

DEPARTMENT OF MINES

SOUTH AUSTRALIA

REPORT ON SITE INVESTIGATION

LOTS 6-8, 21 and 24, WEST BEACH ROAD, WEST RICHMOND

(Stepleton, Hodge & McMichael)

by

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Geologist

GEOLOGICAL SURVEY

SOILS GEOLOGY SECTION

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Department of Mines
South Australia

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(Stapleton, Hodge & McMichael)

ABSTRACT

Six hand auger test holes disclosed alluvial type soils of the Plympton Association over all but a small area in the north western part of the site. For the southern part of the site the use of rigid strip footings of adequate bearing area, such as the inverted Tee beam; or deep beam type of footing, 18 inches thick and of adequate width for the designed loads is recommended.

INTRODUCTION

This investigation was initiated by Messrs. Stapleton Hodge, and McMichael, acting as architects for D. A. J. Fowler Ltd on 19th November, 1957. While the whole site was eventually to be covered by factory and warehouse buildings, or heavy duty roadways, the first buildings were to be confined to the northern three sevenths of the site.

Determination of the soil types was made both by observation of the surface soil, and by means of six hand auger holes to depths varying from seven to ten feet. Since the entire area, excepting a small block in the north west corner, had been cultivated as a vegetable garden, mapping of the disturbed surface soils with reasonable certainty was possible. This, combined with information from auger holes was adequate assessment of the soil conditions. Subsoil conditions were considered complicated by the presence of a deep bore (233 ft) in the bottom of a 30 ft. wall, just south of the area assigned for the initial building programme.

The field work was carried out by E. A. Clothier and subsequently, in February 1958, oral advice on foundation conditions in the northern part of the area was given to Mr. Stapleton by Mr. A. A. Gibson, Senior Geologist. This

enabled the architects to complete foundation design. A ware house and office block for Independent Distributors Ltd. is now (September 1959) under construction on the northern part of the site. Because of pressure of work, the advice given was not confirmed by a written report.

The Architects have now requested further advice on the southern part of the site, on which it is proposed to erect ware house and factory buildings for D. & J. Fowler Ltd. Because of Mr. Gibson's accident temporarily to other duties, this report has been prepared by P. Dunlop, in consultation with Mr. Gibson, from data previously assembled.

FOUNDATION CONDITIONS

The soils on the site are principally the sub-dominant Type PA2a of the Plympton Association, comprising Recent alluvial soils of the River Terrane Complex. Auger holes Nos. 2 to 6 disclosed soil of this type, which is essentially a dark grey heavy alluvium overlying buried degraded red brown earth. Auger Hole No. 1 was very similar, being Type PA2 but with affinities to Type RB7, a major member of the Hindmarsh Association. A description of the soils in the six auger holes is appended.

The Plympton Association soils are subject to shrinking and swelling movements due to the clay horizons present and may also be subject to some settlement under load. In the present instance the stability of the soils near the north centre of the site may have been affected by rising pressure waters from the deep bore and well formerly used for irrigation purposes in the market garden. This bore is recorded in Geological Survey Bulletin No. 27 (K. R. Miles - Geology and Underground Water Resources of the Adelaide Plains). It is 233 feet deep, having out irrigation quality water (58.67 grains/gallon) at 205 ft., and yielding 7,000 gallons per hour. The present status of this bore is unknown, but unless the deep water is to be utilised, it should be effectively sealed off.

Oral advice on the foundation conditions in the northern half of the area has already been given on the basis of a maximum safe bearing capacity of $1\frac{1}{2}$ tons per square foot. This is also considered the maximum safe bearing capacity over the southern area. The appropriate foundation practice as recommended by the C.S.I.R.O. is the use of a rigid strip footing of adequate bearing area for the designed load, such as the inverted Tee beam. Because of practical considerations it may be preferable to use a deep beam type of footing, at least 18 inches thick and of a suitable width for the loading. It is suggested that reinforcement should be not less than six inch rods, three top and three bottom. Additional reinforcement may be required depending on the width of the footing. The footing may be set down one to two feet into the clay horizons.

For columns, pad footings should be used, seated well down in the clay soil (a depth of one to two feet is suggested).

In order to maintain uniform moisture conditions in the soil, paving of areas outside the proposed structure and adjacent to the external walls is recommended. Roof run-off and industrial effluent should be carried well clear of the building in properly constructed drains. Lawns and gardens should be kept to a minimum of 10 ft. from all foundations.

PD:CKRF
5/10/59


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GEOLOGIST

APPENDIX

LOGS OF HAND AUGER TEST HOLES

Hole No. 1 - Transitional soil - Type PA2 Plympton Association and Type RB7, Hindmarsh Association.

- 0" - 6" Dull, light brown loam.
- 6" - 16" Stiff granular red-brown clay showing some prismatic and polyhedral structure towards bottom.
- 16" - 18" Transition.
- 18" - 36" Greeny-brown very limy clay. Lime as soft nodules and diffuse.
- 36" - 64" Light reddish-brown clay becoming friable with depth - tending to silty clay. Few hard dark brown lime nodules in this horizon.
- 64" - 96" Yellowish-brown, stiff, plastic, silty clay with diffuse lime.

Hole No. 2 - Soil Type PA2a

- 0" - 9" Gray, granular silty clay (hydromorphic)
- 9" - 16" Transitional. Mottled stiff plastic clay. Mottled grey-black and light reddish-brown becoming light red-brown in depth.
- 16" - 33" Light reddish-brown stiff plastic clay with coarse structure of partly developed polyhedra. Small nodules lime throughout. Some grit throughout.
- 33" - 39" As above less structure.
- 39" - 45" As above. No structure, Lime nodules soft.
- 45" - 63" Increase in lime content. Plentiful soft lime and lime nodules.
- 63" - 70" Fairly soft, light red-brown plastic silty clay with some diffuse lime.
- 70" - 79" Becoming increasingly sandy.
- 79" - 91" Light red-brown fine grained silty sand with occasional lime nodule and clay pellet.

Hole No. 3 - Soil Type PA2a

- 0" - 9" Blackish-gray silty clay.
- 9" - 32" Mottled reddish-brown and gray stiff plastic clay with fair percentage of soft lime at top, becoming very limy at bottom.
- 32" - 57" As above becoming light red-brown in colour lime more diffuse.
- 57" - 89" Very plastic silty clay with coarse structure of polyhedral units (Fissured clay).

Hole No. 4 - Soil Type PA2a

- 0" - 14" Granular, soft, plastic, grey-black clay.
- 14" - 18" Transition to gritty plastic brown clay.
- 18" - 35" Mottled brown silty clay with some coarse grit.
- 35" - 42" Line enrichment
Dull, coarsely polyhedral and sub-prismatic limy clay. Creamy brown in colour.
- 42" - 60" As above but very limy (soft nodules and diffuse)
- 60" - 67" Creamy-brown, to light reddish brown gritty, granular clay with much less lime. High proportion quartzite-shale fragments.
- 67" - 78" Reddish-brown gritty clay with coarse polyhedral structure.
- 78" - 120" Light red-brown coarse structural silty clay. Becoming friable with depth.

(Water at 9'6" after standing over weekend)

Hole No. 5 - Soil Type PA2a

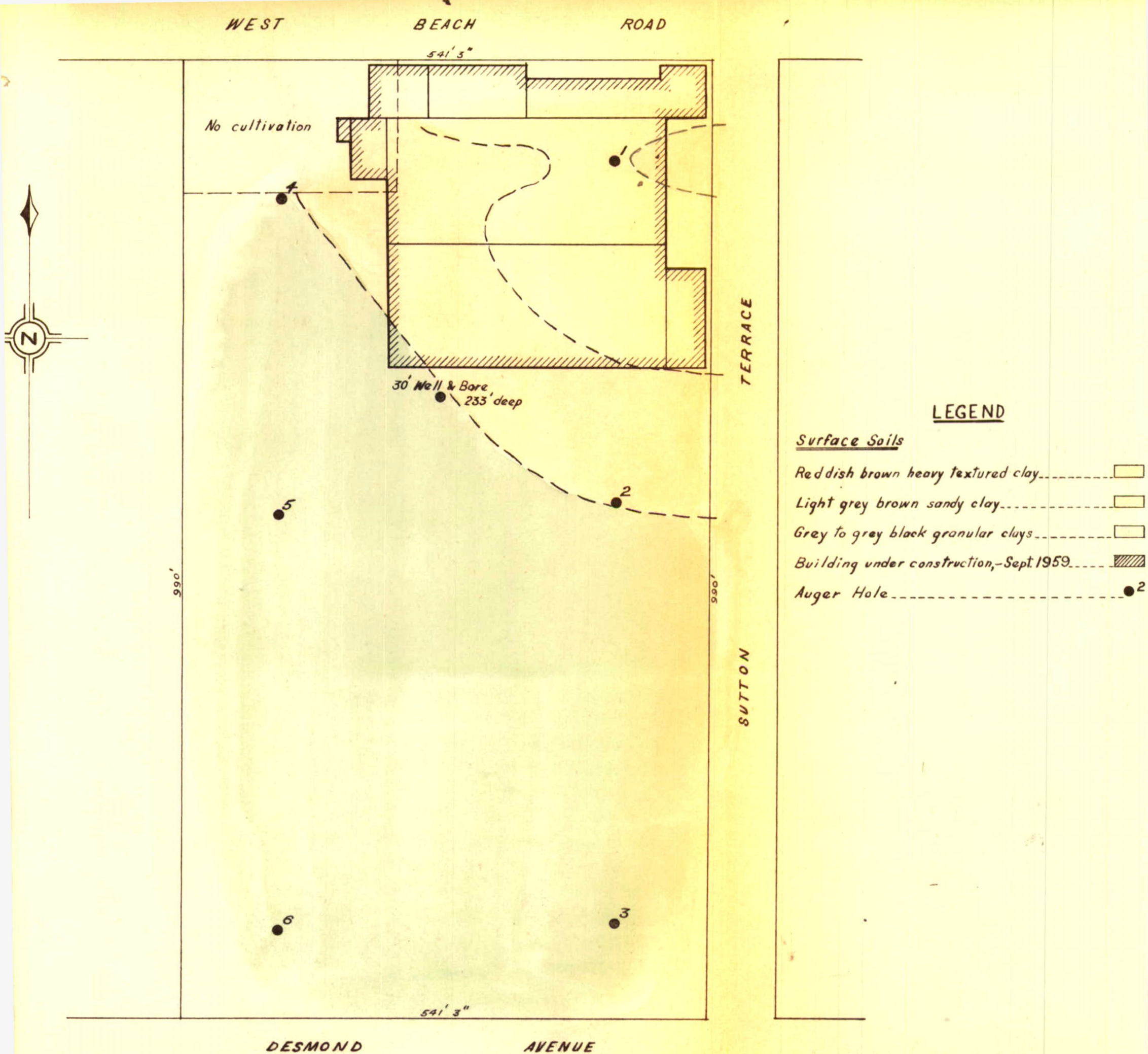
- 0" - 10" Grey-black soft plastic clay.
- 10" - 47" Gritty mottled brown and yellow brown sub-granular to sub-polyhedral stiff plastic clay becoming limy towards 47".
- 47" - 56" Coarse gritty clayey sand with rounded pebbles.
- 56" - 91" Lime enrich (soft nodules and diffuse) light reddish brown to cream brown clay with polyhedral and sub-prismatic structure. Fairly high surface sheen on polyhedra.
- 91" - 108" As above but becoming duller and more friable. Pockets water towards bottom - probably from irrigation.

Hole No. 6 - Soil Type PA2a

- 0" - 13" Grey-black soft plastic clay or loamy clay.
- 13" - 16" Transition.
- 16" - 26" Granular, mottled grey and yellow-brown stiff plastic clay with some grit.
- 26" - 38" Gritty, stiff brown clay with coarse structure becoming lighter coloured and limy towards bottom. Pebbles ferruginous quartzite and shale throughout.
- 38" - 49" As above with increasing lime content and sub-polyhedral structure.

Slide No. 6. (Contd)

- 49" - 73" Cream coloured very limy stiff clay. Coarse polyhedral and sub-prismatic structure increasing with depth. Surface shows on polyhedra.
- 73" - 86" Red-brown stiff polyhedral clay. Much less lime than above. Some hard lime nodules.
- 86" - 90" Silty red-brown clay.
- 90" - 105" As above. Becoming quite damp.
- 73" - 105" Initially friable until rolled out-silty clays.



LEGEND

Surface Soils

- Reddish brown heavy textured clay.....
- Light grey brown sandy clay.....
- Grey to grey black granular clays.....
- Building under construction, -Sept. 1959.....
- Auger Hole.....

To accompany report by P.R. & Dunlop, D^M 2105/57

S.A. DEPARTMENT OF MINES

SITE INVESTIGATION
Lots 5 to 8 and 21, West Beach Road
WEST RICHMOND
showing
TEST HOLES AND SOIL TYPES

Approved

Passed

Scale: 1" = 100 ft

Drn.

Tcd. J.B.A.

Ckd.

Exd.

Director

S2265

Ha5

Date 5-10-59

Amendment

Exd.

Date