#### **NOTES**

#### GENERAL NOTES

- 1. THIS BRIDGE HAS BEEN DESIGNED FOR GENERAL SITE CONDITIONS. THE PROJECT ENGINEER SHALL BE RESPONSIBLE FOR THE STRUCTURE'S SUITABILITY TO THE EXISTING SITE CONDITIONS AND FOR THE HYDRAULIC EVALUATION -INCLUDING SCOUR AND CONFIRMATION OF SOIL CONDITIONS.
- 2. PRIOR TO CONSTRUCTION, CONTRACTOR MUST VERIFY ALL ELEVATIONS SHOWN THROUGH THE ENGINEER.
- 3. ONLY CONTECH BRIDGE SOLUTIONS INC. THE BEBO® APPROVED PRECASTER IN NORTH CAROLINA MAY PROVIDE THE STRUCTURE DESIGNED IN ACCORDANCE WITH
- 4. THE USE OF ANOTHER PRECAST STRUCTURE WITH THE DESIGN ASSUMPTIONS USED FOR THE BEBO® STRUCTURE MAY LEAD TO SERIOUS DESIGN ERRORS. USE OF ANY OTHER PRECAST STRUCTURE WITH THIS DESIGN AND DRAWINGS VOIDS ANY CERTIFICATION OF THIS DESIGN AND WARRANTY. CONTECH BRIDGE SOLUTIONS INC. ASSUMES NO LIABILITY FOR DESIGN OF ANY ALTERNATE OR SIMILAR TYPE STRUCTURES.
- 5. ALTERNATE STRUCTURES MAY BE CONSIDERED, PROVIDED THAT SIGNED AND SEALED DESIGN DRAWINGS (AND CALCULATIONS) ARE SUBMITTED TO THE ENGINEER 2 WEEKS PRIOR TO THE BID DATE FOR REVIEW AND APPROVAL.
- 6. PROPOSED ALTERNATES TO A BEBO® BRIDGE SYSTEM MUST SUBMIT AT LEAST TWO (2) INDEPENDENTLY VERIFIED FULL SCALE LOAD TESTS THAT CONFIRM THE PROPOSED DESIGN METHODOLOGY OF THE THREE SIDED/ARCH STRUCTURE(S). THE PROPOSED ALTERNATE, UPON SATISFACTORY CONFIRMATION OF DESIGN METHODOLOGY, MAY BE CONSIDERED AN ACCEPTABLE

#### **DESIGN DATA**

DESIGN LOADING:

BRIDGE UNITS: HL-93 HEADWALLS: EARTH PRESSURE ONLY WINGWALLS: EARTH PRESSURE ONLY DESIGN FILL HEIGHT: 1'-6" MIN. TO 4'-0" MAX.

FROM TOP OF CROWN TO TOP OF PAVEMENT. DESIGN METHOD: LOAD RESISTANCE FACTOR DESIGN

PER AASHTO LRFD SPECIFICATION FACTORED BEARING RESISTANCE: 10000 PSF \*

PREPARED BY NCDOT DATED: 7/18/2011

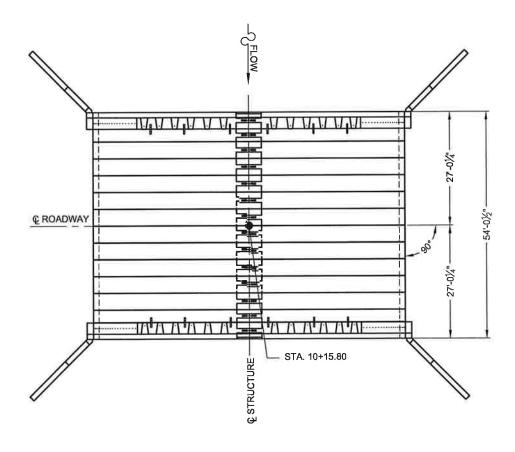
\*FOUNDATION EXCAVATION AND SUBGRADE PREPARATION SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL REPORT FOR THIS PROJECT

#### **MATERIALS**

PRECAST UNITS SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH BEBO® SPECIFICATIONS. CONCRETE FOR FOOTINGS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI. REINFORCING STEEL FOR FOOTINGS SHALL CONFORM TO ASTM A615 OR A996-GRADE 60.

# NCDOT STOKES COUNTY BRIDGE REPLACEMENT WALNUT COVE, NORTH CAROLINA





A CREAM

CONTECH ARCH ENGINEERING, PROFESSIONAL CORPORATION

FIRM LICENSE NUMBER: C-3034

LOCATION PLAN NOT TO SCALE

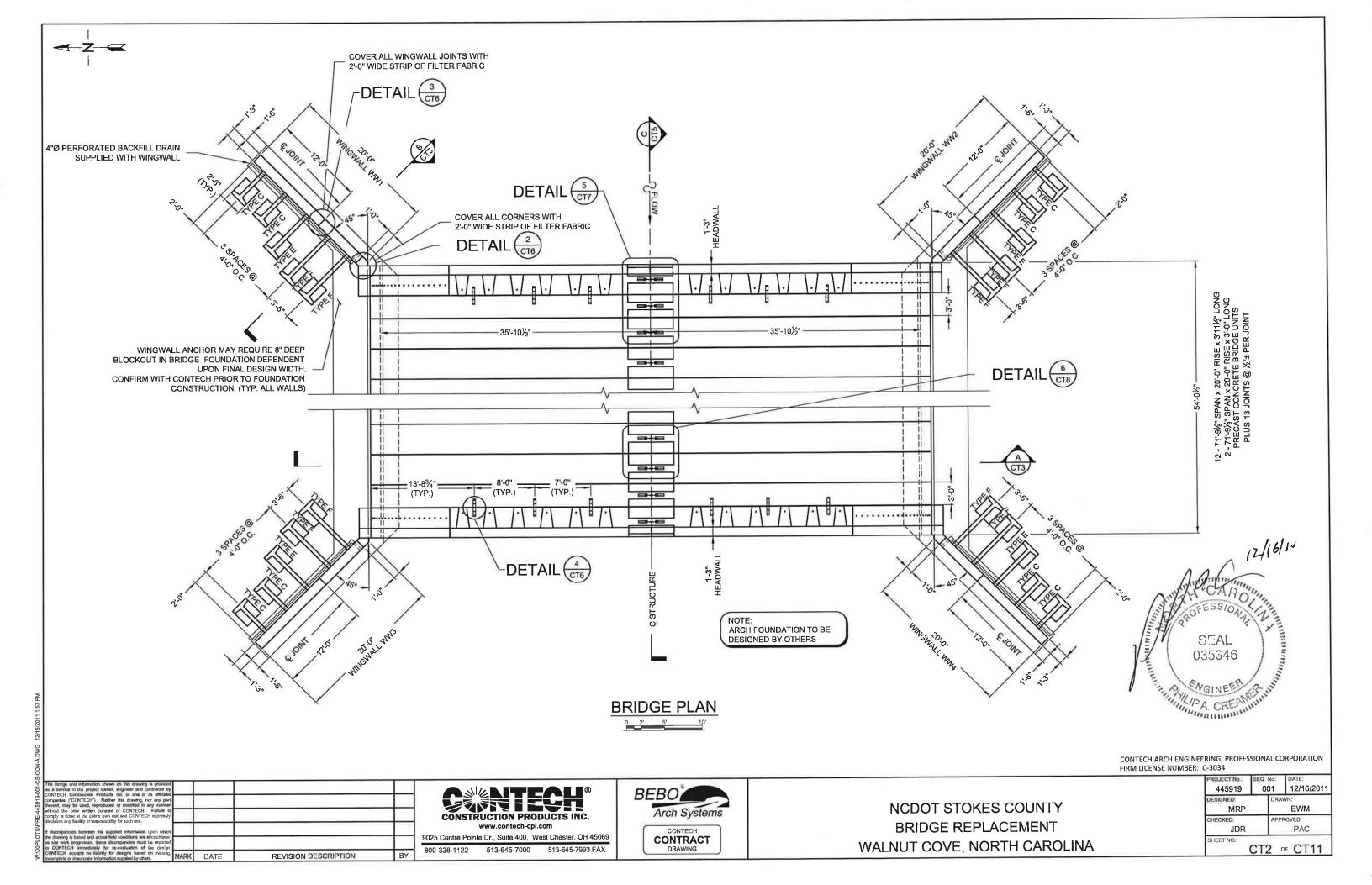
to CONTECH immediately for re-evaluation of the design.	MARK	DATE	REVISION DESCRIPTION	BY
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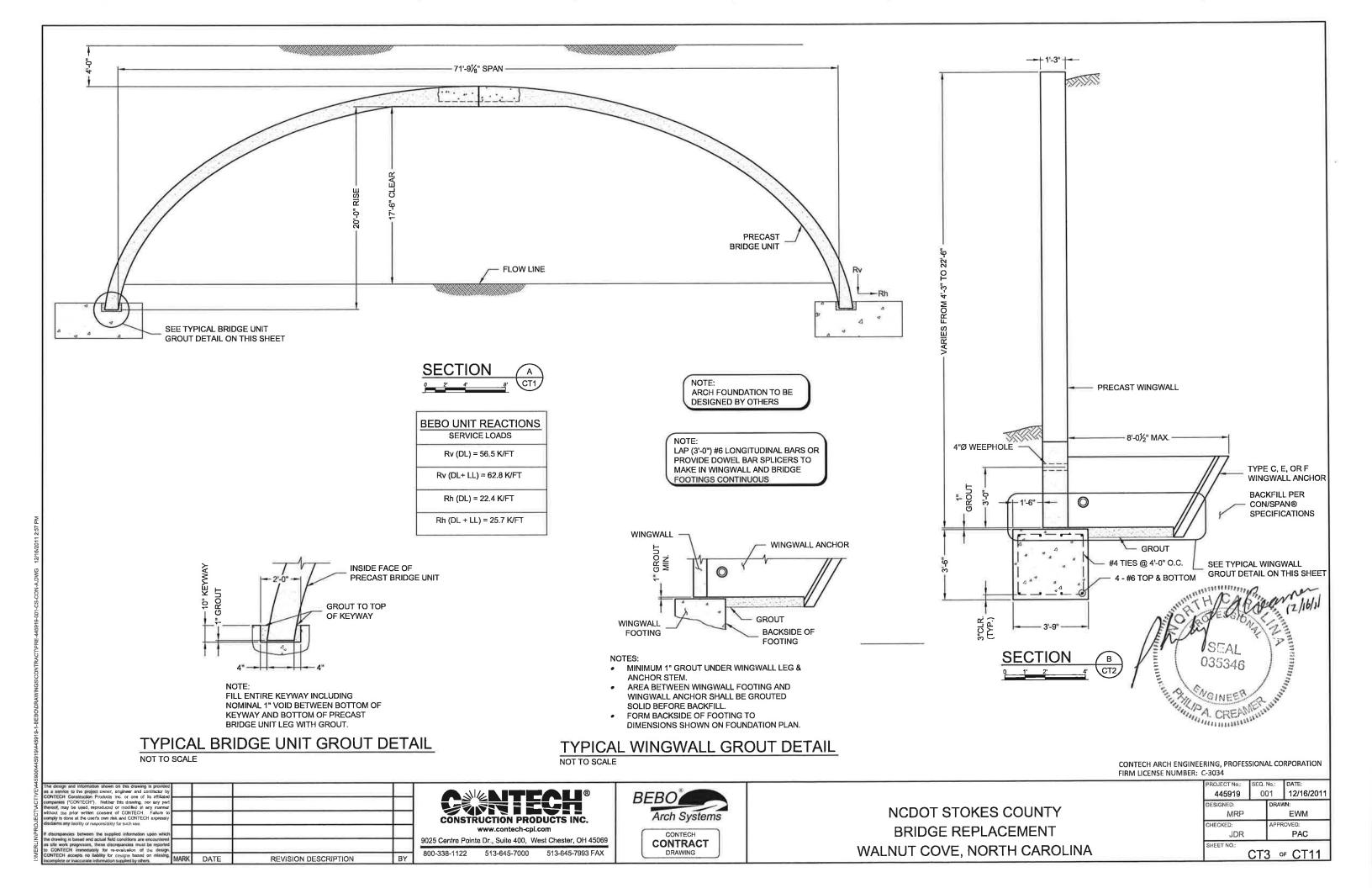
CONSTRUCTION PRODUCTS INC.

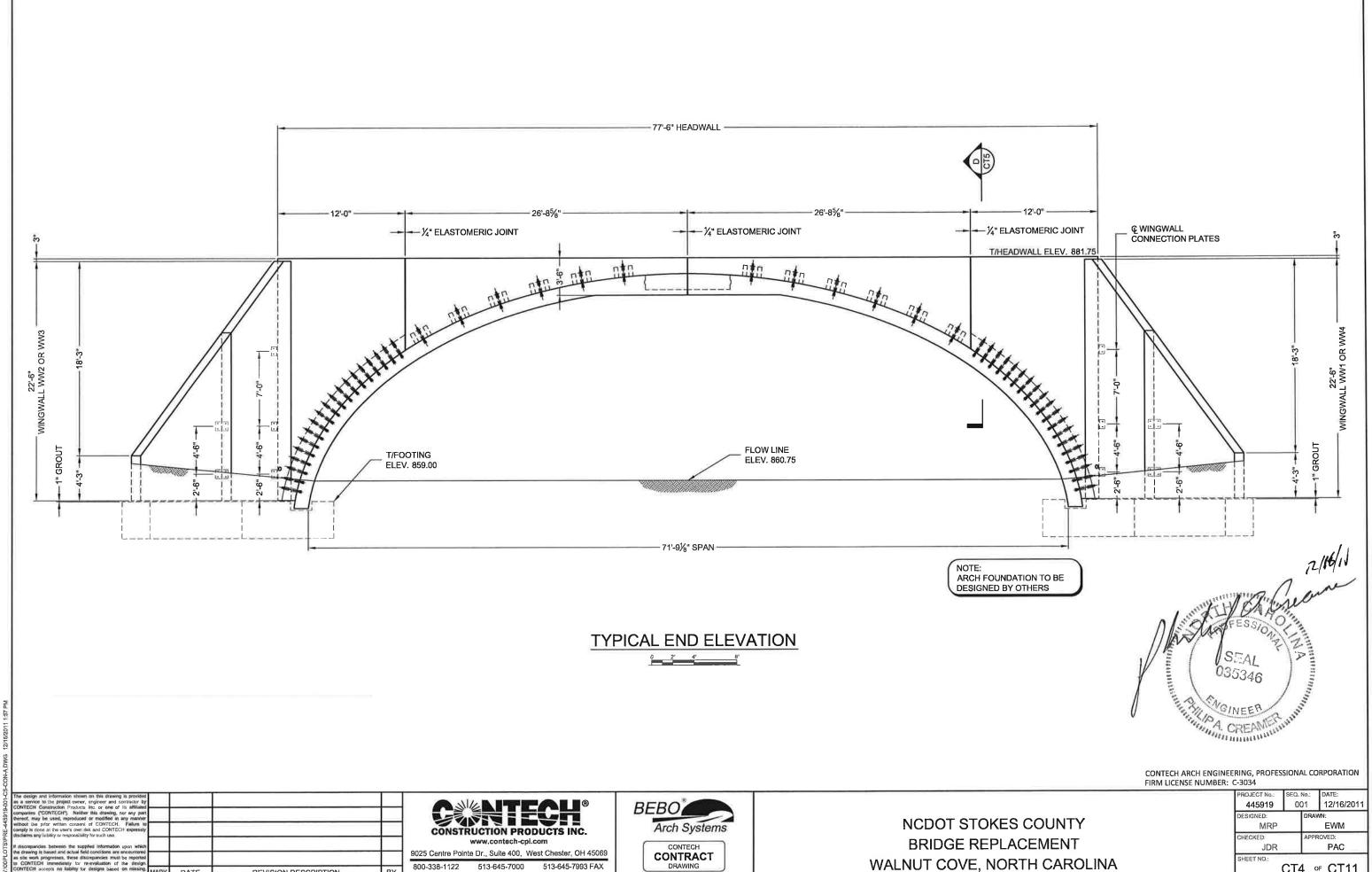
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069 800-338-1122 513-645-7000 513-645-7993 FAX



PROJECT No.: 445919	SEQ No: 001		DATE: 12/16/2011
DESIGNED: MRP		DRAV	N: EWM
CHECKED: JDR		APPR	PAC
SHEET NO:	CT	1 0	- CT11





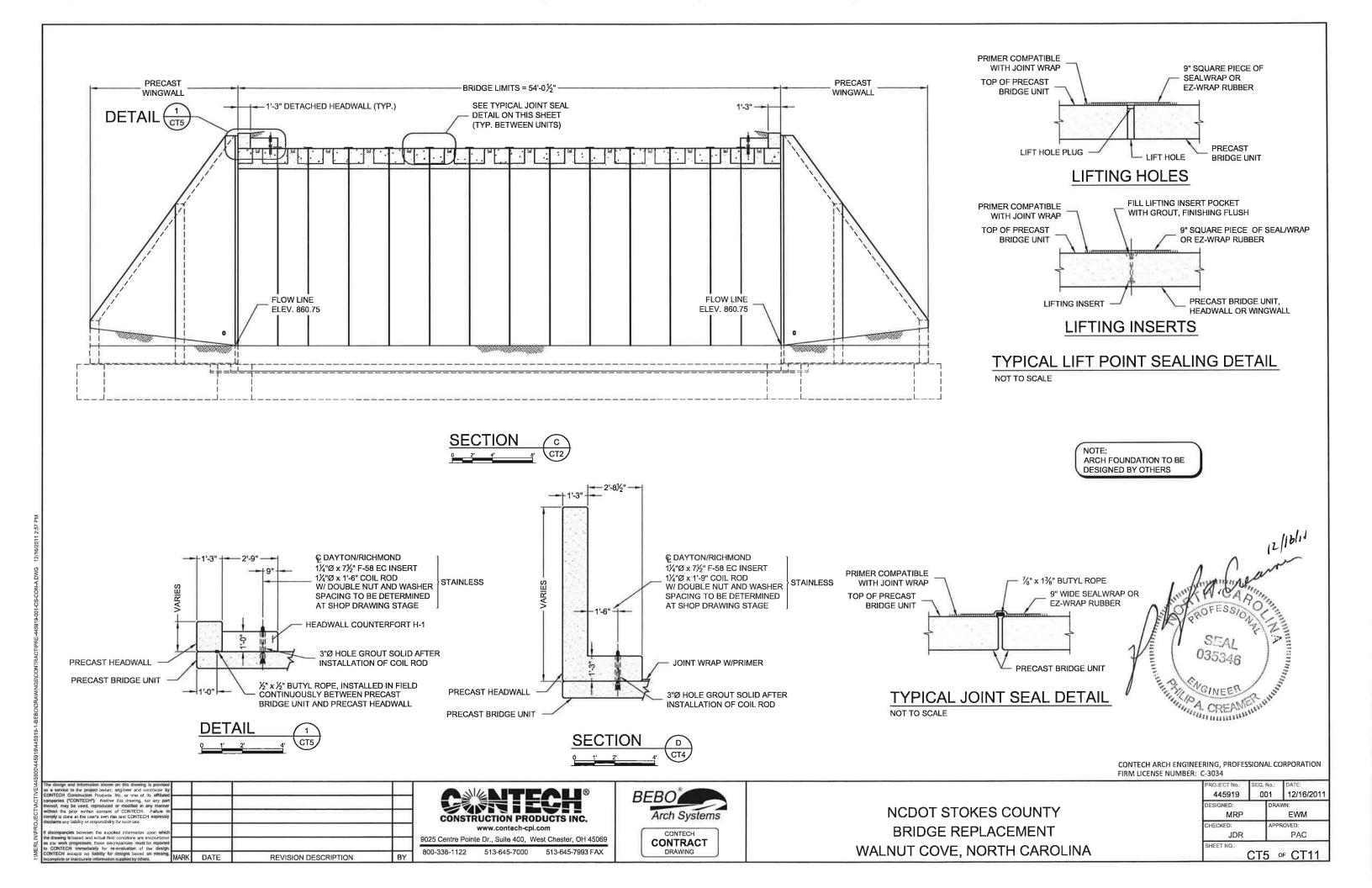


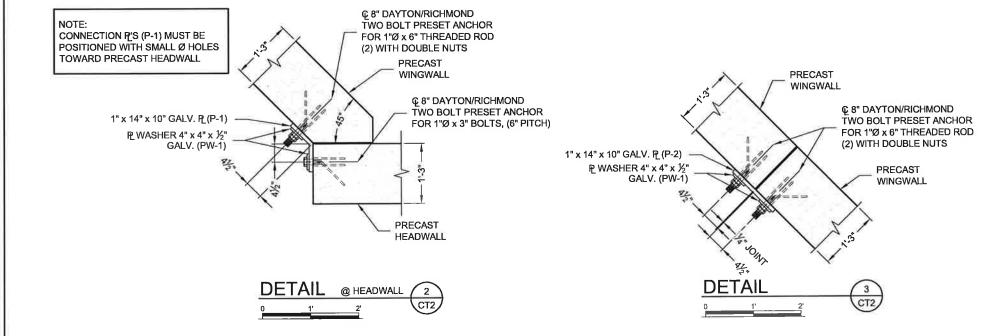
CT4 of CT11

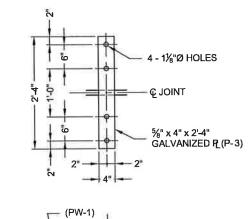
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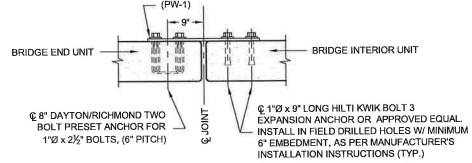
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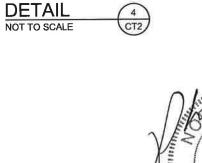
MARK DATE











SEAL 035346

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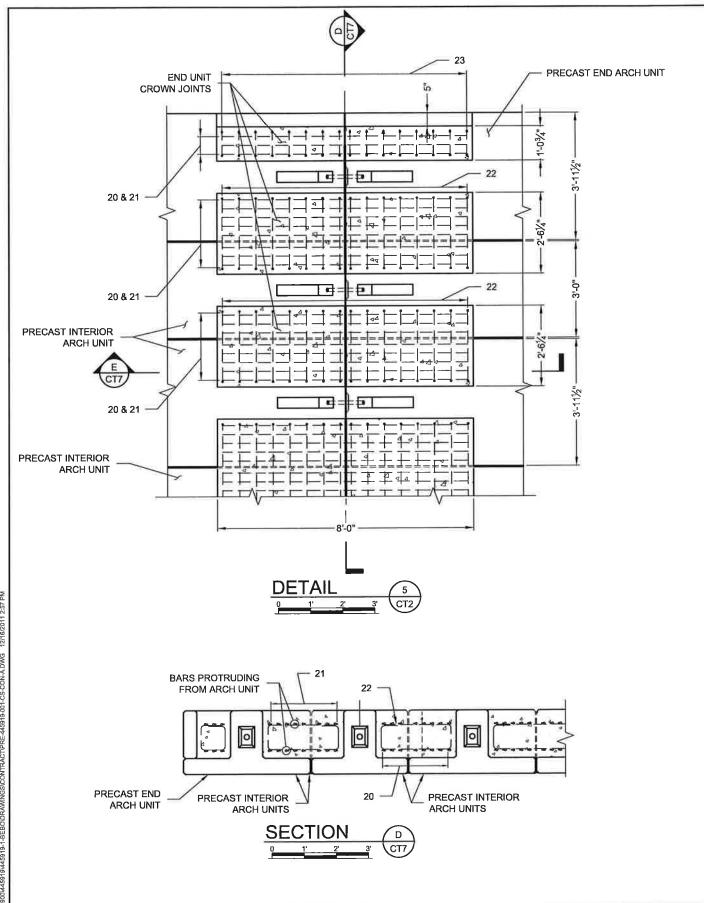
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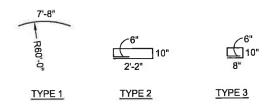
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PROJECT No.: 445919	SEQ.		12/16/2011	
DESIGNED: MRP	DRAWN: EWM			
CHECKED: JDR		APPROVED: PAC		
SHEET NO.:	CT	3 0	⊳ CT11	





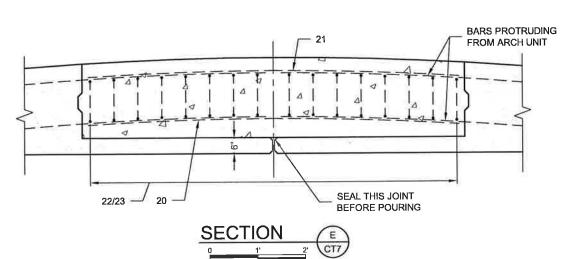
### **REINFORCING BAR LIST - E72T**

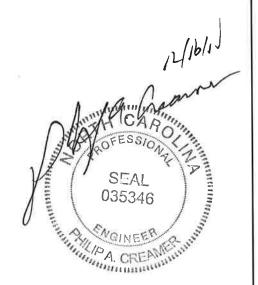
L						
	MARK	SIZE	NO.	LENGTH	TYPE	fy = 60 ksi
ľ	20	#6	76	7'-8"	1	SPACED @ 3%"± O.C.
Ī	21	#8	76	7'-8"	1	SPACED @ 31/8"± O.C.
Ī	22	#3	64	6'-6"	2	SPACED @ 6" O.C.
	23	#3	32	3'-6"	3	SPACED @ 6"± O.C.

- NOTE:

  SELECT APPROPRIATE SPACERS (NOT INDICATED ON DRAWING).

  CROWN JOINT TO BE CAST-IN-PLACE 6000 PSI CONCRETE.
- CONCRETE AND REINFORCEMENT SUPPLIED BY CONTRACTOR EXCEPT WHERE NOTED.





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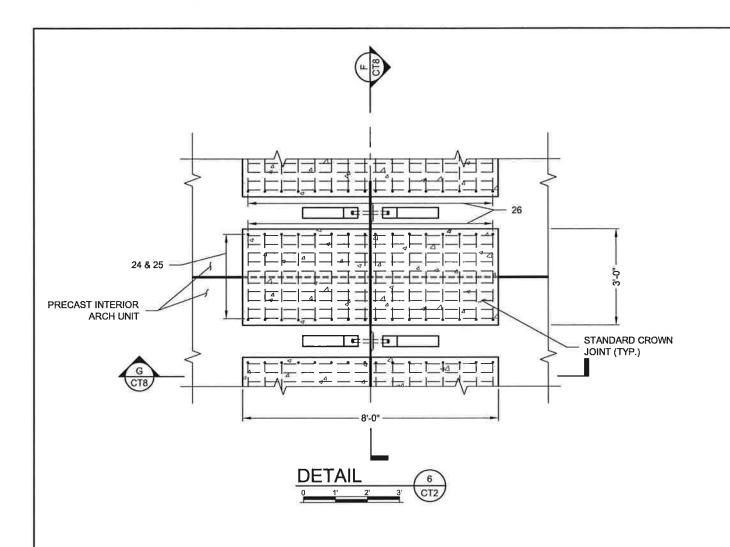
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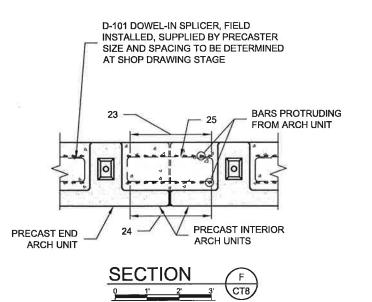
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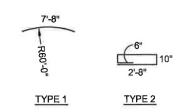
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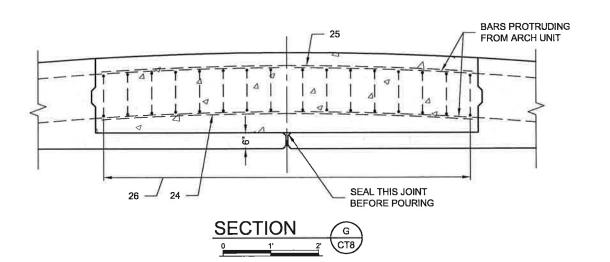






REINFORCING BAR LIST - E72T								
MARK	SIZE	NO.	LENGTH	TYPE	fy = 60 ksi			
24	#6	360	7'-8"	1	SPACED @ 31/8"± O.C.			
25	#8	360	7'-8"	1	SPACED @ 31/8"± O.C.			
26	#3	360	7'-6"	2	SPACED @ 6" O.C.			

- NOTE:
   SELECT APPROPRIATE SPACERS (NOT INDICATED ON DRAWING).
- CROWN JOINT TO BE CAST-IN-PLACE 6000 PSI CONCRETE.
- CONCRETE AND REINFORCEMENT SUPPLIED BY CONTRACTOR





CONTECH ARCH ENGINEERING, PROFESSIONAL CORPORATION FIRM LICENSE NUMBER: C-3034

REVISION DESCRIPTION MARK DATE

CONSTRUCTION PRODUCTS INC. 9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069

800-338-1122 513-645-7000 513-645-7993 FAX



	JECT No.: 145919	SEQ. I		DATE: 12/16/2011
DES	IGNED:		DRAV	/N:
	MRP			EWM
CHE	CKED:		APPR	OVED:
	JDR			PAC
SHE	ET NO.:			
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TYPE - THIS WORK SHALL CONSIST OF FURNISHING AND CONSTRUCTING A BEBO® BRIDGE SYSTEM IN ACCORDANCE WITH THESE SPECIFICATIONS AND IN REASONABLY OLOSE CONFORMITY WITH THE LINES, GRADES, DESIGN AND DIMENSIONS SHOWN ON THE PLANS OR AS ESTABLISHED BY THE ENGINEER, IN SITUATIONS WHERE TWO OR MORE SPECIFICATIONS APPLY TO THIS WORK, THE MOST STRINGENT REQUIREMENTS SHALL GOVERN.

1.2. DESIGNATION - PRECAST REINFORCED CONCRETE BEBO® BRIDGE UNITS MANUFACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY SPAN AND RISE PRECAST REINFORCED CONCRETE WINGWALLS AND HEADWALLS MANUFACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY LENGTH, HEIGHT, AND DEFLECTION

 DESIGN
 THE PRECAST ELEMENTS ARE DESIGNED IN
 ACCORDANCE WITH THE "AASHTO LRFD BRIDGE SPECIFICATION"

A SOCIATION OF STATEMENT OF STATEME 4TH EDITION, ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 2007. A MINIMUM OF ONE AND ONE-HALE FEET OF COVER ABOVE THE CROWN OF THE BRIDGE UNITS IS REQUIRED IN THE INSTALLED CONDITION (UNLESS NOTED OTHERWISE ON THE SHOP DRAWINGS AND DESIGNED ACCORDINGLY.)

- MATERIALS
   TONCRETE THE CONCRETE FOR THE PRECAST ELEMENTS SHALL BE AIR-ENTRAINED WHEN INSTALLED IN AREAS SUBJECT TO COMPOSED OF PORTLAND CEMENT.

  ON THE PROPERTY OF FINE AND COARSE AGGREGATES, ADMIXTURES AND WATER.
  AIR-ENTRAINED CONCRETE SHALL CONTAIN 6 ± 2 PERCENT AIR. THE AIR-ENTRAINING ADMIXTURE SHALL CONFORM TO AASHTO M154. THE MINIMUM CONCRETE COMPRESSIVE STRENGTH SHALL BE AS SHOWN ON THE SHOP DRAWINGS.
- 3.1.1. PORTLAND CEMENT SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATIONS C150-TYPE I, TYPE II, OR TYPE III CEMENT
- 3.1.2. COARSE AGGREGATE SHALL CONSIST OF STONE HAVING A MAXIMUM SIZE OF 1\*. AGGREGATE SHALL MEET REQUIREMENTS FOR ASTM C33.
- 3.1.3. WATER REDUCING ADMIXTURE THE MANUFACTURER MAY SUBMIT, FOR APPROVAL BY THE ENGINEER, A WATER-REDUCING ADMIXTURE FOR THE PURPOSE OF INCREASING WORKABILITY AND REDUCING THE WATER REQUIREMENT FOR THE CONCRETE.
- 3.1.4. CALCIUM CHLORIDE THE ADDITION TO THE MIX OF CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CALCIUM CHLORIDE WILL NOT BE PERMITTED.
- 3.1.5. MIXTURE THE AGGREGATES, CEMENT AND WATER SHALL BE PROPORTIONED AND MIXED IN A BATCH MIXER TO PRODUCE A HOMOGENEOUS CONCRETE MEETING THE STRENGTH REQUIREMENTS OF THIS SPECIFICATION. THE PROPORTION OF PORTLAND CEMENT IN THE MIXTURE SHALL NOT BE LESS THAN 564 POUNDS (6 SACKS) PER CUBIC YARD OF CONCRETE. 3.2. STEEL REINFORCEMENT

3.2.1. THE MINIMUM STEEL YIELD STRENGTH SHALL BE 60,000 PSI,

- UNLESS OTHERWISE NOTED ON THE SHOP DRAWINGS. 3.2.2. ALL REINFORCING STEEL FOR THE PRECAST ELEMENTS SHALL BE FABRICATED AND PLACED IN ACCORDANCE WITH THE DETAILED SHOP DRAWINGS SUBMITTED BY THE MANUFACTURER
- 3.2.3. REINFORCEMENT SHALL CONSIST OF WELDED WIRE FABRIC CONFORMING TO ASTM SPECIFICATION A 185 OR A 497, OR DEFORMED BILLET STEEL BARS CONFORMING TO ASTM SPECIFICATION A 615, GRADE 60. LONGITUDINAL DISTRIBUTION REINFORCEMENT MAY CONSIST OF WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS.

- 3.3.1. BOLTS AND THREADED RODS FOR WINGWALL CONNECTIONS SHALL CONFORM TO ASTM A 307. NUTS SHALL CONFORM TO AASHTO M292 (ASTM A194) GRADE 2H, ALL BOLTS, THREADED RODS AND NUTS USED IN WINGWALL CONNECTIONS SHALL BE MECHANICALLY ZINC COATED IN ACCORDANCE WITH ASTM B695 CLASS 50.
- 3.3.2. STRUCTURAL STEEL FOR WINGWALL CONNECTION PLATES AND PLATE WASHERS SHALL CONFORM TO AASHTO M270 (ASTM A709)
  GRADE 36 AND SHALL BE HOT DIP GALVANIZED AS PER AASHTO
- M111 (ASTM A123).

  3,3,3, INSERTS FOR WINGWALLS SHALL BE 1" DIAMETER TWO-BOLT PRESET WINGWALL ANCHORS AS MANUFACTURED BY DAYTON/RICHMOND CONCRETE ACCESSORIES, MIAMISBURG OHIO, (800) 745-3700.
- 3.3.4. FERRULE LOOP INSERTS SHALL BE F-64 FERRULE LOOP INSERTS AS MANUFACTURED BY DAYTON/RICHMOND CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700.
- 3.3.5. HOOK BOLTS USED IN ATTACHED HEADWALL CONNECTIONS SHALL BE ASTM A307. 3,3,6. INSERTS FOR DETACHED HEADWALL CONNECTIONS SHALL BE
- ASI TYPE 304 STAINLESS STEEL, F-58 EXPANDED COIL INSERTS AS MANUFACTURED BY DAYTON/RICHMOND CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700. COIL RODS AND NUTS USED IN HEADWALL CONNECTIONS SHALL BE AISI TYPE 304 STAINLESS STEEL, WASHERS USED IN HEADWALL CONNECTIONS SHALL BE EITHER AISI TYPE 304 STAINLESS STEEL PLATE WASHERS OR AASHTO M270 (ASTM A709) GRADE 36 PLATE WASHERS HOT DIP GALVANIZED AS PER AASHTO M111 (ASTM A123)
- 3.3.7. REINFORCING BAR SPLICES SHALL BE MADE USING THE DOWEL BAR SPLICER SYSTEM AS MANUFACTURED BY DAYTON/RICHMOND CONCRETE ACCESSORIES. MIAMISBURG.

OHIO, (800) 745-3700, AND SHALL CONSIST OF THE DOWEL BAR SPLICER (DB-SAE) AND DOWEL-IN (DI).

4. MANUFACTURE OF PRECAST ELEMENTS SUBJECT TO THE PROVISIONS OF SECTION 5, BELOW, THE PRECAST ELEMENT DIMENSION AND REINFORCEMENT DETAILS SHALL BE AS PRESCRIBED IN THE PLAN AND SHOP DRAWINGS PROVIDED BY THE

4.1 FORMS - THE FORMS USED IN MANUFACTURE SHALL BE SUFFICIENTLY RIGID AND ACCURATE TO MAINTAIN THE REQUIRED PRECAST ELEMENT DIMENSIONS WITHIN THE PERMISSIBLE VARIATIONS GIVEN IN SECTION 5 OF THESE SPECIFICATIONS ALL CASTING SURFACES SHALL BE OF A SMOOTH MATERIAL,

4.2 PLACEMENT OF REINFORCEMENT

- 4.2.1. PLACEMENT OF REINFORCEMENT IN PRECAST BRIDGE UNITS-THE COVER OF CONCRETE OVER THE OUTSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 2" MINIMUM. THE COVER OF CONCRETE OVER THE INSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 1½" MINIMUM, UNLESS OTHERWISE NOTED ON THE SHOP DRAWINGS. THE CLEAR DISTANCE OF THE END CIRCUMFERENTIAL WIRES SHALL NOT BE LESS THAN 1" NOR MORE THAN 2" FROM THE ENDS OF EACH SECTION. REINFORCEMENT SHALL BE ASSEMBLED UTILIZING SINGLE OR MULTIPLE LAYERS OF WELDED WIRE FABRIC (NOT TO EXCEED 3 LAYERS), SUPPLEMENTED WITH A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS, WHEN NECESSARY. WELDED WIRE FABRIC SHALL BE COMPOSED OF CIRCUMFERENTIAL AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE BRIDGE UNIT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL DISTRIBUTION REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW. THE ENDS OF THE LONGITUDINAL DISTRIBUTION REINFORCEMENT SHALL BE NOT MORE THAN 3" AND NOT LESS THAN 1½" FROM THE ENDS OF THE
- 4.2.2. PLACEMENT OF REINFORCEMENT FOR PRECAST WINGWALLS AND HEADWALLS - THE COVER OF CONCRETE OVER THE LONGITUDINAL AND TRANSVERSE REINFORCEMENT SHALL BE 2" MINIMUM THE CLEAR DISTANCE FROM THE END OF EACH PRECAST ELEMENT TO THE END OF REINFORCING STEEL SHALL NOT BE LESS THAN ½" NOR MORE THAN 3". REINFORCEMENT SHALL BE ASSEMBLED UTILIZING A SINGLE LAYER OF WELDED WIRE FABRIC, OR A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS, WELDED WIRE FABRIC SHALL BE COMPOSED OF TRANSVERSE AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE ELEMENT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW.

4.3. LAPS WELDS SPACING

- 4.3.1. LAPS, WELDS, AND SPACING FOR PRECAST BRIDGE UNITS -TENSION SPLICES IN THE CIRCUMFERENTIAL REINFORCEMENT SHALL BE MADE BY LAPPING LAPS MAY BE TACK WELDED. TOGETHER FOR ASSEMBLY PURPOSES. FOR SMOOTH WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 8,30.2 AND 8,32.6. FOR DEFORMED WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 8,30.1 AND 8,32.5. THE OVERLAP OF WELDED WIRE FABRIC SHALL BE MEASURED BETWEEN THE OUTER-MOST LONGITUDINAL WIRES OF EACH FABRIC SHEET. FOR DEFORMED BILLET-STEEL BARS, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 8.25. FOR SPLICES OTHER THAN TENSION SPLICES, THE OVERLAP SHALL BE A MINIMUM OF 1'-0" FOR WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS THE SPACING CENTER TO CENTER OF THE CIRCUMFERENTIAL WIRES IN A WIRE FABRIC SHEET SHALL BE NOT LESS THAN 2 NOR MORE THAN 4". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL WIRES SHALL NOT BE MORE THAN 8". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL DISTRIBUTION STEEL FOR EITHER LINE OF REINFORCING IN THE TOP SLAB SHALL BE NOT MORE THAN 1'4".
- 4.3.2. LAPS, WELDS, AND SPACING FOR PRECAST WINGWALLS AND HEADWALLS - SPLICES IN THE REINFORCEMENT SHALL BE MADE BY LAPPING, LAPS MAY BE TACK WELDED TOGETHER FOR ASSEMBLY PURPOSES, FOR SMOOTH WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 8.30.2 AND 8.32.6, FOR DEFORMED WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 8,30,1 AND 8,32,5. FOR DEFORMED BILLET-STEEL BARS, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 8,25. THE SPACING CENTER-TO-CENTER OF THE WIRES IN A WIRE FABRIC SHEET SHALL BE NOT LESS THAN 2" NOR MORE THAN 8".
- 4.4. CURING THE PRECAST CONCRETE ELEMENTS SHALL BE CURED FOR A SUFFICIENT LENGTH OF TIME SO THAT THE CONCRETE WILL DEVELOP THE SPECIFIED COMPRESSIVE STRENGTH IN 28 DAYS OR LESS. ANY ONE OF THE FOLLOWING METHODS OF CURING OR COMBINATIONS THEREOF SHALL BE USED: 4.4.1. STEAM CURING - THE PRECAST ELEMENTS MAY BE
- LOW-PRESSURE STEAM CURED BY A SYSTEM THAT WILL MAINTAIN A MOIST ATMOSPHERE.

  4.4.2. WATER CURING - THE PRECAST ELEMENTS MAY BE WATER
- CURED BY ANY METHOD THAT WILL KEEP THE SECTIONS MOIST

4,4.3. MEMBRANE CURING - A SEALING MEMBRANE CONFORMING TO THE REQUIREMENTS OF ASTM SPECIFICATION C 309 MAY BE APPLIED AND SHALL BE LEFT INTACT UNTIL THE REQUIRED

800-338-1122

CONCRETE COMPRESSIVE STRENGTH IS ATTAINED. THE CONCRETE TEMPERATURE AT THE TIME OF APPLICATION SHALL BE WITHIN +/- 10 DEGREES F OF THE ATMOSPHERIC TEMPERATURE. ALL SURFACES SHALL BE KEPT MOIST PRIOR TO THE APPLICATION OF THE COMPOUNDS AND SHALL BE DAMP WHEN THE COMPOUND IS APPLIED.

4.5. STORAGE, HANDLING & DELIVERY 4.5.1. STORAGE - PRECAST CONCRETE BRIDGE ELEMENTS SHALL BE LIFTED AND STORED IN "AS-CAST" POSITION.

PRECAST CONCRETE HEADWALL AND WINGWALL UNITS ARE CAST, STORED AND SHIPPED IN A FLAT POSITION

THE PRECAST ELEMENTS SHALL BE STORED IN SUCH A MANNER TO PREVENT CRACKING OR DAMAGE. STORE ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE. THE UNITS SHALL NOT BE MOVED UNTIL THE CONCRETE COMPRESSIVE STRENGTH HAS REACHED A MINIMUM OF 2500 PSI, AND THEY SHALL NOT BE STORED IN AN UPRIGHT POSITION.

4.5.2. HANDLING - HANDLING DEVICES SHALL BE PERMITTED IN EACH PRECAST ELEMENT FOR THE PURPOSE OF HANDLING AND

SPREADER BEAMS MAY BE REQUIRED FOR THE LIFTING OF PRECAST CONCRETE BRIDGE ELEMENTS TO PRECLUDE DAMAGE FROM BENDING OR TORSION FORCES

THE CONTRACTOR MUST PROVIDE A DOUBLE-DRUM CRANE WITH EQUAL CAPACITY ON EACH DRUM FOR THE INSTALLATION OF THE PRECAST ELEMENTS.

4.5.3. DELIVERY - PRECAST CONCRETE ELEMENTS MUST NOT BE SHIPPED UNTIL THE CONCRETE HAS ATTAINED THE SPECIFIED DESIGN COMPRESSIVE STRENGTH, OR AS DIRECTED BY THE

PRECAST CONCRETE ELEMENTS MAY BE UNLOADED AND PLACED ON THE GROUND AT THE SITE UNTIL INSTALLED. STORE ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE.

- 4.6 QUALITY ASSURANCE THE PRECASTER SHALL DEMONSTRATE ADHERENCE TO THE STANDARDS SET FORTH IN THE NPCA QUALITY CONTROL MANUAL, THE PRECASTER SHALL MEET EITHER SECTION 4.6.1 OR 4.6.2
- 4.6.1. CERTIFICATION THE PRECASTER SHALL BE CERTIFIED BY THE PRECAST/PRESTRESSED CONCRETE INSTITUTE PLANT CERTIFICATION PROGRAM OR THE NATIONAL PRECAST CONCRETE ASSOCIATION'S PLANT CERTIFICATION PROGRAM PRIOR TO AND DURING PRODUCTION OF THE PRODUCTS COVERED BY THIS SPECIFICATION.
  4.6.2. QUALIFICATIONS, TESTING AND INSPECTION

4.6.2.1, THE PRECASTER SHALL HAVE BEEN IN THE BUSINESS OF PRODUCING PRECAST CONCRETE PRODUCTS SIMILAR TO THOSE SPECIFIED FOR A MINIMUM OF THREE YEARS.

HE SHALL MAINTAIN A PERMANENT QUALITY CONTROL AGENCY ON A CONTINUING BASIS. THE AGENCY SHALL ISSUE A REPORT, CERTIFIED BY A LICENSED ENGINEER, DETAILING THE ABILITY OF THE PRECASTER TO PRODUCE QUALITY PRODUCTS CONSISTENT WITH INDUSTRY STANDARDS.

4.6.2.2. THE PRECASTER SHALL SHOW THAT THE FOLLOWING TESTS ARE PERFORMED IN ACCORDANCE WITH THE ASTM STANDARDS INDICATED. TESTS SHALL BE PERFORMED AS INDICATED IN SECTION 6 OF THESE SPECIFICATIONS.

4.6.2.2.1 AIR CONTENT: C231 OR C173

- 4.6.2.2.2 COMPRESSIVE STRENGTH: C31, C39, C497 4.6.2.3. THE PRECASTER SHALL PROVIDE DOCUMENTATION DEMONSTRATING COMPLIANCE WITH THIS SECTION TO CONTECH® BRIDGE SOLUTIONS AT REGULAR INTERVALS
- OR UPON REQUEST.
  4.6.2.4. THE OWNER MAY PLACE AN INSPECTOR IN THE PLANT WHEN THE PRODUCTS COVERED BY THIS SPECIFICATION
- ARE BEING MANUFACTURED.

  4.6.3. DOCUMENTATION THE PRECASTER SHALL SUBMIT PRECAST PRODUCTION REPORTS TO CONTECH® BRIDGE SOLUTIONS AS

- 5.1.1. INTERNAL DIMENSIONS THE INTERNAL DIMENSION SHALL VARY NOT MORE THAN 1% FROM THE DESIGN DIMENSIONS NOR MORE THAN 1½" WHICHEVER IS LESS.
  5.1.2. SLAB AND WALL THICKNESS - THE SLAB AND WALL THICKNESS
- SHALL NOT BE LESS THAN THAT SHOWN IN THE DESIGN BY MORE THAN X". A THICKNESS MORE THAN THAT REQUIRED IN THE DESIGN SHALL NOT BE CAUSE FOR REJECTION.
  5.1.3, LENGTH OF OPPOSITE SURFACES - VARIATIONS IN LAYING
- LENGTHS OF TWO OPPOSITE SURFACES OF THE BRIDGE UNIT SHALL NOT BE MORE THAN ½" IN ANY SECTION, EXCEPT WHERE BEVELED ENDS FOR LAYING OF CURVES ARE SPECIFIED BY THE PURCHASER
- 5.1.4, LENGTH OF SECTION THE UNDERRUN IN LENGTH OF A SECTION
- SHALL NOT BE MORE THAN ½" IN ANY BRIDGE UNIT.

  5.1.5, POSITION OF REINFORCEMENT THE MAXIMUM VARIATION IN
  POSITION OF THE REINFORCEMENT SHALL BE ± ½". IN NO CASE
  SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN 1½" FOR THE OUTSIDE CIRCUMFERENTIAL STEEL OR BE LESS THAN 1" FOR THE INSIDE CIRCUMFERENTIAL STEEL AS MEASURED TO THE EXTERNAL OR INTERNAL SURFACE OF THE

BRIDGE. THESE TOLERANCES OR COVER REQUIREMENTS DO NOT APPLY TO MATING SURFACES OF THE JOINTS

5.1.6. AREA OF REINFORCEMENT - THE AREAS OF STEEL REINFORCEMENT SHALL BE THE DESIGN STEEL AREAS AS SHOWN IN THE MANUFACTURER'S SHOP DRAWINGS, STEEL AREAS GREATER THAN THOSE REQUIRED SHALL NOT BE

CAUSE FOR REJECTION. THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCEMENT SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCEMENT,

5.2. WINGWALLS & HEADWALLS

- 5.2.1. WALL THICKNESS THE WALL THICKNESS SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN 1/2".
  5.2.2. LENGTH/ HEIGHT OF WALL SECTIONS THE LENGTH AND HEIGHT
- OF THE WALL SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN ½". 5,2,3, POSITION OF REINFORCEMENT - THE MAXIMUM VARIATION IN THE
- POSITION OF THE REINFORCEMENT SHALL BE ± ½". IN NO CASE SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN
- 5.2.4. SIZE OF REINFORCEMENT THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCING SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCING, STEEL AREA GREATER THAN THAT REQUIRED SHALL NOT BE CAUSE FOR REJECTION.

- 6.1.1. TYPE OF TEST SPECIMEN CONCRETE COMPRESSIVE STRENGTH SHALL BE DETERMINED FROM COMPRESSION TESTS MADE ON CYLINDERS OR CORES. FOR CYLINDER TESTING, A MINIMUM OF 3 CYLINDERS SHALL BE TAKEN FOR EACH LOT OF BRIDGE ELEMENTS, (A LOT IS DEFINED AS THE PRECAST ELEMENTS MADE USING THE SAME CONCRETE MIX DURING A SINGLE DAY'S PRODUCTION.) FOR CORE TESTING, ONE CORE SHALL BE CUT FROM EACH OF 3 PRECAST ELEMENTS SELECTED AT RANDOM FROM EACH GROUP OF 15 OR FEWER ELEMENTS MADE USING A SINGLE CONCRETE MIX IN THE SAME DAY'S PRODUCTION. EACH LOT SHALL BE CONSIDERED SEPARATELY FOR THE PURPOSE OF TESTING AND ACCEPTANCE.
- 6.1.2. COMPRESSION TESTING CYLINDERS SHALL BE MADE AND TESTED AS PRESCRIBED BY THE ASTM C 39 SPECIFICATION. CORES SHALL BE OBTAINED AND TESTED FOR COMPRESSIVE STRENGTH IN ACCORDANCE WITH THE PROVISIONS OF THE ASTM C42 SPECIFICATION.
- 6.1.3. ACCEPTABILITY OF CYLINDER TESTS WHEN THE AVERAGE COMPRESSIVE STRENGTH OF ALL CYLINDERS TESTED IS EQUAL TO OR GREATER THAN THE DESIGN COMPRESSIVE STRENGTH. AND NOT MORE THAN 10% OF THE CYLINDERS TESTED HAVE A COMPRESSIVE STRENGTH LESS THAN THE DESIGN CONCRETE STRENGTH, AND NO CYLINDER TESTED HAS A COMPRESSIVE STRENGTH LESS THAN 80% OF THE DESIGN COMPRESSIVE STRENGTH, THEN THE LOT SHALL BE ACCEPTED. WHEN THI COMPRESSIVE STRENGTH OF THE CYLINDERS TESTED DOES NOT CONFORM TO THESE ACCEPTANCE CRITERIA, THE ACCEPTABILITY OF THE LOT MAY BE DETERMINED AS DESCRIBED

IN SECTION 6.1.4, BELOW, 6.1.4, ACCEPTABILITY OF CORE TESTS - THE COMPRESSIVE STRENGTH OF THE CONCRETE IN A LOT IS ACCEPTABLE WHEN THE AVERAGE CORE TEST STRENGTH IS EQUAL TO OR GREATER THAN THE DESIGN CONCRETE STRENGTH. WHEN THE COMPRESSIVE STRENGTH OF A CORE TESTED IS LESS THAN THE DESIGN CONCRETE STRENGTH, THE PRECAST ELEMENT FROM WHICH THAT CORE WAS TAKEN MAY BE RE-CORED, WHEN THE COMPRESSIVE STRENGTH OF THE RE-CORE IS EQUAL TO OR GREATER THAN THE DESIGN CONCRETE STRENGTH, COMPRESSIVE STRENGTH OF THE CONCRETE IN THAT LOT IS

- 6.1.4.1. WHEN THE COMPRESSIVE STRENGTH OF ANY RECORE IS LESS THAN THE DESIGN CONCRETE STRENGTH, THE PRECAST ELEMENT FROM WHICH THAT CORE WAS TAKEN SHALL BE REJECTED. TWO PRECAST ELEMENTS FROM THE REMAINDER OF THE LOT SHALL BE SELECTED AT RANDOM AND ONE CORE SHALL BE TAKEN FROM EACH, IF THE COMPRESSIVE STRENGTH OF BOTH CORES IS FOUND TO OR GREATER THAN THE DESIGN CONCRETE STRENGTH, THE COMPRESSIVE STRENGTH OF THE REMAINDER OF THAT GROUP IS ACCEPTABLE. IF THE COMPRESSIVE STRENGTH OF EITHER OF THE TWO CORES TESTED IS LESS THAN THE DESIGN CONCRETE STRENGTH. THE REMAINDER OF THE GROUP SHALL BE REJECTED OR, AT THE OPTION OF THE MANUFACTURER, EACH PRECAST ELEMENT OF THE REMAINDER OF THE GROUP SHALL BE CORED AND ACCEPTED INDIVIDUALLY. AND ANY OF THESE ELEMENTS THAT HAVE CORES WITH LESS THAN THE DESIGN CONCRETE STRENGTH SHALL BE REJECTED
- 6.1.4.2. PLUGGING CORE HOLES THE CORE HOLES SHALL BE PLUGGED AND SEALED BY THE MANUFACTURER IN A MANNER SUCH THAT THE ELEMENTS WILL MEET ALL OF THE TEST REQUIREMENTS OF THIS SPECIFICATION.
  PRECAST ELEMENTS SO SEALED SHALL BE CONSIDERED
- SATISFACTORY FOR USE.

  6.1.4.3. TEST EQUIPMENT EVERY MANUFACTURER FURNISHING PRECAST ELEMENTS UNDER THIS SPECIFICATION SHALL FURNISH ALL FACILITIES AND PERSONNEL NECESSARY
  TO CARRYOUT THE TEST REQUIRED.
  6.2. INSPECTION - THE QUALITY OF MATERIALS, THE PROCESS OF

MANUFACTURE, AND THE FINISHED PRECAST ELEMENTS SHALL BE SUBJECT TO INSPECTION BY THE PURCHASER.

7. JOINTS
THE BRIDGE UNITS SHALL BE PRODUCED WITH FLAT BUTT ENDS. THE ENDS OF THE BRIDGE UNITS SHALL BE SUCH THAT WHEN THE SECTIONS ARE LAID TOGETHER THEY WILL MAKE A CONTINUOUS LINE WITH A SMOOTH INTERIOR FREE OF APPRECIABLE IRREGULARITIES, ALL COMPATIBLE WITH THE PERMISSIBLE VARIATIONS IN SECTION 5, ABOVE, THE JOINT WIDTH BETWEEN ADJACENT PRECAST UNITS SHALL

WORKMANSHIP/FINISH
THE BRIDGE UNITS, WINGWALLS, AND HEADWALLS SHALL BE
SUBSTANTIALLY FREE OF FRACTURES. THE ENDS OF THE BRIDGE UNITS SHALL BE NORMAL TO THE WALLS AND CENTERLINE OF THE BRIDGE SECTION, WITHIN THE LIMITS OF THE VARIATIONS GIVEN IN SECTION 5, ABOVE, EXCEPT WHERE BEVELED ENDS ARE SPECIFIED THE FACES OF THE WINGWALLS AND HEADWALLS SHALL BE PARALLEI TO EACH OTHER, WITHIN THE LIMITS OF VARIATIONS GIVEN IN SECTIO 5. ABOVE, THE SURFACE OF THE PRECAST ELEMENTS SHALL BE A SMOOTH STEEL FORM OR TROWELED SURFACE, TRAPPED AIR POCKETS CAUSING SURFACE DEFECTS SHALL BE CONSIDERED AS PART OF A SMOOTH, STEEL FORM FINISH.

REPAIRS
PRECAST ELEMENTS MAY BE REPAIRED, IF NECESSARY, BECAUSE OF IMPERFECTIONS IN MANUFACTURE OR HANDLING DAMAGE AND WILL BE ACCEPTABLE IF, IN THE OPINION OF THE PURCHASER, THE REPAIRS ARE SOUND, PROPERLY FINISHED AND CURED, AND THE REPAIRED SECTION CONFORMS TO THE REQUIREMENTS OF THIS SPECIFICATION

10. REJECTION
THE PRECAST ELEMENTS SHALL BE SUBJECT TO REJECTION ON ACCOUNT OF ANY OF THE SPECIFICATION REQUIREMENTS. INDIVIDUA PRECAST ELEMENTS MAY BE REJECTED BECAUSE OF ANY OF THE FOLLOWING:

10.1,FRACTURES OR CRACKS PASSING THROUGH THE WALL, EXCEPT FOR A SINGLE END CRACK THAT DOES NOT EXCEED ONE HALF THE THICKNESS OF THE WALL.

10.2.DEFECTS THAT INDICATE PROPORTIONING, MIXING, AND MOLDING NOT IN COMPLIANCE WITH SECTION 4 OF THESE SPECIFICATIONS

10,3.HONEYCOMBED OR OPEN TEXTURE 10.4 DAMAGED ENDS, WHERE SUCH DAMAGE WOULD PREVENT MAKING A SATISFACTORY JOINT.

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: DATE OF MANUFACTURE

NAME OR TRADEMARK OF THE MANUFACTURER



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12/16/2011 445919 001 MRE FWM **JDR** PAC CT9 of CT11

12. INSTALLATION PREPARATION
TO FUSURE 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

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. A COPY OF THE REPORT SHALL BE SUBMITTED TO CONTECH® BRIDGE SOLUTIONS PRIOR TO SHIPMENT OF PRECAST CONCRETE ELEMENTS.

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 WITHOUT WRITTEN APPROVAL FROM CONTECH® BRIDGE SOLUTIONS.

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 X" IN 10'-0".

JE 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

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

13.INSTALLATION 13.1. GENERAL - THE INSTALLATION OF THE PRECAST CONCRETE ELEMENTS SHALL BE AS LAID OUT IN THE PROJECT'S

- PRE-CONSTRUCTION NOTES.

  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 OF HOLES PROVIDED IN EACH LINIT 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® BRIDGE 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® BRIDGE
- 13.1.2.1. IN THE IMMEDIATE AREA OF THE BRIDGE UNIT, 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 INCHES 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
- AFTER THE COMPACTED FILL LEVEL HAS REACHED THE DESIGN COVER, OR 2 FEET, 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 PAD/ SHIMS - THE BRIDGE UNITS AND WINGWALLS
- SHALL BE SET ON MASONITE OR STEEL SHIMS 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

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 3/2".

IT IS IMPERATIVE THAT ANY LATERAL SPREADING OF THE BRIDGE ELEMENTS BE AVOIDED DURING AND AFTER THEIR PLACEMENT. THEREFORE, A SUFFICIENT QUANTITY OF HARDWOOD WEDGES MUST BE AVAILABLE AND ON SITE. THE HARDWOOD WEDGES ARE PLACED IN THE KEY AND SMALLER SHIMS AND WEDGES ADDED BEFORE COMPLETE RELEASE OF THE PRECAST CONCRETE BRIDGE ELEMENT FROM THE CRANE. ALSO, A SUPPLY OF 1/4", 1/2" AND 16" THICK STEEL OR MASONITE SHIMS FOR VARIOUS

SHIMMING PURPOSES SHOULD BE ON SITE, PER SECTION 13.2. 13,3.1. BEBO PRECAST CONCRETE TWIN-LEAF ARCH UNITS ARE TRANSPORTED AND LIFTED/ROTATED IN A SIMILAR MANNER AS THE SINGLE-LEAF ELEMENTS. TWO DOUBLE-DRUM CRANES (OR ONE CRANE AND DISPLACEABLE SCAFFOLDING) ARE REQUIRED FOR THE ERECTION OF THE PRECAST

13.3.2. IDEALLY, ONE CRANE SHALL BE LOCATED ON EACH (OUTER) SIDE OF THE FOUNDATIONS TO INDEPENDENTLY LIFT HALF-ARCH UNITS FROM THE DELIVERY TRUCKS AND INTO POSITION. THE TWO TWIN PRECAST CONCRETE UNITS ARE

LIFTED AND POSITIONED SIMULTANEOUSLY.

13.3.3. ALTERNATIVELY, IF CRANES ARE TO BE POSITIONED ON THE SAME SIDE OF THE FOUNDATIONS OR WITHIN THE ARCH SPAN, THEY SHOULD BE LOCATED SO THAT THE FINAL JOINTING MOVEMENT OF THE UNITS AT THE CROWN CAN BE EFFECTED WITHOUT DAMAGE TO THE INTERLOCKING JOIN

13.3.4. BEFORE RELEASING THE LOAD OF EACH PRECAST CONCRETE ARCH HALF UNIT FROM THE CRANE, BOTH ELEMENTS MUST BE BLOCKED AT THE FOUNDATION KEY IN THE CORRECT POSITION AND THE CURVED TIE ROD MUST BE INSERTED AND FIXED IN THE BLOCKOUTS AT THE CROWN

13.3.5. CHECK THE SPAN WIDTH AT REGULAR INTERVALS TO

MINIMIZE THE SPREADING.

13.3.6. ONCE CORRECTLY POSITIONED AND ALIGNED, THE PRECAST CONCRETE TWIN-LEAF UNITS ARE JOINTED AT THE CROWN WITH CAST-IN-PLACE CONCRETE AS SHOWN IN THE

13.4. PLACEMENT OF WINGWALLS & HEADWALLS - THE WINGWALLS AND HEADWALLS SHALL BE PLACED AS SHOWN ON THE PLAN DRAWINGS, SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE.

13.5. WATERPROOFING/ JOINT PROTECTION AND SUBSURFACE

13.5.1. EXTERNAL PROTECTION OF JOINTS - THE BUTT JOINT MADE BY TWO ADJOINING BRIDGE UNITS SHALL BE COVERED WITH A ½" x 1½" 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 NINE INCHES ON EACH SIDE OF THE JOINT. THE EXTERNAL WRAP SHALL BE EITHER 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 LEG, ACROSS 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.

13.5.2. 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. 13.5.3. CROWN JOINT WATERPROOFING MEMBRANE - THE CAST-IN-PLACE CROWN JOINTS CONNECTING TWO ARCH LEAFS SHALL BE COVERED WITH WATERPROOFING MEMBRANE, THE MEMBRANE SHALL BE A MINIMUM OF 3'-0" WIDE AND OVERLAPPED AS REQUIRED PER THE MEMBRANE MANUFACTURER'S RECOMMENDATIONS TO PROVIDE CONTINUOUS COVERAGE OF THE ARCH CROWN, THE SURFACE SHALL BE FREE OF DIRT BEFORE APPLYING THE MEMBRANE. A PRIMER COMPATIBLE WITH THE MEMBRANE TO BE USED SHALL BE APPLIED. THE MEMBRANE SHALL BE BITUTHENE 3000 BY W.R. GRACE OR APPROVED EQUAL. THE CROWN JOINT SHALL BE CONTINUOUSLY COVERED PLUS 3'-0" MINIMUM BEYOND THE C.L.P. CONCRETE, ANY SPLICES THAT RESULT IN THE MEMBRANE SHALL HAVE A MINIMUM OF A 6" LONG LAP AND WITH THE OVERLAP RUNNING DOWNHILL. A LIQUID MEMBRANE TERMINATION SHALL BE APPLIED TO THE PERIMETER OF THE MEMBRANE. CROWN JOIN WATERPROOFING IS NOT REQUIRED IF FULL ARCH

MEMBRANE WATERPROOFING IS REQUIRED.

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

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13.5.5. SUBSOIL DRAINAGE SHALL BE AS DIRECTED BY THE

13.6. GROUTING

13.6.1. GROUTING SHALL NOT BE PERFORMED WHEN TEMPERATURES ARE EXPECTED TO GO BELOW 35° FOR A PERIOD OF 72 HOURS.

13.6.2. 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 PSLEOR SPANS ≤ 48 FEET. 5000 PSI FOR SPANS > 48 FEET

UNLESS OTHERWISE INDICATED ON THE INSTALLATION DRAWINGS. VIBRATE AS REQUIRED TO ENSURE THAT THE ENTIRE KEY AROUND THE BRIDGE ELEMENT IS COMPLETELY

13,6,3. ALL GROUT SHALL HAVE A MAXIMUM AGGREGATE SIZE OF 13.6.4. LIFTING AND ERECTION ANCHOR RECESSES SHALL BE FILLED WITH GROUT.

13.7. CROWN JOINT
13.7.1. THE CROWN JOINT AREAS MUST BE CLEAN AND FREE OF DEBRIS BEFORE POURING OF CONCRETE.
13.7.2. THE JOINTS BETWEEN ARCH UNITS SURROUNDING THE CROWN JOINTS MUST BE FILLED SO AS TO NOT ALLOW WET CONCRETE TO SEEP

THROUGH JOINTS WHILE THE CROWN JOINT IS BEING POURED.
CONCRETE USED FOR THE CROWN JOINT CLOSURE POUR MUST HAVE A
MINIMUM COMPRESSIVE STRENGTH AS SPECIFIED ON THE DRAWINGS.

13.7.4. THE CONCRETE FOR THE CROWN JOINT SHALL BE AIR-ENTRAINED WHEN INSTALLED IN AREAS SUBJECT TO FREEZE-THAW CONDITIONS, COMPOSED OF PORTLAND CEMENT, FINE AND COARSE AGGREGATES, ADMIXTURES, AND WATER, AIR-ENTRAINED CONCRETE SHALL CONTAIN 6 +/- 2 PERCENT AIR, THE AIR-ENTRAINING ADMIXTURE SHALL CONFORM TO AASHTO M154

13.7.4.1. THE PORTLAND CEMENT SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATIONS C150-TYPE I, TYPE II, OR TYPE III CEMENT. 13.7.4.2. THE COARSE AGGREGATE SHALL CONSIST OF STONE HAVING A MAXIMUM SIZE OF 1 INCH. AGG REQUIREMENTS FOR ASTM C33.

REQUIREMENTS FOR AS IM C.33,
THE CONTRACTOR MAY SUBMIT, FOR APPROVAL BY THE ENGINEER,
A WATER-REDUCING ADMIXTURE FOR THE PURPOSE OF
INCREASING WORKABILITY AND REDUCING THE WATER REQUIREMENT FOR THE CROWN JOINT CONCRETE.

13.7.4.4. THE ADDITION OF CALCIUM CHLORIDE OR ADMIXTURES TONTAINING CALCIUM CHLORIDE WILL NOT BE PERMITTED.

THE AGGREGATES, CEMENT, AND WATER SHALL BE PROPORTIONED AND MIXED TO PRODUCE A HOMOGENEOUS CONCRETE MEETING

THE STRENGTH REQUIREMENTS OF THE DESIGN 13.7.5. ALL REINFORCING BARS USED IN THE CROWN JOINT SHALL BE

DEFORMED BARS (ASTM AGLS) GRADE 60.

13.7-5.1. BAR REINFORCEMENT SHALL BE CUT AND BENT TO THE SHAPES SHOWN ON THE PLANS. ALL BARS SHALL BE BENT COLD, UNLESS OTHERWISE PERMITTED.

13.7.5.2. BAR REINFORCEMENT SHALL BE ACCURATELY PLACED AS SHOWN BAN REINFORCEMENT STAILS BE ACCORAGED TO EACH OF SHOWN ON THE PLANS AND FIRMLY HELD IN POSITION DURING THE PLACING AND SETTING OF THE CROWN JOINT CONCRETE. TACK WELDING OF THE REINFORCEMENT WILL NOT BE PERMITTED FOR ASSEMBLY OF REINFORCEMENT.

13.7.6. LEGS OF ARCHES TO BE FULLY GROUTED IN FOUNDATION KEYWAY
BEFORE POURING THE CROWN JOINT. KEYWAY GROUT TO ATTAIN 75%
OF ITS DESIGN STRENGTH (3750 PSI) BEFORE CROWN JOINT CAN BE

13.7.7. CONCRETE IN CROWN JOINT MUST ATTAIN 75% OF ITS DESIGN STRENGTH BEFORE HEADWALL PANELS CAN BE SET ON THE ARCH UNITS.

13.7.8. CONCRETE IN CROWN JOINT MUST ATTAIN 100% OF ITS DESIGN
STRENGTH BEFORE BACKFILLING OPERATIONS CAN BEGIN.

13.7.9. DO NOT POUR CONCRETE FOR THE CROWN JOINT WHEN TEMPERATURES ARE EXPECTED TO GO BELOW 35 DEGREES

FARENHEIGHT FOR A PERIOD OF 72 HOURS.

13.7.10. NO WATERPROOFING SEALANT OR SEALER SHALL BE APPLIED WITHIN THE CROWN JOINT AREA. SHOULD ANY AREAS WITHIN THE CROWN JOINT AREA. SHOULD ANY AREAS WITHIN THE CROWN JOINT BE COVERED WITH SEALANT OR SEALER, THE AREAS SHOULD BE SANDBLASTED TO REMOVE THE SEALANT OR SEALER.

ENGINEER

.8. <u>BACKFILL</u> 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

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

13.8.4. BACKFILL ZONES

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

MODIFIED IN THIS SECTION.

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 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 - 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 - IS THE ROAD SECTION OF GRAVEL, ASPHALT

OR CONCRETE BUILT IN COMPLIANCE WITH LOCAL ENGINEERING PRACTICES.

13.8.6. PLACING AND COMPACTING BACKFILL - DUMPING FOR BACKFILLING IS NOT ALLOWED ANY NEARER THAN 3'-0" TO A VERTICAL PLANE THROUGH THE BRIDGE KEY.

> 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 STANDARD PROCTOR AS

SOIL WITHIN 1'-0" OF CONCRETE SURFACES SHOULD BE HAND-COMPACTED. ELSEWHERE, USE OF ROLLERS IS ACCEPTABLE. IF VIBRATING ROLLER-COMPACTORS ARE USED, THEY SHOULD 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 SHOULD SATISFY THE CRITERIA FOR THE

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

BRIDGE UNITS - FOR FILL HEIGHTS OVER 12-0", NO BACKFILLING MAY BEGIN UNTIL A BACKFILL COMPACTION TESTING PLAN HAS BEEN COORDINATED WITH AND APPROVED BY CONTECH® BRIDGE SOLUTIONS. COST OF THE BACKFILL COMPACTION TESTING SHALL BE INCLUDED IN THE COST OF THE PRECAST UNITS. THIS INCLUDED COST APPLIES ONLY TO PROJECTS WITH FILL HEIGHTS OVER 12'-0" (AS MEASURED FROM TOP CROWN OF BRIDGE TO FINISHED GRADE). 13.8.8. WINGWALLS - BACKFILL IN FRONT OF WINGWALLS SHALL BE

CARRIED TO GROUND LINES SHOWN IN THE PLANS.

13.9. 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 ROW 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

THE MAXIMUM DIFFERENCE IN VERTICAL DISPLACEMENTS 'V' SHOULD NOT EXCEED 1" ALONG THE LENGTH OF ONE

SEAL CREATION OF THE PROPERTY OF TH

CONTECH ARCH ENGINEERING, PROFESSIONAL CORPORATION FIRM LICENSE NUMBER: C-3034

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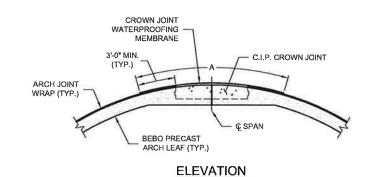


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	PROJECT No.:	CT No.: SEQ.		DATE:		
	445919	00	)1	12/16/2011		
	DESIGNED:		DRAV	RAWN:		
	MRP			EWM		
	CHECKED:		APPR	OVED		
	JDR			PAC		
	SHEET NO :					
		<u> T1</u>	0 0	F CT11		

#### SPECIFICATIONS FOR MANUFACTURE AND INSTALLATION OF BEBO® ARCH SYSTEMS (CONTINUED)

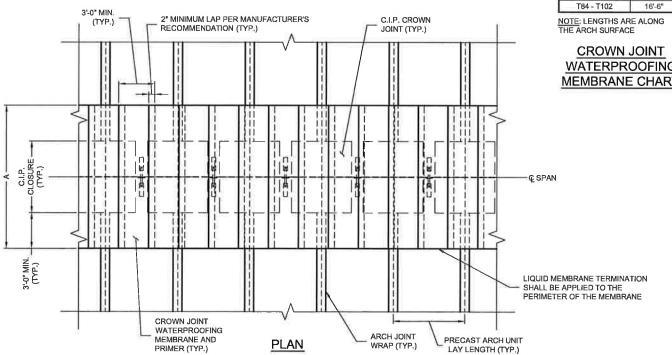
#### ACCEPTABLE SOILS FOR USE IN ZONE B BACKFILL

TYPICAL USCS MATERIALS	AASHTO GROUP	AASHTO SUBGROUP	PERCENT PASSING US SIEVE NO.		CHARACTER OF FRACTION PASSING NO. 40 SIEVE			
			#10	#40	#200	LIQUID LIMIT	PLASTICITY INDEX	SOIL DESRIPTION
GW, GP, SP		A-1A	50 MAX	30 MAX	15 MAX		6 MAX	LARGELY GRAVEL BUT CAN INCLUDE SAND AND FINES
GM, SW, SP, SM	A1	A-1B		50 MAX	25 MAX		6 MAX	GRAVELLY SAND OR GRADED SAND, MAY INCLUDE FINES
GM, SM, ML, SP, GP	A2	A-2-4			35 MAX	40 MAX	10 MAX	SANDS, GRAVELS WITH LOW- PLASTICITY SILT FINES
SC, GC, GM	AZ	A-2-5			35 MAX	41 MIN	10 MAX	SANDS, GRAVELS WITH PLASTIC SILT FINES
SP, SM, SW	АЗ			51 MIN	10 MAX		NON- PLASTIC	FINE SANDS
ML, SM, SC	A4				36 MIN	40 MAX	10 MAX	LOW-COMPRESSIBILTY SILTS

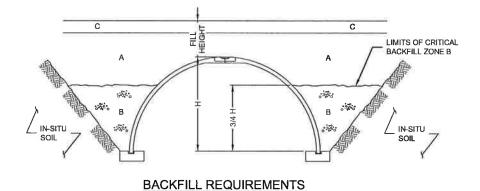


FORM/SPAN	Α*
C30T - C54T	12'-6"
E54T - E66T	12'-6"
E72T - E84T	14'-6"
T64 - T82	14'-6"
T84 - T102	16'-6"

**CROWN JOINT** WATERPROOFING MEMBRANE CHART



**CROWN JOINT SEALING DETAILS** 



VARIES BY ANCHOR TYPE LIMITS OF EXCAVATION B= 4'-1" C= 5'-1" FINISHED GRADE -D= 6'-1" COMPACTED MATERIAL (SAME AS UNIT BACKFILL) LIMITS OF CRITICAL BACKFILL ZONE (C.B.Z.)

WALL BACKFILL REQUIREMENTS



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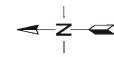
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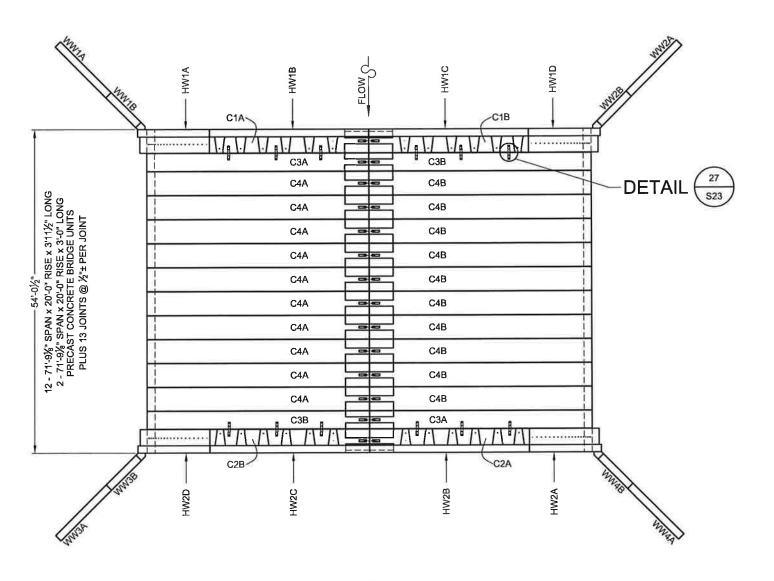
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**BEBO** Arch Systems CONTECH CONTRACT

IV. C 2024					
	PROJECT No.:	SEQ	No:	DATE:	
	445919	00	01	12/16/2011	
	DESIGNED:		DRAV	/N:	
	MRP			EWM	
	CHECKED:		APPR	OVED:	
	JDR		PAC		
	SHEET NO:				
		<u> </u>	<b>1</b> o	<sup></sup> CT11	

# NCDOT STOKES COUNTY BRIDGE REPLACEMENT WALNUT COVE, NORTH CAROLINA





SEAL 035346

**KEY PLAN** 

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ш	without the prior written consent of CONTECH. Failure to comply is done at the user's own risk and CONTECH expressly disclaims any liability or responsibility for such use					
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≥	CONTECH accepts no liability for designs based on missing.	MARK	DATE	REVISION DESCRIPTION	BV	,

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DESIGNED:		DRAV	VN:		
MRP			JCH		
CHECKED: RKL		APPROVED: PAC			
SHEET NO.:	S1	0	F S23		

# SEE SHEET S3 A2 FOR REINFORCING B1 SEE CHARTS ON SHEET S3 PRECAST UNIT MESH REINFORCEMENT

#### WEIGHT OF REQUIRED MESH REINFORCEMENT = 373 LBS/FT

9							
445919445919-1-BEBO\DRAWINGS\FABRICATION\P	SHEET NO.	CIRCUMFERENTIAL AREA REQ'D (IN²/FT)	LONGITUDINAL AREA REQ'D (IN²/FT)	MESH SIZE	LENTGH (FT)	CIRCUMFERENTIAL AREA REQ'D (IN²/FT)	LONGITUDINAL AREA REQ'D (IN²/FT)
NGSN	1	A1A = 0.72	0.13		22'-4"		
<b>DRAW</b>	2	A1B = 0.42	0.13		22'-4"		
EBO/	3	A2 = 0.72	0.13		8'-8"		
19-1-8	4	A3A = 0.72	0.13		35'-2"		
9/4459	5	A3B = 0.60	0.13		34'-10"		
4591	6	A4 = 0.36	0.13		11-0"		

DESIGN LOADING: HL-93

800-338-1122 513-645-7000 513-645-7993 FAX DATE REVISION DESCRIPTION

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COVER = 1'-6" MIN. \ 4'-0" MAX.

BEBO Arch Systems CONTECH FABRICATION DRAWING

NCDOT STOKES COUNTY **BRIDGE REPLACEMENT** WALNUT COVE, NORTH CAROLINA

1. MINIMUM 28-DAY CONCRETE COMPRESSIVE STRENGTH SHALL

2. OVERLAP LENGTH SHALL BE MEASURED FROM LAST

3. DIMENSIONS SHOWN ARE FOR FORM SYSTEM "E72T". 4. MINIMUM YIELD STRENGTH FOR WELDED WIRE FABRIC SHALL BE

5. REINFORCING SHALL BE LIMITED

6. ALL EDGES OF PRECAST TO HAVE

PER AREA (A1 OR A3).

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 MUST BE A MAXIMUM OF 8" O.C.

TO A MAXIMUM OF THREE LAYERS OF REINFORCING (WWF OR BARS)

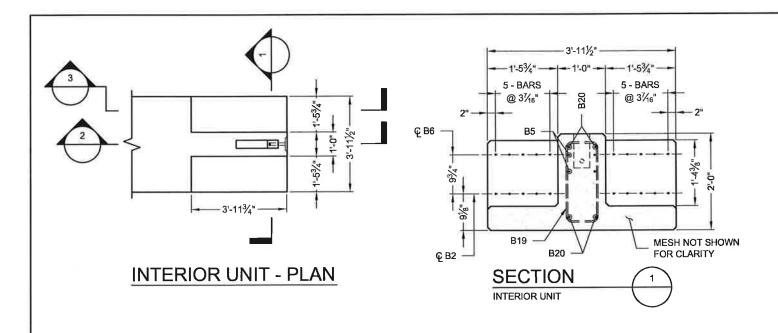
BE 6000 PSI.

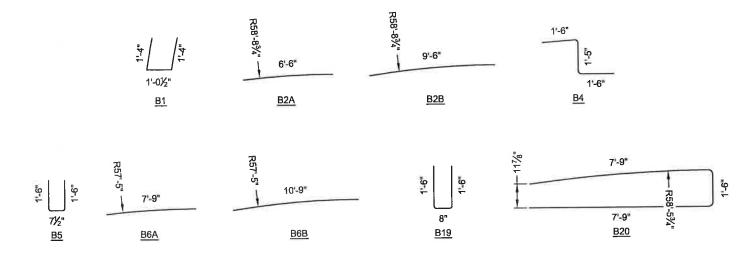
CROSSWIRE.

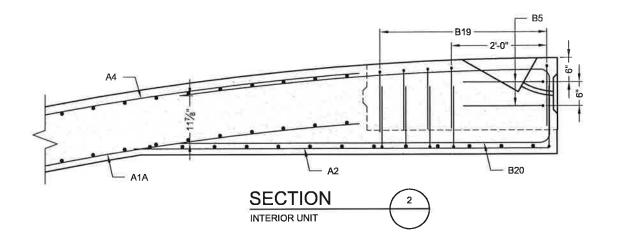
65,000 PSI.

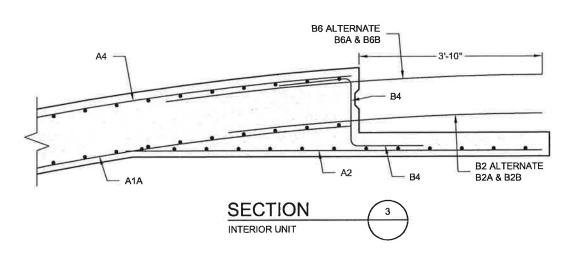
CONTECH ARCH ENGINEERING, PROFESSIONAL CORPORATION

PROJECT No.:	SEQ,	No:	DATE:		
445919	00	)1	12/15/2011		
DESIGNED:		DRAV	VN:		
MRP			JCH		
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RKL			PAC		
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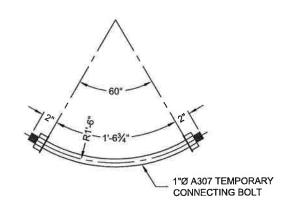








#### WEIGHT OF REQUIRED BAR REINFORCEMENT = 487.93 LBS/UNIT **UNIT - REINFORCING BAR LIST** MARK SIZE NO. LENGTH Fy = 60 KSI 3'-81/2" BENT SPACED @ 9" O.C. SPACE AS SHOWN BENT SPACE AS SHOWN 9'-6" SPACED @ 4" O.C. 4'-5" BENT #4 10 SPACE AS SHOWN 3'-71/2" BENT SPACE AS SHOWN 7'-9" BENT SPACE AS SHOWN 10'-9" BENT BENT SPACED @ 6" O.C. (UNLESS NOTED) #3 10 3'-8" SPACED @ 6½" O.C. 17'-2"



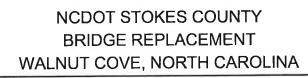
#### TEMPORARY CONNECTING **BOLT DETAIL**

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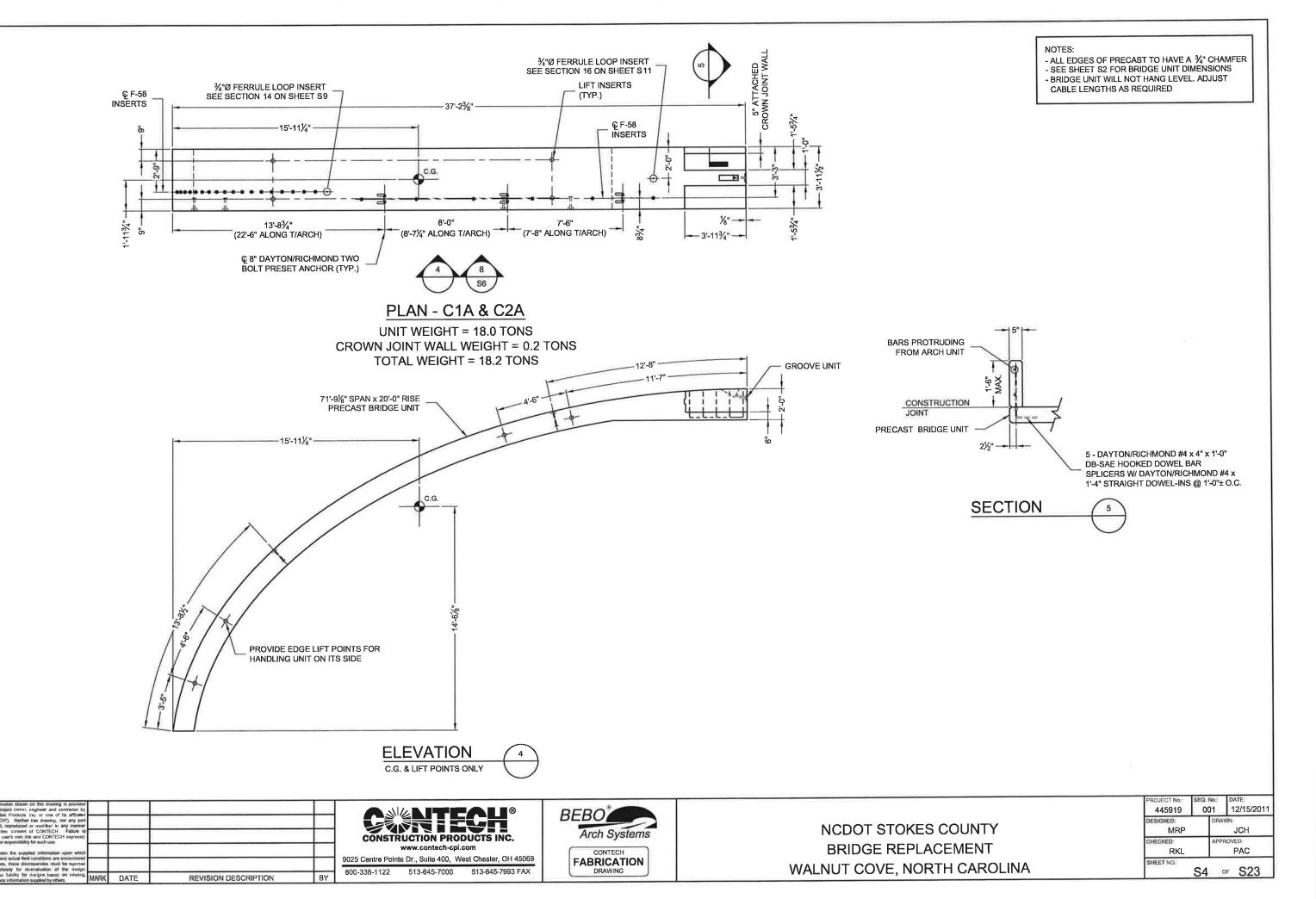
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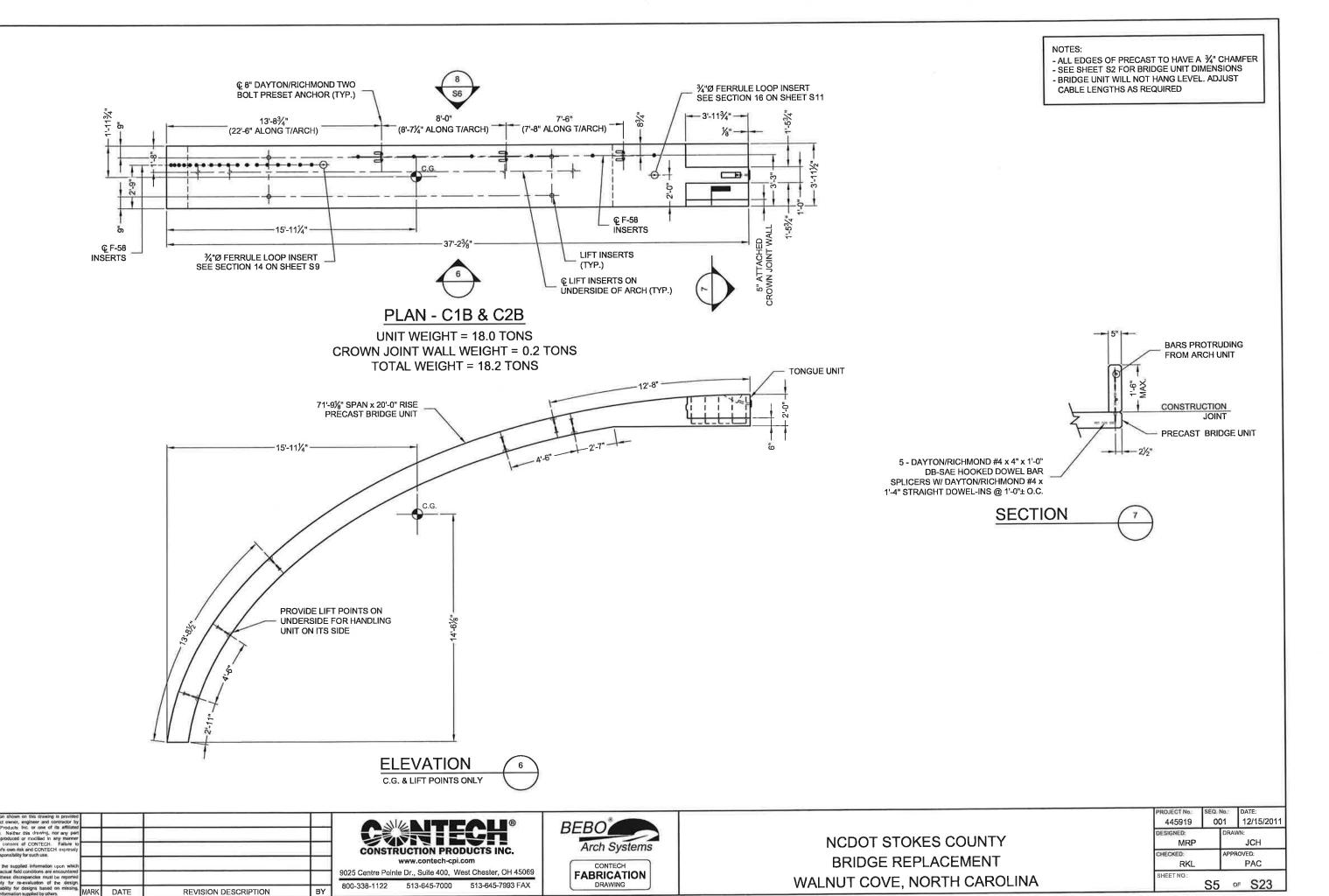
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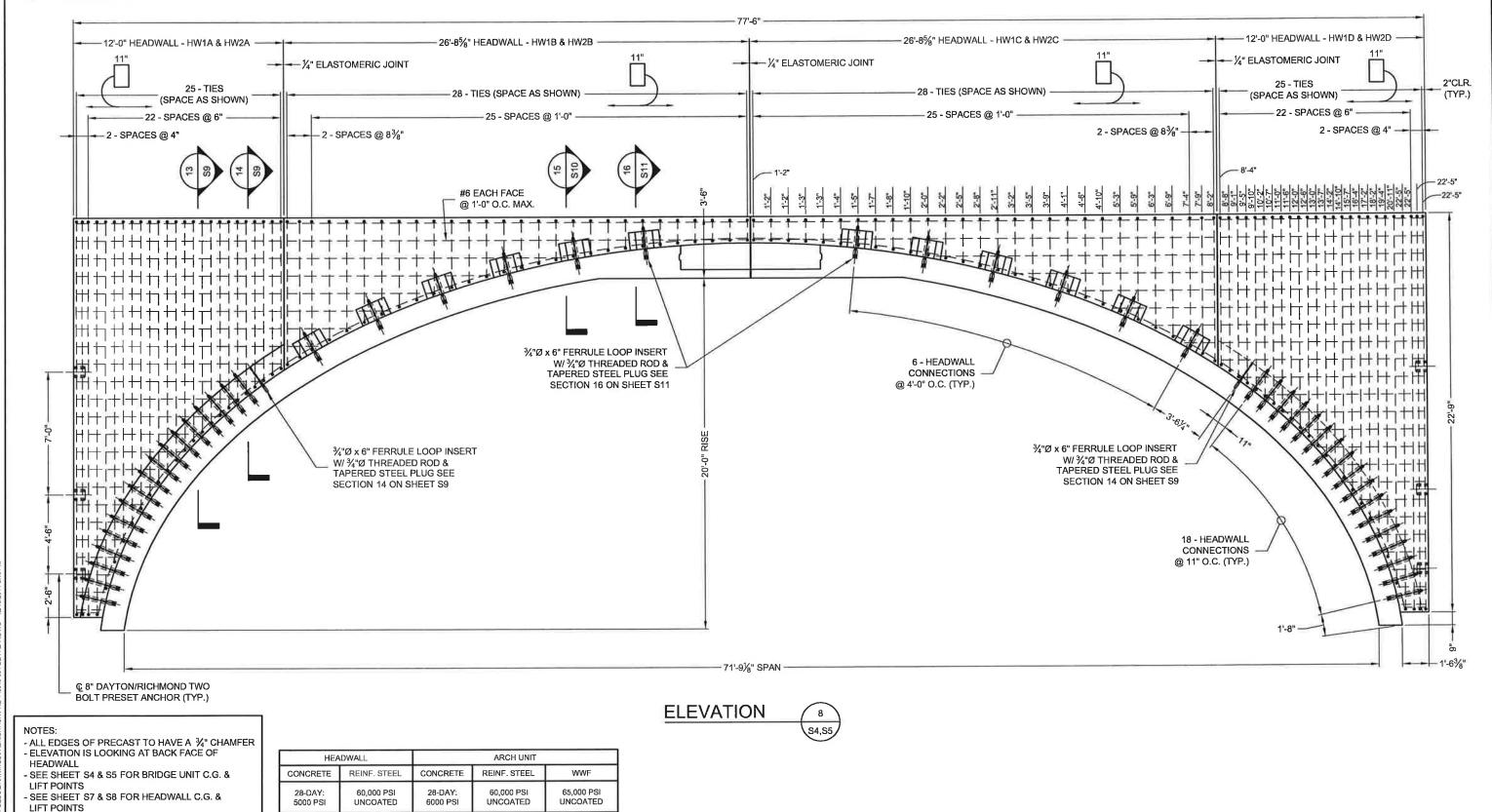
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	445919	00	)1	12/15/2011		
	DESIGNED:		DRAW	WH:		
	MRP			JCH		
	CHECKED:		APPR	OVED:		
	RKL			PAC		
ĺ	SHEET NO.	202		222		
		S3	0	F S23		







- HEADWALL TO BE CAST AGAINST BRIDGE UNIT - BRIDGE UNITS MUST BE GROUTED OR BRACED
- WHEN SETTING PRECAST HEADWALLS - SEE SHEET \$2 FOR BRIDGE UNIT DIMENSIONS

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.

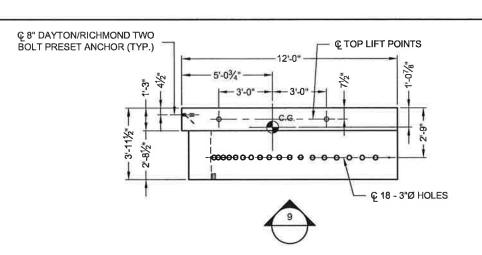
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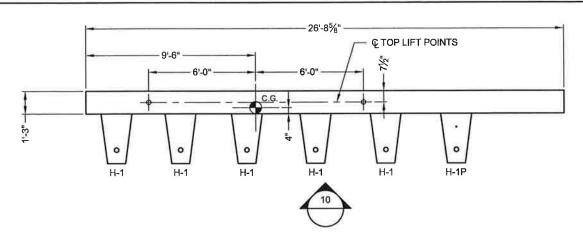
	PROJECT No.:	SEQ	No.:	DATE:
	445919	00	01	12/15/2011
	DESIGNED:		DRAW	/N:
	MRP			JCH
	CHECKED:		APPR	OVED:
	RKL			PAC
	SHEET NO.:	-	/	
_		S6	0	S23

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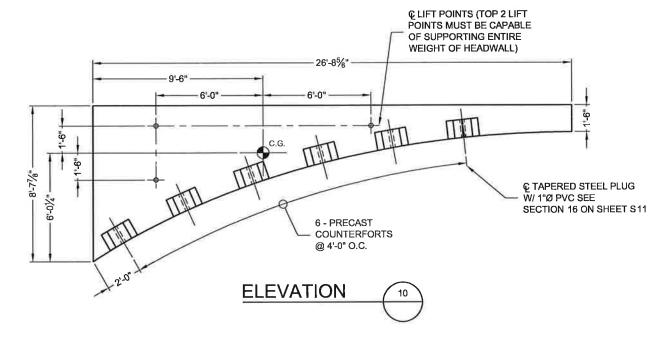
#### PLAN - HW1A & HW2A **TOTAL WEIGHT = 21.6 TONS**

© LIFT POINTS (TOP 2 LIFT POINTS MUST BE CAPABLE -5'-03/4" -€ 8" DAYTON/RICHMOND TWO BOLT PRESET ANCHOR (TYP.) OF SUPPORTING ENTIRE 3'-0"--WEIGHT OF HEADWALL) 2-0 Ç TAPERED STEEL PLUG W/ 1"Ø PVC SEE SECTION 14 ON SHEET S9 18 - 3"Ø HOLES @ 11" O.C. € 4" x 4" x 2" BLOCKOUT



#### PLAN - HW1B & HW2B

TOTAL WEIGHT = 11.0 TONS



1'-75%"---

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NCDOT STOKES COUNTY BRIDGE REPLACEMENT WALNUT COVE, NORTH CAROLINA

PROJECT No.: 445919	SEQ, No.: 001		12/15/2011	
DESIGNED:		DRAWN:		
MRP		JCH		
CHECKED:		APPROVED:		
RKL			PAC	
SHEET NO.:				
	S7	C	∍ S23	

- ALL EDGES OF PRECAST TO HAVE A ¾" CHAMFER - ELEVATION IS LOOKING AT BACK FACE OF

- SEE SHEET S10 FOR H-1 COUNTERFORT DETAILS

- SEE SHEET S11 FOR H-1P COUNTERFORT DETAILS

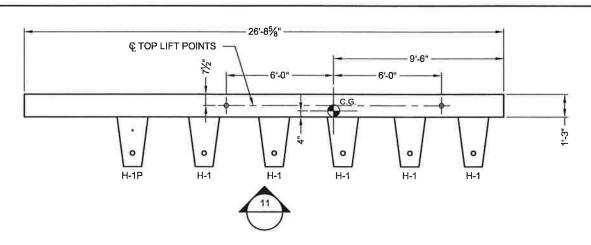
- HEADWALL TO BE CAST AGAINST BRIDGE UNIT - BRIDGE UNITS MUST BE GROUTED OR BRACED WHEN SETTING PRECAST HEADWALLS - HEADWALL WILL NOT HANG LEVEL. ADJUST

CABLE LENGTHS AS REQUIRED

NTECH Immediatory for re-evanged and the company of the company of

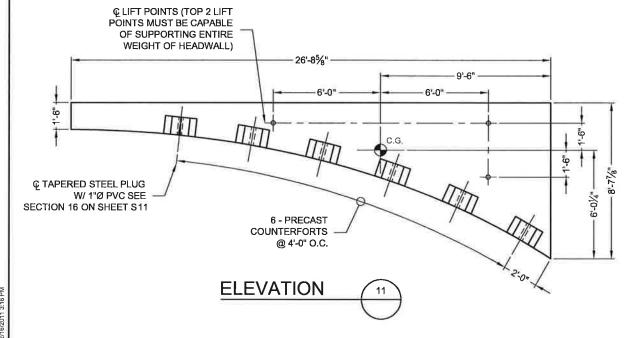
REVISION DESCRIPTION

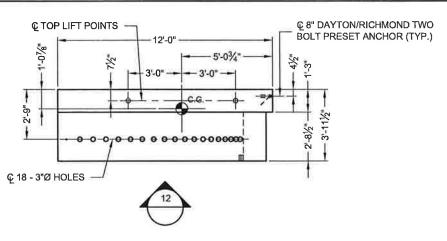
**ELEVATION** 



#### PLAN - HW1C & HW2C

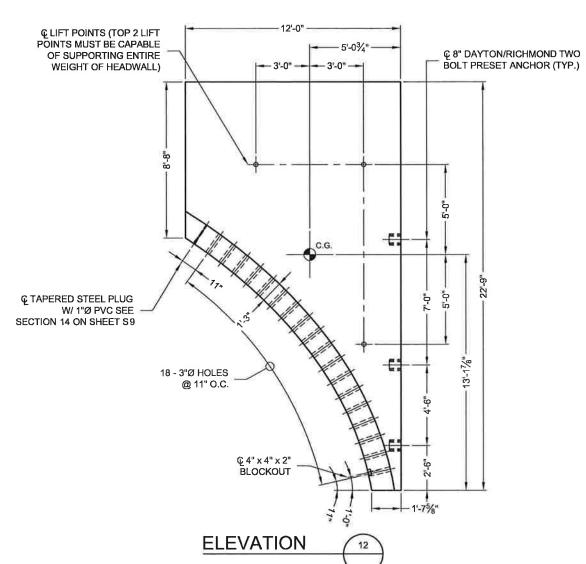
**TOTAL WEIGHT = 11.0 TONS** 





#### PLAN - HW1D & HW2D

TOTAL WEIGHT = 21.6 TONS



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PROJECT No.: 445919	SEQ.			ATE: 2/15/201
DESIGNED: MRP		DRAV		JCH
CHECKED: RKL		APPR	-	ED: PAC
SHEET NO.:	S8	0	F	S23

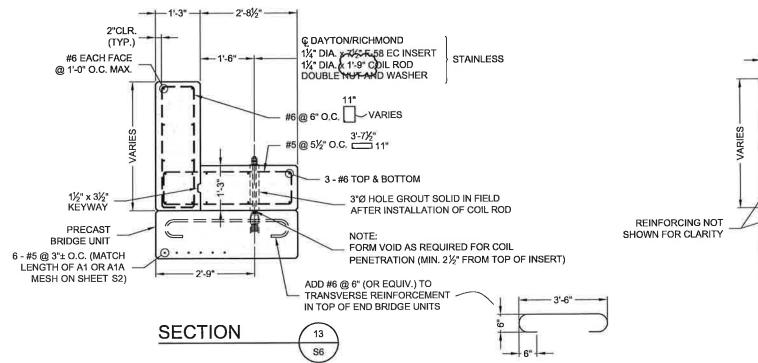
- ALL EDGES OF PRECAST TO HAVE A 3/4" CHAMFER - ELEVATION IS LOOKING AT BACK FACE OF

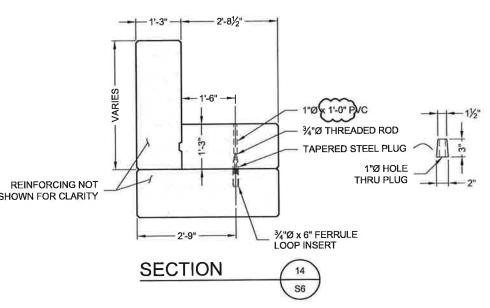
- SEE SHEET S10 FOR H-1 COUNTERFORT DETAILS - SEE SHEET S11 FOR H-1P COUNTERFORT DETAILS

 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

HEADWALL





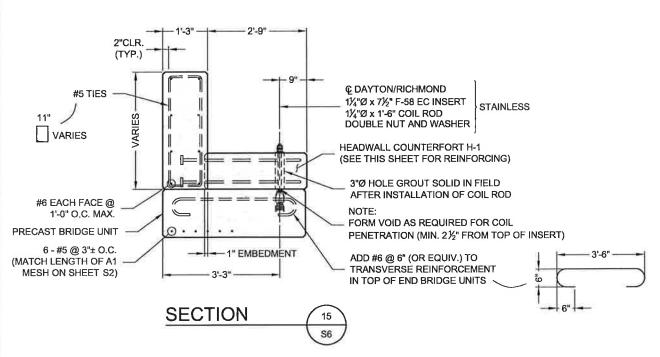
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PRC	discrepancies between the supplied information upon which is drawing is based and actual field conditions are encountered			$\perp$
	as site work progresses, these discrepancies must be reported to CONTECH immediately for re-evaluation of the design			
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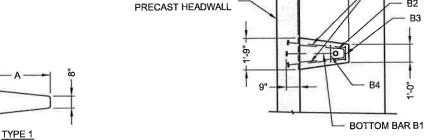
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BEBO 4

SHEET NO:	S9	0	S23
CHECKED: RKL		APPR	PAC
DESIGNED: MRP		DRAV	JCH
PROJECT No.: 445919	SEQ. No.: 001		DATE: 12/15/2011

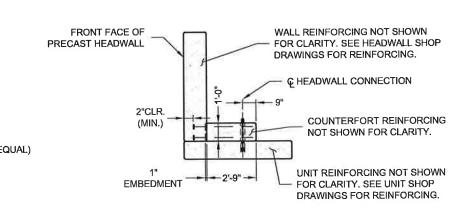




FRONT FACE OF

#### PLAN - TYPE H-1

TOP BARS B1



#### **SECTION - TYPE H-1**

© 3"Ø HOLE GROUT SOLID IN FIELD AFTER INSTALLATION OF COIL ROD

#### PRECAST COUNTERFORT TYPE H-1

TOTAL WEIGHT = .284 TONS

	(SEE THIS SHEET FOR REINFORCING)	
1" EMBEDMENT	3"Ø HOLE GROUT SOLID IN FIELD AFTER INSTALLATION OF COIL ROD NOTE: FORM VOID AS REQUIRED FOR COIL PENETRATION (MIN. 2½" FROM TOP OF INSERT)  ADD #6 @ 6" (OR EQUIV.) TO TRANSVERSE REINFORCEMENT IN TOP OF END BRIDGE UNITS	TYPE 2
<u> </u>	15 S6	#8 HRC 150 OR #8 HRC 120 HEAD (OR EQUIVELDED TO #6 BAR
		TYPE 3 (EPOXY COATED*)

BAR LIST - TYPE H-1							
MARK	QTY.	SIZE	Α	В	TYPE	LENGTH	FINISH
B1	3	#6	3'-0"	2	3	3'-0"	EPOXY*
B2	2	#5	2'-6"	1'-5"	1	5'-8"	BLACK
В3	1	#3	8"		2	2'-8"	BLACK
B4	1	#3	11"	×	2	3'-2"	BLACK

STANDARD CLEARANCE = 2"

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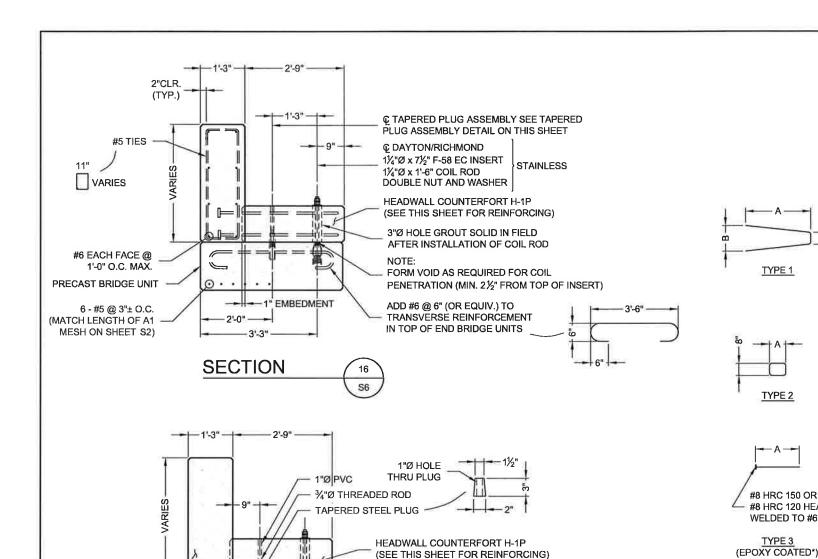
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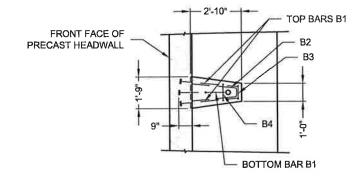
\*NOTE: EPOXY COATING IS NOT REQUIRED ON HEADED ENDS OF TYPE 3 BARS, BUT

WILL NOT BE DETRIMENTAL IF PROVIDED. \*NOTE: HRC HEADS PROVIDED BY HEADED REINFORCEMENT CORP.

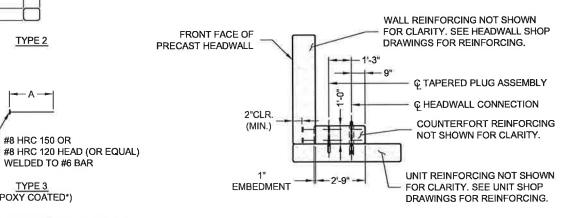
PROJECT No.: 445919	SEQ. No.: 001		12/15/201°
DESIGNED:		DRA	wn: JCH
CHECKED:		APP	PAC
SHEET NO.:	S10	) (	∍ S23



3/4"Ø x 6" FERRULE



#### PLAN - TYPE H-1P



#### **SECTION - TYPE H-1P**

#### Ç 3"Ø HOLE GROUT SOLID IN © 1"Ø PVC & FIELD AFTER INSTALLATION TAPERED STEEL PLUG OF COIL ROD 1 - B1

#### PRECAST COUNTERFORT TYPE H-1P

TOTAL WEIGHT = .284 TONS

#### TAPERED PLUG ASSEMBLY DETAIL

	BAR LIST - TYPE H-1P								
MARK	QTY.	SIZE	Α	В	TYPE	LENGTH	FINISH		
B1	3	#6	3'-0"	*	3	3'-0"	EPOXY*		
B2	2	#5	2'-6"	1'-5"	1	5'-8"	BLACK		
В3	1	#3	8"	=	2	2'-8"	BLACK		
B4	1	#3	11"	*	2	3'-2"	BLACK		

STANDARD CLEARANCE = 2"

REINFORCING NOT

SHOWN FOR CLARITY

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I:WER	to CONTECH immediately for re-evaluation of the design CONTECH accepts no liability for designs based on messing, incomplete or inaccutate information supplied by others.	DATE	REVISION DESCRIPTION	BY	1

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TYPE 2

#8 HRC 150 OR

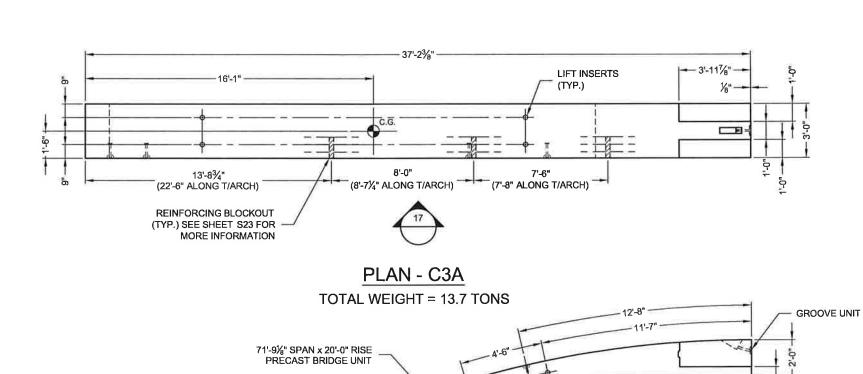
\*NOTE: EPOXY COATING IS NOT REQUIRED

ON HEADED ENDS OF TYPE 3 BARS, BUT

WILL NOT BE DETRIMENTAL IF PROVIDED. \*NOTE: HRC HEADS PROVIDED BY HEADED REINFORCEMENT CORP.

WELDED TO #6 BAR

 PROJECT No:	SEQ	No.:	DATE:
445919	. 00	01	12/15/2011
DESIGNED:		DRAW	/N:
MRP			JCH
CHECKED:		APPR	OVED:
RKL			PAC
SHEET NO.:			
	<u>S11</u>	0	F S23



- ALL EDGES OF PRECAST TO HAVE A ¾" CHAMFER SEE SHEET S2 FOR BRIDGE UNIT DIMENSIONS
- BRIDGE UNIT WILL NOT HANG LEVEL. ADJUST
- CABLE LENGTHS AS REQUIRED
- MANUFACTURER SHALL MARK END OF UNIT C3A WITH REINFORCING BLOCKOUT PRIOR TO SHIPPING.

	ARCH UNIT						
CONCRETE	REINF. STEEL	WWF					
28-DAY: 6000 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.



42						
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ш	without the prior written consent of CONTECH. Faure to comply is done at the user's own risk and CONTECH expressly disclaims any liability or responsibility for such use					
	If discrepancies between the supplied information upon which					ı
군	as site work progresses, these discrepancies must be reported to CONTECH immediately for re-evaluation of the design.					ı
	CONTECH accepts no liability for designs based on missing, incomplete or inaccurate information supplied by others.	MARK	DATE	REVISION DESCRIPTION	BY	l

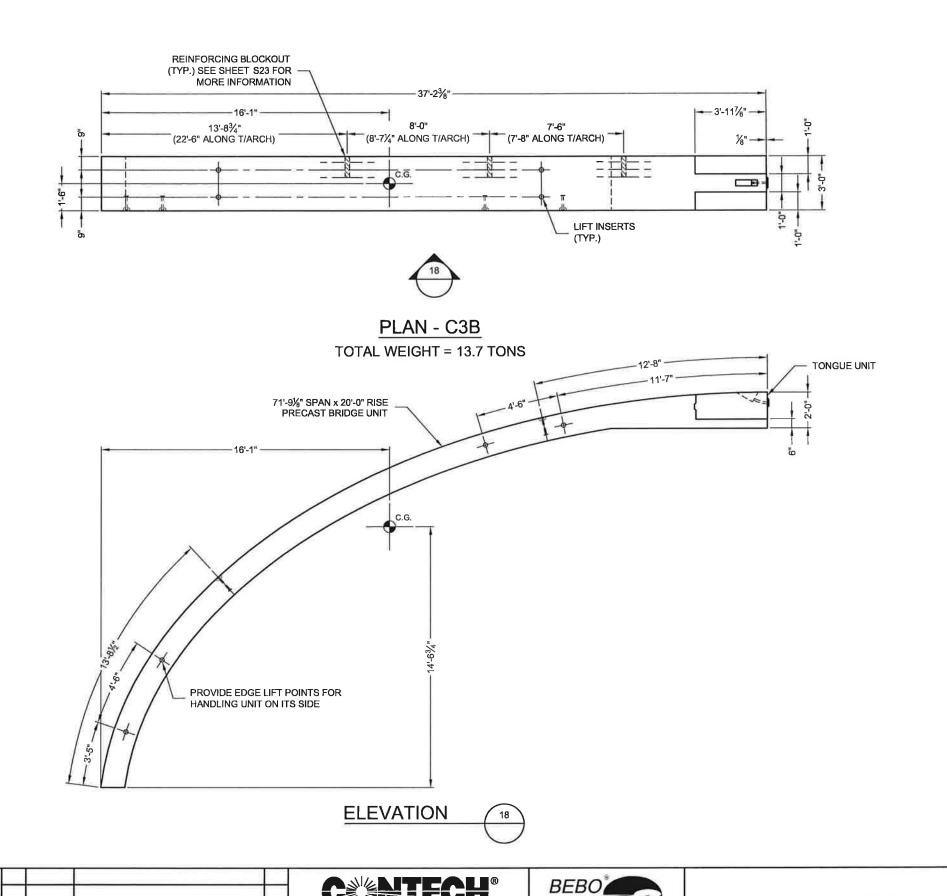
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PROVIDE EDGE LIFT POINTS FOR HANDLING UNIT ON ITS SIDE

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PROJECT No.:	SEQ.	No_:	DATE:			
445919	00	01	12/15/2011			
DESIGNED:		DRAWN:				
MRP		JCH				
CHECKED:		APPROVED:				
RKL		PAC				
SHEET NO.:						
S12 of S23						



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REVISION DESCRIPTION

Arch Systems

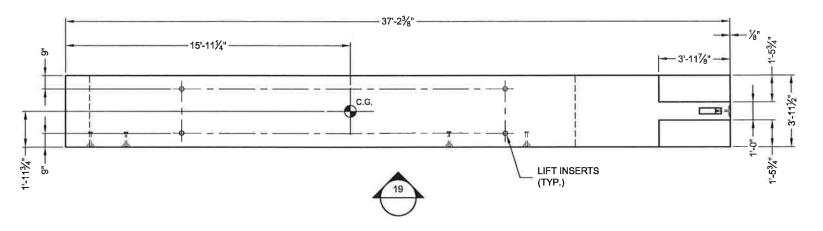
FABRICATION DRAWING

- ALL EDGES OF PRECAST TO HAVE A ¾" CHAMFER SEE SHEET S2 FOR BRIDGE UNIT DIMENSIONS
- BRIDGE UNIT WILL NOT HANG LEVEL. ADJUST
- CABLE LENGTHS AS REQUIRED - MANUFACTURER SHALL MARK END OF UNIT C3B
- WITH REINFORCING BLOCKOUT PRIOR TO SHIPPING.

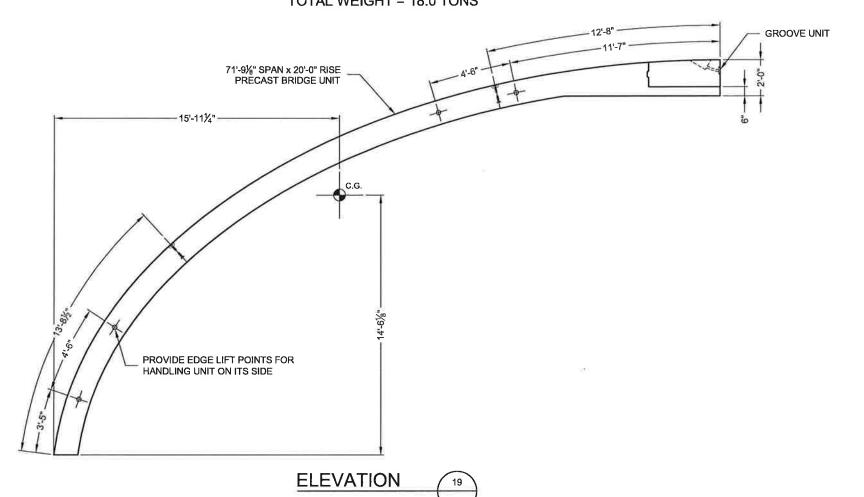
ARCH UNIT					
CONCRETE	REINF. STEEL	WWF			
28-DAY: 6000 PSI	60,000 PSI UNCOATED	65,000 PSI UNCOATED			

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.

445919	1 00	01	12/15/2011
DESIGNED:		DRAV	
MRP			JCH
HECKED:		APPR	OVED:
RKL			PAC
SHEET NO.:			
	S13	} 0	F S23



#### PLAN - C4A TOTAL WEIGHT = 18.0 TONS



REVISION DESCRIPTION MARK DATE



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NCDOT STOKES COUNTY **BRIDGE REPLACEMENT** WALNUT COVE, NORTH CAROLINA

PROJECT No.: 445919	SEQ.		DATE: 12/15/2011
440919	001		
DESIGNED:	DRA		WN:
MRP	>		JCH
CHECKED:		APPI	ROVED:

PAC

- ALL EDGES OF PRECAST TO HAVE A 1/4" CHAMFER - SEE SHEET S2 FOR BRIDGE UNIT DIMENSIONS - BRIDGE UNIT WILL NOT HANG LEVEL. ADJUST CABLE LENGTHS AS REQUIRED

> ARCH UNIT REINF. STEEL

60,000 PSI UNCOATED

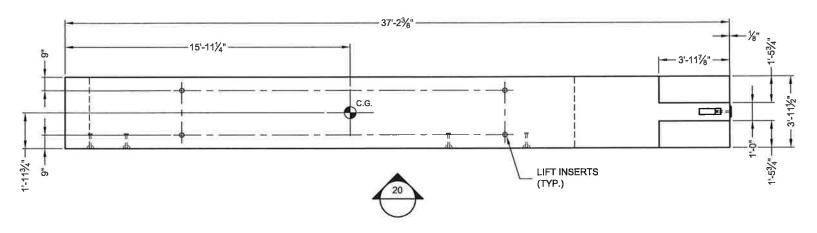
WHEREVER THE REINFORCING IS CUT FOR THE PLACEMENT OF LIFT HOLES OR OTHER BLOCKOUTS, REINFORCING BARS OR WIRES OF EQUIVALENT
CROSS-SECTIONAL AREA SHALL BE PLACED
SYMMETRICALLY AROUND THE HOLE. AT LEAST ONE

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.

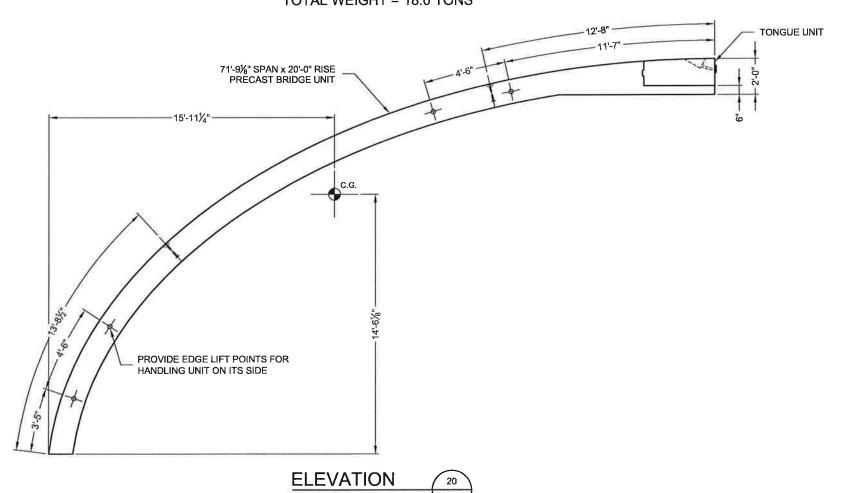
65,000 PSI

28-DAY: 6000 PSI

S14 of S23



## PLAN - C4B TOTAL WEIGHT = 18.0 TONS



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NCDOT STOKES COUNTY BRIDGE REPLACEMENT WALNUT COVE, NORTH CAROLINA

OJECT No.:	SEQ. No.:		DATE:
445919	00	)1	12/15/2011
SIGNED:		DRAV	VN:
MRP			JCH
ECKED:	APPROVED:		OVED:
RKL	PAC		PAC
EET NO.:			
	S15 of S23		F S23

#### NOTES

- ALL EDGES OF PRECAST TO HAVE A ¾" CHAMFER - SEE SHEET S2 FOR BRIDGE UNIT DIMENSIONS
- BRIDGE UNIT WILL NOT HANG LEVEL. ADJUST CABLE LENGTHS AS REQUIRED

ARCH UNIT					
CONCRETE	REINF. STEEL	WWF			
28-DAY: 6000 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.

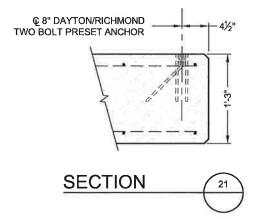
#### 12'-0" - 5'-01/<sub>8"</sub> - 3'-0" -VERTICAL BARS: € LIFT POINTS (TOP 2 LIFT POINTS MUST BE CAPABLE OF SUPPORTING 4 - #5 @ 3" O.C. BACK FACE ONLY ENTIRE WEIGHT OF WINGWALL) VERTICAL BARS: 2 - #4 @ 3" O.C. BACK FACE ONLY 2"CLR. (TYP.) #4 x 11'-8" BACK FACE ONLY TYPE C TYPEC TYPEC TYPEE - 4'-0" - 4'-0" --ፍ WALL ANCHOR

## WINGWALL - WW1A & WW4A TOTAL WEIGHT = 14.2 TONS

# #4 @ 1'-6" O.C. EACH FACE, EACH WAY OR EQUIVALENT MESH VERTICAL BARS: 4 - #5 @ 3" O.C. BACK FACE ONLY VERTICAL BARS: 2 - #4 @ 3" O.C. BACK FACE ONLY VERTICAL STEEL AT ANCHOR TO BE 2"CLR. FROM BACK FACE OF WALL (TYP.) ACK FACE ONLY TYPE C TYPE C TYPE TYPE C TYPE TYPE C TYPE TYPE C TYPE C

#### REINFORCING DETAIL - WW1A & WW4A

(FOR ANCHOR REINFORCING SEE SHEET S20)



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NCDOT STOKES COUNTY
BRIDGE REPLACEMENT
WALNUT COVE, NORTH CAROLINA

PROJECT No.: 445919	SEQ	No.: 01	DATE: 12/15/2011
DESIGNED:		DRAV	VIN:
MRP			JCH
CHECKED:	APPROVED:		OVED:
RKL	PAC		PAC
SHEET NO:			
S16 ∘ S23			

#### NOTES

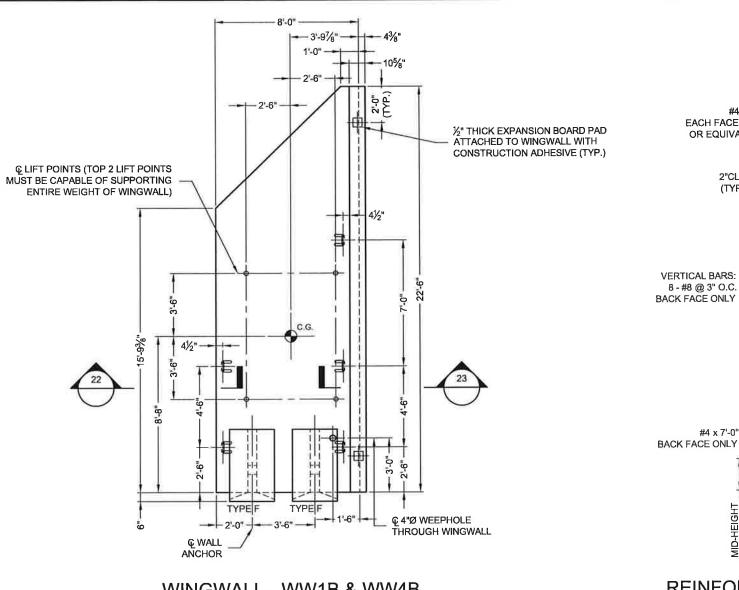
- ALL EDGES OF PRECAST TO HAVE A ¾" CHAMFER - ELEVATION IS LOOKING AT BACK FACE OF WINGWALL

- 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 - WW1B & WW4B

TOTAL WEIGHT = 17.3 TONS

**SECTION** 

# **REINFORCING DETAIL - WW1B & WW4B** (FOR ANCHOR REINFORCING SEE SHEET S21) © 8" DAYTON/RICHMOND TWO BOLT PRESET ANCHOR **SECTION** 23

#4 x 7'-0"

TYPE F

#5 EACH FACE

(TYP. ALL EDGES)

#4 @ 1'-6" O.C. EACH FACE, EACH WAY

OR EQUIVALENT MESH

(TYP.)

- ALL EDGES OF PRECAST TO HAVE A  $\,\%''$  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.

REVISION DESCRIPTION

MARK DATE

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€ 8" DAYTON/RICHMOND TWO BOLT PRESET ANCHOR

22

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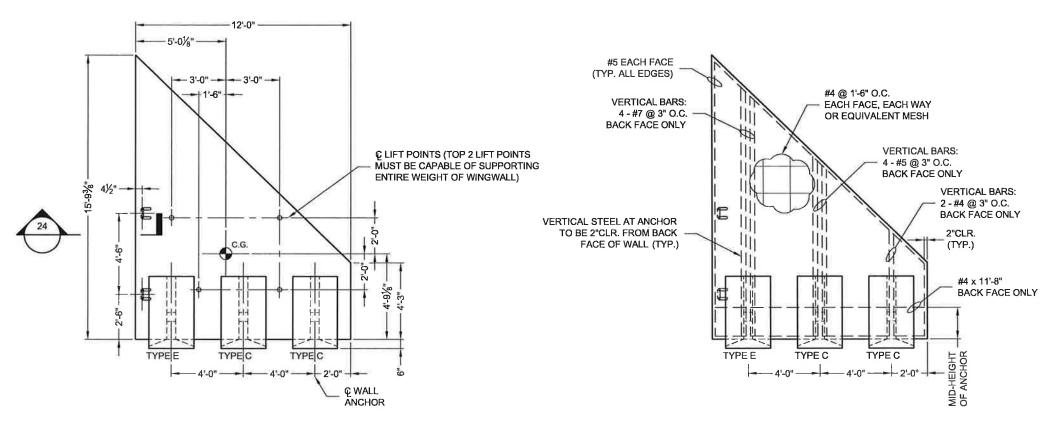
NCDOT STOKES COUNTY **BRIDGE REPLACEMENT** WALNUT COVE, NORTH CAROLINA

VERTICAL BARS:

VERTICAL STEEL AT ANCHOR TO BE 2"CLR. FROM BACK FACE OF WALL (TYP.)

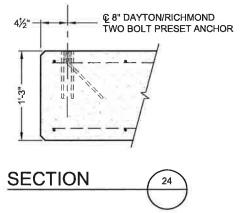
8 - #8 @ 3" O.C. BACK FACE ONLY

PROJECT No.:	SEQ		DATE:
445919	00	01	12/15/2011
DESIGNED:	DRAW		VN.
MRP	JCH		JCH
CHECKED:	APPROVED:		OVED:
RKL	PAC		PAC
SHEET NO.:	0020000000		
	S17	7 0	F S23



#### REINFORCING DETAIL - WW2A & WW3A

(FOR ANCHOR REINFORCING SEE SHEET S20)



# MARK DATE REVISION DESCRIPTION

WINGWALL - WW2A & WW3A **TOTAL WEIGHT = 14.2 TONS** 



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**NCDOT STOKES COUNTY BRIDGE REPLACEMENT** WALNUT COVE, NORTH CAROLINA

PROJECT No.:	SEQ	No.:	DATE:
445919	00	01	12/15/2011
DESIGNED:		DRAV	/N:
MRP			JCH
CHECKED:	APPROVE		OVED:
RKL	PAC		PAC
SHEET NO.:			
	S18	3 0	F S23

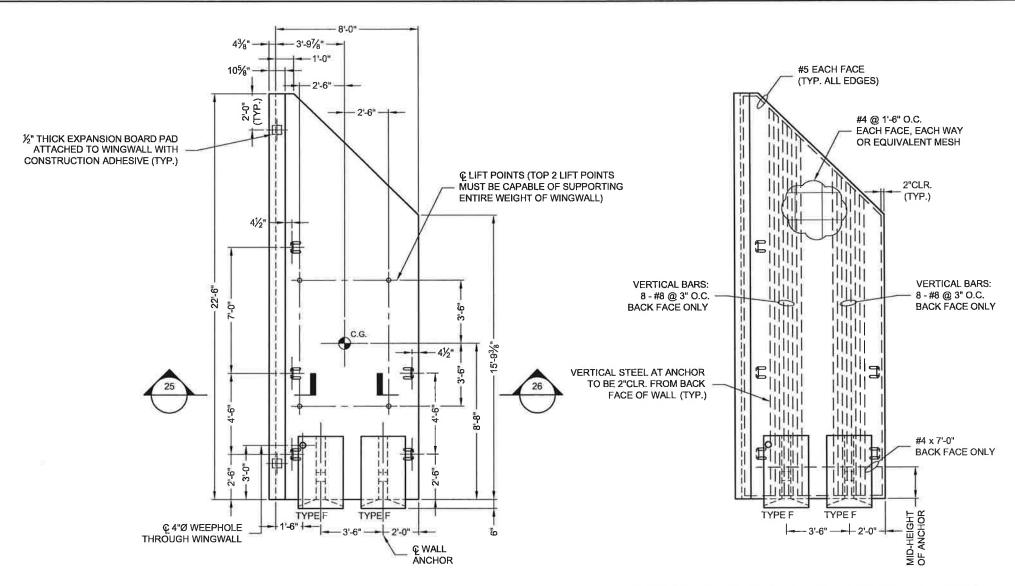
- ALL EDGES OF PRECAST TO HAVE A ¾" CHAMFER - ELEVATION IS LOOKING AT BACK FACE OF WINGWALL

- 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.



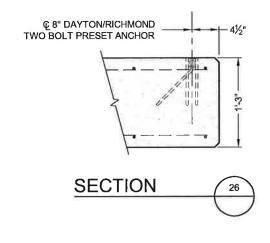
#### WINGWALL - WW2B & WW3B

**TOTAL WEIGHT = 17.3 TONS** 

# € 8" DAYTON/RICHMOND TWO BOLT PRESET ANCHOR **SECTION**

#### **REINFORCING DETAIL - WW2B & WW3B**

(FOR ANCHOR REINFORCING SEE SHEET S21)



DATE

REVISION DESCRIPTION

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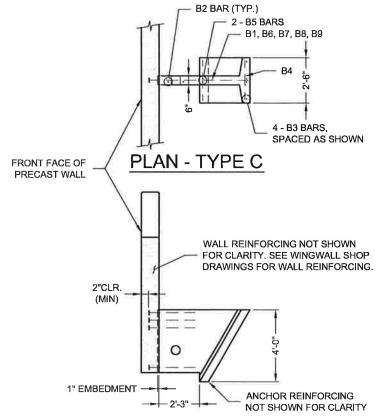
NCDOT STOKES COUNTY **BRIDGE REPLACEMENT** WALNUT COVE, NORTH CAROLINA

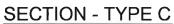
- ALL EDGES OF PRECAST TO HAVE A ¾" CHAMFER ELEVATION IS LOOKING AT BACK FACE OF WINGWALL
- BACK FACE DENOTES ANCHOR SIDE OF WINGWALL
- WINGWALL WILL NOT HANG LEVEL. ADJUST CABLE LENGTHS AS REQUIRED

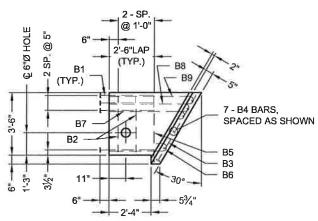
WINGWALL					
CONCRETE	REINF, STEEL	WWF			
28-DAY: 5000 PSI	60,000 PSI UNCOATED	65,000 PSI UNCOATED			

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.

> 445919 001 12/15/2011 MRP JCH PAC RKL S19 of S23





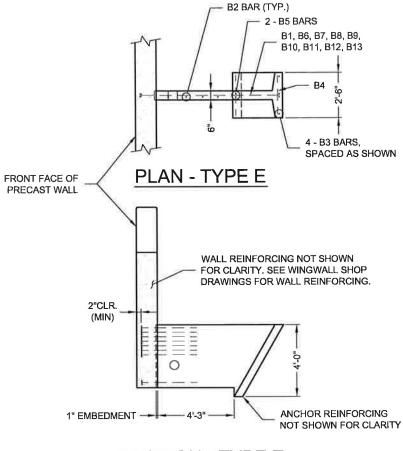


#### PRECAST ANCHOR TYPE C

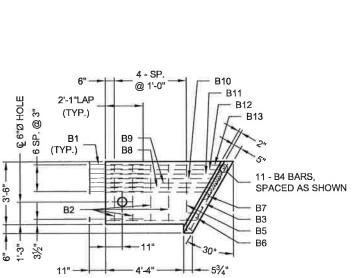
TOTAL WEIGHT = .896 TONS

BAR LIST - TYPE C								
MARK	QTY.	SIZE	Α	TYPE	LENGTH	FINISH		
B1	4	#6	3'-0"	3		EPOXY*		
B2	2	#5	-	STR.	3'-2"	BLACK		
В3	4	#5		STR.	4"-3"	BLACK		
B4	7	#5		STR.	2'-2"	BLACK		
B5	2	#5	3'-8"	2		BLACK		
В6	1	#5	3'-2"	1	:	BLACK		
B7	1	#5	4'-2"	1		BLACK		
B8	1	#5	4'-5"	1	- S	BLACK		
В9	1	#5	4'-8"	1		BLACK		

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



#### **SECTION - TYPE E**



# TYPE E

6" - 3'-6" - 6 SP @ 3" 11, 11, 12, 13	12 11"	30°-534"	13 2* 5* 11 - B4 BARS, SPACED AS SHOW B7 B3 B5 B6
PR	ECAST AND	HOR	

**TOTAL WEIGHT = 1.159 TONS** 

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NCDOT STOKES COUNTY **BRIDGE REPLACEMENT** WALNUT COVE, NORTH CAROLINA

PROJECT No.: 445919	SEQ.	No.: <b>)1</b>	12/15/2011				
DESIGNED		DRAWN:					
MRP		JCH					
CHECKED:		APPROVED:					
RKL		PAC					
SHEET NO:							
S20 of S23							

BAR LIST - TYPE E

TYPE LENGTH

3'-2"

4'-3"

STR.

STR.

STR.

2

FINISH

EPOXY\*

BLACK BLACK

BLACK

**BLACK** 

**BLACK** 

BLACK BLACK

BLACK

BLACK

BLACK

BLACK

BLACK

Α

3'-0"

3"-8"

5'-2"

5'-9"

5'-11"

6'-1"

6'-3"

6'-5"

6'-6"

MARK QTY. SIZE

4

11

2

1

1

#5

#5

#5

#5

#5

#5

#5

#5

#5

#5

#5

#5

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

B2

**B**3

B5

**B6** 

B7

В8

B10

B11

B12

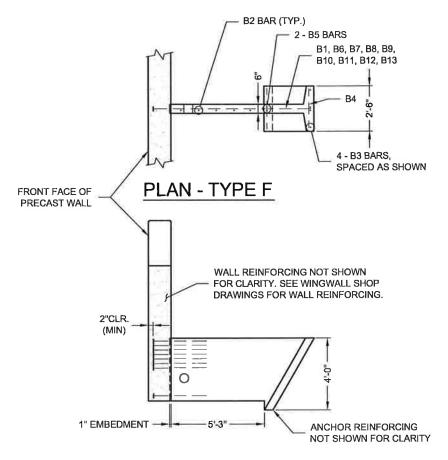
#8 HRC 150 OR #8 HRC 120 HEAD (OR EQUAL) WELDED TO #6 BAR

TYPE 3 (EPOXY COATED\*)

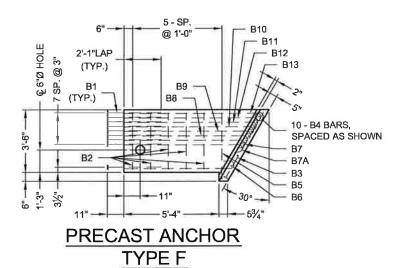
TYPE 2

\*NOTE: EPOXY COATING IS NOT REQUIRED ON HEADED ENDS OF TYPE 3 BARS, BUT WILL NOT BE DETRIMENTAL IF PROVIDED.

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



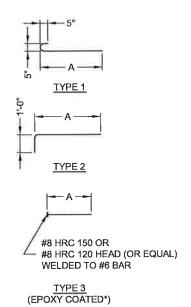
#### SECTION - TYPE F



TOTAL WEIGHT = 1.290 TONS

BAR LIST - TYPE F								
MARK	QTY.	SIZE	Α	TYPE	LENGTH	FINISH		
B1	8	#6	3'-0"	3		EPOXY*		
B2	5	#5	-	STR.	3'-2"	BLACK		
В3	4	#5	-	STR.	4'-3"	BLACK		
B4	10	#5	-	STR.	2'-2"	BLACK		
B5	2	#5	3'-8"	2		BLACK		
В6	1	#5	6'-2"	1_		BLACK		
B7	1	#5	6'-9"	1		BLACK		
В7А	1	#5	6'-7"	1		BLACK		
B8	1	#5	6'-11"	1		BLACK		
В9	1	#5	7'-1"	1		BLACK		
B10	1	#5	7'-3"	1		BLACK		
B11	1	#5	7'-5"	1	_	BLACK		
B12	1	#5	7'-6"	1	-	BLACK		
B13	1	#5	7'-8"	1	4	BLACK		

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



\*NOTE: EPOXY COATING IS NOT REQUIRED ON HEADED ENDS OF TYPE 3 BARS, BUT WILL NOT BE DETRIMENTAL IF PROVIDED.

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

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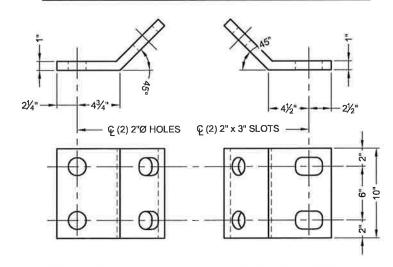
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069 800-338-1122 513-645-7000 513-645-7993 FAX



PROJECT No: 445919	SEQ.		DATE: 12/15/2011
DESIGNED:	,	DRAV	JCH
CHECKED:		APPR	OVED:
SHEET NO.	S2	0	F S23

#### **PLAN VIEW**

#### TYPICAL CONNECTION DETAIL - P-1



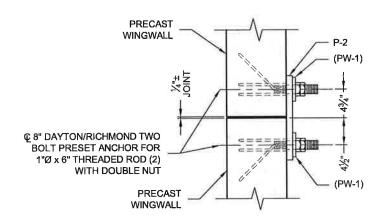
**HEADWALL LEG** 

WINGWALL LEG

(尺, 1" x 14" x 10") (GALVANIZED AS PER ASTM A153)

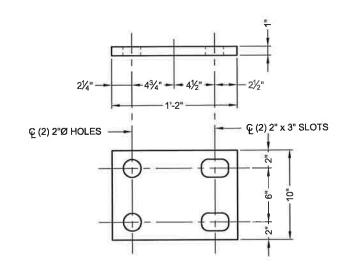
PLATE P-1

TOTAL REQUIRED = 12
(4) PW-1 REQ'D. PER PLATE



#### **PLAN VIEW**

#### TYPICAL CONNECTION DETAIL - P-2

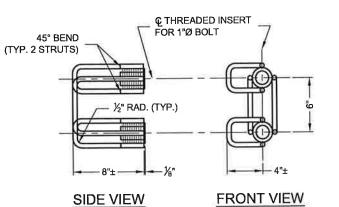


P-2

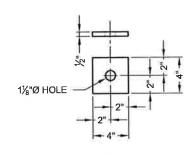
(₱, 1" x 14" x 10") (GALVANIZED AS PER ASTM A153)

PLATE P-2

TOTAL REQUIRED = 8 (4) PW-1 REQ'D. PER PLATE



# DAYTON/RICHMOND TWO BOLT PRESET ANCHOR



PW-1

(₱ WASHER, ½" x 4" x 4") (GALVANIZED AS PER ASTM A153)

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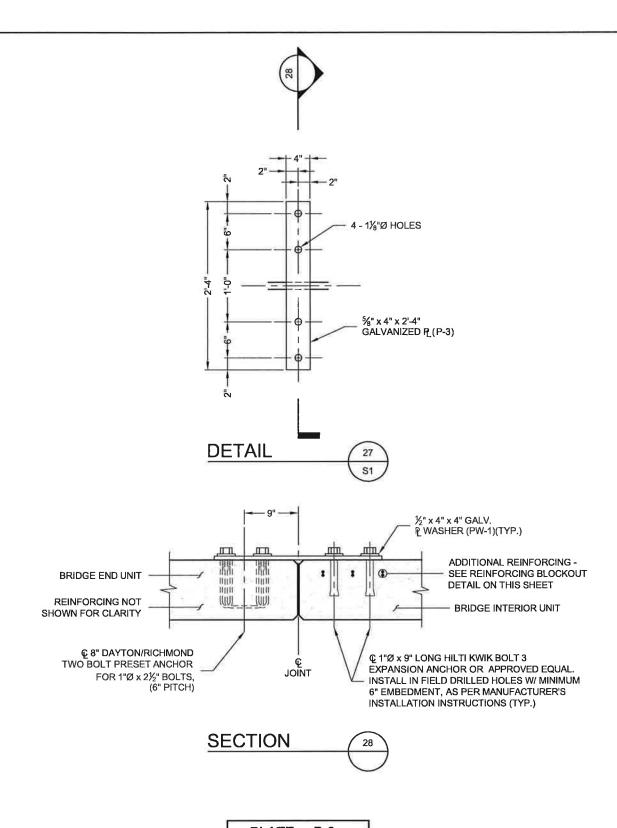
MARK DATE REVISION DESCRIPTION BY

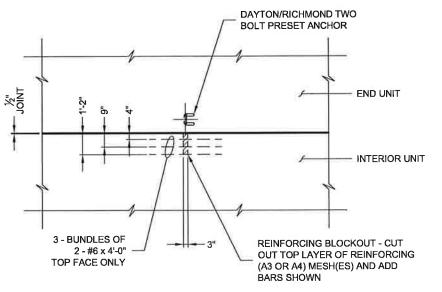
CONSTRUCTION PRODUCTS INC.

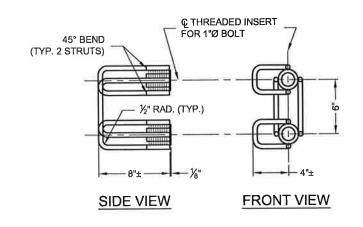
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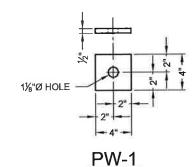
PROJECT No.: 445919	SEQ. No.:		DATE: 12/15/2011	
DESIGNED: MRP		DRAWN: JCH		
CHECKED: RKL		APPR	PAC	
SHEET NO:	S22	2 0	F S23	







# DAYTON/RICHMOND TWO BOLT PRESET ANCHOR



(₱ WASHER, ½" x 4" x 4") (GALVANIZED AS PER ASTM A153)

#### REINFORCING BLOCKOUT DETAIL

PLATE P-3

TOTAL REQUIRED = 12 (4) PW-1 REQ'D. PER PLATE

П						
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NCDOT STOKES COUNTY
BRIDGE REPLACEMENT
WALNUT COVE, NORTH CAROLINA

1	PROJECT No.:	SEQ.	No.:	DATE:
J	445919	00	1	12/15/2011
3	DESIGNED:		DRAW	/N:
d	MRP			JCH
ï	CHECKED:		APPR	OVED:
	RKL			PAC
1	SHEET NO.:			
		<u>S23</u>	<b>3</b> 0	F S23