

***2. DATA OF GEOLOGICAL INVESTIGATION  
AND SOIL TEST***

## 2. DATA OF GEOLOGICAL INVESTIGATION AND SOIL TEST

(Performed by PWD and DID in and around Study Areas)

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**Table-1 Results of Geological Investigation (Sungai Petani)**

Borehole No.	Location	Depth (m)	Soil condition
BH1	Center of river	0 - 3.3 m	very soft, sluge
		3.3 - 4.5 m	very soft, marine clay
BH2	Center of river	0 - 4.0 m	very soft, sludge
		4.0 - 4.5 m	very soft, marine clay
BH3	Left bank	0 - 2.8 m	very soft, mud or sludge
		2.8 - 4.0 m	very soft, marine clay
BH4	Right bank	0 - 3.7 m	very soft, mud or sludge
		3.7 - 5.2 m	very soft, marine clay
		5.2 - 5.5 m	soft, marine clay
BH5	Center of river	0 - 4.0 m	very soft, sludge
		4.0 - 6.0 m	very soft, marine clay
		6.0 - 6.3 m	marine clay
BH6	Center of river	0 - 2.7 m	very soft, sludge
		2.7 - 3.4 m	very soft, marine clay
		3.4 - 3.5 m	soft to firm, clay
BH7	Center of river	0 - 3.3 m	very soft, sludge
		3.3 - 4.1 m	very soft, sandy clay
		4.1 - 4.5 m	very soft, marine clay

\* Boreholes is located between the mouth of Sg. Air Mendidih and the former Custom's jetty

**Table-2 Results of Geological Investigation (Sg. Melaka, Melaka), BH3**

Depth (m)	Geological condition	N value
0 - 0.6	silty clay	
0.6 - 9.0	very soft, clay	1.5m (N=0), 4.5m (N=0), 7.0m (N=0)
9.0 - 16.0	very soft to firm, clay	10.5m (N=1), 13.5m (N=5)
16.0 - 17.0	firm to stiff, clay	16.5m (N=8)
17.0 - 18.0	compact, clayey coarse to medium sand	
18.0 - 22.5	compact, clayey/silty coarse to medium sand	18.0m (N=12), 19.5m (N=11), 21.0m (N=14)
22.5 - 23.0	very soft, silty clay	22.5m (N=2)
23.0 - 25.0	stiff, sandy clay	24.0m (N=13)
25.0 - 28.0	stiff to very stiff, sandy clay	25.5m (N=15), 27.0m (N=20)
28.0 - 29.0	dense, clayey coarse to medium sand	28.5m (N=45)
29.0 - 31.5	compact, clayey fine to medium sand	30.0m (N=13)
31.5 - 33.0	dense, gravelly sand	31.5m (N=50/17cm)
33.0 - 34.95	compact, sandy gravels	33.0m (N=21), 34.5m (N=24)

\* Drilling depth : 34.95 m, water table : d&gt;9.5m (1.9-2.4m), d=34.5m (6.0m)

\* Shear strength by vane shear test : 3.0m (249psf), 6.0m (373psf), 12.0m (350psf), 15.0m (194psf)

**Table-3 Results of Geological Investigation (Sg. Melaka, Melaka), BH4**

Depth (m)	Geological condition	N value
0 - 1.5	silty clay	
1.5 - 13.5	soft, clay	1.5m (N=0), 4.5m (N=0), 7.5m (N=0), 10.5m (N=0)
13.5 - 15.0	firm, clay	13.5m (N=5)
15.0 - 16.0	firm, silty clay	15.0m (N=0)
16.0 - 17.5	stiff, silty clay	16.5m (N=9)
17.5 - 19.0	very loose to loose, silty coarse to medium sand	18.0m (N=4)
19.0 - 22.0	dense, silty coarse to medium sand	19.5m (N=44), 21.0m (N=38)
22.0 - 23.6	firm, silty clay	22.5m (N=7)
23.6 - 25.0	loose, silty/clayey coarse to medium sand	24.0m (N=6)
25.0 - 27.0	compact, silty coarse sand	25.5m (N=29)
27.0 - 28.0	loose, silty/clayey coarse to medium sand	27.0m (N=10)
28.0 - 30.0	medium dense, silty fine to medium coarse sand	28.5m (N=30)
30.0 - 33.0	very dense, fine to medium coarse sand	30.0m (N=50/12cm), 31.5m (N=50/11cm)
33.0 - 34.5	very dense, silty fine sand	33.0m (N=50/11cm)
34.5 - 34.95	very dense, silty coarse to medium sand	34.5m (N=46)

\* Drilling depth : 34.95 m, water table : d&gt;21.0m (0-0.3m), d=34.5m (8.8m)

\* Shear strength by vane shear test : 3.0m (295psf), 6.0m (270psf), 12.0m (412psf)

**Table 4 Results of Soil Test (Sg. Melaka, Melaka), BH3**

Depth (m)	Geological condition	Moisture Content(%)		Atterberg limit		Components of soil (%)		Dry density (KN/m <sup>3</sup> )		Specific gravity		Triaxial test (UU)		Consolidation test	
		LL	PL	PI	Gravel	Sand	Silt/clay	(KN/m <sup>3</sup> )	(KN/m <sup>3</sup> )	C(KN/m <sup>2</sup> )	$\phi$ (°)	P <sub>0</sub> (KN/m <sup>2</sup> )	Cc	$e_0$	
1.95	very soft, clay	120	156	56	100	-	-	-	-	-	-	-	-	-	
2.4 - 3.0	-ditto-	107	160	35	125	-	-	13.39	6.47	2.29	4.0	27	0.92	2.31	
5.4 - 6.0	-ditto-	91	133	65	68	-	-	14.04	7.35	2.39	6.0	6.5	88	1.04	2.22
11.4 - 12.0	very soft to firm, clay	66	96	42	54	-	-	15.22	9.18	2.38	19.0	2.0	132	0.75	1.44
16.95	firm to stiff, clay	29	53	20	33	-	-	-	-	-	-	-	-	-	-
18.45	compact, clayey/silty coarse to medium sand	16	34	13	21	23	57	20	-	-	-	-	-	-	-
22.95	very soft, silty clay	25	34	14	20	-	-	-	-	-	-	-	-	-	-
24.45	stiff, sandy clay	18	39	18	21	-	-	-	-	-	-	-	-	-	-
25.95	stiff to very stiff, sandy clay	19	30	14	16	-	-	-	-	-	-	-	-	-	-
28.95	dense, clayey coarse to medium sand	15	-	-	-	12	78	10	-	-	-	-	-	-	-
31.67	dense, gravelly sand	8.8	-	-	-	35	59	6	-	-	-	-	-	-	-
34.95	compact, sandy gravels	7.1	-	-	-	66	34	0	-	-	-	-	-	-	-

**Table 5 Results of Soil Test (Sg. Melaka, Melaka), BH4**

Depth (m)	Geological condition	Moisture Content(%)		Atterberg limit		Components of soil (%)		Dry density (KN/m <sup>3</sup> )		Specific gravity		Triaxial test (UU)		Consolidation test	
		LL	PL	PI	Gravel	Sand	Silt/clay	(KN/m <sup>3</sup> )	(KN/m <sup>3</sup> )	C(KN/m <sup>2</sup> )	$\phi$ (°)	P <sub>0</sub> (KN/m <sup>2</sup> )	Cc	$e_0$	
1.95	soft, clay	107	134	43	91	-	-	-	-	-	-	-	-	-	-
2.4 - 3.0	-ditto-	87	124	35	89	-	-	14.34	7.67	2.18	6.0	5.0	44	0.54	1.79
5.4 - 6.0	-ditto-	99	140	39	101	-	-	13.85	6.96	2.19	4.0	5.0	53	0.90	2.09
7.95	-ditto-	100	114	41	73	-	-	-	-	-	-	-	-	-	-
11.4 - 12.0	-ditto-	96	125	37	88	-	-	13.65	6.96	2.38	10.0	1.5	68.5	1.07	2.33
13.95	firm, clay	127	65	32	33	-	-	-	-	-	-	-	-	-	-
15.45	firm, silty clay	27	48	21	27	-	-	-	-	-	-	-	-	-	-
16.95	stiff, silty clay	21	NP	-	-	-	-	-	-	-	-	-	-	-	-
18.45	very loose to loose, silty coarse to medium sand	11	-	-	-	28	65	7	-	-	-	-	-	-	-
19.95	dense, silty coarse to medium sand	13	-	-	-	16	73	1	-	-	-	-	-	-	-
22.95	firm, silty clay	16	30	13	17	-	-	-	-	-	-	-	-	-	-
24.45	loose, silty/clayey coarse to medium sand	15	NP	-	-	15	78	7	-	-	-	-	-	-	-
25.95	compact, silty coarse sand	20	-	-	-	11	63	26	-	-	-	-	-	-	-
27.45	loose, silty/clayey coarse to medium sand	15	-	-	-	10	75	15	-	-	-	-	-	-	-
24.95	very dense, silty coarse to medium sand	19	-	-	-	4	78	18	-	-	-	-	-	-	-

**Table-6 Results of Geological Investigation and Soil Test (Jalan Bachang - Batu Berendam, Melaka), BH-1 (Road)**

Depth (m)	Geological condition	N-value (times)	Moisture content (%)	Atterberg limit			Components of soil (%)			Specific gravity	U.C.S (KN/m <sup>2</sup> )	Triaxial test (UU) C(KN/m <sup>2</sup> )	$\phi (\circ)$	Consolidation test $P_0(\text{KN/m}^2)$
				L.L	P.L	IP	Gravel	Sand	Silt & clay (KN/m <sup>3</sup> )					
1.5	stiff, clayey silt	10	22	66	24	42	11	18	71	-	-	-	-	-
3.0	-ditto-	9	23	47	27	20	12	32	56	-	-	-	-	-
4.5	stiff to very stiff, sandy silt	11	-	-	-	-	-	-	-	-	-	-	-	-
6.0	-ditto-	15	14	52	22	30	0	34	66	-	-	-	-	-
7.5	stiff, clayey/sandy silt	8	24	44	26	18	1	33	66	-	-	-	-	-
9.0	-ditto-	10	-	-	-	-	-	-	-	-	-	-	-	-
10.5	very stiff, clayey/sandy silt	39	30	45	30	15	20	21	59	-	-	-	-	-
12.0	hard, sandy silt	50/20cm	22	49	30	19	18	16	66	-	-	-	-	-
13.5	-ditto-	50/15cm	-	-	-	-	-	-	-	-	-	-	-	-
15.0	-ditto-	50/25cm	20	49	28	21	8	9	83	-	-	-	-	-
16.5	-ditto-	50/23cm	13	48	29	19	24	18	58	-	-	-	-	-
18.0	-ditto-	50/21cm	18	49	30	19	11	12	77	-	-	-	-	-
19.5	-ditto-	50/15.5cm	-	-	-	-	-	-	-	-	-	-	-	-
21.0	-ditto-	50/16.5cm	8	46	29	17	26	26	48	-	-	-	-	-

\* Drilling depth : 21.32 m, water table : G.L 2.70 m, 0 - 1.0 m (silty clay)

\* Atterberg limit : L.L liquid limit, P.L plastic limit, IP index of plasticity, U.C.S : unconfined compressive strength

\* gravel : grain size 2.0 mm or more, sand : 2.0 - 0.06 mm, silt & clay : 0.02 mm or less

**Table-7 Results of Geological Investigation and Soil Test (Jalan Bachang - Batu Berendam, Melaka), BH-2 (Road)**

Depth (m)	Geological condition	N-value (times)	Moisture content (%)	Atterberg limit			Components of soil (%)			Specific gravity	U.C.S (KN/m <sup>2</sup> )	Triaxial test (UU) C(KN/m <sup>2</sup> )	$\phi (\circ)$	Consolidation test $P_0(\text{KN/m}^2)$
				L.L	P.L	IP	Gravel	Sand	Silt & clay (KN/m <sup>3</sup> )					
1.5	stiff, clayey silt	7	23	36	26	10	19	41	40	-	-	-	-	-
3.0	very soft, clayey silt	1	101	57	31	26	0	21	79	-	-	-	-	-
3.5	-ditto-	-	53	-	-	-	-	-	-	1.66	1.08	2.57	51.6	25.0
4.5	loose, silty/clayey medium to coarse sand	8	38	42	26	16	8	50	42	-	-	-	-	-
6.0	-ditto-	9	-	-	-	-	-	-	-	-	-	-	-	-
7.5	-ditto-	23	24	59	26	33	11	18	71	-	-	-	-	-
9.0	very hard, sandy silt	50/28.5cm	18	65	26	39	5	24	71	-	-	-	-	-
10.5	-ditto-	50/27cm	18	46	30	16	5	12	83	-	-	-	-	-
12.0	hard clayey silt	50/23.5cm	21	47	30	17	6	9	85	-	-	-	-	-
13.5	-ditto-	50/23.5cm	19	46	30	16	10	24	66	-	-	-	-	-
15.0	-ditto-	50/23cm	17	66	30	36	11	24	65	-	-	-	-	-
16.5	-ditto-	50/19cm	-	-	-	-	-	-	-	-	-	-	-	-
18.0	-ditto-	50/22.5cm	12	47	30	17	4	19	77	-	-	-	-	-

\* Drilling depth : 18.38 m, water table : G.L 0.80 m, 0 - 0.7 m (silty clay)

**Table-8 Results of Geological Investigation and Soil Test (Jalan Bachang - Batu Berendam, Melaka), BH-1 (Bridge)**

Depth (m)	Geological condition	N-value (times)	Moisture content (%)	Atterberg limit			Components of soil (%)			Triaxial test (UU)			Consolidation test			
				L.L.	P.L.	IP	Gravel	Sand	Silt & clay	Bulk density/Dry density (KN/m <sup>3</sup> )	Specific gravity	(KN/m <sup>2</sup> )	C(KN/m <sup>2</sup> )	$\phi$ (°)	$P_0$ (KN/m <sup>2</sup> )	Cc
1.5	stiff, silty clay	9	19	60	30	30	-	-	-	-	-	-	-	-	-	-
3.0	-ditto-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.5	medium stiff, silty clay	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.0	-ditto-	5	17	51	22	29	0	16	84	-	-	-	-	-	-	-
7.5	medium stiff, clayey silt	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9.0	-ditto-	5	7	50	22	28	0	45	55	-	-	-	-	-	-	-
10.5	-ditto-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12.0	stiff, clayey silt	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.5	-ditto-	7	34	57	29	28	0	5	95	-	-	-	-	-	-	-
15.0	-ditto-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16.5	stiff to very stiff, clayey silt	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18.0	-ditto-	14	25	52	29	23	0	9	91	-	-	-	-	-	-	-
19.5	hard, sandy/clayey silt	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21.0	-ditto-	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.5	-ditto-	37	32	42	28	14	0	8	92	-	-	-	-	-	-	-
24.0	hard, clayey silt	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25.5	-ditto-	50/16cm	18	49	30	19	0	2	98	-	-	-	-	-	-	-
27.0	-ditto-	50/24.5cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28.5	-ditto-	50/16.5cm	22	50	31	19	0	2	98	-	-	-	-	-	-	-
30.0	-ditto-	50/16cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31.5	-ditto-	50/11cm	19	47	30	17	0	3	97	-	-	-	-	-	-	-
33.0	-ditto-	50/11.5cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34.5	-ditto-	50/14.5cm	18	48	29	19	0	3	97	-	-	-	-	-	-	-

\* Drilling depth : 34.65 m, water table : G.L 0.90 m, 0 - 0.9 m (silty clay)

**Table-9 Results of Geological Investigation and Soil Test (Jalan Bachang - Batu Berendam, Melaka), BH-3 (Bridge)**

Depth (m)	Geological condition	N-value (times)	Moisture content (%)	Atterberg limit			Components of soil (%)			U.C.S (KN/m <sup>2</sup> )			Triaxial test (UU)			Consolidation test		
				L.L.	P.L.	I.P.	Gravel	Sand	Silt & clay	Bulk densit (KN/m <sup>3</sup> )	Dry densit (KN/m <sup>3</sup> )	Specific gravity	C(KN/m <sup>2</sup> )	C(KN/m <sup>2</sup> )	$\phi$ (°)	$P_0$ (KN/m <sup>2</sup> )	Cc	$e_0$
1.5	medium stiff, silty clay	5	29	62	24	38	10	16	74	-	-	-	-	-	-	-	-	
3.0	soft, clay	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4.5	very soft, clayey silt	1	101	74	25	49	0	4	96	-	-	-	-	-	-	-	-	
5.0	-ditto-	-	-	-	-	-	-	-	-	1.44	0.8	2.29	24.8	3.3	1.5	72	0.664	
6.0	-ditto-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
7.5	-ditto-	2	36	64	24	40	0	10	90	-	-	-	-	-	-	-	-	
9.0	stiff, clay	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
10.5	-ditto-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12.0	medium stiff, silty clay	5	43	55	31	24	0	5	95	-	-	-	-	-	-	-	-	
13.5	stiff, silty clay	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15.0	-ditto-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
16.5	-ditto-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
18.0	-ditto-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
19.5	stiff, clayey silt	12	29	46	29	17	0	12	88	-	-	-	-	-	-	-	-	
21.0	-ditto-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
22.5	-ditto-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
24.0	-ditto-	18	38	46	29	17	0	8	92	-	-	-	-	-	-	-	-	
25.5	-ditto-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
27.0	-ditto-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
28.5	-ditto-	29	26	46	29	17	0	13	87	-	-	-	-	-	-	-	-	
30.0	very hard, clayey silt	50/20.5cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
31.5	-ditto-	50	22	46	30	16	0	10	90	-	-	-	-	-	-	-	-	
33.0	-ditto-	50/19cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
34.5	-ditto-	50/16.3cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
36.0	hard, clayey silt	50/15.3cm	18	45	29	16	0	4	96	-	-	-	-	-	-	-	-	
37.5	-ditto-	50/12.5cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
39.0	-ditto-	50/10cm	20	48	30	18	0	4	96	-	-	-	-	-	-	-	-	

\* Drilling depth : 39.26 m, water table : G.L 0.90 m, 0 - 0.8 m (silty clay)

\* Shear strength by vane test : 6.5 m (14.88KN/m<sup>2</sup>), 8.0m (11.90KN/m<sup>2</sup>)

**Table-10 Results of Geological Investigation and Soil Test (Jalan Bachang - Batu Berendam, Melaka), BH-4 (Bridge)**

Depth (m)	Geological condition	N-value (times)	Moisture content (%)	Atterberg limit			Components of soil (%)			U.C.S Specific gravity	C(KN/m <sup>2</sup> )	P <sub>0</sub> (KN/m <sup>2</sup> )	$\phi$ (°)	Consolidation test
				L.L	P.L	IP	Gravel	Sand	Silt & clay					
1.5	loose, clayey/silty medium coarse sand	7	22	47	25	22	14	42	44	-	-	-	-	-
3.0	soft, clay	4	-	-	-	-	-	-	-	-	-	-	-	-
4.5	very soft, silty clay	0	-	-	-	-	-	-	-	-	-	-	-	-
6.0	-ditto-	1	-	-	-	-	-	-	-	-	-	-	-	-
6.5	-ditto-	-	98	-	-	-	-	-	-	1.41	0.71	21.8	9.0	2.0
7.5	-ditto-	2	103	83	23	60	0	9	91	-	-	-	-	-
9.0	stiff, clayey silt	8	-	-	-	-	-	-	-	-	-	-	-	-
10.5	-ditto-	6	46	59	29	30	1	9	90	-	-	-	-	-
12.0	medium stiff, clayey silt	7	59	30	29	0	8	92	0	-	-	-	-	-
13.5	stiff, clayey silt	6	-	-	-	-	-	-	-	-	-	-	-	-
15.0	-ditto-	8	38	60	29	31	0	7	93	-	-	-	-	-
16.5	-ditto-	7	-	-	-	-	-	-	-	-	-	-	-	-
18.0	very stiff, clayey silt	19	33	71	24	47	9	15	76	-	-	-	-	-
19.5	-ditto-	16	-	-	-	-	-	-	-	-	-	-	-	-
21.0	-ditto-	14	30	49	30	19	0	14	86	-	-	-	-	-
22.5	-ditto-	20	-	-	-	-	-	-	-	-	-	-	-	-
24.0	very hard, clayey silt	50/15.5cm	-	-	-	-	-	-	-	-	-	-	-	-
25.5	-ditto-	50/15cm	25	47	30	17	0	11	89	-	-	-	-	-
27.0	-ditto-	50/15.5cm	-	-	-	-	-	-	-	-	-	-	-	-
28.5	-ditto-	50/21cm	19	45	29	16	0	9	91	-	-	-	-	-
30.0	-ditto-	50/13.5cm	-	-	-	-	-	-	-	-	-	-	-	-
31.5	-ditto-	50/13cm	18	46	25	21	14	26	60	-	-	-	-	-
33.0	-ditto-	50/11cm	-	-	-	-	-	-	-	-	-	-	-	-

\* Drilling depth : 33.26 m, water table : G.L. 0.60 m, 0 - 0.8 m (silty clay)

\* Shear strength by vane test : 5.0 m (11.90KN/m<sup>2</sup>), 8.0m (11.90KN/m<sup>2</sup>)

**Table-11 Results of Geological Investigation and Soil Test (Jalan Bachang - Batu Berendam, Melaka), BH-5 (Bridge)**

Depth (m)	Geological condition	N-value (times)	Moisture content (%)	Atterberg limit			Components of soil (%)			Triaxial test (UU)			Consolidation test		
				L.L.	P.L.	IP	Gravel	Sand	Silt & clay	Dry densit (KN/m <sup>3</sup> )	Specific gravity	U.C.S (KN/m <sup>2</sup> )	C(KN/m <sup>2</sup> )	$\phi$ (°)	$P_0$ (KN/m <sup>2</sup> )
1.5	loose, clayey/silty sand	6	21	44	26	18	6	46	48	-	-	-	-	-	-
3.0	very soft, silty clay	2	65	59	23	36	0	3	97	-	-	-	-	-	-
3.5	very soft, clayey silt	-	104	-	-	-	-	-	1.4	0.69	2.42	-	6.8	1.9	0.940 2.524
4.5	-ditto-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
6.0	-ditto-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
7.5	-ditto-	3	94	77	24	53	0	5	95	-	-	-	-	-	-
8.0	-ditto-	-	93	-	-	-	-	-	-	-	-	-	-	-	-
9.0	-ditto-	1	-	-	-	-	-	-	-	1.43	0.74	2.57	18.6	9.0	2.0 95 1.651 2.475
10.5	-ditto-	2	98	46	26	30	0	43	57	-	-	-	-	-	-
11.0	-ditto-	-	99	-	-	-	-	-	-	1.41	0.71	2.47	28.7	12.0	1.2 33 1.103 2.473
12.0	very soft, silty clay	3	-	-	-	-	-	-	-	-	-	-	-	-	-
13.5	medium stiff, clayey silt	5	-	-	-	-	-	-	-	-	-	-	-	-	-
15.0	-ditto-	6	46	64	26	38	6	10	84	-	-	-	-	-	-
16.5	very stiff, clayey silt	12	-	-	-	-	-	-	-	-	-	-	-	-	-
18.0	-ditto-	23	17	61	26	35	0	12	88	-	-	-	-	-	-
19.5	-ditto-	22	-	-	-	-	-	-	-	-	-	-	-	-	-
21.0	-ditto-	26	32	58	26	32	2	22	76	-	-	-	-	-	-
22.5	hard, silt	50/30cm	-	-	-	-	-	-	-	-	-	-	-	-	-
24.0	hard, clayey silt	50/23.5cm	22	40	29	11	0	12	88	-	-	-	-	-	-
25.5	-ditto-	50/22cm	-	-	-	-	-	-	-	-	-	-	-	-	-
27.0	-ditto-	50/20cm	20	40	29	11	1	30	69	-	-	-	-	-	-
28.5	-ditto-	50/15.5cm	-	-	-	-	-	-	-	-	-	-	-	-	-
30.0	hard, clayey/sandy silt	50/11.5cm	-	-	-	-	-	-	-	-	-	-	-	-	-
31.5	-ditto-	50/15cm	20	41	30	11	1	10	89	-	-	-	-	-	-

\* Drilling depth : 31.80 m, water table : G.L 0.80 m, 0 - 1.0 m (fine silty clay)

\* Shear strength by vane test : 5.0 m (19.35KN/m<sup>2</sup>), 6.5m (14.88KN/m<sup>2</sup>), 9.5m (14.88KN/m<sup>2</sup>), 12.5m (22.32KN/m<sup>2</sup>)

**Table-12 Results of Geological Investigation and Soil Test (Jalan Bachang - Batu Berendam, Melaka), BH-6 (Bridge)**

Depth (m)	Geological condition	Atterberg limit			Components of soil (%)			Dry density (KN/m <sup>3</sup> )	Specific gravity	U.C.S (KN/m <sup>2</sup> )	Triaxial test (UU) C(KN/m <sup>2</sup> )	Consolidation test P <sub>0</sub> (KN/m <sup>2</sup> )	C <sub>c</sub>	e <sub>0</sub>
		N-value (times)	Moisture content (%)	L.L.	P.L.	IP	Gravel	Sand	Silt & clay (KN/m <sup>3</sup> )					
1.5	medium stiff, silty clay	6	23	47	26	21	6	39	55	-	-	-	-	-
3.0	very soft, silty clay	3	-	-	-	-	-	-	-	-	-	-	-	-
3.5	-ditto-	104	-	-	-	-	-	-	-	-	-	-	-	-
4.5	-ditto-	0	75	59	23	36	0	14	86	-	-	-	-	-
6.0	very soft, clayey silt	0	-	-	-	-	-	-	-	-	-	-	-	-
6.5	-ditto-	102	-	-	-	-	-	-	-	-	-	-	-	-
7.5	-ditto-	2	89	75	23	52	0	3	97	-	-	-	-	-
9.0	-ditto-	1	-	-	-	-	-	-	-	-	-	-	-	-
9.5	-ditto-	103	-	-	-	-	-	-	-	-	-	-	-	-
10.5	-ditto-	2	126	46	29	17	0	44	56	-	-	-	-	-
12.0	-ditto-	2	-	-	-	-	-	-	-	-	-	-	-	-
13.5	-ditto-	2	105	46	28	18	1	15	84	-	-	-	-	-
15.0	stiff, clayey silt	13	-	-	-	-	-	-	-	-	-	-	-	-
16.5	-ditto-	18	49	59	26	33	0	12	88	-	-	-	-	-
18.0	very hard, clayey silt	20	-	-	-	-	-	-	-	-	-	-	-	-
19.5	-ditto-	50/30cm	28	45	31	14	2	5	93	-	-	-	-	-
21.0	very dense, clayey medium to coarse sand	50/20cm	-	-	-	-	-	-	-	-	-	-	-	-
22.5	-ditto-	50/21cm	25	50	26	24	4	46	50	-	-	-	-	-
24.0	very dense, silty medium to coarse sand	50/1.5cm	-	-	-	-	-	-	-	-	-	-	-	-
25.5	-ditto-	50/1.3cm	25	51	26	25	9	51	40	-	-	-	-	-
27.0	-ditto-	50/1.5cm	-	-	-	-	-	-	-	-	-	-	-	-
28.5	-ditto-	50/13.5cm	27	50	26	24	1	11	88	-	-	-	-	-

\* Drilling depth : 28.64 m, water table : G.L. 0.75 m, 0 - 1.0 m (silty clay)

\* Shear strength by vane test : 5.0 m (13.39KN/m<sup>2</sup>), 8.0m (14.88KN/m<sup>2</sup>), 11.0m (17.86KN/m<sup>2</sup>)

**Table-13 Results of Geological Investigation and Soil Test (Jalan Bachang - Batu Berendam, Melaka), BH-7 (Bridge)**

Depth (m)	Geological condition	N-value (times)	Moisture content (%)	Atterberg limit			Components of soil (%)			Dry density (KN/m <sup>3</sup> )	Specific gravity	(KN/m <sup>2</sup> )	C(KN/m <sup>2</sup> )	$\phi$ (°)	Po(KN/m <sup>2</sup> )	Cc	$e_0$	Consolidation test
				L.L.	P.L.	IP	Gravel	Sand	Silt & clay									
1.5	medium stiff, sandy/clayey silt	4	17	46	26	20	11	30	60	-	-	-	-	-	-	-	-	
3.0	very stiff, clayey silt	2	52	60	23	37	4	5	91	-	-	-	-	-	-	-	-	
3.5	-ditto-	-	102	-	-	-	-	-	-	1.43	0.71	-	9.17	2.0	2.5	-	-	
4.5	-ditto-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
6.0	-ditto-	2	95	77	23	54	2	4	94	-	-	-	-	-	-	-	-	
6.5	-ditto-	-	110	-	-	-	-	-	-	1.68	0.8	2.28	25.6	2.9	0.5	30	0.890	
7.5	-ditto-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
9.0	-ditto-	3	97	49	27	22	0	24	76	-	-	-	-	-	-	-	-	
9.5	-ditto-	-	110	-	-	-	-	-	-	1.21	0.58	-	17.7	3.0	1.5	-	-	
10.5	-ditto-	2	105	48	28	20	1	29	70	-	-	-	-	-	-	-	-	
12.0	stiff, clayey silt	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13.5	-ditto-	21	23	60	24	36	3	18	79	-	-	-	-	-	-	-	-	
15.0	-ditto-	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
16.5	very dense, silty fine to medium sand	50/30cm	19	53	26	27	6	49	45	-	-	-	-	-	-	-	-	
18.0	-ditto-	50/27.5cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
19.5	-ditto-	50/23cm	16	49	26	23	6	55	39	-	-	-	-	-	-	-	-	
21.0	-ditto-	50/22.5cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
22.5	-ditto-	50/15.5cm	21	50	28	22	0	25	75	-	-	-	-	-	-	-	-	
24.0	very dense, clayey/silty fine to medium s	50/15.5cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
25.5	-ditto-	50/15cm	18	50	26	24	0	40	60	-	-	-	-	-	-	-	-	

\* Drilling depth : 25.80 m, water table : G.L 0.90 m, 0 - 1.0 m (silty clay)

\* Shear strength by vane test : 5.0 m (14.88KN/m<sup>2</sup>), 8.0m (22.32KN/m<sup>2</sup>), 11.0m (17.86KN/m<sup>2</sup>)

**Table-14 Results of Geological Investigation and Soil Test (Jalan Bachang - Batu Berendam, Melaka), BH-8 (Bridge)**

Depth (m)	Geological condition	N-value (times)	Moisture content (%)	Atterberg limit			Components of soil (%)			Dry density (KN/m <sup>3</sup> )	Specific gravity	U.C.S (KN/m <sup>2</sup> )	Triaxial test (UU) C(KN/m <sup>2</sup> )	$\phi$ (°)	$P_0$ (KN/m <sup>2</sup> )	Consolidation test Cc	$e_0$
				L.L	P.L	IP	Gravel	Sand	Silt & clay (KN/m <sup>3</sup> )								
1.5	silty clay	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.0	soft, clayey silt	2	59	58	23	35	0	9	91	-	-	-	-	-	-	-	-
3.5	-ditto-	-	83	-	-	-	-	-	-	1.48	0.81	2.47	26.2	13.0	1.0	31	0.827
4.5	very soft, clayey silt	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.057
6.0	-ditto-	1	75	75	23	52	0	4	96	-	-	-	-	-	-	-	-
6.5	-ditto-	-	80	-	-	-	-	-	-	1.78	0.99	2.39	24.1	6.2	1.0	43	0.990
7.5	-ditto-	2	73	84	24	60	0	4	96	-	-	-	-	-	-	-	-
9.0	-ditto-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10.0	-ditto-	-	69	-	-	-	-	-	-	1.5	0.88	2.36	52.2	15.0	0.9	33	0.691
10.5	medium stiff, silty clay	5	16	42	27	15	1	30	69	-	-	-	-	-	-	-	-
12.0	stiff, silty clay	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.5	-ditto-	14	20	48	26	22	1	30	69	-	-	-	-	-	-	-	-
15.0	very stiff, clayey silt	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16.5	-ditto-	26	28	56	27	29	1	19	80	-	-	-	-	-	-	-	-
18.0	hard, clayey silt	50/30cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19.5	-ditto-	50/30cm	25	49	26	23	1	11	88	-	-	-	-	-	-	-	-
21.0	-ditto-	50/28cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.5	-ditto-	50/24.5cm	23	51	26	25	0	31	69	-	-	-	-	-	-	-	-
24.0	-ditto-	50/18.5cm	34	44	29	15	1	3	96	-	-	-	-	-	-	-	-
25.5	-ditto-	50/16cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27.0	-ditto-	50/21cm	26	47	30	17	1	3	96	-	-	-	-	-	-	-	-

\* Drilling depth : 27.36 m, water table : G.L 1.20 m, 0 - 1.0 m (silty clay)

\* Shear strength by vane test : 5.0 m (19.35KN/m<sup>2</sup>), 8.0m (20.83KN/m<sup>2</sup>)

**Table-15 Results of Geological Investigation and Soil Test (Jalan Bachang - Batu Berendam, Melaka), BH-9 (Bridge)**

Depth (m)	Geological condition	N-value (times)			Moisture content (%)			Atterberg limit			Components of soil (%)			Triaxial test (UU)			Consolidation test		
		L.L.	P.L.	I.P.	Gravel	Sand	Silt & clay	Bulk density (KN/m <sup>3</sup> )	Dry density (KN/m <sup>3</sup> )	Specific gravity	C(KN/m <sup>2</sup> )	C(KN/m <sup>2</sup> )	$\phi$ (°)	$P_0$ (KN/m <sup>2</sup> )	Cc	$e_0$			
1.5	medium stiff, clayey silt	7	31	26	25	6	68	-	-	-	-	-	-	-	-	-	-		
3.0	very soft, clayey silt	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3.5	-ditto-	-	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
4.5	-ditto-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
6.0	-ditto-	2	65	76	23	53	0	4	96	-	-	-	-	-	-	-	-		
7.5	-ditto-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
8.0	-ditto-	-	79	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
9.0	-ditto-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
10.5	-ditto-	2	67	78	23	55	0	4	96	-	-	-	-	-	-	-	-		
12.0	soft, clayey silt	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
13.5	-ditto-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
15.0	-ditto-	1	64	72	23	49	0	3	97	-	-	-	-	-	-	-	-		
15.5	-ditto-	2	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
16.5	-ditto-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
18.0	soft, silty clay	3	47	50	27	23	4	31	65	-	-	-	-	-	-	-	-		
19.5	loose, silty/clayey coarse to medium sand	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
21.0	-ditto-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
22.5	-ditto-	5	47	47	29	18	1	9	90	-	-	-	-	-	-	-	-		
24.0	medium stiff, silty clay	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
25.5	stiff, clayey silt	10	68	47	28	19	0	5	95	-	-	-	-	-	-	-	-		
27.0	hard, clayey silt	50/30cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
28.5	-ditto-	50/30cm	27	46	30	16	6	9	85	-	-	-	-	-	-	-	-		
30.0	-ditto-	50/30cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
31.5	-ditto-	50/28cm	27	45	30	15	10	14	76	-	-	-	-	-	-	-	-		
33.0	-ditto-	50/27cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
34.5	-ditto-	50/17cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
36.0	-ditto-	50/19.5cm	20	48	29	19	9	11	80	-	-	-	-	-	-	-	-		

\* Drilling depth : 36.35 m, water table : G.L 2.60 m, 0 - 0.8 m (silty clay)

\* Shear strength by vane test : 5.0 m (12.65KN/m<sup>2</sup>), 9.5m (17.86KN/m<sup>2</sup>), 14.0 m (20.09KN/m<sup>2</sup>), 17.0m (17.86KN/m<sup>2</sup>)