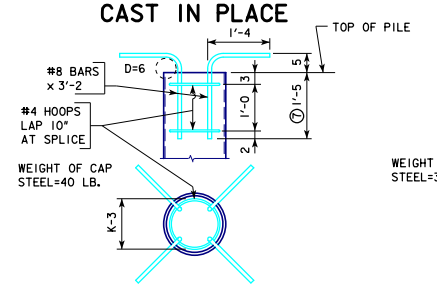
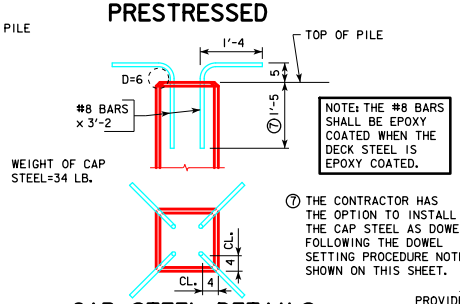
REVISION 07-2019: CHANGED ALL REFERENCES OF "LINEAL" TO "LINEAR". TYPE 3 FOR "ROUND HP14x73 PILE" CHANGED "CONCRETE (E=18')" QTY. TO 3.17 (WAS 2.75). CHANGED "CONCRETE I' CHANGE" TO 0.176 (WAS 0.153). CHANGED "REINFORCING (E=18')" WEIGHT TO 110 LB. (WAS 107). CHANGED "REINFORCING I' CHANGE" TO 5.62 LB. (WAS 5.50). TYPE 3 FOR "ROUND HP14x89 PILE" CHANGED "CONCRETE (E=18')" QTY. TO 3.15 (WAS 2.73). CHANGED "CONCRETE I' CHANGE" TO 0.175 (WAS 0.152). CHANGED "REINFORCING (E=18')" WEIGHT TO 110 LB. (WAS 107). CHANGED "REINFORCING I' CHANGE" WEIGHT TO 5.62 LB. (WAS 5.50).

ENGLISH\MISCELLANEOUSBRIDGES.DGN - PIOL - THIS SHEET ISSUED 01-09.

CAST IN PLACE



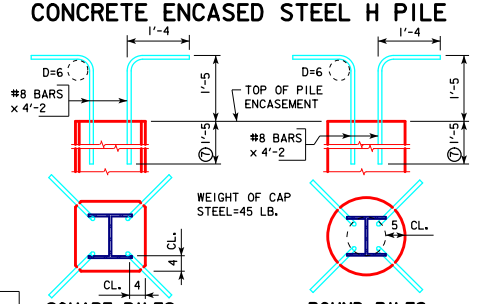
PRESTRESSED



NOTE: THE #8 BARS SHALL BE EPOXY COATED WHEN THE DECK STEEL IS EPOXY COATED.

⑦ THE CONTRACTOR HAS THE OPTION TO INSTALL THE CAP STEEL AS DOWELS FOLLOWING THE DOWEL SETTING PROCEDURE NOTES SHOWN ON THIS SHEET.

CONCRETE ENCASED STEEL H PILE

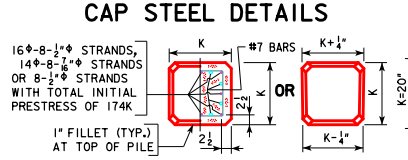


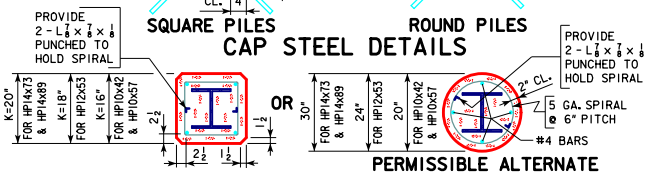
SQUARE PILES ROUND PILES

CAP STEEL DETAILS

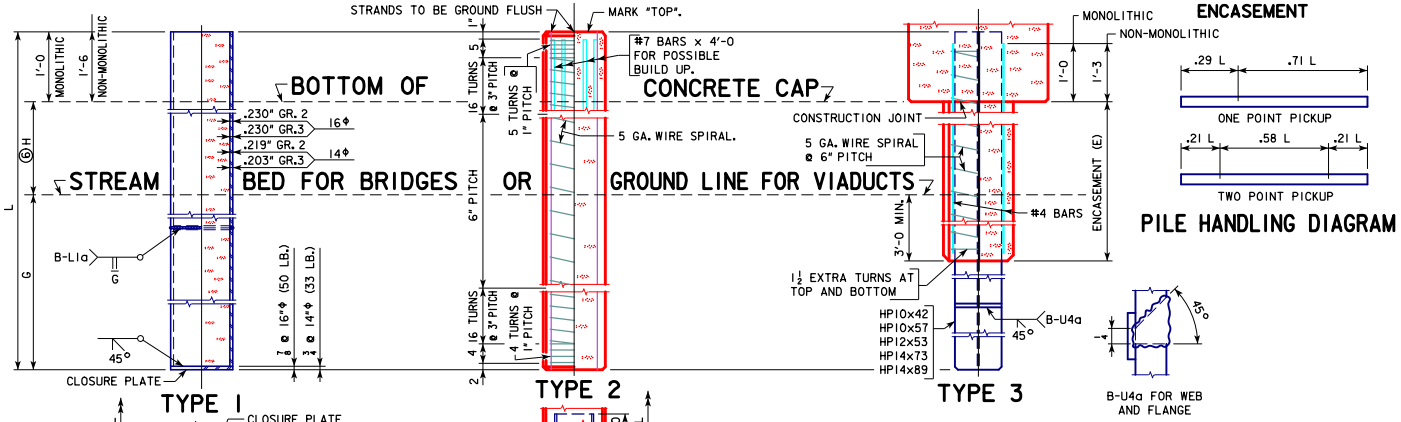
SPIRAL WELDED OR SEAMLESS STEEL PIPE ASTM A252 GR. 2 OR GR. 3

CAP STEEL DETAILS





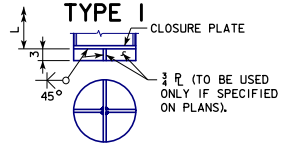
PERMISSIBLE ALTERNATE ENCASEMENT

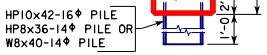


PILE HANDLING DIAGRAM

B-U4a FOR WEB AND FLANGE

TYPE 1 TYPE 2 TYPE 3





STEEL DRIVING POINTS

ASTM A36

K DIMENSION	IN.	14Φ		16Φ	
G MIN. BELOW GROUND	FT.	24		27	
⑥H MAX. ABOVE GROUND	FT.	18		22	
SHELL ASTM A-252		GR. 2	GR. 3	GR. 2	GR. 3
CONCRETE (L=40')	C.Y.	1.49	1.49	1.95	1.95
CONCRETE I' CHANGE	C.Y.	0.0372	0.0373	0.0488	0.0488
① WT. OF SHELL (L=40')	LB.	1325	1231	1600	1600
WT. OF SHELL I' CHANGE	LB.	32.26	29.94	38.77	38.77
f'c	KSI	4.0	4.0	4.0	4.0
⑤NOMINAL RESISTANCE Pn	KIPS	119	119	137	137

① INCLUDES WEIGHT OF CLOSURE PLATE.

STEEL DRIVING POINTS

ASTM A36

STRAND STRENGTH		270K	
K DIMENSION	IN.	14Φ	16Φ
G MIN. BELOW GROUND	FT.	24	27
⑥H MAX. ABOVE GROUND	FT.	18	22
CONCRETE (L=40')	C.Y.	2.01	2.62
CONCRETE I' CHANGE	C.Y.	0.050	0.066
② REINFORCING (L=40')	LB.	232	280
REINFORCING I' CHANGE	LB.	3.93	5.10
MAX. L 1 PT. PICK-UP	FT.	57	60
MAX. L 2 PT. PICK-UP	FT.	82	86
f'c	KSI	5.0	5.0
⑤NOMINAL RESISTANCE Pn	KIPS	127	146
③ INITIAL PRESTRESS	KIPS	174	231

② INCLUDES PRESTRESSING STRANDS.
③ INCREASE 5% FOR ARTIFICIAL CURING.

⑥ THE MAXIMUM H MAY BE MEASURED TO THE STREAMBED ELEVATION. HOWEVER, H SHALL BE MEASURED TO THE SCOUR ELEVATION WHEN THIS ELEVATION IS DEEPER THAN THE STREAMBED ELEVATION.

STEEL H PILE		HP10x42	HP10x57	HP12x53	HP14x73	HP14x89
G MINIMUM BELOW GROUND	FT.	18	18	21	24	24
⑥H MAX. ABOVE GROUND W/MONOLITHIC	FT.	19	19	23	28	29
⑥H MAX. ABOVE GROUND W/NON-MONOLITHIC	FT.	15	16	20	25	26
SQUARE CONCRETE (E=18')	C.Y.	1.12	1.10	1.41	1.74	1.72
SQUARE CONCRETE I' CHANGE	C.Y.	0.062	0.061	0.078	0.097	0.096
SQUARE ④REINFORCING (E=18')	LB.	96	96	99	103	103
SQUARE ④REINFORCING I' CHANGE	LB.	4.98	4.98	5.13	5.28	5.28
ROUND CONCRETE (E=18')	C.Y.	1.40	1.38	2.02	3.17	3.15
ROUND CONCRETE I' CHANGE	C.Y.	0.078	0.076	0.112	0.176	0.175
ROUND ④REINFORCING (E=18')	LB.	97	97	102	110	110
ROUND ④REINFORCING I' CHANGE	LB.	5.02	5.02	5.26	5.62	5.62
⑤NOMINAL RESISTANCE Pn	KIPS	154	208	192	265	324

f'c = 4.0 KSI

④ INCLUDES WEIGHT OF PUNCHED L 7/8 x 7/8 x 1/8
⑤ SEE BRIDGE DESIGN MANUAL 6.6.4.2 FOR ADDITIONAL INFORMATION

GENERAL NOTES:

EXCEPT AS NOTED ELSEWHERE, MATERIAL, CONSTRUCTION, DRIVING AND EXTENSIONS OR BUILD UPS WHEN NECESSARY SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS OF THE IOWA D.O.T. AND CURRENT SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS APPLICABLE.

CAP STEEL SHALL BE AS DETAILED ON THIS SHEET (D=PIN DIAMETER). IT SHALL BE USED IF PILE EMBEDMENT IS LESS THAN 1'-6.

"NOMINAL RESISTANCE Pn", "G", AND "H" AS GIVEN IN TABLES ARE RECOMMENDED DESIGN VALUES FOR ORDINARY CONDITIONS, BUT MAY BE MODIFIED FOR SPECIAL CONDITIONS ON ANY GIVEN JOB.

NOMINAL RESISTANCE Pn AND PILE SIZE REQUIRED SHALL IN ALL CASES BE AS SPECIFIED ON THE PLANS.

NOMINAL RESISTANCE Pn SHOWN ARE FOR FRICTION RESISTANCE EXCEPT FOR TYPE 3 PILING WHERE THE RESISTANCE VALUES SHOWN COULD BE EITHER FRICTION OR POINT RESISTANCE.

COST OF ALL DRIVING POINTS AND CAP STEEL IS TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT FOR PILING.

WIRE SPIRAL SHALL CONFORM TO ASTM A82.

CAST IN PLACE PILE NOTES:

SHELL THICKNESSES SHOWN ARE MINIMUM REQUIREMENTS. THE METHOD OF DRIVING STEEL SHELL PILES SHALL BE ADAPTED TO THE TYPE AND THICKNESS OF SHELL SPECIFIED. ANY SHELLS WHICH HAVE BEEN IMPROPERLY DRIVEN, BROKEN OR ARE OTHERWISE DEFECTIVE SHALL BE REMOVED AND REPLACED BY THE BRIDGE CONTRACTOR.

ALL CAST IN PLACE PILES SHALL HAVE A CLOSURE PLATE. DRIVING POINTS SHALL BE USED IF SPECIFIED ON THE PLANS.

PRESTRESSED PILE NOTES:

EXCEPT AS OTHERWISE NOTED ALL EXPOSED CORNERS 90° OR SHARPER SHALL BE FILLETED 3/4".

DRIVING POINTS FOR PRESTRESSED PILES, IF CALLED FOR ON THE PLANS, SHALL BE AS DETAILED.

HEADS OF PRESTRESSED PILES TO BE FINISHED SMOOTH AND NORMAL TO AXIS OF PILE.

BIDDING NOTES:

THE PLANS SHALL DESIGNATE THE SIZE OF PILE TO BE USED. THEY SHALL ALSO SPECIFY THE TYPE, EITHER TYPE 1, TYPE 2, OR TYPE 3. IF THE OPTION OF TYPE 1 OR 2 IS GIVEN ON THE PLANS, THE CONTRACTOR SHALL CHOOSE THE TYPE TO BE USED. IF TYPE 3 IS SPECIFIED, TYPE 3 SHALL BE USED, BUT THE CONTRACTOR MAY CHOOSE THE SHAPE OF THE ENCASEMENT. IT SHOULD BE KEPT IN MIND THAT FOR A GIVEN SIZE AND RESISTANCE VALUE, LENGTH MAY VARY WITH THE SHAPE (SQUARE OR ROUND).

PILES SHALL BE BID DESIGNATING THE SIZE, TYPE AND LENGTH.

TYPE 1 PILING WILL BE BID PER LINEAR FOOT OF PILE.

TYPE 2 PILING WILL BE BID PER LINEAR FOOT OF PILE.

TYPE 3 PILING WILL BE BID PER LINEAR FOOT OF PILE AND LINEAR FOOT OF ENCASEMENT. PRICE BID FOR ENCASEMENT SHALL BE FULL PAYMENT FOR NECESSARY EXCAVATION AND FOR FURNISHING AND PLACING ALL MATERIAL.

DOWEL SETTING PROCEDURE:

IF CAP STEEL IS REQUIRED FOR THE PRESTRESSED PILES THE #8 DEFORMED BARS ARE TO BE SET AS DOWELS INTO THE PILES WITH POLYMER GROUT IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS OR BY THE FOLLOWING PROCEDURE.

-A.) DRILL HOLE APPROXIMATELY TWICE THE DIAMETER OF THE DOWEL BAR AND TO THE DEPTH INDICATED.

-B.) FILL HOLE WITH WATER AND ALLOW TO STAND LONG ENOUGH TO THOROUGHLY SATURATE THE SURROUNDING CONCRETE (ABOUT FOUR HOURS).

-C.) BLOW OUT ALL FREE WATER AND FILL HOLE 2/3 FULL OF MORTAR.

-D.) INSERT DOWEL BY DRIVING, IF NECESSARY, AND MANIPULATE OR TAP WITH A HAMMER TO CONSOLIDATE MORTAR AND SECURE COMPLETE EMBEDMENT.

-E.) ADD MORE MORTAR, IF NECESSARY, TO FILL HOLE.

-F.) MORTAR SHALL CONSIST OF EQUAL PARTS PORTLAND CEMENT AND SAND WITH JUST ENOUGH WATER TO MAKE A WORKABLE MIX.

APPROVED BY: _____
BRIDGE ENGINEER

LATEST REVISION 07-2019
DATE:

STANDARD DESIGN

CONCRETE AND STEEL PILES

CAST IN PLACE, PRESTRESSED AND ENCASED FOR USE IN

LRFD TRESTLE PILE BENTS - PIOL

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	LRFD DESIGNED TRESTLE PILE BENTS	STANDARD PIOL	COUNTY	PROJECT NUMBER	SHEET NUMBER