SECTION.

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY

SOILS GEOLOGY SECTION

REPORT ON SITE INVESTIGATION

PROPOSED CIVIC BUILDING

WHYALLA

HD. RANDELL

by

A. A. Gibson
Senior Geologist

Rept. Bk. No. 49/158
G.S. No. 1548
D.M. 1986/59

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ABSTRACT

The site of a proposed civic building in the town of Whyalla was tested by means of 5 power-auger test bores. These bores revealed aeolian fine sands and silts and red-brown sandy clay overlying bedrock, probably Corunna Conglomerate.

The soil profiles are very uniform in character excepting in the depth to firm bedrock, which varies from 10'3" to 16'0".

If it is intended to construct a basement, for which the site is very suitable, some excavation of hard rock will be necessary in the south-west corner. Elsewhere the building will be founded on firm, finely sandy and silty clay, underlain by bedrock at shallow depth.

For a buildings without a basement it will be necessary to seat the footings at a minimum depth of 4 ft. below the surface. At this depth the maximum safe bearing capacity is estimated to be of the order of 4 tons per square foot, but since the soil here is fine and somewhat limey some significant loss of strength could result if it were allowed to become saturated. Properly constructed drains of adequate capacity therefore will be necessary to dispose of roof run-off and other waste water.

INTRODUCTION

This investigation was initiated verbally by Mr. W. G. Barnes of Messrs. Cheesman, Doley, Brabham and Neighbour, architects, and arrangements were subsequently confirmed in writing.

The Whyalla Town Commission proposed to erect a civic building on Lots 238 and 239 at the corner of Forsyth Street and Darling Terrace.

The structure originally planned was to contain a theatre, offices and shops, with provision for underground parking in the basement. Some doubts are now entertained as to whether a basement will be constructed or not.

The site has a slope of about 5% to northward. During World War II numerous air raid shelter trenches were cut into this site, but their locations and the materials used to fill them are unknown.

TEST BORING AND RESULTS

Test boring at the site was carried out by means of Land Rover-mounter power-auger DM 90 operated by Driller J. Garrick. Four test boreholes, each 30 ft. deep were requested. However, since Bores Nos. 1 to 4 averaged about 14 ft. deep only and significant variation in the depth to bedrock occurred it was considered advisable to put down Bore No. 5 in a central position to provide additional detail. This brought the total footage to 74'3" as against the footage of 120 ft. requested.

The positions of the test bores are shown on the accompanying print (S 2313).

The following profiles were revealed by the test bores:-

Bore No. 1

0 - 4'0"	Light red-brown, somewhat limey, fine sand and silt. Numerous small limey nodules. Moderately compact.
4'0" - 8'0"	Ditto, but nodules abundant. Very compact.
8'0" - 13'6"	Red-brown, very finely sandy and silty clay. Damp, Firm.
13'6" - 14'0"	Hard sandstone. Probably Corunna conglomerate.

Bore No. 2

0 - 4'0"	Light red-brown, somewhat limey, fine sand and silt. Frequent small limey nodules. Moderately compact.
4'0" - 8'3"	Ditto, but with numerous small limey nodules. Very compact.
8'3" - 10'3"	Red-brown, very finely sandy and silty clay. Damp. Firm.
	Hard rock encountered at 10'3".

Bore No. 3

0 - 1'0"	Red-brown fine sand and silt.
1'0" - 4'0"	Light red-brown, somewhat limey, fine sand and silt. Numerous small limey nodules. Moderately compact.

Bore No. 3 (Contd.)

4'0" - 8'0"	Ditto, but very compact.
8'0" - 12'0"	Red-brown, very finely sandy and silty clay, with occasional sandstone fragments near the base.
12'0" - 14'0"	Sandstone (Corunna Conglomerate?) with red-brown sandy clay occurring in fractures.

Bore No. 4.

0 - 6"	Red-brown fine sand and silt.
6" - 4'0"	Light red-brown, somewhat limey and slightly clayey fine sand and silt, with numerous small limey nodules. Damp. Moderately compact.
4'0" - 7'6"	Ditto, but very compact.
7'6" - 8'0"	Ditto, but with abundant small stone fragments.
8'0" - 14'6"	Red-brown very finely sandy and silty clay, with occasional small sandstone fragments.
14'6" - 16'0"	Ditto, but with abundant sandstone fragments, merging to:-
16'0" - 18'0"	Jointed sandstone (Corunna Conglomerate?) with interstitial, red-brown, sandy clay.

Bore No. 5

0 - 1'0"	Red-brown fine sand and silt.
1'0" - 4'0"	Light red-brown, somewhat limey, fine sand and silt, with scattered fine limey nodules. Moderately compact.
4'0" - 8'0"	Ditto, but with frequent small limey nodules and very compact.
8'0" - 10'0"	Red-brown slightly clayey, fine sand and silt, with numerous small sandstone fragments and some limey nodules. Very compact.
10'0" - 13'0"	Red-brown, very finely sand and silty clay, with occasional sandstone fragments. Very firm.
13'0" - 16'0"	Ditto, but with abundant sandstone fragments.
16'0" - 18'0"	Jointed sandstone (Corunna Conglomerate ?) with interstitial sandy clay.

It can be seen that the soil profiles are very uniform in character, excepting in the depths to firm bedrock which varies from 10'3" to 16'0".

Down to a depth of 4 ft. the soil is only moderately compact and therefore would be subject to some settlement under load. Furthermore, it is somewhat limey and would be subject to

significant loss of strength with a marked increase in moisture content.

The material from 4 ft. to 8 ft. depth is closely similar, but here it is very compact and contains a higher proportion of small limey nodules. Here again significant loss of strength could result if this material were allowed to become saturated.

The underlying clay is very sandy and silty and very firm. Over much of the area this clay contains abundant small sandstone fragments as the underlying bedrock is approached.

From the nature of the cuttings recovered it is considered that the bedrock is Corrunna Conglomerate. This rock contains numerous coarse, well rounded stone fragments ranging from ferruginous sandstone to quartzite and set in a sandstone matrix. Here this rock appears to be jointed, with sandy clay infilling in the joints.

FOUNDATION RECOMMENDATIONS

If it is intended to construct a basement this site would be very suitable for that purpose. The materials overlying bedrock are mainly of adequate depth, they should be easy to excavate and being compact should stand well in the excavation walls. Only in the south-western corner will it be necessary to excavate hard rock, i.e. in the vicinity of Bore No. 2. Elsewhere the building would be founded on very firm, finely sandy and silty clay, underlain by bedrock at shallow depth.

For a building without a basement it will be necessary to seat the footings at a minimum depth of 4 ft. below the surface. In the condition examined, i.e. after a long spell of dry weather, this material would have an estimated maximum safe bearing capacity of the order of 4 tons per square foot. However, the material at this depth, and to a depth of 8 ft., is very fine and somewhat limey and is therefore apt to suffer significant loss of strength if it is allowed to become saturated. Therefore, in order to

accommodate any accidental local saturation which might occur (burst water pipes, etc.) an added margin of safety should be incorporated in the design. In addition, properly constructed drains of adequate capacity should be constructed to dispose of roof run-off and other waste waters.

The number, locations and depths of the previously existing air raid trenches could not be determined. However, it is reasonable to assume that these were back-filled with the material excavated from them and since the site has been used as a parking area for years and there is no sign of any subsidence having occurred, there should be no cause for concern on this point.

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SOILS GEOLOGY SECTION

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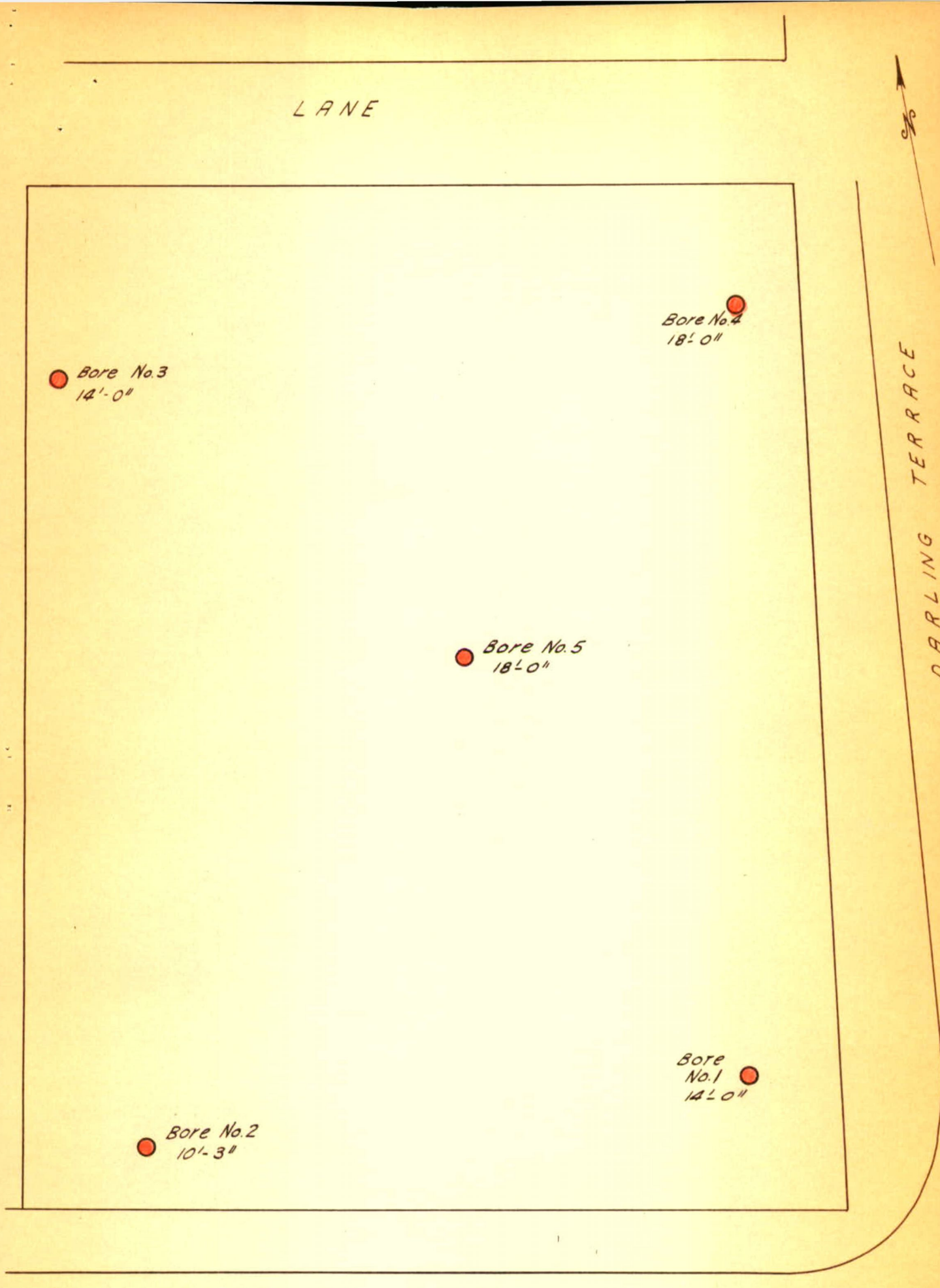

To accompany report by A.A. Gibson

S.A. DEPARTMENT OF MINES					
Approved	Passed	Drn. A.W	SITE INVESTIGATION CIVIC BUILDING-WHYALLA WHYALLA TOWN COMISSION	D.M.	Scale 1/20" to 1'-0"
		Tcd.		Req.	S2313 Dk 2.
		Ckd.			
Director		Exd.			Date 20-11-59

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