Section

Rept. Bk. No. 61/13
G.S. No. 3191
D.M. 1637/64

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
ENGINEERING AND SOILS GEOLOGY SECTION

REPORT ON SITE INVESTIGATION

PRIMARY SCHOOL, HILLCREST

for

Public Buildings Department

by
S. Robson
Geologist

D.M. 1637/64

16th July, 1965

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INTRODUCTION

A site investigation has been carried out for Public Buildings Department for a proposed Primary School at Hillcrest (Fig. 1). The school will be a two-storey concrete building with load-bearing walls seated upon piles, and a groundfloor shelter block with pier and beam footings. Piles will have point loadings of 30 tons, 50 tons and 80 tons, respectively.

The investigation was requested in a letter to the Director of Mines dated 24th August, 1964.

Two percussion drill holes were drilled at the site, Hole 1 to 98 feet and Hole 2 to 52 feet. Open tube samples were taken in both holes, apart from various intervals where drilling was necessary, and in Hole 2 where sealed tube samples were obtained from selected depths.

Standard Penetration Tests were carried out in both drill holes, below 50 feet in Hole 1 and above 50 feet in Hole 2.

The holes have been logged on a scale of 1 inch to 10 feet, and the materials encountered have been classified according to the Unified Soils Classification.

This report describes the results of the drilling and discusses the foundation characteristics of the soils at the proposed site.

OUTLINE OF REGIONAL GEOLOGY

The area investigated is on the Para Fault Block

to the north-east of the Adelaide city area. The depositional history of the block is greatly influenced by movement along the Para Fault itself, the trace of which runs approximately three miles west of the site area.

Contemporaneous with this Late Cainozoic faulting is movement of greater magnitude along the Eden Fault further east and consequent continuous deposition of alluvial materials upon the ara Fault Block although uplift was occurring upon it. However, more pronounced uplift in Quaternary times caused the return to an erosive cycle with a subsequent thinning of the alluvial cover on the block.

The deposits laid down upon the undermass re-Cambrian sediments were Early Tertiary terrestrial and freshwater sediments, the Post Tertiary history being of a more complex nature, including resorting of earlier materials, and alternating alluvial deposition and erosion.

GEOLOGICAL SUCCESSION SHOWN IN DRILLHOLES

An alluvial Black Earth clay profile has developed in the upper levels at the proposed site, and this continues down to a maximum depth of five feet in Hole 2, though here it is overlain by two feet of fill.

Below these black clays are coarsely structured pale brown and mottled sandy clays which might be equated with the leistocene Mottled Clays of the Adelaide lains further south. At the site they are much thinner, attaining a maximum thickness of 12 feet in Hole 1.

Underlying the mottled clays, that is below 12 to 15 feet, is a sequence of poorly sorted sands, which are pale-brown red and yellow mottled. They are of probable Early Tertiary age. These are strongly-cemented sediments throughout their thickness, the cementing agent being ferruginous material.

At and below about 40 feet highly to completely weathered

Pre-Cambrian sediments occur. These are dipping quite steeply (60°), are well-bedded, and contain a few hard bands of less-weathered rock.

FOUNDATION CHARACTERISTICS

The alluvial clays from the surface to 15 feet in Hole 1, and 12 feet in Hole 2 are very stiff apart from a short interval within the limy surface clays where readings of unconfined compressive strength (qu) by Soiltest penetrometer were less than 1.5 tons per sq.ft. These clays are subject to seasonal movements due to moisture content changes and exhibit coarse structures with polished surfaces at certain depths.

The mottled sands below these clays are consistently dense to hard materials and in both holes required drilling below 20 feet. It is considered likely that piles will meet refusal at about 20 feet. Standard Penetration Tests within the sands at greater depths gave persistently high readings of blows per foot although interpretation of the results is difficult due to the nature of the cemented banded intervals and presence of large pebbles.

The basal silty materials derived from completely weathered Pre-Cambrian sediments are dense and hard in places where more resistant rock bands occur. Alternating with the silt layers are fine-grained sandy horizons and occasional clay bands, which are generally softer than the main sequence.

GROUNDWATER

No water was cut in either drill hole and the site appears to be well-drained.

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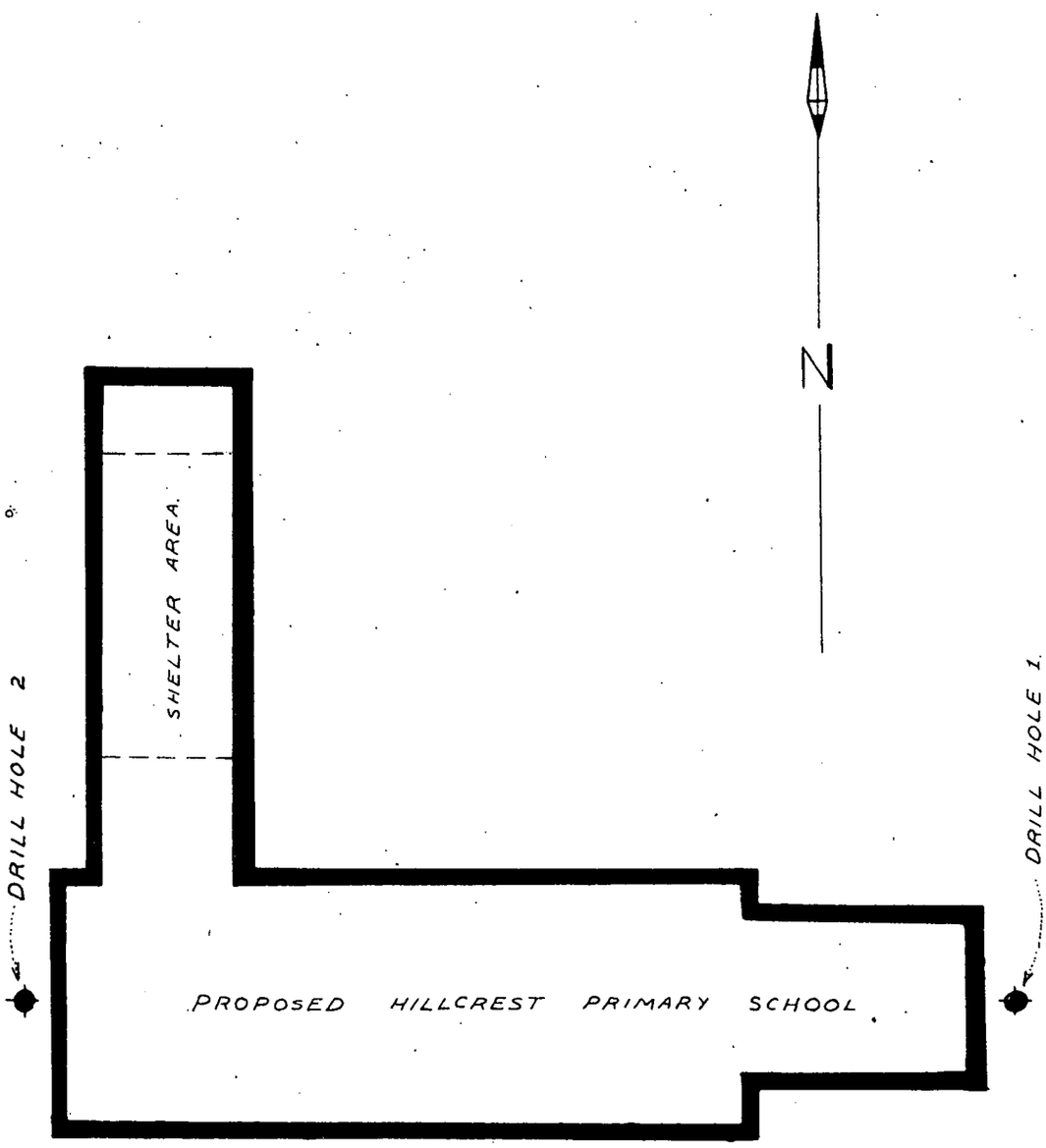
S. ROBSON
GEOLOGIST
ENGINEERING AND SOILS GEOLOGY SECTION

SR:AWK
16.7.65

REFERENCES

1. The Soils and Geology of Adelaide and Suburbs".
Aitchison, G.D. Sprigg, R.C. and Cochrane, G.W.
Bulletin 32, Ge 1, Surv. SA 1954

QUEENSBOROUGH AVENUE



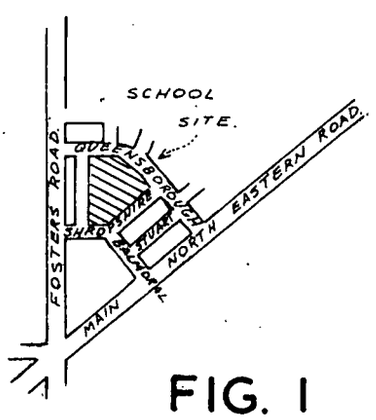


FIG. 1

DEPARTMENT OF MINES — SOUTH AUSTRALIA

	Drn.	SITE INVESTIGATION	SCALE: 1in : 40ft.
	Tcd.	HILLCREST PRIMARY SCHOOL	S 4366 Ho 5
	Ckd.	LOCALITY PLAN	
	Exd.		DATE:

DEPARTMENT OF MINES - SOUTH AUSTRALIA

LOG OF PERCUSSION DRILL HOLE

HOLE NO. 1

SHEET 1 OF 1

PROJECT **HILLCREST SCHOOL** BORE **P.B.D.**

LOCATION **HILLCREST**

FEATURE **FOUNDATION** Depth **98** ft R.L. Coords

SOIL TYPE GEOLOGICAL DESCRIPTION	CASING R.L. (FEET)	DEPTH (FEET)	GRAPHIC LOG	GROUP SYMBOL	SOIL DESCRIPTION GROUP NAME	CONSISTENCY REL. DENSITY	MOISTURE CONTENT	WATER LEVELS	SOIL TEST PENETROMETER 1 2 3 4
SANDY and CLAYEY FILL				SP	SAND, poorly graded, few clay pockets, 75% grains up to 1 mm.				
				CL	CLAYSOIL, low plasticity, black, few fragments up to 2 mm. across.				
Ill-defined cloddy structure in parts, with granular substructure, medium sheens on faces.		10		CL	CLAY SOIL, medium plasticity, some fine grained sandy patches, pale brown, green, yellow and red mottled, lime approx. 10% of soil in top foot, few plant stains.	Very Stiff			
TERTIARY TERRESTRIAL SANDS. Sands partly cemented in places.		20		SC	SAND, medium grained, excess clay fines, pale brown, red mottled.				Drilled
				SP	SAND, poorly graded, medium grained, pale brown, red and yellow mottled, few clayey fines in parts, some hard fragments up to 0·1 ft across.				
		30			gradational				
				SP	SAND, poorly graded, fine to medium grained, yellow, few grains up to 2 mm. across.				Drilled
		40							
PRE-CAMBRIAN ADELAIDE SYSTEM SEDIMENTS. Completely weathered to highly weathered bedrock; relict bedding dipping approx. 60°.				ML SP	SILT SOIL, low plasticity, abundant fine sand in parts, red, purple, yellow, green, etc., some semi-hard bands.	Dense to Hard	Damp	No Water Cut	Standard Penetration Test 47 blows
		50							
		60							SPT 44
		70							SPT 52
		80							
		90							SPT 120
					END OF HOLE 98 FT.		M		

TYPE OF SAMPLE	HYDROLOGY	CONSISTENCY	REL. DENSITY AND STATE
Open Tube	Water cut	VS-Very Soft	VL-Very Loose H-Humid
Sealed Tube	Static level	S-Soft	L-Loose D-Damp
Auger barrel	Supply	F-Firm	C-Compact M-Moist
Slush pump	Analysis (p.p.m)	St-Stiff	D-Dense W-Wet
Casing	← Water level. (Date)	VSt-Very Stiff H-Hard	VD-Very Dense S-Saturated

RUSTON

Driller PHILLIPS.

Started 18th MAR. '65

Finished 24th MAR. '65

S.A.

5th APR. '65

S.A.

Traced

Checked

PLAN No. S 4284 Ha 5

Vertical Scale 1" = 10 FEET.

DEPARTMENT OF MINES - SOUTH AUSTRALIA

LOG OF PERCUSSION DRILL HOLE

HOLE NO. 2

SHEET 1 OF 1

PROJECT: **HILL CREST SCHOOL** Hired: **P. B. D.**

LOCATION: **HILL CREST** Sec.

FEATURE: **FOUNDATION** Depth **52** ft. R.L. Coords.

SOIL TYPE GEOLOGICAL DESCRIPTION	CASING R.L. (FEET)	DEPTH (FEET)	GRAPHIC LOG	GROUP SYMBOL	SOIL DESCRIPTION GROUP NAME	CONSISTENCY REL. DENSITY	MOISTURE CONTENT	WATER LEVELS
FILL; clay with stone rubbish.				CL	CLAYSOIL, low plasticity, black, fragments up to 2 mm.			
				CL	CLAY SOIL, low plasticity, dark grey to black.			
Ill defined cloddy structure and granular substructure.		10		CL	CLAYSOIL, medium plasticity sandy in places, pale brown, pale green, red mottled, few lime patches near top.	H Very stiff.		
partly cemented sands.				SC	SAND, excess clay fines, pale brown, red mottled.			
		20		SP	SAND, poorly graded, medium grained, pale brown, red and yellow mottled, few clay fines in parts, some hard fragments up to 0.2 ft. across.	Dense to Very Dense	Damp	No Water Cut
		30						
		40		SP	SAND, poorly graded medium to fine grained, pale yellow, few grains up to 2 mm. across.			
PRE CAMBRIAN ADELAIDE SYSTEM SEDIMENTS. Highly weathered to completely weathered bedrock, dipping 60°		50		ML I SP	SILTSOIL, low plasticity, abundant fine sand in parts, purple, red, yellow, pale green, etc., few semi-hard bands.			
					END OF HOLE 52 FT.			
		60						
		70						
		80						
		90						

PENETRATION — SOIL TEST PENETROMETER 1 2 3 4

S.P.T. 21 blows.

SPT 200 blows. Drilled

SPT 130 blows. Drilled 41 blows.

SPT

SPT 72 blows.

SPT 53 blows.

TYPE OF SAMPLE: Open Tube; Sealed Tube; Auger barrel; Slush pump; Casing

HYDROLOGY: Water cut; Static level; Supply; Analysis (p.p.m); ← Water level. (Date)

CONSISTENCY: VS-Very Soft, S-Soft, F-Firm, St-Stiff, VSt-Very Stiff, H-Hard

REL. DENSITY: VL-Very Loose, L-Loose, C-Compact, D-Dense, VD-Very Dense

MOISTURE: H-Humid, D-Damp, M-Moist, W-Wet, S-Saturated

Page 9 — RUSTON — Driller PHILLIPS — Started 25 Mar. '65 — Finished 29 Mar. '65

S. A. — 5th Apr. '65 — S. A. — Traced — Checked

PLAN No. S4282 Ha 5

Vertical Scale 1" = 10 FT.