

STEEL A_s/A_e	UNFACTORED AXIAL LOAD (P_n)	SPIRALS SPACING C-C	HOOPS SPACING C-C	$M_{ne} @$ $\epsilon_c=0.003$	M_p	ϕ_p	I_{cr}	ϕI	V_s
%	% kips	in	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips
1.05% STEEL	0	0	6	236	224	0.001770	0.143	0.000224	55
	0	0	6	236	224	0.001770	0.143	0.000224	55
	5	95	6	294	273	0.002006	0.177	0.000221	55
	95	95	6	294	273	0.002006	0.177	0.000221	55
	10	189	6	344	318	0.001657	0.203	0.000225	55
	189	189	6	344	318	0.001657	0.203	0.000225	55
	15	284	6	380	358	0.001469	0.223	0.000231	55
	284	284	6	380	358	0.001469	0.223	0.000231	55
1.33% STEEL	0	0	6	287	274	0.001669	0.171	0.000230	55
	0	0	6	287	274	0.001669	0.171	0.000230	55
	5	98	6	345	323	0.001850	0.202	0.000230	55
	98	98	6	345	323	0.001850	0.202	0.000230	55
	10	196	6	385	366	0.001565	0.225	0.000234	55
	196	196	6	385	366	0.001565	0.225	0.000234	55
	15	294	6	420	403	0.001368	0.242	0.000239	55
	294	294	6	420	403	0.001368	0.242	0.000239	55
1.68% STEEL	0	0	6	345	326	0.001311	0.1983	0.000242	118
	0	0	6	345	326	0.001311	0.193	0.000242	118
	5	102	6	390	377	0.002795	0.22	0.000245	118
	102	102	6	390	377	0.002795	0.22	0.000245	118
	10	205	6	425	415	0.002552	0.239	0.000249	118
	205	205	6	425	415	0.002552	0.239	0.000249	118
	15	307	6	458	447	0.002271	0.253	0.000254	118
	307	307	6	458	447	0.002271	0.253	0.000254	118
20	409	6	490	472	0.002054	0.261	0.000261	118	
	409	6	490	472	0.002054	0.261	0.000261	118	

DESIGN INFORMATION:

DIAMETER OF DRILLED SHAFT = 24"
 EFFECTIVE Dia OF PILE (ϕ_{eff}) = 24"
 EFFECTIVE AREA OF PILE (A_e) = 452 in²

#4 SPIRALS - DEFORMED $\phi = 0.56"$, $A_b = 0.20$ in²

#6 HOOPS - DEFORMED $\phi = 0.88"$, $A_b = 0.44$ in²

#8 MAIN Reinf - DEFORMED $\phi = 1.13"$, $A_b = 0.79$ in²

#9 MAIN Reinf - DEFORMED $\phi = 1.25"$, $A_b = 1.00$ in²

#10 MAIN Reinf - DEFORMED $\phi = 1.44"$, $A_b = 1.27$ in²

$f'_{ce} = 5$ ksi

$f_{ye} = 68$ ksi

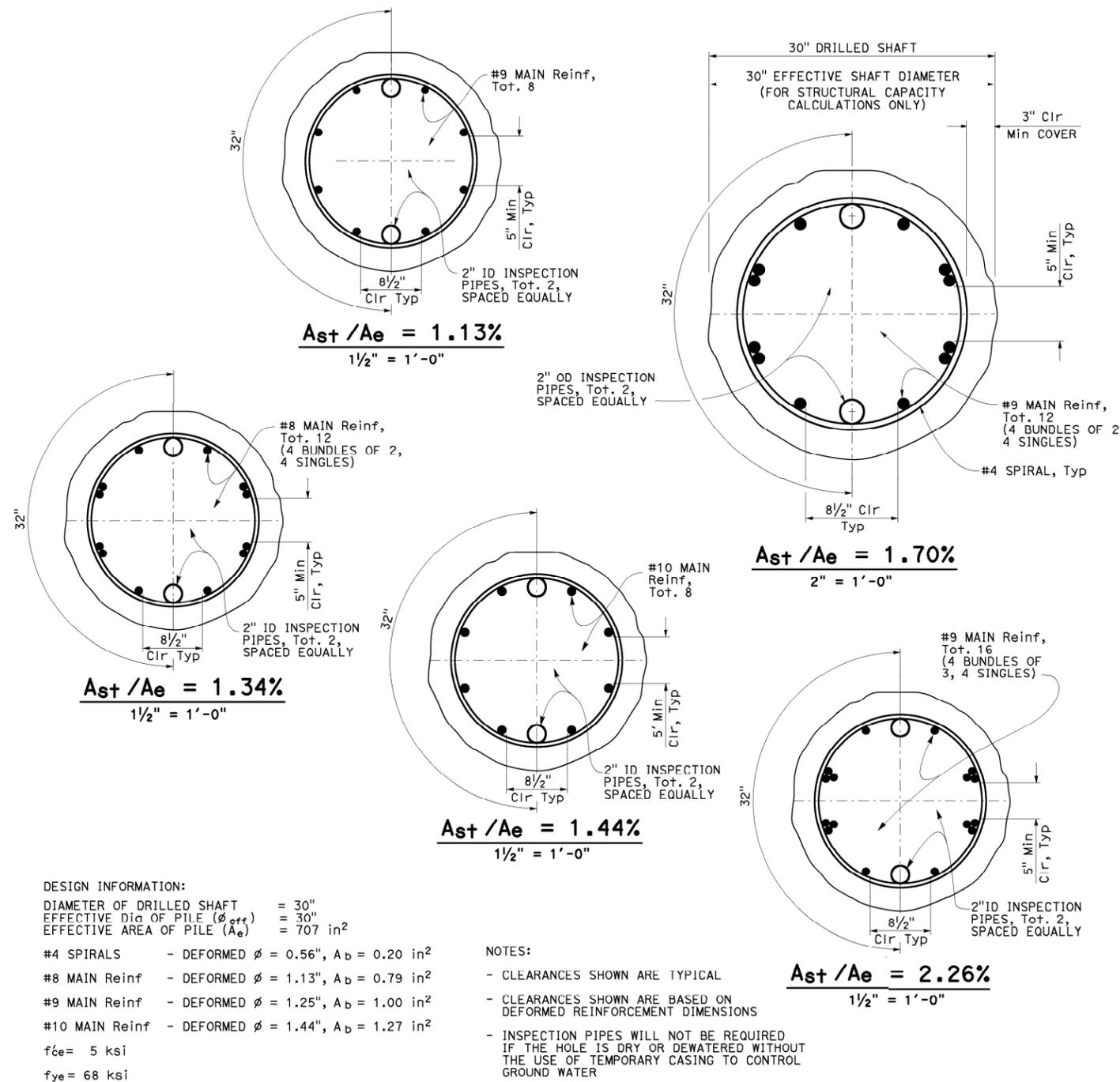
NOTES:

- CLEARANCES SHOWN ARE TYPICAL

- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS

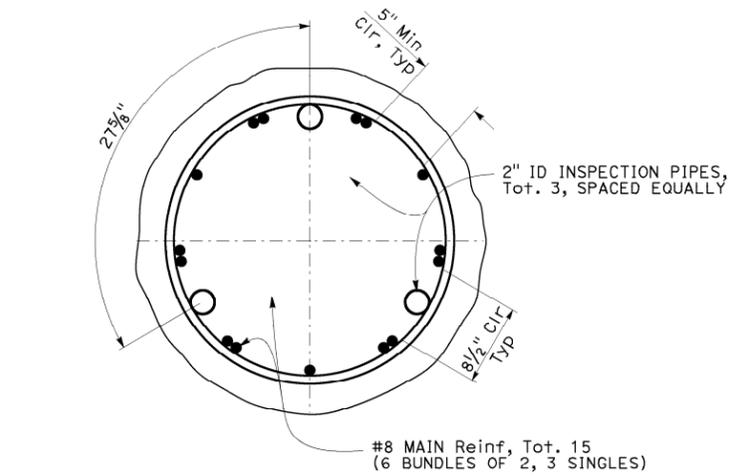
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER

24" DIA CIDH PILE DETAILS WITHOUT CASING



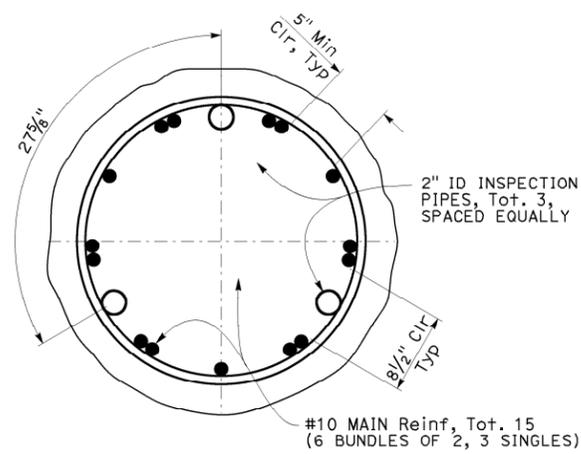
STEEL P_L A_{st}/A_e	UNFACTORED AXIAL LOAD (P_n)	SPIRALS SPACING C-C	$M_{no} @ \epsilon_c = 0.003$	M_p	ϕ_p	I_{cr}	ϕ_{yi}	V_s	
%	%	kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips
1.13% STEEL	0	0	6	500	494	0.001491	0.403	0.000176	74
	0	0	6	500	494	0.001491	0.403	0.000176	74
	5	149	6	613	591	0.001355	0.494	0.000172	74
	10	299	6	714	684	0.001215	0.567	0.000173	74
	15	448	6	790	767	0.001068	0.625	0.000176	74
	20	597	6	862	841	0.000939	0.668	0.000181	74
	597	6	862	841	0.000939	0.668	0.000181	74	
1.34% STEEL	0	0	6	577	569	0.001425	0.458	0.000178	74
	0	0	6	577	569	0.001425	0.458	0.000178	74
	5	153	6	685	662	0.001252	0.544	0.000175	74
	10	307	6	779	750	0.001117	0.613	0.000175	74
	15	460	6	858	829	0.001015	0.673	0.000177	74
	20	613	6	932	902	0.000918	0.707	0.000183	74
	613	6	932	902	0.000918	0.707	0.000183	74	
1.44% STEEL	0	0	6	611	602	0.001402	0.480	0.000180	74
	0	0	6	611	602	0.001402	0.480	0.000180	74
	5	155	6	723	698	0.001278	0.563	0.000178	74
	10	310	6	808	788	0.001149	0.630	0.000180	74
	15	466	6	882	870	0.001006	0.681	0.000183	74
	20	621	6	952	941	0.000875	0.719	0.000188	74
	621	6	952	941	0.000875	0.719	0.000188	74	
1.70% STEEL	0	0	6	701	695	0.001289	0.546	0.000183	74
	0	0	6	701	695	0.001289	0.546	0.000183	74
	5	160	6	807	786	0.001164	0.625	0.000180	74
	10	320	6	890	870	0.001056	0.687	0.000182	74
	15	481	6	968	948	0.000961	0.735	0.000185	74
	20	641	6	1036	1018	0.000866	0.770	0.000190	74
	641	6	1036	1018	0.000866	0.770	0.000190	74	
2.26% STEEL	0	0	6	888	880	0.001146	0.675	0.000187	74
	0	0	6	888	880	0.001146	0.675	0.000187	74
	5	171	6	979	970	0.001032	0.744	0.000187	74
	10	342	6	1063	1054	0.000936	0.797	0.000190	74
	15	513	6	1132	1130	0.000847	0.837	0.000194	74
	20	684	6	1188	1197	0.000762	0.864	0.000199	74
	684	6	1188	1197	0.000762	0.864	0.000199	74	

30" DIA CIDH PILE DETAILS WITHOUT CASING



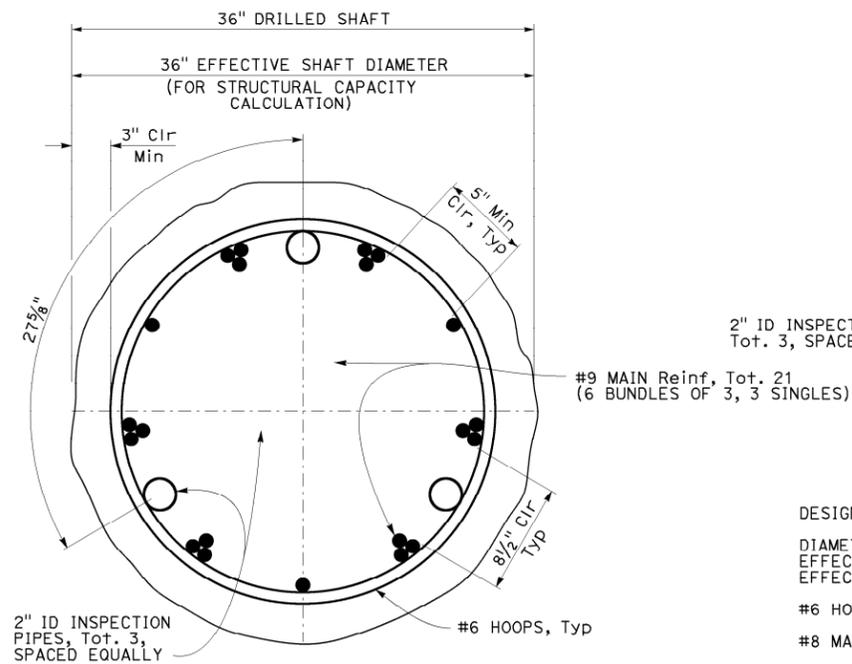
$$\frac{A_{st}}{A_e} = 1.16\%$$

$$1\frac{1}{2}'' = 1'-0''$$



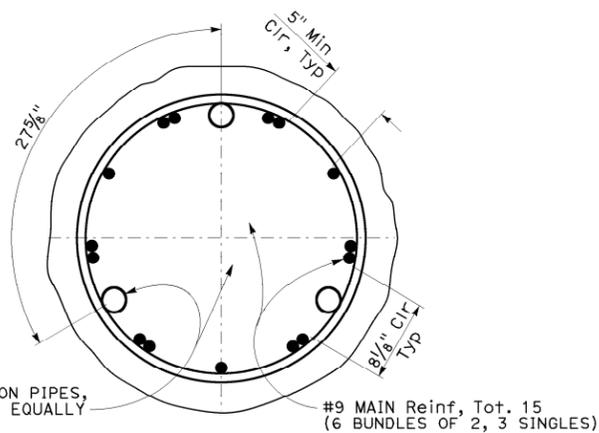
$$\frac{A_{st}}{A_e} = 1.87\%$$

$$1\frac{1}{2}'' = 1'-0''$$



$$\frac{A_{st}}{A_e} = 2.06\%$$

$$2'' = 1'-0''$$



$$\frac{A_{st}}{A_e} = 1.47\%$$

$$1\frac{1}{2}'' = 1'-0''$$

DESIGN INFORMATION:

DIAMETER OF DRILLED SHAFT = 36"
 EFFECTIVE Dia OF PILE (ϕ_{eff}) = 36"
 EFFECTIVE AREA OF PILE (A_e) = 1018 in²

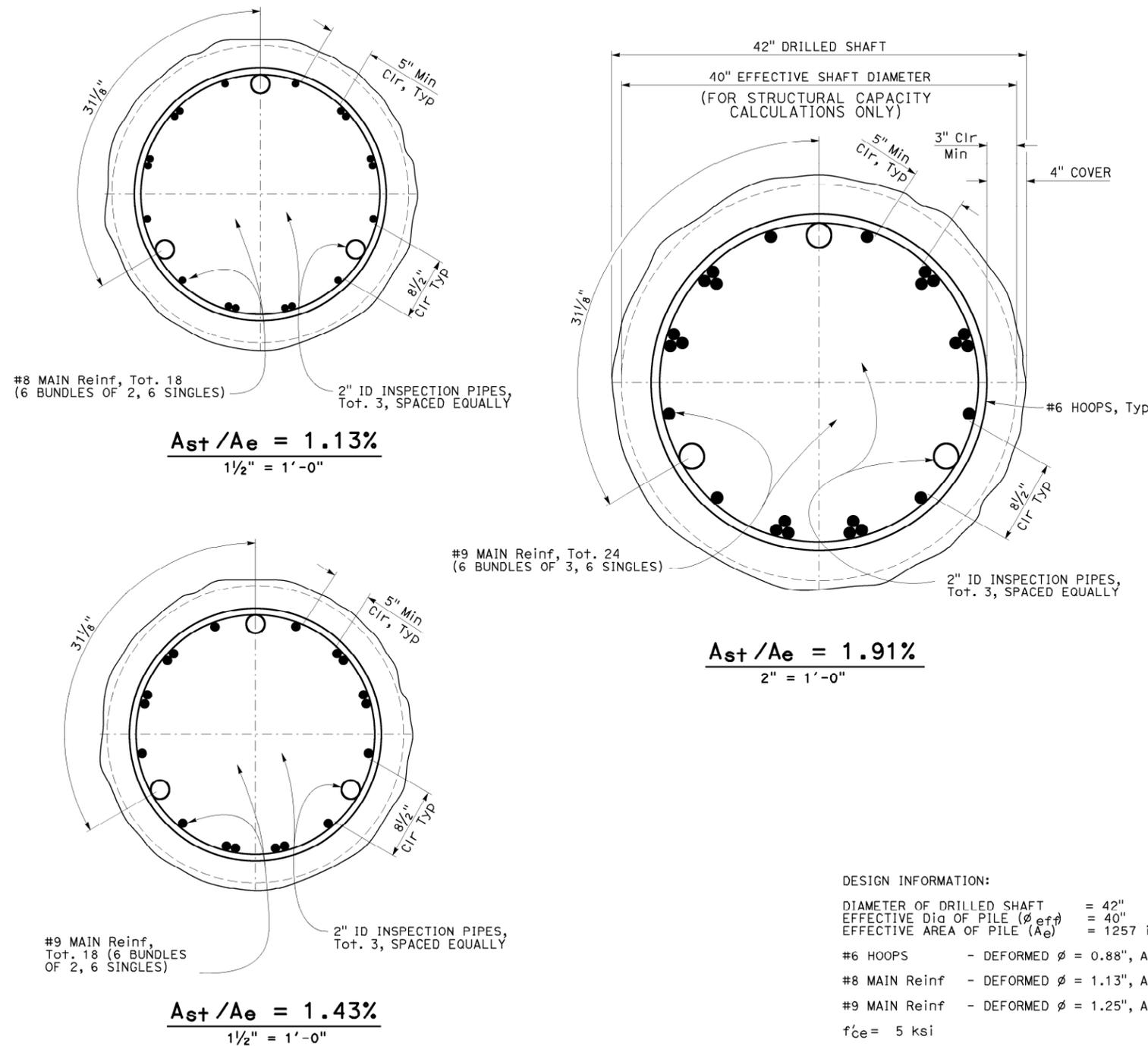
#6 HOOPS - DEFORMED ϕ = 0.88", A_b = 0.44 in²
 #8 MAIN Reinf - DEFORMED ϕ = 1.13", A_b = 0.79 in²
 #9 MAIN Reinf - DEFORMED ϕ = 1.25", A_b = 1.00 in²
 #10 MAIN Reinf - DEFORMED ϕ = 1.44", A_b = 1.27 in²
 f_{ce} = 5 ksi
 f_{ye} = 68 ksi

NOTES:

- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER.

STEEL PL A_{st}/A_e	UNFACTORED AXIAL LOAD (P_n)	HOOPS SPACING C-C	$M_{no} @ \epsilon_c=0.003$	M_p	ϕ_p	I_{cr}	$\phi_y i$	V_s	
%	% kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips	
1.16% STEEL	0	0	6	900	927	0.001803	0.883	0.000151	201
	0	0	12	901	900	0.001294	0.884	0.000146	101
	5	216	6	1091	1091	0.001600	1.074	0.000146	201
	5	216	12	1091	1069	0.001141	1.075	0.000143	101
	10	432	6	1260	1245	0.001427	1.227	0.000146	201
	10	432	12	1260	1227	0.000992	1.230	0.000143	101
	15	648	6	1411	1383	0.001280	1.348	0.000147	201
	15	648	12	1411	1369	0.000880	1.351	0.000145	101
1.47% STEEL	0	0	6	1098	1140	0.0016470	1.057	0.000155	201
	0	0	12	1098	1105	0.0011880	1.058	0.000150	101
	5	225	6	1281	1301	0.0014880	1.232	0.000152	201
	5	225	12	1281	1270	0.0010550	1.235	0.000148	101
	10	449	6	1443	1448	0.0013290	1.373	0.000151	201
	10	449	12	1444	1421	0.0009250	1.376	0.000148	101
	15	674	6	1586	1582	0.0012210	1.483	0.000153	201
	15	674	12	1586	1556	0.0008350	1.500	0.000149	101
1.87% STEEL	0	0	6	1333	1392	0.001535	1.256	0.000159	201
	0	0	12	1334	1347	0.001097	1.257	0.000154	101
	5	235	6	1508	1546	0.001376	1.413	0.000157	201
	5	235	12	1509	1505	0.000965	1.416	0.000153	101
	10	471	6	1663	1688	0.001253	1.542	0.000157	201
	10	471	12	1664	1651	0.000868	1.543	0.000154	101
	15	706	6	1795	1818	0.001152	1.636	0.000160	201
	15	706	12	1795	1783	0.000785	1.640	0.000156	101
2.06% STEEL	0	0	6	1450	1507	0.001486	1.359	0.000159	201
	0	0	12	1450	1460	0.001063	1.360	0.000154	101
	5	241	6	1623	1661	0.001343	1.512	0.000158	201
	5	241	12	1623	1618	0.000947	1.515	0.000153	101
	10	482	6	1774	1803	0.001230	1.634	0.000158	201
	10	482	12	1774	1764	0.000850	1.637	0.000155	101
	15	722	6	1903	1931	0.001126	1.726	0.000161	201
	15	722	12	1903	1895	0.000772	1.731	0.000157	101
2.06% STEEL	20	963	6	2010	2045	0.001031	1.793	0.000164	201
	20	963	12	2010	2011	0.000694	1.797	0.000161	101

36" DIA CIDH PILE DETAILS WITHOUT CASING



STEEL P_L A_{st}/A_e	UNFACTORED AXIAL LOAD (P_n)	HOOPS SPACING C-C	M_{ne} @ $\epsilon_c=0.003$	M_p	ϕ_p	I_{cr}	ϕ_{yi}	V_s	
%	% kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips	
1.13% STEEL	0	0	6	1222	1267	0.001562	1.351	0.000135	229
	0	0	12	1222	1228	0.001124	1.353	0.000130	114
	5	266	6	1483	1499	0.001388	1.652	0.000130	229
	266	12	1484	1469	0.000966	1.654	0.000127	114	
	10	531	6	1726	1716	0.001238	1.891	0.000130	229
	531	12	1727	1692	0.000843	1.895	0.000128	114	
	15	797	6	1930	1915	0.001106	2.081	0.000132	229
797	12	1930	1895	0.000740	2.087	0.000130	114		
20	1062	6	2118	2092	0.000999	2.226	0.000135	229	
1062	12	2117	2080	0.000660	2.233	0.000134	114		
1.43% STEEL	0	0	6	1490	1561	0.001439	1.621	0.000138	229
	0	0	12	1491	1512	0.001017	1.623	0.000134	114
	5	276	6	1747	1788	0.001297	1.898	0.000135	229
	276	12	1747	1745	0.000893	1.902	0.000132	114	
	10	552	6	1976	1999	0.001165	2.119	0.000135	229
	552	12	1977	1961	0.000780	2.125	0.000132	114	
	15	827	6	2175	2187	0.001035	2.292	0.000137	229
827	12	2174	2155	0.000700	2.299	0.000135	114		
20	1103	6	2350	2358	0.000950	2.423	0.000140	229	
1103	12	2347	2334	0.000625	2.431	0.000138	114		
1.91% STEEL	0	0	6	1897	1986	0.001314	2.019	0.000141	229
	0	0	12	1897	1919	0.000918	2.022	0.000136	114
	5	292	6	2146	2204	0.001184	2.269	0.000139	229
	292	12	2147	2147	0.000824	2.273	0.000136	114	
	10	584	6	2360	2406	0.001068	2.467	0.000140	229
	584	12	2360	2357	0.000721	2.473	0.000137	114	
	15	876	6	2545	2590	0.000977	2.621	0.000142	229
876	12	2545	2546	0.000650	2.629	0.000139	114		
20	1168	6	2706	2753	0.000896	2.735	0.000144	229	
1168	12	2705	2716	0.000587	2.744	0.000142	114		

DESIGN INFORMATION:

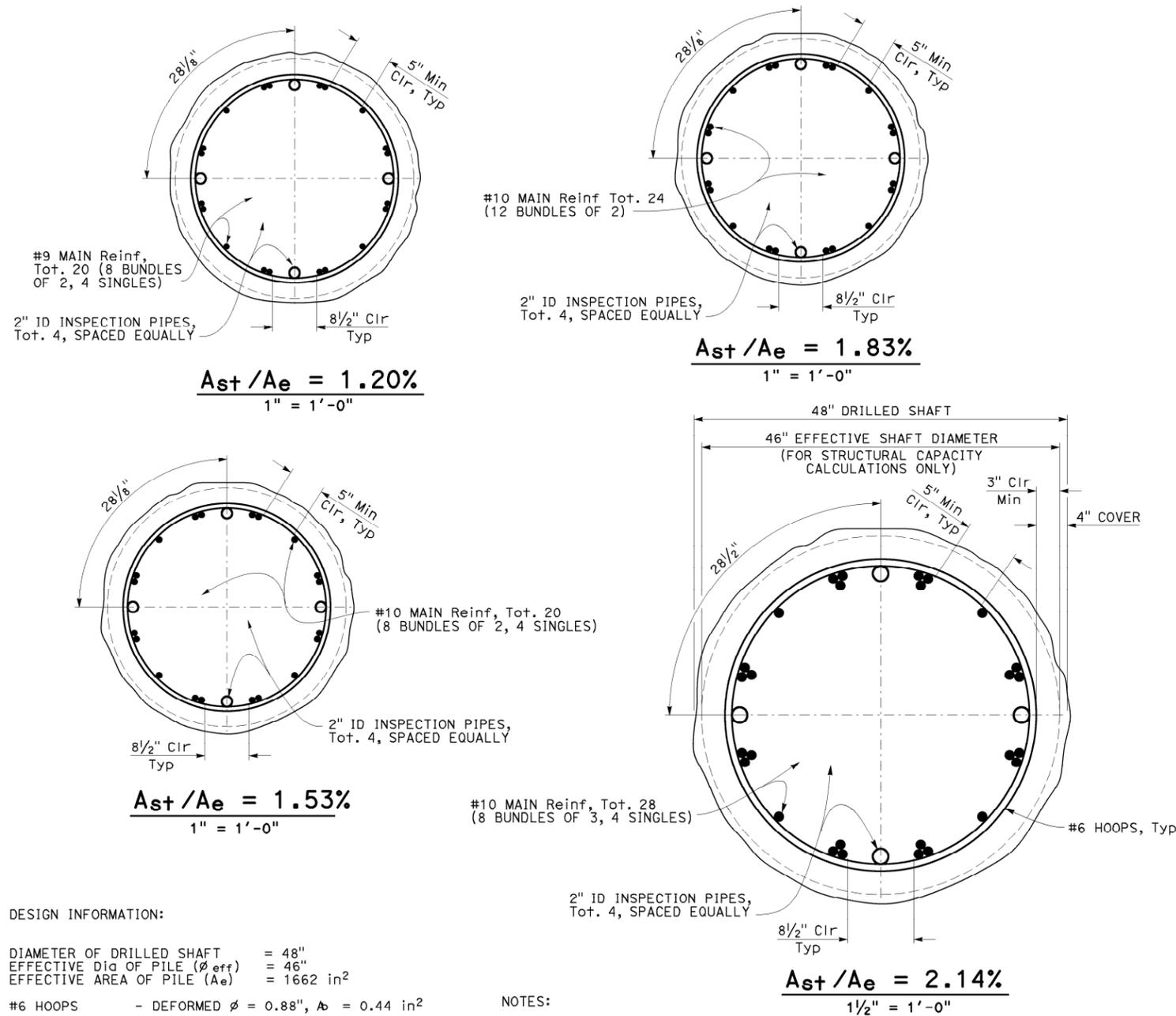
DIAMETER OF DRILLED SHAFT = 42"
 EFFECTIVE DIA OF PILE (ϕ_{eff}) = 40"
 EFFECTIVE AREA OF PILE (A_e) = 1257 in²

#6 HOOPS - DEFORMED $\phi = 0.88"$, $A_B = 0.44$ in²
 #8 MAIN Reinf - DEFORMED $\phi = 1.13"$, $A_B = 0.79$ in²
 #9 MAIN Reinf - DEFORMED $\phi = 1.25"$, $A_B = 1.00$ in²
 $f'_{ce} = 5$ ksi
 $f_{ye} = 68$ ksi

NOTES:

- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER.

**42" DIA CIDH PILE DETAILS
 WITHOUT CASING**


DESIGN INFORMATION:

DIAMETER OF DRILLED SHAFT = 48"
 EFFECTIVE DIA OF PILE (ϕ_{eff}) = 46"
 EFFECTIVE AREA OF PILE (A_e) = 1662 in²

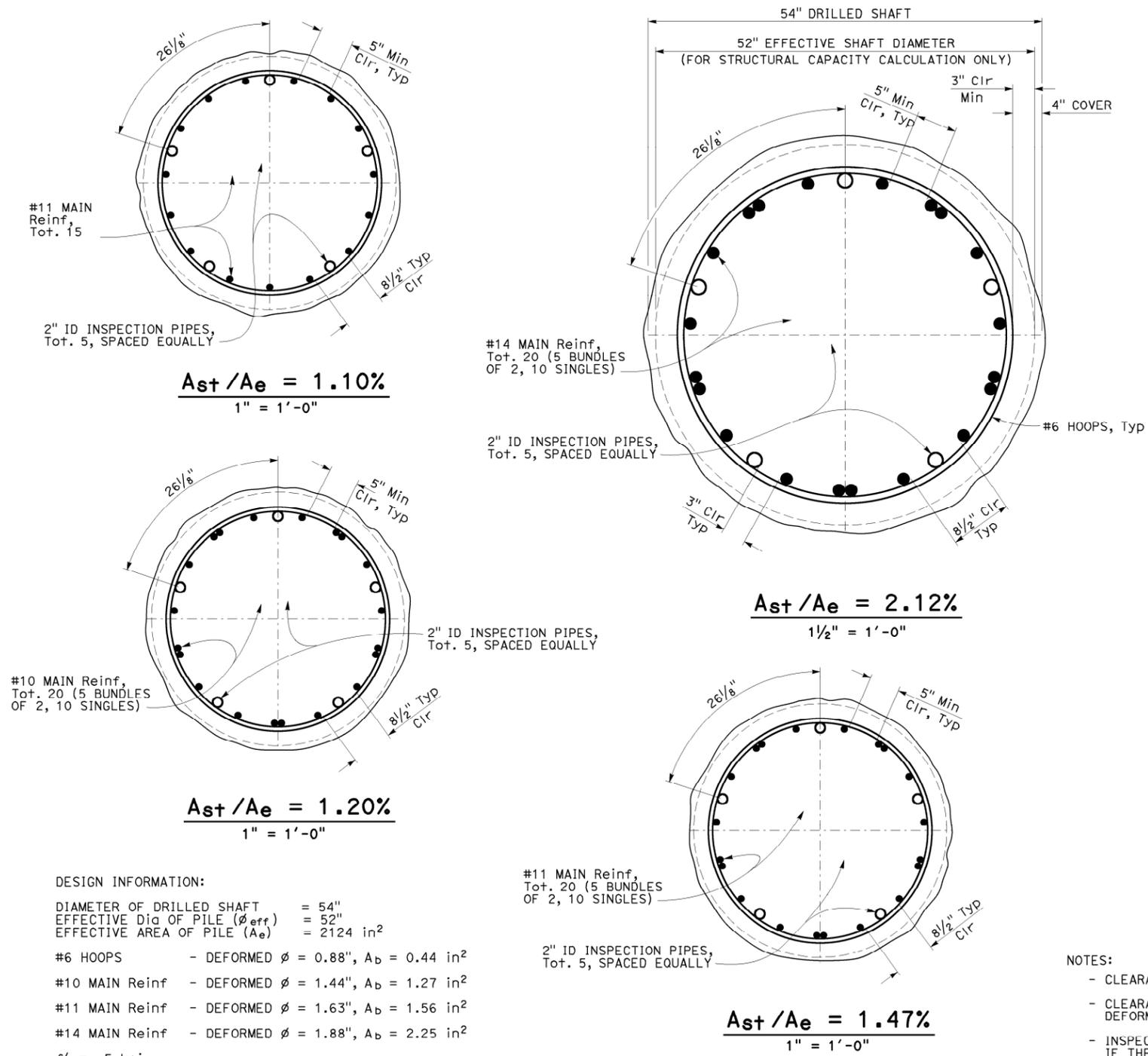
#6 HOOPS - DEFORMED $\phi = 0.88"$, $A_b = 0.44$ in²
 #8 MAIN Reinf - DEFORMED $\phi = 1.13"$, $A_b = 0.79$ in²
 #9 MAIN Reinf - DEFORMED $\phi = 1.25"$, $A_b = 1.00$ in²
 #10 MAIN Reinf - DEFORMED $\phi = 1.44"$, $A_b = 1.27$ in²
 $f'_{ce} = 5$ ksi
 $f_{ye} = 68$ ksi

NOTES:

- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER.

STEEL PL A_{st}/A_e	UNFACTORED AXIAL LOAD (P_n)		HOOPS SPACING C-C	M_{ne} @ $\epsilon_c = 0.003$	M_p	ϕ_p	I_{cr}	ϕ_{yi}	V_s
	%	kips							
1.20% STEEL	0	0	6	1985	2103	0.001249	2.565	0.000118	270
		0	12	1985	2032	0.000890	2.567	0.000114	135
	5	354	6	2388	2457	0.010850	3.097	0.000114	270
		354	12	2389	2402	0.000765	3.103	0.000111	135
	10	709	6	2762	2794	0.000965	3.524	0.000114	270
		709	12	2762	2749	0.000663	3.534	0.000112	135
	15	1063	6	3074	3100	0.000858	3.864	0.000115	270
		1063	12	3074	3063	0.000579	3.879	0.000113	135
	20	1417	6	3359	3375	0.000776	4.127	0.000117	270
		1417	12	3358	3348	0.000519	4.144	0.000116	135
1.53% STEEL	0	0	6	2430	2569	0.001125	3.073	0.000120	270
		0	12	2431	2487	0.000810	3.077	0.000116	135
	5	369	6	2824	2920	0.001010	3.561	0.000118	270
		369	12	2824	2849	0.000703	3.569	0.000115	135
	10	738	6	3174	3246	0.000900	3.952	0.000118	270
		738	12	3174	3184	0.000614	3.965	0.000115	135
	15	1107	6	3481	3541	0.000807	4.262	0.000119	270
		1107	12	3481	3489	0.000548	4.277	0.000117	135
	20	1476	6	3742	3810	0.000738	4.497	0.000122	270
		1476	12	3741	3769	0.000489	4.515	0.000120	135
1.83% STEEL	0	0	6	2837	2994	0.001062	3.535	0.000122	270
		0	12	2838	2894	0.000748	3.544	0.000117	135
	5	383	6	3228	3338	0.000953	4.004	0.000120	270
		383	12	3228	3252	0.000688	4.013	0.000116	135
	10	766	6	3560	3657	0.000854	4.354	0.000121	270
		766	12	3560	3584	0.000582	4.368	0.000118	135
	15	1148	6	3855	3945	0.000772	4.638	0.000122	270
		1148	12	3856	3883	0.000521	4.655	0.000120	135
	20	1531	6	4104	4207	0.000708	4.853	0.000124	270
		1531	12	4102	4157	0.000466	4.871	0.000122	135
2.14% STEEL	0	0	6	3230	3407	0.001009	3.977	0.000123	270
		0	12	3233	3293	0.007060	3.985	0.000119	135
	5	397	6	3609	3744	0.000903	4.401	0.000122	270
		397	12	3610	3647	0.000631	4.412	0.000119	135
	10	793	6	3940	4057	0.000820	4.762	0.000122	270
		793	12	3939	3974	0.000560	4.754	0.000120	135
	15	1190	6	4218	4344	0.000745	5.003	0.000125	270
		1190	12	4216	4271	0.000500	5.021	0.000122	135
	20	1586	6	4450	4599	0.000678	5.199	0.000127	270
		1586	12	4448	4540	0.000447	5.217	0.000125	135

**48" DIA CIDH PILE DETAILS
 WITHOUT CASING**


DESIGN INFORMATION:

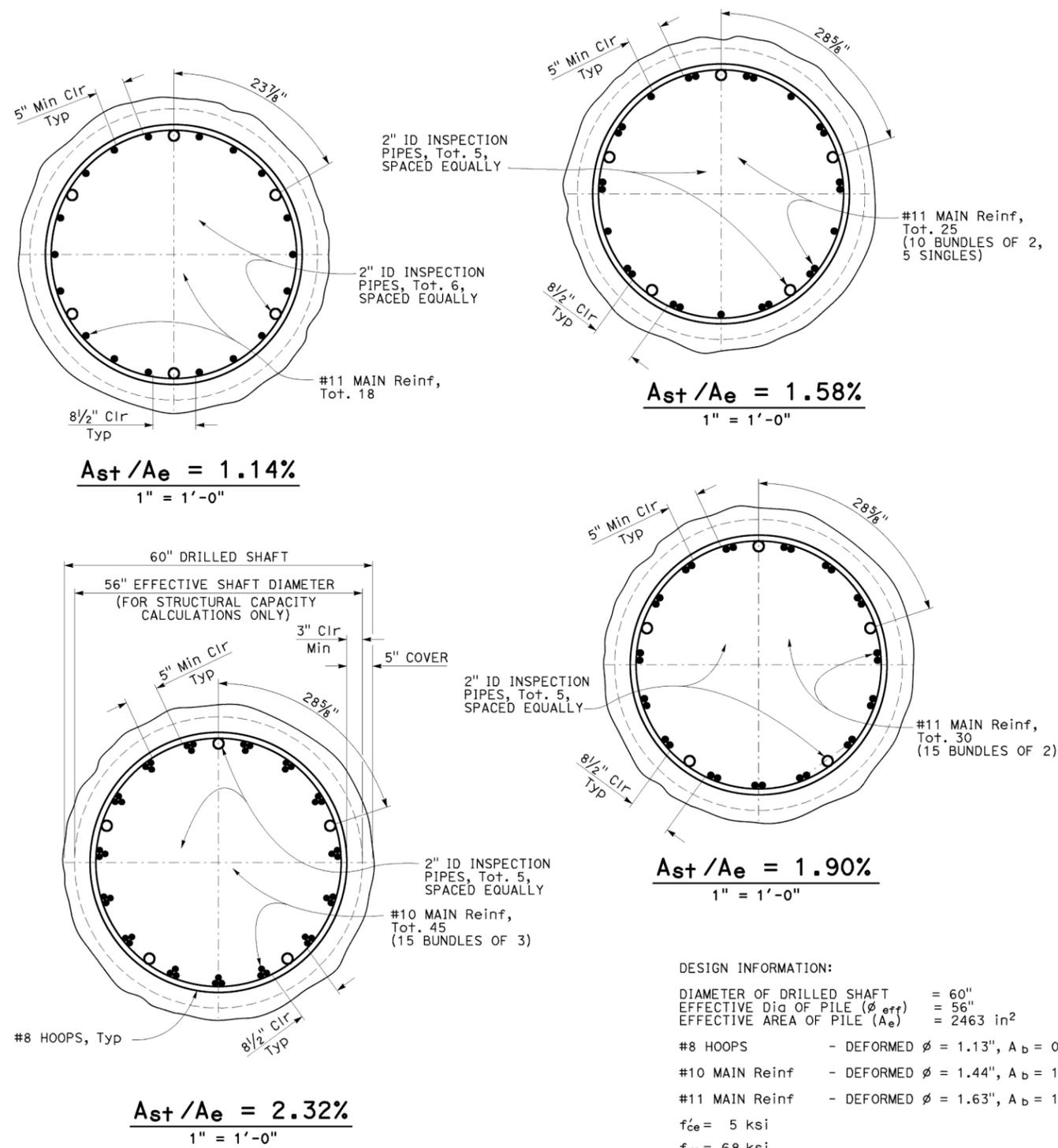
DIAMETER OF DRILLED SHAFT = 54"
EFFECTIVE Dia OF PILE (ϕ_{eff}) = 52"
EFFECTIVE AREA OF PILE (A_e) = 2124 in²

- #6 HOOPS - DEFORMED $\phi = 0.88"$, $A_b = 0.44$ in²
- #10 MAIN Reinf - DEFORMED $\phi = 1.44"$, $A_b = 1.27$ in²
- #11 MAIN Reinf - DEFORMED $\phi = 1.63"$, $A_b = 1.56$ in²
- #14 MAIN Reinf - DEFORMED $\phi = 1.88"$, $A_b = 2.25$ in²
- $f'_{ce} = 5$ ksi
- $f_{ye} = 68$ ksi

STEEL A_L A_{st}/A_e	UNFACTORED AXIAL LOAD (P_n)	HOOPS SPACING C-C	$M_{ne} @$ $\epsilon_c = 0.003$	M_p	ϕ_p	I_{cr}	$\phi_y i$	V_s	
%	% kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips	
1.10% STEEL	0	0	6	2675	2910	0.001056	3.979	0.000105	312
	0	12	12	2677	2807	0.000775	3.977	0.000101	156
	5	447	6	3274	3431	0.000918	4.873	0.000101	312
	447	12	12	3275	3341	0.000662	4.884	0.000098	156
	10	894	6	3810	3919	0.000807	5.595	0.000101	312
	894	12	12	3812	3841	0.000570	5.612	0.000098	156
	15	1341	6	4287	4366	0.000715	6.172	0.000102	312
1.20% STEEL	0	0	6	2879	3077	0.001044	4.265	0.000104	312
	0	12	12	2880	2977	0.000765	4.270	0.000100	156
	5	452	6	3469	3600	0.000903	5.141	0.000100	312
	452	12	12	3470	3520	0.000654	5.154	0.000098	156
	10	905	6	4009	4095	0.000799	5.851	0.000100	312
	905	12	12	4010	4026	0.000562	5.871	0.000098	156
	15	1357	6	4472	4547	0.000707	6.420	0.000102	312
1.47% STEEL	0	0	6	3436	3694	0.000943	4.987	0.000106	312
	0	12	12	3438	3565	0.000700	4.991	0.000103	156
	5	468	6	4010	4201	0.000840	5.802	0.000104	312
	468	12	12	4010	4085	0.000603	5.817	0.000101	156
	10	936	6	4530	4674	0.000746	6.463	0.000104	312
	936	12	12	4533	4572	0.000525	6.485	0.000101	156
	15	1404	6	4979	5104	0.000666	6.988	0.000105	312
2.12% STEEL	0	0	6	4692	5127	0.000814	6.571	0.000112	312
	0	12	12	4695	4947	0.000586	6.591	0.000108	156
	5	506	6	5243	5609	0.000730	7.282	0.000111	312
	506	12	12	5243	5436	0.000514	7.303	0.000107	156
	10	1011	6	5712	6050	0.000656	7.849	0.000111	312
	1011	12	12	5713	5890	0.000462	7.878	0.000107	156
	15	1517	6	6142	6454	0.000600	8.292	0.000112	312

- NOTES:
- CLEARANCES SHOWN ARE TYPICAL
 - CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
 - INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER.

54" DIA CIDH PILE DETAILS WITHOUT CASING

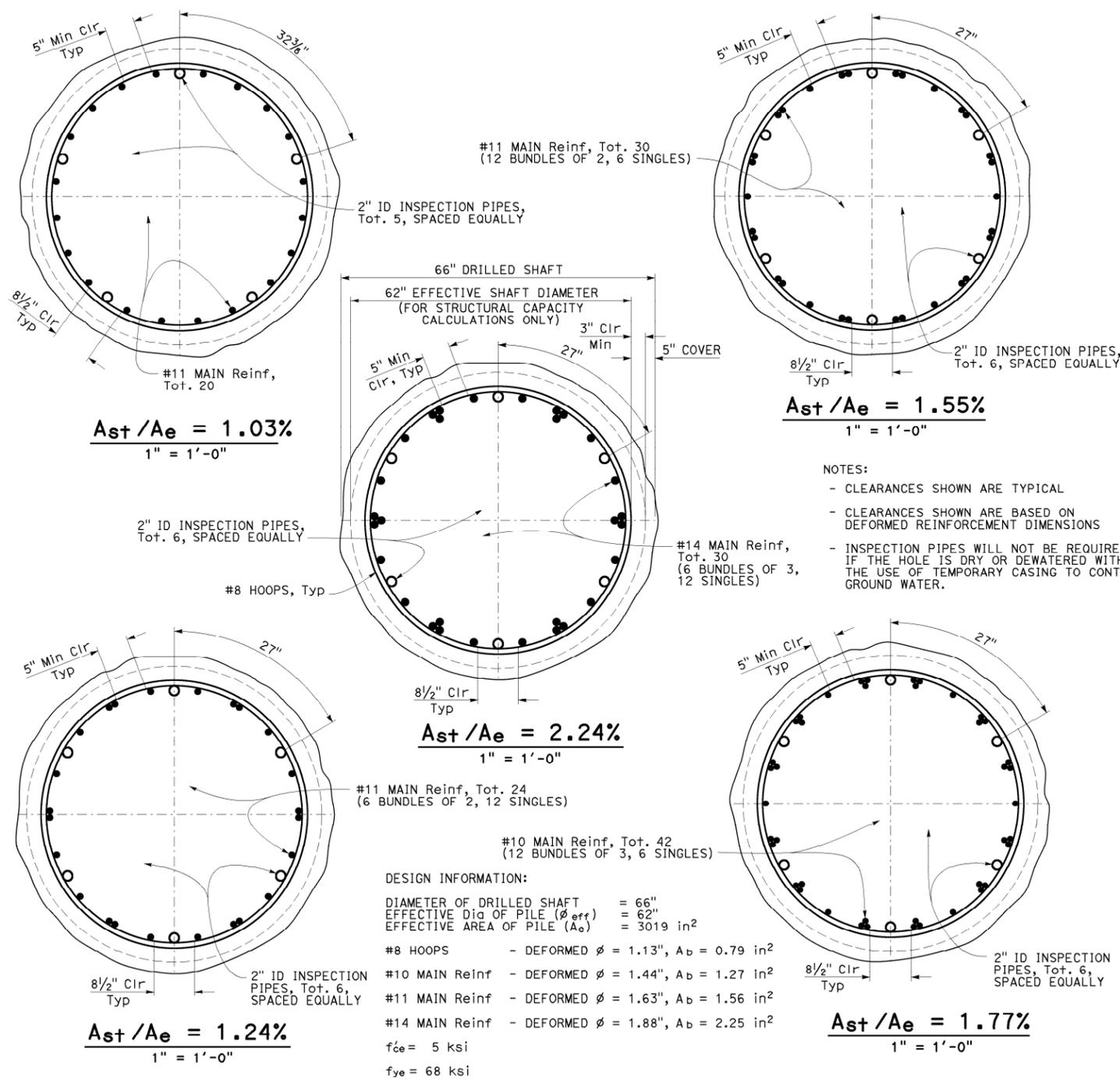


STEEL PL A_{st}/A_e	UNFACTORED AXIAL LOAD (P_n)	HOOPS SPACING C-C	M_{ne} @ $\epsilon_c = 0.003$	M_p	ϕ_p	I_{cr}	ϕy_i	V_s
%	%	kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in
1.14% STEEL	0	0	6	3457	3924	0.001322	5.529	0.000102
	0	0	12	3459	3736	0.000922	5.525	0.000097
	5	521	6	4197	4581	0.001182	6.711	0.000098
		521	12	4195	4387	0.000803	6.722	0.000094
	10	1042	6	4885	5196	0.001060	7.667	0.000097
		1042	12	4878	4998	0.000707	7.684	0.000093
	15	1563	6	5468	5764	0.000955	8.432	0.000098
	1563	12	5458	5555	0.000619	8.451	0.000094	
	20	2084	6	5998	6269	0.000847	9.032	0.000100
	2084	12	5984	6060	0.000556	9.050	0.000096	303
1.58% STEEL	0	0	6	4596	5182	0.001191	7.144	0.000104
	0	0	12	4592	4913	0.000819	7.155	0.000099
	5	551	6	5317	5809	0.001066	8.220	0.000101
		551	12	5311	5540	0.000723	8.235	0.000097
	10	1101	6	5959	6390	0.000960	9.087	0.000101
		1101	12	5952	6124	0.000641	9.104	0.000097
	15	1652	6	6527	6927	0.000871	9.776	0.000102
	1652	12	6513	6660	0.000575	9.795	0.000098	
	20	2202	6	7011	7413	0.000796	10.309	0.000103
	2202	12	6985	7145	0.000520	10.324	0.000099	303
1.90% STEEL	0	0	6	5375	6011	0.001079	8.224	0.000105
	0	0	12	5372	5719	0.000768	8.233	0.000100
	5	572	6	6086	6623	0.000968	9.225	0.000103
		572	12	6081	6329	0.000676	9.242	0.000098
	10	1143	6	6703	7192	0.000879	10.028	0.000103
		1143	12	6694	6903	0.000609	10.047	0.000099
	15	1715	6	7245	7721	0.000806	10.666	0.000104
	1715	12	7227	7429	0.000549	10.684	0.000100	
	20	2287	6	7697	8189	0.000737	11.154	0.000105
	2287	12	7679	7904	0.000497	11.165	0.000102	303
2.32% STEEL	0	0	6	6379	6990	0.001019	9.583	0.000105
	0	0	12	6375	6681	0.000722	9.607	0.000100
	5	600	6	7062	7609	0.000924	10.511	0.000104
		600	12	7056	7305	0.000645	10.529	0.000100
	10	1200	6	7661	8184	0.000841	11.252	0.000104
		1200	12	7649	7880	0.000578	11.272	0.000100
	15	1800	6	8173	8708	0.000770	11.833	0.000106
	1800	12	8154	8405	0.000524	11.849	0.000102	
	20	2399	6	8595	9184	0.000709	12.271	0.000107
	2399	12	8574	8877	0.000476	12.280	0.000104	303

NOTES:

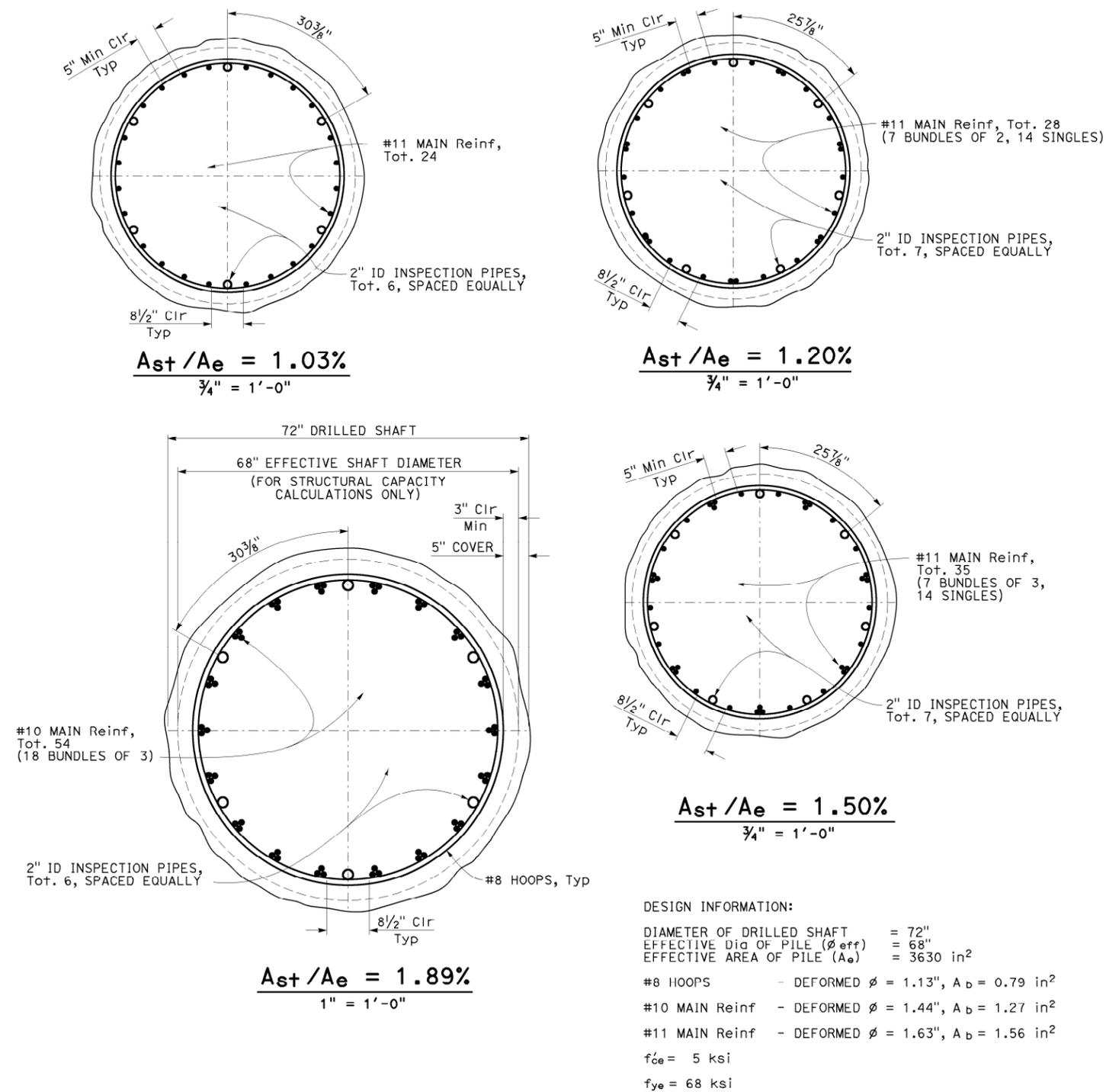
- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER

**60" DIA CIDH PILE DETAILS
WITHOUT CASING**



STEEL	UNFACTORED AXIAL LOAD (P_n)	HOOPS SPACING C-C	M_{ne} @ $\epsilon_c = 0.003$	M_p	ϕ_p	I_{cr}	ϕ_{yi}	V_s
A_{st}/A_e	%	kips	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips
1.03% STEEL	0	0	6	4340	4906	0.001109	7.782	0.000090
	0	0	12	4335	4705	0.000821	7.804	0.000087
	5	630	6	5361	5854	0.001036	9.674	0.000087
	5	630	12	5360	5604	0.000694	9.693	0.000083
	10	1260	6	6297	6699	0.000922	11.187	0.000086
	10	1260	12	6294	6454	0.000603	11.211	0.000083
	15	1890	6	7120	7481	0.000827	12.401	0.000087
	15	1890	12	7110	7238	0.000530	12.430	0.000084
1.24% STEEL	0	0	6	5075	5775	0.001128	9.019	0.000092
	0	0	12	5075	5474	0.000758	9.015	0.000087
	5	647	6	6095	6668	0.000998	10.786	0.000089
	5	647	12	6092	6356	0.000651	10.808	0.000084
	10	1294	6	7011	7484	0.000872	12.221	0.000088
	10	1294	12	7013	7193	0.000576	12.252	0.000084
	15	1940	6	7812	8247	0.000790	13.366	0.000089
	15	1940	12	7801	7963	0.000507	13.403	0.000085
1.55% STEEL	0	0	6	6173	6938	0.000999	10.726	0.000093
	0	0	12	6171	6588	0.000695	10.746	0.000088
	5	672	6	7164	7802	0.000888	12.375	0.000090
	5	672	12	7158	7459	0.000607	12.402	0.000086
	10	1344	6	8051	8604	0.000793	13.701	0.000090
	10	1344	12	8042	8270	0.000538	13.730	0.000086
	15	2016	6	8837	9350	0.000722	14.756	0.000091
	15	2016	12	8825	9024	0.000479	14.792	0.000088
1.77% STEEL	0	0	6	6940	7635	0.000965	11.970	0.000092
	0	0	12	6937	7289	0.000671	11.988	0.000087
	5	690	6	7920	8513	0.000866	13.534	0.000090
	5	690	12	7915	8171	0.000588	13.563	0.000086
	10	1380	6	8791	9323	0.000775	14.805	0.000090
	10	1380	12	8780	8998	0.000524	14.840	0.000087
	15	2070	6	9553	10076	0.000704	15.819	0.000091
	15	2070	12	9532	9751	0.000465	15.857	0.000088
2.24% STEEL	0	0	6	8489	9649	0.000859	14.263	0.000097
	0	0	12	8483	9174	0.000587	14.288	0.000092
	5	728	6	9426	10471	0.000774	15.675	0.000096
	5	728	12	9415	10001	0.000526	15.709	0.000091
	10	1456	6	10258	11245	0.000711	16.819	0.000096
	10	1456	12	10245	10771	0.000473	16.858	0.000092
	15	2185	6	10967	11945	0.000647	17.720	0.000097
	15	2185	12	10943	11466	0.000424	17.759	0.000093
2.24% STEEL	20	2913	6	11556	12572	0.000592	18.408	0.000098
	20	2913	12	11524	12094	0.000387	18.436	0.000094

66" DIA CIDH PILE DETAILS WITHOUT CASING

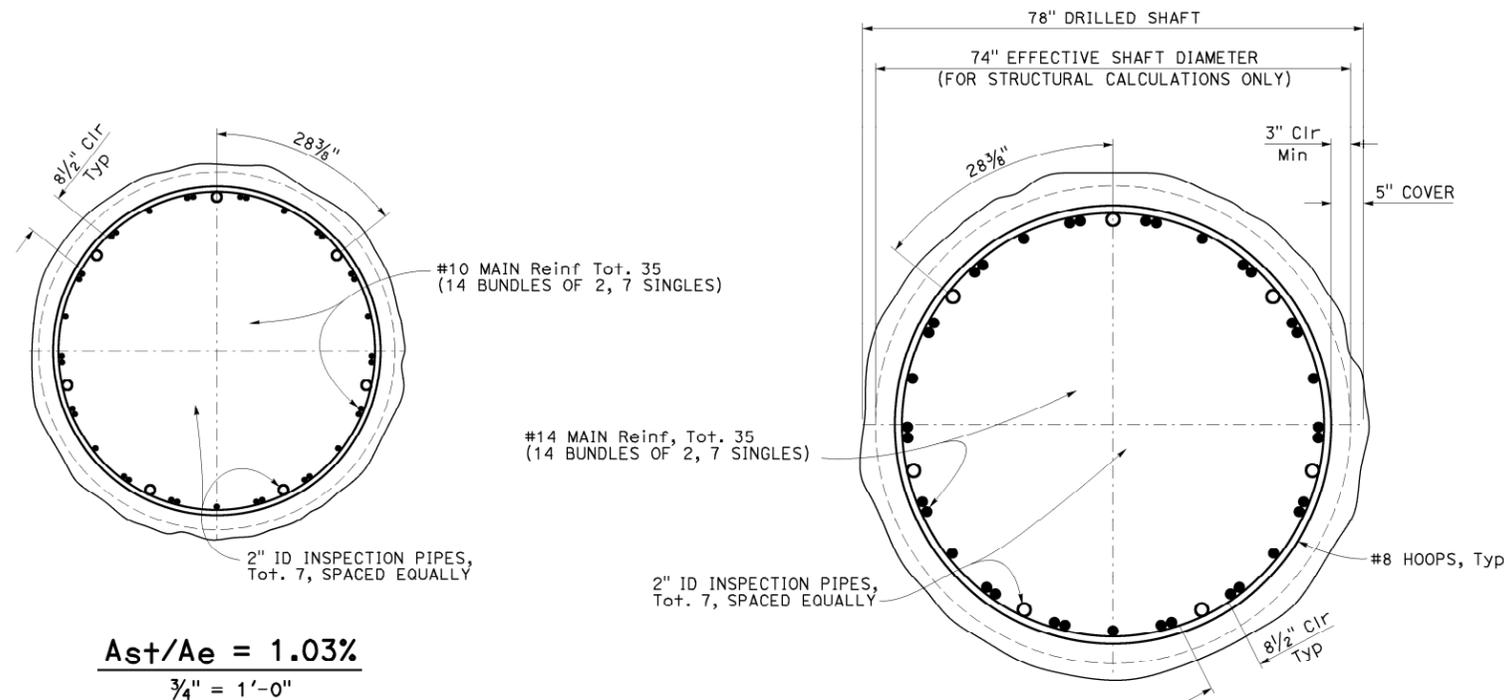


STEEL A_{st}/A_e	UNFACTORED AXIAL LOAD (P_n)	HOOPS SPACING C-C	M_{ne} @ $\epsilon_c=0.003$	M_p	ϕ_p	I_{cr}	$\phi_y i$	V_s		
%	% kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips		
1.03% STEEL	0	0	6	5773	6496	0.000950	11.479	0.000081	755	
	0	0	12	5775	6256	0.000728	11.501	0.000078	378	
	5	757	6	7128	7784	0.000910	14.225	0.000079	755	
	5	757	12	7126	7450	0.000611	14.259	0.000075	378	
	10	1515	6	8367	8905	0.000789	16.449	0.000078	755	
	10	1515	12	8360	8589	0.000532	16.497	0.000074	378	
	15	2272	6	9462	9942	0.000703	18.236	0.000078	755	
	15	2272	12	9450	9639	0.000465	18.293	0.000076	378	
	20	3030	6	10434	10899	0.000633	19.651	0.000080	755	
	20	3030	12	10408	10598	0.000407	19.713	0.000077	378	
	1.20% STEEL	0	0	6	6592	7487	0.000983	12.973	0.000083	755
		0	0	12	6591	7114	0.000681	12.996	0.000079	378
5		774	6	7948	8673	0.000861	15.608	0.000080	755	
5		774	12	7945	8301	0.000582	15.642	0.000076	378	
10		1549	6	9171	9777	0.000758	17.732	0.000079	755	
10		1549	12	9161	9411	0.000505	17.782	0.000076	378	
15		2323	6	10243	10796	0.000681	19.444	0.000080	755	
15		2323	12	10227	10447	0.000450	19.504	0.000077	378	
20		3097	6	11176	11734	0.000612	20.792	0.000081	755	
20		3097	12	11150	11391	0.000395	20.852	0.000078	378	
1.50% STEEL		0	0	6	8019	9036	0.000903	15.474	0.000084	755
		0	0	12	8015	8571	0.000621	15.506	0.000079	378
	5	804	6	9350	10184	0.000796	17.927	0.000082	755	
	5	804	12	9345	9732	0.000539	17.970	0.000078	378	
	10	1608	6	10530	11257	0.000710	19.901	0.000081	755	
	10	1608	12	10522	10824	0.000476	19.960	0.000078	378	
	15	2412	6	11566	12255	0.000642	21.492	0.000082	755	
	15	2412	12	11550	11835	0.000421	21.554	0.000079	378	
	20	3216	6	12462	13160	0.000581	22.730	0.000083	755	
	20	3216	12	12428	12755	0.000378	22.793	0.000080	378	
	1.89% STEEL	0	0	6	9789	10758	0.000840	18.497	0.000083	755
		0	0	12	9787	10257	0.000575	18.536	0.000079	378
5		842	6	11084	11908	0.000747	20.755	0.000082	755	
5		842	12	11077	11428	0.000505	20.807	0.000079	378	
10		1684	6	12224	12986	0.000674	22.571	0.000083	755	
10		1684	12	12208	12529	0.000444	22.636	0.000079	378	
15		2525	6	13213	13973	0.000608	24.022	0.000083	755	
15		2525	12	13189	13534	0.000398	24.086	0.000081	378	
20		3367	6	14055	14876	0.000555	25.146	0.000085	755	
20		3367	12	14014	14446	0.000358	25.208	0.000082	378	

NOTES:

- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER.

**72" DIA CIDH PILE DETAILS
 WITHOUT CASING**

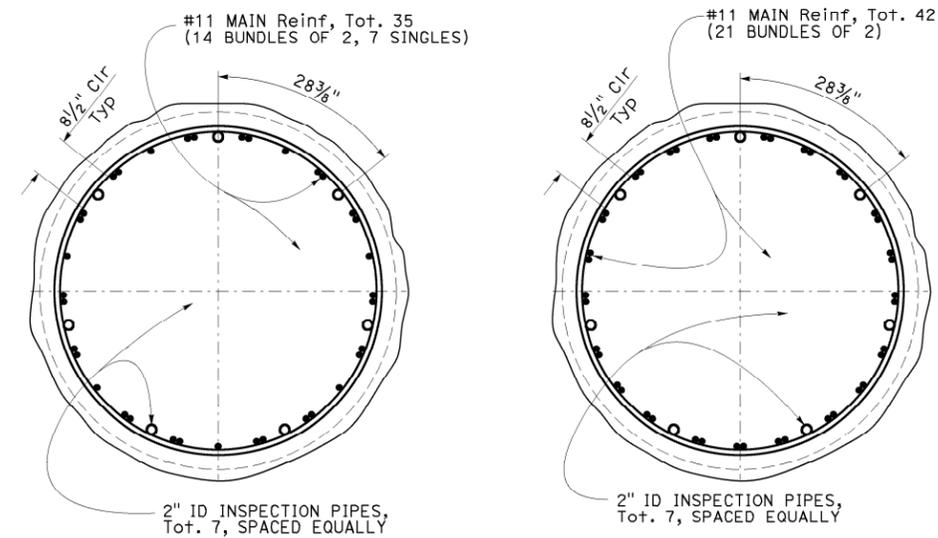


$$\frac{A_{st}}{A_e} = 1.03\%$$

$$\frac{3}{4}'' = 1'-0''$$

$$\frac{A_{st}}{A_e} = 1.83\%$$

$$1'' = 1'-0''$$



$$\frac{A_{st}}{A_e} = 1.27\%$$

$$\frac{3}{4}'' = 1'-0''$$

$$\frac{A_{st}}{A_e} = 1.52\%$$

$$\frac{3}{4}'' = 1'-0''$$

DESIGN INFORMATION:

 DIAMETER OF DRILLED SHAFT = 78"
 EFFECTIVE Dia OF PILE (ϕ_{eff}) = 74"
 EFFECTIVE AREA OF PILE (A_e) = 4301 in²

 #8 HOOPS - DEFORMED ϕ = 1.13", A_b = 0.79 in²

 #10 MAIN Reinf - DEFORMED ϕ = 1.44", A_b = 1.27 in²

 #11 MAIN Reinf - DEFORMED ϕ = 1.63", A_b = 1.56 in²

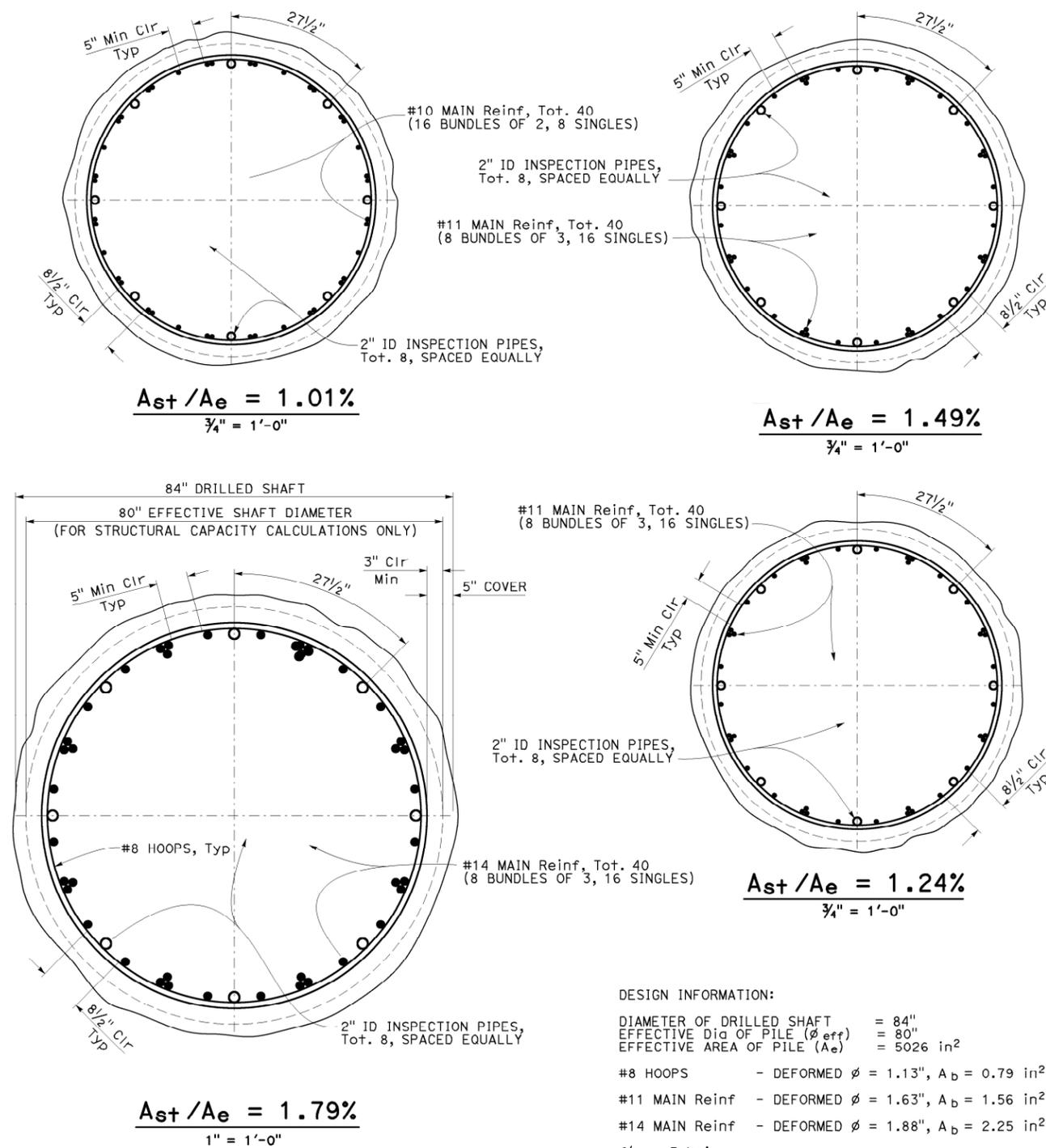
 #14 MAIN Reinf - DEFORMED ϕ = 1.88", A_b = 2.25 in²
 f'_{ce} = 5 ksi

 f_{ye} = 68 ksi

STEEL $\frac{A_{st}}{A_e}$	UNFACTORED AXIAL LOAD (P_u)	HOOPS SPACING C-C	$M_{ne @}$ $\epsilon_c=0.003$	M_p	ϕ_p	I_{cr}	$\phi \gamma_i$	V_s	
%	% kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips	
1.03% STEEL	0	0	6	7513	8357	0.000924	16.348	0.000073	830
	0	0	12	7515	8001	0.000655	16.366	0.000070	415
	5	897	6	9263	9949	0.000791	20.251	0.000071	830
	897	12	9261	9603	0.000550	20.299	0.000068	415	
	10	1795	6	10878	11438	0.000687	23.395	0.000070	830
	1795	12	10874	11103	0.000468	23.473	0.000068	415	
	15	2692	6	12304	12817	0.000607	25.928	0.000071	830
	2692	12	12295	12493	0.000410	26.020	0.000069	415	
20	3589	6	13550	14084	0.000543	27.936	0.000072	830	
3589	12	13527	13760	0.000359	28.036	0.000070	415		
1.27% STEEL	0	0	6	8955	10111	0.000832	19.177	0.000076	830
	0	0	12	8954	9628	0.000588	19.202	0.000072	415
	5	925	6	10711	11640	0.000726	22.850	0.000073	830
	925	12	10707	11162	0.000503	22.902	0.000070	415	
	10	1850	6	12281	13066	0.000640	25.791	0.000073	830
	1850	12	12269	12607	0.000438	25.875	0.000070	415	
	15	2774	6	13667	14389	0.000572	28.175	0.000073	830
	2774	12	13649	13952	0.000387	28.266	0.000071	415	
20	3699	6	14859	15601	0.000514	30.036	0.000075	830	
3699	12	14832	15180	0.000342	30.148	0.000072	415		
1.52% STEEL	0	0	6	10522	11782	0.000772	22.200	0.000076	830
	0	0	12	10521	11213	0.000546	22.239	0.000072	415
	5	954	6	12243	13279	0.000682	25.607	0.000074	830
	954	12	12235	12714	0.000471	25.805	0.000071	415	
	10	1909	6	13777	14674	0.000605	28.385	0.000074	830
	1909	12	13761	14148	0.000417	28.476	0.000071	415	
	15	2863	6	15117	15974	0.000546	30.617	0.000075	830
	2863	12	15009	15467	0.000367	30.727	0.000072	415	
20	3817	6	16267	17154	0.000492	32.361	0.000076	830	
3817	12	16235	16676	0.000328	32.467	0.000074	415		
1.83% STEEL	0	0	6	12524	14084	0.000710	25.648	0.000079	830
	0	0	12	12522	13428	0.000494	25.682	0.000075	415
	5	990	6	14050	15549	0.000632	28.842	0.000077	830
	990	12	14043	14897	0.000434	28.917	0.000074	415	
	10	1980	6	15551	16913	0.000568	31.446	0.000077	830
	1980	12	15536	16273	0.000386	31.548	0.000074	415	
	15	2971	6	16843	18165	0.000513	33.526	0.000078	830
	2971	12	16820	17528	0.000342	33.640	0.000075	415	
20	3961	6	17926	19301	0.000468	35.169	0.000079	830	
3961	12	17895	18670	0.000308	35.258	0.000076	415		

**78" DIA CIDH PILE DETAILS
WITHOUT CASING**
NOTES:

- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER.

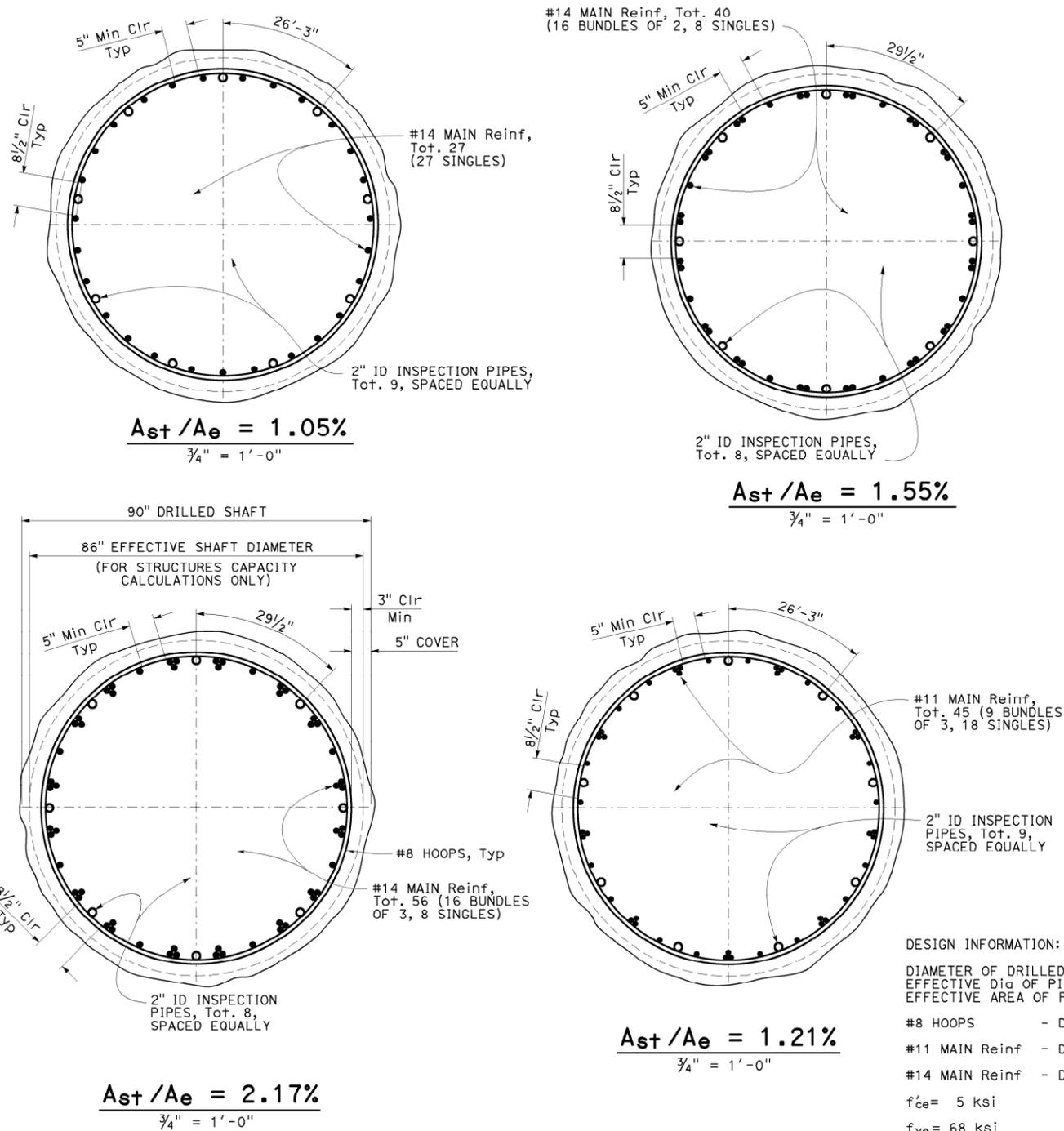


STEEL A_{st}/A_e	UNFACTORED AXIAL LOAD (P_n)	HOOPS SPACING C-C	$M_{ne @}$ $\epsilon_c = 0.003$	M_p	ϕ_p	I_{cr}	ϕ_i	V_s	
%	%	kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips
1.01% STEEL	0	0	6	9383	10418	0.000844	22.185	0.000067	904
		0	12	9384	9952	0.000586	22.224	0.000064	452
	5	1046	6	11579	12433	0.000712	27.586	0.000065	904
		1046	12	11577	12000	0.000491	27.651	0.000062	452
	10	2091	6	13625	14335	0.000618	31.937	0.000064	904
		2091	12	13618	13917	0.000416	32.040	0.000062	452
	15	3137	6	15441	16090	0.000544	35.453	0.000065	904
	3137	12	15419	15699	0.000361	35.584	0.000063	452	
	20	4182	6	17018	17707	0.000486	38.245	0.000066	904
		4182	12	16991	17333	0.000316	38.406	0.000065	452
1.24% STEEL	0	0	6	11180	12598	0.000753	26.063	0.000069	904
		0	12	11179	11978	0.000526	26.103	0.000066	452
	5	1077	6	13393	14549	0.000657	31.122	0.000067	904
		1077	12	13387	13944	0.000449	31.211	0.000064	452
	10	2154	6	15386	16360	0.000574	35.221	0.000067	904
		2154	12	15379	15793	0.000388	35.344	0.000064	452
	15	3231	6	17152	18051	0.000513	38.518	0.000067	904
	3231	12	17124	17516	0.000341	38.674	0.000065	452	
	20	4308	6	18674	19601	0.000458	41.131	0.000068	904
		4308	12	18630	19102	0.000301	41.303	0.000066	452
1.49% STEEL	0	0	6	13117	14689	0.000702	30.159	0.000070	904
		0	12	13115	13961	0.000489	30.170	0.000066	452
	5	1111	6	15311	16586	0.000612	34.905	0.000068	904
		1111	12	15305	15889	0.000421	35.005	0.000065	452
	10	2222	6	17255	18375	0.000545	38.768	0.000068	904
		2222	12	17241	17713	0.000368	38.900	0.000065	452
	15	3332	6	18973	20027	0.000489	41.877	0.000069	904
	3332	12	18946	19414	0.000325	42.045	0.000066	452	
	20	4443	6	20431	21540	0.000440	44.328	0.000070	904
		4443	12	20396	20969	0.000288	44.509	0.000068	452
1.79% STEEL	0	0	6	15676	17568	0.000645	34.866	0.000072	904
		0	12	15673	16725	0.000441	34.938	0.000069	452
	5	1152	6	17604	19418	0.000566	39.313	0.000071	904
		1152	12	17598	18607	0.000386	39.426	0.000068	452
	10	2304	6	19470	21168	0.000511	42.935	0.000071	904
		2304	12	19452	20366	0.000340	43.083	0.000068	452
	15	3455	6	21122	22761	0.000458	45.839	0.000071	904
	3455	12	21092	21985	0.000303	46.012	0.000069	452	
	20	4607	6	22515	24215	0.000417	48.114	0.000072	904
		4607	12	22469	23456	0.000270	48.285	0.000070	452

NOTES:

- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER.

**84" DIA CIDH PILE DETAILS
WITHOUT CASING**



DESIGN INFORMATION:

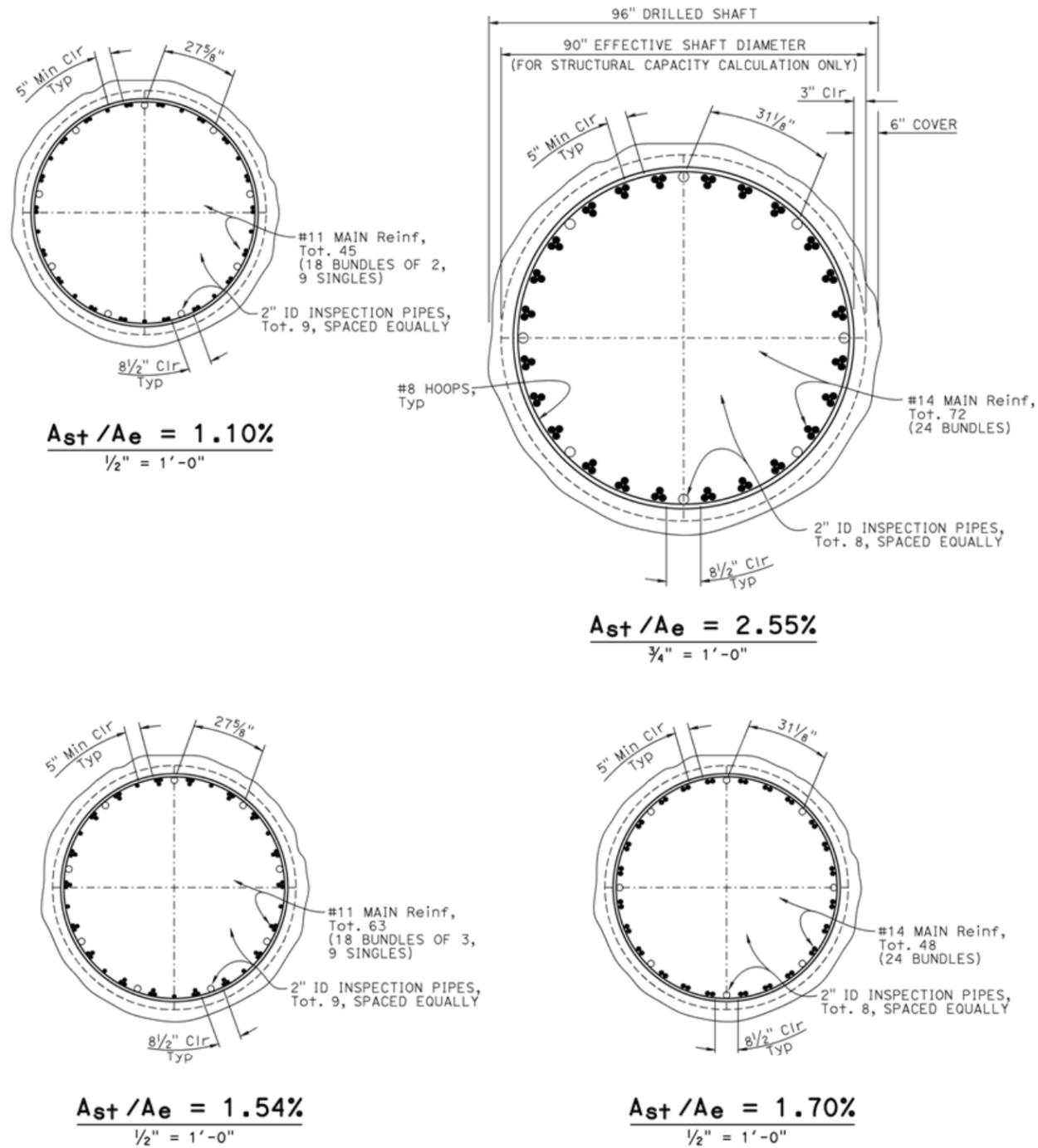
DIAMETER OF DRILLED SHAFT	= 90"
EFFECTIVE Dia OF PILE (ϕ_{eff})	= 86"
EFFECTIVE AREA OF PILE (A_e)	= 5809 in ²
#8 HOOPS	- DEFORMED $\phi = 1.13"$, $A_b = 0.79$ in ²
#11 MAIN Reinf	- DEFORMED $\phi = 1.63"$, $A_b = 1.56$ in ²
#14 MAIN Reinf	- DEFORMED $\phi = 1.88"$, $A_b = 2.25$ in ²
f'_{ce}	= 5 ksi
f_{ye}	= 68 ksi

NOTES:

- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON
- DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER.

90" DIA CIDH PILE DETAILS WITHOUT CASING

STEEL A_{st}/A_e	UNFACTORED AXIAL LOAD (P_n)	HOOPS SPACING C-C	M_{ne} @ $\epsilon_c=0.003$	M_p	ϕ_p	I_{cr}	$\phi_y i$	V_s	
%	%	kips	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips	
1.05% STEEL	0	0	6	12609	13894	0.000727	30.658	0.000065	978
		0	12	12612	13331	0.000524	30.707	0.000062	489
	5	1214	6	15022	16378	0.000619	37.781	0.000062	978
		1214	12	15021	15812	0.000441	37.879	0.000060	489
	10	2428	6	17351	18695	0.000536	43.558	0.000062	978
		2428	12	17342	18121	0.000375	43.702	0.000060	489
	15	3641	6	19561	20841	0.000475	48.223	0.000062	978
	3641	12	19548	20265	0.000328	48.427	0.000060	489	
	4855	6	21520	22804	0.000423	51.921	0.000063	978	
	4855	12	21487	22225	0.000287	52.173	0.000061	489	
1.21% STEEL	0	0	6	13645	15355	0.000688	34.420	0.000064	978
		0	12	13654	14665	0.000499	34.444	0.000061	489
	5	1240	6	16399	17791	0.000594	41.267	0.000062	978
		1240	12	16395	17118	0.000425	41.388	0.000059	489
	10	2479	6	18905	20066	0.000519	46.822	0.000062	978
		2479	12	18881	19416	0.000365	46.993	0.000059	489
	15	3718	6	21103	22185	0.000462	51.291	0.000062	978
	3718	12	21075	21567	0.000321	51.521	0.000060	489	
	4958	6	23004	24130	0.000412	54.850	0.000063	978	
	4958	12	22967	23542	0.000282	55.102	0.000061	489	
1.55% STEEL	0	0	6	17418	19386	0.000614	41.961	0.000066	978
		0	12	17419	18563	0.000441	42.022	0.000063	489
	5	1293	6	19793	21755	0.000537	48.284	0.000065	978
		1293	12	19785	20928	0.000380	48.424	0.000062	489
	10	2586	6	22124	23967	0.000478	53.414	0.000064	978
		2586	12	22099	23149	0.000333	53.613	0.000062	489
	15	3879	6	24243	26014	0.000428	57.551	0.000065	978
	3879	12	24206	25196	0.000294	57.802	0.000063	489	
	5172	6	26051	27861	0.000385	60.817	0.000066	978	
	5172	12	25984	27058	0.000262	61.067	0.000064	489	
2.17% STEEL	0	0	6	23029	25724	0.000533	54.725	0.000067	978
		0	12	23027	24594	0.000380	54.856	0.000064	489
	5	1391	6	25462	28008	0.000477	60.282	0.000067	978
		1391	12	25440	26901	0.000336	60.479	0.000064	489
	10	2781	6	27754	30132	0.000428	64.820	0.000067	978
		2781	12	27722	29048	0.000299	65.064	0.000064	489
	15	4172	6	29694	32070	0.000387	68.442	0.000067	978
	4172	12	29657	31002	0.000267	68.704	0.000065	489	
	5562	6	31329	33837	0.000354	71.261	0.000068	978	
	5562	12	31267	32784	0.000239	71.528	0.000066	489	



STEEL $\rho_t = A_{st}/A_e$	UNFACTORED AXIAL LOAD (P_n)	HOOPS SPACING C-C	$M_{ne@}$ $\epsilon_c = 0.003$	M_p	Φ_p	I_{cr}	Φ_{yi}	V_s	
%	%	kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips
1.10% STEEL	0	6	14530	16386	0.000690	38.54	0.000060	1043	
		12	14525	15546	0.000473	38.64	0.000058	522	
	5	6	17652	19194	0.000587	47.07	0.000059	1043	
		12	17650	18400	0.000398	47.21	0.000056	522	
	10	6	20554	21834	0.000510	53.94	0.000058	1043	
		12	20554	21089	0.000340	54.14	0.000056	522	
	15	6	23113	24286	0.000452	59.47	0.000059	1043	
		12	23112	23603	0.000296	59.73	0.000057	522	
	20	6	25332	26536	0.000401	63.90	0.000060	1043	
		12	25317	25917	0.000259	64.21	0.000058	522	
1.54% STEEL	0	6	19477	21627	0.000571	50.56	0.000060	1043	
		12	19477	20625	0.000410	50.66	0.000058	522	
	5	6	22610	24345	0.000498	58.14	0.000059	1043	
		12	22609	23397	0.000352	58.32	0.000057	522	
	10	6	25391	26916	0.000443	64.34	0.000060	1043	
		12	25379	26026	0.000307	64.59	0.000058	522	
	15	6	27820	29290	0.000394	69.33	0.000060	1043	
		12	27794	28475	0.000270	69.64	0.000059	522	
	20	6	29900	31472	0.000356	73.29	0.000061	1043	
		12	29862	30729	0.000240	73.63	0.000060	522	
1.70% STEEL	0	6	21629	24000	0.000542	54.42	0.000063	1043	
		12	21634	22936	0.000383	54.52	0.000060	522	
	5	6	24339	26693	0.000477	61.83	0.000062	1043	
		12	24338	25660	0.000333	62.03	0.000059	522	
	10	6	27023	29217	0.000424	67.84	0.000062	1043	
		12	27013	28214	0.000292	68.09	0.000059	522	
	15	6	29403	31533	0.000379	72.66	0.000062	1043	
		12	29377	30561	0.000258	72.97	0.000060	522	
	20	6	31434	33653	0.000344	76.46	0.000063	1043	
		12	31391	32714	0.000229	76.80	0.000061	522	
2.55% STEEL	0	6	30363	33740	0.000460	74.92	0.000065	1043	
		12	30360	32237	0.000323	75.11	0.000062	522	
	5	6	33201	36330	0.000412	81.20	0.000064	1043	
		12	33190	34881	0.000287	81.47	0.000061	522	
	10	6	35737	38717	0.000371	86.32	0.000064	1043	
		12	35717	37325	0.000255	86.63	0.000062	522	
	15	6	37892	40920	0.000338	90.38	0.000065	1043	
		12	37861	39579	0.000228	90.73	0.000063	522	
	20	6	39633	42899	0.000308	93.52	0.000066	1043	
		12	39584	41606	0.000205	93.86	0.000064	522	

DESIGN INFORMATION:

DIAMETER OF DRILLED SHAFT = 96"
 EFFECTIVE Dia OF PILE (ϕ_{eff}) = 90"
 EFFECTIVE AREA OF PILE (A_e) = 6362 in²

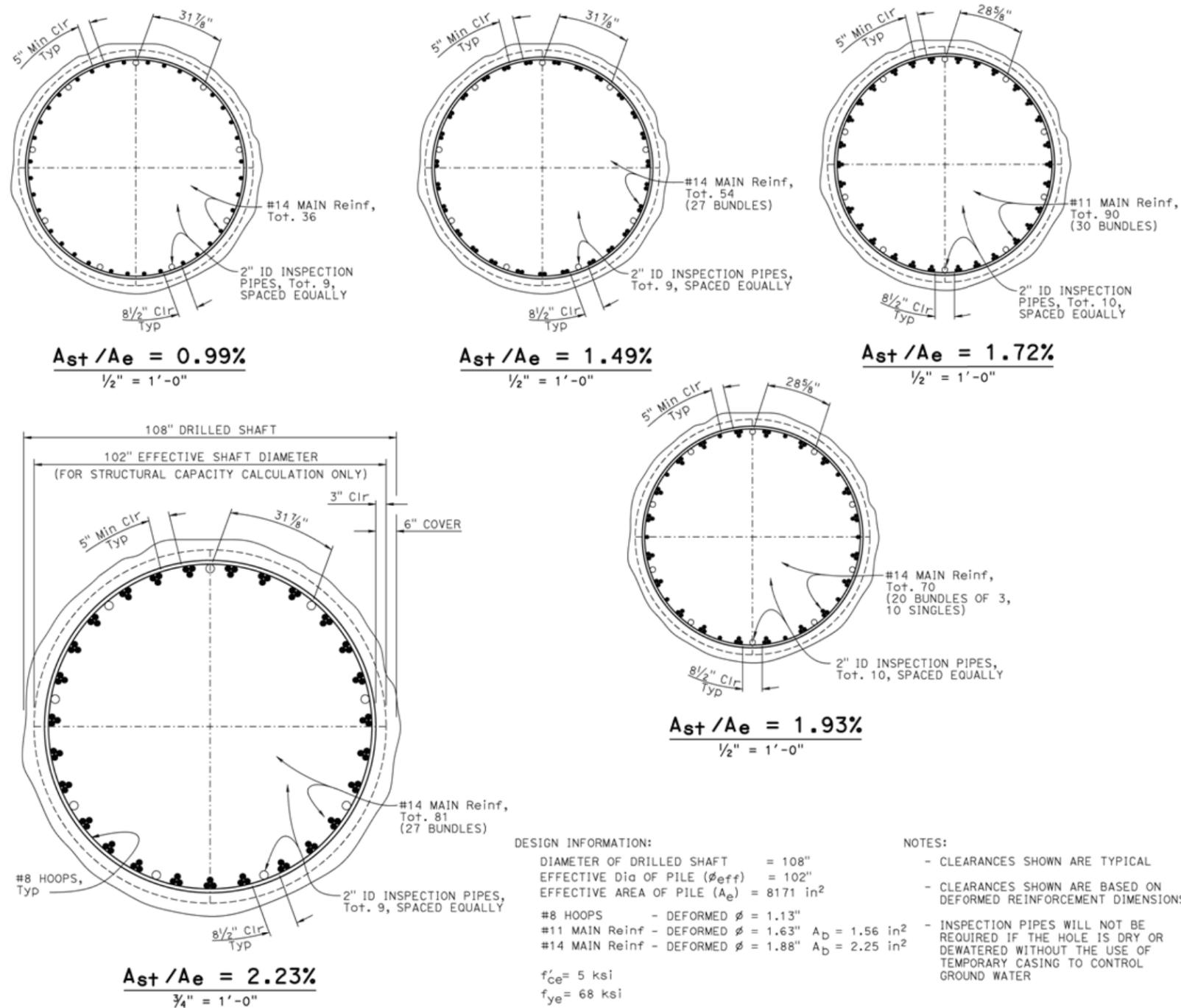
#8 HOOPS - DEFORMED $\phi = 1.13''$
 #11 MAIN Reinf - DEFORMED $\phi = 1.63''$ $A_D = 1.56$ in²
 #14 MAIN Reinf - DEFORMED $\phi = 1.88''$ $A_D = 2.25$ in²

$f'_{ce} = 5$ ksi
 $f_{ye} = 68$ ksi

NOTES:

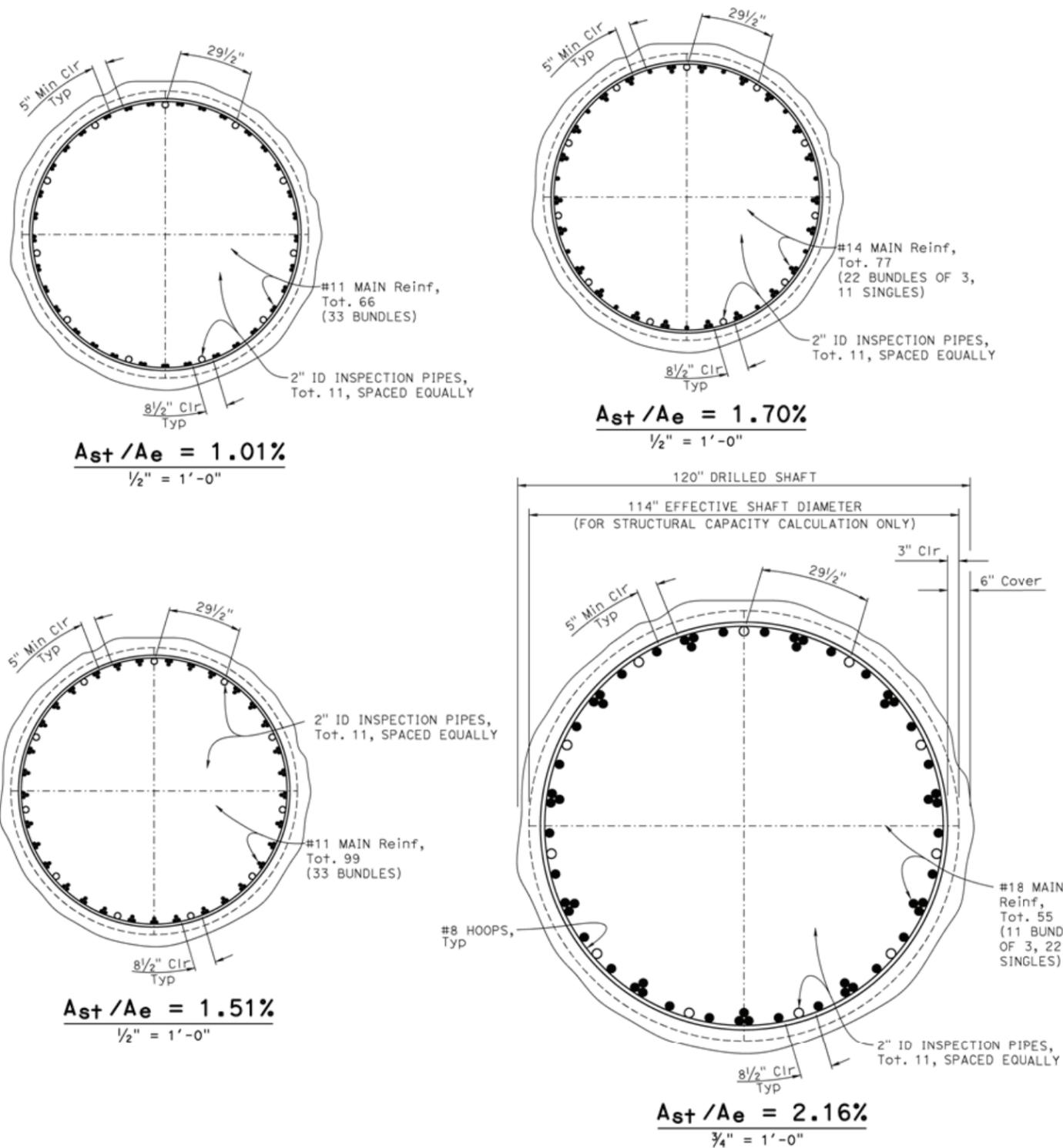
- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER

**96" DIA CIDH PILE DETAILS
 WITHOUT CASING**



STEEL $\rho_t =$ A_{st}/A_e	UNFACTORED AXIAL LOAD (P_n)	HOOPS SPACING C-C	$M_{ne} @$ $\epsilon_c = 0.003$	M_p	Φ_p	I_{cr}	Φ_{yi}	V_s	
%	%	kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips
0.99% STEEL	0	0	6	20429	22279	0.000583	59.26	0.000054	1190
			12	20439	21325	0.000411	59.30	0.000052	595
	5	1695	6	24468	26502	0.000494	73.79	0.000052	1190
			12	24472	25542	0.000341	74.03	0.000050	595
	10	3391	6	28348	30412	0.000422	85.58	0.000051	1190
			12	28334	29501	0.000288	85.94	0.000049	595
	15	5086	6	32061	34065	0.000373	95.11	0.000051	1190
			12	32036	33181	0.000249	95.55	0.000050	595
	20	6781	6	35358	37389	0.000328	102.69	0.000052	1190
			12	35324	36562	0.000216	103.25	0.000051	595
1.49% STEEL	0	0	6	28552	31456	0.000488	82.04	0.000055	1190
			12	28559	30032	0.000343	82.44	0.000052	595
	5	1805	6	32482	35454	0.000423	95.01	0.000054	1190
			12	32480	34080	0.000293	95.32	0.000051	595
	10	3610	6	36340	39218	0.000375	105.48	0.000053	1190
			12	36317	37885	0.000254	105.95	0.000051	595
	15	5415	6	39929	42676	0.000332	113.94	0.000054	1190
			12	39888	41418	0.000222	114.47	0.000052	595
	20	7220	6	42982	45833	0.000299	120.66	0.000055	1190
			12	42918	44651	0.000197	121.27	0.000053	595
1.72% STEEL	0	0	6	31459	34646	0.000465	92.24	0.000054	1190
			12	31457	33004	0.000329	92.46	0.000051	595
	5	1856	6	35981	38587	0.000407	104.44	0.000053	1190
			12	35972	37066	0.000284	104.80	0.000051	595
	10	3712	6	39982	42321	0.000363	114.42	0.000053	1190
			12	39961	40923	0.000248	114.91	0.000051	595
	15	5568	6	43457	45760	0.000323	122.48	0.000054	1190
			12	43411	44516	0.000217	123.04	0.000052	595
	20	7425	6	46414	48933	0.000292	128.83	0.000055	1190
			12	46354	47845	0.000193	129.45	0.000053	595
1.93% STEEL	0	0	6	34507	39145	0.000436	100.88	0.000056	1190
			12	35411	37365	0.000305	101.11	0.000053	595
	5	1903	6	39378	43042	0.000386	112.74	0.000055	1190
			12	39365	41309	0.000265	113.56	0.000052	595
	10	3806	6	43219	46685	0.000344	122.32	0.000055	1190
			12	43199	45042	0.000233	122.84	0.000053	595
	15	5708	6	46618	50012	0.000308	130.00	0.000055	1190
			12	46566	48472	0.000206	130.64	0.000053	595
	20	7610	6	49476	53074	0.000280	136.04	0.000056	1190
			12	49400	51609	0.000183	136.70	0.000054	595
2.23% STEEL	0	0	6	40002	44243	0.000410	113.36	0.000056	1190
			12	40002	42235	0.000286	113.66	0.000053	595
	5	1969	6	44018	48101	0.000366	124.45	0.000055	1190
			12	43999	46163	0.000251	124.90	0.000053	595
	10	3939	6	47826	51669	0.000328	133.51	0.000056	1190
			12	47802	49828	0.000221	134.06	0.000053	595
	15	5909	6	51093	54941	0.000296	140.77	0.000056	1190
			12	51048	53211	0.000197	141.41	0.000054	595
	20	7878	6	53813	57922	0.000269	146.42	0.000057	1190
			12	53731	56287	0.000175	147.08	0.000055	595

 108" DIA CIDH PILE DETAILS
 WITHOUT CASING



STEEL $\rho_t = \frac{A_{st}}{A_e}$	UNFACTORED AXIAL LOAD (P_n)		HOOPS SPACING C-C	$M_{ne} @ \epsilon_c = 0.003$	M_p	Φ_p	I_{cr}	Φ_{yi}	V_s
%	%	kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips
1.01% STEEL	0	0	6	27908	30988	0.000506	94.90	0.000047	1340
			12	27925	29458	0.000353	95.07	0.000044	670
	5	2122	6	34100	36841	0.000425	117.62	0.000045	1340
			12	34093	35397	0.000292	118.06	0.000043	670
	10	4244	6	40099	42326	0.000363	136.03	0.000045	1340
			12	40070	41039	0.000246	136.62	0.000043	670
	15	6368	6	45397	47456	0.000319	150.96	0.000045	1340
			12	45356	46328	0.000211	151.75	0.000044	670
	20	8490	6	50024	52004	0.000281	162.96	0.000046	1340
			12	49938	51223	0.000183	163.88	0.000045	670
1.51% STEEL	0	0	6	39516	43641	0.000424	131.62	0.000048	1340
			12	39529	41475	0.000295	132.01	0.000045	670
	5	2262	6	45959	49227	0.000366	151.76	0.000047	1340
			12	45933	47262	0.000251	152.32	0.000045	670
	10	4524	6	51676	54522	0.000322	168.21	0.000047	1340
			12	51626	52759	0.000217	168.99	0.000045	670
	15	6786	6	56679	59444	0.000286	181.47	0.000047	1340
			12	56606	57914	0.000189	182.44	0.000046	670
	20	9048	6	60956	63952	0.000256	192.09	0.000048	1340
			12	60856	62677	0.000166	193.14	0.000047	670
1.70% STEEL	0	0	6	44923	49291	0.000396	144.38	0.000049	1340
			12	44923	46984	0.000273	144.47	0.000047	670
	5	2313	6	50355	54817	0.000346	163.68	0.000048	1340
			12	50355	52629	0.000235	164.27	0.000046	670
	10	4626	6	55781	60017	0.000307	179.50	0.000048	1340
			12	55737	57953	0.000204	180.30	0.000046	670
	15	6939	6	60653	64782	0.000272	192.25	0.000048	1340
			12	60599	62871	0.000179	193.26	0.000047	670
	20	9252	6	64830	69151	0.000246	202.37	0.000049	1340
			12	64728	67409	0.000158	203.49	0.000048	670
2.16% STEEL	0	0	6	56406	61465	0.000355	174.53	0.000051	1340
			12	56391	58679	0.000241	175.01	0.000048	670
	5	2440	6	61488	66905	0.000315	192.06	0.000050	1340
			12	61469	64201	0.000211	192.95	0.000048	670
	10	4880	6	66162	71942	0.000281	206.73	0.000050	1340
			12	66112	69327	0.000185	207.65	0.000048	670
	15	7319	6	70403	76532	0.000253	218.38	0.000050	1340
			12	70333	74058	0.000164	219.46	0.000048	670
	20	9759	6	74228	80715	0.000229	227.49	0.000051	1340
			12	74086	78351	0.000146	228.62	0.000049	670

DESIGN INFORMATION:

DIAMETER OF DRILLED SHAFT = 120"
 EFFECTIVE Dia OF PILE (ϕ_{eff}) = 114"
 EFFECTIVE AREA OF PILE (A_e) = 10,207 in²

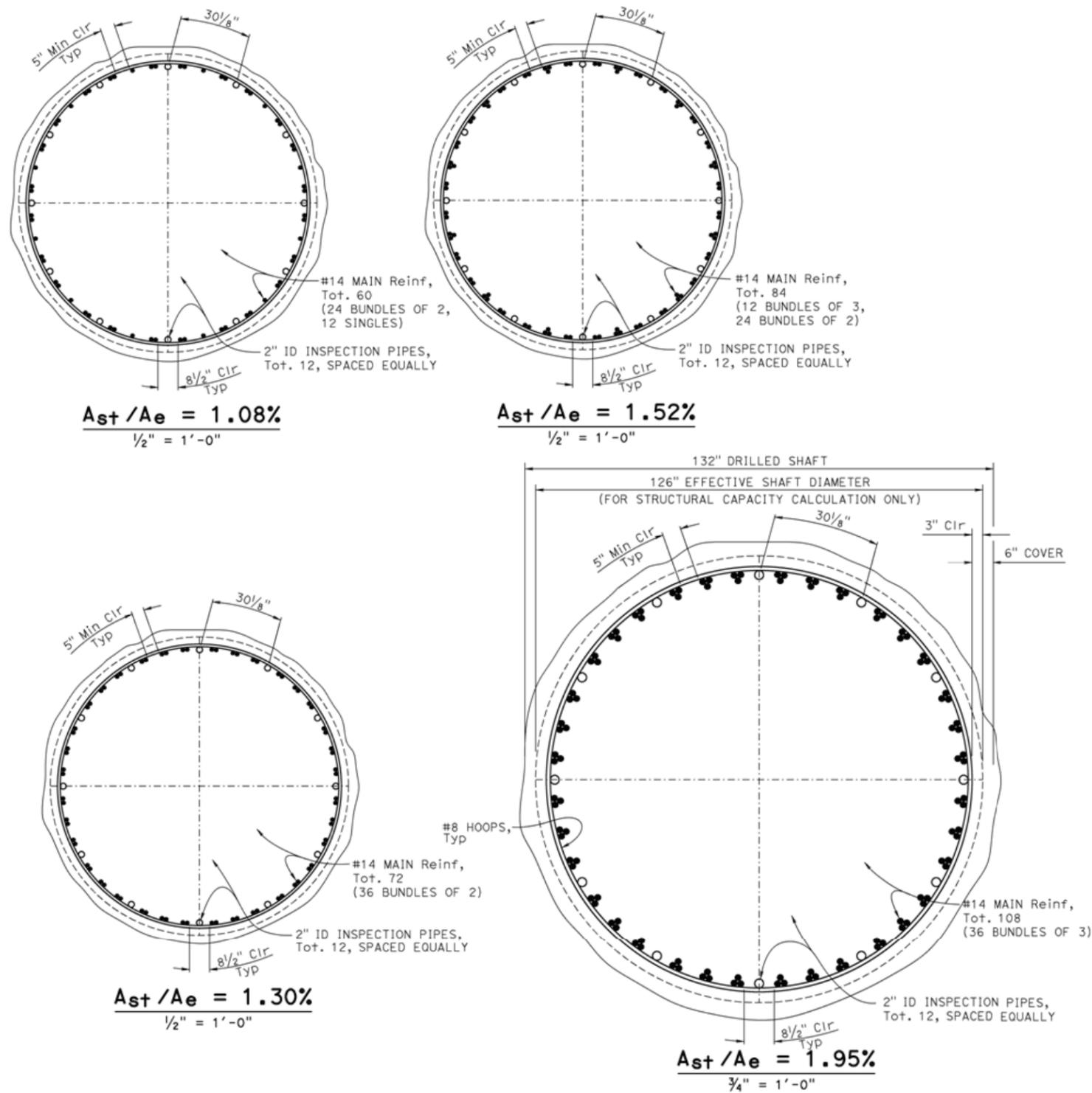
#8 HOOPS - DEFORMED $\phi = 1.13''$
 #11 MAIN Reinf - DEFORMED $\phi = 1.63''$ $A_b = 1.56$ in²
 #14 MAIN Reinf - DEFORMED $\phi = 1.88''$ $A_b = 2.25$ in².
 #18 MAIN Reinf - DEFORMED $\phi = 2.50''$ $A_b = 4.00$ in²

$f'_{ce} = 5$ ksi
 $f_{ye} = 68$ ksi

NOTES:

- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER

120" DIA CIDH PILE DETAILS WITHOUT CASING



STEEL $\rho_t =$ A_{st}/A_e	UNFACTORED AXIAL LOAD (P_N)	HOOPS SPACING C-C	$M_{ne} @$ $\epsilon_c = 0.003$	M_p	Φ_p	I_{cr}	$\Phi_{\gamma i}$	V_s	
%	%	kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips
1.08% STEEL	0	0	6	42088	45545	0.000421	151.35	0.000043	1488
			12	42116	43688	0.000306	151.46	0.000041	744
	5	2618	6	49620	53439	0.000354	184.96	0.000041	1488
			12	49634	51626	0.000254	185.53	0.000040	744
	10	5236	6	56864	60820	0.000304	212.13	0.000041	1488
			12	56843	59093	0.000215	213.14	0.000040	744
	15	7854	6	63820	67683	0.000266	234.21	0.000041	1488
			12	63797	66053	0.000185	235.51	0.000040	744
	20	10472	6	69975	73964	0.000234	252.01	0.000042	1488
			12	69939	72440	0.000160	253.45	0.000041	744
1.30% STEEL	0	0	6	48934	53185	0.00388	175.37	0.000044	1488
			12	48980	50970	0.000281	176.00	0.000042	744
	5	2691	6	56363	60906	0.000331	207.31	0.000042	1488
			12	56378	58774	0.000236	208.04	0.000041	744
	10	5382	6	63589	68142	0.000287	233.22	0.000042	1488
			12	63554	66113	0.000202	234.33	0.000040	744
	15	8073	6	70430	74863	0.000254	254.24	0.000042	1488
			12	70396	72941	0.000175	255.65	0.000041	744
	20	10765	6	76403	81004	0.000224	270.96	0.000043	1488
			12	76376	79227	0.000154	272.57	0.000042	744
1.52% STEEL	0	0	6	55603	60598	0.000362	198.84	0.000044	1488
			12	55640	58053	0.000261	199.32	0.000042	744
	5	2764	6	62960	68169	0.000311	229.02	0.000043	1488
			12	62967	65747	0.000223	229.82	0.000041	744
	10	5528	6	70187	75308	0.000274	253.71	0.000043	1488
			12	70189	72993	0.000193	254.95	0.000041	744
	15	8293	6	76927	81893	0.000242	273.71	0.000043	1488
			12	76884	79710	0.000167	275.24	0.000042	744
	20	11057	6	82717	87913	0.000216	289.68	0.000044	1488
			12	82667	85903	0.000148	291.36	0.000042	744
1.95% STEEL	0	0	6	68536	74887	0.000323	243.09	0.000044	1488
			12	68551	71770	0.000233	243.75	0.000042	744
	5	2911	6	75907	82117	0.000284	270.74	0.000044	1488
			12	75881	79321	0.000202	271.78	0.000042	744
	10	5822	6	83179	89249	0.000252	293.44	0.000044	1488
			12	83136	86413	0.000176	294.81	0.000042	744
	15	8732	6	89584	95600	0.000224	311.73	0.000044	1488
			12	89526	92960	0.000155	313.37	0.000043	744
	20	11642	6	94994	101433	0.000202	326.19	0.000045	1488
			12	94931	98980	0.000137	327.95	0.000043	744

DESIGN INFORMATION:

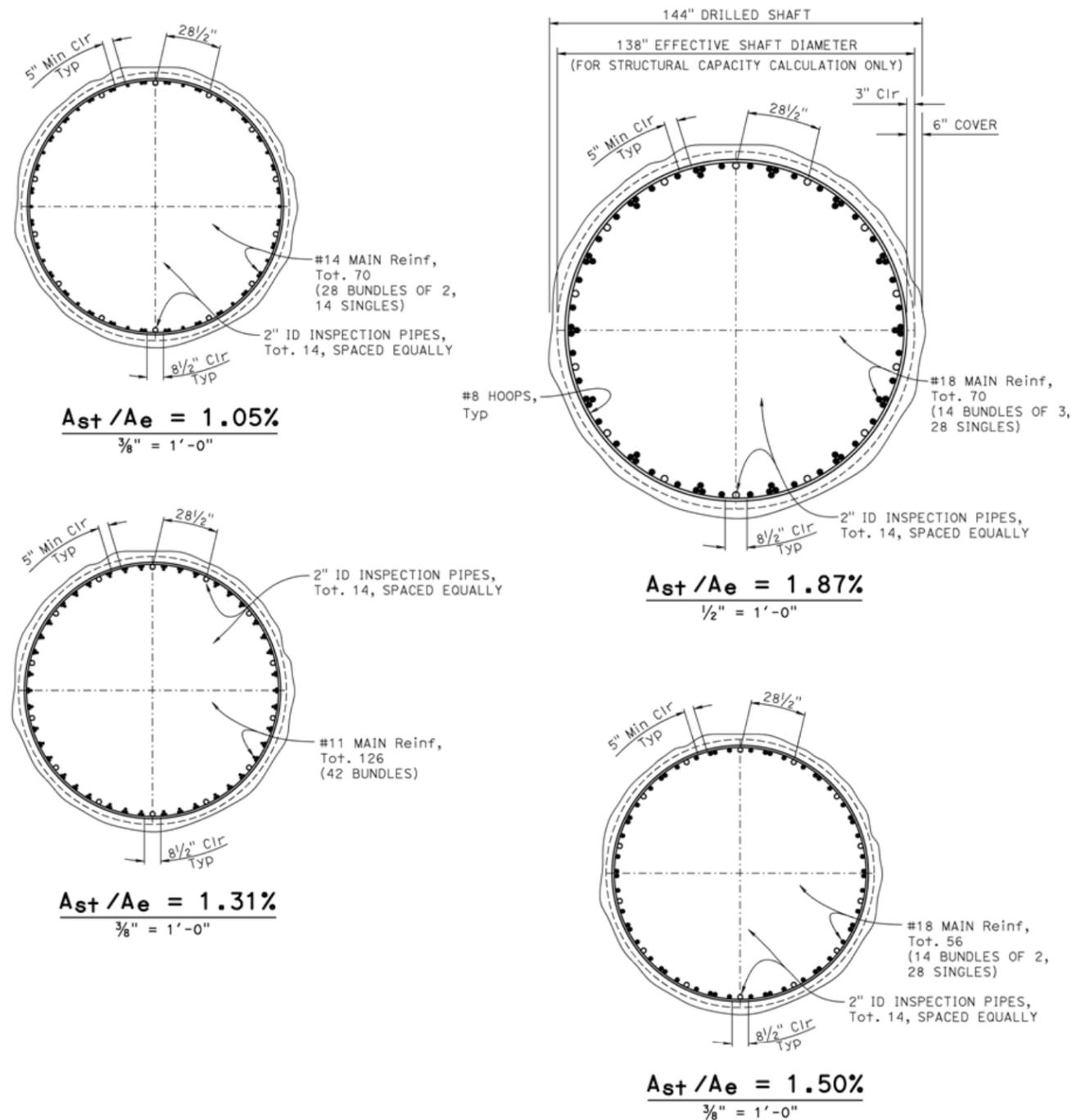
DIAMETER OF DRILLED SHAFT = 132"
 EFFECTIVE Dia OF PILE (ϕ_{eff}) = 126"
 EFFECTIVE AREA OF PILE (A_e) = 12,469 in²

#8 HOOPS - DEFORMED $\phi = 1.13''$
 #14 MAIN Reinf - DEFORMED $\phi = 1.88''$ $A_b = 2.25$ in²
 $f'_{ce} = 5$ ksi
 $f_{ye} = 68$ ksi

NOTES:

- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER

**132" DIA CIDH PILE DETAILS
WITHOUT CASING**



STEEL $\rho_t = A_{st}/A_e$	UNFACTORED AXIAL LOAD (P_n)	HOOPS SPACING C-C	$M_{ne@}$ $\epsilon_c = 0.003$	M_p	Φ_p	I_{cr}	Φ_{γ_i}	V_s	
%	%	kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips
1.05% STEEL	0	0	6	54399	58427	0.000372	214.74	0.000039	1637
		12	54409	55950	0.000267	215.15	0.000037	819	
	5	3128	6	64278	68856	0.000311	263.49	0.000038	1637
		12	64289	66476	0.000219	264.39	0.000036	819	
	10	6256	6	73799	78614	0.000265	303.21	0.000037	1637
			12	73781	76414	0.000185	304.66	0.000036	819
15	9385	6	82942	87718	0.000231	335.64	0.000038	1637	
		12	82884	85703	0.000158	337.34	0.000036	819	
20	12513	6	91105	96060	0.000203	361.24	0.000038	1637	
		12	91026	94263	0.000137	363.61	0.000037	819	
1.31% STEEL	0	0	6	62647	68784	0.000341	257.15	0.000038	1637
		12	62696	65646	0.000246	257.56	0.000037	819	
	5	3234	6	74057	78961	0.000291	302.88	0.000037	1637
			12	74000	76097	0.000206	303.93	0.000036	819
	10	6468	6	84436	88557	0.000252	340.32	0.000037	1637
			12	84371	86048	0.000175	341.91	0.000036	819
15	9702	6	93538	97557	0.000221	370.59	0.000038	1637	
		12	93447	95422	0.000151	372.63	0.000037	819	
20	12937	6	101424	105820	0.000196	394.84	0.000038	1637	
		12	101279	104105	0.000132	397.38	0.000038	819	
1.50% STEEL	0	0	6	75014	80261	0.000314	285.44	0.000040	1637
		12	75008	76975	0.000223	285.87	0.000039	819	
	5	3309	6	84453	90326	0.000270	329.60	0.000039	1637
			12	84440	87140	0.000189	330.84	0.000038	819
	10	6617	6	93312	99769	0.000237	365.57	0.000039	1637
			12	93241	96709	0.000162	367.37	0.000038	819
15	9926	6	101281	108466	0.000209	394.66	0.000039	1637	
		12	101183	105576	0.000141	396.98	0.000038	819	
20	13234	6	108537	116402	0.000186	418.01	0.000040	1637	
		12	108363	113731	0.000124	420.52	0.000039	819	
1.87% STEEL	0	0	6	90276	97021	0.000284	341.34	0.000041	1637
		12	90262	92951	0.000200	342.68	0.000039	819	
	5	3460	6	99448	106844	0.000248	382.40	0.000040	1637
			12	99426	102906	0.000172	385.31	0.000038	819
	10	6920	6	107940	116034	0.000219	415.74	0.000040	1637
			12	107877	112321	0.000150	417.68	0.000039	819
15	10381	6	115651	124448	0.000195	442.65	0.000040	1637	
		12	115529	120955	0.000131	445.09	0.000039	819	
20	13840	6	122643	132160	0.000175	464.00	0.000041	1637	
		12	122436	128883	0.000116	466.65	0.000040	819	

DESIGN INFORMATION:

DIAMETER OF DRILLED SHAFT = 144"
EFFECTIVE Dia OF PILE (ϕ_{eff}) = 138"
EFFECTIVE AREA OF PILE (A_e) = 14,957 in²

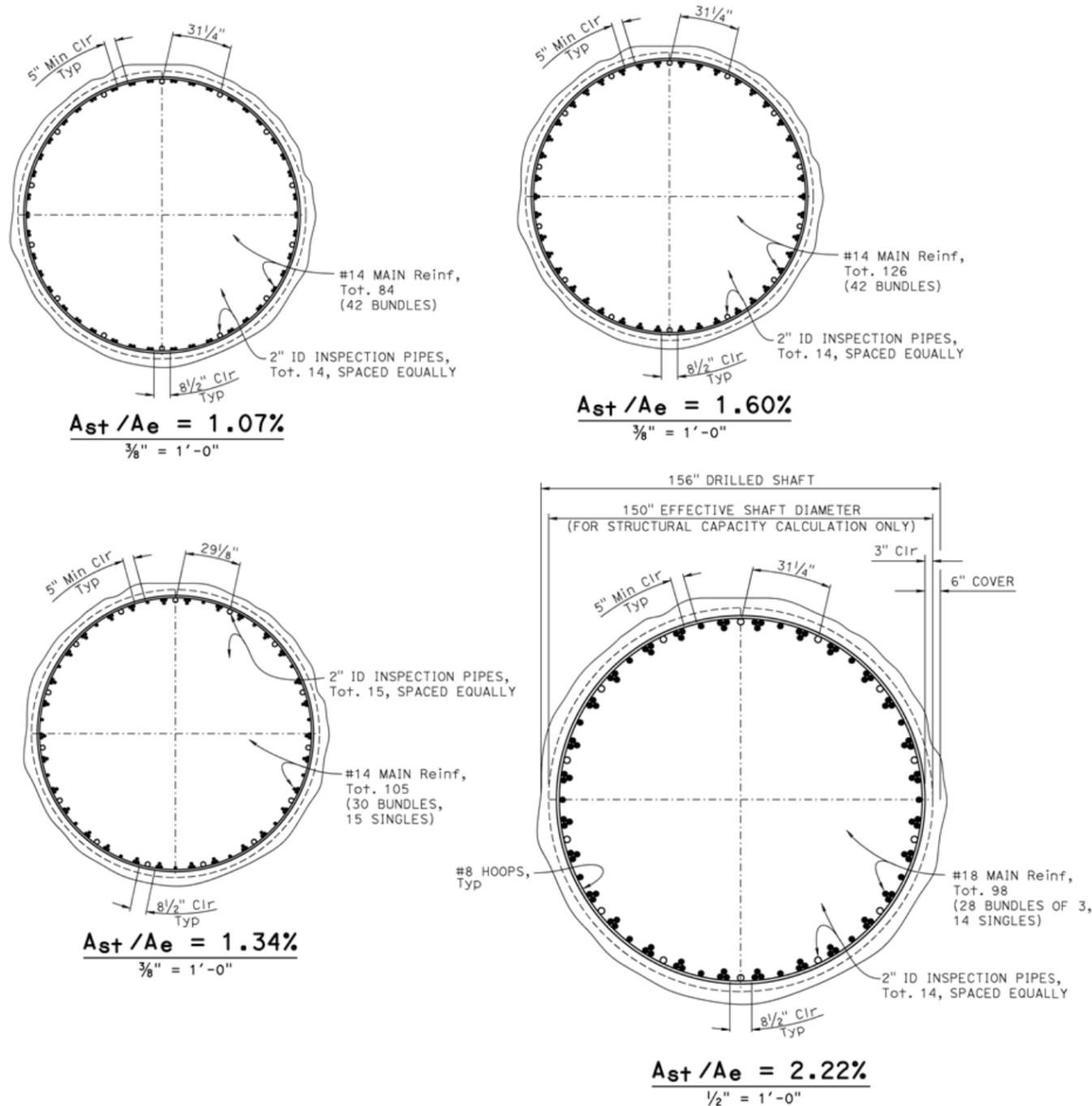
#8 HOOPS - DEFORMED ϕ = 1.13"
#11 MAIN Reinf - DEFORMED ϕ = 1.63" A_b = 1.56 in²
#14 MAIN Reinf - DEFORMED ϕ = 1.88" A_b = 2.25 in²
#18 MAIN Reinf - DEFORMED ϕ = 2.50" A_b = 4.00 in²

f'_{ce} = 5 ksi
 f_{ye} = 68 ksi

NOTES:

- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER

**144" DIA CIDH PILE DETAILS
WITHOUT CASING**



STEEL $\rho_t = A_{st}/A_e$	UNFACTORED AXIAL LOAD (P_n)	HOOPS SPACING C-C	$M_{ne} @$ $\epsilon_c = 0.003$	M_p	Φ_p	I_{cr}	Φ_{yi}	V_s	
%	%	kips	in	kip-ft	kip-ft	rad/in	ft ⁴	rad/in	kips
1.07% STEEL	0	0	6	71080	75918	0.000324	305.31	0.000036	1786
			12	71124	73121	0.000245	306.21	0.000034	893
	5	3704	6	83743	89327	0.000270	373.85	0.000034	1786
			12	83761	86622	0.000201	375.10	0.000033	893
	10	7408	6	95936	101908	0.000230	429.30	0.000034	1786
			12	95915	99355	0.000169	431.33	0.000033	893
	15	11112	6	107639	113631	0.000200	474.46	0.000034	1786
			12	107581	111254	0.000145	477.08	0.000033	893
	20	14816	6	118115	124414	0.000175	510.64	0.000035	1786
			12	118028	122207	0.000125	513.99	0.000034	893
1.34% STEEL	0	0	6	85504	91753	0.000292	366.05	0.000036	1786
			12	85550	88353	0.000220	367.34	0.000035	893
	5	3832	6	97947	104866	0.000248	430.34	0.000035	1786
			12	97970	101579	0.000184	431.91	0.000034	893
	10	7664	6	110065	117154	0.000214	482.54	0.000035	1786
			12	109998	114073	0.000157	484.87	0.000034	893
	15	11496	6	121614	128607	0.000188	524.93	0.000035	1786
			12	121530	125707	0.000136	528.42	0.000034	893
	20	15328	6	131677	139090	0.000166	558.86	0.000036	1786
			12	131617	136459	0.000119	562.55	0.000035	893
1.60% STEEL	0	0	6	99466	107047	0.000268	424.65	0.000036	1786
			12	99518	103076	0.000202	425.23	0.000035	893
	5	3960	6	111790	119896	0.000230	484.80	0.000035	1786
			12	111809	116110	0.000171	486.67	0.000034	893
	10	7920	6	123955	132007	0.000202	534.22	0.000035	1786
			12	123905	128424	0.000148	536.78	0.000034	893
	15	11880	6	135238	143199	0.000178	574.19	0.000036	1786
			12	135191	139870	0.000129	577.63	0.000035	893
	20	15840	6	144941	153494	0.000159	606.11	0.000036	1786
			12	144833	150441	0.000113	609.82	0.000035	893
2.22% STEEL	0	0	6	134112	143637	0.000229	549.92	0.000037	1786
			12	134147	138467	0.000171	552.02	0.000036	893
	5	4254	6	145624	156160	0.000202	604.11	0.000037	1786
			12	145612	151125	0.000148	606.51	0.000036	893
	10	8508	6	156168	167806	0.000179	648.17	0.000037	1786
			12	156152	162917	0.000130	651.29	0.000036	893
	15	12762	6	165789	178470	0.000160	683.74	0.000037	1786
			12	165679	173793	0.000114	687.48	0.000036	893
	20	17015	6	174345	188141	0.000143	711.62	0.000038	1786
			12	174259	183672	0.000101	715.53	0.000037	893

DESIGN INFORMATION:

DIAMETER OF DRILLED SHAFT = 156"
 EFFECTIVE Dia OF PILE (ϕ_{eff}) = 150"
 EFFECTIVE AREA OF PILE (A_e) = 17,671 in²

#8 HOOPS - DEFORMED ϕ = 1.13"
 #14 MAIN Reinf - DEFORMED ϕ = 1.88" A_b = 2.25 in²
 #18 MAIN Reinf - DEFORMED ϕ = 2.50" A_b = 4.00 in²

f'_{ce} = 5 ksi
 f_{ye} = 68 ksi

NOTES:

- CLEARANCES SHOWN ARE TYPICAL
- CLEARANCES SHOWN ARE BASED ON DEFORMED REINFORCEMENT DIMENSIONS
- INSPECTION PIPES WILL NOT BE REQUIRED IF THE HOLE IS DRY OR DEWATERED WITHOUT THE USE OF TEMPORARY CASING TO CONTROL GROUND WATER

**156" DIA CIDH PILE DETAILS
WITHOUT CASING**