCEDURE MUST BE FOLLOWED:

- 1) FIND "MEASURED SPAN" UPON ARCH UNIT'S DELIVERY TO SITE. PRIOR TO LIFTING FROM TRUCK AND REMOVING CABLE TIES/TIE RODS, "MEASURED SPAN" SHALL BE THE AVERAGE OF (3) SPAN MEASUREMENTS ALONG THE LAY LENGTH OF THE ARCH UNIT.
- 2) AFTER SETTING OF BRIDGE UNIT ON THE FOUNDATION, VERIFY THE SPAN. THIS "INSTALLED SPAN MEASUREMENT" SHALL NOT EXCEED THE MAXIMUM OF:
  - A) THE NOMINAL SPAN + 1/2" OR
  - B) THE "MEASURED SPAN"
 IF THE "INSTALLED SPAN MEASUREMENT" EXCEEDS THIS AMOUNT, THE ARCH UNIT SHALL BE LIFTED AND RE-SET UNTIL THE "INSTALLED SPAN MEASUREMENT" MEETS THE LIMITS.

**13.5. PLACEMENT OF WINGWALLS, HEADWALLS AND FOUNDATION UNITS** - THE WINGWALLS, HEADWALLS AND FOUNDATIONS SHALL BE PLACED AS SHOWN ON THE PLAN DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE.

**13.6. WATERPROOFING/JOINT PROTECTION AND SUBSURFACE DRAINAGE**

**13.6.1. EXTERNAL PROTECTION OF JOINTS** - THE BUTT JOINT MADE BY TWO ADJOINING BRIDGE UNITS SHALL BE COVERED WITH A 7/8" x 1 1/2" PREFORMED BITUMINOUS JOINT SEALANT AND A MINIMUM OF A 9" WIDE JOINT WRAP. THE SURFACE SHALL BE FREE OF DIRT BEFORE APPLYING THE JOINT MATERIAL. A PRIMER COMPATIBLE WITH THE JOINT WRAP TO BE USED SHALL BE APPLIED FOR A MINIMUM WIDTH OF 9" ON EACH SIDE OF THE JOINT. THE EXTERNAL WRAP SHALL BE CS212 BY CONCRETE SEALANTS INC., EZ-WRAP RUBBER BY PRESS-SEAL GASKET CORPORATION, SEAL WRAP BY MAR MAC MANUFACTURING CO. INC. OR APPROVED EQUAL. THE JOINT SHALL BE COVERED CONTINUOUSLY FROM THE BOTTOM OF ONE BRIDGE SECTION TO THE TOP OF THE BRIDGE AND TO THE OPPOSITE BRIDGE SECTION LEG. ANY LAPS THAT RESULT IN THE JOINT WRAP SHALL BE A MINIMUM OF 6" LONG WITH THE OVERLAP RUNNING DOWNHILL.

**13.6.2. IN ADDITION TO THE JOINTS BETWEEN BRIDGE UNITS, THE JOINT BETWEEN THE END BRIDGE UNIT AND THE HEADWALL SHALL ALSO BE SEALED AS DESCRIBED ABOVE. IF PRECAST WINGWALLS ARE USED, THE JOINT BETWEEN THE END BRIDGE UNIT AND THE WINGWALL SHALL BE SEALED WITH A 2'-0" STRIP OF FILTER FABRIC. ALSO, IF LIFT HOLES ARE FORMED IN THE BRIDGE UNITS, THEY SHALL BE PRIMED AND COVERED WITH A 9" x 9" SQUARE OF JOINT WRAP.**

**13.6.3. DURING THE BACKFILLING OPERATION, CARE SHALL BE TAKEN TO KEEP THE JOINT WRAP IN ITS PROPER LOCATION OVER THE JOINT.**

**13.6.4. SUBSOIL DRAINAGE SHALL BE AS DIRECTED BY THE ENGINEER.**

**13.7. GROUTING**

**13.7.1. GROUTING SHALL NOT BE PERFORMED WHEN TEMPERATURES ARE EXPECTED TO GO BELOW 35° FOR A PERIOD OF 72 HOURS.** FILL THE BRIDGE-FOUNDATION KEYWAY WITH CEMENT GROUT (PORTLAND CEMENT AND WATER OR CEMENT MORTAR COMPOSED OF PORTLAND CEMENT, SAND AND WATER) WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI. VIBRATE AS REQUIRED TO ENSURE THAT THE ENTIRE KEY AROUND THE BRIDGE ELEMENT IS COMPLETELY FILLED. IF BRIDGE ELEMENTS HAVE BEEN SET WITH TEMPORARY TIES (CABLES, BARS, ETC.) GROUT MUST ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI BEFORE TIES MAY BE REMOVED.

**13.7.2. ALL GROUT SHALL HAVE A MAXIMUM AGGREGATE SIZE OF 1/4".**

**13.7.3. LIFTING AND ERECTION ANCHOR RECESSES SHALL BE FILLED WITH GROUT.**

**13.7.4. AFTER GROUT HAS REACHED ITS DESIGN STRENGTH THE TEMPORARY HARDWOOD WEDGES SHALL BE REMOVED AND THEIR HOLES FILLED WITH GROUT.**

**13.8. BACKFILL**

**13.8.1. DO NOT PERFORM BACKFILLING DURING WET OR FREEZING WEATHER.**

**13.8.2. NO BACKFILL SHALL BE PLACED AGAINST ANY STRUCTURAL ELEMENTS UNTIL THEY HAVE BEEN APPROVED BY THE ENGINEER.**

**13.8.3. BACKFILL SHALL BE CONSIDERED AS ALL REPLACED EXCAVATION AND NEW EMBANKMENT ADJACENT TO THE PRECAST CONCRETE ELEMENTS.** THE PROJECT CONSTRUCTION AND MATERIAL SPECIFICATIONS, WHICH INCLUDE THE SPECIFICATIONS FOR EXCAVATION FOR STRUCTURES AND ROADWAY EXCAVATION AND EMBANKMENT CONSTRUCTION, SHALL APPLY EXCEPT AS MODIFIED IN THIS SECTION.

**13.8.4. BACKFILL ZONES:**

- IN-SITU SOIL
- ZONE A: CONSTRUCTED EMBANKMENT OR OVERFILL.
- ZONE B: FILL THAT IS DIRECTLY ASSOCIATED WITH PRECAST CONCRETE BRIDGE INSTALLATION.
- ZONE C: ROAD STRUCTURE.

**13.8.5. REQUIRED BACKFILL PROPERTIES**

**13.8.5.1. IN-SITU SOIL** - NATURAL GROUND IS TO BE SUFFICIENTLY STABLE TO ALLOW EFFECTIVE SUPPORT TO THE PRECAST CONCRETE BRIDGE UNITS. AS A GUIDE, THE EXISTING NATURAL GROUND SHOULD BE OF SIMILAR QUALITY AND DENSITY TO ZONE B MATERIAL FOR MINIMUM LATERAL DIMENSION OF ONE BRIDGE SPAN OUTSIDE OF THE BRIDGE FOOTING.

**13.8.5.2. ZONE A** - ZONE A REQUIRES FILL MATERIAL WITH SPECIFICATIONS AND COMPACTING PROCEDURES EQUAL TO THAT FOR NORMAL ROAD EMBANKMENTS.

**13.8.5.3. ZONE B** - GENERALLY, SOILS SHALL BE REASONABLY FREE OF ORGANIC MATTER, AND, NEAR CONCRETE SURFACES, FREE OF STONES LARGER THAN 3" IN DIAMETER SEE CHARTS FOR DETAILED DESCRIPTIONS OF ACCEPTABLE SOILS.

**13.8.5.4. ZONE C** - ZONE C IS THE ROAD SECTION OF GRAVEL, ASPHALT OR CONCRETE BUILT IN COMPLIANCE WITH LOCAL ENGINEERING PRACTICES.

**13.8.5.5. GEOTECHNICAL ENGINEER SHALL REVIEW GRADATIONS OF ALL INTERFACING MATERIALS AND, IF NECESSARY, RECOMMEND GEOTEXTILE FILTER FABRIC (PROVIDED BY CONTRACTOR)**

**13.8.6. PLACING AND COMPACTING BACKFILL** DUMPING FOR BACKFILLING IS NOT ALLOWED ANY NEARER THAN 3'-0" FROM THE BRIDGE LEG.

THE FILL MUST BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8". THE MAXIMUM DIFFERENCE IN THE SURFACE LEVELS OF THE FILL ON OPPOSITE SIDES OF THE BRIDGE MUST NOT EXCEED 2'-0".

THE FILL BEHIND WINGWALLS MUST BE PLACED AT THE SAME TIME AS THAT OF THE BRIDGE FILL. IT MUST BE PLACED IN PROGRESSIVELY PLACED HORIZONTAL LAYERS NOT EXCEEDING 8" PER LAYER.

THE BACKFILL OF ZONE B SHALL BE COMPACTED TO A MINIMUM DENSITY OF 95% OF THE STANDARD PROCTOR, AS REQUIRED BY AASHTO T-99.

SOIL WITHIN 1'-0" OF CONCRETE SURFACES SHALL BE HAND-COMPACTED. ELSEWHERE, USE OF ROLLERS IS ACCEPTABLE. IF VIBRATING ROLLER-COMPACTORS ARE USED, THEY SHALL NOT BE STARTED OR STOPPED WITHIN ZONE B AND THE VIBRATION FREQUENCY SHOULD BE AT LEAST 30 REVOLUTIONS PER SECOND.

THE BACKFILL MATERIAL AND COMPACTING BEHIND WINGWALLS SHALL SATISFY THE CRITERIA FOR THE BRIDGE BACKFILL, ZONE B.

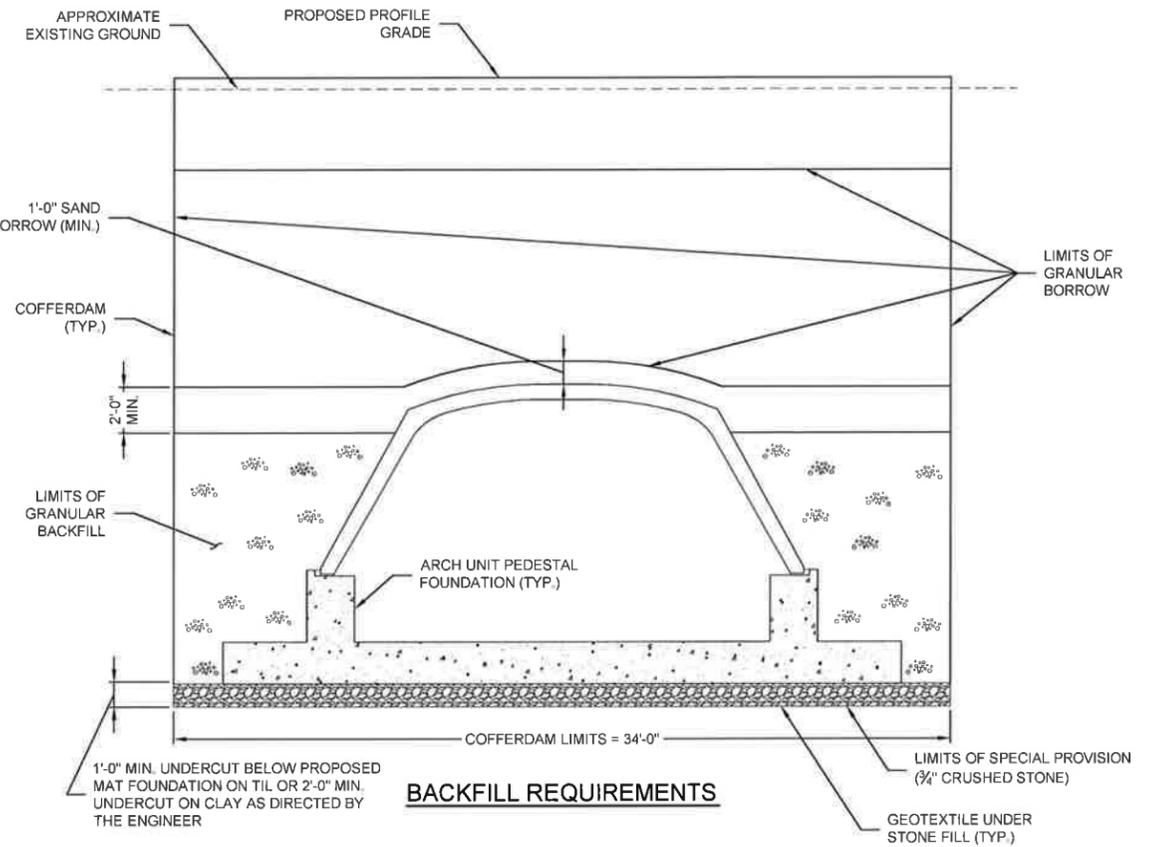
BACKFILL AGAINST A WATERPROOFED SURFACE SHALL BE PLACED CAREFULLY TO AVOID DAMAGE TO THE WATERPROOFING MATERIAL.

**13.8.7. BRIDGE UNITS** FOR FILL HEIGHTS OVER 12 FEET (AS MEASURED FROM TOP CROWN OF BRIDGE TO FINISHED GRADE), NO BACKFILLING MAY BEGIN UNTIL A BACKFILL COMPACTION TESTING PLAN HAS BEEN COORDINATED WITH AND APPROVED BY CONTECH® ENGINEERED SOLUTIONS.

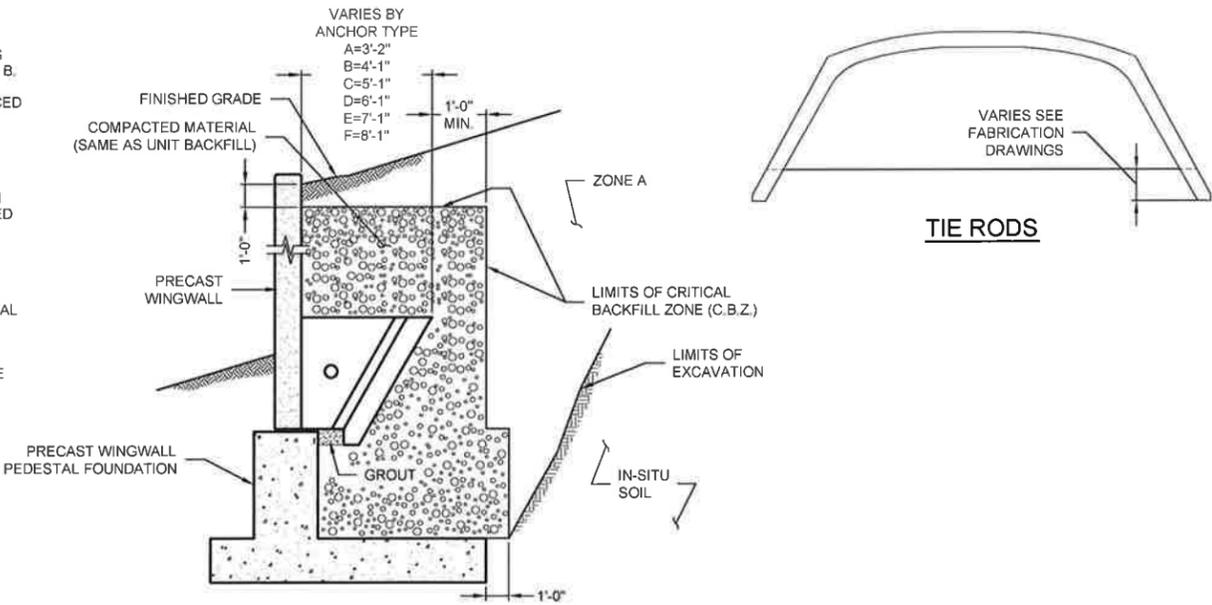
**13.8.8. WINGWALLS** BACKFILL IN FRONT OF WINGWALLS SHALL BE CARRIED TO GROUND LINES SHOWN IN THE PLANS.

**13.8.9. MONITORING** THE CONTRACTOR SHALL CHECK SETTLEMENTS AND HORIZONTAL DISPLACEMENT OF FOUNDATION TO ENSURE THAT THEY ARE WITHIN THE ALLOWABLE LIMIT PROVIDED BY THE ENGINEER. THESE MEASUREMENTS SHOULD GIVE AN INDICATION OF THE SETTLEMENTS AND DEFORMATIONS ALONG THE LENGTH OF THE FOUNDATIONS.

THE FIRST MEASUREMENT SHOULD TAKE PLACE AFTER THE ERECTION OF ALL PRECAST BRIDGE SYSTEM ELEMENTS, A SECOND AFTER COMPLETION OF BACKFILLING, AND A THIRD BEFORE OPENING OF THE BRIDGE TO TRAFFIC. FURTHER MEASUREMENTS MAY BE MADE ACCORDING TO LOCAL CONDITIONS.



**TYPICAL ARCH EARTH WORK SECTION**  
(PER SHEET 7 OF 74 OF BID DOCUMENTS)



**WALL BACKFILL REQUIREMENTS**

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DESIGNED: <b>KDK</b>	DRAWN: <b>TRL</b>	
CHECKED: <b>JDR</b>	APPROVED: <b>PAC</b>	
SHEET NO.: <b>S22</b> OF <b>S22</b>		