

ภาคผนวก ก.
ข้อมูลจากการสำรวจ

ข้อมูลจากสำนักงานชลประทานที่ 3 จ.พิษณุโลก

รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของป่อ PCP. 20		
ระดับความลึก (m.)	รายละเอียด	จัดอยู่ในดิน กลุ่ม
0 – 1	<u>SANDY CLAY</u> reddish brown , fine to course grained sand some gravel	SC
1 – 3	<u>CLAY</u> reddish brown , soft	CL
3 – 6	<u>CLAY</u> medium to dark brownish gray , modulate with reddish brown , some fined grain sand	CL
6 – 14	<u>CLAY</u> grayish brown some fine to course grained sand	CL
14 – 16	<u>SAND</u> brown medium grained sand , subangular to subrounded moderately sorted compared with quartz , rock fragment	SW-SP
16 – 18	<u>SAND</u> grayish brown , medium to course grained sand subangular	SW-SP
18 – 20	<u>SAND</u> grayish brown , medium to course grained sand subangular moderately or poorly sorted composed with quartz , rock fragment	SW-SP
20 – 24	<u>SAND</u> grayish brown , course to very course grained SAND subangular moderately composed with quartz , rock fragment	SW-SP
24 – 41	<u>SAND</u> gray , course to very course grained	SW-SP

	SAND subangular moderately composed with quartz , rock fragment	
41 - 43	SAND gray fine to medium grained SAND subangular to subrounded , or sorted , compared with quartz , rock fragment	SW-SP

รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของบ่อ PCP. 21		
ระดับความลึก (m.)	รายละเอียด	จัดอยู่ในดิน กลุ่ม
0 - 4	CLAY reddish brown , soft	CL
4 - 6	CLAY gray molten , with brown , soft	CL
6 - 9	CLAY brown , soft	CL
9 - 12	SANDY CLAY gray molten with red, medium to very course grained sand	SW-SC
12-21	SAND brown course grained sand , subangular to subrounded poorly sorted , common gravel ,some clay composed of quartz , rock fragments, chert	SW-SC
21-23	SAND brown, very course grained sand, subangular to subrounded , moderately to poorly sorted , some gravel , composed of	SM-SP

	quartz, rock fragment	
23-25	SANDY CLAY grayish brown , course grained sand	SW-SC
25-28	CLAYEY SAND gray medium to course grained sand subangular to subrounded , moderately poorly sorted , composed of quartz , rock fragment , chert	SC-CL
28-30	SAND gray medium to course grained sand subangular to subrounded , moderately poorly sorted , composed of quartz , rock fragment	SC-SP
30-36	CLAY brown some very fine grained sand	CL
36-38	SANDY CLAY brown., fine grained sand	SW-SC
38-39	SAND as well as at depth 21-23 m.	SM-SP
39-40	SAND brown course grained sand subangular to subrounded , moderately poorly sorted , composed of quartz , rock fragment , common clay	SM-SP
40-53	SAND gray, medium grained sand subangular to subrounded , moderately poorly sorted , composed of quartz , rock fragment	SM-SP

รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของบ่อ PCP. 22		
ระดับความลึก (m.)	รายละเอียด	จัดอยู่ในดิน กลุ่ม
0-2	SANDY CLAY clay, brown, very fine grained sand	SW-SC
2-4	SANDY CLAY dark gray to black very fine grained sand	SW-SC
4-10	CLAY brown soft	CL
10-11	CLAY reddish orange , soft	CL
11-14	CLAY brown soft	CL
14-18	CLAYEY SAND sand brown , fine to very course grained sand subangular to subrounded , mode sorted	CL-SC
18-24	GRAVELLY SAND brown, fine to very course grained sand , subangular to subrounded, poorly sorted , ϕ gravel 2 – 9 mm. , composed with quartz , rock fragment	GP-GM
24-34	GRAVELLY SAND above at depth 18-24 m., common clay at depth 24-31m. , 32-34 m.	GP-GC
34-35	SANDY CLAY brownish gray fine to medium grained sand.	SW-SC
35-48	GRAVELLY SAND gray course to very course grained sand , subangular to subrounded moderately to poorly sorted, ϕ gravel 2 – 3 mm. , composed with quartz , rock fragment	GP-GC

48-53	GRAVELLY SAND sand gray very course grained sand, subangular to subrounded moderately to well sorted some clay composed with quartz , rock fracment	GP-GC
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รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของบ่อ PCP. 23		
ระดับความลึก (m.)	รายละเอียด	จัดอยู่ในดิน กลุ่ม
0-11	CLAY yellowish brown , soft , at depth 0 - 4 m. is sand (very fine grained sand moderate to well sorted)	CL
11-15	CLAY yellowish brown to reddish brown , soft , at depth 14 –15 m. molten , with dark gray	CL
15-24	SAND brown, medium to course grained sand,	SW-SC
24-25	SANDY CLAY medium purplish gray , course grained sand	SW-SC
25-30	GRAVELLY SAND gray ,course to very course grained sand , gravel size ϕ about 2 - 6 mm., subangular to subrounded poorly sorted , composed of quartz , rock fragments	GP-GC
30-32	GRAVELLY CLAY brown, gravel size ϕ about 2 - 5 mm. ,poorly sorted , subangular to subrounded	GP-GC
32-35	CLAY medium gray , some very fine grained sand	CL

35-37	SANDY CLAY brown., molted with gray ,very fine grained sand	SW-SC
37-38	CLAYEY SAND medium gray, find to medium find grained sand, subangular , moderately sorted	SW-SC
38-45	GRAVELLY SAND brownish , gray to medium gray , course to very course grained sand , gravel size ϕ about 2 - 4 mm. subangular , poorly sorted	GP-GC
45-50	GRAVELLY CLAY gray , gravel size ϕ about 3 - 4 mm. at depth 40 – 47 m. have bigger gravel than another depth.	GP-GC

รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของบ่อ PCP. 25		
ระดับความลึก (m.)	รายละเอียด	จัดอยู่ในดิน กลุ่ม
0-4	CLAY reddish brown , soft	CL
4-13	CLAY brown to yellowish brown , some very fine grained sand	CL
13-17	SAND gray fine to very coarse grained sand , subrounded ,poorly sorted some gravel ϕ about 2-3 mm. some clay	SW-SC
17-23	GRAVEL gray ϕ about 2-5 mm. subangular to	GP-GC

35-41	CLAYEY SAND brown , gravel size ϕ about 2-6 mm. , subangular to subrounded, poorly sorted common sand	GP-GC
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รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของบ่อ PCP. 27		
ระดับความลึก (m.)	รายละเอียด	จัดอยู่ในดิน กลุ่ม
0-3	CLAY medium brown , soft	CL
3-5	CLAY brown	CL
5-11	CLAY yellowish brown ,to orangish brown	CL
11-13	SANDY CLAY grayish brown , fine	SW-SC
13-16	SAND light brown, course grained sand , subangular to subrounded, poorly sorted, composed of quartz	SW-SC
16-20	SANDY GRVEL brown , size ϕ about 2-3 mm. subangular to subrounded , poorly sorted , composed of quartz , rock fragments , common sand ,some granule at depth 16-17m.	SW-SC
20-21	SANDY CLAY oranges brown., medium to course grained sand	SW-SC
21-23	CLAY greenish gray , soft	CL
23-34	CLAYEY SAND brown , medium to course grained sand , subangular to subrounded , poorly sorted, composed of quartz , chert , rock fragment , some gravel	SC-CL

34-42	SAND gray medium to course grained sand , subangular to subrounded , poorly sorted, composed of quartz , chert	SW-SC
42-45	CLAYEY SAND grey , medium to course grained sand as well as at depth 34-42 m.	SW-SP
45-47	SAND gray, medium to course grained sand subangular to subrounded , poorly sorted , some greenish gray clay	SM-SP

รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของบ่อ PCP. 28		
ระดับความลึก (m.)	รายละเอียด	จัดอยู่ในดิน กลุ่ม
0-2	CLAY dark brown , soft	CL
2-3	CLAY dark brownish gray , soft	CL
3-7	CLAY medium to dark brown , soft	CL
7-12	CLAY yellowish brown to medium brown, soft	CL
12-14	SANDY CLAY brown molten with gray , medium to course grained sand	SW-SC
14-17	SAND brown , course to very course grained sand , subangular to subrounded poorly sorted , composed of quartz , rock fragments	SM-SP

17-24	GRAVEL brown, size ϕ about 2-12 mm. subangular to subrounded poorly sorted , some sand	GW-GP
24-25	CLAYEY SAND brown medium to course grained sand subangular to subrounded , poorly sorted	SC-CL
25-27	GRAVELLY CLAY brown, size ϕ about 2-4 mm.	GW-GP
27-31	SAND brown , course to very course grained sand , subangular to subrounded poorly sorted , composed of quartz , rock fragments	SM-SP
31-32	SANDY CLAY brown., course grained sand	SP-SC
32-33	SANDY GRAVEL brown, gravel size ϕ about 2-4 mm. subangular to subrounded , poorly sorted course grained sand	SM-SP
33-36	SAND greenish brown course to very course grained sand subangular to subrounded , poorly sorted , composed of quartz , rock fragments , common gravel	SM-SP
36-38	SAND gray , as above at depth 33-36 m.	GW-GP
38-41	GRAVELLY CLAY gray, gravel size ϕ about 2- 8 mm.	SM-SP
41-43	SAND gray , as above at depth 33-36 m.	SM-SP

43-47	SAND brownish course to very course grained sand subangular to subrounded , sorted , composed of quartz , rock fragment	SM-SP
47-45	SAND gray, course to very course grained sand subangular to subrounded , to moderately sorted , composed of quartz , rock fragment	SM-SP

รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของบ่อ PCP. 29		
ระดับความลึก (m.)	รายละเอียด	จัดอยู่ในดิน กลุ่ม
0-4	CLAY dark reddish brown , some fine grained sand (common at depth 2 – 3 m.)	CL
4-6	CLAY medium gray , soft	CL
6-11	CLAY brown , molted with brown , soft	CL
11-12	SANDY CLAY brown , very fine to fine grained sand	SM-SC
12-17	SAND brown, fine to medium grained sand , subangular to subrounded moderately to well sorted composed of quartz , rock fragments	SP-SM
17-20	SANDY CLAY gray , very fine to fine grained sand	SW-SC
20-23	CLAY gray , soft , some fine grained sand at bottom	CL

23-24	SAND gray, medium grained sand subangular to subrounded , poorly to moderately sorted , composed of quartz , rock fragments , some course grained sand	SW-SP
24-26	GRAVEL gray, size ϕ about 2-4 mm. subangular to subrounded , poorly sorted , composed of rock fragments , quartz , chert ,some sand	GW-GP
26-29	GRAVELLY SAND gray , medium to very course grained sand , subangular to subrounded poorly sorted , composed of quartz ,chert , rock fragments gravel size ϕ about 2-8 mm.	GW-GP
29-30	SAND gray , medium to course grained sand , subangular to subrounded poorly sorted , composed of quartz ,chert , rock fragments gravel size ϕ about 2 - 4 mm	SW-SC
30-34	CLAY gray, some fine grained sand	CL
34-35	CLAYEY SAND gray fine to medium grained sand subangular to subrounded , poorly sorted , composed of quartz , rock fragments , chert	SP-SM
35-39	SANDY CLAY gray , course to very course grained sand, highly clay at depth 37 – 38 m.	SP-SM

39-41	SAND gray, medium to course grained sand, subangular to subrounded , poorly sorted , composed of quartz , chert , rock fragments	SP-SM
41-45	SAND gray, course to very course grained sand subangular to subrounded , poorly sorted , composed of quartz , rock fragment	SP-SM
45-47	SAND as above at depth 39 - 41	SP-SM
47-50	CLAYEY SAND gray, medium to course grained sand subangular to subrounded ,some gravel at top part	SM-SC

รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของบ่อ PCP. 30		
ระดับความลึก (m.)	รายละเอียด	จัดอยู่ในดิน กลุ่ม
0-4	CLAY dark brown , soft	CL
4-7	CLAY medium to dark gray , soft	CL
7-12	CLAY yellowish brown to grayish brown , molted with red gray , soft	CL
12-13	SANDY CLAY brown, medium to course grained sand	SP-SM
13-15	SAND brown, medium to course grained sand , subangular to subrounded, poorly sorted, composed of quartz, rock fragment	SP-SM

15-26	CLAY brownish gray to gray , common very fine to fine grained sand	CL
26-27	CLAYEY SAND gray , medium grained sand , subangular to subrounded , moderately to well sorted	SM-SC
27-29	GRAVELLY CLAY gray , gravel size ϕ about 2 - 4 mm. subangular to subrounded ,	GW-GP
29-30	SAND gray medium to coarse grained sand , subangular to subrounded , poorly sorted,	SP-SM
30-35	CLAYEY SAND gray , course to very course grained sand subangular to subrounded , poorly sorted, some gravel	SP-SC
35-53	SAND gray, course to very course grained sand subangular to subrounded , poorly sorted , some gravel (size ϕ about 2 - 4 mm.)	SW-SC

รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของป่อ PCP. 31		
ระดับความลึก (m.)	รายละเอียด	จัดอยู่ในดิน กลุ่ม
0-2	SANDY CLAY dark brown, very fine grained sand	SP-SM
2-4	CLAY brown, soft	CL

4-6	CLAY grayish brown, soft	CL
6-12	CLAY brown, molted with light gray , yellow , orange , soft	CL
12-23	CLAY medium gray, molted with light gray, orange ,greenish gray , soft	CL
23-26	SANDY CLAY grained sand , subangular to subrounded , moderately to well sorted	SP-SM
26-34	SANDY CLAY brown, course grained sand , subangular to subrounded , poorly sorted , composed with quartz, chert , some gravel	SP-SC
34-44	GRAVELLY CLAY grayish brown ,medium to course grained sand subangular to subrounded ,to moderately sorted , composed with quartz, chert , some clay	SM-SC

รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของบ่อ PCP. 32		
ระดับความลึก (m.)	รายละเอียด	จัดอยู่ในดิน กลุ่ม
0-8	CLAY dark brown to dark gray, soft	CL
8-11	SAND medium to dark brown , fine grained sand , subangular to subrounded, moderate to well sorted, composed of quartz, rock , chert , mica	SP-SM

11-15	GRAVELLY SAND gray, coarse grained sand , size ϕ about 2 - 15 mm. some sand , subangular to subrounded, poorly sorted, composed of quartz	GW-GP
15-17	CLAYEY GRAVEL grayish brown , have gravel size ϕ about 2 - 15 mm. some sand , subangular to subrounded, poorly sorted, composed with quartz, rock fragment , chert	GM-GC
17-22	SANDYCLAY brown, coarse grained sand , some gravel	SW-SP
22-25	CLAY medium gray , soft	CL
25-30	SAND brown, coarse grained sand , subangular to subrounded , poorly sorted, composed with quartz, rock fragment , chert , some clay	SP-SM
30-33	SANDY CLAY medium brownish gray , course grained sand	SM-SC
33-41	SAND medium gray , as well as at depth 25 – 30 m.	SP-SM
41-44	SANDY CLAY gray , course grained sand some gravel	SP-SC
44-45	SANDY CLAY gray , medium to course grained sand	SM-SC

รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของบ่อ PCP. 33		
ระดับความลึก	รายละเอียด	จัดอยู่ในดิน
(m)		กลุ่ม
0-1	CLAY dark gray to black, some sand	CL
1-4	CLAY medium brown , some sand	CL
4-7	CLAY grayish brown , molted with light gray , some sand	CL
7-8	CLAY orange , molted with light gray , back , soft	CL
8-17	SANDYCLAY brown, course grained sand , some gravel	CL
17-23	CLAY brownish gray , molted with light gray , reddish brown , soft	CL
23-29	SAND gray, medium course to very course grained sand , subangular to subrounded , poorly sorted, composed with quartz, chert	SP-SM
29-30	SANDY CLAY gray , size ϕ about 2 - 6 mm. subangular to subrounded , poorly sorted, composed with quartz, chert , rock , fragment.	GW-GP
30-41	SAND gray , find to very course grained sand, subangular to subrounded , poorly sorted, composed with quartz, chert , rock , fragment	SP-SM

รายละเอียดของลักษณะชั้นดินในแต่ละชั้นของบ่อ PCP. 34		
ระดับความลึก	รายละเอียด	จัดอยู่ในดิน
(m.)		กลุ่ม
0-3	CLAY brown to grayish brown, some fine sand	CL
3-11	CLAY yellowish brown to brown , molted with gray	CL
11-15	CLAY reddish brown , molted with gray , yellow	CL
15-21	SAND brown , fine to medium grained sand, subangular to subrounded, moderately to well sorted, composed with quartz, rock fragment	SP-SM
21-23	CLAYEY SAND brown , course to very course grained sand, subangular to subrounded, poorly sorted, common gravel composed with quartz, rock fragment	GM-GC
23-24	CLAYEY SAND brown, course grained sand , as well as depth above	SM-SC
24-25	CLAYEY SAND brown , as well as depth 21-23 m.	GM-GC
25-29	GRAVEL brown, gravel size ϕ about 2 - 4 mm. subangular to subrounded, poorly sorted compose of quartz, rock fragment some sand at bottom	GW-GP

29-32	SAND grayish brown , as well as at depth 15 - 21 m.	SP-SM
32-35	SAND grayish brown , medium to very course grained sand subangular to subrounded, poorly sorted , at depth 33-34 m. have common gravel (gravel size ϕ about 2 - 4 mm.)	SP-SM
35-47	CLAY gray , some very fine grained sand	CL

แสดงระดับน้ำใต้ดินที่วัดจากปากบ่อ			
ลำดับที่	หมายเลขบ่อ	วัน-เดือน-ปี	ระดับน้ำใต้ดิน
1	PCP-20	15 กันยายน 2541	7.78
2	PCP-21	15 กันยายน 2541	10.51
3	PCP-22	15 กันยายน 2541	7.99
4	PCP-23	15 กันยายน 2541	7.79
5	PCP-25	15 กันยายน 2541	6.54
6	PCP-26	15 กันยายน 2541	8.61
7	PCP-27	9 กันยายน 2541	7.47
8	PCP-28	9 กันยายน 2541	8.31
9	PCP-29	9 กันยายน 2541	6.69
10	PCP-30	11 กันยายน 2541	7.64
11	PCP-31	14 กันยายน 2541	6.2
12	PCP-32	14 กันยายน 2541	7.2
13	PCP-33	14 กันยายน 2541	6.7
14	PCP-34	14 กันยายน 2541	5.97

SUMMARY DATA OF EACH BORING LOG. NO. DB - 1									
DATA FROM: นิคมอุตสาหกรรม (จ. พิจิตร)						GWL. DEPTH -			
DEPTH: (m.)		USCS GROUP	LL %	PL %	γ_t t./cu.m	SPT-N N	C_u Ton/m ² .	ϕ	CONSISTENCY & DENSITY
FROM	TO								
0	1.00	CH	-	-	-	50/10"	-	0	HARD
1.00	1.50	CH	53	25	2.05	52	3.31**	0	HARD
1.50	2.00	CH	-	-	2.16	50/9"	-	0	HARD
2.00	3.00	CL	31	16	-	52	1.99**	0	HARD
3.00	4.50	CL	-	-	2.07	55	-	0	HARD
4.50	6.00	CL	-	-	2.01	51	-	0	HARD
6.00	7.50	CL	40	19	2.06	30	1.14**	0	VERY STIFF
7.50	9.00	CL	-	-	2.14	30	-	0	VERY STIFF
9.00	10.50	CL	-	-	2.12	30	-	0	VERY STIFF
10.50	12.00	CL	41	20	2.12	49	1.88**	0	HARD
12.00	13.50	CL	-	-	2.04	33	-	0	HARD
13.50	15.00	CL	-	-	2.07	36	-	0	HARD
15.00	16.50	CH	55	25	2.03	46	2.94**	0	HARD
16.50	18.00	CH	-	-	2.07	48	-	0	HARD
18.00	19.50	CL	-	-	2.13	39	-	0	HARD
19.50	21.00	CL	34	18	2.08	40	1.53**	0	HARD
21.00	22.50	CL	-	-	2.18	43	-	0	HARD
22.50	24.00	CL	-	-	2.12	53	-	0	HARD
24.00	25.50	CL	28	16	2.11	29	0.55**	0	VERY STIFF
25.50	27.00	CL	-	-	2.20	47	-	0	HARD
27.00	28.50	SM	-	-	-	48	-	40*	DENSE
28.50	30.00	SM	-	-	-	50/9"	-	41*	VERY DENSE
30.00	30.25	SM	-	-	-	50/10"	-	41*	VERY DENSE

** เป็นค่าที่ประมาณได้จากกราฟที่ 2.16 ในบทที่ 2

* เป็นค่าที่ประมาณได้จากกราฟที่ 2.17 ในบทที่ 2

SUMMARY DATA OF EACH BORING LOG. NO. DB - 2									
DATA FROM: นิคมอุตสาหกรรม (จ. พิจิตร)					GWL. DEPTH - 2.60 m.				
DEPTH. (m.)		USCS GROUP	LL %	PL %	γ_t t/cu.m	SPT-N N	C_u Ton/m ² .	ϕ	CONSISTENCY & DENSITY
FROM	TO								
0	1.00	CL	46	21	-	23	0.88**	0	VERY STIFF
1.00	1.50	CL	-	-	1.95	20	-	0	VERY STIFF
1.50	2.00	CL	32	14	-	18	0.69**	0	VERY STIFF
2.00	3.00	SC	-	-	-	19	-	33*	
3.00	4.50	SC	30	16	-	8	1.85**	29*	LOOSE
4.50	6.00	SC	-	-	-	14	-	32*	MED.DENSE
6.00	7.50	SM	-	-	-	20	-	34*	MED. DENSE
7.50	9.00	CH	55	22	2.06	29	1.85**	0	VERY STIFF
9.00	10.50	CH	-	-	2.08	33	-	0	HARD
10.50	12.00	CH	-	-	2.02	37	-	0	HARD
12.00	13.50	CH	51	22	2.11	39	2.49**	0	HARD
13.50	15.00	CH	-	-	2.08	51	-	0	HARD
15.00	16.50	CH	-	-	2.11	42	-	0	HARD
16.50	18.00	CH	50	23	2.06	45	2.86**	0	HARD
18.00	19.50	CH	-	-	2.12	45	-	0	HARD
19.50	21.00	CL	-	-	2.12	50/10"	-	0	HARD
21.00	22.50	CL	44	21	2.16	50/7"	-	0	HARD
22.50	24.00	CL	-	-	2.10	33	-	0	HARD
24.00	25.50	CL	-	-	2.09	41	-	0	HARD
25.50	27.00	CL	-	-	2.10	45	-	0	HARD
27.00	28.50	CL	31	15	2.14	34	1.30**	0	HARD
28.50	30.00	CL	-	-	-	44	-	0	HARD
30.00	30.25	SC	-	-	-	50/10"	-	44*	VERY DENSE
** เป็นค่าที่ประมาณได้จากกราฟที่ 2.16 ในบทที่ 2									
* เป็นค่าที่ประมาณได้จากกราฟที่ 2.17 ในบทที่ 2									

SUMMARY DATA OF EACH BORING LOG. NO. DB - 3									
DATA FROM. นิคมอุตสาหกรรม (จ. พิจิตร)						GWL. DEPTH -			
DEPTH. (m.)		USCS GROUP	LL %	PL %	γ_t t./cu.m	SPT-N N	C_u Ton/m ² .	ϕ	CONSISTENC Y & DENSITY
FROM	TO								
0	1.00	CL	-	-	-	9	-	0	STIFF
1.00	1.50	SC-CL	29	14	-	15	0.29**	0	STIFF
1.50	2.00	CL	37	18	2.17	20	0.76**	0	VERYSTIFF
2.00	3.00	CL	-	-	2.14	22	-	0	VERY STIFF
3.00	4.50	CL	37	18	1.98	11	0.42**	0	STIFF
4.50	6.00	SM	-	-	-	24	-	34*	MED. DENSE
6.00	7.50	SM	-	-	-	10	-	30*	LOOSE
7.50	9.00	CH	-	-	1.86	32	-	0	HARD
9.00	10.50	CH	57	26	2.10	24	1.53**	0	VERY STIFF
10.50	12.00	CH	-	-	2.10	48	-	0	HARD
12.00	13.50	CH	-	-	2.07	42	-	0	HARD
13.50	15.00	CH	50	24	2.09	57	3.63**	0	HARD
15.00	16.50	CH	-	-	2.09	50/10"	-	0	HARD
16.50	18.00	CH	-	-	2.03	50/10"	-	0	HARD
18.00	19.50	CL	47	23	2.07	32	1.22**	0	HARD
19.50	21.00	CL	-	-	2.14	34	-	0	HARD
21.00	22.50	CL	-	-	-	48	-	0	HARD
22.50	24.00	SC	34	20	-	52	1.99**	42*	VERY DENSE
24.00	25.50	SM	-	-	-	50/9"	-	44*	VERY DENSE
25.50	27.00	SM	-	-	-	50/10"	-	44*	VERY DENSE
27.00	28.50	SM	-	-	-	50/10"	-	44*	VERY DENSE
28.50	30.00	SM	-	-	-	50/10"	-	44*	VERY DENSE
30.00	30.20	SC	25	15	-	50/8"	-	44*	VERY DENSE
** เป็นค่าที่ประมาณได้จากกราฟที่ 2.16 ในบทที่ 2									
* เป็นค่าที่ประมาณได้จากกราฟที่ 2.17 ในบทที่ 2									

SUMMARY DATA OF EACH BORING LOG. NO. DB - 4									
DATA FROM. นิคมอุตสาหกรรม (จ. พิจิตร)					GWL. DEPTH - 3.10 m.				
DEPTH. (m.)		USCS GROUP	LL %	PL %	γ_t t./cu.m	SPT-N N	C_u Ton/m ² .	ϕ	CONSISTENCY & DENSITY
FROM	TO								
0	1.00	CL	45	24	2.17	30	1.14**	0	VERYSTIFF
1.00	1.50	CL	-	-	2.24	32	-	0	HARD
1.50	2.00	CL	-	-	2.10	50/9"	-	0	HARD
2.00	3.00	SC	26	17	2.12	37	0.70**	38*	DENSE
3.00	4.50	SC	-	-	1.97	18	-	33*	MED.DENSE
4.50	6.00	SC	36	17	2.16	25	0.96**	35*	MED.DENSE
6.00	7.50	SM	-	-	-	30	-	36*	MED. DENSE
7.50	9.00	SM	-	-	-	28	-	36*	MED. DENSE
9.00	10.50	CL	-	-	2.13	36	-	0	HARD
10.50	12.00	CL	46	22	2.11	41	1.57**	0	HARD
12.00	13.50	CL	-	-	-	36	-	0	HARD
13.50	15.00	CH	60	26	-	19	1.21**	0	VERYSTIFF
15.00	16.50	CH	-	-	-	21	-	0	VERYSTIFF
16.50	18.00	CL	-	-	-	25	-	0	VERYSTIFF
18.00	19.50	CL	23	14	-	19	0.37**	0	VERYSTIFF
19.50	21.00	CL	-	-	-	41	-	0	HARD
21.00	22.50	SP - SM	-	-	-	46	-	40*	DENSE
22.50	24.00	SP - SM	-	-	-	20	-	33*	MED. DENSE
24.00	25.50	SM	-	-	-	41	-	39*	DENSE
25.50	27.00	SM	-	-	-	51	-	41*	VERY DENSE
27.00	28.50	SM	-	-	-	34	-	37*	DENSE
28.50	30.00	SM	-	-	-	35	-	37*	DENSE
30.00	30.45	CL	45	21	2.15	35	1.34**	0	HARD
** เป็นค่าที่ประมาณได้จากกราฟที่ 2.16 ในบทที่ 2									
* เป็นค่าที่ประมาณได้จากกราฟที่ 2.17 ในบทที่ 2									

SUMMARY DATA OF EACH BORING LOG. NO. DB - 5									
DATA FROM. นิคมอุตสาหกรรม (จ. พิจิตร)						GWL. DEPTH -			
DEPTH. (m.)		USCS GROUP	LL %	PL %	γ_t t./cu.m	SPT-N N	C_u Ton/m ² .	ϕ	CONSISTENCY & DENSITY
FROM	TO								
0	1.00		-	-	1.81	16	-	0	VERY STIFF
1.00	1.50	CH	63	27	1.94	18	1.14**	0	VERY STIFF
1.50	2.00	CH	-	-	1.99	13	-	0	STIFF
2.00	3.00	CL	-	-	2.08	28	-	0	VERY STIFF
3.00	4.50	CL	46	21	1.98	21	0.81**	0	VERY STIFF
4.50	6.00	CL	-	-	2.07	23	-	0	VERY STIFF
6.00	7.50	SM	-	-	-	30	-	36*	MED. DENSE
7.50	9.00	CL	-	-	2.16	34	-	0	HARD
9.00	10.50	CL	42	22	2.13	16	0.61**	0	VERY STIFF
10.50	12.00	CL	-	-	2.12	18	-	0	VERY STIFF
12.00	13.50	CL	-	-	-	17	-	0	VERY STIFF
13.50	15.00	CL	48	23	1.97	32	1.22**	0	HARD
15.00	16.50	CL	-	-	2.10	21	-	0	VERY STIFF
16.50	18.00	SM	-	-	-	21	-	34*	MED. DENSE
18.00	19.50	ML-SM	-	-	-	21	-	34*	MED. DENSE
19.50	21.00	ML-SM	-	-	-	33	-	37*	DENSE
21.00	22.50	SM	-	-	-	36	-	38*	DENSE
22.50	24.00	SC	26	13	-	22	0.42**	0	MED.DENSE
24.00	25.50	SM	-	-	-	41	-	39*	DENSE
25.50	27.00	SM	-	-	-	37	-	38*	DENSE
27.00	28.50	SM	-	-	-	44	-	40*	DENSE
28.50	30.00	SM	-	-	-	38	-	38*	DENSE
30.00	30.45	SM	-	-	-	34	-	37*	DENSE
** เป็นค่าที่ประมาณได้จากกราฟที่ 2.16 ในบทที่ 2									
* เป็นค่าที่ประมาณได้จากกราฟที่ 2.17 ในบทที่ 2									

SUMMARY DATA OF EACH BORING LOG. NO. BH - 7									
DATA FROM. เทศบาลเมืองพิษณุโลก					GWL. DEPTH - 0.60 m.				
DEPTH. (m.)		USCS GROUP	LL %	PL %	γ_t t./cu.m	SPT-N N	C_u Ton/m ² .	ϕ	CONSISTENCY & DENSITY
FROM	TO								
0	2.00	ML - OL	-	-	1.97	13	0.31	0	STIFF
2.00	4.00	ML - OL	37.25	28.03	2.07	16	0.74	0	VERYSTIFF
4.00	5.00	ML - OL	45.45	36.03	2.11	23	2.57	0	VERYSTIFF
5.00	7.00	ML - OL	46.10	21.08	1.93	45	0.27	0	HARD
7.00	9.00	CL	-	-	1.96	34	0.44	0	HARD
9.00	11.00	ML - OL	41.81	28.35	2.01	38	1.50	0	HARD
11.00	12.00	ML - OL	-	-	1.90	28	0.22	0	VERY STIFF
12.00	15.00	CL	45.95	26.19	1.95	31	0.69	0	HARD
15.00	17.00	CL	38.20	19.76	-	25	0.96	0	VERY STIFF
17.00	19.90	SM	-	-	-	58	-	43*	VERY DENSE

** เป็นค่าที่ประมาณได้จากกราฟที่ 2.16 ในบทที่ 2

* เป็นค่าที่ประมาณได้จากกราฟที่ 2.17 ในบทที่ 2

SUMMARY DATA OF EACH BORING LOG. NO. BH - 8									
DATA FROM. เทศบาลเมืองพิษณุโลก					GWL. DEPTH - 0.64 m.				
DEPTH. (m.)		USCS GROUP	LL %	PL %	γ_t t./cu.m	SPT-N N	C _u Ton/m ² .	ϕ	CONSISTENCY & DENSITY
FROM	TO								
0	2.5	CL	-	-	1.97	10	0.55	0	STIFF
2.5	3.5	CL	35.29	21.19	2.09	15	1.08	0	STIFF
3.5	4.5	CL	-	-	2.12	16	2.52	0	VERY STIFF
4.5	5.5	CL	-	-	2.10	48	2.13	0	HARD
5.5	6.5	CL	41.45	20.55	2.03	25	0.95	0	VERY STIFF
6.5	10.0	CL	42.26	21.98	2.13	39	2.14	0	HARD
10.0	13	CL	41.60	21.03	2.06	43	1.06	0	HARD
13	16.2	CL	29.95	16.62	-	38	1.45	0	HARD
16.2	20.2	SP - SM	-	-	-	64	-	44*	VERY DENSE
** เป็นค่าที่ประมาณได้จากกราฟที่ 2.16 ในบทที่ 2									
* เป็นค่าที่ประมาณได้จากกราฟที่ 2.17 ในบทที่ 2									

SUMMARY DATA OF EACH BORING LOG. NO. BH - 1 (1998)										
DATA FROM.มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าธนบุรี						GWL. DEPTH - 1.80				m.
DEPTH. (m.)		USCS GROUP	LL %	PI %	γ_t t./cu.m	SPT-N N	C_u Ton/m ² .	ϕ	CONSISTENC Y & DENSITY	
FROM	TO									
0	4.00	ML - OL	31.63	7.93	2.07	-	0.86	0	VERY SOFT	
4.00	6.00	CL	-	-	2.10	-	2.04	0	VERY SOFT	
6.00	9.20	CL	38.50	15.64	2.07	20	1.33	0	VERY STIFF	
9.20	10.00	CL	-	-	1.87	20	1.20	0	VERY STIFF	
10.00	12.00	CL	37.43	12.92	1.87	22	1.57	0	VERY STIFF	
12.00	13.00	CL	-	-	1.85	21	1.55	0	VERY STIFF	
13.00	14.00	CL	-	-	1.82	19	1.10	0	VERY STIFF	
14.00	15.00	CL	-	-	1.94	17	0.98	0	VERY STIFF	
15.00	16.50	ML - OL	39.77	11.70	-	5	-	0	MED. STIFF	
16.50	18.20	SP - SC	-	-	-	11	-	0	MED. DENSE	
18.20	19.50	CL	32.96	10.46	1.91	19	1.65	0	VERY STIFF	
19.50	21.50	SP - SC	-	-	-	26	-	35	MED. DENSE	
** เป็นค่าที่ประมาณได้จากกราฟที่ 2.16 ในบทที่ 2										
* เป็นค่าที่ประมาณได้จากกราฟที่ 2.17 ในบทที่ 2										

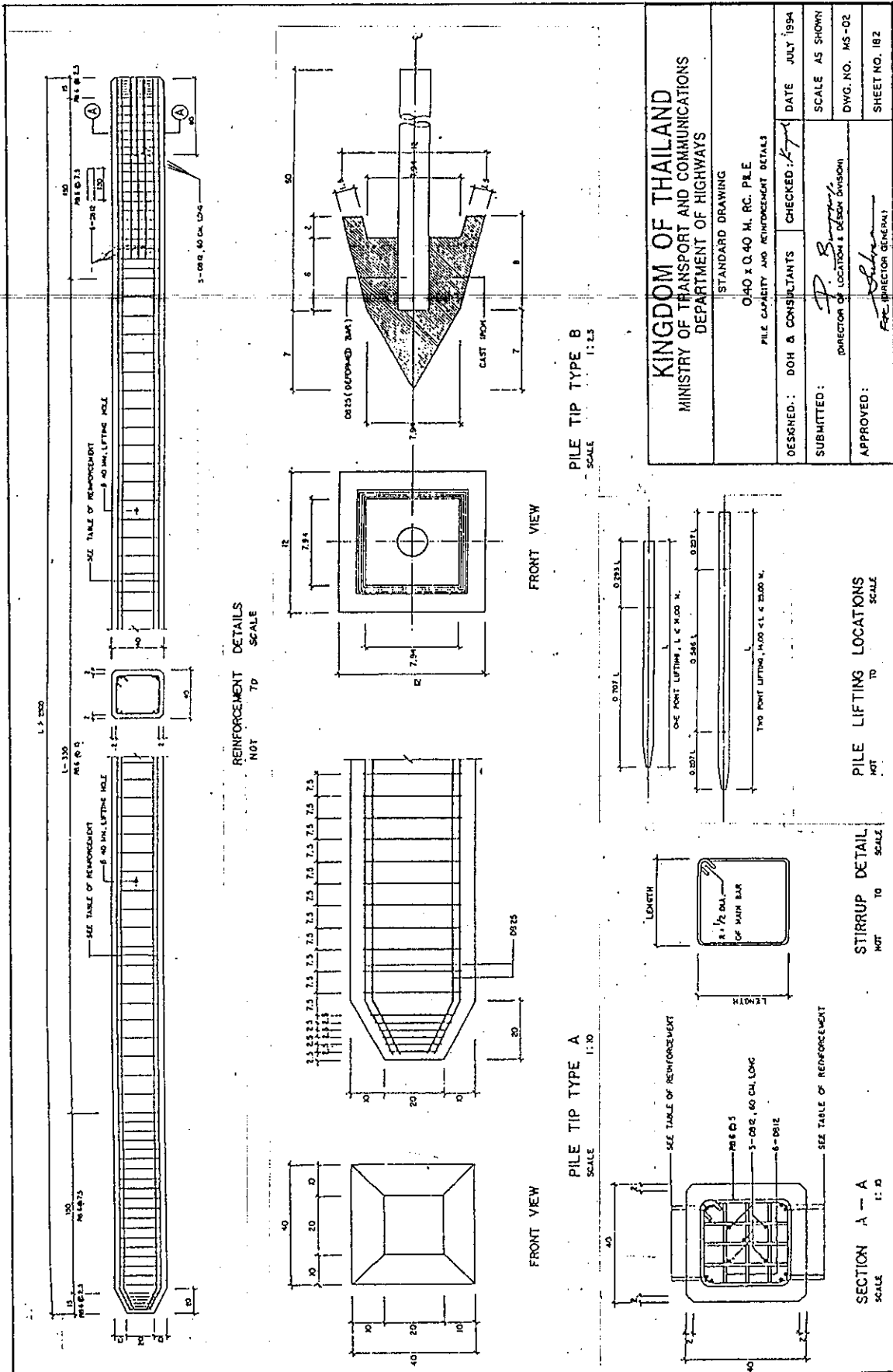
SUMMARY DATA OF EACH BORING LOG. NO. BH - 2									
DATA FROM มหาวิทยาลัยเกษตรศาสตร์ พิษณุโลก .						GWL. DEPTH -10.28 m.			
DEPTH. (m.)		USCS GROUP	LL %	PL %	γ_t t/cu.m	SPT-N N	C_u Ton/m ² .	ϕ	CONSISTENCY & DENSITY
FROM	TO								
0	2.00	SM	-	-	1.80	15	-	32*	MED. DENSE
2.00	2.50	CL - CH	30	16	2.10	21	1.87	-	VERY STIFF
2.50	3.50	CL - CH	50	22	2.00	17	1.22	-	VERY STIFF
3.50	5.50	CL	31	16	2.20	21	1.40	-	VERY STIFF
5.50	7.00	CL	35	20	2.10	22	1.25	-	VERY STIFF
7.00	8.50	CL	39	22	2.00	16	0.89	-	VERY STIFF
8.50	10.00	MH - OH	50	27	2.00	19	1.33	-	VERY STIFF
10.00	11.50	ML - OL	36	26	2.00	26	1.40	-	VERY STIFF
11.50	13.00	MH - OH	50	27	1.90	22	1.29	-	VERY STIFF
13.00	14.00	CL	48	26	2.10	32	1.80	-	HARD
14.00	15.70	CL	32	21	2.10	15	1.25	-	STIFF
15.70	17.50	SM	-	-	1.80	15	-	32*	MED. DENSE
17.50	19.00	SM	-	-	1.90	26	-	35*	MED. DENSE
19.00	20.50	SM	-	-	1.80	23	-	44*	MED. DENSE
20.50	21.50	SM	-	-	1.80	21	-	34*	MED. DENSE
21.50	23.50	SM	-	-	1.80	22	-	34*	MED. DENSE
23.50	25.00	SM	-	-	2.00	42	-	39*	DENSE
25.00	26.50	SM	-	-	2.00	42	-	39*	DENSE
26.50	28.00	SM	-	-	1.90	26	-	35*	MED. DENSE
28.00	30.00	SM	-	-	1.90	27	-	35*	MED. DENSE
30.00	31.50	SM	-	-	2.00	38	-	38*	DENSE
31.50	32.50	SM	-	-	2.20	75	-	44*	VERY DENSE
32.50	34.00	SM	-	-	1.90	33	-	37*	DENSE
34.00	35.00	SM	-	-	2.10	51	-	41*	VERY DENSE

** เป็นค่าที่ประมาณได้จากกราฟที่ 2.16 ในบทที่ 2

* เป็นค่าที่ประมาณได้จากกราฟที่ 2.17 ในบทที่ 2

SUMMARY DATA OF EACH BORING LOG. NO. BH - 3									
DATA FROM.มหาวิทยาลัยขอนแก่น วิศวกรรม ธรณีวิทยา.						GWL. DEPTH - 5.60 m.			
DEPTH. (m.)		USCS GROUP	LL %	PL %	γ_t t/cu.m	SPT-N N	C_u Ton/m ² .	ϕ	CONSISTENCY & DENSITY
FROM	TO								
0	1.50	SM	-	-	1.90	26	-	35*	MED. DENSE
1.50	2.50	SM	-	-	1.90	26	-	35*	MED. DENSE
2.50	4.00	ML - OL	-	-	2.10	22	-	-	VERY STIFF
4.00	5.50	CL	33	19	2.20	85	2.24	-	HARD
5.50	7.00	CL	32	17	2.10	38	1.76	-	HARD
7.00	8.50	CL	40	24	2.10	48	2.14	-	HARD
8.50	10.00	CL	48	27	2.10	25	1.43	-	VERY STIFF
10.00	11.50	ML - OL	49	30	2.10	-	1.60	-	VERY STIFF
11.50	13.00	ML - OL	49	29	2.10	21	1.40	-	VERY STIFF
13.00	14.50	ML - OL	39	24	2.10	-	1.40	-	VERY STIFF
14.50	16.00	CL	40	23	2.10	-	0.61	-	MED. STIFF
16.00	17.50	ML - OL	-	-	2.10	28	-	-	VERY STIFF
17.50	19.00	ML - OL	-	-	2.10	26	-	-	VERY STIFF
19.00	20.50	CL	31	19	2.00	15	1.02	-	STIFF
20.50	23.00	CL	27	19	2.10	22	1.09	-	VERY STIFF
23.00	25.00	CL	29	16	2.00	20	1.02	-	VERY STIFF
25.00	26.50	CL	29	16	2.10	22	1.12	-	VERY STIFF
26.50	28.00	SM	-	-	2.00	38	-	38*	DENSE
28.00	29.50	SM	-	-	2.10	65	-	44*	VERY DENSE
29.50	31.00	SC	30	16	1.80	20	-	33*	MED. DENSE
31.00	32.50	SC	41	23	2.00	21	1.60	36*	MED. DENSE
32.50	34.00	SM	-	-	2.10	63	-	44*	VERY DENSE
34.00	35.50	SM	-	-	2.20	75	-	44*	VERY DENSE
35.50	35.90	CL	40	28	2.20	67	-	44*	HARD
35.90	36.45	SC	19	11	2.20	110	-	44*	VERY DENSE
** เป็นค่าที่ประมาณได้จากกราฟที่ 2.16 ในบทที่ 2									
* เป็นค่าที่ประมาณได้จากกราฟที่ 2.17 ในบทที่ 2									

ภาคผนวก ข.
แสดงมาตรฐานการรับน้ำหนักของเสาเข็ม
โดยวิธีการนับ BLOW COUNT ที่กรมทางหลวงที่ใช้



รูปที่ ข.1 แสดงรายละเอียดของเสาเข็ม TYPE A และ TYPE B

TABLE 1

LENGTH OF PILE (L) M.	APPROX. WEIGHT OF PILE (P) TONS	3.5 - TON DROP HAMMER (W) WITH FRACTION WINCH																				
		PENETRATION (S) - CM.																				
		1.5	1.0	0.7	0.5	0.4	0.3	0.2	0.1	0.05	100	120	150	100	120	150	100	120	150	100	120	150
6	2.304	85	99	120	106	125	146	127	145	120	140	120	140	120	140	120	140	120	140	120	140	
7	2.686	80	94	113	102	118	141	121	138	162	136	154	179	145	163	189	154	173	199	164	183	209
8	3.072	76	89	108	97	113	134	115	132	154	130	147	171	138	155	180	147	165	190	157	175	200
9	3.456	73	85	103	93	107	128	110	125	148	124	141	163	132	149	172	141	158	181	150	168	191
10	3.840	69	81	98	89	103	122	105	120	141	119	135	157	127	143	165	135	151	174	144	161	184
11	4.224	66	78	94	85	99	117	101	116	135	114	129	150	122	137	159	130	146	167	138	153	177
12	4.608	64	75	90	82	95	113	97	111	131	110	124	145	117	132	153	125	140	161	133	149	170
13	4.992	61	72	87	79	91	109	94	107	126	108	120	140	113	127	147	120	135	155	129	144	164
14	5.376	59	69	84	76	86	105	90	103	121	102	116	135	109	123	142	116	131	150	124	139	159
15	5.760	57	67	81	73	83	101	87	100	117	99	112	130	105	119	137	112	126	145	120	134	153
16	6.144	55	65	78	71	82	98	84	97	114	96	108	126	102	115	133	109	122	141	116	130	149
17	6.528	53	63	76	69	80	95	82	94	110	93	105	122	99	112	129	106	119	136	113	126	144
18	6.912	52	61	73	67	77	92	79	91	107	90	102	119	96	109	125	102	115	132	110	123	140
19	7.296	50	59	71	65	75	89	77	88	104	87	99	115	93	105	122	100	112	129	107	119	136
20	7.680	49	57	69	63	73	87	75	86	101	85	96	112	91	102	118	97	109	125	104	116	132
21	8.064	47	56	67	61	71	85	73	84	98	83	94	109	88	100	115	94	106	122	101	113	129
22	8.448	46	54	65	60	69	82	71	81	96	81	91	106	85	97	112	92	103	119	98	110	126

KINGDOM OF THAILAND
 MINISTRY OF TRANSPORT AND COMMUNICATIONS
 DEPARTMENT OF HIGHWAYS

STANDARD DRAWING
 0.40 x 0.40 M. RC. PLE
 PILE CAPACITY AND REINFORCEMENT DETAILS

DESIGNED: OOH & CONSULTANTS
 CHECKED: *[Signature]*
 DATE: JULY 1994

SUBMITTED: *[Signature]*
 DIRECTOR OF LOCATION & DESIGN DIVISION

APPROVED: *[Signature]*
 P.C. DIRECTOR (GENERAL)

SCALE AS SHOWN
 DWG. NO. MS-02
 SHEET NO. 1B2

TABLE OF APPROXIMATE ULTIMATE CAPACITY (R) 40 X 40 cm. PILE IN TONS DRIVEN BY DROP HAMMER WITH FRACTION WINCH, HAMMER WEIGHT (W) 3.5 TONS, DROP HIGH (h) OF 100, 120 AND 150 cm. WITH APPROPRIATE CUSHION OF 5 cm. THICK ON THE TOP OF PILE HEAD, IN ACCORDANCE WITH AVERAGE PILE PENETRATION (S) FOR THE LAST FIVE BLOWS.

TABLE 2

LENGTH OF PILE (L) M.	APPROX. WEIGHT OF PILE (P) TONS	4.0 - TON DROP HAMMER (W) WITH FRACTION WHICH PENETRATION (S) - CM.																										
		HAMMER DROP HEIGHT (H) - CM.																										
		1.5	1.0	0.7	0.5	0.4	0.3	0.2	0.1	0.03	100	120	150	180	200	220	240	260	280	300								
6	2.304	99	105	109	125	143	170	145	166	193	162	183	212	171	193	222	182	203	233	192	214	244	204	226	256	210	232	262
7	2.688	94	110	132	118	136	161	138	158	184	154	175	202	163	184	212	173	194	222	184	205	233	195	216	245	204	222	251
8	3.072	90	104	125	113	130	154	132	151	176	148	167	193	155	176	203	166	183	212	176	196	223	186	207	234	192	212	240
9	3.456	85	100	120	108	123	147	127	144	169	141	160	185	150	169	194	159	178	204	168	188	214	179	198	225	184	204	230
10	3.840	82	96	115	104	119	141	121	138	162	136	153	178	144	162	187	152	171	195	162	180	205	172	191	216	177	195	221
11	4.224	79	92	111	100	115	136	117	133	156	131	148	171	138	156	179	147	164	188	156	174	193	165	184	208	171	189	213
12	4.608	76	88	106	96	111	131	112	128	150	126	142	165	133	150	173	141	159	182	150	168	191	160	177	201	165	182	206
13	4.992	73	85	103	92	107	126	108	124	145	121	137	159	129	145	167	137	153	175	145	162	184	154	171	194	159	176	199
14	5.376	70	82	99	89	103	122	105	120	140	117	133	154	124	140	162	132	148	170	140	156	178	149	166	188	154	170	192
15	5.760	68	79	96	86	100	118	101	116	135	114	128	149	120	136	156	128	143	164	136	152	173	145	160	182	149	163	186
16	6.144	66	77	93	84	96	114	98	112	131	110	125	144	117	131	152	124	139	159	132	147	168	140	155	176	143	160	181
17	6.528	64	75	90	81	94	111	95	109	127	107	121	140	113	128	147	120	135	155	128	143	163	136	151	171	140	155	176
18	6.912	62	72	87	79	91	108	92	106	124	104	117	136	110	124	143	117	131	150	124	139	153	132	147	166	136	151	171
19	7.296	60	70	85	76	88	105	90	103	120	101	114	132	107	121	139	114	127	146	121	135	154	129	145	162	133	147	166
20	7.680	59	68	82	74	86	102	87	100	117	98	111	129	104	117	135	111	124	142	116	131	150	125	139	158	129	143	162
21	8.064	57	67	80	72	84	99	85	97	114	95	108	126	101	114	132	108	121	139	115	128	145	122	135	154	126	139	158
22	8.448	56	65	78	71	82	97	83	95	111	93	106	122	99	111	129	105	118	135	112	125	142	119	132	150	123	136	154

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT AND COMMUNICATIONS
DEPARTMENT OF HIGHWAYS

STANDARD DRAWING
0.40 x 0.40 M. RC. PILE
PILE CAPACITY AND REINFORCEMENT DETAILS

DESIGNED BY: BOH & CONSULTANTS CHECKED BY: *[Signature]* DATE: JULY 1994

SUBMITTED BY: *[Signature]* SCALE AS SHOWN

APPROVED BY: *[Signature]* DWG. NO. MS-02

SHEET NO. 1B2

TABLE OF APPROXIMATE ULTIMATE CAPACITY (R) 40 X 40 CM. PILE IN TONS DRIVEN BY DROP HAMMER WITH FRACTION WINCH, HAMMER WEIGHT (W) OF 4.0 TONS, DROP HIGH (H) OF 100, 120 AND 150 CM. WITH APPROPRIATE CUSHION OF 5 CM. THICK ON THE TOP OF PILE HEAD, IN ACCORDANCE WITH AVERAGE PILE PENETRATION (S) FOR THE LAST FIVE BLOWS.

ตารางที่ 2

TABLE 3

LENGTH OF PILE (L) (M)	4.5-TON DROP HAMMER (K) WITH FRICTION WINCH																										
	PENETRATION (S) - CM.																										
	1.5	1.0	0.7	0.5	0.4	0.3	0.2	0.1	0.05																		
HAMMER DROP HEIGHT (H) - CM.																											
	500	170	150	140	130	120	110	100	90	80	70	60	50	40	30	20	15	10	5	0							
6	113	131	157	140	161	190	162	184	215	180	203	234	190	213	244	200	223	265	211	235	267	223	247	279	229	253	285
7	107	125	150	134	154	181	155	176	205	172	194	224	181	203	234	191	214	244	202	224	255	213	236	257	219	242	273
8	103	120	143	128	147	174	148	169	197	165	186	214	174	195	224	183	205	234	193	215	245	204	226	256	210	232	262
9	98	115	137	123	141	167	142	162	189	158	178	206	167	187	215	176	197	225	186	207	235	196	216	246	202	223	242
10	94	110	132	118	136	160	137	156	182	152	171	198	160	180	207	169	189	216	179	199	227	189	209	237	194	215	243
11	91	106	127	114	131	154	132	150	175	146	165	191	154	174	200	163	182	208	172	192	218	182	202	229	187	207	234
12	88	102	122	110	126	149	127	145	169	141	159	184	149	167	193	157	176	201	166	185	211	176	195	221	181	200	225
13	85	98	118	106	122	144	123	140	163	137	154	178	144	162	186	152	170	195	161	179	204	170	189	214	175	194	218
14	82	95	114	102	118	139	119	135	158	132	149	172	139	157	180	147	165	189	156	173	197	165	183	207	170	187	212
15	79	92	111	99	114	135	115	131	153	128	144	167	135	152	175	143	160	183	151	168	191	160	177	200	164	182	205
16	77	89	107	96	110	130	112	127	148	124	140	162	131	147	169	139	155	177	147	163	186	155	172	195	160	176	199
17	74	87	104	93	107	127	108	123	144	121	136	157	127	143	165	135	151	172	142	158	180	151	167	189	156	171	193
18	72	84	101	91	104	123	106	120	140	117	132	153	124	139	160	131	146	168	138	154	175	146	162	184	151	167	188
19	70	82	98	88	101	120	103	117	136	114	129	149	120	135	156	127	142	163	135	150	171	143	158	179	147	162	183
20	68	80	96	86	99	117	100	114	133	111	125	145	117	132	152	124	139	159	131	146	166	139	154	174	143	153	178
21	67	78	93	84	96	114	97	111	129	108	122	141	114	129	148	121	135	155	128	142	162	135	150	170	139	154	174
22	65	76	91	82	94	111	95	108	126	106	119	138	112	125	144	118	132	151	125	139	158	132	146	166	136	150	170

TABLE OF APPROXIMATE ULTIMATE CAPACITY (R) 40 X 40 cm. PILE IN TONS DRIVEN BY DROP HAMMER WITH FRICTION WINCH, HAMMER WEIGHT (W) OF 4.0 TONS, DROP HIGH (h) OF 100, 120 AND 150 cm. WITH APPROPRIATE CUSHION OF 5 cm. THICK ON THE TOP OF PILE HEAD, IN ACCORDANCE WITH AVERAGE PILE PENETRATION (S) FOR THE LAST FIVE BLOWS.

KINGDOM OF THAILAND
 MINISTRY OF TRANSPORT AND COMMUNICATIONS
 DEPARTMENT OF HIGHWAYS

STANDARD DRAWING
 0.50 x 0.40 M. RC. PILE
 PILE CAPACITY AND REINFORCEMENT DETAILS

DESIGNED BY: OOH & CONSULTANTS
 CHECKED BY: *[Signature]*
 DATE: JULY 1994

SUBMITTED BY: *[Signature]*
 DIRECTOR OF LOCATION & DESIGN DIVISION

APPROVED BY: *[Signature]*
 PILE DIVISION GENERAL

SHEET NO. 1B2

NOTE

1. CONCRETE SHALL HAVE A MINIMUM CEMENT CONTENT OF 350 kg./m³ AND A MINIMUM 28-DAY 0.15 m.-CUBE STRENGTH OF 300 kg./cm.² CEMENT SHALL BE TIS 15 TYPE 1 PORTLAND CEMENT A SUGGESTED APPROXIMATE MIX DESIGN PER CUBICMETER IS AS FOLLOWS.

PORTLAND CEMENT	350	kg.
SAND	0.43	m. ³
CRUSHED ROCK OR GRAVEL	0.86	m. ³
CONCRETE SLUMP , MAX	10	cm.

2. REBAR ϕ 12 mm. OR LARGER SHALL BE TIS 24 GRADE SD 30 DEFORMED BAR , OTHERS SHALL BE TIS 20 GRADE SD24 PLANE BARS UNLESS OTHERWISE INDICATED.
3. IN CASE OF SALINE PROTECTION , HIGH SULPHATE RESISTANCE PORTLAND CEMENT TYPE 5 CONFORMING TO TIS 15 SPECIFICATION SHALL BE USED INSTEAD OF PORTLAND CEMENT TYPE 1
4. CLEAR CONCRETE COVER SHALL BE 5 cm.
5. WEIGHT OF DROP HAMMER SHALL NOT BE LESS THAN HALF THE WEIGHT OF PILE , NOT BE LESS THAN 3.5 TONS.

KINGDOM OF THAILAND MINISTRY OF TRANSPORT AND COMMUNICATIONS DEPARTMENT OF HIGHWAYS		
STANDARD DRAWING 0.40 x 0.40 M. RC. PILE <small>PILE CAPACITY AND REINFORCEMENT DETAILS</small>		
DESIGNED : DOH & CONSULTANTS	CHECKED : <i>[Signature]</i>	DATE JULY 1994
SUBMITTED : <i>[Signature]</i> <small>(DIRECTOR OF LOCATION & DESIGN DIVISION)</small>		SCALE AS SHOWN
APPROVED : <i>[Signature]</i> <small>GEN. (DIRECTOR GENERAL)</small>		DWG. NO. MS-02
		SHEET NO. 182

6. FOLLOWER SHALL NOT BE USED UNLESS IT IS NECESSARY AND AN APPROVAL OF THE ENGINEER IS GIVEN IN SUCH CASES , ITEM 7 BELOW SHALL BE FOLLOWED.
7. PILE LOAD TESTS MAY BE NEEDED UNDER THE ENGINEER. TESTING PROCEDURE AND CRITERIA SHALL BE ACCORDANCE WITH THE DOH SPECIFICATIONS,
8. SHOP DRAWING SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL FOR PILES LONGER THAN OR DIFFER FROM THOSE SHOW ON THIS DRAWING.
9. TYPE A. OR TYPE B. PILE TIPS SHALL BE USED UNDER THE APPROVAL OF THE ENGINEERING
10. ALL DIMENSIONS SHOWN ARE IN CENTIMETERS UNLESS OTHERWISE INDICATED.
11. ALL PILE ULTIMATE CAPACITIES SHOWN IN THIS SRAWING ARE DERIVED FROM HILEY ' S FORMULA.

$$R = \frac{nWhE}{S + \frac{C}{2}}$$

WHEN R , W , h , AND S ARE AS STATED IN THE TABLES.

$$n. = \text{EFFICIENCY FACTOR} = \frac{W + Pa^2}{W + P}$$

P. = WEIGHT OF THE PILE IN TONS.

KINGDOM OF THAILAND MINISTRY OF TRANSPORT AND COMMUNICATIONS DEPARTMENT OF HIGHWAYS		
STANDARD DRAWING 0.40 x 0.40 M. RC. PILE PILE CAPACITY AND REINFORCEMENT DETAILS		
DESIGNED : DOH & CONSULTANTS	CHECKED : <i>[Signature]</i>	DATE JULY 1994
SUBMITTED : <i>P. B...</i> (DIRECTOR OF LOCATION & DESIGN DIVISION)		SCALE AS SHOWN
APPROVED : <i>[Signature]</i> R.C. (DIRECTOR GENERAL)		DWG. NO. MS-02
		SHEET NO. 182

a. = COEFFICIENT OF PILE HEAD AND CUSHION.

= 0.25 FOR CONCRETE PILE WITH JUTE MAT HEAD CUSHION.

E = EQUIPMENT LOSS FACTOR = 0.75

C = TEMPORALY COMPRESSION = $C_1 + C_2 + C_3$

C_1 = PILE SHORTENING FOR PILE LENGTH OF L (m.)

$$= \frac{10^5 RL}{AEc} \text{ cm.}$$

C_2 = COMPRESSION IN PILE HEAD CUSHION

$$= 9.018 \frac{R}{A} \text{ cm.}$$

C_3 = COMPRESSION IN THE SOIL UNDERNEATH AND
SURROUNDING THE PILE = 0.25 cm.

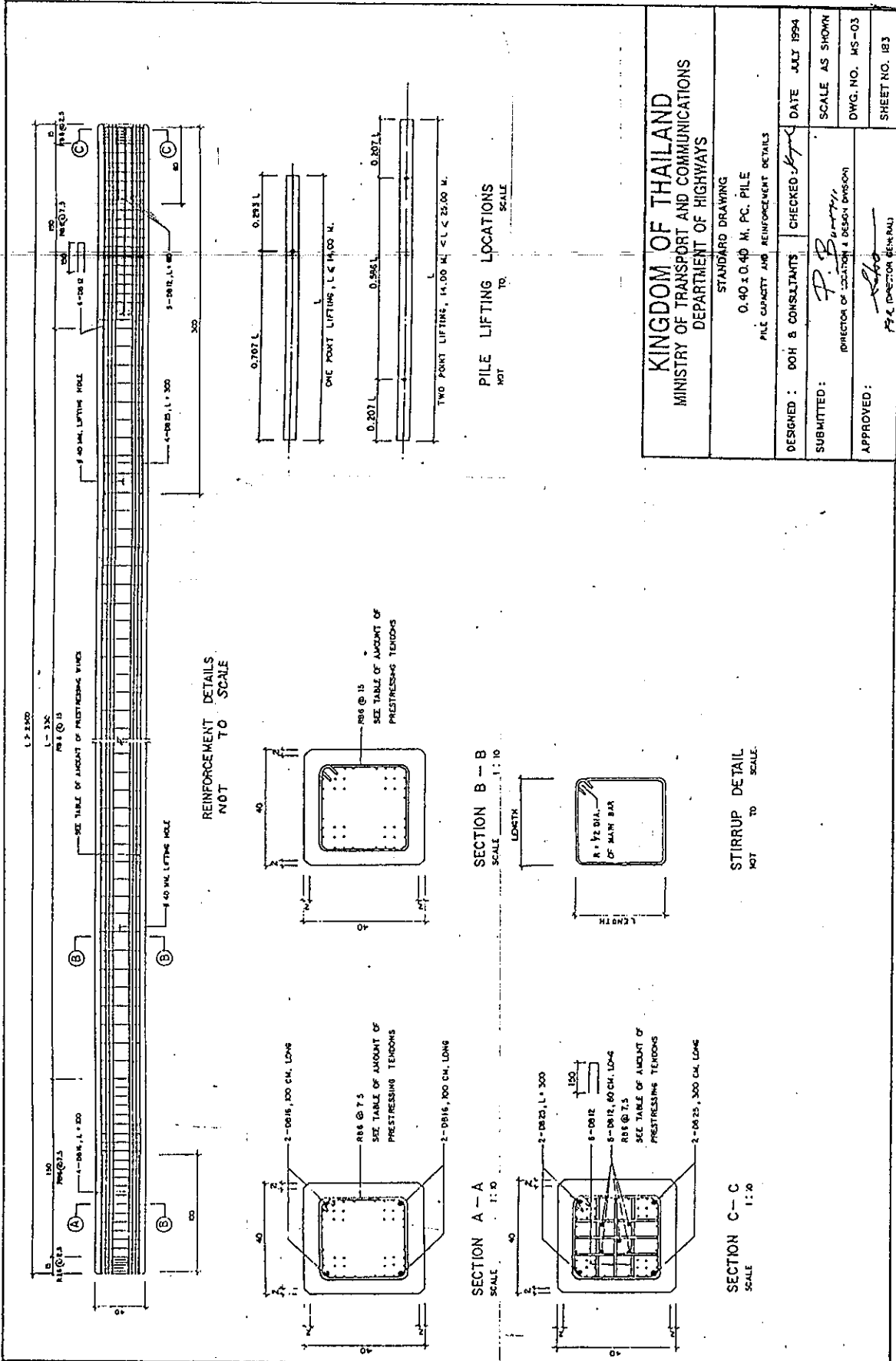
A = CROSS SECTIONAL AREA OF PILE IN cm^2

E_c = MODULUS OF ELASTICITY OF CONCRETE

= 230,500 kg./cm^2

12. THIS DRAWING IS ADAPTED FROM DOH DWG. NO. 38/1

KINGDOM OF THAILAND MINISTRY OF TRANSPORT AND COMMUNICATIONS DEPARTMENT OF HIGHWAYS		
STANDARD DRAWING 0.40 x 0.40 M. RC. PILE PILE CAPACITY AND REINFORCEMENT DETAILS		
DESIGNED: DOH & CONSULTANTS	CHECKED: <i>[Signature]</i>	DATE JULY 1994
SUBMITTED:	<i>P. Rangsom</i> (DIRECTOR OF LOCATION & DESIGN DIVISION)	SCALE AS SHOWN
APPROVED:	<i>[Signature]</i> FIVE (DIRECTOR GENERAL)	DWG. NO. MS-02
		SHEET NO. 182



รูปที่ ๒. ๒ แสดงรายละเอียดของเสาเข็ม

TABLE 1

LENGTH OF PILE (L) M.	3.5 - TON DIECP HAMMER (W) WITH FRICTION WINCH																			
	PENETRATION (S) - CM.																			
	1.5	1.0	0.7	0.5	0.4	0.3	0.2	0.1	0.05	0.05	0.1	0.2	0.3	0.4	0.5	0.7	1.0	1.5		
	100	120	150	100	120	150	100	120	150	100	120	150	100	120	150	100	120	150	100	
6	85	99	120	106	125	144	127	145	171	143	162	168	192	172	198	162	182	209	173	193
7	80	94	115	102	118	141	121	138	162	136	154	179	145	163	189	154	173	199	164	183
8	76	89	108	97	113	134	115	132	154	150	147	171	138	156	180	147	163	190	157	175
9	73	85	103	93	107	128	110	125	148	124	141	163	132	149	172	141	158	181	150	168
10	69	81	98	89	103	122	105	120	141	119	135	157	127	143	165	135	151	174	144	161
11	65	78	94	85	99	117	101	116	136	114	129	150	122	137	159	130	146	167	138	153
12	64	75	90	82	95	113	97	111	131	110	124	145	117	132	153	125	140	161	133	149
13	61	72	87	79	91	109	94	107	126	106	120	140	113	127	147	120	135	155	129	144
14	59	69	84	76	88	105	90	103	121	102	116	133	109	123	142	116	131	150	124	139
15	57	67	81	73	85	101	87	100	117	99	112	130	105	119	137	112	126	143	120	134
16	55	65	78	71	82	98	84	97	114	96	108	126	102	115	133	109	122	141	116	130
17	53	63	76	69	80	95	82	94	110	93	105	122	99	112	129	106	119	136	113	126
18	52	61	73	67	77	92	79	91	107	90	102	119	96	108	123	102	115	132	110	123
19	50	59	71	65	75	89	77	88	104	87	98	115	93	105	122	100	112	129	107	119
20	49	57	69	63	73	87	75	85	101	85	96	112	91	102	118	97	109	125	104	116
21	47	56	67	61	71	85	73	84	98	83	94	109	88	100	115	94	106	122	101	113
22	46	54	66	60	69	82	71	81	96	81	91	106	86	97	112	92	103	119	98	110

TABLE OF APPROXIMATE ULTIMATE CAPACITY (R) 40 X 40 cm. PILE IN TONS DRIVEN BY DROP HAMMER WITH FRICTION WINCH, HAMMER WEIGHT (W) 3.5 TONS, DROP HIGH (h) OF 100, 120 AND 150 cm. WITH APPROPRIATE CUSHION OF 5 cm. THICK ON THE TOP OF PILE HEAD, IN ACCORDANCE WITH AVERAGE PILE PENETRATION (S) FOR THE LAST FIVE BLOWS.

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT AND COMMUNICATIONS
DEPARTMENT OF HIGHWAYS

STANDARD DRAWING
 0.40 x 0.40 M. P.C. PILE
 PILE CAPACITY AND REINFORCEMENT DETAILS

DESIGNED :	DOH & CONSULTANTS	CHECKED :	DATE	JULY 1994
SUBMITTED :	<i>P. B. ...</i>		SCALE	AS SHOWN
APPROVED :	<i>...</i>		DWG. NO.	HS-03
	<i>...</i>		SHEET NO.	1B3

TABLE 2

LENGTH OF PILE (L) X.	4.0 - TON DROP HAMMER (W) WITH FRACTION WINCH																										
	PENETRATION (S) - CM.																										
	1.3	1.0	0.7	0.5	0.4	0.3	0.2	0.1	0.05	100	120	150	180	200	220	240	260	280	300	320	340	360	380	400			
6	99	115	139	123	143	170	145	166	193	162	183	212	171	193	222	182	203	233	192	214	244	204	226	256	210	232	262
7	94	110	132	118	136	161	138	158	184	154	175	202	163	184	212	173	194	222	184	205	233	195	216	245	208	222	231
8	90	104	126	113	130	154	132	151	176	148	157	193	156	176	203	166	183	212	176	196	223	186	207	234	192	212	240
9	85	100	120	106	125	147	127	144	169	141	160	185	140	169	194	159	178	204	168	188	214	179	199	225	184	204	232
10	82	96	115	104	119	141	121	138	162	135	153	178	144	162	187	153	171	195	162	180	205	172	191	216	177	195	221
11	79	92	111	100	115	136	117	133	156	131	148	171	138	155	179	147	164	188	156	174	199	166	184	206	171	189	213
12	76	88	106	96	111	131	112	128	150	126	142	165	133	150	173	141	159	182	150	168	191	160	177	201	165	182	206
13	73	85	103	92	107	126	108	124	145	121	137	159	129	145	167	137	153	175	145	162	184	154	171	194	159	176	199
14	70	82	99	89	103	122	105	120	140	117	133	154	124	140	162	132	148	170	140	156	178	149	166	188	154	170	192
15	68	79	96	86	100	118	101	116	135	114	128	149	120	136	156	128	143	164	136	152	173	145	160	182	149	165	186
16	66	77	93	84	98	114	98	112	131	110	125	144	117	131	152	124	139	159	132	147	168	140	155	176	145	160	181
17	64	75	90	81	94	111	95	109	127	107	121	140	113	128	147	120	135	155	128	143	163	136	151	171	140	155	176
18	62	72	87	79	91	108	92	106	124	104	117	136	110	124	143	117	131	150	124	139	158	132	147	166	136	151	171
19	60	70	85	76	88	105	90	103	120	101	114	132	107	121	139	114	127	146	121	135	154	129	143	162	133	147	166
20	59	68	82	74	86	102	87	100	117	98	111	129	104	117	135	111	124	142	118	131	150	125	139	158	129	143	162
21	57	67	80	72	84	98	85	97	114	96	108	126	101	114	132	108	121	139	115	128	146	122	135	154	126	139	158
22	56	65	78	71	82	97	83	95	111	93	106	122	99	111	129	105	118	135	112	125	142	119	132	150	123	135	154

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT AND COMMUNICATIONS
DEPARTMENT OF HIGHWAYS

STANDARD DRAWING
0.40 X 0.40 M. P.C. PILE
PILE CAPACITY AND REINFORCEMENT DETAILS

DESIGNED BY: DOH & CONSULTANTS CHECKED BY: *[Signature]* DATE: JULY 1994

SUBMITTED BY: *[Signature]* SCALE AS SHOWN

APPROVED BY: *[Signature]* DIRECTOR OF DESIGN & DESIGN DIVISION

SHEET NO. 183

TABLE OF APPROXIMATE ULTIMATE CAPACITY (R) 40 X 40 CM. PILE IN TONS DRIVEN BY DROP HAMMER WITH FRACTION WINCH, HAMMER WEIGHT (W) OF 4.0 TONS, DROP HIGH (h) OF 100, 120 AND 150 CM. WITH APPROPRIATE CUSHION OF 5 CM. THICK ON THE TOP OF PILE HEAD, IN ACCORDANCE WITH AVERAGE PILE PENETRATION (S) FOR THE LAST FIVE BLOWS.

TABLE 3

LENGTH OF PILE (L) M.	APPROX. WEIGHT OF PILE (P) TONS	4.5-TON DROP HAMMER (W) WITH FRICTION WINCH																										
		PENETRATION (S) - CM.																										
		1.5	1.0	0.7	0.5	0.4	0.3	0.2	0.1	0.05	1.5	1.0	0.7	0.5	0.4	0.3	0.2	0.1	0.05									
6	2.304	113	131	157	140	161	190	162	184	215	180	203	234	190	213	244	200	223	255	211	235	267	223	247	279	233	285	
7	2.688	107	125	150	134	164	181	155	176	205	172	194	224	181	203	234	191	214	244	202	224	255	213	236	267	218	242	273
8	3.072	103	120	143	128	147	174	148	169	197	165	186	214	174	195	224	183	206	234	193	215	245	204	226	256	210	232	262
9	3.456	98	115	137	123	141	167	142	162	189	158	178	206	167	187	215	176	197	225	186	207	235	196	216	245	202	225	252
10	3.840	94	110	132	118	136	160	137	156	182	152	171	198	160	180	207	169	189	216	179	199	227	189	209	237	194	215	243
11	4.224	91	106	127	114	131	154	132	150	175	146	165	191	154	174	200	163	182	209	172	192	218	182	202	229	187	207	234
12	4.608	86	102	122	110	126	149	127	145	169	141	159	184	149	167	193	157	176	201	166	185	211	176	195	221	181	200	226
13	4.992	85	98	118	106	122	144	123	140	163	137	154	178	144	162	186	152	170	195	161	179	204	170	189	214	175	194	218
14	5.376	82	95	114	102	118	139	119	135	158	132	149	172	139	157	180	147	165	189	156	173	197	163	183	207	170	187	212
15	5.760	79	92	111	99	114	135	115	131	153	128	144	167	135	152	175	143	160	183	151	168	191	160	177	200	164	182	206
16	6.144	77	89	107	96	110	130	112	127	148	124	140	162	131	147	169	139	155	177	147	163	186	155	172	195	160	176	199
17	6.528	74	87	104	93	107	127	108	123	144	121	136	157	127	143	165	135	151	172	142	158	180	151	167	189	155	171	193
18	6.912	72	84	101	91	104	123	106	120	140	117	132	153	124	139	160	131	146	168	138	154	175	146	162	184	151	167	188
19	7.296	70	82	98	88	101	120	103	117	136	114	129	149	120	135	156	127	142	163	135	150	171	143	158	179	147	162	183
20	7.680	68	80	96	86	99	117	100	114	133	111	125	145	117	132	152	124	139	159	131	146	166	138	154	174	143	153	178
21	8.064	67	78	93	84	95	114	97	111	129	106	122	141	114	129	148	121	135	155	128	142	162	135	150	170	139	154	174
22	8.448	65	76	91	82	94	111	95	108	126	106	119	138	112	125	144	118	132	151	125	139	158	132	146	165	156	170	170

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT AND COMMUNICATIONS
DEPARTMENT OF HIGHWAYS

STANDARD DRAWING
 0.40 x 0.40 M. P.C. PILE
 PILE CAPACITY AND REINFORCEMENT DETAILS

DESIGNED BY : *DOH & CONSULTANTS* CHECKED BY : *[Signature]* DATE : JULY 1994

SUBMITTED BY : *P. B. [Signature]* SCALE AS SHOWN

APPROVED BY : *[Signature]* DIRECTOR OF DESIGN & DESIGN INSPECTION DWG. NO. MS-03

P.A. DESIGN GENERAL SHEET NO. 183

TABLE OF APPROXIMATE ULTIMATE CAPACITY (R) 40 X 40 cm. PILE IN TONS DRIVEN BY DROP HAMMER WITH FRICTION WINCH, HAMMER WEIGHT (W) OF 4.5 TONS, DROP HIGH (H) OF 100, 120 AND 150 cm. WITH APPROPRIATE CUSHION OF 5 cm. THICK ON THE TOP OF PILE HEAD, IN ACCORDANCE WITH AVERAGE PILE PENETRATION (S) FOR THE LAST FIVE BLOWS.

ตารางที่ 3

NOTE

1. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 450 kg./cm.² FOR 15 x 15 x 15 CUBE AT 28-DAYS.
2. MIX DESIGN PER CUBIC METER OF CONCRETE SHALL HAVE A MINIMUM TIS 15 TYPE 1 PORTLAND CEMENT OF 350 kg.
3. IN CASE OF SALINE PROTECTION ,HIGH SULPHATE RESISTANT PORTLAND CEMENT TYPE 5 , SHALL BE INSTEAD OF TYPE 1 CEMENT.
4. PRESTRESSING WIRES SHALL BE STRESS-RELIEVED WIRES CONFORMING TO TIS 95.
 - a.) ϕ 5 mm. WIRE SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH OF 17,500 kg./cm.²
 - b.) ϕ 7 mm. WIRE SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH OF 16,000 kg./cm.²
5. PRESTRESSING TENDONS ϕ 9.53 mm. (3/8 ") SHALL BE TIS 420 GRADE 1725 HAVING A MINIMUM ULTIMATE TENSILE LOAD OF 9,078 kg.
6. REBAR ϕ 12 mm. OR LARGER SHALL BE TIS 24 GRADE SD 30 DEFORMED BAR , OTHERS SHALL BE TIS 20 GRADE SD24 PLANE BARS UNLESS OTHERWISE INDICATED.
7. INITIAL PRESTRESSING FORCE SHALL BE AS FOLLOWS
 - a.) ϕ 5 mm. STRESS - RELIEVED WIRE SHALL HAVE AN INITIAL PRESTRESSING FORCE OF 2,400 kg.

KINGDOM OF THAILAND MINISTRY OF TRANSPORT AND COMMUNICATIONS DEPARTMENT OF HIGHWAYS		
STANDARD DRAWING 0.40 x 0.40 M. PC. PILE PILE CAPACITY AND REINFORCEMENT DETAILS		
DESIGNED : DOH & CONSULTANTS	CHECKED <i>[Signature]</i>	DATE JULY 1994
SUBMITTED : <i>P. B...</i> (DIRECTOR OF LOCATION & DESIGN DIVISION)		SCALE AS SHOWN
APPROVED : <i>[Signature]</i> P.R. (DIRECTOR GENERAL)		DWG. NO. MS-03
		SHEET NO. 183

- b.) ϕ 7 mm. STRESS-RELIEVED WIRE SHALL HAVE AN INITIAL PRESTRESSING FORCE OF 4,310 kg.
- c.) ϕ 9.53 mm. SHALL HAVE AN INITIAL PRESTRESSING FORCE OF 6,330 kg.
8. CLEAR CONCREAT COVER SHALL BE 5 cm.
 9. WEIGHT OF DROP HAMMER SHALL NOT BE LESS THAN HALF THE WEIGHT OF PILE , NOT BE LESS THAN 3.5 TONS.
 10. FOLLOWER SHALL NOT BE USED UNLESS IT IS NECESSARY AND AN APPROVAL OF THE ENGINEER IS GIVEN IN SUCH CASES , ITEM 7 BELOW SHALL BE FOLLOWED.
 11. PILE LOAD TESTS MAY BE NEEDED UNDER THE ENGINEER. TESTING PROCEDURE AND CRITERIA SHALL BE ACCORDANCE WITH THE DOH SPECIFICATIONS,
 12. SHOP DRAWING SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL FOR PILES LONGER THAN OR DIFFER FROM THOSE SHOW ON THIS DRAWING.
 13. TYPE A. OR TYPE B. PILE TIPS SHALL BE USED UNDER THE APPROVAL OF THE ENGINEERING
 14. ALL DIMENSIONS SHOWN ARE IN CENTIMETERS UNLESS OTHERWISE INDICATED.

KINGDOM OF THAILAND MINISTRY OF TRANSPORT AND COMMUNICATIONS DEPARTMENT OF HIGHWAYS		
STANDARD DRAWING 0.40 x 0.40 M. PC. PILE PILE CAPACITY AND REINFORCEMENT DETAILS		
DESIGNED : DOH & CONSULTANTS	CHECKED: <i>K.P.</i>	DATE JULY 1994
SUBMITTED :	<i>P. Buratt</i> (DIRECTOR OF LOCATION & DESIGN DIVISION)	SCALE AS SHOWN
APPROVED :	<i>Sako</i> P.C. (DIRECTOR GENERAL)	DWG. NO. MS-03
		SHEET NO. 183

15. ALL PILE ULTIMATE CAPACITIES SHOWN IN THIS DRAWING ARE DERIVED FROM HILEY'S FORMULA.

$$R = \frac{nWhE}{S + \frac{C}{2}}$$

WHEN R, W, h, AND S ARE AS STATED IN THE TABLES.

$$n = \text{EFFICIENCY FACTOR} = \frac{W + Pa^2}{W + P}$$

Q. = WEIGHT OF THE PILE IN TONS.

b. = COEFFICIENT OF PILE HEAD AND CUSHION.

= 0.25 FOR CONCRETE PILE WITH JUTE MAT HEAD CUSHION.

E = EQUIPMENT LOSS FACTOR = 0.75

C = TEMPORALY COMPRESSION = $C_1 + C_2 + C_3$

C_1 = PILE SHORTENING FOR PILE LENGTH OF L (m.)

$$= \frac{10^5 RL}{AEc} \text{ cm.}$$

C_2 = COMPRESSION IN PILE HEAD CUSHION

$$= 9.018 \frac{R}{A} \text{ cm.}$$

C_3 = COMPRESSION IN THE SOIL UNDERNEATH AND SURROUNDING THE PILE

= 0.25 cm.

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DESIGNED : DOH & CONSULTANTS	CHECKED : <i>[Signature]</i>	DATE JULY 1994
SUBMITTED :	<i>P. Burattin</i> (DIRECTOR OF LOCATION & DESIGN DIVISION)	SCALE AS SHOWN
APPROVED :	<i>[Signature]</i> P.R. (DIRECTOR GENERAL)	DWG. NO. MS-03
		SHEET NO. 183

A = CROSS SECTIONAL AREA OF PILE IN cm^2

E_c = MODULUS OF ELASTICITY OF CONCRETE

= 230,500 kg/cm^2

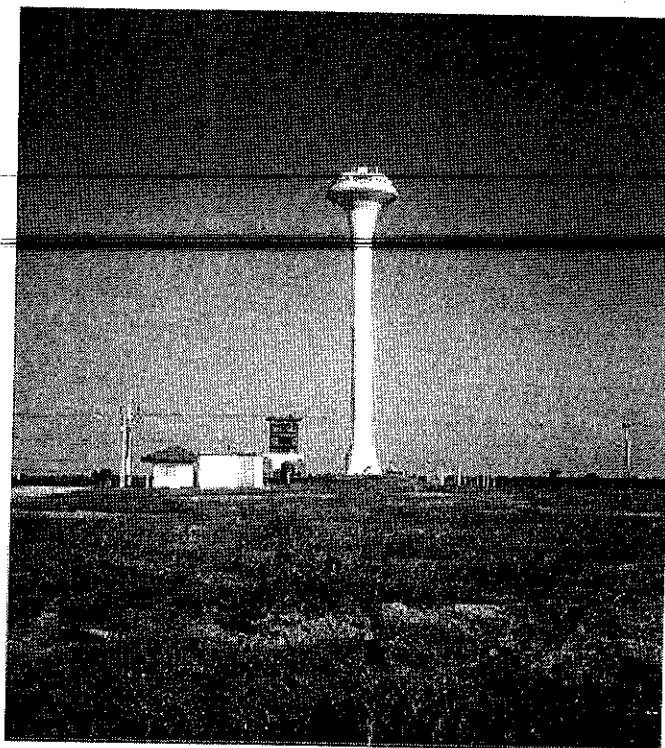
16. THIS DRAWING IS ADAPTED FROM DOH DWG. NO. 3P/1

KINGDOM OF THAILAND MINISTRY OF TRANSPORT AND COMMUNICATIONS DEPARTMENT OF HIGHWAYS		
STANDARD DRAWING 0.40 x 0.40 M. PC. PILE PILE CAPACITY AND REINFORCEMENT DETAILS		
DESIGNED : DOH B CONSULTANTS	CHECKED : <i>Ky</i>	DATE JULY 1994
SUBMITTED : <i>P. B. Sumpati</i> <small>DIRECTOR OF LOCATION & DESIGN DIVISION</small>		SCALE AS SHOWN
APPROVED : <i>Sako</i> <small>1st DEPT. DIRECTOR GENERAL</small>		DWG. NO. MS-03
		SHEET NO. 183

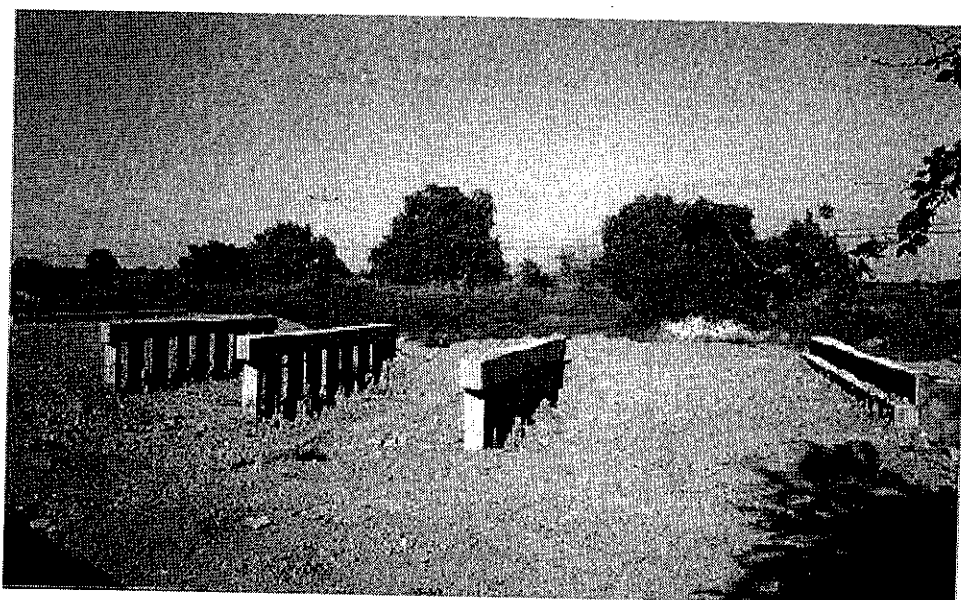
ภาคผนวก ค.
รูปถ่ายแสดงฐานรากบริเวณที่ทำการดำเนินโครงการ



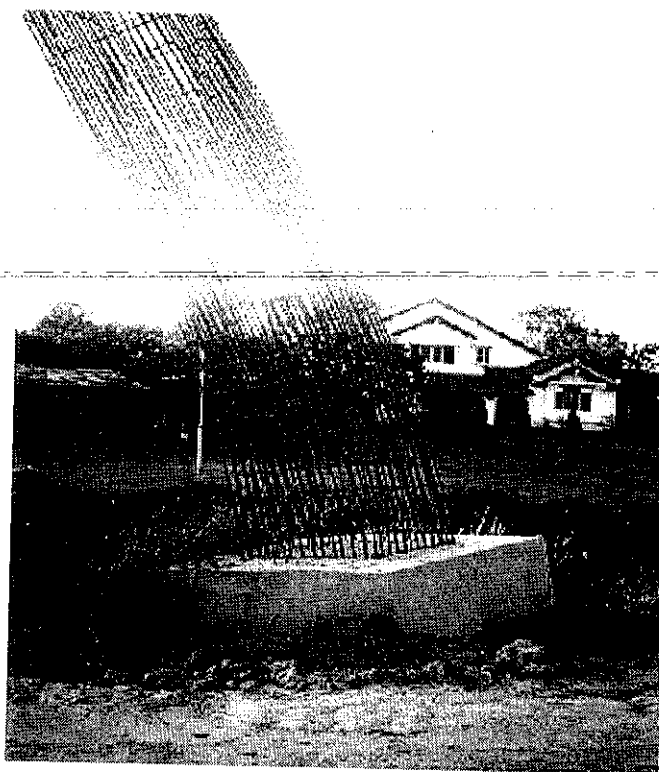
รูปที่ ค.1 นิคมอุตสาหกรรมภาคเหนือตอนล่าง จ.พิจิตร



รูปที่ ค.2 แทงค์น้ำสูง ในนิคมอุตสาหกรรมภาคเหนือตอนล่าง จ.พิจิตร



รูปที่ ค.3 ฐานรากสะพาน บนทางหลวงหมายเลข 117



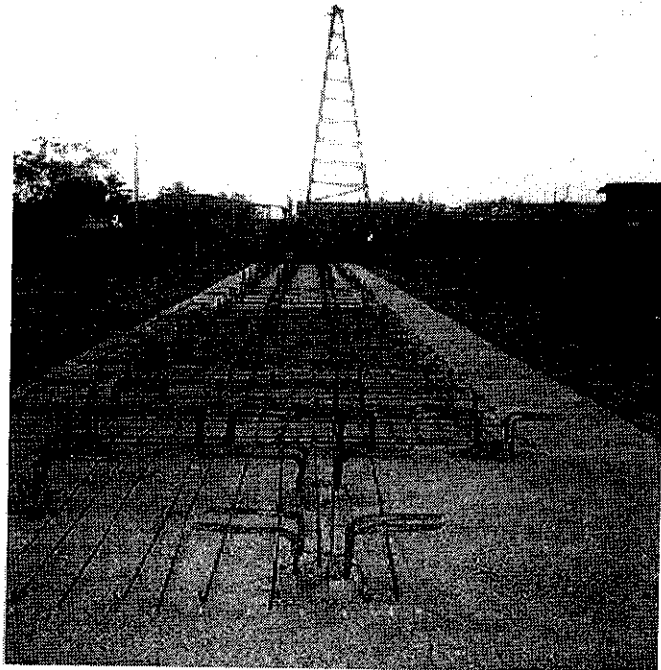
รูปที่ ค.4 ฐานรากค้ำของเสาไฟฟ้า ริมถนนหมายเลข 117



รูปที่ ค.5 เสาไฟฟ้าฐานรากค้ำริมถนนหมายเลข 117



รูปที่ ค.6 ฐานราก กำแพงกันดิน สะพานข้ามแม่น้ำน่าน



รูปที่ ค.7 ฐานรากสะพานข้ามแม่น้ำน่าน เป็นส่วนที่อยู่ในแม่น้ำ