



ENG. GEOLOGY SECTION

**DEPARTMENT OF MINES
SOUTH AUSTRALIA**

GEOLOGICAL SURVEY

ENGINEERING AND SOILS GEOLOGY SECTION

REPORT ON SITE INVESTIGATION
PROPOSED PRIMARY SCHOOL - WHYALLA FAR WEST
- Public Buildings Department -

by

R.D. Steel
Assistant Senior Geologist

27th July, 1965

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<u>Fig. No.</u>	<u>Title</u>	<u>Plan No.</u>
1	Proposed Whyalla Far West Primary School. Locality Plan showing Positions of Foundation Test Drillholes.	S 3964
2	Graphic Geological Log, Drillhole No. 1.	S 3962
3	Graphic Geological Log, Drillhole No. 2.	S 3963

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INTRODUCTION

Investigation of the site for a proposed new primary school in the rapidly expanding far western suburbs of Whyalla, was requested by The Director, Public Buildings Department, in a letter dated 28th August, 1964. The site is bounded by Carlson, Havelberg and McNamara Streets and McRitchie Crescent.

The proposed school will be of two-storey construction, with load bearing walls, supported on bored concrete piles under pad footings.

SCOPE OF THE INVESTIGATION

The site has been explored by two percussion drill-holes in the positions shown on Figure 1. Hole No. 1 was continuously open tube sampled to a depth of 100 feet and Hole No. 2 to 50 feet.

The drillholes have been logged at a scale of 10 feet to 1 inch using the Unified Soil Classification System (Reference 1), and the logs are shown graphically as Figures 2 and 3.

This report discusses the results of the drilling and the foundation characteristics of the materials penetrated.

OUTLINE OF REGIONAL GEOLOGY

Whyalla is situated in the South - West Quadrant of the Cultana 1 mile to 1 inch geological sheet (Published 1964).

The area surrounding the township is of low topographic relief, characteristic of long periods of weathering, erosion and peneplanation under generally arid conditions and poor or limited internal drainage.

Three separate physiographic provinces are recognized, namely the coastal swamps, coastal plain, and remnant tableland.

The coastal swamps form a narrow continuous strip of low lying salt water marshes south of the town, which probably represent remnants of the "Osborne" high sea level of Holocene (Recent) Times.

The soil-covered coastal plain rises gently westwards from the marshes to heights of 50 to 100 feet above sea level. North-west of the Whyalla - Iron Knob railway, the surface gradients steepen and reach a maximum elevation of 519 feet in the prominent landmark of Mount Laura, a flat topped remnant of Pre Cambrian masses of the Northern Tableland (Ref. 2).

The coastal plain is composed mainly of alluvial and talus material, underlain by estuarine sands, in turn resting on highly decomposed Pre Cambrian bedrock. The surface is generally covered by several feet of fine aeolian bulldust.

GEOLOGICAL SUCCESSION SHOWN IN DRILLHOLES.

The proposed school site is on essentially flat ground, and lies within the higher portions of the coastal plain.

The geological profile indicated by the drilling, can be considered roughly in two equal sections:-

Above 50 feet, the sequence is composed mainly of alluvium and slopewash material. Fine aeolian bulldust blankets the site for a depth of 6 feet and is underlain by calcareous silty clay soil, with occasional gravel lenses.

Very stiff mottled clays with abundant pockets of

gypsum crystals (selenite) occur continuously between 16 and 32 feet. These become progressively sandier below 32 feet.

Estuarine, brightly mottled fine and occasionally coarse grained sands, extend from 50 feet to the base of Hole 1.

FOUNDATION CHARACTERISTICS

The surface aeolian material is compact, but very powdery and required generally less than 10 blows per foot of penetration.

The underlying calcareous clay soil is stiff, although somewhat friable in the dry state, but would tend to become soft if allowed to become saturated.

Between 16 and 32 feet, the gypsiferous clays are stiff to very stiff, generally requiring more than 25 blows per foot of penetration. Values of unconfined compressive strength taken by soil test penetrometer, gave readings well in excess of 4.5 tons per square foot. Piles driven into these clays should meet refusal at little depth below 16 feet.

The sediments tend to become softer below 36 feet especially as the water table (at 48 feet) below the surface is approached.

The sands present below 50 feet are very dense and compact, although saturated throughout.



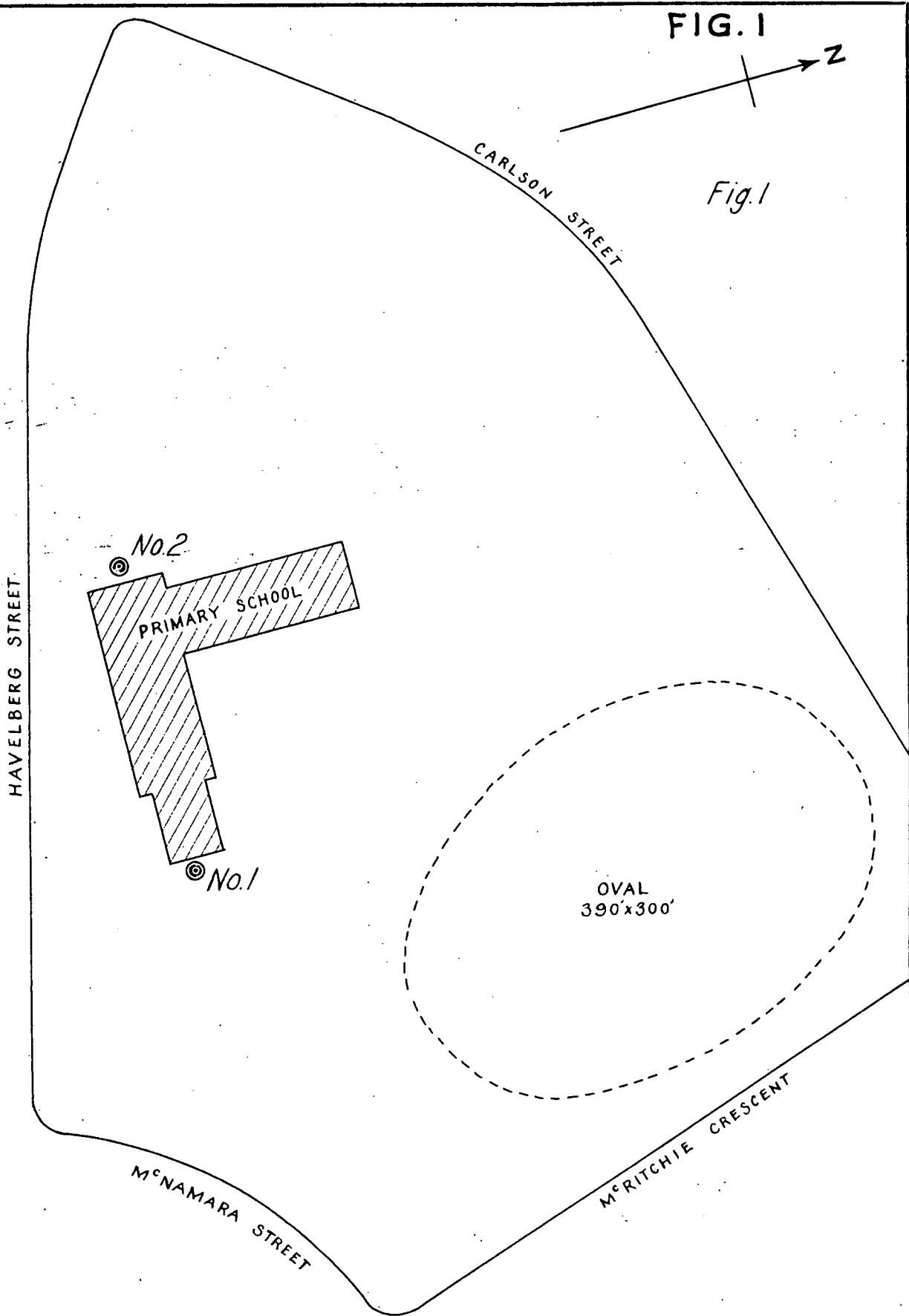
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27.7.65

REFERENCES

1. "Soils Classification Chart" Based on the Unified Soil Classification System of the U.S. Bureau of Reclamation Earth Manual, Denver, Colorado, 1960.
2. Geology and Iron ore Resources of the Middleback Ranges.
K.R. Miles.
Geological Survey of South Australia Bulletin 32.



Percussion Test Drillhole: No. 1



To accompany report by R.D. Steel.

S.A. DEPARTMENT OF MINES

Approved	Passed	Drn. R.S.	POSITIONS OF FOUNDATION TEST DRILLHOLES PROPOSED WHYALLA FAR WEST PRIMARY SCHOOL	D.M.	Scale 100 Ft. to 1 Ins.
		Tcd. D.E.		Req.	S 3964
		Ckd.			Dk 2
Director		Exd.			Date 19-11-64

LOG OF PERCUSSION DRILL HOLE

PROJECT NEW PRIMARY SCHOOL

HARPER PUBLIC BUILDINGS

LOCATION WHYALLA FAR WEST

Sec - 14

FEATURE FOUNDATIONS

Depth 100ft. R.L. - Coords

FIG. 2

SOIL TYPE		CASING	DEPTH (FEET)	GRAPHIC LOG	GROUP SYMBOL	SOIL DESCRIPTION	CONSISTENCY	REL DENSITY	MOISTURE CONTENT	PENETRATION DATA
GEOLOGICAL DESCRIPTION		RL (FEET)				GROUP NAME				Hand Penetration Qu (tons p.sq.ft.)
										1 2 3 4 5
Slightly calcareous. Few small lime nodules.					ML	SILT SOIL, low plasticity, finely sandy. Brown, reddish brown. Contains up to 20% gravel.				
and quartz grit fragments.						Approx. 5% small gravel.				
Gravel, mainly laterite sand and quartz, with some gypsum.					GM	GRAVEL, well graded. Max size 0.2 ins. Av 0.1 ins. 20% silt and clay fines. Red-brown.				
Lime present as small nodules and earthy pockets.			10		CL	CLAY SOIL, low plasticity, silty to finely sandy. Brown to red-brown. 5% small gravel.				
Fragments well rounded quartz, laterite.					ML	SILT SOIL, low plasticity, clayey to finely sandy. Brown to red-brown. 20% gravel Ar 0.1 in.				
					GC	GRAVEL, well graded 0.05 to 0.3 ins. Av 0.1 ins. 40% clay fines. Red-brown, brown.				
Gypsum present as whitish selenite crystals in pockets up to 4 inch size.			20		CH-GC	CLAY SOIL, high plasticity, slightly silty. Green-gray, reddish mottled. 40% Selenite (gypsum) crystals up to 4 in.				
						Mainly dark red-brown, dark red & gray mottled.				
Grains mainly subangular quartz.			40		SM-SC	SAND, fine grained. 35% clay and silt fines. 5% gravel up to 0.1 ins. Brown to reddish-brown.				
Grains subrounded quartz.			50		SW-SM	SAND, well graded, medium coarse grain. 20% silt and clay fines. 5% small gravel. 0.1 ins. Brown, reddish-brown.				
					SP	SAND, fine grained, few silt and clay fines. 5% gravel up to 0.05 ins. Brown, yellow, gray and reddish.				
Grains mainly sub-angular to subrounded quartz.			60		SW	SAND, coarse grained, well graded. 10% clay and silt fines. Light gray, red-brown.				
Cemented by Fe oxide to hardish lumps.					SC	SAND, fine grained, clayey in part. Light gray, brown, red-brown.				
Grains mainly subangular quartz.			70			Light grey, yellow and reddish mottling. Few gravel fragments up to 1.0 ins.				
30% partially cemented to hardish lumps.			80		SP-GW	SAND, fine grained. Gray with yellow and reddish mottling.				
						Brick red, red-brown.				
						SAND, fine grained, clayey. Light grey with vague yellow and reddish mottling.				
						Contains up to 30% gravel fragments max size 0.2 feet.				

LOG OF PERCUSSION DRILL HOLE

PROJECT NEW PRIMARY SCHOOL

PUBLIC BUILDINGS.

LOCATION WHYALLA FAR WEST

Section 437.1

FEATURE FOUNDATIONS

Depth 50 feet. R.L.

Coords - E

FIG. 3

SOIL TYPE		CASING RL (FEET)	DEPTH (FEET)	GRAPHIC LOG	GROUP SYMBOL	SOIL DESCRIPTION GROUP NAME	CONSISTENCY REL DENSITY	MOISTURE CONTENT	WATER LEVELS	PENETRATION DATA				
GEOLOGICAL DESCRIPTION										SECTIONS FOOT				
										Hand penetrometer Qu (tons p. sq. ft.)				
										1 2 3 4 5				
QUATERNARY ALLUVIUM AND SLOPE DEPOSITS	OLDER	6"	10	ML	CL	CLAY SOIL, low plasticity, finely sandy. Contains 5% gravel 0.1 in. Brown to reddish-brown. 10% gravel 0.01 - 0.1 in.	STIFF TO SOMEWHAT FRIABLE	HUMID	NO WATER CUT	Unable to record				
QUATERNARY ALLUVIUM AND SLOPE DEPOSITS	OLDER	10	20	CH	GC	CLAY SOIL, high plasticity. Slightly silty. Mainly green-gray with reddish mottling. 10% gravel up to 3 inch size.	VERY TO EXTREMELY STIFF	MQIST	NO WATER CUT	Qu values much greater than 4.5.				
QUATERNARY ALLUVIUM AND SLOPE DEPOSITS	OLDER	20	30	CH	GC	CLAY SOIL, high plasticity. Green-gray with red-brown mottling becoming predominant at depth. 1% gravel fragments.	VERY TO EXTREMELY STIFF	MQIST	NO WATER CUT	Qu values much greater than 4.5.				
QUATERNARY ALLUVIUM AND SLOPE DEPOSITS	OLDER	30	40	CL	CL	CLAY SOIL, low plasticity. Very silty, increasingly sandy with depth. Reddish, with lesser grayish mottling.	STIFF	VERY MOIST	NO WATER CUT	Qu values much greater than 4.5.				
END OF HOLE 50 FEET		50												
		60												