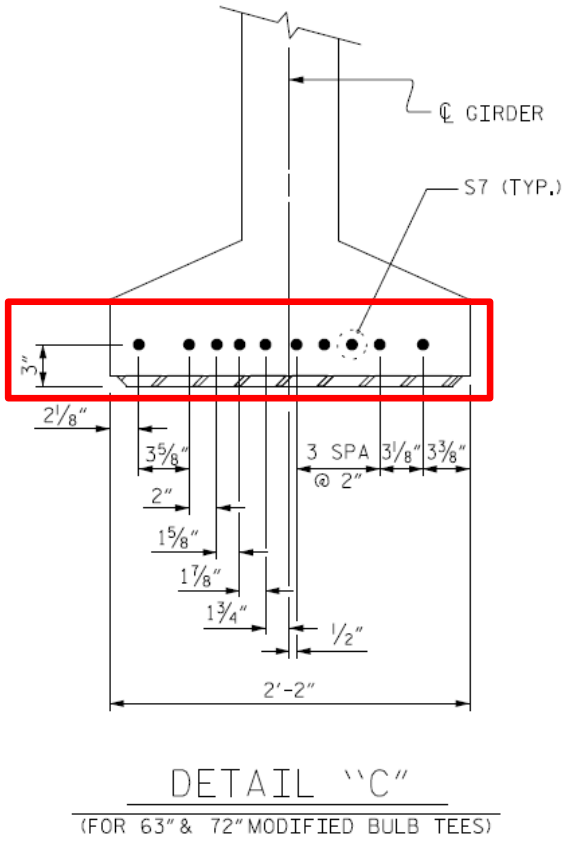
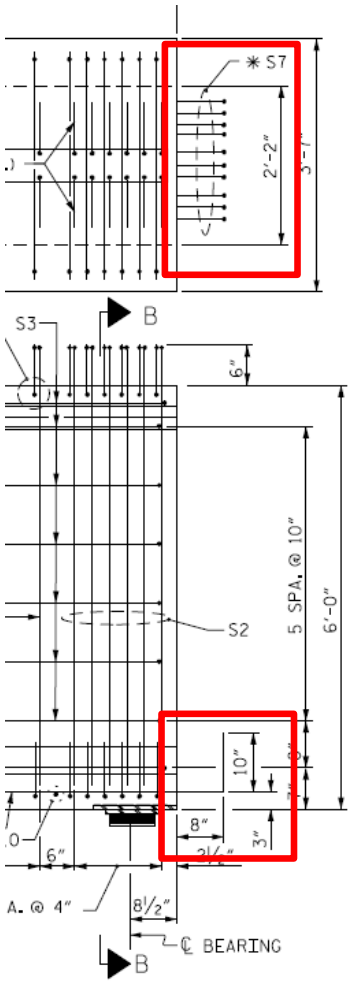
NCDOT Continuity Detail for MBTs

From NCDOT standard drawings



DETAIL "C"
(FOR 63" & 72" MODIFIED BULB TEES)



REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1		#4	1	6'-10"	
S1		#4	1	6'-10"	
S2	24	#5	1	6'-10"	171
S3	14	#4	2	8'-5"	79
S4	84	#4	3	3'-0"	168
S5	1	#5	2	9'-10"	10
S6		#5	4	4'-4"	
S6		#5	4	4'-4"	
✳S7	10	#5	STR	3'-8"	38

For Mod BT-63 & 72

10 - #5 S7 bars

A_s = 10 x 0.31 in^2 = 3.1 in^2

At strength limit state:

$F_u = A_s f_y$ = 3.1 x 60 = 186 kip

Equivalent Strand Continuity Detail for MBTs

Simplified approach

- **Use detail from NCDOT standard drawings, and F_u = 186 kip**
- **Neglects slight difference in moment arm, but it is conservative**
- **Provides basis for estimate of equivalent strand connections**

Results can be refined by using direct approach to compute required force in connection

Equivalent Strand Continuity Detail for MBTs

Using F_u = 186 kip based on detail from NCDOT standard drawings

Using LRFD Eq. 5.12.3.3.9c-2

$f_{pul} = (l_{dsh} - 8)/0.163$ for strength limit state

where

l_{dsh} = total length of extended strands (including 8 in. min. projection)

For l_{dsh} = 24 in., f_{pul} = 98.2 ksi $\Rightarrow$ 9 strands; vertical leg is 16 in.

For l_{dsh} = 36 in., f_{pul} = 172 ksi $\Rightarrow$ 5 strands; vertical leg is 28 in.

Solving for 6 strands: l_{dsh} = 32 in. with f_{pul} = 143 ksi; vertical leg is 24 in.

Solving for 4 strands: l_{dsh} = 43 in. with f_{pul} = 214 ksi; vertical leg is 35 in.

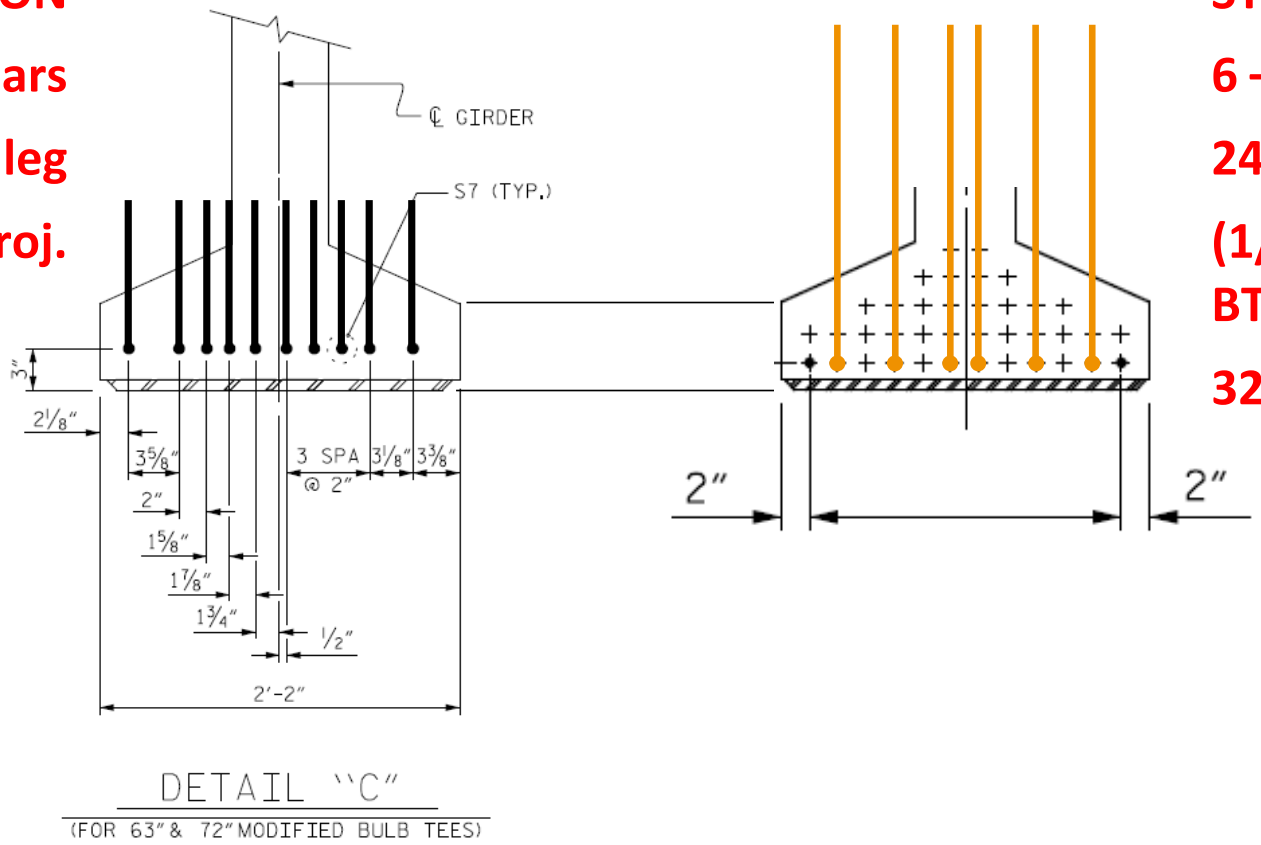
Equivalent Strand Continuity Detail for MBTs

REBAR SOLUTION

10 - #5 S7 bars

10 in. vert. leg

18 in. total proj.



DETAIL "C"
(FOR 63" & 72" MODIFIED BULB TEES)

STRAND SOLUTION 1

6 – 0.6 in. strands

24 in. vert. leg

(1/3 height of Mod BT-72)

32 in. total projection

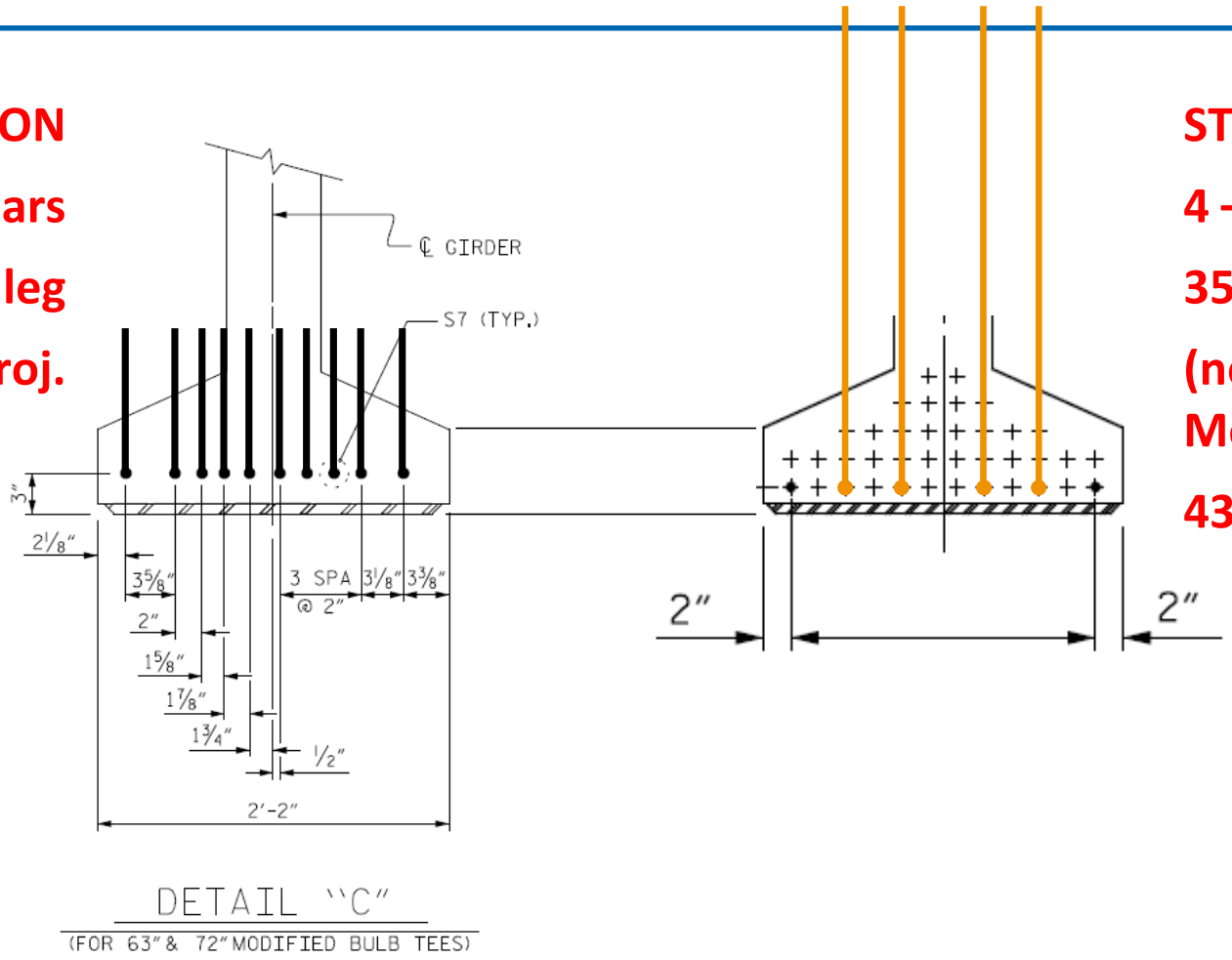
Equivalent Strand Continuity Detail for MBTs

REBAR SOLUTION

10 - #5 S7 bars

10 in. vert. leg

18 in. total proj.



DETAIL "C"
(FOR 63" & 72" MODIFIED BULB TEES)

STRAND SOLUTION 2

4 – 0.6 in. strands

35 in. vert. leg

(nearly ½ height of Mod BT-72)

43 in. total projection