Chapter 02 - Substructure

SECTION 04

PIERS

(SUB-PR)
When bridge seat elevations are such that the height of any pad becomes greater than 1'-0'' and the sloping of cap can eliminate or alleviate this condition then cap shall be sloped as indicated in "Alternate Cap Detail". For Section A-A and B-B see sheet 4 of 4.

All main bars to be extended into this area so that the welded extension indicated on REBAR-ER-101 can be utilized. Designer must keep in mind this might necessitate more steel than required for original design.

Note:
1. Standard is for roadway widths and skew angle requiring a cap length less than 50', measured along center line of pier.
2. When bridge seat elevations are such that the height of any pad becomes greater than 1'-0'' and the sloping of cap can eliminate or alleviate this condition then cap shall be sloped as indicated in "Alternate Cap Detail".
3. For Section A-A and B-B see sheet 4 of 4.
When bridge seat elevations are such that the height of any pad becomes greater than 1'-0" and the sloping of cap can eliminate or alleviate this condition then cap shall be sloped as indicated in "Alternate Cap Detail".

For Section A-A and B-B see sheet 4 of 4.

* All main bars to be extended into this area so that the welded extension indicated on REBAR-ER-101 can be utilized. Designer must keep in mind this might necessitate more steel than required for original design.

Note:
1. Standard is for roadway widths and skew angle requiring a cap length between 50' and 68', measured along center line of pier.
2. When bridge seat elevations are such that the height of any pad becomes greater than 1'-0" and the sloping of cap can eliminate or alleviate this condition then cap shall be sloped as indicated in "Alternate Cap Detail".
3. For Section A-A and B-B see sheet 4 of 4.
When bridge seat elevations are such that the height of any pad becomes greater than 1'-0'' and the sloping of cap can eliminate or alleviate this condition then cap shall be sloped as indicated in "Alternate Cap Detail". For Section A-A and B-B see sheet 4 of 4.

**Note:**
1. Criteria for individual pier units shall be as shown on sheets 1 and 2 of 4.
2. When bridge seat elevations are such that the height of any pad becomes greater than 1'-0'' and the sloping of cap can eliminate or alleviate this condition then cap shall be sloped as indicated in "Alternate Cap Detail".
3. Whenever possible the S dimensions shall remain equal.
4. For Section A-A and B-B see sheet 4 of 4.

**Criteria for individual pier units shall be as shown on sheets 1 and 2 of 4.**

**Whenever possible the S dimensions shall remain equal.**

**For Section A-A and B-B see sheet 4 of 4.**

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**ALTERNATE CAP DETAIL**

Scale: $\frac{1}{32}$ '' = 1'-0''

**ELEVATION**

Scale: $\frac{1}{32}$ '' = 1'-0''

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*All main bars to be extended into this area so that the welded extension indicated on REBAR-ER-101 can be utilized. Designer must keep in mind this might necessitate more steel than required for original design.*

**If possible**

**Note:**
1. Criteria for individual pier units shall be as shown on sheets 1 and 2 of 4.
2. When bridge seat elevations are such that the height of any pad becomes greater than 1'-0'' and the sloping of cap can eliminate or alleviate this condition then cap shall be sloped as indicated in "Alternate Cap Detail".
3. Whenever possible the S dimensions shall remain equal.
4. For Section A-A and B-B see sheet 4 of 4.

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**STATE OF MARYLAND**

**DEPARTMENT OF TRANSPORTATION**

**STATE HIGHWAY ADMINISTRATION**

**OFFICE OF STRUCTURES**

**DESIGN CRITERIA FOR TYPICAL REINFORCED CONCRETE PIER (CAP LENGTH LESS THAN 50')**

**APPROVAL**

**OFFICE OF STRUCTURES**

**DIRECTOR**

**DATE:** 07-26-2006

**VERSION**

**1.0**

**DETAIL NO. SUB-PR-101**

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*FOR OFFICE USE ONLY*
DESIGN CRITERIA FOR TYPICAL REINFORCED CONCRETE PIER SUBSTRUCTURE - PIER

1. Reinforcing steel for column spirals shall be cold drawn steel conforming to ASTM A 82.
2. The design bearing pressure for spread footings shall be shown on applicable Pier Sheet thus "Maximum Design Bearing Pressure for Pier ____ is ____ Tons/s.f."

MAXIMUM NUMBER OF MAIN COLUMN BARS

<table>
<thead>
<tr>
<th>Column Diameter</th>
<th>#9</th>
<th>#10</th>
<th>#11</th>
</tr>
</thead>
<tbody>
<tr>
<td>2'-6&quot;</td>
<td>16</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>2'-8&quot;</td>
<td>18</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>2'-10&quot;</td>
<td>19</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>3'-0&quot;</td>
<td>20</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>3'-2&quot;</td>
<td>22</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>3'-6&quot;</td>
<td>25</td>
<td>23</td>
<td>22</td>
</tr>
</tbody>
</table>

Note:
Where solid rock exists consideration should be given to individual footings, 7'-0" x 7'-0" x 2'-0" minimum size.

* IF rock is present these notes must appear on Plans.

* Rock Line

* 1'-0" min. into rock.

* Rock Line

* 2'-6" min.

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STATE OF MARYLAND
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DETAIL NO. SUB-PR-101

SHEET 4 OF 4
NOSE ANGLE FOR SOLID SHAFT WATER PIER

1. Angle to be steel conforming to ASTM A-36.
2. Angle to be hot dipped galvanized, after fabrication, in accordance with ASTM A-123.
For fiberglass requirements see 921.11.

1. For fiberglass requirements see 921.11.
2. For other fiberglass jacket requirements see Special Provisions.
3. Inside of jacket shall be thoroughly cleaned.

Notes:

- Unless otherwise specified L=8'.
- **Unless otherwise specified, locate at this elevation.

State of Maryland
Department of Transportation
Office of Structures
State Highway Administration
Office of Structures
Fiberglass Jacket for Cast-in-place Concrete Column

Detail No. SUB-PR-301
Sheet ___ of ___
Meanwater Line (Average of mean high water and mean low water). **

Unless otherwise specified, locate at this elevation. **

Outside Diameter = pile outside diameter plus 1 1/2''

Notes:
1. No vertical joints allowed.
2. Jackets to be placed before cap or footer is poured.
3. Fiberglass shall conform to 92LM.
4. For epoxy grout material requirements see Special Provisions.
5. Inside of jacket shall be thoroughly cleaned.
6. Jacket pile areas to be cleaned just prior to placing jacket refer to Section 418.
1. Fiberglass shall conform to 921.13.
2. For fiberglass and grout material requirements see Special Provisions.
3. Clean pile area to be jacketed just prior to placing jacket.
4. Cost of studs to be included in pertinent protective jacket item.
Equal spaces (min, spacing 12'-0") typ. each end.

Optional jacket joint.

See Detail "A" below.

Limits of fiberglass tape through each trough (Typical).

2" protective jacket anchor (Typical).

1/4" protective jacket.

Cast-in-place concrete footing.

Bottom of footing.

Top of Footing

2- 3/8" x 7" long fiberglass bolts with fiberglass nuts spaced max. 12" % vertically. Top and bottom bolts to be 4' from end of jacket.

Joint to be sealed with epoxy and epoxy grout.

Fiberglass plate 3/8" x 7", full height of joint.

8" Fiberglass tape width of each trough extend 3" onto jacket face each side of trough.

SECTION A-A
Scale: 1 1/2" = 1'-0"

1/4" Protective Jacket Anchor.

1/4" x 2" Protective Jacket Anchor.

1/4" Protective Jacket

DETAIL A
Scale: None