

**GENERAL NOTES**

- USE OF THIS STANDARD REQUIRES PERMISSION FROM THE DISTRICT BRIDGE ENGINEER. THE STANDARD IS INTENDED TO BE UTILIZED BY DESIGNERS OF ACCELERATED BRIDGE CONSTRUCTION PROJECTS AND BY CONTRACTORS FOR VALUE ENGINEERING OR DESIGN-BUILD PROJECTS.
- THIS STANDARD APPLIES TO STRAIGHT BRIDGES WITH A SKEW BETWEEN 90 DEGREES AND 60 DEGREES INCLUSIVE, CONSTRUCTED WITH EITHER PRESTRESSED CONCRETE PA BULB-TEE BEAMS OR STEEL BEAMS/GIRDERS.
- SPANS CROSSING ROADWAYS AND RAILROADS SHALL USE REMOVABLE HAUNCH FORMWORK. ALL OTHER SPANS SHALL USE STAY-IN-PLACE HAUNCH FORMWORK. SEE SHEET 4 FOR HAUNCH FORMWORK DETAILS.
- IF SCUPPER IS DETERMINED TO BE REQUIRED ON THE DECK SLAB, DESIGNER MUST ENSURE THE DECK SLAB REINFORCEMENT ADEQUACY AT SCUPPER AND DECK GEOMETRY ADEQUACY AT LONGITUDINAL POST TENSIONING DUCT IF APPLICABLE.

**DESIGN NOTES**

- MINIMUM STRUCTURAL THICKNESS OF PRECAST CONCRETE DECK PANELS SHALL BE 8". THICKER PANELS MAY BE REQUIRED TO ACCOMMODATE POST-TENSIONING ANCHORAGES AND ANCHORAGE REINFORCEMENT. PRECAST CONCRETE DECK PANEL THICKNESS SHALL INCLUDE A 1/4" ALLOWANCE FOR GRINDING.
- WEARING SURFACE SHALL BE EITHER EPOXY BASED SURFACE TREATMENT FOR BRIDGE DECKS, 3/8" MIN. THICKNESS OR LATEX MODIFIED CONCRETE WEARING SURFACE, 1 1/4" MIN. THICKNESS AS DIRECTED BY THE DISTRICT BRIDGE ENGINEER. WEARING SURFACE SHALL BE PLACED AFTER ALL CLOSURE POURS, JOINTS, HAUNCHES, AND SHEAR BLOCKOUTS HAVE BEEN GROUTED/CONCRETED, CURED, AND GROUND SMOOTH AS REQUIRED.
- ULTRA HIGH PERFORMANCE CONCRETE STRENGTH VARIES WITH TIME, DESIGNER SHOULD CHECK WITH MANUFACTURER TO DETERMINE APPROPRIATE MATERIAL FOR PROJECT SCHEDULE.
- THE DESIGN OF LONGITUDINAL POST-TENSIONING SHALL BE IN ACCORDANCE WITH AASHTO SECTION 9.7.5. FOR CONTINUOUS SPANS, THE DESIGNER SHALL PROVIDE ADDITIONAL PRESTRESS IN DECK TO OVERCOME THE SERVICE LOAD TENSILE STRESS DUE TO NEGATIVE COMPOSITE DEAD LOAD AND LIVE LOAD MOMENTS TO ACHIEVE AN EFFECTIVE MINIMUM PRESTRESS OF 0.250 KSI IN DECK UNDER ALL SERVICE LOADING CONDITIONS.
- DESIGNER SHALL PROVIDE THE NUMBER, LOCATION, FORCE AND STRESSING SEQUENCE OF THE POST-TENSIONING TENDONS. GENERAL ZONE REINFORCING SHALL BE DESIGNED BY THE DESIGNER AND DEPICTED ON THE CONTRACT DRAWINGS. FINAL DESIGN OF POST-TENSIONING SYSTEM AND LOCAL ZONE REINFORCING SHALL BE PERFORMED BY THE CONTRACTOR. THE PLANS SHALL NOTE THE ASSUMPTIONS USED TO DEVELOP THE POST TENSIONING FORCE INCLUDING THE ASSUMPTIONS USED FOR LOSS CALCULATIONS.
- THE NUMBER AND LOCATION OF LIFTING DEVICES SHALL BE DETERMINED BY THE DESIGNER AND SHOWN ON THE CONTRACT DRAWINGS. THE DESIGNER SHALL VERIFY THAT THE PANELS ARE STABLE AND STRUCTURALLY ADEQUATE WHEN LIFTED BY THE SELECTED LOCATIONS. DESIGN OF LIFTING DEVICES SHALL BE PERFORMED BY THE CONTRACTOR.
- DESIGN OF BEAMS SHALL ACCOUNT FOR UNEQUAL DISTRIBUTION OF DEAD LOAD CAUSED BY NON-SYMMETRIC PANELS. NOTE DEAD LOAD OF PRECAST PANEL (INCLUDING BARRIER) IS APPLIED TO NONCOMPOSITE BEAM SECTION. ON THE CONTRACT DRAWINGS, PROVIDE THE FRACTION OF DECK PANEL WEIGHT ASSUMED TO BE CARRIED BY EACH OF THE BEAMS.
- VERTICAL ADJUSTMENT DEVICES SHALL BE SIZED USING TWICE THE TRIBUTARY AREA TO ACCOUNT FOR THE POSSIBILITY THAT ALL DEVICES MAY NOT BE IN CONTACT WITH THE BEAMS DURING INITIAL PLACEMENT.
- DESIGN OF THE DECK OVERHANG AND BRIDGE BARRIER REINFORCING SHALL ACCOUNT FOR THE OPEN JOINTS IN THE BRIDGE BARRIER.
- DEAD LOAD OF EPOXY BASED SURFACE TREATMENT FOR BRIDGE DECKS, 3/8" MIN. THICKNESS SHALL BE TAKEN AS 7 LB/SF.

- DEAD LOAD OF LATEX MODIFIED CONCRETE WEARING SURFACE, 1 1/4" MIN. THICKNESS SHALL BE TAKEN AS 16 LB/SF.
- MATERIALS: REINFORCEMENT STEEL  $f_y = 60$  KSI  
CONCRETE  $f'_c = 5$  KSI MIN. (DECK AND BARRIER)
- CONCRETE COVER: DECK TOP COVER = 2 1/2"  
DECK BOTTOM COVER = 1"  
BARRIER = 2"  
TRANSVERSE JOINTS = 1 1/2"  
LONGITUDINAL JOINTS = 1 1/2"
- DESIGNER SHALL DESIGN THE PRECAST PANEL REINFORCEMENT. THE USE OF BD-601M DESIGN TABLES FOR PRECAST PANEL REINFORCEMENT DOES NOT CONSTITUTE A DESIGN. HOWEVER, THE PRECAST PANEL REINFORCEMENT SHALL NOT BE LESS THAN WHAT WOULD BE DETERMINED FROM THE BD-601M DESIGN TABLES.

**DRAWING NOTES**

- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSION OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408.
- SUBMIT SHOP DRAWINGS FOR PRECAST CONCRETE DECK PANELS AND ASSOCIATED COMPONENTS.
- FINAL DESIGN OF POST-TENSIONING SYSTEM SHALL BE PERFORMED BY THE CONTRACTOR. POST-TENSIONING CALCULATIONS SHALL ACCOUNT FOR THE PROPOSED HARDWARE AND SHALL BE SUBMITTED AS PART OF THE SHOP DRAWING SUBMISSION.
- LIFTING DEVICES SHALL BE DESIGNED BY THE CONTRACTOR. LIFTING DEVICE CALCULATIONS SHALL BE SUBMITTED AS PART OF THE SHOP DRAWING SUBMISSION.
- THE INSIDE FACES OF THE SHEAR BLOCKOUTS AND ALL SHEAR KEYS SHALL BE BLAST CLEANED TO HAVE AN EXPOSED AGGREGATE FINISH.
- INTERFACE OF PRECAST PANELS ALONG THE TRANSVERSE AND LONGITUDINAL JOINTS SHALL BE BLAST CLEANED TO CREATE AN EXPOSED AGGREGATE FINISH.

**SEQUENCE OF CONSTRUCTION**

- ERECT BEAMS AND INSTALL DIAPHRAGMS.
  - IF STAY-IN-PLACE HAUNCH FORMWORK IS APPLICABLE, PLACE FORMWORK PER DETAILS ON SHEET 4. REMOVABLE FORMS ARE PLACED AFTER PANELS ARE SET (SEE STEP 9 BELOW).
  - PREPARE PANELS BY PRE-SETTING THE VERTICAL ADJUSTMENT DEVICES TO THE REQUIRED ANTICIPATED DEPTH.
  - SET PRECAST DECK PANELS STARTING AT EITHER ABUTMENT AND PROGRESS ALONG BEAM/GIRDER LINE TO OPPOSITE ABUTMENT.
  - ADJUST EACH PANEL TO PROPER ELEVATION USING VERTICAL ADJUSTMENT DEVICES. ADJUST TORQUE IN VERTICAL ADJUSTMENT DEVICE TO PROPERLY DISTRIBUTE DECK DEAD LOAD TO BEAMS (AS DETERMINED BY DESIGN).
  - PLACE FORMWORK FOR TRANSVERSE JOINTS. COUPLE POST-TENSIONING DUCTS (IF REQUIRED). FILL TRANSVERSE JOINTS WITH ULTRA HIGH PERFORMANCE CONCRETE IN ACCORDANCE WITH ULTRA HIGH PERFORMANCE CONCRETE STANDARD SPECIAL PROVISION, IF APPLICABLE OR NON-SHRINK EPOXY GROUT PER SECTION 1080.2(c) OF PENNDOT PUB. 408.
  - TRANSVERSE JOINT MATERIAL SHALL REACH A MINIMUM STRENGTH OF 4 KSI BEFORE PROCEEDING TO NEXT STEP.
  - INSTALL POST-TENSIONING STRANDS IN DUCTS AND TENSION TO SPECIFIED STRESS (IF REQUIRED). GROUT DUCTS WITHIN 3 CALENDAR DAYS AFTER TENSIONING. PUMP GROUT FROM LOW END OF BRIDGE AND FILL POST-TENSIONING DUCTS FULL LENGTH OF BRIDGE (IF REQUIRED). IF GROUTING IS NOT GOING TO BE PERFORMED DURING THE SAME DAY THE TENDONS ARE STRESSED, THEN WITHIN 4 HOURS AFTER STRESSING, PROTECT THE TENDONS AND GROUT DUCTS AGAINST CORROSION AND DEBRIS BY TEMPORARILY SEALING ALL OPENINGS AND VENTS, CLEANING RUST AND OTHER DEBRIS FROM ALL METAL SURFACES TO BE COVERED BY THE GROUT CAP; AND PLACING THE GROUT CAP, INCLUDING A SEAL, OVER THE ANCHOR PLATE UNTIL THE TENDON IS GROUTED. FAILURE TO GROUT THE DUCTS WITHIN 3 CALENDAR DAYS AFTER TENSIONING WILL REQUIRE THE CONTRACTOR TO DEMONSTRATE THE DUCTS ARE UNOBSTRUCTED TO ACHIEVE COMPLETE GROUTING. IF OBSTRUCTION(S) ARE PRESENT, CLEAN DUCTS TO REMOVE OBSTRUCTIONS AND RE-INSPECT PRIOR TO GROUTING.
  - IF REMOVABLE HAUNCH FORMWORK IS REQUIRED, PLACE HAUNCH FORMWORK PER DETAILS ON SHEET 4.
  - FILL SHEAR BLOCKOUTS AND HAUNCHES WITH ULTRA HIGH PERFORMANCE CONCRETE IN ACCORDANCE WITH ULTRA HIGH PERFORMANCE CONCRETE STANDARD SPECIAL PROVISION, IF APPLICABLE OR WITH EPOXY NON-SHRINK GROUT PER SECTION 1080.2(c) OF PENNDOT PUB. 408.
  - PLACE FORMWORK FOR LONGITUDINAL JOINT IN ACCORDANCE WITH ULTRA HIGH PERFORMANCE CONCRETE STANDARD SPECIAL PROVISION.
  - FILL LONGITUDINAL CLOSURE POUR WITH ULTRA HIGH PERFORMANCE CONCRETE IN ACCORDANCE WITH ULTRA HIGH PERFORMANCE CONCRETE STANDARD SPECIAL PROVISION.
  - GROUT POST-TENSIONING BLOCKOUTS (IF REQUIRED). GROUT SHALL BE PLACED IN BLOCKOUTS NO MORE THAN 14 DAYS AFTER TENDONS ARE STRESSED.
  - REMOVE ANY REMAINING FORMWORK THAT IS NOT STAY-IN-PLACE.
  - PREPARE DECK SURFACE AND PLACE WEARING SURFACE.
- PRE-WET PRECAST INTERFACE OF JOINT WITH WATER TO CREATE A SATURATED SURFACE CONDITION.

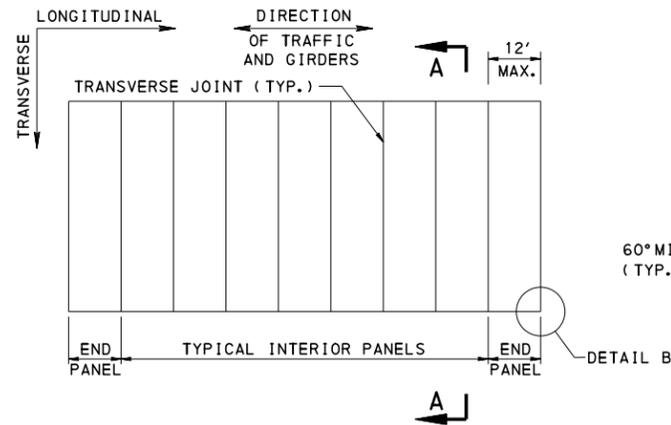
e-Notification No. 63,  
dated Nov. 21, 2016

**COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF TRANSPORTATION  
BUREAU OF PROJECT DELIVERY**

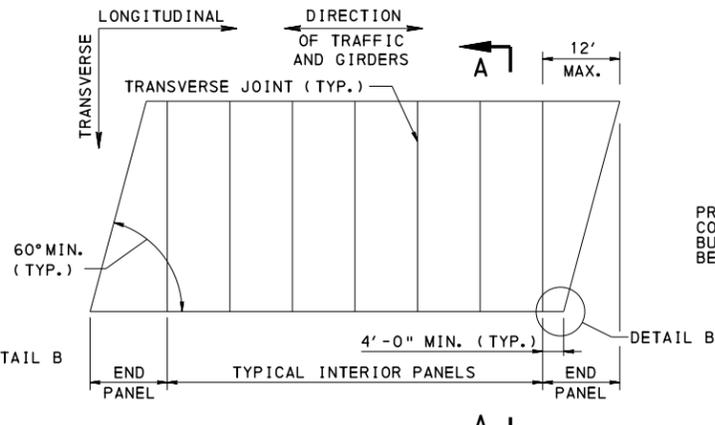
**STANDARD  
FULL DEPTH PRECAST CONCRETE DECK  
PANELS FOR PRESTRESSED CONCRETE  
PA BULB-TEE BEAM AND  
STEEL I-BEAM/I-GIRDER BRIDGES**

BD-601M	CONCRETE DECK SLAB
BC-751M	BRIDGE DRAINAGE
<b>REFERENCE DRAWINGS</b>	

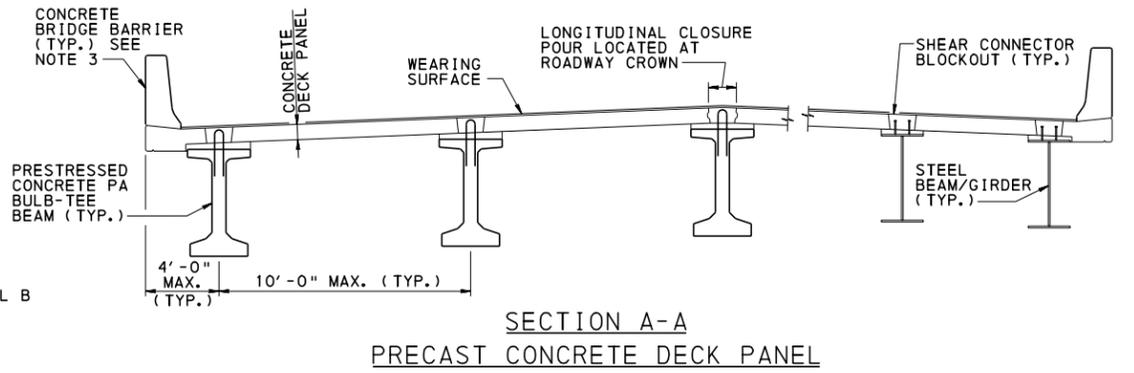
RECOMMENDED APR. 29, 2016	RECOMMENDED APR. 29, 2016	SHEET 1 OF 6
<i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	<i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	<b>BD-605M</b>



PANELS FOR 90° BRIDGES

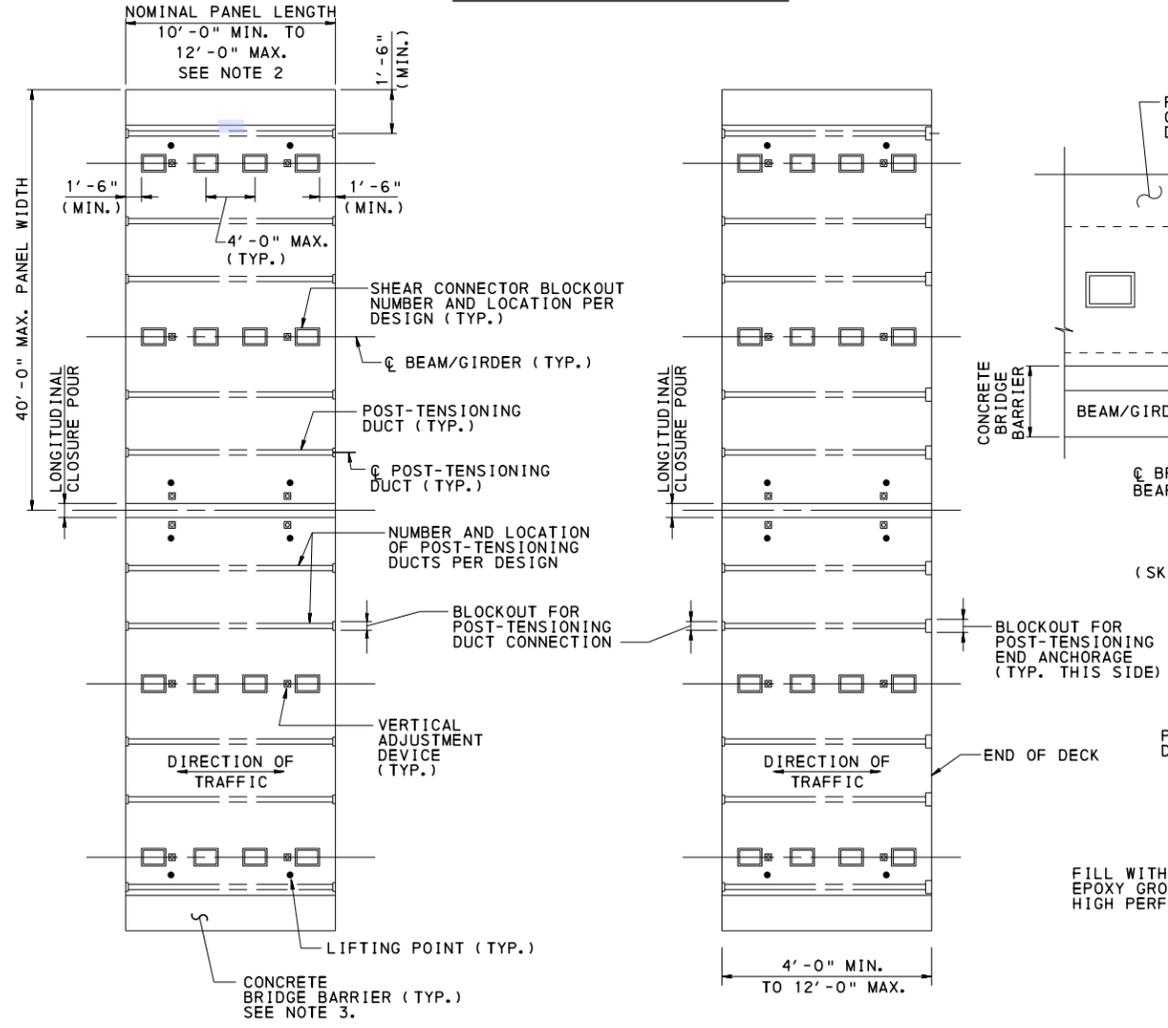


PANELS FOR SKEWED BRIDGES  
BETWEEN 90° AND 60°



SECTION A-A  
PRECAST CONCRETE DECK PANEL

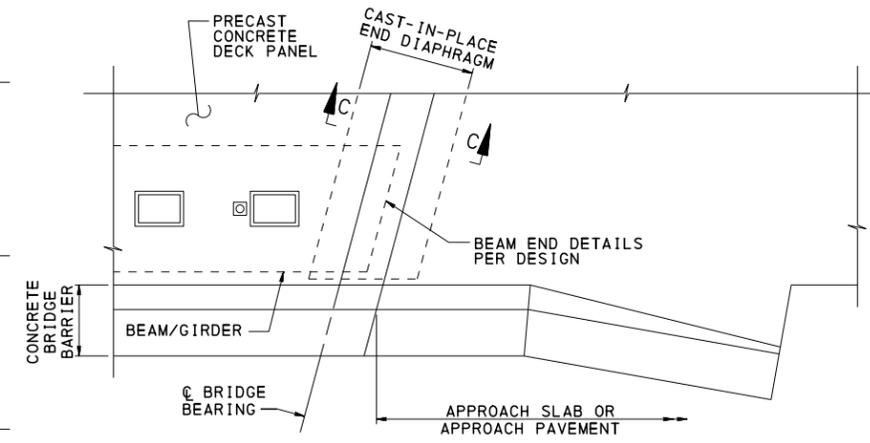
TYPICAL DECK LAYOUT



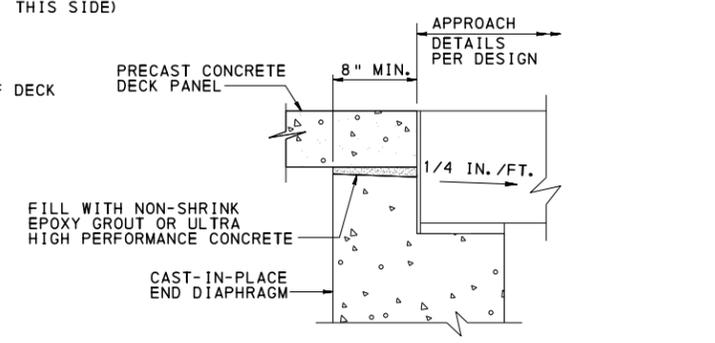
INTERIOR PANEL  
(SEE NOTE 4)

END PANEL  
(SIMILAR TO INTERIOR PANEL EXCEPT AS NOTED)  
(SEE NOTE 4)

TYPICAL PANEL LAYOUTS



DETAIL B  
(SKEWED BRIDGE SHOWN; NON-SKEWED BRIDGE SIMILAR)



SECTION C-C  
(PRECAST CONCRETE DECK PANEL EDGE SUPPORT AT ABUTMENT)  
(BEAM/GIRDER NOT SHOWN FOR CLARITY)

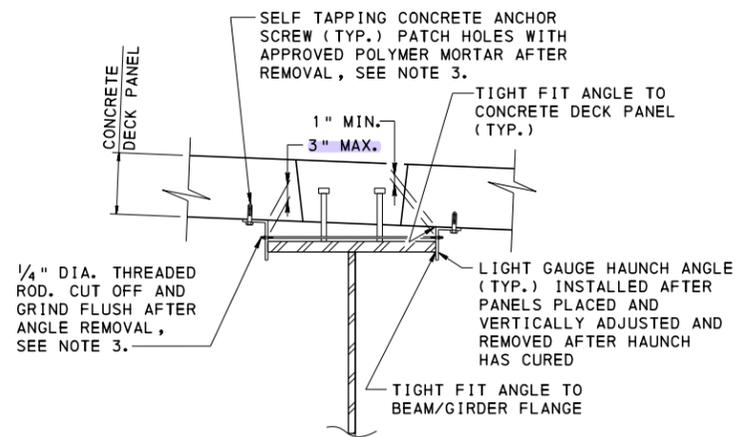
NOTES:

1. FOR ADDITIONAL NOTES, SEE SHEET 1.
2. PANEL LENGTH TO BE DETERMINED BY DESIGNER. MINIMUM AND MAXIMUM VALUES ARE GUIDELINES FOR INTERIOR PANELS. DESIGNER SHALL VERIFY ABILITY TO SHIP PANELS.
3. BRIDGE BARRIERS SHALL BE CAST INTEGRAL WITH DECK PANEL PRIOR TO ERECTION. BRIDGE BARRIER MAY BE CAST-IN-PLACE AT THE OPTION OF THE CONTRACTOR.
4. PANELS SHOWN WITH LONGITUDINAL POST-TENSIONING. PANELS WITHOUT LONGITUDINAL POST-TENSIONING SIMILAR.
5. FOR DECK PANEL REINFORCEMENT DETAILS, SEE SHEET 3.
6. FOR HAUNCH DETAILS AND SHEAR CONNECTOR BLOCKOUT DETAILS, SEE SHEET 4.
7. FOR BRIDGE BARRIER DETAILS, TRANSVERSE JOINT DETAILS AND LONGITUDINAL CLOSURE POUR DETAILS, SEE SHEET 5.
8. FOR VERTICAL ADJUSTMENT DEVICE DETAILS AND POST-TENSIONING DETAILS, SEE SHEET 6.

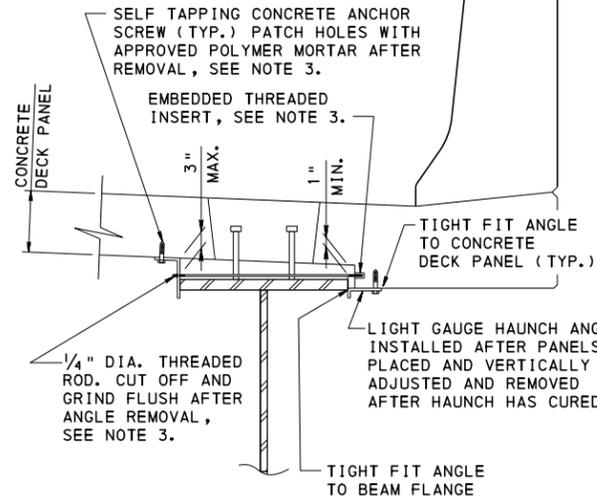
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FULL DEPTH PRECAST CONCRETE DECK  
PANELS FOR PRESTRESSED CONCRETE  
PA BULB-TEE BEAM AND  
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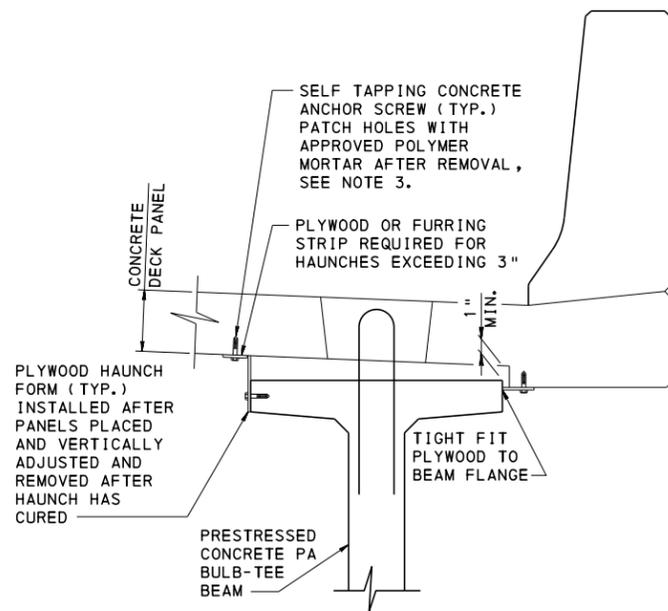




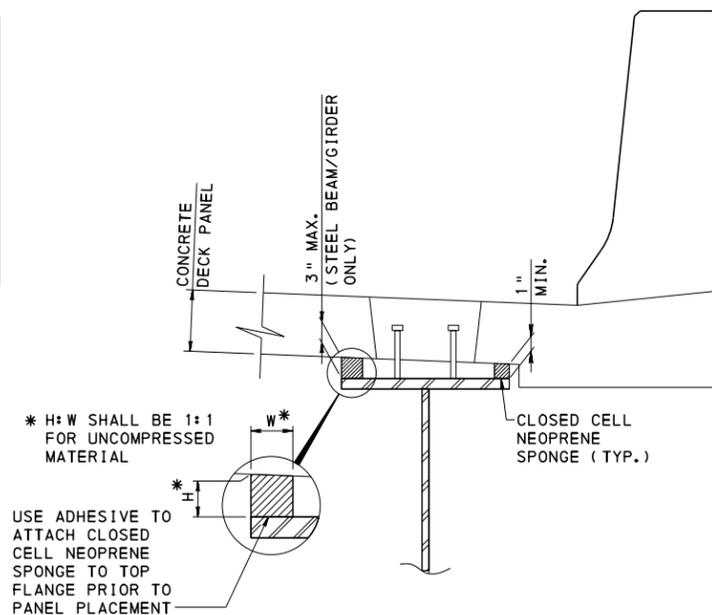
REMOVABLE HAUNCH FORMWORK DETAIL  
INTERIOR STEEL BEAM/GIRDER



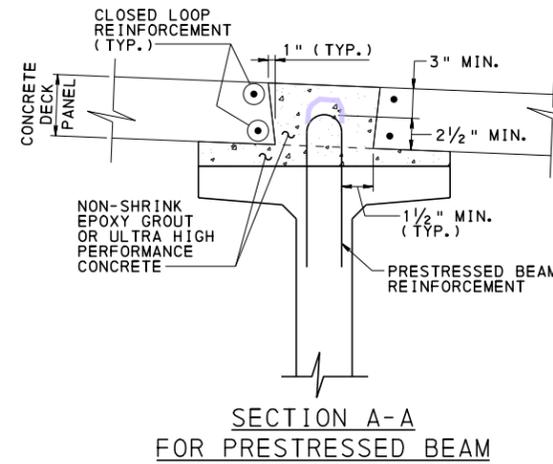
REMOVABLE HAUNCH FORMWORK DETAIL  
STEEL FASCIA BEAM/GIRDER



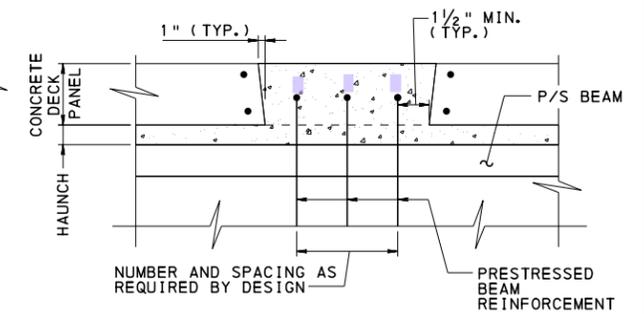
REMOVABLE HAUNCH FORMWORK DETAIL  
PRESTRESSED BEAM



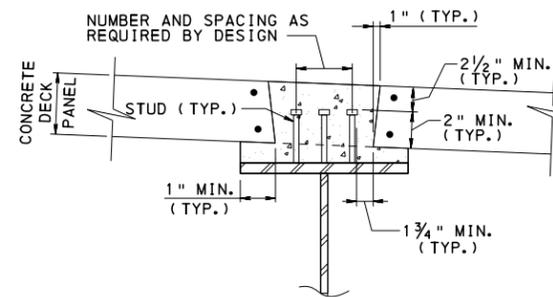
STAY-IN-PLACE HAUNCH FORMWORK DETAIL  
(STEEL BEAM/GIRDER SHOWN, CONCRETE BEAM SIMILAR)



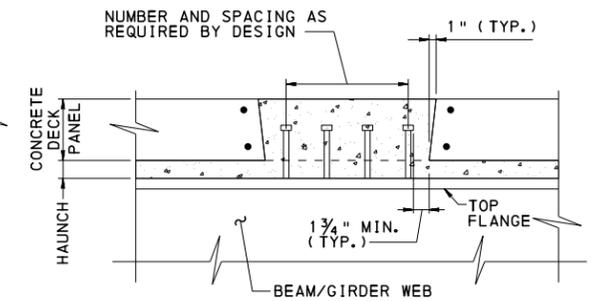
SECTION A-A  
FOR PRESTRESSED BEAM



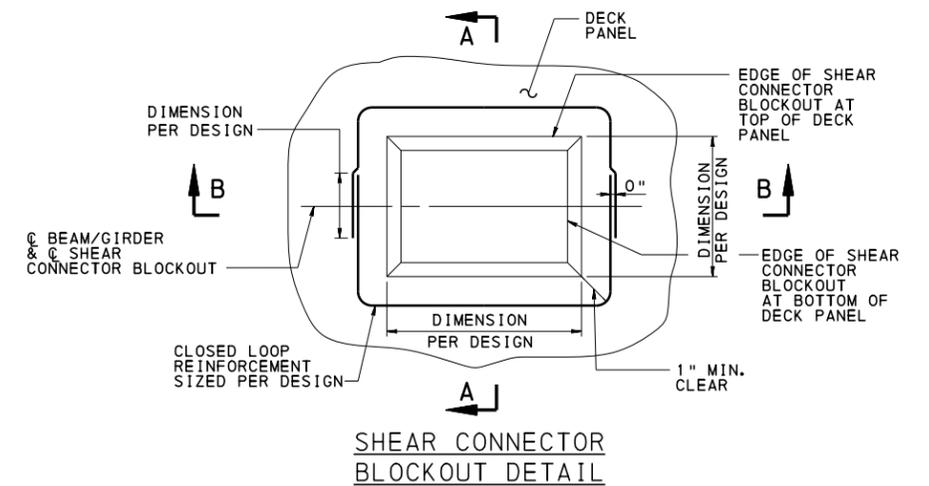
SECTION B-B  
FOR PRESTRESSED BEAM



SECTION A-A  
FOR STEEL BEAM/GIRDER  
(SIMILAR TO PRESTRESSED BEAM  
EXCEPT AS NOTED)



SECTION B-B  
FOR STEEL BEAM/GIRDER



SHEAR CONNECTOR  
BLOCKOUT DETAIL

NOTES:

1. HAUNCH FORMWORK MATERIAL, ATTACHMENT HARDWARE AND PATCHING MATERIAL ARE INCIDENTAL ITEMS TO THE PRECAST DECK.
2. PAINT ALL EXPOSED STEEL WITH APPROVED GALVANIZED SPRAY CONTAINING A MINIMUM OF 92% ZINC.
3. MAXIMUM SPACING OF FORM SUPPORT/ATTACHMENT DEVICES IS 4'-0".

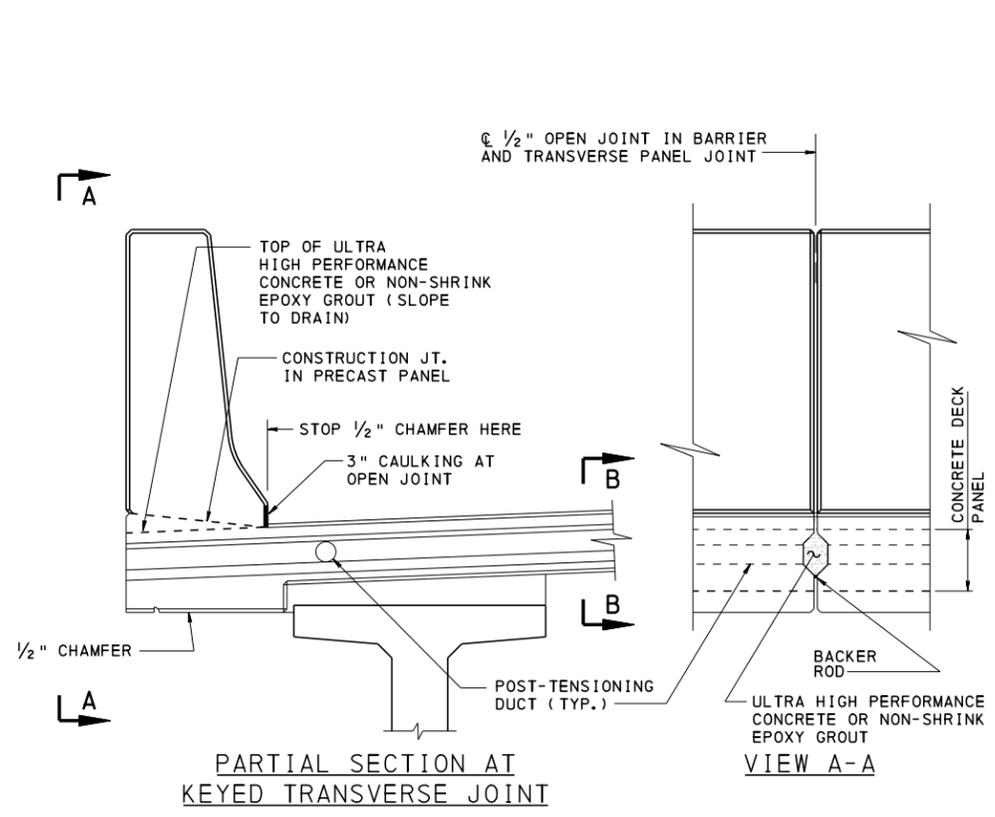
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RECOMMENDED APR. 29, 2016  
*Thomas P. Maiore*  
CHIEF BRIDGE ENGINEER

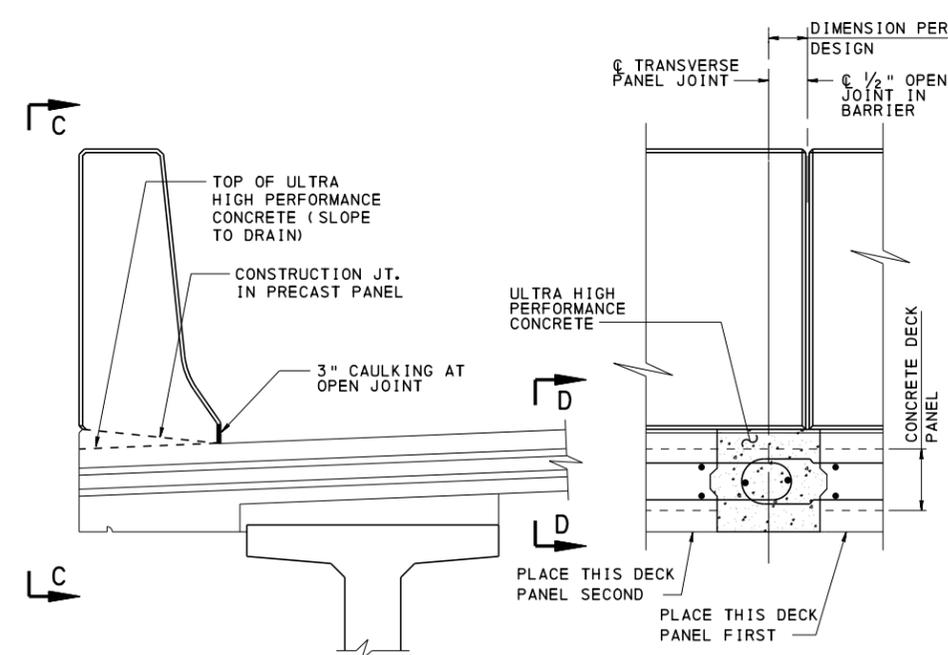
RECOMMENDED APR. 29, 2016  
*Brenda S. Thompson*  
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SHEET 4 OF 6  
BD-605M



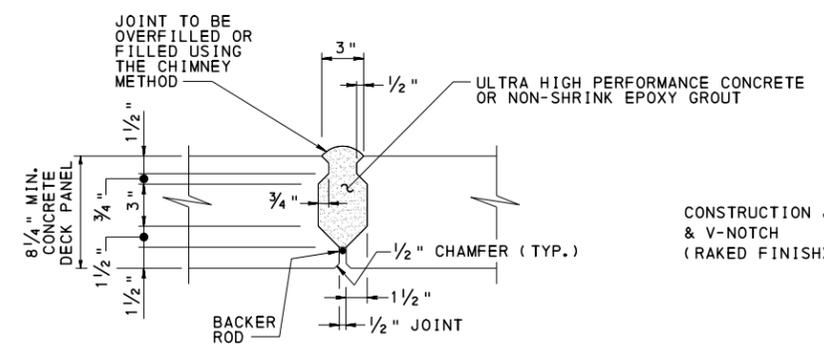
PARTIAL SECTION AT KEYED TRANSVERSE JOINT

KEYED TRANSVERSE JOINT DETAILS (TO BE USED FOR DECKS WITH LONGITUDINAL POST-TENSIONING)

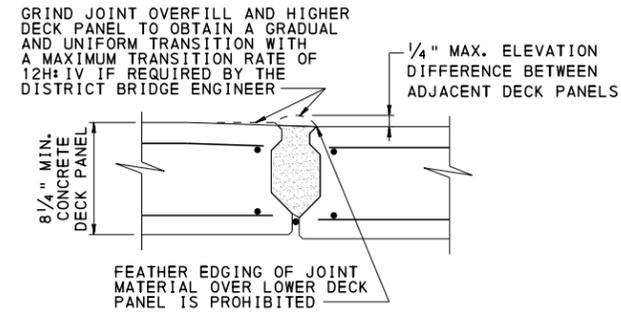


PARTIAL SECTION AT REINFORCED TRANSVERSE JOINT

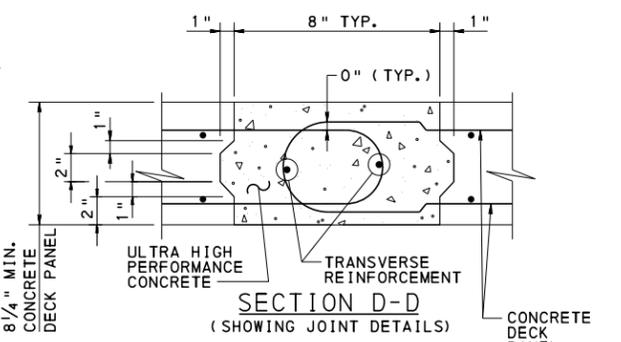
REINFORCED TRANSVERSE JOINT DETAILS (TO BE USED FOR DECKS WITHOUT LONGITUDINAL POST-TENSIONING)



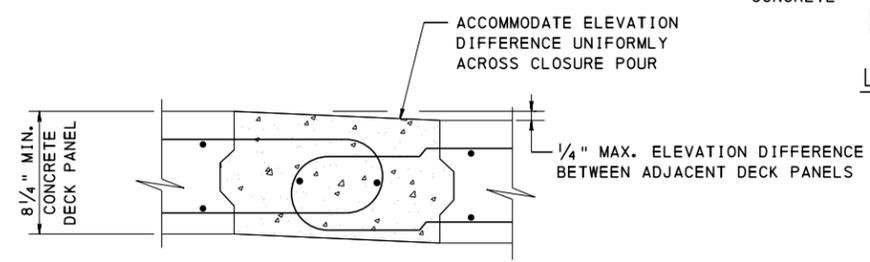
SECTION B-B (SHOWING JOINT DIMENSIONS) (DECK REINFORCEMENT NOT SHOWN FOR CLARITY)



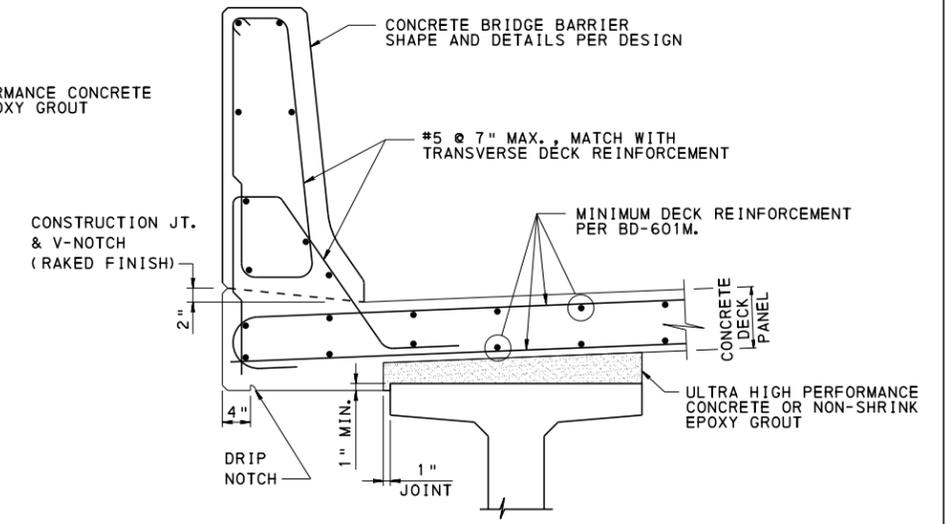
SECTION B-B (SHOWING JOINT ALIGNMENT)



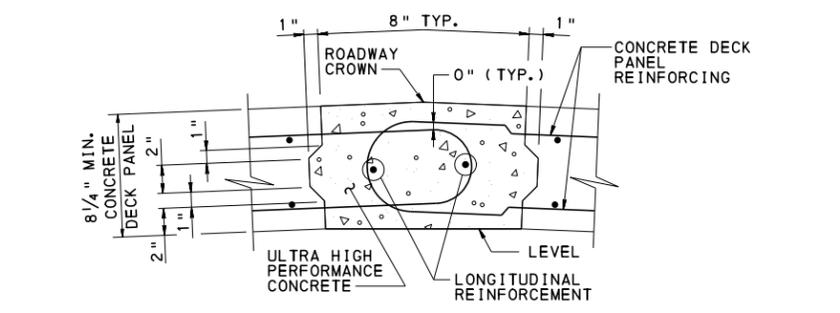
SECTION D-D (SHOWING JOINT DETAILS)



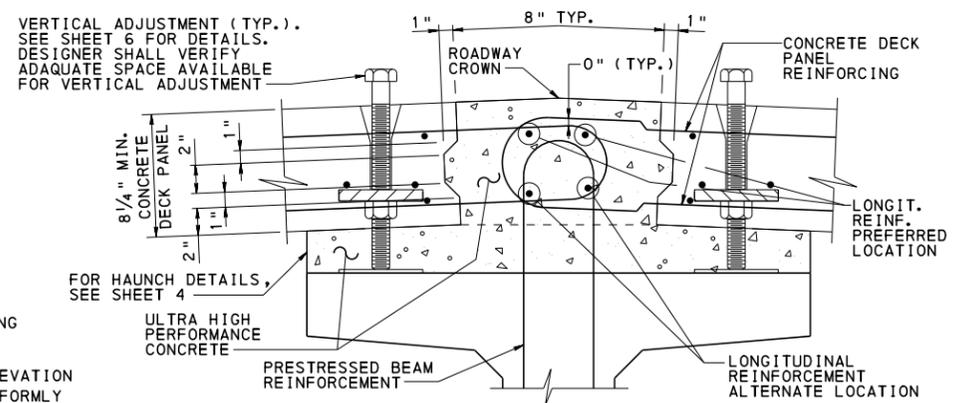
SECTION D-D (SHOWING JOINT ALIGNMENT)



CONCRETE BRIDGE BARRIER DETAIL TYPICAL BARRIER SHOWN, OTHERS PER DESIGN



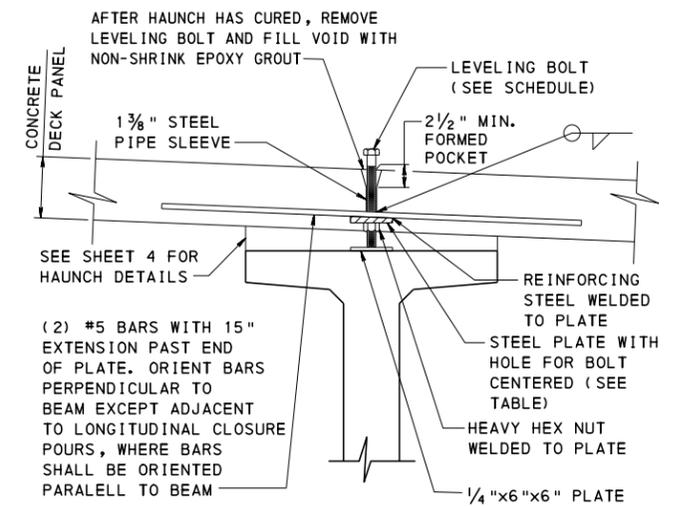
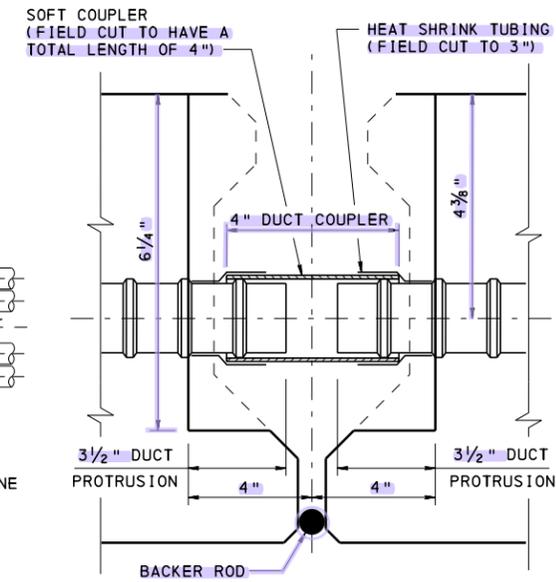
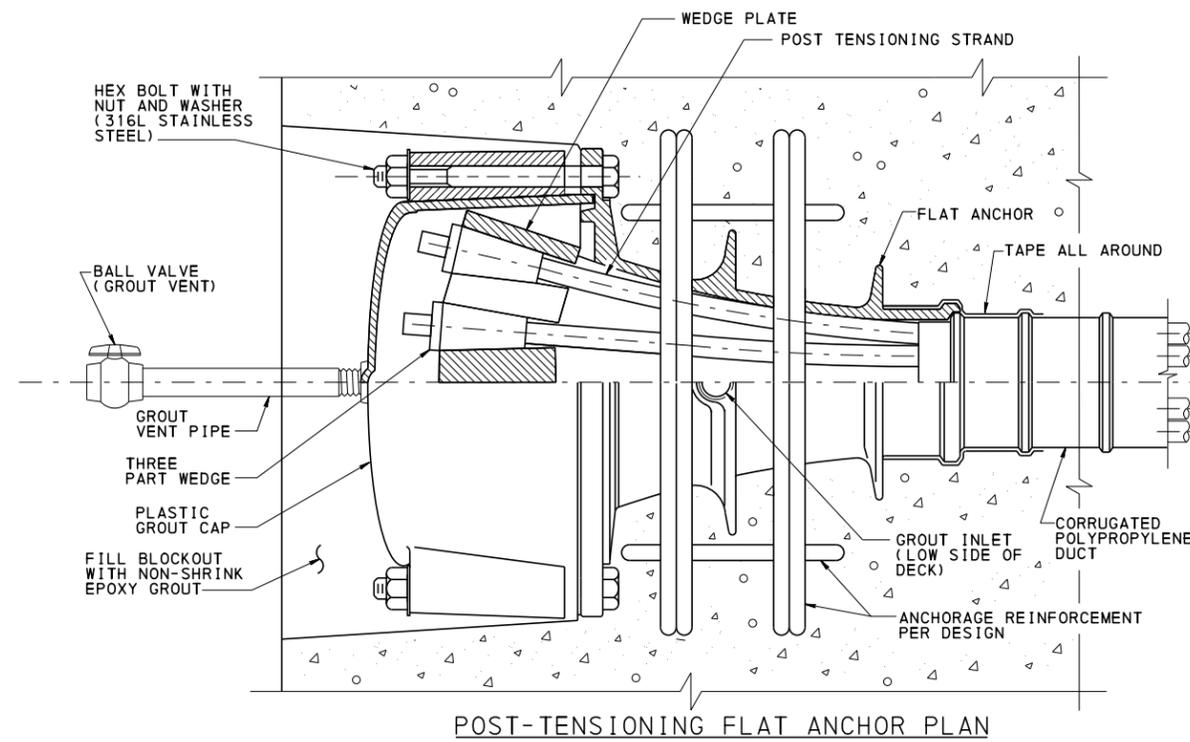
LONGITUDINAL CLOSURE POUR BETWEEN BEAMS/GIRDERS



LONGITUDINAL CLOSURE POUR OVER BEAM (CONCRETE BEAM SHOWN, STEEL BEAM/GIRDER SIMILAR) (HAUNCH DETAILS NOT SHOWN FOR CLARITY)

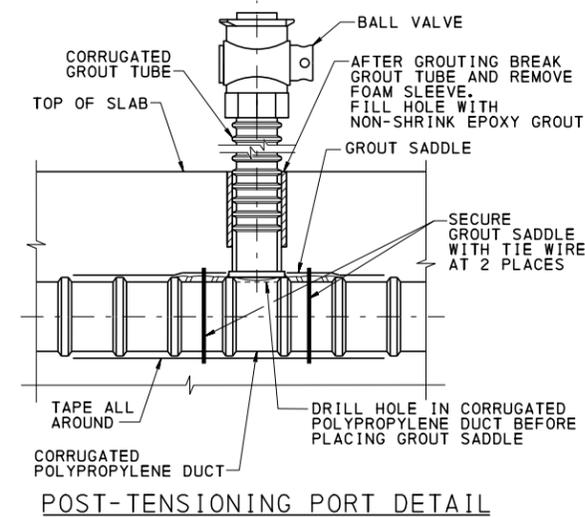
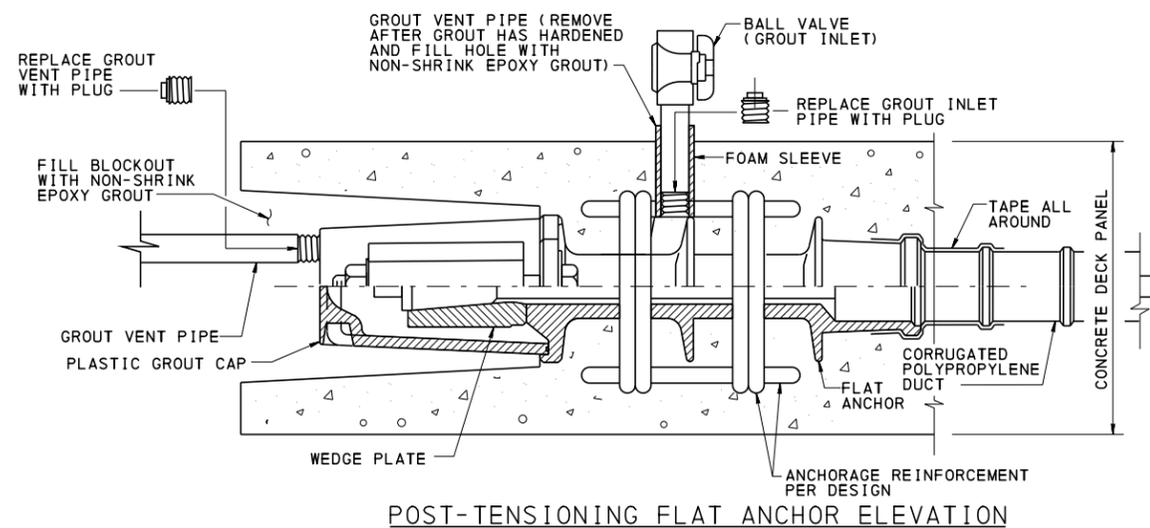
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VERTICAL ADJUSTMENT DEVICE (VERTICAL ADJUSTMENT ON STEEL BEAM/GIRDER SIMILAR) (HAUNCH DETAILS NOT SHOWN FOR CLARITY) (MIN. OF 2 LOCATIONS PER BEAM PER PANEL)

VERTICAL ADJUSTMENT SCHEDULE		
SERVICE LOAD	BOLT DIA.	STEEL PLATE WITH HOLE FOR BOLT CENTERED
10 K	1"	4"x4"x5/8"
20 K	1 1/4"	4"x4"x3/8"



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