1979/49. Test pitting for road-making materials along Eddystone and Musselroe Roads, Portland Municipality

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Abstract

Four sites in the Eddystone Road-Musselroe Road area were tested for gravel resources using a backhoe. Sizing analysis of material sampled and other factors show only two sites as being worth considering for future gravel pit operations.

INTRODUCTION

This report contains the results of a test programme which was recommended in a previous report (Threader, 1979) and carried out under supervision of the writer by the Portland Municipal Council using a backhoe mounted on a David Brown 995 agricultural wheeled tractor.

AREA EXAMINED

On the basis of the previous work, four localities were selected for further examination. These were:

(1) Eddystone Road - Little Boggy Creek area
(2) Eddystone Road - 4 km north of Area 1
(3) Browns Bridge area
(4) north end of Musselroe Road

The areas examined are shown in Figure 1.

RESULTS

Area 1, test pits 1-5

Test pits 3, 4 and 5, which were dug on the western side of the vehicular track leading from Eddystone Road to Little Boggy Creek, showed promise of there being a significant gravel resource, together with a suitable fall of the land to the south for ease of operation.

Area 2, test pits 6-10

All pits, except 8, were in suitable material, indicating a probable extension of the resource surrounding the existing gravel pit.

Area 3, test pits 11-13

No gravels were intersected near the bridge, probably due to the deposition of river silt over gravel. There is evidence of shallow diggings around pit 13 and it is presumed that the thin mantle of gravel previously existing has been removed.

Area 4, test pits 14-18

There was insufficient gravel fraction in these test pits for the material to have any application in road-making. Pit 14 contained 1.8 m of clayey pebbly sand which could be blended with coarser material from elsewhere. Pit 18 was deficient in fines, but this material could be used for concrete aggregate or as a road sealant.

Presentation of results

The logs of test pits, together with gravel/sand/silt-clay proportions and the results of plasticity tests carried out on all materials containing excessive fines are shown in Table 1. The gravel/sand/silt-clay ratios are shown on a triangular diagram (fig. 2) which clearly shows the sandy, clayey nature of the material. There is no true gravel and the best materials are those described as sandy gravel. A 5-10% fines content is desirable to act as a binder. Complete sizing analyses of the material tested are given in Table 2.

DISCUSSION

It was hoped to locate some areas with several metres thickness of suitable material so that the further proliferation of broad shallow pits could be avoided. Unfortunately none were located, which may be as a result of the nature of the terrain, but could also be due to the inadequacies of the plant used. The backhoe was deficient in two respects; the reach was limited to two metres and the hydraulics were inadequate for the purpose. The machine could only dig to two metres in soft sand and significantly less where cemented layers were encountered. Consequently, some holes had to be abandoned without properly investigating the site.

RECOMMENDATION

The two areas on Eddystone Road, namely 3, 4 and 5 in Area 1 and 6-10 in Area 2 are the only sites considered worth opening up as future gravel pits.

REFERENCE

THREADER, V.M. 1979. Prospecting for gravel in the Eddystone and Musselroe Roads area. *Unpubl.Rep.Dep. Mines Tasm.* 1979/7.

[23 November 1979]

Table 1. LOGS AND MATERIAL PROPERTIES OF TEST PITS

Pit No.	AMG reference	Log	Depth (mm)	Sample No.	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit	Plast-icity Index	Type of material	Use
1	EQ985592	Coarse sand	600								Not sampled, appeared deficient in coarse fraction.
		Sand with scattered pebbles	900								
		Sand, clayey at base	1650								
		Cream clay	2100								
2	EQ984594	Coarse sand	600	2.3	29	67	4	36	13	SG	Top 600 mm suitable, remainder excessive in fines. Total depth 1.5 m of marginal quality.
		Peaty sandy clay	900	2.2	16	55	29	46	23	VCPS	
		Off white red mottled sandy clay	1500	2.1	9	63	28	62	33	VCPS	
			Weighted mean		18	63	19			CPS	
3	EQ983593	Peaty soil	450)	3	21	76	3			PS	Slightly deficient in gravel fraction. Total depth in excess of 1.65 m.
		Coarse white sand	1500)								
		Cemented coarse white sand	) 1650)		(Could not penetrate)						
4	EQ982593	Coarse sand	1200)	4	33	62	5			SG	Satisfactory to 2.4 m. Could possibly include some of fines to 2.7 m.
		Cemented coarse sand	1500)								
		Medium sand, finer at base	) 2400)								
		Sandy clay (continuing)	2700								
5	EQ982592	Coarse sand, peaty, iron stained	1500	5	29	68	3			SG	Satisfactory to 1.8 m.
		Cemented coarse sand	1800								
6	EQ968636	White sand	450)	6	21	68	11			CPS	Marginal to satis-factory to 1.8 m.
		Yellow clay with scattered grit	) 750)								
		Peaty gritty clay	1200)								
		Coarse, yellow, clayey, sand	) 1800)								
7	EQ967637	Peaty soil	150)	7.1	46	50	4			SG	Satisfactory to 1.2 m. Probably a greater depth available.
		Coarse white sand	600)								
		Peaty sand	750)								
		Cemented, coarse, clayey sand	1200	7.2	37	60	3	(Could not penetrate)		SG	
			Weighted mean		43	54	3			SG	

Pit No.	AMG Reference	Log	Depth (mm)	Sample No.	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit	Plast-icity Index	Type of material	Use
8	EQ968635	Peaty, sandy soil	300								Not sampled, no gravel.
		Sand	900								
		White clay with scattered grit	1200								
9	EQ966638	Soil	150								Satisfactory to 1.5 m.
		Coarse white sand	600	9.1	35	61	4			SG	
		Sandy clay with bands of white clay	1500	9.2	44	50	6			SG	
			Weighted mean		37	48	5			SG	
10	EQ969634	Peaty sandy soil	150								Satisfactory to 1.35 m.
		White sand	600	10.1	24	71	5			SG	
		Peaty clayey sand	750)	10.2	30	55	15			CSG	
		Coarse clayey sand	1350)								
			Weighted mean		28	61	11			CSG	
11	EQ915677	Soil	150)	11.1	0	91	9			S	Unsatisfactory, deficient in gravel fraction.
		Fine white sand	750)								
		Iron stained sand	1050)	11.2	1	84	15	Slip		CS	
		Fine brown, clayey sand	1950)								
			Weighted mean		1	87	12			CS	
12	EQ918678	Fine sand and soil cemented sand	(could not penetrate)								As above
13	EQ922681	Coarse, clean sand	600	13.1	39	55	6			SG	Marginal quality
		Peaty, sandy clay	900)	13.2	35	44	21	55	28	VCSG	
		Mottled white and brown gritty clay (continuing)	1900)								
			Weighted mean		36	48	16			CSG	
14	EQ991762	Soil	150								Unsatisfactory due to excessive fines but may suitable for blending with less plastic materials.
		Fine white sand	600	14.4	13	71	16	30	11	CPS	
		Peaty sand	750	14.3	13	77	10			CPS	
		Cemented iron-stained sand	1350	14.2	11	74	15	Slip		CPS	
		Clayey sand	1800	14.1	4	70	26	Slip		VCSG	
			Weighted mean		10	72	18			CPS	

Pit No.	AMG Reference	Log	Depth (mm)	Sample No.	Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit	Plast-icity Index	Type of material	Use
15	EQ990753	Coarse sand	300	(600 mm already removed)							No gravel fraction - already stripped
		Sandy clay	600	(pit abandoned)							
16	EQ988775	White sand	600	(600 mm already removed)							Unsatisfactory - excess-ive fines.
		Fine white sand	1050	16.2	0	4	96	51	22	M	
		Clay (continuing)	1650	16.1	0	70	30	Slip			
17	EQ988773	Fine, white sand	750)								Unsatisfactory, no gravel fraction.
		Peaty sand	900)								
		Cemented, iron stained sand	1200)	17	1	93	6			S	
18	EQ989777	Fine white sand	900	18.1	0	98	2			S	Unsatisfactory for road-making but suitable as sealing aggregate or for concrete making.
		Partially consolid-ated iron stained, cross-bedded sand	1500	18.2	3	96	1			S	
		Granule sand	2100	18.3	11	88	1			PS	
		White sand (in floor of old pit)	4100	18.4	9	91	0			PS	
			Weighted mean		6	93	1			PS	

Table 2. SIZING ANALYSES OF SAMPLED MATERIAL

Registered No.		Sizing analysis (mm)									
		9.53	4.75	2.36	1.18	0.6	0.425	0.3	0.15	0.075	-0.075
791363-2.1	Mass %		1.5	7.7	16.8	17.9	9.9	8.4	8.4	1.5	27.9
	Cum.mass %		1.5	9.2	26.0	43.9	53.8	62.2	70.6	72.1	100
791364-2.2	Mass %		2.3	13.4	16.7	18.3	7.6	5.4	5.9	1.8	28.6
	Cum.mass %		2.3	15.7	32.4	50.7	58.3	63.7	69.6	71.4	100
791365-2.3	Mass %		6.7	22.6	20.7	22.7	10	5.6	6	2.1	3.6
	Cum.mass %		6.7	29.3	50	72.7	82.7	88.3	94.3	96.4	100
791366-3	Mass %		3.9	16.8	30.3	33.4	6.9	2.9	2.4	0.8	2.6
	Cum.mass %		3.9	20.7	51	84.4	91.3	94.2	96.6	97.4	100
791367-4	Mass %	0.2	11.3	21.2	22.1	23.7	6.7	3.5	4.2	1.5	5.6
	Cum.mass %	0.2	11.5	32.7	54.8	78.5	85.2	88.7	92.9	94.4	100
791368-5	Mass %	0.2	9.1	19.8	25.5	24.3	9.1	4.6	3.7	1	2.7
	Cum.mass %	0.2	9.3	29.1	54.6	78.9	88	92.6	96.3	97.3	100
791369-6	Mass %		3.6	17.9	23.5	19.7	7.9	5.5	7.5	3.7	10.7
	Cum.mass %		3.6	21.5	45	64.7	72.6	78.1	85.6	89.3	100
791370-7.1	Mass %	0.9	16.4	28.5	22.6	14.7	5.1	2.4	3.6	1.8	4
	Cum.mass %	0.9	17.3	45.8	68.4	83.1	88.2	90.6	94.2	96	100
791371-7.2	Mass %	0.5	8.2	28.5	24.4	16.7	5.9	4	5.7	2.9	3.2
	Cum.mass %	0.5	8.7	37.2	61.6	78.3	84.2	88.2	93.9	96.8	100
791372-9.1	Mass %		8.4	27.1	25.1	17.1	5.8	4	5.8	2.4	4.3
	Cum.mass %		8.4	35.5	60.6	77.7	83.5	87.5	93.3	95.7	100
791373-9.2	Mass %	3.5	16.8	23.3	12.3	9.2	6.2	6.4	10.1	5.6	6.6
	Cum.mass %	3.5	20.3	43.6	55.9	65.1	71.3	77.7	87.8	93.4	100
791374-10.1	Mass %		6.3	17.9	21.9	23	10.2	6.1	6.7	2.5	5.4
	Cum.mass %		6.3	24.2	46.1	69.1	79.3	85.4	92.1	94.6	100
791375-10.2	Mass %		7	23.3	21.5	10.9	4.3	4.4	8.9	4.6	15.1
	Cum.mass %		7	30.3	51.8	62.7	67	71.4	80.3	84.9	100
791376-11.1	Mass %			0.2	0.9	10	18.1	24.6	28.2	9	9
	Cum.mass %			0.2	1.1	11.1	29.2	53.8	82	91	100
791377-11.2	Mass %			0.8	4.3	10.3	13.5	18.6	25.9	11.4	15.2
	Cum.mass %			0.8	5.1	15.4	28.9	47.5	73.4	84.8	100
791378-13.1	Mass %	0.1	10.5	28.2	21	16.6	6.7	3.6	4.7	2	6.6
	Cum.mass %	0.1	10.6	38.8	59.8	76.4	83.1	86.7	91.4	93.4	100
791379-13.2	Mass %	0.1	7.1	28	17.6	8.2	3.7	3.9	7.2	2.7	21.5
	Cum.mass %	0.1	7.2	35.2	52.8	61	64.7	68.6	75.8	78.5	100
791380-14.1	Mass %		0.2	4.1	13.7	14.7	9.1	7.7	14.2	10.7	25.6
	Cum.mass %		0.2	4.3	18	32.7	41.8	49.5	63.7	74.4	100
791381-14.2	Mass %			10.8	19.6	18.8	9.5	7.3	11.6	7.4	15
	Cum.mass %			10.8	30.4	49.2	58.7	66	77.6	85	100
791382-14.3	Mass %		0.6	12.8	29.5	21	7.7	5.8	8.2	4.5	9.9
	Cum.mass %		0.6	13.4	42.9	63.9	71.6	77.4	85.6	90.1	100
791383-14.4	Mass %	0.1	0.4	12.6	24.3	17.4	7.9	7.1	10.9	3.3	16
	Cum.mass %	0.1	0.5	13.1	37.4	54.8	62.7	69.8	80.7	84	100
791384-16.1	Mass %			Trace	3	4.6	4	5.3	26.2	26.5	30.4
	Cum.mass %			Trace	3	7.6	11.6	16.9	43.1	69.6	100

Registered No.		Sizing analysis (mm)									
		9.53	4.75	2.36	1.18	0.6	0.425	0.3	0.15	0.075	-0.075
791385-16.2	Mass %				Trace	0.1	0.1	0.2	0.9	2.5	96.2
	Cum.mass %				Trace	0.1	0.2	0.4	1.3	3.8	100
791386-17	Mass %			0.6	14.1	20.9	10.2	9.5	26.6	11.8	6.3
	Cum.mass %			0.6	14.7	35.6	45.8	55.3	81.9	93.7	100
791387-18.1	Mass %			Trace	25.4	43.8	4.5	4.2	17.4	2.8	1.9
	Cum.mass %			Trace	25.4	69.2	73.7	77.9	95.3	98.1	100
791388-18.2	Mass %	0.8	2.5	0.2	6.2	27.3	11.2	12.2	34.1	4	1.5
	Cum.mass %	0.8	3.3	3.5	9.7	37	48.2	60.4	94.5	98.5	100
791389-18.3	Mass %			11.1	39.1	17.2	5.9	7.4	16.6	1.6	1.1
	Cum.mass %			11.1	50.2	67.4	73.3	80.7	97.3	98.9	100
791390-18.4	Mass %	1	2	6.1	19.7	13.8	4.8	7	40.6	4.9	0.1
	Cum.mass %	1	3	9.1	28.8	42.6	47.4	54.4	95	99.9	100

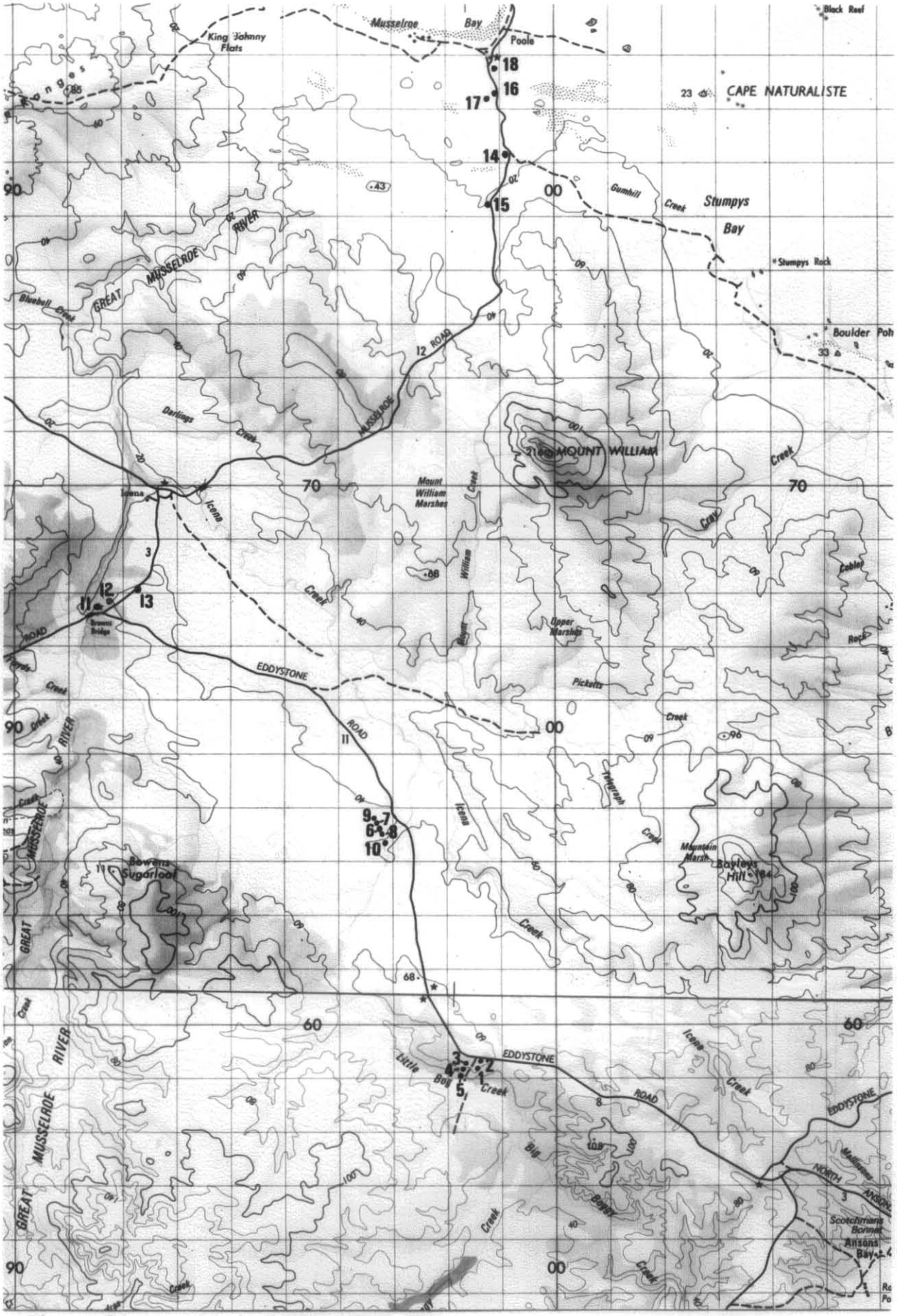
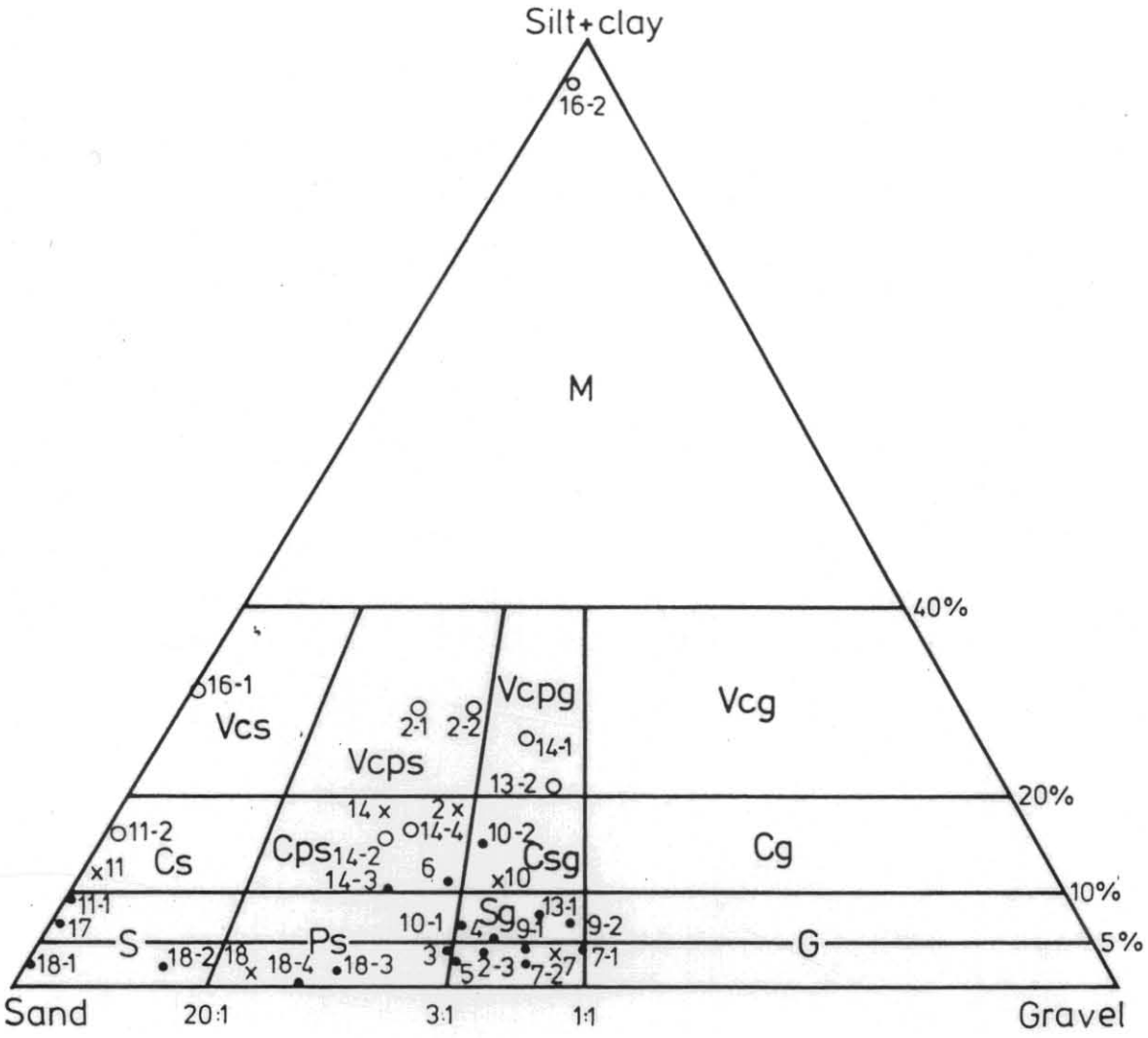


Figure 1. *Location of test areas*



M	mud	Csg	clayey sandy gravel
Vcs	very clayey sand	Cg	clayey gravel
Vcps	very clayey pebbly sand	S	sand
Vcpg	very clayey pebbly gravel	Ps	pebbly sand
Vcg	very clayey gravel	Sg	sandy gravel
Cs	clayey sand	G	gravel
Cps	clayey pebbly sand		

x weighted mean

o sample - Atterberg limit tests performed

• sample - sizing analysis only

5 cm

Figure 2. *Grain size distribution of samples*