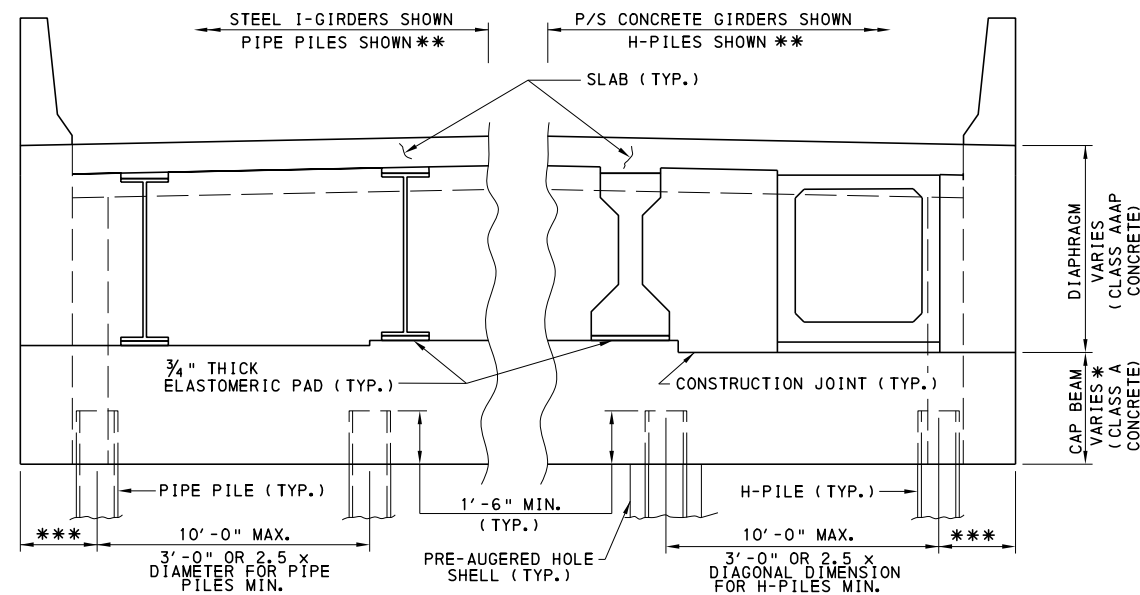


GENERAL NOTES

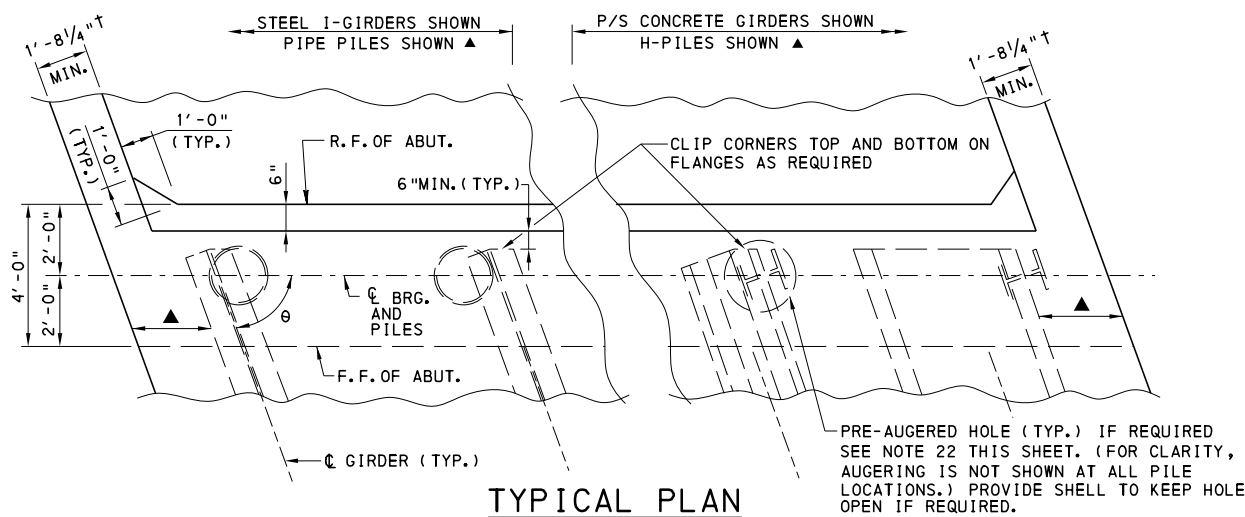
- ALL DIMENSIONS GIVEN IN U.S. CUSTOMARY UNITS.
- DESIGN SPECIFICATIONS
 - AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
 - PENNDOT DESIGN MANUAL PART 4, VOLUME 1, PART B: DESIGN SPECIFICATIONS AND VOLUME 2, APPENDIX G
- PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PUBLICATION 408 AND CONTRACT SPECIAL PROVISIONS.
- MATERIAL STRENGTH
 - REINFORCEMENT STEEL $f_y = 60$ KSI
 - CONCRETE $f'_c = 4000$ PSI (CLASS AAAP CONCRETE) FOR DECK SLABS, APPROACH SLABS, AND END DIAPHRAGMS AND WINGWALLS ABOVE CONSTRUCTION JOINT, MODULAR RATIO (E_s/E_c) $n = 8$.
 - $f'_c = 3500$ PSI (CLASS AA CONCRETE) FOR BARRIERS, MODULAR RATIO (E_s/E_c) $n = 8$.
 - $f'_c = 3000$ PSI (CLASS A CONCRETE) FOR CAP BEAM AND WINGWALLS BELOW CONSTRUCTION JOINT, MODULAR RATIO (E_s/E_c) $n = 9$.
- DEAD LOAD
 - DENSITY OF NORMAL WEIGHT CONCRETE = 150 PCF
 - FUTURE WEARING SURFACE = 30 PSF
- LIVE LOAD
 - LIVE LOAD IS CALCULATED ASSUMING ALL POTENTIAL LANES ARE LOADED. USE A MULTIPLE PRESENCE FACTOR OF 1.0 FOR DESIGN OF THE INTEGRAL ABUTMENT CAP AND SUPPORTING PILES.
 - THE LIVE LOAD IS ASSUMED TO BE EVENLY DISTRIBUTED TO ALL PILES.
- DYNAMIC LOAD ALLOWANCE (IM) = 33% IS APPLIED TO LIVE LOADS ON THE ABUTMENTS AND THE PILES ACCORDING TO ARTICLES A3.6.2.1 AND D3.6.2.1.
- DESIGN CONTROLS
 - CONCRETE COVER: INTEGRAL ABUTMENT (I.e., CAP BEAM AND END DIAPHRAGM) AND WINGWALLS = 3"
 - UNLESS OTHERWISE INDICATED, USE THE FOLLOWING MINIMUM REINFORCEMENT SPLICE LENGTHS:

#4 2'-2"	#6 3'-3"	#8 5'-1"	#10 8'-2"
#5 2'-9"	#7 3'-10"	#9 6'-5"	#11 10'-0"
 - BAR SIZE: MAXIMUM BAR SIZE #11
MINIMUM BAR SIZE #4
- FOR DESIGN CONTROLS OF DECK AND BARRIERS, SEE BD-601M.
- USE ONLY ONE ROW OF VERTICAL PILES PER ABUTMENT. PILES MAY BE H-PILES OR PIPE PILES. FOR H-PILES, ORIENT THE WEB PERPENDICULAR TO THE LONGITUDINAL AXIS OF THE GIRDER OF THE END SPAN. TAPERED PILES MAY BE USED PROVIDED THE TAPER POINT IS BELOW THE POINT OF CONTRAFLEXURE.
- ALL REINFORCING BARS ARE TO BE EPOXY COATED.
- USE ONLY NORMAL WEIGHT CONCRETE FOR WINGWALLS AND ABUTMENTS.
- DETAIL ALL BARS ON THE CONTRACT DRAWINGS.
- PROVIDE A TROWEL SMOOTH SURFACE OF THE CONSTRUCTION JOINT DIRECTLY UNDER THE GIRDERS AND THE AREA EXTENDING 2" OUTSIDE OF THAT AREA. ON ALL OTHER CONSTRUCTION JOINTS, PROVIDE A RAKED SURFACE.
- PROVIDE 3/4" THICK, 50 DUROMETER NEOPRENE PADS UNDER ALL GIRDERS. ALL PADS WILL BE 12" ALONG THE LENGTH OF THE BEAM AND MATCH THE WIDTH OF THE BEAM MINUS ANY CHAMFERS. BLOCK THE AREAS UNDER THE GIRDERS NOT IN CONTACT WITH THE BEARING PADS USING 1" THICK BACKER RODS.
- TAKE LIMITS OF FILL BEHIND THE ABUTMENT AND THE WINGWALLS AS SHOWN ON RC-12M.
- FOR DETAILS OF INSERTS IN PRECAST CONCRETE BEAMS, SEE BD-655M IN ADDITION TO SHEETS 2 AND 8 OF THIS STANDARD.
- FOR DETAILS OF APPROACH SLABS FOR INTEGRAL ABUTMENT BRIDGES, SEE BD-628M.
- PLACE ALL GIRDERS, INCLUDING BOX BEAMS, WITH THEIR WEBS VERTICAL. STEP TOP OF CAP BEAM TO PROVIDE THE CORRECT BEAM SEAT ELEVATION. CHANGE HAUNCH THICKNESS ACROSS THE WIDTH OF THE GIRDERS TO PROVIDE THE CORRECT ROADWAY CROSS-SLOPE AND SUPERELEVATION. SLOPE BEAM SEAT IN THE LONGITUDINAL DIRECTION TO MATCH BOTTOM OF BEAM.
- THE BOTTOM OF THE ABUTMENT MAY BE HORIZONTAL. HOWEVER, THE VARIATION IN THE PILE CAP DEPTH FROM ONE END OF THE ABUTMENT TO THE OTHER DUE TO SUPERELEVATION IS LIMITED TO 1'-6" [1'-0" FOR SKEWS LESS THAN 80 DEGREES]. FOR SUPERELEVATIONS THAT WOULD RESULT IN GREATER VARIATIONS, THE BOTTOM OF THE ABUTMENT MUST BE PARALLEL TO THE SLOPE OF THE ROADWAY. FOR THE REINFORCEMENT SHOWN, THE PILE CAP IS TO BE A MINIMUM 3'-3" THICK, WITH A MAXIMUM DEPTH OF 4'-3" FOR SKEWS LESS THAN 80 DEGREES, AND A MAXIMUM DEPTH OF 4'-9" FOR SKEWS GREATER THAN OR EQUAL TO 80 DEGREES. PILE CAP DEPTHS GREATER THAN 4'-3" FOR SKEWS LESS THAN 80 DEGREES AND PILE CAP DEPTHS GREATER THAN 4'-9" FOR SKEWS GREATER THAN OR EQUAL TO 80 DEGREES MUST BE APPROVED BY CHIEF BRIDGE ENGINEER.
- INTEGRAL ABUTMENTS AT OPPOSITE ENDS OF A BRIDGE SHALL BE THE SAME DEPTH EXCEPT FOR VARIATIONS DUE TO DIFFERENCES IN ROADWAY CROSS SLOPE OR SUPERELEVATION. THE BEAM SEAT MUST BE PARALLEL TO THE ROADWAY GRADE, IN THE LONGITUDINAL DIRECTION.
- DETERMINE THE MINIMUM DIAMETER OF THE PRE-AUGERED HOLES IN ACCORDANCE WITH DESIGN MANUAL, PART 4 AP.G.1.4.2.1.
- BEAM DEPTH IS RESTRICTED TO A 6'-0" MAXIMUM DEPTH WHEN USED FOR INTEGRAL ABUTMENT UNLESS APPROVED BY CHIEF BRIDGE ENGINEER.
- USE OF ADJACENT BOX BEAMS IS NOT PERMITTED, DETAILS FOR BEAMS LESS THAN 1'-5" ARE NOT INCLUDED IN THIS STANDARD.
- SKEW LIMITATION FOR INTEGRAL ABUTMENTS PER SECTION 1.2.2 OF DESIGN MANUAL, PART 4 APPENDIX "G".
- FLARED WINGWALLS ARE NOT TO BE USED WITH INTEGRAL ABUTMENTS. REFERENCE APPENDIX "G" OF DESIGN MANUAL PART 4 SECTION 1.4.4.
- BOTH THE TYPICAL AND ALTERNATE SIDEWALK DETAILS MAY BE USED ON INTEGRAL ABUTMENT BRIDGES. IF USED, THOSE DETAILS MUST BE CARRIED THROUGH THE APPROACH SLAB.
- THE STLRFD SOFTWARE REQUIRES BEARING STIFFENERS AT THE CENTERLINE OF BEARING AND ALSO CONSIDERS THE GIRDERS TO BE Laterally BRACED AT THE CENTERLINE OF BEARING. THE DESIGNER IS RESPONSIBLE FOR DETAILING THE BEARING STIFFENERS. THE LATERAL BRACING (END DIAPHRAGM) IS TO BE OMITTED AND THE FOLLOWING NOTE ADDED TO THE CONSTRUCTION DRAWINGS:
 - THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY BRACING OF THE GIRDERS. PLACE THE #8 REINFORCEMENT BARS THROUGH THE BEAMS AND THE CAP FORMWORK PRIOR TO PLACING ANY DECK CONCRETE.
- SUPERSTRUCTURE MUST BE ERECTED AND CONNECTED TO THE INTEGRAL ABUTMENTS PRIOR TO PLACING BACKFILL BEHIND THE ABUTMENTS.
- IF AN INTEGRAL ABUTMENT BRIDGE IS BEING REDECKED, THE END DIAPHRAGM MUST BE REMOVED COMPLETELY PRIOR TO DECK REMOVAL TO AVOID SUBJECTING THE GIRDERS TO STRUCTURE AND PAVEMENT TEMPERATURE FORCES AND EARTH PRESSURE.



TYPICAL ELEVATION

- * DEPTH OF ABUTMENT BELOW CONSTRUCTION JOINT IS 3'-3" AT SHALLOWEST POINT (SEE DESIGN MANUAL, PART 4, AP.G.1.4.1). THE MAXIMUM DIFFERENCE BETWEEN THE MINIMUM AND MAXIMUM CAP DEPTH WILL NOT EXCEED 1'-0" FOR SKEW < 80° OR 1'-6" FOR SKEW ≥ 80°.
- ** BOTH H-PILES AND PIPE PILES MAY BE USED WITH STEEL OR CONCRETE GIRDERS. GALVANIZE TOP 15'-0" LENGTH OF THE PILES OR ENTIRE PILES LENGTH.
- *** THE MAXIMUM EDGE DISTANCE BETWEEN THE CENTERLINE OF THE PILE AND THE END OF THE ABUTMENT, MEASURED ALONG THE SKEW, SHALL BE THE LARGER OF:
 - 2'-6" AND $\frac{(W+dp_{ile}/2)}{\sin(\theta)}$ (ROUNDED UP TO THE NEXT 3" INCREMENT)
 - WHERE: W: WIDTH OF WINGWALL AT REAR FACE OF INTEGRAL ABUTMENT, NEGLECTING THE 1' HAUNCH (ft.)
 - dp_{ile} : OUTSIDE DIAMETER FOR PIPE PILES OR PILE DEPTH FOR H-PILES (ft.)
- THE MINIMUM EDGE DISTANCE BETWEEN THE CENTERLINE OF THE PILE AND THE END OF THE ABUTMENT, MEASURED ALONG THE SKEW, SHALL BE THE LARGER OF:
 - 1'-6"
 - THE DISTANCE REQUIRED TO PROVIDE 3" CLEARANCE FROM THE PILES TO THE HORIZONTAL REINFORCEMENT EXTENDING FROM THE WINGWALL.



TYPICAL PLAN

- † WINGWALL WIDTH MAY VARY BASED ON BARRIER TYPE SELECTED.
- ▲ EXTERIOR BEAMS TO BE LOCATED TO PROVIDE 3" CLEAR TO THE HORIZONTAL REINFORCEMENT EXTENDING FROM THE WINGWALLS.

DETACHED WINGWALL NOTES

- DETERMINE THE MOVEMENT REQUIREMENTS AND THE OPENING OF THE EXPANSION DAM FOR THE EXPANSION JOINT BETWEEN THE ABUTMENT AND DETACHED WINGWALLS, AT THE TIME OF CONSTRUCTION, IN ACCORDANCE WITH DESIGN MANUAL, PART 4 AP.G.1.6.
- BOND THE PREFORMED NEOPRENE COMPRESSION SEAL BETWEEN THE ABUTMENT AND THE DETACHED WINGWALL EXPANSION JOINTS (SEE SECTION M-M ON SHEET 5) TO BOTH THE ABUTMENT AND THE DETACHED WINGWALL.
- BOND THE CLOSED CELL NEOPRENE SPONGE IN THE DETACHED WINGWALL EXPANSION JOINTS (SEE SECTION M-M ON SHEET 5) TO THE WINGWALL. RECESS THE NEOPRENE SPONGE 1/2" INTO THE WINGWALL.
- THE WATERPROOFING MEMBRANE ACROSS THE EXPANSION JOINT BETWEEN THE INTEGRAL ABUTMENT AND DETACHED WINGWALLS WILL BE IN ACCORDANCE WITH PUBLICATION 408, SECTION 680. THE MEMBRANE SHALL SPAN THE WIDTH OF THE RECESS IN THE ABUTMENT AND IN THE DETACHED WALL, AND SHALL HAVE 8" BONDED ON EACH SIDE. THE LENGTH OF THE MEMBRANE SHALL BE 6" LONGER THAN THE SPANNED LENGTH (I.e., 6" SLACK) AT THE TIME OF INSTALLATION. SEE DETAIL P ON SHEET 6.
- PAINT THE CONTACT SURFACE BETWEEN THE APPROACH SLAB AND WINGWALL WITH AN APPROVED BOND BREAKER AND SEAL WITH AN APPROVED SEALER.

REFERENCE DRAWINGS	DESCRIPTION
BD-601M	CONCRETE DECK SLAB
BD-622M	R.C. ABUTMENTS WITH BACKWALL
BD-624M	R.C. ABUTMENTS WITHOUT BACKWALL
BD-628M	BRIDGE APPROACH SLABS
BD-655M	TYPICAL SUPERSTRUCTURE SECTIONS
BD-656M	TYPICAL LONGITUDINAL SECTIONS
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
BC-751M	BRIDGE DRAINAGE
BC-754M	STEEL DIAPHRAGMS FOR STEEL BEAM/GIRDER STRUCTURES (STRAIGHT GIRDERS ONLY)
BC-788M	TYPICAL WATERPROOFING AND EXPANSION DETAILS
RC-12M	BACKFILL AT STRUCTURES
RC-50M	GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS

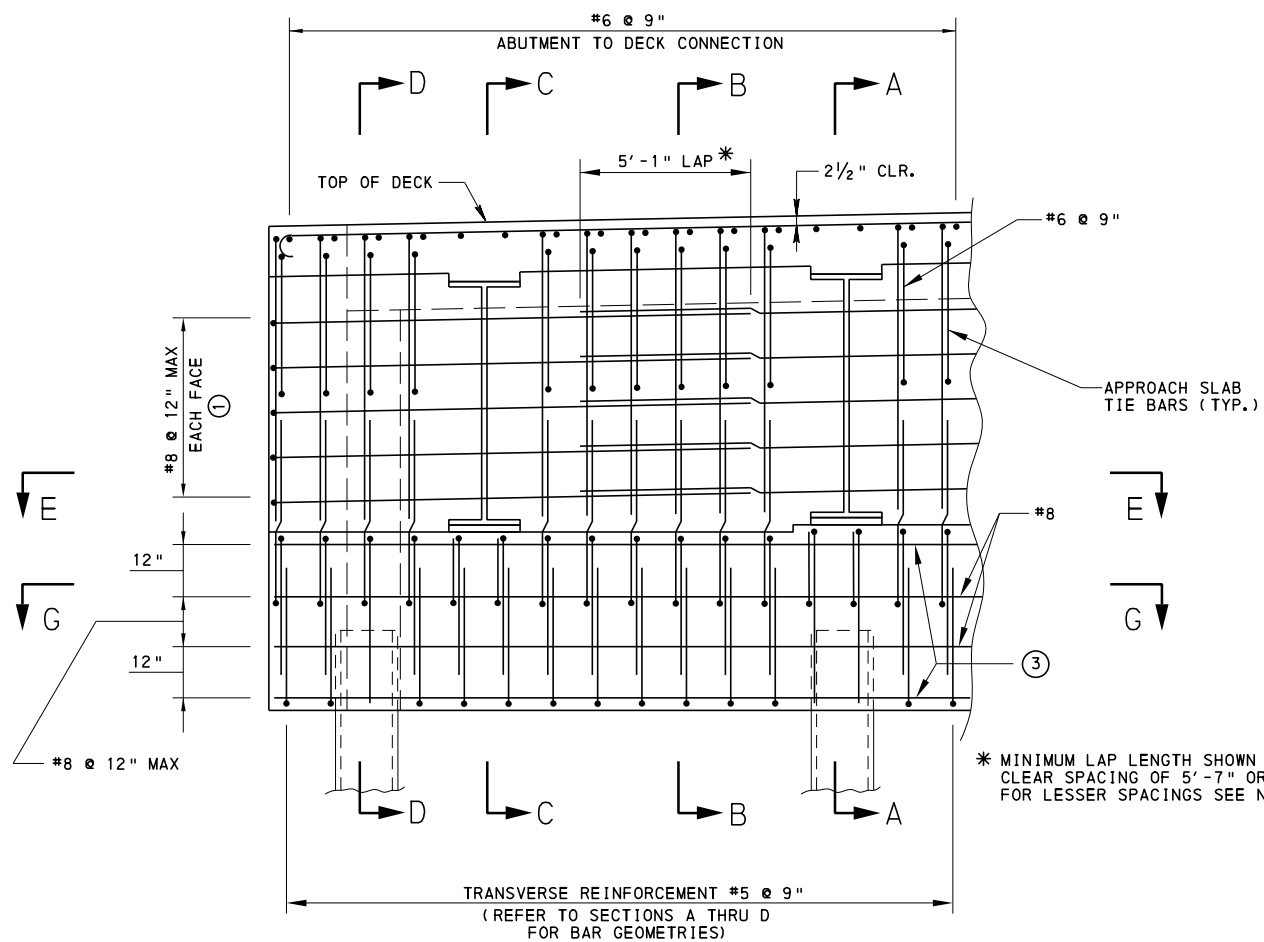
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
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STANDARD
INTEGRAL ABUTMENT
LAYOUT AND GENERAL NOTES

RECOMMENDED FEB. 19, 2021	RECOMMENDED FEB. 19, 2021	SHEET 1 OF 9
<i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	<i>Burt S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	BD-667M

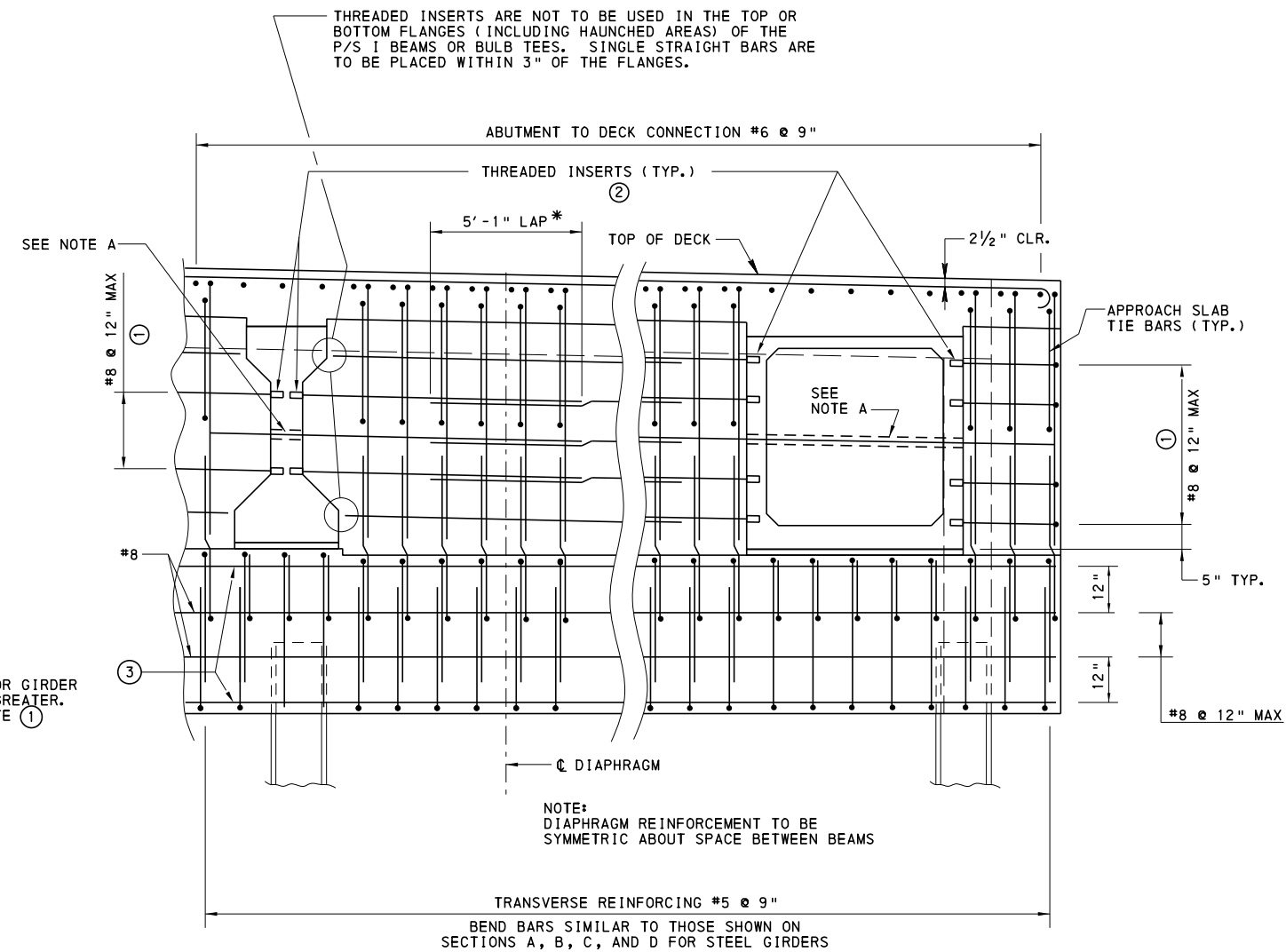
CHANGE 3

(Note: Change 2 revisions not highlighted)



**PARTIAL SECTION THRU ABUTMENT
STEEL GIRDERS**

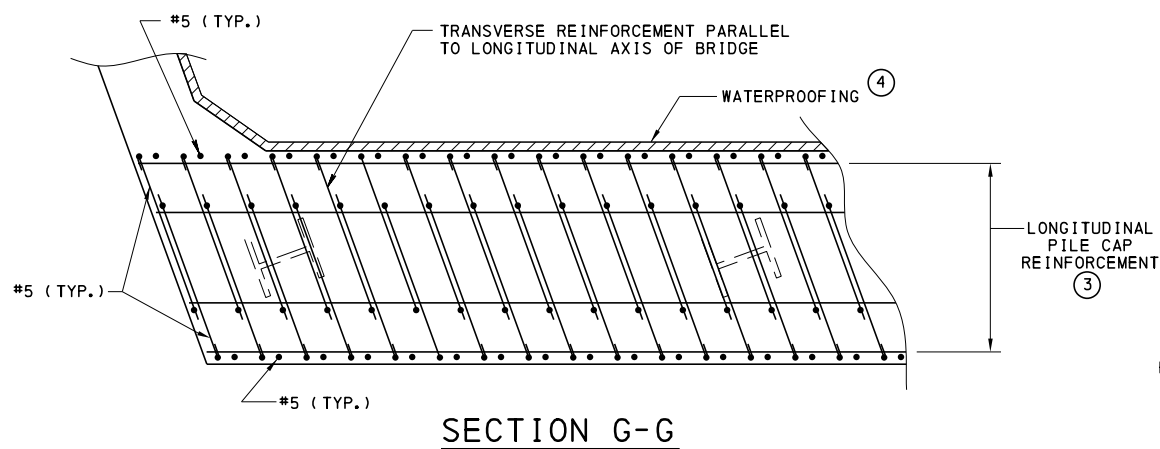
NOTE: FOR SECTION A-A, SEE SHEET 3.
FOR SECTION B-B, SEE SHEET 3.
FOR SECTION C-C, SEE SHEET 3.
FOR SECTION D-D, SEE SHEET 3.
FOR SECTION E-E, SEE SHEET 4.
DECK REINFORCEMENT NOT SHOWN FOR CLARITY



**PARTIAL SECTION THRU ABUTMENT
CONCRETE GIRDERS**

NOTE: DECK REINFORCEMENT NOT SHOWN FOR CLARITY

NOTE A:
AS AN ALTERNATE TO
THREADED INSERTS AND
BAR LAPS, SLEEVES MAY
BE PROVIDED IN P/S BEAMS.



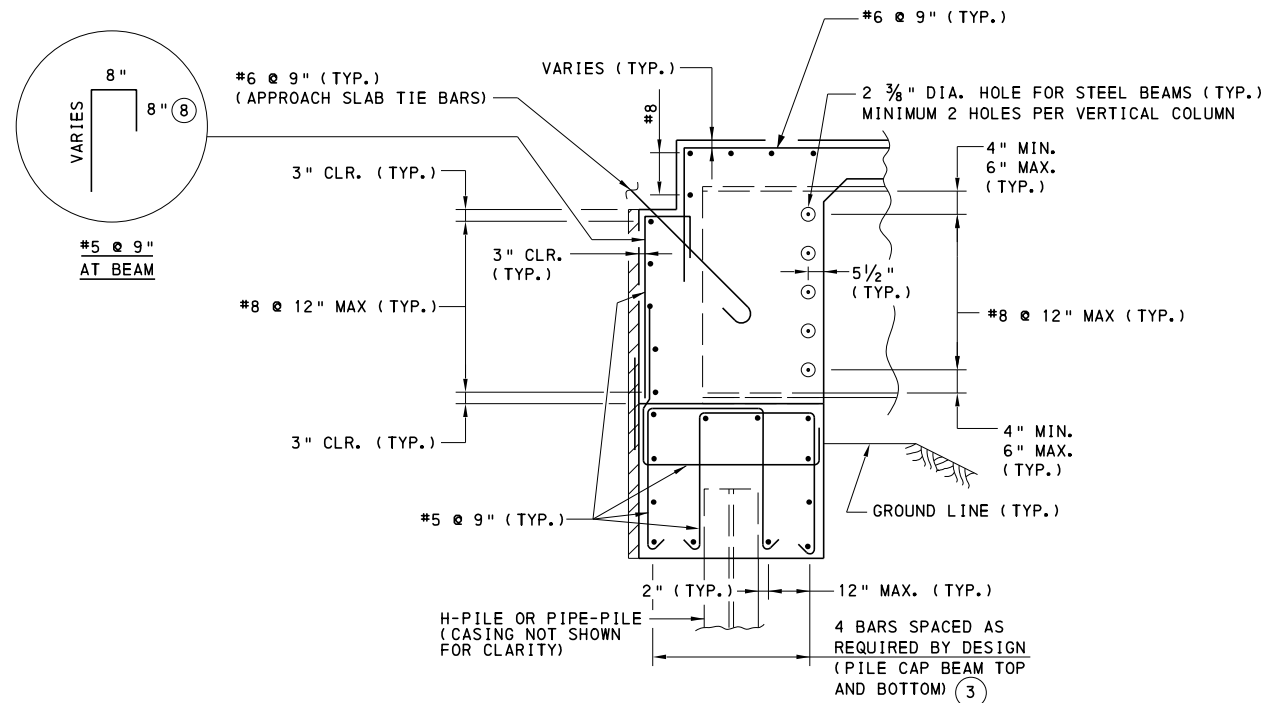
SECTION G-G

LEGEND:

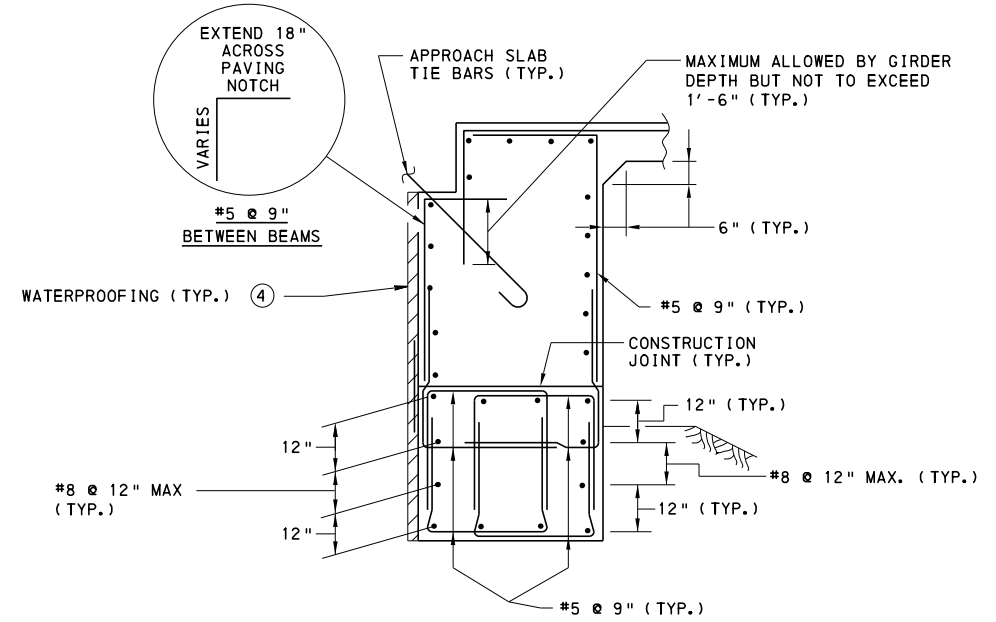
- ① LENGTH OF BARS BETWEEN GIRDERS:
FOR BARS BETWEEN INTERIOR BEAMS, USE MINIMUM BAR LENGTH EQUAL TO 3" THREADING + 1/2 GIRDER CLEAR SPACING + 1/2 LAP SPLICE LENGTH. IF THE LAP SPLICE LENGTH IS GREATER THAN THE GIRDER CLEAR SPACING THE BARS SHOULD EXTEND TO WITHIN 3" OF THE ADJACENT BEAMS.
FOR P/S BEAMS
BAR LENGTH ON THE FASCIA SIDE OF THE FASCIA BEAM SHOULD BE TO WITHIN 3" OF THE END OF DIAPHRAGM WITH A 9" BENT LEG AND INCLUDE 3" THREADED.
FOR BARS BETWEEN INTERIOR BEAMS, USE MINIMUM BAR LENGTH EQUAL TO THE CLEAR SPACING + LAP LENGTH. IF THE LAP SPLICE LENGTH IS GREATER THAN THE GIRDER CLEAR SPACING EXTEND BARS TO WITHIN 3" OF THE ADJACENT BEAMS ON EACH SIDE.
FOR STEEL BEAMS
BAR LENGTH ON THE FASCIA SIDE OF THE FASCIA BEAM SHOULD BE TO WITHIN 3" OF THE END OF DIAPHRAGM WITH A 9" BENT LEG.
- ② FOR INSERT DETAILS, SEE BD-655M AND BD-656M FULL DEPTH DIAPHRAGM WITHOUT BACKWALL AND INTEGRAL ABUTMENT DETAILS. FOR INSERT LOCATIONS, SEE SHEET 8.
- ③ FOR BAR SIZES OF PILE CAP BEAM TOP AND BOTTOM REINFORCEMENT, SEE DESIGN MANUAL, PART 4, AP. G 1.4.3
- ④ REFER TO WATERPROOFING DETAIL ON SHEET 4 FOR ADDITIONAL INFORMATION.

COMMONWEALTH OF PENNSYLVANIA
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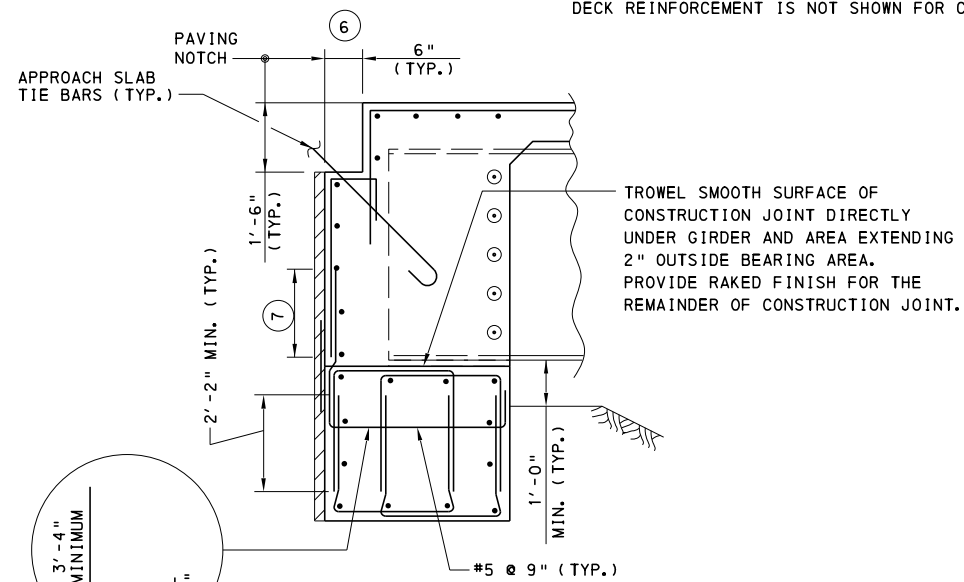
STANDARD
INTEGRAL ABUTMENT
TYPICAL SECTIONS



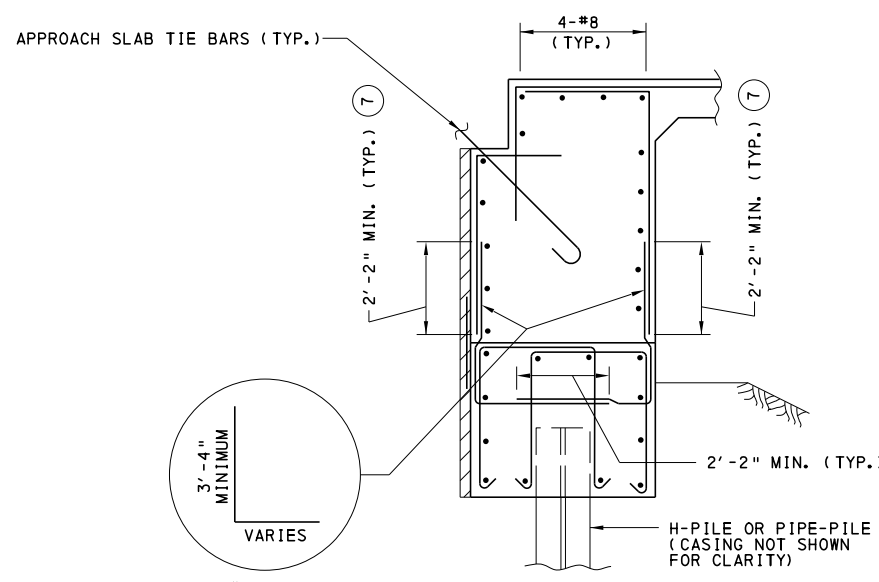
SECTION A-A
GIRDER WITH PILE (5) (6)
 DECK REINFORCEMENT IS NOT SHOWN FOR CLARITY.



SECTION B-B
NO GIRDER, NO PILE (5)
 DECK REINFORCEMENT IS NOT SHOWN FOR CLARITY.



SECTION C-C
GIRDER WITHOUT PILE (5) (6)
 DECK REINFORCEMENT IS NOT SHOWN FOR CLARITY.



SECTION D-D
PILE WITHOUT GIRDER (5)
 DECK REINFORCEMENT IS NOT SHOWN FOR CLARITY.

NOTES:

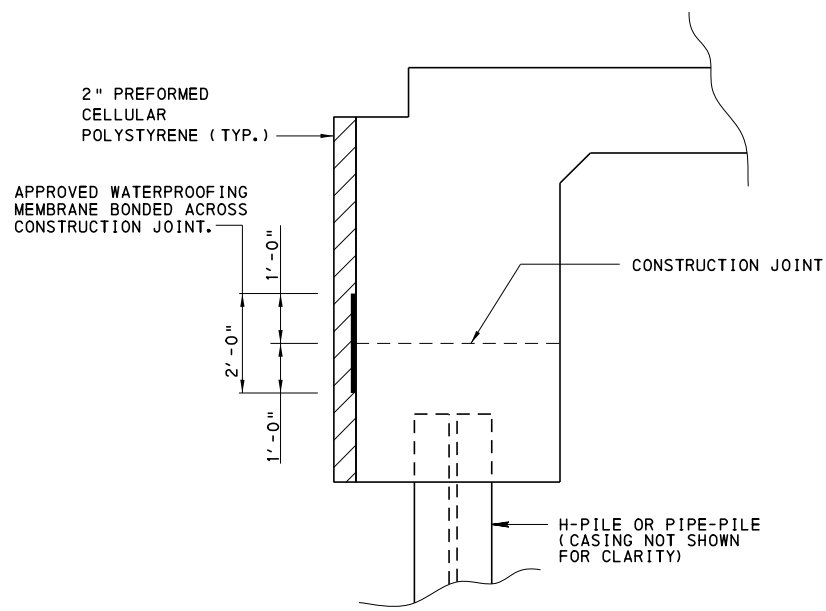
1. FOR SECTIONS A-A, B-B, C-C, AND D-D THE REINFORCEMENT AND WATERPROOFING INDICATED AS TYPICAL IN THE SECTIONS IS PRESENT IN ALL SECTIONS WHETHER SPECIFICALLY STATED OR NOT.
2. DETAILS SHOWN ARE FOR STEEL BEAMS, DETAILS SIMILAR FOR P/S BEAMS. SEE SHEET 8 FOR INSERT LOCATIONS.
3. FOR SECTION CUTS A-A, B-B, C-C AND D-D SEE SHEET 2.

LEGEND:

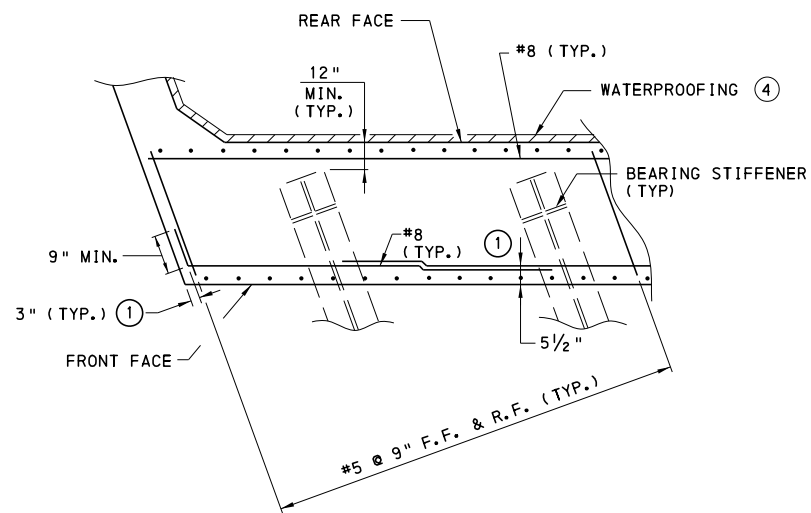
- (3) FOR BAR SIZES OF PILE CAP BEAM TOP AND BOTTOM REINFORCEMENT, SEE DESIGN MANUAL, PART 4, AP. 6 1.4.3.
- (4) REFER TO WATERPROOFING DETAIL ON SHEET 4 FOR ADDITIONAL INFORMATION.
- (5) SECTIONS ARE DRAWN SHOWING STEEL I-GIRDERS AND H-PILES. SECTIONS WITH CONCRETE GIRDERS AND/OR PIPE PILES WOULD BE SIMILAR EXCEPT FOR THE THREADED INSERTS REQUIRED FOR CONCRETE GIRDERS (SEE NOTE 2) AND THE REINFORCEMENT REQUIRED TO ANCHOR PIPE PILES (SEE DETAIL ON SHEET 6).
- (6) STEEL BEAM SHOWN P/S BEAMS SIMILAR. SEE SHEET 8 AND PARTIAL SECTION THRU ABUTMENT CONCRETE GIRDERS, ON SHEET 2 FOR INSERT/SLEEVE LOCATIONS.
- (7) FOR GIRDERS TOO SHALLOW TO PERMIT A 2'-2" LAP LENGTH, THE SPLICE IS NOT PERMITTED. ELIMINATING THE SPLICE IS OPTIONAL IN ALL OTHER CASES.
- (8) IF BAR EXTENDS INTO CAP EXTEND BAR TO PROVIDE 2" MIN. EMBEDMENT.

COMMONWEALTH OF PENNSYLVANIA
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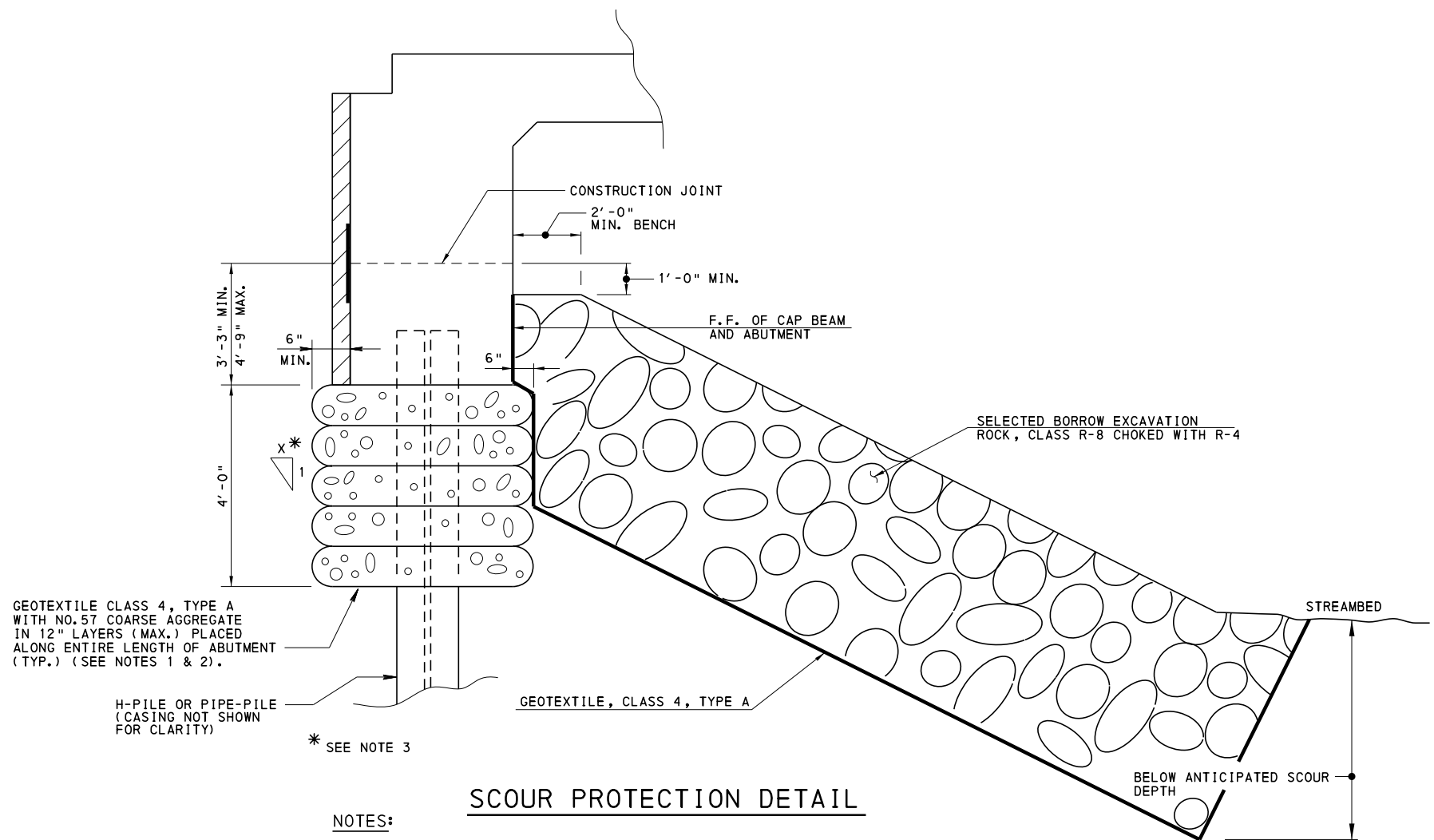
STANDARD
 INTEGRAL ABUTMENT
 TYPICAL SECTIONS



WATERPROOFING DETAIL



SECTION E-E



SCOUR PROTECTION DETAIL

GEOTEXTILE CLASS 4, TYPE A WITH NO. 57 COARSE AGGREGATE IN 12" LAYERS (MAX.) PLACED ALONG ENTIRE LENGTH OF ABUTMENT (TYP.) (SEE NOTES 1 & 2).

H-PILE OR PIPE-PILE (CASING NOT SHOWN FOR CLARITY)

* SEE NOTE 3

NOTES:

1. MAXIMUM CAP BEAM DEPTH EQUALS 4'-9". IF CAP BEAM EXTENDS BELOW BOTTOM OF SELECT BORROW EXCAVATION ROCK, R-8, THE INDICATED GEOTEXTILE, CLASS 4 (TYPE A) WITH NO. 57 COARSE AGGREGATE CAN BE ELIMINATED.
2. NO. 8 COARSE AGGREGATE MAY BE USED IN LIEU OF THE NO. 57 COARSE AGGREGATE FOR THE GEOTEXTILE.
3. PLACE GEOTEXTILE ALONG A VERTICAL REAR EXCAVATION FACE IF POSSIBLE. IF A VERTICAL EXCAVATION FACE CANNOT BE OBTAINED, GEOTEXTILE MAY BE PLACED ALONG THE EXCAVATION SLOPE NOT TO EXCEED 1.5H TO 1.0V.

NOTE: PROVIDE WATERPROOFING MEMBRANE IN ACCORDANCE WITH PUBLICATION 408, SECTION 680.2(b) ADHESIVE BACKED PREFORMED MEMBRANE.

LEGEND:

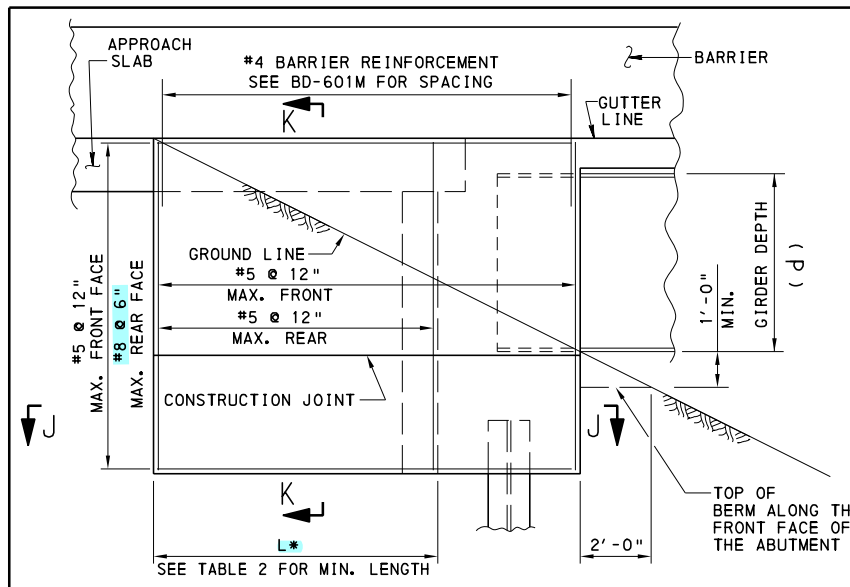
- ① LENGTH OF BARS BETWEEN GIRDERS:
 - FOR P/S BEAMS: FOR BARS BETWEEN INTERIOR BEAMS, USE MINIMUM BAR LENGTH EQUAL TO 3" THREADING + 1/2 GIRDER CLEAR SPACING + 1/2 LAP SPLICE LENGTH. IF THE LAP SPLICE LENGTH IS GREATER THAN THE GIRDER CLEAR SPACING THE BARS SHOULD EXTEND TO WITHIN 3" OF THE ADJACENT BEAMS.
 - BAR LENGTH ON THE FASCIA SIDE OF THE FASCIA BEAM SHOULD BE TO WITHIN 3" OF THE END OF DIAPHRAGM WITH A 9" BENT LEG AND INCLUDE 3" THREADED.
- FOR STEEL BEAMS:
 - FOR BARS BETWEEN INTERIOR BEAMS, USE MINIMUM BAR LENGTH EQUAL TO THE CLEAR SPACING + LAP LENGTH. IF THE LAP SPLICE LENGTH IS GREATER THAN THE GIRDER CLEAR SPACING EXTEND BARS TO WITHIN 3" OF THE ADJACENT BEAMS ON EACH SIDE.
 - BAR LENGTH ON THE FASCIA SIDE OF THE FASCIA BEAM SHOULD BE TO WITHIN 3" OF THE END OF DIAPHRAGM WITH A 9" BENT LEG.

④ REFER TO WATERPROOFING DETAIL FOR ADDITIONAL INFORMATION.

COMMONWEALTH OF PENNSYLVANIA
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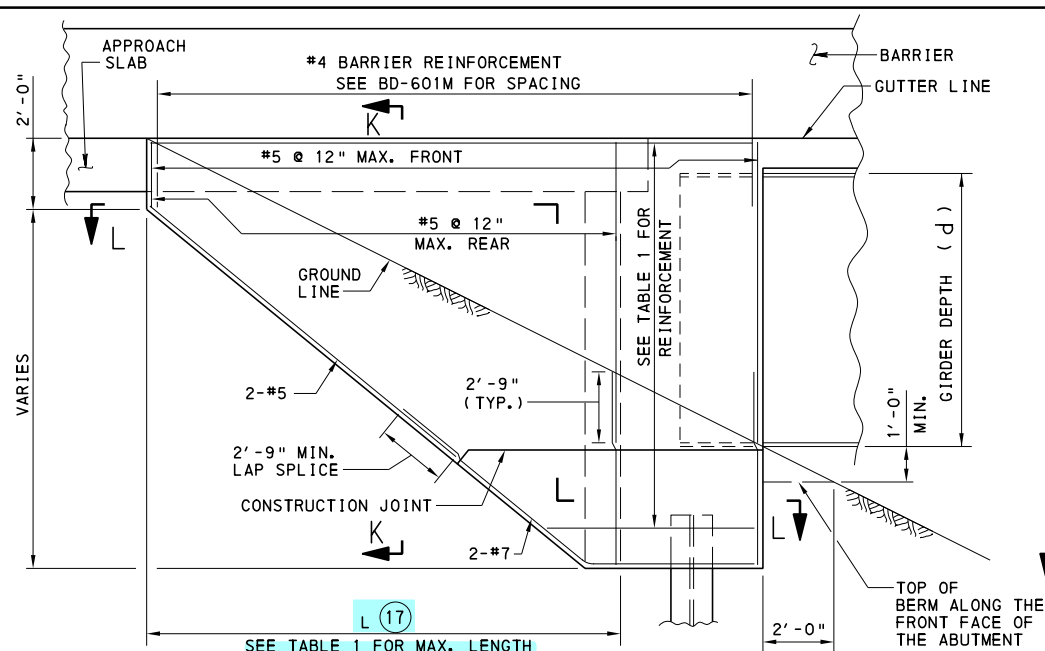
STANDARD
INTEGRAL ABUTMENT
DETAILS

RECOMMENDED FEB. 19, 2021 <i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED FEB. 19, 2021 <i>Burt S. Thayer</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 4 OF 9 BD-667M
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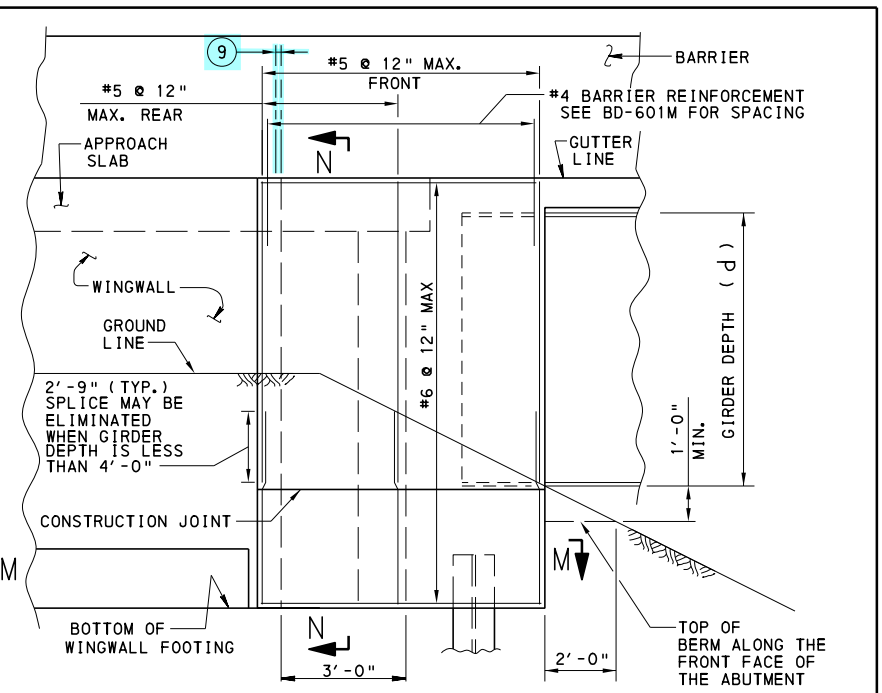


ATTACHED RECTANGULAR WINGWALL ELEVATION
(FOR GIRDER DEPTH $d < 5'-0"$)

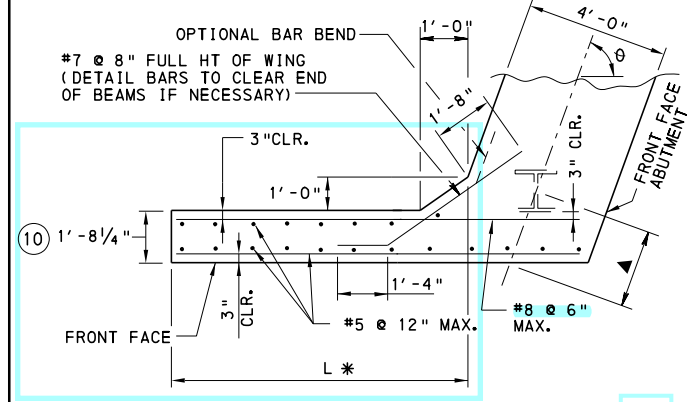
NOTE TO DESIGNER: THE BEAM DEPTH AND MAXIMUM WINGWALL LENGTHS ARE BASED ON STRUCTURAL CAPACITY OF THE WING WALL ATTACHMENT TO THE CAP. THEREFORE THE BARRIER END TRANSITION LENGTH INDICATED IN TABLE 3 MAY CONTROL THE MINIMUM BEAM DEPTH.



ATTACHED TAPERED WINGWALL ELEVATION
(FOR GIRDER DEPTH $5'-0" \leq d < 8'-0"$)

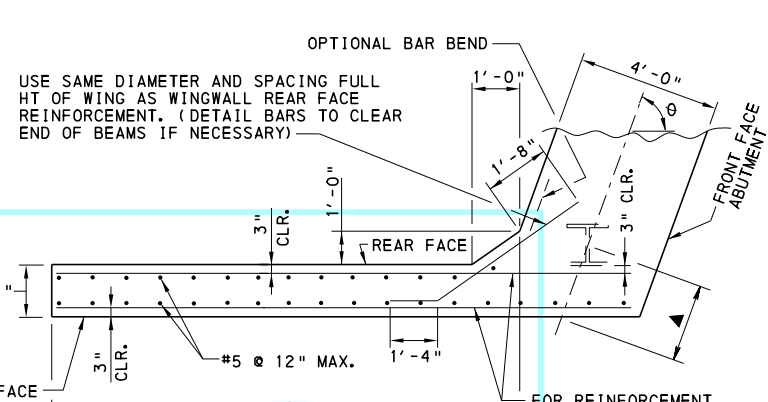


DETACHED WINGWALL ELEVATION

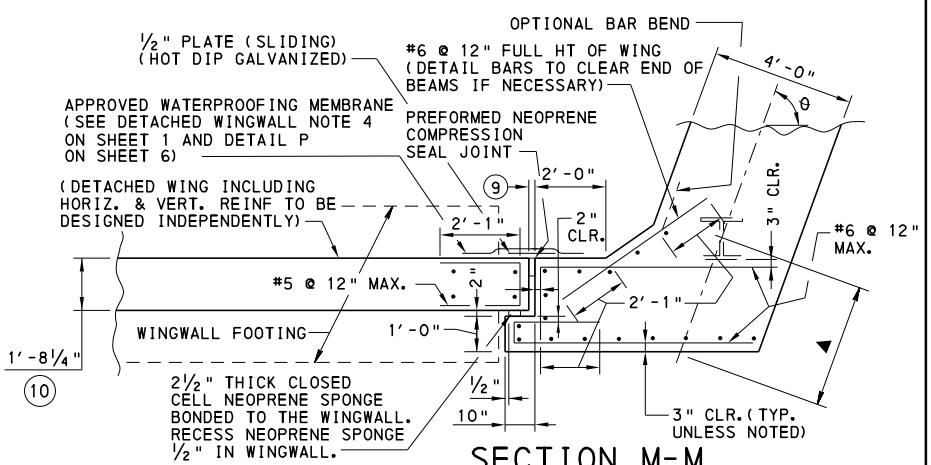


SECTION J-J

* THE WING LENGTH MUST BE LONG ENOUGH TO INCLUDE THE APPROPRIATE BARRIER END TRANSITION LENGTH FOR THE BRIDGE BARRIER TYPE ON THE STRUCTURE. SEE NOTE ON SHEET 6. SEE TABLE 3.

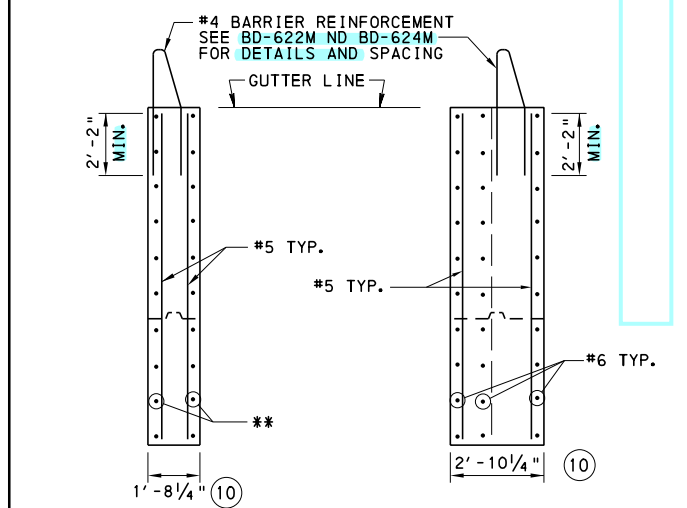


SECTION L-L



SECTION M-M

FOR MEMBRANE SLACK, SEE DETAIL P SHEET 6



SECTION K-K
(RECTANGULAR OR TAPERED WING)

SECTION N-N
(DETACHED WING)

** FOR RECTANGULAR WINGWALL REINFORCEMENT: SEE SECTION J-J. FOR TAPERED WINGWALL REINFORCEMENT: SEE TABLE 1 THIS SHEET.

TABLE 1: TAPERED WINGWALL REINFORCEMENT			
GIRDER DEPTH (d)	WINGWALL LENGTH BEYOND THE REAR FACE OF THE ABUTMENT (L)	REINFORCEMENT	
		REAR FACE	FRONT FACE
$60 \leq d < 72$	$L \leq 14'-2"$	#8 @ 6"	#5 @ 12"
$72 \leq d < 84$	$L \leq 15'-0"$	#8 @ 6"	#5 @ 12"
$84 \leq d < 96$	$L \leq 15'-10"$	#8 @ 6"	#5 @ 12"
$96 = d^*$	$L \leq 16'-7"$	#8 @ 6"	#5 @ 12"

* CHIEF BRIDGE ENGINEER APPROVAL IS REQUIRED FOR BEAM DEPTHS GREATER THAN 6'-0"

TABLE 2: MINIMUM ATTACHED WINGWALL LENGTH (L) ***					
WALL	GIRDER DEPTH (d)	SKEW=90°		45° ≤ SKEW < 90°	
		RECTANGULAR	TAPERED	RECTANGULAR	TAPERED
RECTANGULAR	$d < 48"$	7'-6"	7'-6"	7'-6"	7'-6"
	$48" \leq d < 60"$	7'-8"	9'-0"	9'-0"	9'-0"
TAPERED	$60" \leq d < 72"$	9'-8"	10'-8"	9'-8"	10'-8"
	$72" \leq d < 84"$	11'-8"	12'-8"	11'-8"	12'-8"
	$84" \leq d < 96"$	13'-8"	14'-8"	13'-8"	14'-8"
	$d = 96"*$	14'-0"	15'-0"	14'-0"	15'-0"

*** ACTUAL WINGWALL LENGTH SHALL BE DETERMINED BASED ON GRADING-CONTOURS AND THE MINIMUM BARRIER END TRANSITION LENGTH IN TABLE 3.

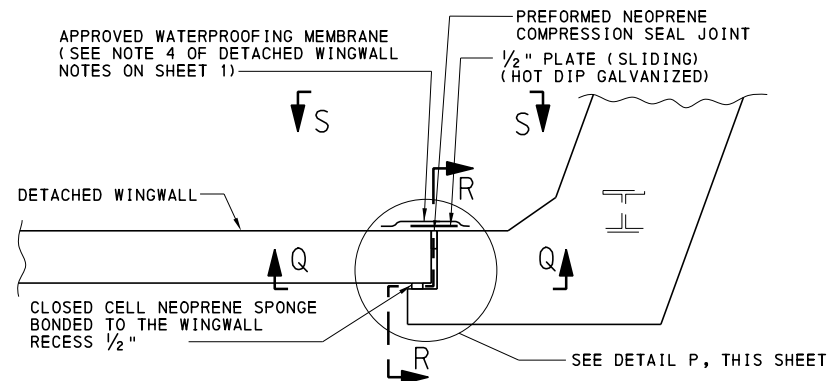
TABLE 3: RECTANGULAR WINGWALL			
BARRIER TYPE	PERMISSIBLE BEAM DEPTH (d)	MINIMUM BARRIER END TRANSITION LENGTH (L)	MAXIMUM WINGWALL LENGTH
32" F-SHAPE CONCRETE BARRIER	$21" \leq d < 60"$	12'-0"	15'-6"
42" AND 45" F-SHAPE CONCRETE BARRIER	$48" \leq d < 60"$	12'-0"	12'-0"
32" VERTICAL WALL CONCRETE BARRIER	$21" \leq d < 60"$	7'-0"	15'-6"
42" VERTICAL WALL CONCRETE BARRIER	$48" \leq d < 60"$	10'-0"	12'-0"
PA BRIDGE BARRIER	$48" \leq d < 60"$	9'-0"	12'-0"
PA TYPE 10M BRIDGE BARRIER	$21" \leq d < 60"$	9'-0"	15'-6"

LEGEND:

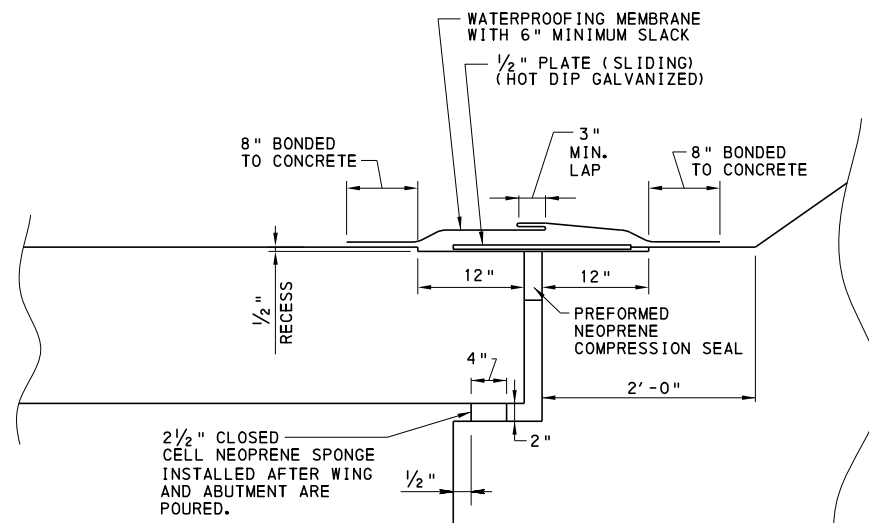
- ⑨ DISTANCES TO BE DETERMINED BASED ON DESIGN MOVEMENT, CONSTRUCTION TEMPERATURE, AND COMPRESSION SEAL JOINT MINIMUM INSTALLATION OPENING REQUIREMENTS. SEE NOTE 1 OF DETACHED WINGWALL NOTES, ON SHEET 1.
- ⑩ WINGWALL WIDTH MAY VARY BASED ON BARRIER TYPE. MINIMUM WINGWALL WIDTH EQUALS 1'-8 1/4".
- ⑪ FOR MINIMUM BARRIER END TRANSITION LENGTH (L) REFER TO TABLE 3.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
INTEGRAL ABUTMENT
WINGWALL DETAILS



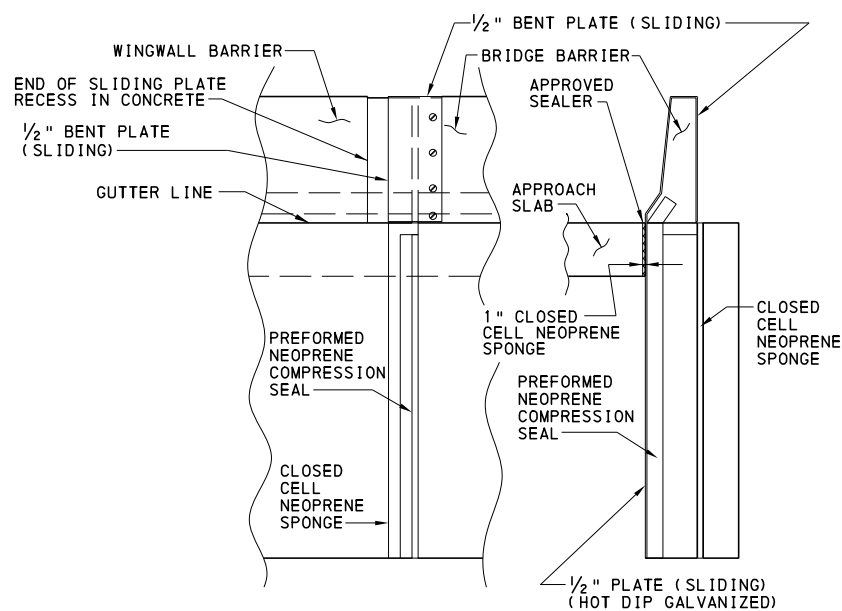
PARTIAL SECTION THRU DETACHED WINGWALL EXPANSION JOINT



DETAIL P

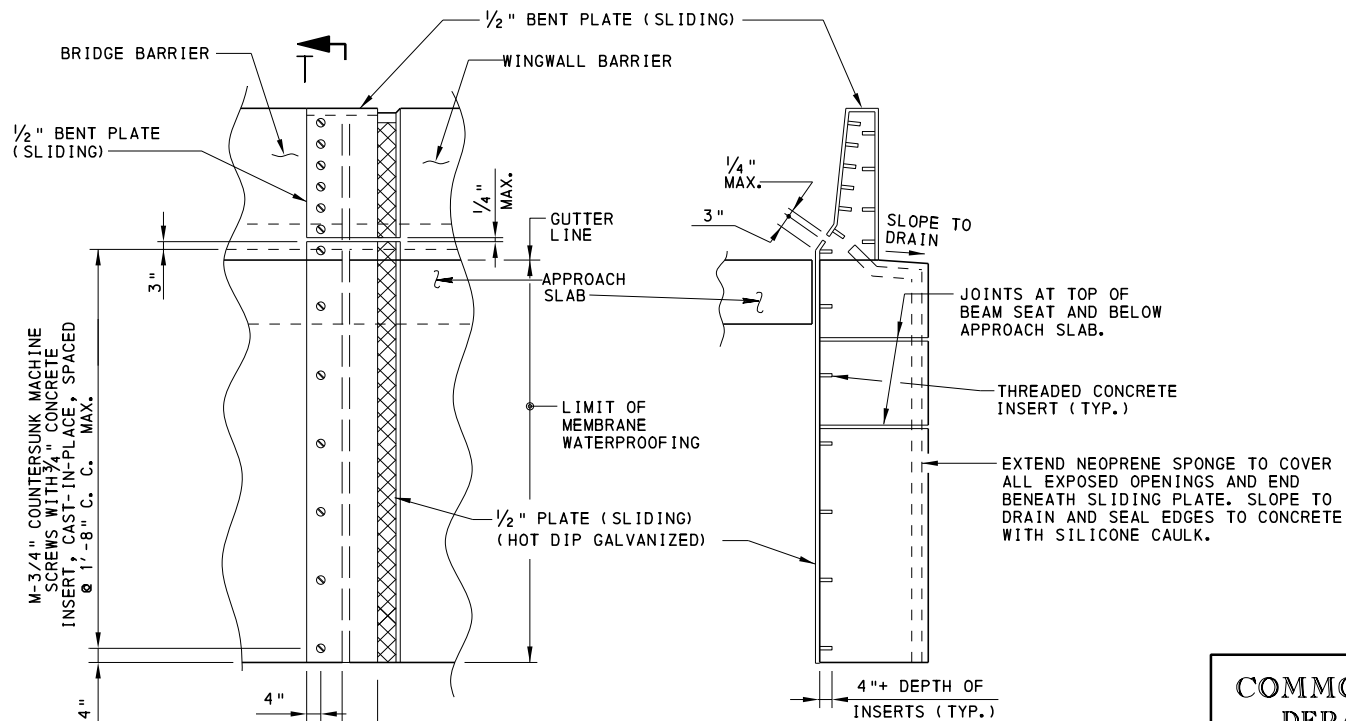
NOTE:

IF THE ATTACHED RECTANGULAR WINGWALL CANNOT ACCOMMODATE THE REQUIRED TRANSITION LENGTH, USE THE ATTACHED TAPERED WINGWALL OR DETACHED WINGWALL.



SECTION Q-Q

SECTION R-R



VIEW S-S

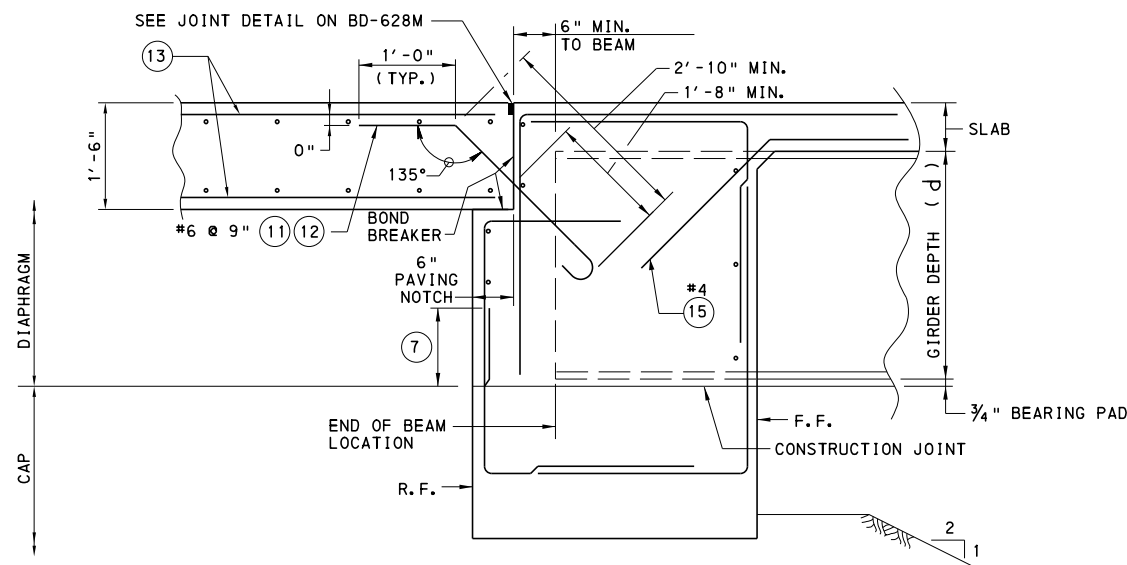
SECTION T-T

(WATERPROOFING MEMBRANE AND LIMITS OF RECESS IN CONCRETE REMOVED FOR CLARITY)

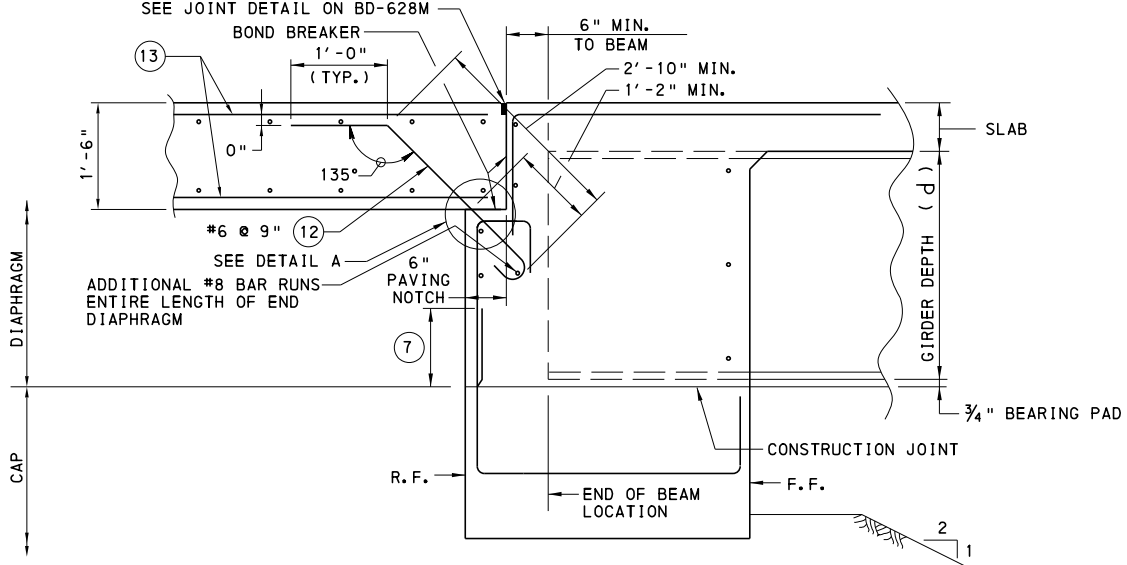
NOTE:
FORM CONCRETE RECESS AREA IN BARRIER AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT WA-1 OR PERFORMANCE GRADED ASPHALT CEMENT PG 64-22 TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
INTEGRAL ABUTMENT
DETACHED WINGWALL DETAILS

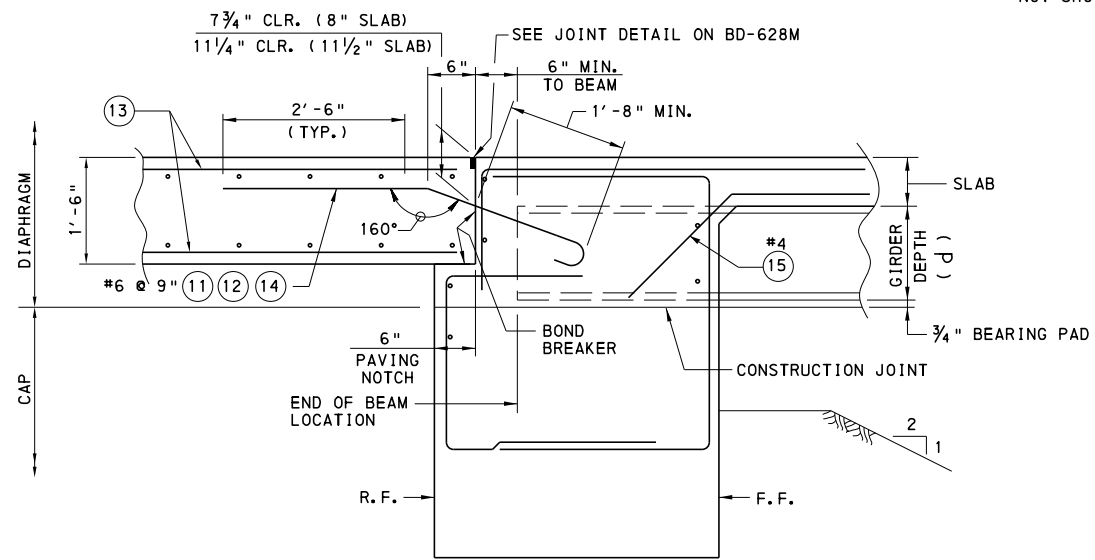


**SECTION THRU
END DIAPHRAGM BETWEEN BEAMS
GIRDER DEPTH ≥ 2'-0"**

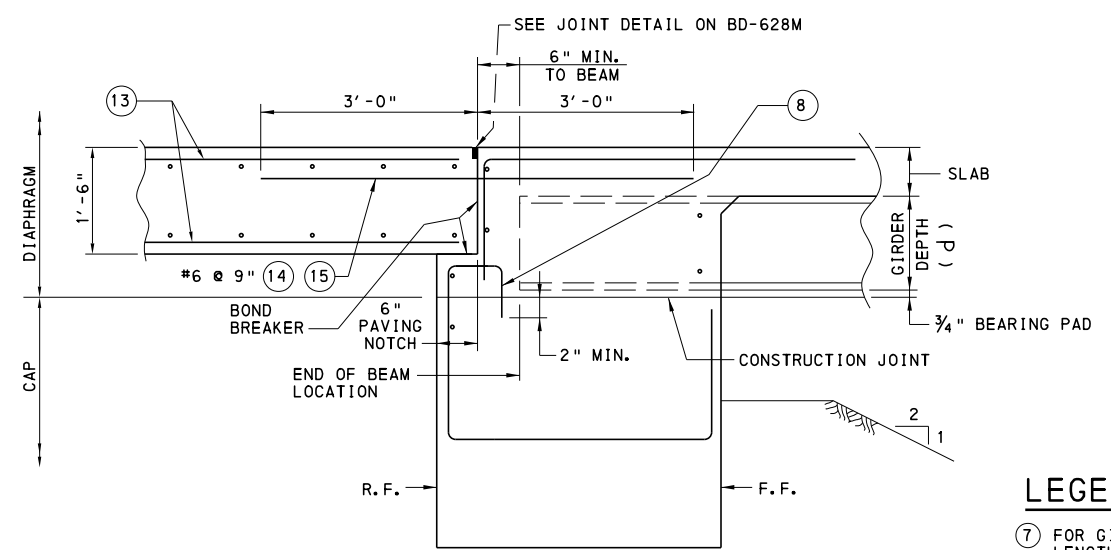


**SECTION THRU
END DIAPHRAGM AT BEAMS
GIRDER DEPTH ≥ 2'-0"**

NOTE: DECK AND CAP REINFORCEMENT NOT SHOWN FOR CLARITY.



**SECTION THRU
END DIAPHRAGM BETWEEN BEAMS
GIRDER DEPTH < 2'-0"**



**SECTION THRU
END DIAPHRAGM AT BEAMS
GIRDER DEPTH < 2'-0"**

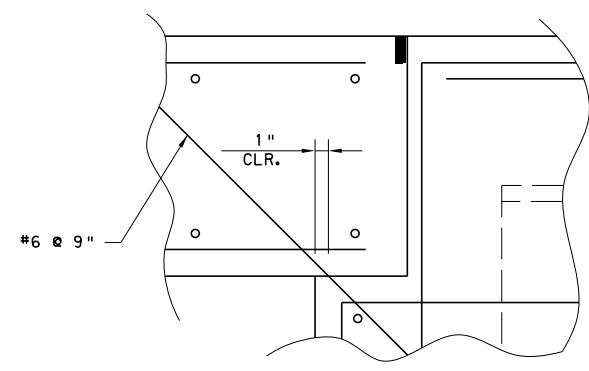
LEGEND:

- ⑦ FOR GIRDERS TOO SHALLOW TO PERMIT A 2'-2" LAP LENGTH, THE SPLICE IS NOT PERMITTED. ELIMINATING THE SPLICE IS OPTIONAL IN ALL OTHER CASES.
- ⑧ IF BAR EXTENDS INTO CAP EXTEND BAR TO PROVIDE 2" MIN. EMBEDMENT.
- ⑪ DETAIL SPACING TO CLEAR GIRDERS.
- ⑫ FOR 180° HOOK DIMENSIONS, REFER TO BC-736M.
- ⑬ FOR DIMENSIONS AND REINFORCEMENT OF APPROACH SLAB, SEE BD-628M.
- ⑭ THE HORIZONTAL LEG OF THE BAR IS TO BE LOCATED AT THE SAME PLANE AS THE LONGITUDINAL DECK REINFORCEMENT IN THE BOTTOM MAT OF THE DECK.
- ⑮ SPACED WITH LONGITUDINAL DECK REINFORCEMENT

GIRDER DEPTH (d)	MINIMUM APPROACH SLAB LENGTH ALONG C		
	SKEW = 90°	SKEW = 60°	SKEW = 45°
17" ≤ d ≤ 24"	12'-0"	14'-0"	18'-0"
24" < d ≤ 36"	14'-0"	16'-0"	20'-0"
36" < d ≤ 48"	15'-0"	18'-0"	22'-0"
48" < d ≤ 60"	17'-0"	20'-0"	24'-0"
60" < d ≤ 72"	18'-0"	22'-0"	25'-0"
72" < d* ≤ 84"	20'-0"	24'-0"	----
84" < d* ≤ 96"	22'-0"	25'-0"	----

NOTES FOR USE OF TABLE:

1. THE 25'-0" APPROACH SLAB LENGTH SHOWN ON BD-628M, SHEET 35 OF 35 (TYPE 5), MAY BE REDUCED TO THE VALUE INDICATED ABOVE WHEN SITE CONDITIONS EXIST THAT RESTRICT THE USE OF THE 25'-0" APPROACH SLAB LENGTH OR WHEN DIRECTED BY THE DISTRICT BRIDGE ENGINEER.
 2. DO NOT CHANGE THE APPROACH SLAB REINFORCEMENT SPECIFIED ON BD-628M IF THE APPROACH SLAB LENGTH IS REDUCED.
 3. FOR SKEW ANGLES OTHER THAN THOSE INDICATED, USE THE NEXT LARGER APPROACH SLAB LENGTH INDICATED (I.E. FOR A 70° SKEW, USE THE 60° SKEW LENGTH).
- * - CHIEF BRIDGE ENGINEER APPROVAL IS REQUIRED FOR BEAM DEPTHS GREATER THAN 6'-0"

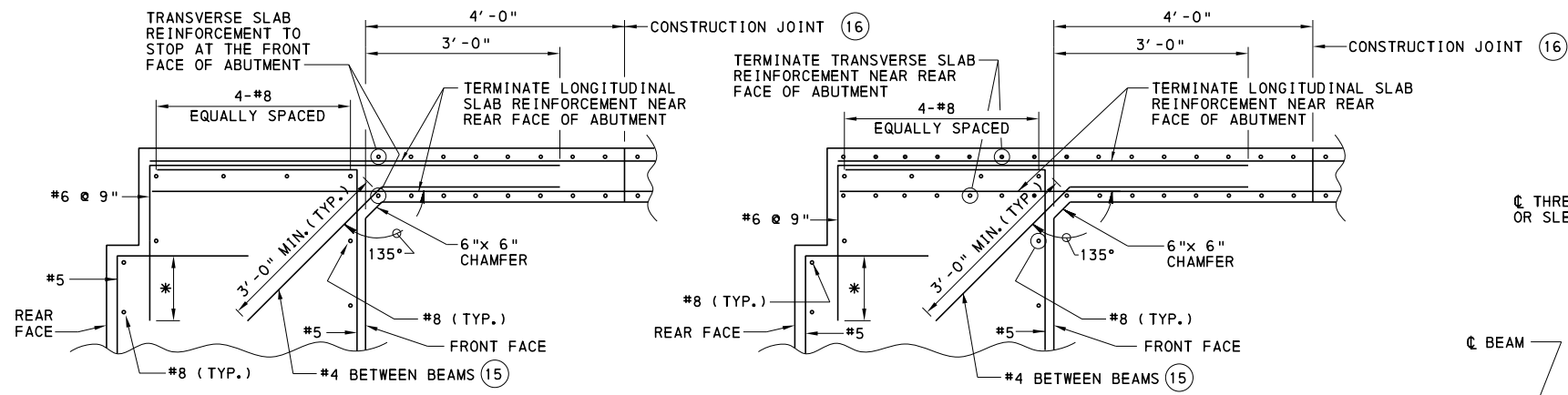


DETAIL A

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

**STANDARD
INTEGRAL ABUTMENT
APPROACH SLAB DETAILS**

RECOMMENDED FEB. 19, 2021 <i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED FEB. 19, 2021 <i>Brenda Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 7 OF 9 BD-667M
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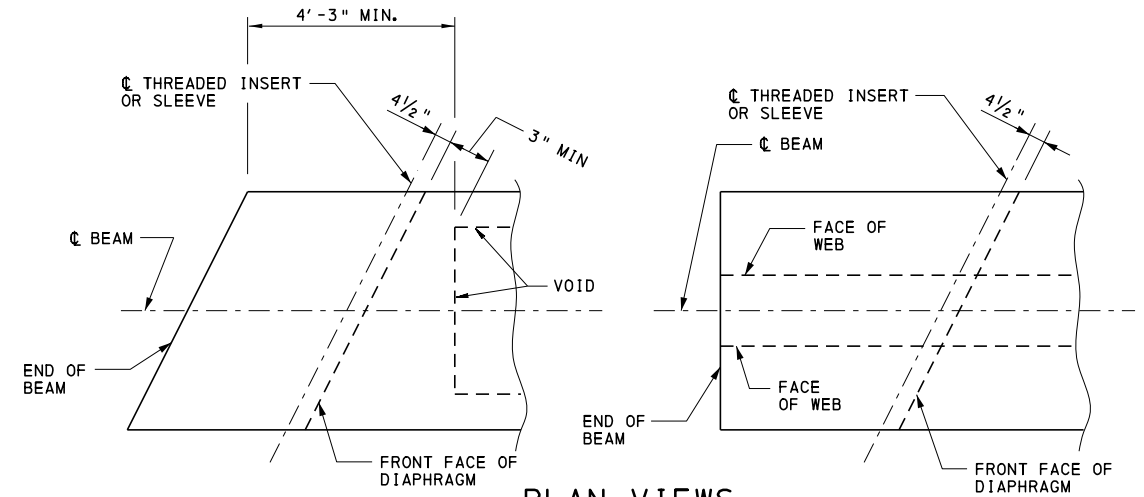
**TRANSVERSE SLAB REINFORCEMENT
PARALLEL TO ABUTMENT
(SKEWS OF 75° TO 90°)**

**TRANSVERSE SLAB REINFORCEMENT
NOT PARALLEL TO ABUTMENT
(SKEWS < 75°)**

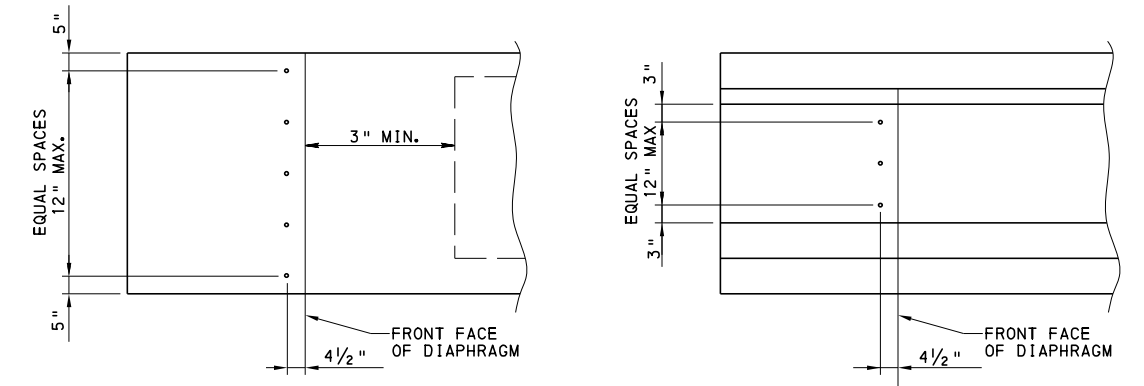
SLAB-ABUTMENT CONNECTION DETAIL

- FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.
- SECTIONS BETWEEN GIRDERS SHOWN

* 1'-6" MAXIMUM LENGTH ALLOWED DUE TO GIRDER DEPTH.



PLAN VIEWS



CONCRETE BOX BEAMS

CONCRETE I-BEAMS

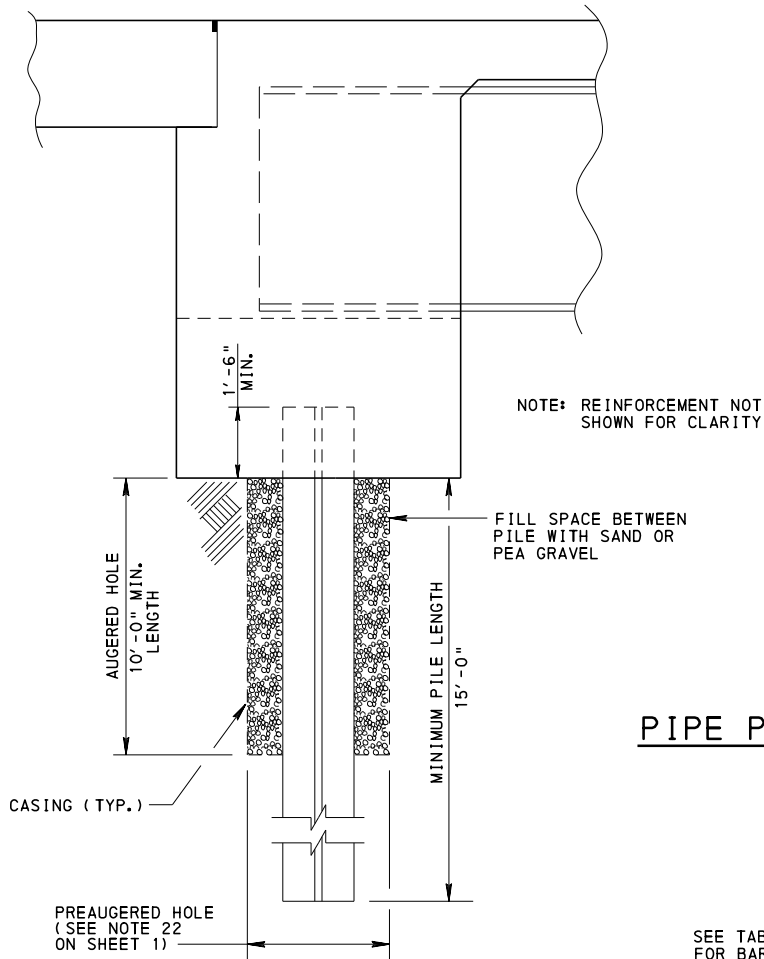
ELEVATION VIEWS

**THREADED INSERT LOCATIONS IN PRESTRESS BEAMS.
BEAM ENDS SUPPORTED ON INTEGRAL ABUTMENTS**

(SEE SHEET 3 FOR HOLE LOCATION IN WEBS OF STEEL BEAMS)

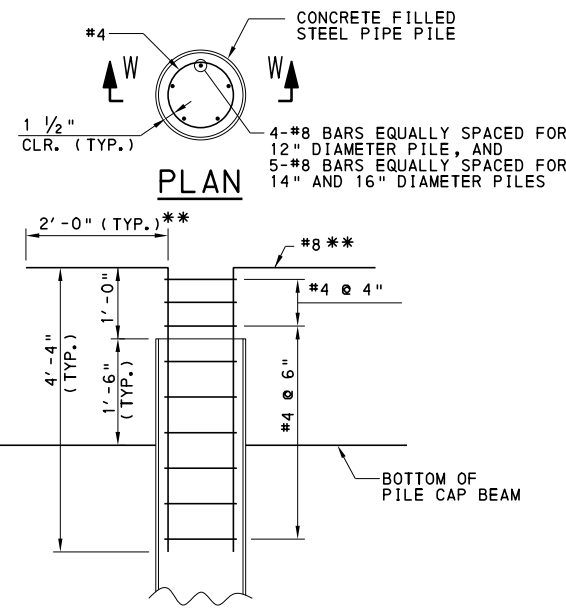
LEGEND:

- (15) SPACED WITH LONGITUDINAL DECK REINFORCEMENT
- (16) DECK PLACEMENT SEQUENCE:
 1. POUR THE ENTIRE DECK EXCEPT THE PORTIONS WITHIN 4'-0" FROM THE FRONT FACES OF THE ABUTMENTS.
 2. THEN POUR THE END DIAPHRAGMS.
 3. FOR GIRDER DEPTHS > 36", WAIT A MINIMUM OF 2 HOURS BEFORE POURING THE REMAINDER OF THE DECK. FOR GIRDER DEPTHS ≤ 36" THE REMAINDER OF THE DECK CAN BE POURED SIMULTANEOUSLY WITH THE END DIAPHRAGMS.



**INTEGRAL ABUTMENT PILE
INSTALLATION DETAIL**

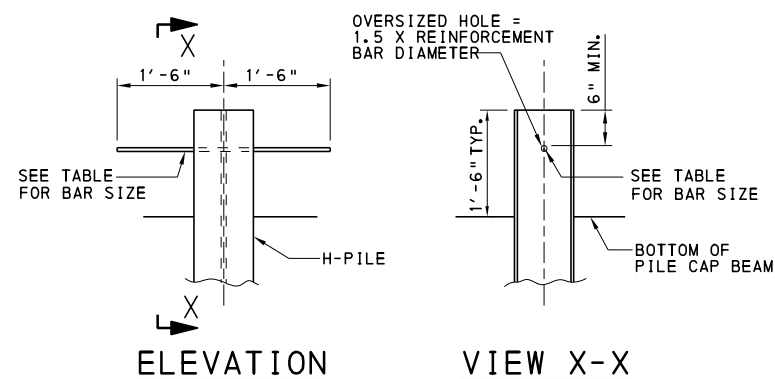
- SEE APPENDIX G OF DESIGN MANUAL PART 4 SECTION 1.4.2 FOR PRE AUGERING REQUIREMENTS
- PREDRILL OVERSIZED HOLES FOR ALL PILES IN ACCORDANCE WITH DESIGN MANUAL PART 4 AP.G.1.4.2.1. PLACE PILES VERTICAL IN THE HOLES BEFORE FILLING THE HOLES. FILL THE HOLES WITH DRY LOOSE SAND OR PEA GRAVEL BEFORE DRIVING THE PILES.



SECTION W-W

** HOOK 180° PER BC-736M OR ROTATE TO FIT SHORTER CAP WIDTHS

PIPE PILE-TO-PILE CAP CONNECTION DETAIL

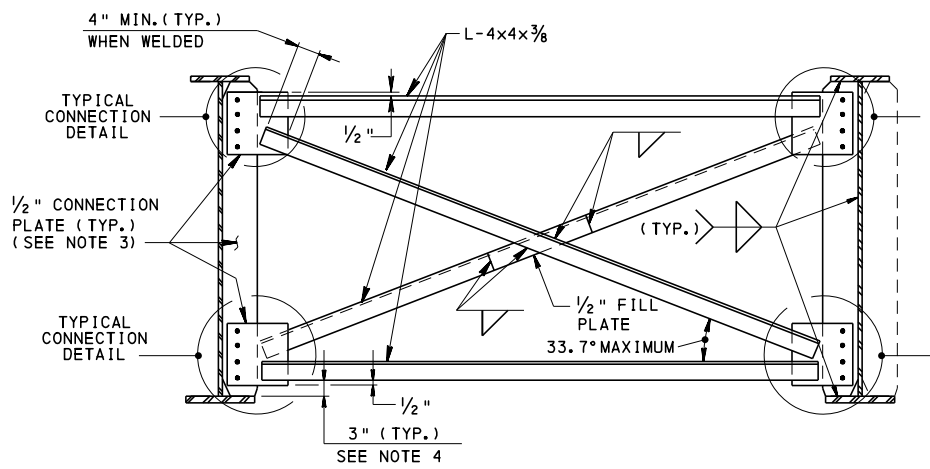


H-PILE-TO-PILE CAP CONNECTION DETAIL

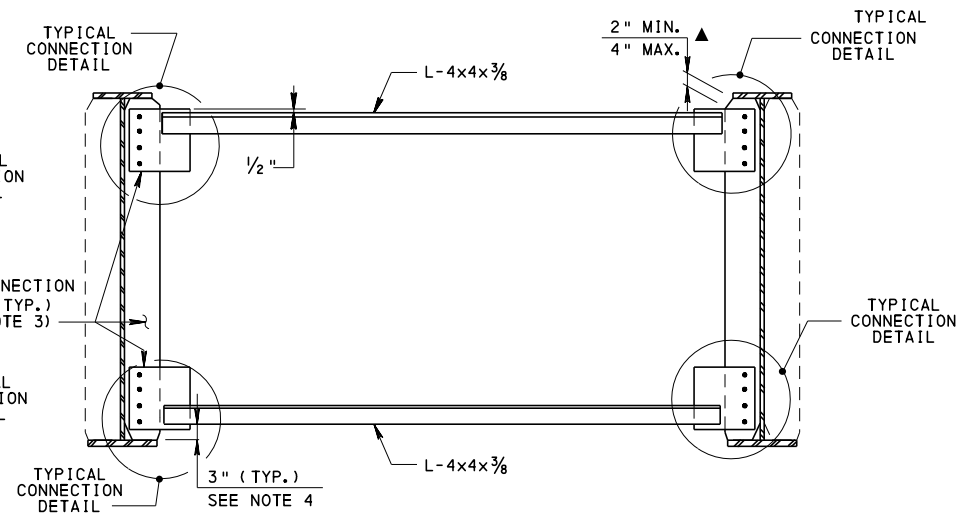
H-PILE TO PILE CAP CONNECTION REINFORCEMENT	
PILE SIZE	BAR
HP 10 x 57	#6
HP 12 x 53	#6
HP 12 x 63	#6
HP 12 x 74	#6
HP 12 x 84	#7
HP 14 x 73	#6
HP 14 x 89	#7
HP 14 x 102	#7
HP 14 x 117	#8

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

**STANDARD
INTEGRAL ABUTMENT
SLAB-ABUTMENT CONNECTION AND
PILE-ABUTMENT CONNECTION DETAILS**

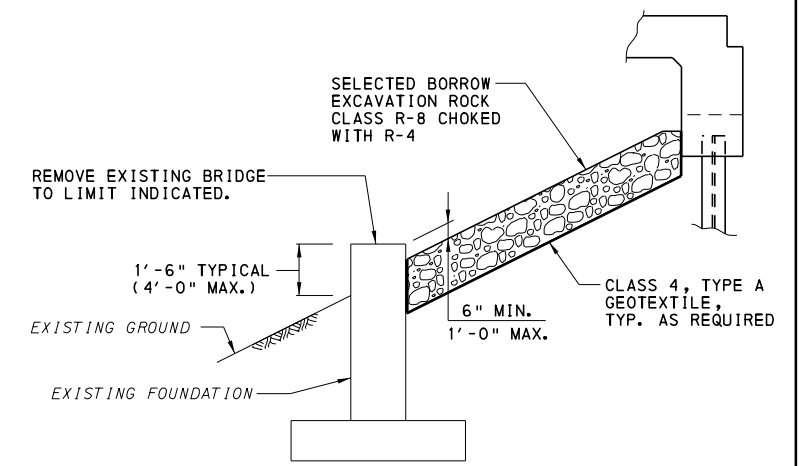


CONNECTION DETAIL - FIRST BAY ERECTED



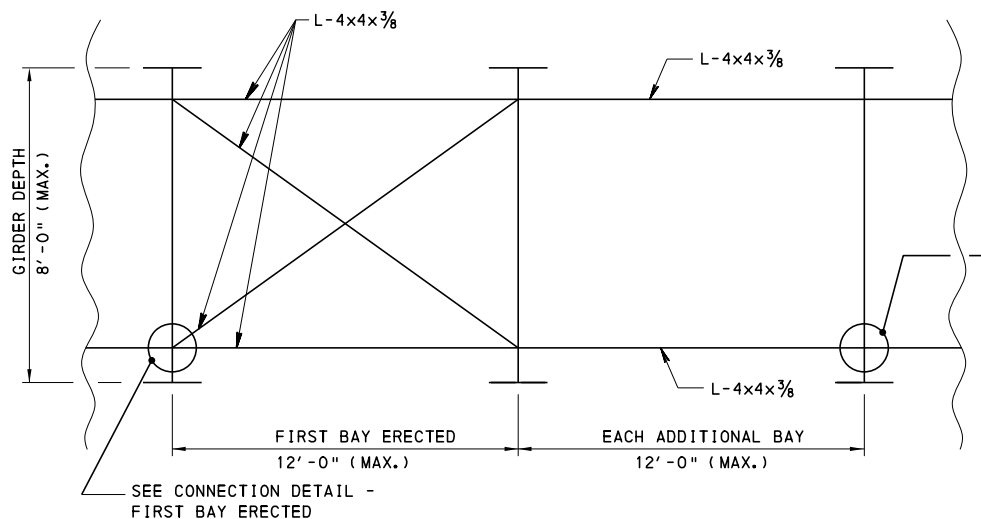
CONNECTION DETAIL - ADDITIONAL BAY

▲ MAY BE EXCEEDED UP TO DECK PAN DEPTH PLUS 1".

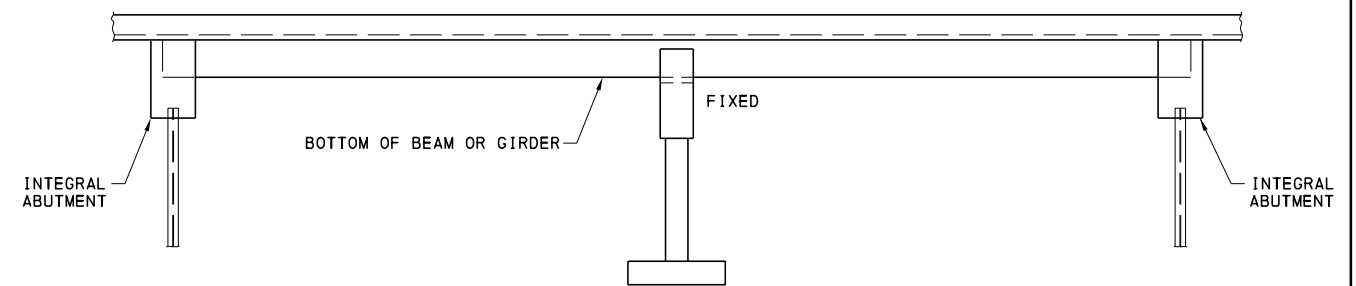


DETAIL FOR USING EXISTING SUBSTRUCTURE UNIT FOR SLOPE PROTECTION

NOTE:
THE ABOVE DETAIL HAS PROVEN AN ECONOMICAL OPTION FOR MANY BRIDGE REPLACEMENTS. STABILITY OF THE REMAINING EXISTING STRUCTURE FOR PROPOSED CONDITIONS NEEDS TO BE CHECKED. ADDITIONAL RIPRAP CAN BE ADDED TO AUGMENT THE EXISTING SUBSTRUCTURE UNIT IF THE LENGTH OR POSITION DOES NOT MEET SITE NEEDS COMPLETELY.



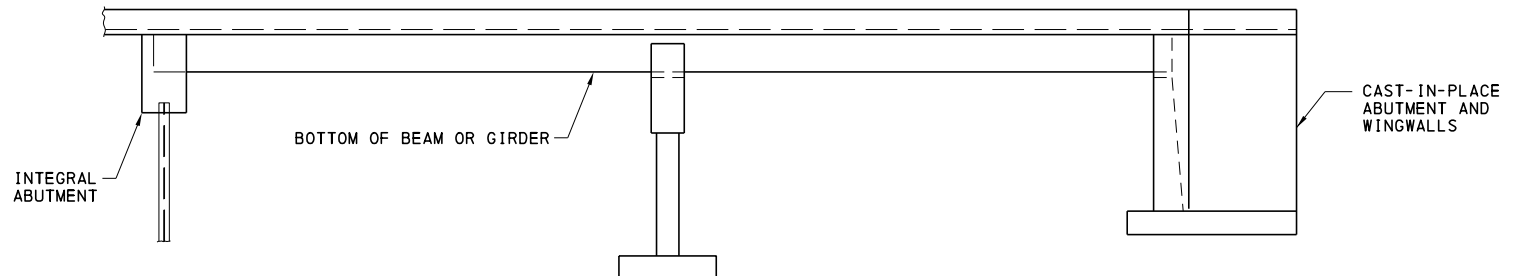
END DIAPHRAGM BRACING (STAY-IN PLACE)



FIXITY ARRANGEMENT FOR MULTI SPAN STRUCTURES

NOTES:

- FOR TWO SPAN ARRANGEMENT THE PIER SHOULD BE FIXED TO MINIMIZE LONGITUDINAL SUPERSTRUCTURE FORCES AT ABUTMENTS.
- FOR ADDITIONAL SPANS, PIER STIFFNESS MUST BE CONSIDERED TO DEVELOP THE MOST EFFICIENT DESIGNS AND MINIMIZE MOVEMENT.



MIXED SUBSTRUCTURE TYPES

NOTE:
INTEGRAL ABUTMENTS MAY BE USED WITH OTHER ABUTMENT TYPES TO MEET SITE REQUIREMENTS FOR GEOMETRY OR GEOTECHNICAL FEATURES. FIXITY SHOULD BE CAREFULLY CONSIDERED TO MINIMIZE JOINTS AND FOUNDATION PRESSURES.

- NOTES:**
- CONFIGURATION IS VALID FOR SKEWS 70 TO 90 AND SPANS LENGTH UP TO 200 FEET.
 - MEMBERS, WELDS AND PLATE SIZES SHOWN ARE VALID FOR STRAIGHT GIRDERS WITH MAXIMUM GIRDER SPACING OF 12'-0" AND FOR SKEW ANGLES BETWEEN 70° AND 90°. PROVIDE SPECIAL DESIGNS FOR ALL THE DIAPHRAGM MEMBERS, WELDS AND PLATE SIZES WHEN THE GIRDER SPACING EXCEEDS 12'-0" AND/OR THE SKEW ANGLE IS LESS THAN 70°.
 - SEE BC-753M FOR THE BEARING STIFFENER AND CONNECTION PLATE INSTALLATION DETAILS.
 - MODIFY THE DISTANCE BETWEEN THE GIRDER BOTTOM FLANGE AND THE LOWER DIAPHRAGM COMPONENT WHEN LOWER LATERAL BRACING IS USED. INDICATE MODIFICATIONS ON THE DESIGN DRAWINGS.
 - FOR "TYPICAL CONNECTION DETAIL" SEE BC-754M.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
INTEGRAL ABUTMENT
MISCELLANEOUS DETAILS

RECOMMENDED FEB. 19, 2021 <i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED FEB. 19, 2021 <i>Burt S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 9 OF 9 BD-667M
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