GIRDER STRUCTURES

CONCRETE SLAB STRUCTURES

ELEVATION

END VIEW

SECTION P1

ALTERNATE SECTION P1

DESIGNER NOTES

All girder lengths to be based on "class C" tension lap splice unless otherwise shown.

Optional keyed construction joints in shafts if provided shall be placed approximately 1/3 above normal water elevation. Optional keyed construction joints in shafts should be provided to limit the maximum height of punch holes for bar projections. The radius of punch holes shall be greater than 3/8". Distances shown from centerline to keyed construction joints shall be used at the discretion of the designer.

Keyed construction joints shall be formed by beveled keyway 4" deep x 1/3 thickness of shaft x 4'-0" max. less than length of shaft.

A standard shaft taper of ice may be used at the option of the designer, based on the waterline elevation.

Shafts may be tapered in one or two directions when required for structural reasons.

A nonstandard shaft section may be provided, provided it is tapering uniformly with the approved design by the Structures Section.

Keyed construction joints shall be placed in the formwork before concrete placement. See standard 19.34 for additional information.

Reinforcement is 1% or more of the gross concrete area.

This maximum vertical bar spacing applies only when the vertical reinforcement is 1% or more of the gross concrete area.

See standard 12.01 for additional reinforcing steel in beam seats of non-slopped caps that are 4 inches or more above the lowest beam seat.

Optional keyed construction joints in shafts should be provided as necessary to prevent battered rock from entering the shafts. Also, beveled keyway dimensions shown in "Construction Joint Detail" should be considered for vertical bar splices at optional joints.

Optional keyed construction joint in shafts, if provided, shall be formed by beveled keyway 4" deep x 1/3 thickness of shaft x 4'-0" max. less than length of shaft.

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Pile Encased Pier

**NOTES**

- Concrete piers (encased) will be allowed and shall be constructed in accordance with standard 13.09.3.4.1.1. Concrete piers (encased) shall not exceed 35 feet in depth unless approved otherwise.
- At pier __, Cofferdam and cofferdam dewatering required.
- Concrete poured underwater shall not exceed 10.0 feet in depth, unless approved otherwise.
- Concrete poured underwater will be allowed and shall be done in accordance with standard spec 502.3.5.3. Concrete poured underwater shall not exceed 35 feet in depth unless approved otherwise.

**DESIGNER NOTES**

See bridge manual section 13.2.3 and standard 12.2 for guidance on pier types, details, and applicable bid items.

See bridge manual section 11.2 for guidance on cofferdams. Construction joints are not required, regardless of length of pier encased pier.

**PILE ENCASED PIER**

- Looking up station 18.01 and 18.02, refer to standards 13.01 for additional applicable designer notes.

- Cofferdam shall be dewatered prior to placing pier concrete.

- At pier __, concrete poured underwater will be allowed and shall be done in accordance with standard spec 502.3.5.3. Concrete poured underwater shall not exceed 35 feet in depth unless approved otherwise.

- For prestressed concrete superstructure, furnish #4 bars @ 1'-0" each face, 2" x 6" beveled keyway.

- Standard 13.03 applies for pier end use. See bridge manual section 13.11.5 for guidance on pier types, details, and applicable bid items.

- See bridge manual section 13.2.3 and standard 13.09 for guidance on stable streambed.

- Cap type detail use main concrete for columns on large beams.

- Designer notes see bridge manual section 11.2.3 and standard 11.2 for guidance on pier details and applicable bid items.
PILE BENT

PLAN

ELEVATION LOOKING UP STATION

END VIEW

SECTION A-A

NOTES

PIECE SHALL BE PAINTED IN ACCORDANCE WITH SECTION 13.04 OF THE STANDARD SPECIFICATIONS.

DESIGNER NOTES

ALL BAR SPlices TO BE BASED ON "class c" tension lap splice unless otherwise shown.

BEARING SEAT AREAS SHALL BE LEVEL EXCEPT FOR THE TWO CASES SHOWN BELOW:

1. FOR GIRDERS WITH ELASTOMERIC BEARING PADS:
   - WHEN THE BOTTOM OF THE GIRDERS SLOPE MORE THAN 1%, SEE STANDARD 13.01.
   - FOR CONCRETE IN;">h-pile use requires prior approval during design of the structures development chief, (608) 266-0075.

BEAM SEATS MAY BE ANGLED TO MATCH SKEW AT THE DESIGN ENGINEER'S DISCRETION.

SEE STANDARD 12.02 FOR ADDITIONAL REINFORCING STEEL IN BEARING AREA FOR BEAM SEATS OF NON-SLOPED CAPS THAT ARE 1'-3" OR MORE ABOVE LOWEST BEAM SEAT.

MAX. LENGTH OF A SINGLE POLE = 60 FT. WHEN POLES USE A DECREASED 2" X 8" DECOUPLING BUSHING BETWEEN POLES.

SEE STANDARD 12.09 FOR ALTERNATIVE CONSTRUCTION JOINTS.

SEEN ANGLE - ROADWAY REFERENCE

% OF PIER

MAX. SPADE = 2'-11" MIN. 2'-6" MIN. SPADE = 2'-0"

PILE SPA. MEASURED AT BOTTOM OF CAP

2. FOR CONCRETE SLAB SUPERSTRUCTURES MAKE THE TOP OF THE CAP PARALLEL TO GRADE. SEE STANDARD 18.01.

SEE STANDARD 13.04 FOR ADDITIONAL REINFORCING STEEL IN BEARING AREA FOR BEAM SEATS OF NON-SLOPED CAPS THAT ARE 1'-3" OR MORE ABOVE LOWEST BEAM SEAT.

MAX. SPADE = 2'-11" MIN. 2'-6" MIN. SPADE = 2'-0"

PILE SPA. MEASURED AT BOTTOM OF CAP

2-0" KEYED CONSTRUCTJN JT. BETWEEN POLES

SEE STANDARD 13.01.
PIER CAP REINFORCEMENT DETAILING

DESIGNER NOTES

Provide adequate clearance between anchor bolts and reinforcement.

For pier caps up to 3'-6" wide, provide at least one 8" min. clearance between reinforcing bars for concrete placement by tremie and for vibration. For caps greater than 3'-6" wide, provide at least two 8" slabs.

Show anchors locating on pier cap sheets.

Abutment reinforcement layout similar to pier cap reinforcement detailing.

NOTE

Provide adequate clearance between reinforcing bars as needed to prevent damage to reinforcing bars.

Avoid spacing that is too tight. Bundled bars may be used. Avoid lapping bundled bars.

Provide additional layers of bar steel to avoid spacing that is too tight. Bundled bars may be used. Avoid lapping bundled bars.

Provide reinforcement necessary to support and reinforce.

BILL OLIVA

BUREAU OF STRUCTURES

STANDARD 13.08

APPROVED: Bill Oliva

DATE: 1/17
PIER

PILE ENCASED PIER (TYPES)

- hammerhead (see Standard 13.02)
- solid wall (as shown on this standard)

Wall Pier Alternatives:
- solid wall as shown on this standard
- hammerhead (see Standard 13.02)

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PILE ENCASED PIER (TYPES)

- hammerhead (see Standard 13.02)
- solid wall (as shown on this standard)

Wall Pier Alternatives:
- solid wall as shown on this standard
- hammerhead (see Standard 13.02)

PIER

PILE ENCASED PIER (TYPES)

- hammerhead (see Standard 13.02)
- solid wall (as shown on this standard)

Wall Pier Alternatives:
- solid wall as shown on this standard
- hammerhead (see Standard 13.02)
REINFORCEMENT, GRADE 60
HIGH-STRENGTH BAR STEEL
CONCRETE MASONRY
ULTIMATE DESIGN STRESSES:

EXISTING PIER FOOTING

ELEVATION

PLAN

TRANSITION

(6) - #5 BARS
(VERT.)

LAP
#4 BARS

SHOULDER
TOP OF
BARRIER
CONCRETE
TOP OF

1'-9"
1'-8"

ATTACHMENT
THRIBE BEAM
FOR THRIBE BEAM ANCHOR ASSEMBLY
TO PIER
TRAFFIC ADJ.
DIRECTION OF
#4 BAR

LENGTH =
#5 BARS @ 6" SPACING
#4 BAR
#4 BAR
BARRIER
CONCRETE
FOOTING
CONCRETE
EDGES, TOP AND ENDS.
PROVIDE 3/4-INCH BEVEL OR 1-INCH RADIUS ON BARRIER
TRANSITION

(SEE DETAIL "A"
TRANSITION TO THRIBE BEAM
VERTICAL CONCRETE BARRIER

BARRIER
CONCRETE

COLUMN
ROUND

BARRIER
CONCRETE
COLUMN
RECTANGULAR

BEVEL
MATCH COLUMN
BACK FACE

#4 BAR
#5 BAR
#4 BAR
#5 BAR
#4 BAR

REINF.
FOOTING
REINF.
BARRIER
8'-0"
8'-0"

PIER COLUMN, (TYP.)
EXISTING (X'-X")  DIA.  CIRCULAR
RECTANGULAR PIER COLUMN, (TYP.)
EXISTING (FILL IN: "W X L")

W

(SEE DETAIL "A"
FOR RECT.  COLUMNS
SHOW DIMENSIONS

DETAILS OF CONSTRUCTION MATERIALS AND WORKMANSHIP
MUST COMPLY WITH THE SPECIFICATIONS OUTLINED IN THE
APPLICABLE SPECIFICATION AND THE APPLICABLE SPECIAL
PROVISIONS.
BARRIER AND FOOTING SHALL CONSIST OF CAST IN PLACE
CONCRETE MASONRY AGGREGATE. SEE DETAIL "A" FOR
THE BARRIER/CONSTRUCTION JOINTS WILL ONLY BE ALLOWED IN
THE FOOTING AT LOCATIONS SHOWN IN THE PLAN VIEW.
DO NOT CUT OR DRILL INTO EXISTING COLUMN BAR STEEL.
ALL REINFORCEMENT SHALL BE EPOXY-COATED.
USE 2" MINIMUM BAR CLEARANCE, EXCEPT AT FOOTINGS
AND FOOTING AT LOCATIONS SHOWN IN THE DRAWING.

PLACE REINFORCEMENT SUCH THAT IT WILL NOT CONFLICT
WITH THE ANCHOR ASSEMBLY FOR THRIBE BEAM ATTACHMENT,
PROVIDE 3/4-INCH BEVEL ON BARRIER EDGES, TOP AND ENDS.
SEE STANDARD 13.11 FOR ADDITIONAL DETAILS.
SEE STANDARD 13.11 FOR DESIGNER NOTES.

51-INCH CONCRETE INTEGRAL BARRIER

NOTE: 51-INCH BARRIER REFERS TO THE DISTANCE
FROM THE TOP OF THE SHOULDER TO THE TOP OF
THE BARRIER,
E.F. OF BARRIER IS FLUSH WITH FACE OF COLUMN

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FROM THE TOP OF THE SHOULDER TO THE TOP OF
THE BARRIER,
E.F. OF BARRIER IS FLUSH WITH FACE OF COLUMN

51-INCH CONCRETE INTEGRAL BARRIER

PLACE 1/2" FILLER BETWEEN COLUMN AND CONCRETE FOOTING (TYP.)

CONCRETE MASONRY
- F = 4,000 P.S.I.
REINFORCEMENT, GRADE 60
- f_y = 30,000 P.S.I.

fy = 60,000 P.S.I.
f'c = 4,000 P.S.I.

51-INCH CONCRETE INTEGRAL BARRIER

51-INCH CONCRETE INTEGRAL BARRIER

BUREAU OF STRUCTURES

APPROVED
Bill Oliva
7-16

STANDARD 13.10
**Integral Barrier Details**

**DESIGNER NOTES**

The details shown on Standards 13.10 and 13.11 are for vehicle protection and are used with existing structures. Consider providing an integral transition section adjacent to the other exterior pier column for the following conditions:

1. There is a concern for traffic to cross-over.
2. There is a concern for traffic torossover.
3. Future traffic control needs may cause the direction of travel adjacent to barrier to be reversed.
4. Hazards may exist in this region that require shielding.

Contact the regional office for verification of any of these conditions.

These details may be used for test levels TL-3/TL-4.

For vehicle protection, see FDM 11-35-1 to determine when beam end anchorage is required. 

**审批人**

Bill Oliva

**Date:** 7-16

**INTEGRAL BARRIER DETAILS**

**BUREAU OF STRUCTURES**

**STANDARD 13.11**