Section

Rept. Bk. No. 55/61
G.S. 2434
D.M. 780/62

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
SOILS GEOLOGY SECTION

REPORT ON

SITE INVESTIGATION

PROPOSED BULK WHEAT SILO - PT. ADELAIDE

FOR S.A. CO-OP BULK HANDLING

by
E.R. Hillwood
Geologist

28th August, 1962

D.M. 780/62

RB 55/4

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I. ABSTRACT

Twelve holes have been drilled on a close pattern to test foundation conditions at a bulk wheat silo site at Port Adelaide. The investigation was carried out for S.A. Co-operative Bulk Handling Ltd.

An upper and a lower sequence have been defined and depths have been suggested for the seating of piles within the lower sequence.

II. INTRODUCTION

Following a request by S.A. Co-operative Bulk Handling Ltd., the foundation conditions at the site of a proposed bulk wheat silo have been investigated by percussion drilling. A series of twelve bores have been drilled on a close grid pattern. Bores 2 and 12 were completed at 120'6" and 133'6" respectively and the remaining ten bores at 70 ft.

The bores were sampled throughout by either open tube or sealed tube methods.

III. GENERAL SEQUENCES

The sedimentary sequence intersected in each of the twelve bores is essentially the same and has been divided into an upper and a lower sequence on a lithological basis.

Selected samples from Bore 12 were submitted to the Palaeontological Section for examination. The boundary of the Recent sediments was placed at the top of the yellow clastic lime sand and corresponds to the lithological division. The lower sequence is of Pleistocene age. This information although not of specific importance has allowed correlation with other bores at Outer Harbour, Torrens Island and Belivar and will perhaps lead to a better understanding of foundation conditions peculiar to the Pt. Adelaide area. The Palaeontological report is appended.

Upper sequence

Approximately 10 ft. of brown fine sand fill is present over the site. Beneath this to a depth of 30 ft. is a grey fine-medium grained quartz sand containing a small amount of shelly material. This is probably a sub-Recent beach or shore line deposit.

The sand is underlain by an oyster and shell bed in a matrix of grey black silt and was deposited in a marine swamp. This is interlayered with a brown fresh water silt and reflects minor fluctuations in sea level.

Lower Sequence

The yellow clastic lime sand is somewhat older and marks the top of the Pleistocene sequence. Beneath this the sediments are essentially brown, grey and reddish brown clays, sands and sandy clays. Nodular and disseminated lime occurs throughout but is particularly common at the top of the clays.

IV. METHODS OF TESTING

The bores were sampled with the Department of Mines standard 4" undisturbed sampling tools. A number of sealed tube samples were also taken. Blows/ft. and moisture condition of the sediments were recorded by the driller, D. Wilson. Water samples were taken of any water cut and were submitted to Australian Mineral Development Laboratories for total salts determination. Unconfined strength readings were taken with a Pocket penetrometer on cohesive samples from selected bores.

V. FOUNDATION CHARACTERISTICS

Blows/ft. and penetrometer readings (tons/sq. ft.) have been plotted graphically alongside the respective graphic bore log on the accompanying sections. Considerable variation in blows/ft. readings can be seen within one lithologic unit and may be due to variations in moisture content and/or size

composition of the sediment. However a general correlation can be seen and supports the following foundation suggestions.

a. The upper sequence consists largely of sands and silts. These sediments were deposited under water and consequently would be more compact than, say, dune sands. However, because of their saturated nature they would need to be artificially consolidated before they could support even moderate loads.

b. The yellow clastic lime sand would offer moderate resistance to driven piles but is generally loose and non cemented by lime. It is not considered suitable for seating end-bearing "cast in place" piles.

c.. The brown limey clay horizon is characterised near the top by a relatively hard layer formed by the hardening of lime through the clay matrix. High blows/ft. were recorded here and this horizon is considered suitable for the seating of driven piles. However the hard horizon is underlain by lenses of sand and sandy clays which are relatively weak, and if this horizon was selected for the seating of end-bearing "cast in place" piles, extreme care would be needed to ensure that the hard band was not penetrated by the boring tool.

d. Sand lenses become less frequent below 65' and the succession is characteristically clayey to at least 133'6" at the site. These clays and silty clays are firm to stiff. The unconfined strength was measured with a "Soiltest" pocket penetrometer and found to be in excess of 4.5 tons/sq. ft. This material is suitable for the seating of end bearing piles of either the driven or "cast in place" type.

The heterogeneous nature of the sediments to 70 ft. will make interpretation of soil mechanics data difficult.

Water Status

The clays and silty clays are only slightly permeable and are not subject to variation in moisture content.

The static water level in the holes is 10' - 12' and corresponds approximately to sea level. Very large flows of water could be expected into any opening beneath this level unless this horizon is carefully cased off. Large flows of sand could be expected unless the horizon is adequately supported.

Water in the clastic lime sand at 30 ft. is likely to be present in large quantities but could be more easily cased than the above sand.

The water at lower levels occurs in thinner sand lenses and would only affect deep piling.

Water yields in excess of 10,000 gallons/hour were encountered in a caisson at the I.C.I. Alkali site, Osborne.

VI. SUMMARY & CONCLUSIONS

The drilling of 12 holes on a close grid pattern has adequately revealed the geological succession and its relationship to deep foundations. Data on penetration rates and unconfined strength show that the site is suitable for a piled foundation.

The upper sequence of Recent age is essentially sandy and non-cohesive, but should give some support to either driven or "cast in place" piles.

The lower sequence has a zone of lime enrichment at about 50 ft. and is in part quite hard. This horizon should be suitable for the seating of driven piles. However, this horizon could be easily penetrated by a boring tool and its advantage immediately lost as a seating horizon for "cast in place" piles, because it is underlain by relatively soft sands and sandy clays. A more suitable founding horizon for "cast in place" piles occurs at 65 ft.

The water status of the sediments indicates that water could be a problem in the construction of "cast in place" piles. A cement not affected by sulphate would be required for any part of the foundation below 10 ft.

VII. REFERENCES

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John Wiley and Sons, Inc. New York.

ANON, 1962 - Bored Piles as Foundations for Large Silo.
Aust. Civil Engineering and Construction, April 3rd, 1962.

STEEL, R.D. 1958 - Preliminary Report on Foundation Conditions for Proposed Osborne "C" Power Station. Western side, Port River, Osborne North.
S.A. Dept. of Mines, G.S. 987 (unpublished) RB 46/127

FIRMAN, J.B. 1962 - Site investigation. Power Station site - Torrens Island.
S.A. Dept. of Mines, G.S. 2375 (unpublished).
RB 54/165

STEEL R.D. 1957 - Site Investigation proposed Seaman's Mission building site. St Vincent St. Pt. Adelaide
RB 45/39 - (trenches to 5')

E. R. Hillwood
Geologist
SOILS GEOLOGY SECTION

ERH:AGK
28/8/62

STEEL R.D. 1958 - Foundation Test Boreholes No 1. St. Vincent St. Pt Adelaide. for S.A. Harbours Board.
RB 46/28

APPENDIX A

PALAEONTOLOGICAL EXAMINATION OF MATERIAL

Sample No. F147/62 to F153/62

Reference DM 780/62

Locality: County Adelaide

Hundred Pt. Adelaide

Section H.B. Block 53

Details: Collected from bore,

S.A. Bulk Handling Bore No. 12

Depth: 13'; 15'-25'; 28'-31'; 31'-33'; 35'-36'; 40' and 63'

Information required: Palaeontological Examination

Submitted by: E.R. Hillwood

Address: Soils Geology Section

Date: 18/7/62

PALAEONTOLOGIST'S REPORT

F147/62
13'

Grey slightly clayey very fine to fine angular and well rounded clear quartz sand. No fossils are evident, and is probably a non marine deposit.

F148/62
15'-25'

Grey very fine to medium subangular to well rounded clear and smoky quartz sand with common worm shell fragments and a few foraminifera, including Streblus beccarrii; Elphidium chapmani and Discorbis cycloclypeus. Mollusca include Batillaria (Zeacumantis) diemenensis.

Rare echinoid spines and sponge spicules, becoming more abundant near 25 ft. This material is a Recent marine deposit of probably a regressive environment.

F149/62
28'-31'

Grey fine to medium clear subangular to well rounded quartz sand containing abundant mollusca including Katalysia scalarina; Batillaria (Zeacumantis) diemenensis; Diala lauta and Salinator fragilis. Foraminifera are also abundant and include Peneroplis planatus (very abundant); Triloculina tricarinata;

F149/62(Contd.)
28'-31'

Elphidium chapmani; Elphidium macellum; Discorbis cycloclypeus; and Vertebralina striata.

This is a Recent shallow water marine deposit and can be correlated with the upper fossil horizon in the Bolivar area (Steel, 1961, Pal. Rep. 3/61, Unpub.)

F150/62
31'-33'

Very light brown slightly sandy and silty calcareous clay containing fine to medium clear and iron-stained quartz grains. No fossils are evident and it is probably a nonmarine deposit.

F151/62
35'-36'

Cream to light yellow brown fossiliferous very slightly quartzitic lime sand. Mollusca include Batillaria (Zeacumantis) diemenensis; Diala lauta and Salinator fragilis.

Foraminifera abundant, and dominated by Marginopora vertebralis; with Triloculina trigonula; Cribrobulimina polystoma; Elphidium chapmani and Streblus beccarrii.

This is a shallow water marine deposit of Pleistocene age, and can be correlated with the lower fossil horizon in the Bolivar area (Steel, 1961, Pal. Rep. 3/61, Unpub.).

F152/62
40'

Light yellow brown clayey fine sand with common mica (chloritic) flakes and small shell fragments.

Foraminifera are rare, but include Marginopora vertebralis and Triloculina trigonula.

Probably representative of a shallow water marine transgression.

F153/62
63'

Yellow brown and grey clayey very micaceous fine to medium clear angular to subrounded quartz sand showing some ironstaining. No fossils are evident and this is a nonmarine deposit.

T.M. Steel
Geologist
PALAEONTOLOGY

APPENDIX B

S.A. BULK HANDLING

Hd. Pt. Adelaide
H.B. Blk. 53

BORE NO.	WATER LEVEL Feet	WATER CUT Feet	DILUTION TEST G.P.G.	SAMPLE NO. W.
1	11'6"	12	2600	1561/62
1	12'	63	4950	1562/62
2	14'6"	11'6"	2000	1563/62
2	14'	65 - 82	5650	1564/62
3	114	13	2540	1565/62
3	11'6"	34	3300	1566/62
4	12'6"	12	2250	1567/62
4	11'6"	33'6"	4500	1568/62
5	11'6"	12	2900	1569/62
5	10'9"	31'6"	5200	1570/62
6	12	12	2100	1574/62
6	11'3"	33'6"	4350	1575/62
6	18'6"	58	4700	1576/62
7	10	12	3160	1601/62
7	11'6"	32	3960	1602/62
7	12'3"	57	5500	1603/62
8	10	30	4250	1620/62
8	10	30	4850	1621/62
8	11	61	5000	1622/62
			Salinity	
9	10	11	2600.6	1664/62
9	13	31'6"	4791.0	1665/62
9	11'6"	62'6"	5127.7	1666/62
			Dilution Test	
10	10'4"	11	3030	1667/62
10	13'4"	32	3200	1668/62
10	11'6"	57	5250	1669/62
11	9'6"	11	2220	1720/62
11	13	31'6"	4100	1721/62
11	11'6"	62	5100	1722/62
12	11'10"	13	2080	1753/62
12	13'5"	33	4250	1754/62
12	14'6"	63	5000	1755/62
12	24'9"	80	5450	1756/62

Australian Mineral Development Laboratories

Telephone: 79 1662
Telegrams: "AMDEL," Adelaide.
Address all communications to the Director.

CONYNGHAM STREET,
PARKSIDE,
SOUTH AUSTRALIA.

Our Reference. AM1.4.0/1206

26th July, 1962

Department of Mines,
Rundle Street,
ADELAIDE, S.A.

W1664/62

Sample of water marked as under yielded on analysis:—

	P.P.M.	GRAINS PER GALLON
Chlorine, Cl		1346.4
Sulphuric acid (radicle), SO_4		287.2
Carbonic acid (radicle), CO_3		25.8
Nitric acid (radicle), NO_3		Nil
Sodium, Na		819.0
Potassium, K.		
Calcium, Ca		26.3
Magnesium, Mg.		95.9
Silica, SiO_2		
Total saline matter		2600.6
Suspended matter		
Organic matter		

ASSUMED COMPOSITION OF SALTS	P.P.M.	GRAINS PER GALLON
Calcium carbonate		43.0
Calcium sulphate		30.9
Calcium chloride		
Magnesium carbonate		
Magnesium sulphate		332.6
Magnesium chloride		112.4
Sodium carbonate		
Sodium sulphate		
Sodium chloride		2081.7
Sodium nitrate		Nil
Potassium chloride		

Name S.A. Bulk Handling

Address Pt. Adelaide.

Hundred

Section

Sample collected by W.D.W.

Bore No. 9

Water Cut 11'

Water Level 10'

Supply at 8.30 a.m.

Depth Bore 70'

Date Collected 22/7/6

HARDNESS
(as Calcium Carbonate)

	P.P.M.	GRAINS PER GALLON
Total		460.3
Temporary		43.0
Permanent		417.3
Due to calcium		65.7
Due to magnesium		394.6

L. Wallace Coffer
Director

Chief Analyst

U729-3/61

Australian Mineral Development Laboratories

Telephone: 79 1662
Telegrams: "AMDEL," Adelaide.
Address all communications to the Director.

CONYNGHAM STREET,
PARKSIDE,
SOUTH AUSTRALIA.

Our Reference. AM 1.4.0/1206

26th July, 1962

Department of Mines,
Rundle Street,
Adelaide.

W1665/62

Sample of water marked as under yielded on analysis:—

	P.P.M.	GRAINS PER GALLON
Chlorine, Cl		2650.4
Sulphuric acid (radicle), SO_4		375.4
Carbonic acid (radicle), CO_3		13.7
Nitric acid (radicle), NO_3		Nil
Sodium, Na		1530.3
Potassium, K.		
Calcium, Ca		52.9
Magnesium, Mg.		168.3
Silica, SiO_2		
Total saline matter		4791.0
Suspended matter		
Organic matter		

ASSUMED COMPOSITION OF SALTS	P.P.M.	GRAINS PER GALLON
Calcium carbonate		22.9
Calcium sulphate		148.4
Calcium chloride		
Magnesium carbonate		
Magnesium sulphate		339.2
Magnesium chloride		390.8
Sodium carbonate		
Sodium sulphate		
Sodium chloride		3889.7
Sodium nitrate		
Potassium chloride		

Name S.A. Bulk Handling

Address Pt. Adelaide

Hundred

Section

Sample collected by W.D.W.

Bore No. 9

Water Cut 31'6"

Water Level 13'

Supply at 1.30 p.m.

Depth Bore 70'

Date Collected 25.6.62

HARDNESS
(as Calcium Carbonate)

	P.P.M.	GRAINS PER GALLON
Total		824.6
Temporary		22.9
Permanent		801.7
Due to calcium		132.0
Due to magnesium		692.6

L. Wallace Coffer
Director.

Chief Analyst

U729-3/61

Australian Mineral Development Laboratories

Telephone: 70 1932
Telegrams: "AMDEL," Adelaide.
Address all communications to the Director.

CONYNGHAM STREET,
PARKSIDE,
SOUTH AUSTRALIA.

Our Reference: AM1.4.0/1206

26th July, 1962

Department of Mines,
Rundle Street,
ADELAIDE, SA.

W1666/62

Sample of water marked as under yielded on analysis:—

	P.P.M.	GRAINS PER GALLON
Chlorine, Cl		2840.7
Sulphuric acid (radicle), SO_4		480.8
Carbonic acid (radicle), CO_3		14.8
Nitric acid (radicle), NO_3		Nil
Sodium, Na		1627.5
Potassium, K.		
Calcium, Ca		57.7
Magnesium, Mg.		186.2
Silica, SiO_2		
Total saline matter		5127.7
Suspended matter		
Organic matter		

ASSUMED COMPOSITION OF SALTS	P.P.M.	GRAINS PER GALLON
Calcium carbonate		24.7
Calcium sulphate		162.4
Calcium chloride		
Magnesium carbonate		
Magnesium sulphate		358.7
Magnesium chloride		445.2
Sodium carbonate		
Sodium sulphate		
Sodium chloride		4136.7
Sodium nitrate		Nil
Potassium chloride		

HARDNESS
(as Calcium Carbonate)

	P.P.M.	GRAINS PER GALLON
Total		910.3
Temporary		24.7
Permanent		885.6
Due to calcium		144.1
Due to magnesium		766.2

Name: S.A. Bulk Handling

Address: Pt. Adelaide.

Hundred:

Section:

Sample collected by: W.E.W.

Bore No. 2

Water Cut 62'6"

Water Level 11'6"

Supply at 1 p.s.i.

Depth Bore 70'

Date Collected 26.6.62

L. Wallace Coffer
Director.

Chief Analyst

U720-2/61

APPENDIX C

ENGINEERING GEOLOGY

PERCUSSION DRILLING

BORE SERIAL NO. 701/62
D.M. 780/62

BORE NUMBER 1

PROJECT: S.A. BULK HANDLING, PT. ADELAIDE — HD.: PORT ADELAIDE
SECT.: M.B. BK.53

PURPOSE: FOUNDATION TESTING

DRILLER: D. WILSON

DATE COMMENCED: 7.5.62 — DATE COMPLETED: 14.5.62

LOGGED BY: E.R. HILLWOOD

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
0 - 1'	Pale brown fine calcareous sand with abundant shell and kunkar fragments. Loose. Dry.	16	
1 - 2'	"	24	
2 - 4'	"	22	
4 - 6'	Fine medium sand with sparse clay bands. Coal and ash fragments. Fill material? (Friable) Damp.	20	
6 - 7'	Ditto	16	
7 - 8'	Ditto	19	
8 - 9'	Ditto	20	
9 - 10'	Ditto	34	
10 - 11'	Yellow brown-grey fine-medium sand and clay. Wet	28	
11 - 12'	Ditto	37	
12 - 13'	Ditto	12	
13 - 14'	Grey fine-medium sand with occasional shell fragments. Wet.	19	
14 - 15'	Ditto	18	
15 - 16'	Ditto	33	
16 - 17'	Ditto	18	
17 - 18'	Ditto	18	
18 - 19'	Ditto	20	
19 - 20'	Ditto	23	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
20 - 21'	Grey fine-medium sand with occasional shell fragments. Wet.	23	
21 - 22'	Ditto	32	
22 - 23'	Ditto	19	
23 - 24'	G Ditto	20	
24 - 25'	Ditto	33	
26 - 27'	Ditto	10	
27 - 29'	Grey fragmental shell band with clay	20	
29 - 30'	Grey and grey-brown clay and shell bands.	13	
30 - 31'	" (Stiff)	11	
31 - 32'	" (Soft)	6	
32 - 33'	" (Friable - hard)	14	
33 - 34'	Ditto	33	
34 - 35'	Ditto	42	
35 - 36'	Yellow-brown and off-white clastic lime sand with some larger shell fragments. Cemented in parts.	45	
36 - 37'	Ditto	10	
37 - 38'	Yellow-brown fine-medium sand with shell fragments. (Soft. Friable. Wet)	12	
38 - 39'	Ditto	12	
39 - 40'	Ditto	24	
40 - 41'	Silty clay with shell fragments	12	2.75
41 - 42'	Ditto	9	1.75
42 - 43'	Ditto	9	2.2
43 - 44'	Brown and greenish-grey silty clay. (Moist. Firm)	11	2.2
44 - 45'	Ditto with frequent nodules of hard lime. (Moist. Stiff)	22	
45 - 46'	Ditto	31	4.5
46 - 47'3"	Sealed tube Brown silty clay with 20-30% hard limestone nodules. (Stiff. Moist		

DEPTH	DESCRIPTION	Blows per Feet	UNCONFINED STRENGTH Tons/Sq.Ft.
47'3 - 48'	Greenish-grey and reddish-brown mottled silty clay with hard limestone nodules. (Stiff. Moist).	16	
48 - 49'	Ditto with a few rounded quartz pebbles. (Very stiff. Moist).	21 38	
49 - 50'	Reddish-brown and greenish-grey silty clay with pockets and nodules of hard limestone (10%) (Very stiff. Moist).	38	
50 - 51'	Reddish-brown and greenish silty grey clay with pockets of hard lime (30-40%) (Very stiff, moist).	57	>4.5
51 - 52'	Ditto. Mainly nodular lime. (Stiff, moist).	55	
52 - 53'	Ditto	44	
53 - 54'	Ditto (Very stiff. Moist)	48	
54 - 55'	Pale brown and greenish-grey mottled very limey clay or marl with pockets and nodules of hard lime. Friable. (Very stiff. Hard. Moist).	74	
55 - 56'	Greenish grey clay and pale brown limey mottled clay (30-40% lime). (Very stiff. Hard).	80	
56 - 57'3"	Sealed tube Reddish-brown and greenish-grey mottled very sandy clay. (Stiff. Moist).	56	2.5
57'3 - 58'	Ditto (Firm. Moist)	21	4
58 - 59'	Ditto Hard siliceous nodules at 58'-58'3". (Firm. Moist, slightly friable)	28	2
59 - 60'	Reddish-brown and grey mottled clayey sand. Friable. (Soft, wet, slightly friable).	25	
60 - 61'	Yellow-brown and grey mottled very finely silty clay. (Firm. Moist).	29	3.5
61 - 62'	Yellow-brown and grey mottled very finely silty clay. (Stiff. Moist).	23	3.75
62 - 63'	Ditto becoming very sandy at 61'9". (Stiff friable, wet).	41	3.75
63 - 64'	Yellow-brown fine-medium sand with some clayey sand. (Wet. Friable, firm).	29	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
64 - 65'	Yellow-brown fine-medium sand with some clayey sand. (Wet. Friable, firm). Clayey sand 63'3" - 63'6". (Firm, wet, friable.)	33	
65 - 66'	Ditto Firm sandy clay 65'9" - 66'. (Friable-wet. Stiff, moist).	46	
66 - 67'	Yellow-brown and grey mottled silty and finely sandy clay. (Very stiff- moist).	58	>4.5
67 - 68'6"	Sealed Tube. Reddish-brown and grey mottled silty and finely sandy clay. (Very stiff, moist).	63	>4.5
68'6 - 69'	Yellow-brown sand with grey and reddish brown firm clay with (moist very stiff) hard nodules of lime.	27	
69 - 70'	Yellow-brown sand and grey and reddish brown firm clay with hard nodules of lime. (Very stiff, moist).	42	
	END OF BORE.		

ENGINEERING GEOLOGY

PERCUSSION DRILLING

BORE SERIAL NO. 701/62
D.M. 780/62

BORE NUMBER 2

PROJECT: S.A. BULK HANDLING, PT. ADELAIDE MD.: PT. ADELAIDE

SECT.: H.B. BK. 53

PURPOSE: FOUNDATION TESTING

DRILLER: D. WILSON

DATE COMMENCED: 15.5.62 DATE COMPLETED: 21.5.62

LOGGED BY: E.R. HILLWOOD DATE: 24.5.62

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
0 - 1'	Silty sand and limestone rubble and shell fragments. (Friable, dry).	25	
1 - 2'	Ditto	18	
2 - 3'	Ditto	29	
4 - 6'	Light yellow-brown fine-medium calcareous sand with shell fragments.	(31 (31	
6 - 7'	Ditto with coal fragments. (Probable fill 0' - 7').	24	
7 - 8'	Light grey and yellow-brown fine-medium sand. (Damp. Soft. Friable.) Some brown clay.	15	
8 - 9'	Ditto	14	
9 - 10'	Ditto	13	
10 - 11'	Ditto (Wet, friable)	15	
11 - 12'	Ditto becoming grey.	18	
12 - 13'	Dark grey-light grey fine-medium well sorted slightly calcareous unconsolidated sands.	34	
13 - 14'	Ditto	18	
14 - 15'	Ditto	28	
15 - 17'	Ditto	(20 (17	
17 - 18'	Ditto	26	
18 - 19'	Ditto	15	
19 - 20'	Ditto	34	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
20 - 21'	Dark grey-light grey fine-medium well sorted slightly calcareous unconsolidated sands.	16	
21 - 22'	Ditto	15	
22 - 23'	Dark grey-light grey fine-medium well sorted slightly calcareous unconsolidated sands.	19	
23 - 24'	Ditto	22	
24 - 27'	Ditto	9 16 4	
27 - 28'	Greenish-grey and brown soft silty clay with some limey nodules and traces of organic material. (Soft, wet).	18	1.25
28 - 29'	Ditto (Firm, wet)	15	1.25
29 - 29'5"	Dark grey and grey calcareous sand with some clay. Abundant shell fragments.	14	
29'5" - 30'	Brown silt. (Wet, soft, friable)		
30 - 32'	Brown clayey silt (wet, soft) and fine sandy silt	9	
32 - 32'8"	Ditto	10	
32'8" - 33'	Hard off-white clastic limestone (old land surface?)		
33 - 34'	Off-white and light yellow clastic limestone. Generally soft and poorly consolidated.	47	
34 - 35'	Ditto	45	
35 - 35'6"	Hard limestone fragments in brown silt (old land surface?)		
35'6" - 36'	Off-white and light yellow clastic L.S. Poorly consolidated. (Wet, friable).	23	
36 - 37'	Yellow and grey clastic limestone with lime sands. (Wet, friable)	19	
37 - 38'	Yellow lime sand and grey silt with hard cemented sandstone nodules. (Wet, friable)	23	
38 - 39'	Brown and grey-brown silt, sand, grit and gravel with some hard siliceous nodules. (Wet, friable).	32	
39 - 40'	Grey and greenish grey silt and fine sand. (Wet, soft-firm).	20	3.5

BORE 2 (Contd.)

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
40 - 41'	Shell fragments and greenish-grey soft very silty clay.	12	1.75
41 - 41'6"	Ditto		
41'6" - 42'	Brown fine well sorted sand. (Wet, soft)	16	
42 - 42'6"	Ditto	13	
42'6" - 43'	Brown and greenish-grey firm clay. (slightly silty).		
43 - 44'	Brown firm slightly silty clay. Occasional lime nodules.	19	2.25
44 - 45'	Brown-grey stiff slightly silty clay with abundant limestone nodules. (Firm, stiff.)	35	4.25
45 - 46'3"	Light reddish-brown and greenish-grey slightly silty stiff clay with abundant hard limestone nodules. (Very stiff).	44	
46'3" -47'	Ditto	49	
47 - 48'6"	Ditto with some pockets of lime.	67	
48'6 - 50'	Sealed tube.	81	
50 - 50'6"	Brown limey clay with abundant nodules of lime and pockets of lime. (Very stiff, hard).	72	
50'6" - 51'	Pale brown, light reddish-brown very limey clay or marl with frequent nodules of hard limestone. Hard, and compact.	41	>4.5
51 - 52'	Light reddish-brown and greenish-grey mottled silty clay with nodules of lime. (Very stiff. Moist.)	46	
52 - 53'	Ditto	61	
53 - 53'9"	Greenish-grey and reddish-brown silty clay and nodules of lime. Very compact and hard.	77	
53'9 - 54'	Pale brown and light reddish-brown hard compact limestone.		
54 - 55'	Grey and yellow-brown hard very limey clay or marl with thin bands of shell fragments. (Very stiff-hard).		
55 - 56'	Ditto	60	
56 - 57'	Grey and yellow-brown clayey sand with hard lime nodules.	31	3.5

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
57 - 58'	Yellow-brown and grey clayey sand. Poorly consolidated. (Firm. Moist).	32	
58 - 59'	Ditto shelly band 58' - 58'3". (Wet, friable)	58	
59 - 59'6"	Ditto	44	
59'6" - 60'	Grey and yellow-brown silty clay and sandy clay. (Firm, moist).		4.5
60 - 61'	Ditto	42	
61 - 62'	Ditto	47	
62 - 63'	Reddish-brown unconsolidated medium grained sand. (Wet, friable).	42	
63 - 64'	Ditto	68	
64 - 65'	Ditto	71	
65 - 66'	Yellow-brown and grey silty clay. (Very stiff. Moist).	61	
66 - 67'	Ditto	39	>4.5
67 - 68'	Ditto with hard limestone nodules	43	
68 - 69'	Yellow-brown and grey mottled silty and slightly sandy clay. (Very stiff. Moist).	57	
69 - 70'	Ditto	56	4.5
70 - 71'	Ditto	44	
71 - 72'	Yellow-brown and grey mottled sandy clay and clayey sand. (Firm. Moist).	21	2.5
72 - 73'	Yellow-brown and grey mottled silty clay. (Firm. Wet)	32	3.0
73 - 74'	Reddish-brown and grey mottled silty clay. (Very stiff. Moist.)	41	>4.5
74 - 75'	Ditto	49	
75 - 76'	Ditto	41	
76 - 77'	Ditto	54	
77 - 78'	Reddish-brown and grey mottled silty clay with pockets of hard lime.	30	
78 - 79'	Yellow-brown and reddish-brown sandy clay and silty sand.	34	2.75

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
79 - 80'	Ditto (Soft, wet).	22	
80 - 81'6"	Sealed tube. Ditto	30	
81'6" - 82'	Ditto (Soft)	13	0.5
82 - 83'	Red-brown and grey mottled stiff silty clay with occasionally pockets of lime.	41	
83 - 84'	Ditto With hard nodules of lime.	38	
84 - 85'	Red-brown and grey mottled very firm clay (Very stiff, moist).	42	
85 - 86'	Ditto	38	
86 - 87'	Ditto	41	
87 - 88'	Pale brown and slight reddish-brown limey clay. Compact, slightly moist.	78	
88 - 89'	Ditto with grey mottling.	79	
89 - 90'	Ditto	51	>4.5
90 - 91'6"	Sealed tube. (Very stiff, Moist.)	56	
91'6 - 92'	Grey with some yellow-brown mottling slightly silty clay. Some pockets of lime.	21	
92 - 93'	Ditto	37	
93 - 94'	Ditto (No lime)	42	
94 - 95'	Ditto	32	
95 - 96'	Ditto	44	
96 - 97'	Ditto	29	
97 - 98'	Ditto	38	
98 - 99'	Ditto (Some lime)	23	
99 - 100'	Reddish-brown and grey mottled silty very compact clay.	23	>4.5
100 - 101'6	Sealed Tube Yellow-brown and grey mottled silty clay.	35	
101'6 - 102	Ditto	13	
102 - 103'	Ditto Finely sandy. Soft.	18	4.25
103 - 104'	Ditto	19	3.5
104 - 105'	Grey clay with sem e yellow mottling. Stiff.	55	3.5

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
105 - 106'	Yellow-brown and grey mottled silty clay. Soft.	33	2.75
106 - 107'	Yellow-brown and grey mottled silty clay. Firm. (Very stiff. Moist).	43	
107 - 108'	Ditto	52	
108 - 109'	Ditto Finely sandy. (Very stiff. Moist).	36	>4.5
109 - 110'	Yellow-brown, pale brown and grey mottled limey clay. Very stiff. Moist.	32	
110 - 111'6"	Sealed Tube. Ditto	39	3.5
111'6 - 112'	Yellow-brown and grey mottled silty clay.	13	
112 - 113'	Ditto	21	
113 - 114'	Ditto with occasional limey nodules.	24	
114 - 115'	Yellow-brown and grey mottled limey clay.	44	
115 - 116'	Yellow-brown and grey mottled silty clay.	39	>4.5
116 - 117'	Ditto	52	
117 - 118'	Ditto With pockets of lime.	28	
118 - 119'	Ditto	26	
119 - 120'6"	Sealed Tube. Ditto	34	
	END OF BORE		

ENGINEERING GEOLOGY

PERCUSSION DRILLING

BORE SERIAL NO. 718/62
D.M. 780/62

BORE NUMBER 3

PROJECT: S.A. BULK HANDLING, PT. ADELAIDE HD.: PT. ADELAIDE

SECT.: H.B. BK. 53

PURPOSE: FOUNDATION TESTING. SILO SITE

DRILLER: D. WILSON

DATE COMMENCED: 22.5.62 DATE COMPLETED: 25.5.62

LOGGED BY: E.R. HILLWOOD DATE: 31.5.62

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.ft.
0 - 1'	Brown fine sand. Friable. Dry. Some shell fragments.	19	
1 - 2'	Ditto (Moist)	29	
2 - 3'	Ditto (Moist)	41	
3 - 4'	Ditto (Friable. Dry)	44	
4 - 5'	Ditto	46	
5 - 6'	Ditto	31	
6 - 7'	Ditto	25	
7 - 8'	Ditto	28	
8 - 9'	Ditto	16	
9 - 10'	Ditto (Wet)	22	
10 - 11'	Brown fine sand with some brown clay bands.	17	
11 - 12'	Ditto (Wet)	32	
12 - 13'	Ditto (Wet)	48	
13 - 14'	Ditto	49	
14 - 15'	Ditto	32	
15 - 16'	Grey fine-medium sand with sparse shelly fragments. Unconsolidated.	16	
16 - 17'	Ditto	15	
17 - 18'	Ditto	37	
18 - 19'	Ditto	21	
19 - 20'	Ditto	21	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
20 - 21'	Grey fine-medium sand with sparse shelly fragments. Unconsolidated.	23	
21 - 22'	Ditto	27	
22 - 23'	Ditto	31	
23 - 27'	Grey fine-medium sand with sparse shelly fragments. Unconsolidated	(13 (10	
27 - 28'	Grey sand with some clay and abundant shell fragments	10	
28 - 29'	Ditto	6	
29 - 30'	Grey clay with abundant shell fragments.	9	
30 - 31'	Brown soft silty clay. (Wet, soft).	10	0.5
31 - 32'	Brown very soft silty clay and grey silt and shell fragments.	7	
32 - 34'	Brown sandy clay. Very soft. Wet.	12	
34 - 35'	Off-white clastic lime sand. Poorly consolidated and non cemented. (Wet, friable)	53	
35 - 36'	Ditto	25	
36 - 37'	Pale brown and off-white sand with clastic lime sand intermixed. (Friable. Wet).	19	
37 - 37'6"	Yellow clastic lime sand with larger shell fragments	26	
37'6" - 38'	Brown silty clay. (Firm. Moist)		3.75
38 - 39'	Calcareous sand with lime nodules to 38'5" and then brown and grey mottled silty clay.	17	
39 - 40'	Ditto	16	
40 - 42'	Brown silty clay. (Soft. Moist)	(10 (22	1.5
42 - 43'	Ditto (Occasional quartz gravel).	18	1.5
43 - 44'	Ditto		1.75
44 - 45'	Ditto	21	2.25
45 - 46'	Ditto (Very stiff, Moist)	20	
46 - 47'	Ditto (with lime nodules)	36	4.5
47 - 48'	Ditto	29	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
48 - 49'	Ditto	25	
49 - 50'	Yellow-brown, pale brown and grey mottled very limey Clay. (very stiff. Moist).	28	
50 - 51'	Ditto	29	
51 - 52'	Pale brown and grey-brown very limey clay. (Very stiff. Slightly moist).	84	
52 - 53'	Brown silty clay with hard lime nodules.	92	
53 - 54'	Grey-brown and reddish-brown limey and silty clay. (Very stiff. Moist).	23	>4.5
54 - 55'	Ditto		
55 - 56'	Grey-brown and reddish-brown limey and silty clay. (Very stiff. Moist).	37	
56 - 57'	Ditto	58	
57 - 58'	Ditto	31	
58 - 59'	Ditto (Large lime nodules)	39	
59 - 60'	Yellow-brown and grey mottled silty clay. (Firm-stiff, moist).	26	2.75
60 - 61'	Ditto	26	3.5
61 - 62'	Ditto	28	4.0
62 - 63'	Yellow-brown and grey mottled very sandy clay. (Firm. Moist).	23	1
63 - 64'	Ditto (Soft-Firm-Moist)	21	
64 - 65'	Ditto	24	
65 - 66'	Ditto	36	
66 - 67'	Yellow-brown and grey mottled silty clay. (Stiff. Moist).	27	
67 - 68'	Ditto	42	>4.5
68 - 68'6"	Ditto	22	
68'6 - 70'	Sealed Tube Ditto (Very stiff. Moist)	48	
	END OF BORE		

ENGINEERING GEOLOGY

PERCUSSION DRILLING

BORE SERIAL NO.
D.M. 780/62

BORE NUMBER 4

PROJECT: S.A. BULK HANDLING, PT. ADELAIDE HD.: PORT ADELAIDE

SECT.: H.B. BK. 53

PURPOSE: FOUNDATION TESTING. SILO SITE

DRILLER: D. WILSON

DATE COMMENCED: 28.5.62 DATE COMPLETED: 31.5.62

LOGGED BY: E.R. HILLWOOD DATE: 1.6.62

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq. Ft.
0 - 1'	Brown fine sand and silt with some shell and rubble etc. (Dry. Friable)	21	
1 - 2'	Ditto	56	
2 - 3'	Ditto	57	
3 - 4'	Ditto	64	
4 - 5'	Ditto	28	
5 - 7'	Ditto	29 8	
7 - 8'	Ditto (Damp. Friable)	17	
8 - 9'	Ditto	12	
9 - 10'	Ditto	18	
10 - 11'	Ditto	26	
11 - 12'	Ditto (Wet. Friable)	31	
12 - 13'	Grey sand intermixed with grey clay.	19	
13 - 14'	Ditto (Wet. Friable)	18	
14 ¾- 15'	Grey fine sand with frequent shells and shell fragments.	22	
15 - 16'	Ditto	32	
16 - 17'	Ditto	20	
17 - 18'	Ditto	16	
18 - 19'	Ditto (Wet)	34	
19 - 20'	Ditto	10	
20 - 21'	Ditto	25	
21 - 22'	Ditto	21	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
22 - 23'	Grey fine sand with frequent shells and shell fragments.	31	
23 - 24'	Ditto	27	
24 - 25'	Grey fine sand with frequent shells and shell fragments.	17	
25 - 26'	Ditto	13	
26 - 27'	Ditto	17	
27 - 28'	Oyster and shell band in a matrix of grey sandy silt.	11	
28 - 29'	Grey silty clay and clay with frequent shells		
29 - 30'	Ditto (Wet. Soft)	17	
30 - 32'	Brown fine sand with silt and some shells.		
32 - 33'	Ditto	8	
33 - 34'	Off-white medium grained clastic lime sand. (Wet. Soft-Friable)	29	
34 - 35'	Ditto	44	
35 - 36'	Ditto	43	
36 - 37'	Yellow clastic lime sand with larger shell fragments at base. (Wet)		
37 - 38'	Ditto	28	
38 - 39'	Brown fine compact silt with occasional rounded quartz gravel and pebbles. (Wet, soft).	13	
39 - 40'	Brown fine limey sand with some clay and hard limestone nodules. (Soft-friable. Wet).	11	
40 - 41'	Ditto Brown fine silty clay, from 41'6	10	
41 - 42'	Brown fine silt. (Soft. Wet)	19	2.0
42 - 43'	Ditto	13	
43 - 44'	Brown fine silty clay. (Firm. Moist)	21	2.25
44 - 45'	Ditto (Stiff. Moist)		3.75

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
45 - 46'	Brown and grey vaguely mottled limey clay with frequent small nodules of lime. (Very stiff. Moist).	44	
46 - 47'	Ditto	22	>4.5
47 - 48'	Ditto	23	
48 - 49'	Ditto	23	
49 - 50'	Ditto with larger disseminations of lime.	25	
50 - 51'	Pale brown and reddish-brown limey clay. (Very stiff. Moist)	33	
51 - 52'	Ditto	63	
52 - 53'	Yellow-brown very limey clay with hard nodules of lime.	34	
53 - 54'	Reddish-brown clayey sand with hard fragmental limestone	24	
54 - 55'	Yellow-brown and grey mottled clay with frequent limey nodules.	23	
55 - 56'6	Sealed Tube. Ditto (Firm. Moist)	44	
56'6 - 57'	Ditto	14	
57 - 58'	Yellow-brown and grey limey clay.	23	4.0
58 - 59'	Yellow-brown and grey mottled slightly clayey sand. (Wet. Friable).	30	
59 - 60'	Ditto	30	
60 - 61'	Ditto	33	
61 - 62'	Ditto (clayey)	28	3.0
62 - 63'	Ditto (Firm. Moist)	28	
63 - 64'	Ditto	34	
64 - 65'	Ditto	46	
65 - 66'	Yellow-brown and grey mottled silty clay.	38	3.75
66 - 67'	Ditto (Very stiff. Moist)	43	
67 - 68'	Ditto	49	>4.5
68 - 69'	Yellow-brown and grey mottled clay with occasional lime nodules.	51	
69 - 70'	Ditto		
	END OF BORE		

ENGINEERING GEOLOGY

PERCUSSION DRILLING

BORE SERIAL NO. 728/62
D.M. 780/62

BORE NUMBER 5

PROJECT: S.A. BULK HANDLING. PT. ADELAIDE HD. PT. ADELAIDE

SECT.: H.B. BK.53

PURPOSE: FOUNDATION TESTING

DRILLER: D. WILSON

DATE COMMENCED: 1.6.62 DATE COMPLETED: 7.6.62

LOGGED BY: E.R. HILLWOOD DATE: 27.6.62

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
0 - 1'	Yellow-brown fine sand with shell fragments. Probable fill	32	
1 - 2'	Ditto	29	
2 - 3'	Ditto (Friable. Dry)	41	
3 - 4'	Ditto	49	
4 - 6'	Ditto (coal fragments. Fill)	33	
6 - 8'	Ditto	19	
8 - 10'	Ditto Damp. Friable with some clay	29	
10 - 11'	Ditto	31	
11 - 12'	Ditto	18	
12 - 13'	" Wet. Friable.	18	
13 - 14'	Grey fine-medium sand. Slightly calcareous in places. (Wet. Friable!)	27	
14 - 15'	Ditto	34	
15 - 16'	Ditto (Wet)	27	
16 - 17'	Ditto	14	
17 - 18'	Ditto	19	
18 - 19'	Ditto	36	
19 - 20'	Ditto	22	
20 - 21'	Ditto	24	
21 - 22'	Ditto	26	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
22 - 23'	Grey fine-medium sand. Slightly calcareous in places. (Wet, friable)	27	
23 - 24'	Ditto	29	
24 - 28'	Grey fine sand and silt with some fine calcareous clastic sand.	11 7 14	
28 - 29'	Oyster bed in a matrix of grey soft clay. (Soft. Wet.)	11	
29 - 30'	Brown fine sandy clay and silt. (Fresh water?) (Soft. Wet)	11	
30 - 31'	Ditto	8	
31 - 31'6	Ditto		
31'6 - 32'	Off-white and light yellow clastic lime sands with some larger shell fragments. (Soft. Wet)	30	
32 - 33'	Ditto (Wet. Friable)	48	
33 - 34'	Ditto	51	
34 - 35'	Ditto with oyster fragments and coarse shell fragments.	15	
35 - 36'	Ditto	18	
36 - 37'	Brown silty clay with some shell fragments.	15	
37 - 38'	Yellow-brown fine sand with some rounded gravel.	31	
38 -39'	" with hard limestone nodules. (Wet. Friable) Soft-	22	
39 - 40'	Ditto	21	
40 - 41'	Grey-brown and yellow-brown fine silt. (Soft. Wet)	19	
41 - 42'	Ditto	19	
42 - 43'	Ditto	22	
43 - 44'	Ditto	19	
44 - 45'	Brown-reddish brown silty clay with frequent hard limestone nodules. (very stiff. Moist).	23	
45 - 46'	Ditto	31	
46 - 47'	Ditto	29	
47 - 48'	Ditto	27	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
48 - 49'	Brown-reddish brown silty clay with frequent hard limestone nodules. (Very stiff. Moist).	46	
49 - 50'	Reddish-brown, grey and pale brown very limey clay (50%) or marl. (Very stiff. Hard. Moist)	47	
50 - 51'	Ditto	86	
51 - 52'	Ditto	46	
52 - 53'	Yellow-brown and grey silty clay with some hard disseminated lime bands. (Stiff. Moist).	25	
53 - 54'	Yellow-brown and grey silty clay with some hard disseminated lime bands. (Stiff. Moist)	38	
54 - 55'	Yellow-brown and grey mottled sandy clay. (Very stiff. Moist.)	35	
55 -56'	Yellow-brown and grey mottled very limey clay	33	
56 - 57'	Yellow and grey mottled fine-medium sand. (Soft. Friable. Wet)	32	
57 - 58'	Ditto	19	
58 - 59'	Ditto		
59 - 60'	" becoming clayey. (Firm. Moist.)	25	
60 - 61'	" some clay.	29	
61 - 62'	Yellow and grey mottled fine-medium sand. (Firm. Moist.)	30	
62 - 63'	Ditto	41	
63 - 64'	Ditto	54	
64 - 65'	Yellow-brown and grey mottled slightly silty clay. (Stiff. Moist.) Occasional brick red spots.	27	
65 - 66'	Ditto	31	
66 - 67'	Yellow and grey mottled clay. (Very stiff. Moist.)	38	
67 - 68'	Ditto	37	
68 - 69'	Ditto	42	
69 - 70'	Yellow and grey mottle d slightly sandy clay. (Very stiff. Moist)	33	
	END OF BORE.		

ENGINEERING GEOLOGY

PERCUSSION DRILLING

BORE SERIAL NO. 739/62

D.M. 780/62

BORE NUMBER 6

PROJECT: S.A. BULK HANDLING, PT. ADELAIDE. HD.: PT. ADELAIDE

SEC.: H.B. BK. 53

DRILLER: D. WILSON

DATE COMMENCED: 7/6/62 DATE COMPLETED: 11/6/62

LOGGED BY: E.R. HILLWOOD DATE: 27/6/62

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
0 - 1'	Limestone rubble, shell fragments and fine sand.	27	
1 - 2'	Ditto	34	
2 - 3'	Ditto	30	
3 - 4'	Brown fine sand. Calcareous.	31	
4 - 5'	Ditto (Friable)	31	
5 - 6'	Ditto	33	
6 - 7'	Ditto	22	
7 - 8'	Ditto	18	
8 - 9'	Ditto (Damp. Friable)	24	
9 - 12'	Ditto	24	
12 - 13'	Grey fine unconsolidated (Wet) sand.	34	
13 - 14'	Ditto	33	
14 - 15'	Ditto	26	
16 - 17'	Ditto	16	
17 - 18'	Ditto	34	
18 - 19'	Ditto	24	
19 - 20'	Ditto	16	
20 - 21'	Ditto	15	
21 - 22'	Ditto	22	
22 - 23'	Ditto	37	
23 - 24'	Ditto	19	
24 - 27'	" (Wet, very soft)	21	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
27 - 30'	Shell band in matrix of soft grey clay. (Soft and wet.)	17	
30 - 31'	Shell band in matrix of soft grey clay. (Soft. Wet)	7	
31 - 32'	Brown fine-medium clayey sand with hard limestone nodules.	8	
32 - 33'	Ditto (Wet. Soft)	9	
33 - 34'	Off-white medium-coarse clastic lime sand with some larger shell fragments. (Soft. Wet)	55	
34 - 35'	Ditto	63	
35 - 36'	Ditto (Wet. Friable)	27	
36 - 37'	Yellow coarse clastic lime sand and shell fragments.	23	
37 - 38'	Brown fine silty clay with disseminated lime bands. (Stiff. Moist)	23	
38 - 39'	Ditto	27	
39 - 41'	Grey-brown silty clay. (Stiff-Soft. Wet)	22 16	
41 - 42'	Brown coarse quartz sand with some silt (Firm. Wet)	20	
42 - 43'	Ditto	15	
43 - 44'	Ditto	23	
45 - 46'	Grey brown silty clay. (Very stiff. Moist.)	49	
46 - 47'	Grey brown silty clay with some hard limestone nodules.	26	
47 - 48'	Ditto	46	
48 - 49'	Ditto	28	
49 - 50'	Ditto	29	
50 - 51'	Reddish-brown and grey mottled clay with disseminations of hard limestone.	54	
51 - 52'	Pale brown and grey very limey clay. (Very stiff - hard. Moist)	57	
52 - 53'	Pale brown and yellow-brown limey clay with some hard nodules.	54	
53 - 54'	Yellow-brown, reddish-brown and grey mottled silty clay (Stiff. Moist)	23	
54 - 55'	Ditto	58	

BORE 6 (Contd.)

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
55 - 56'	Reddish-brown and grey mottled clay. (Very stiff. Moist)	64	
56 - 57'	Pale brown, yellow-brown and grey mottled very limey Clay. (Very stiff. Moist)	58	
57 - 58'	Ditto	28	
58 - 59'	" becoming sandy.	23	
59 - 60'	Pale brown, yellow-brown and grey mottled very limey clay. (Very stiff, moist.)	18	
60 - 61'	Yellow-brown and grey fine-medium sand with some silty clay. (Soft. Wet)	20	
61 - 63'	Yellow-brown and grey mottled silty clay.	(14 (23	
63 - 64'6"	Yellow clayey sand. (Wet. Friable)	(34 (11	
64'6 - 66'	Yellow-brown and grey mottled silty clay.	(16 (31	
66 - 67	Ditto	54	
67 - 68'	Ditto	41	
68 - 69'	Ditto	48	
69 - 70'	Ditto	41	

END OF BORE.

ENGINEERING GEOLOGY

PERCUSSION DRILLING

BORE SERIAL NO. 751/62

D.M. 780/62

BORE NUMBER 7

PROJECT: S.A. BULK HANDLING, PT. ADELAIDE HD.: PT. ADELAIDE

SEC.: H.B. BK. 53

PURPOSE: FOUNDATION TESTING

DRILLER: D. WILSON

DATE COMMENCED: 13/6/62 DATE COMPLETED: 18/6/62

LOGGED BY: E.R. HILLWOOD DATE: 5/7/62

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
0 - 1'	Rubble, and fine sand. Friable.	13	
1 - 2'	Ditto	46	
2 - 3'	Ditto	61	
3 - 4'	Light brown fine sand.	39	
4 - 6'	Ditto	(46 (27	
6 - 7'	Ditto	27	
7 - 8'	Ditto	18	
8 - 9'	Ditto	19	
9 - 10'	Light brown fine sand with some clay. (Damp. Friable)	27	
10 - 11'	Ditto	26	
11 - 12'	Ditto	19	
12 - 13'	Grey, fine sand. (Wet)	41	
13 - 14'	Slightly calcareous in places	29	
14 - 15'	Ditto	19	
15 - 16'	Ditto	17	
16 - 17'	Ditto	21	
17 - 18'	Ditto	22	
18 - 19'	Ditto	10	
19 - 20'	Ditto	20	
20 - 21'	Ditto	33	
21 - 22'	Ditto	16	
22 - 23'	Ditto	23	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
23 - 24'	Slightly calcareous in places.	17	
24 - 26'	Grey, fine sand. (Wet.) Slightly calcareous in places.	20	
26 - 28'	Ditto (Soft, Wet)	6	
28 - 29'	Grey silty clay with shell fragments.	13	
29 - 30'	Brown finely sandy clay.		
30 - 31'	Brown silty clay.	9	
31 - 32'	Oyster shells and brown silty clay.	8	
32 - 33'	Off-white clastic lime sand with some shell fragments. (Wet. Friable.)	51	
33 - 34'	Ditto	29	
35 - 36'	Ditto	32	
36 - 37'	Brown silty clay with some hard lime nodules. (Firm. Moist)	28	
37 - 38'	Ditto	18	
38 - 39'	Ditto	16	
39 - 40'	Brown finely sandy silt with occasional lime nodules.	17	
40 - 41'	Ditto	13	
41 - 42'	" becoming more sandy	22	
42 - 43'	Ditto	12	
43 - 44'	Brown with some grey mottling, silty clay. (Firm. Moist)	16	
44 - 45'	" (Very stiff. Moist)	27	
45 - 46'	"	35	
46 - 47'	"	32	
47 - 48'	Yellow-brown and grey mottled silty clay and abundant lime nodules	28	
48 - 49	Ditto	30	
49 - 50	" becoming very marly	42	
50 - 51'	Yellow-brown and pale brown moderately hard marl. (Very stiff-hard. Moist).	102	
51 - 52'	Ditto	87	
52 - 53'	Yellow-brown and grey-brown clay with abundant disseminations of hard marly limestone. (Stiff. Moist).	26	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
53 - 54'	Yellow-brown and grey mottled silty and limey clay with some disseminations of lime.	35	
54 - 55'	" (Very stiff. Moist)	36	
55 - 56'	Yellow-brown and grey mottled sandy clay with some limey disseminations.	25	
56 - 57'	Yellow-brown and grey mottled sandy clay with some limey disseminations	23	
57 - 58'	" very sandy (Firm. Moist)	38	
58 - 59'	Yellow-brown and grey mottled slightly clayey sand. (Wet, Friable)	41	
59 - 60'	"	43	
60 - 61'	"	34	
61 - 62'	"	37	
62 - 63'	Yellow-brown and grey mottled fine sand	35	
63 - 64'	Yellow-brown medium-coarse sand. (Wet. Friable)	40	
64 - 65'	"	34	
65 - 66'	Yellow-brown and grey mottled clay with some limey disseminations	37	
66 - 67'	Yellow-brown and grey mottled silty clay. (Very stiff. Moist)	36	
67 - 68'	"	30	
68 - 69'	"	30	
69 - 70'	"	36	

END OF BORE

ENGINEERING GEOLOGY

PERCUSSION DRILLING

BORE SERIAL NO. 765/62
D.M. 780/62

BORE NUMBER 8

PROJECT: S.A. BULK HANDLING, PT. ADELAIDE HD.: PT. ADELAIDE

PURPOSE: FOUNDATION TESTING SECT.: H.B. BLK. 53

DRILLER: D. WILSON

DATE COMMENCED: 19/6/62 DATE COMPLETED: 21/6/62

LOGGED BY: E. R. HILLWOOD DATE: 3/7/62

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
0 - 1'	Pale brown fine sand and silt with shell fragments and rubble. (Dry. Friable)	21	
1 - 2'	"	31	
2 - 3'	"	34	
3 - 4'	"	44	
4 - 5'	"	27	
5 - 6'	"	8	
6 - 7'	"	21	
7 - 8'	"	31	
8 - 9'	"	34	
9 - 10'	Grey and yellow-brown fine sand. (Damp. Friable)	27	
10 - 11'	"	15	
11 - 12'	" (Wet. Friable)	15	
12 - 13'	Grey fine-medium sand with some calcareous fragments. (Wet.	47	
13 - 14'	" (Wet.)	16	
14 - 15'	"	34	
15 - 16'	"	37	
16 - 17'	"	18	
17 - 19'	"	29	
19 - 21'	"	6 14	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
21 - 22'	Grey fine-medium sand with some calcareous fragments. (Wet. Friable)	32	
22 - 26'	Grey fine sand with some shell fragments. Becoming clayey.	9 9 10	
26 - 27'	Dark grey sandy and silty clay with oyster and shell fragments. (Wet.)	11	
27 - 28'	Brown silty clay and silt.		
28 - 29'6"	Sealed tube. " (Soft. Wet)	27	
29'6 - 30'	Brown silty clay with hard limestone nodules.	7	
30 - 31'	Off-white fine-medium clastic lime sand. Poorly consolidated. (Wet. Friable.)	41	
31 - 32'	"	39	
32 - 33'	"	21	
33 - 34'	" with some oyster and larger shell fragments. (Wet. Friable)	19	
34 - 35'	Yellow and grey clastic lime sand with abundant shell fragments.	17	
35 - 36'	" some cemented limestone nodules.	16	
36 - 37'6"	Sealed tube. Brown and grey-brown silty clay. (Soft. Wet)	17	
37'6" - 38'	"	8	
38 - 39'	Grey-brown and yellow-brown compact clayey silt.	14	
39 - 40'	"	14	
40 - 41'6"	Sealed tube "	21	
41'6 - 42'	" (Firm. Moist)	10	
42 - 43'	" (Stiff. Moist)	22	
43 - 44'6"	Sealed tube. Brown and grey-brown silty clay with some hard small limestone nodules.	41	
44'6 - 45'	"	11	
45 - 46'	" (Very stiff. Moist.)	22	
46 - 47'	" "	23	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
47 - 48'	Brown, yellow-brown and grey mottled sandy clay with some hard limestone nodules. (Very stiff. Moist).	27	
48 - 49'	Pale brown, yellow- brown and grey mottled limey clay with cemented disseminations of lime. (Very stiff. Hard. Moist)	47	
49 - 50'	"	51	
50 - 51'	"	27	
51 - 52'	Yellow-brown and grey mottled compact sandy clay. (Firm. Stiff. Moist)	26	
52 - 53'	Yellow-brown and grey clay with disseminations of hard lime.	48	
53 - 54'	Yellow-brown and grey clay with disseminations of hard lime.	33	
54 - 55'	Grey and yellow-brown very limey clay. Partly cemented. (Very stiff - hard. Moist)	51	
55 - 56'	Grey and yellow-brown silty and finely sandy clay with disseminations of lime. (Stiff. Moist)	25	
56 - 57'	Grey and yellow-brown fine-medium sand. (Firm. Stiff. Moist)	16	
57 - 58'	"	27	
58 - 59'	"	30	
59 - 60'	" (Stiff. Moist)	25	
60 - 61'	" Poorly consolidated (Firm. Moist)	19	
61 - 62'	Yellow and grey-brown medium-coarse sand with sparse rounded pebbles and gravel. (Wet. Friable)	19	
62 - 63'	"	29	
63 - 64'	"	49	
64 - 65'	Yellow-brown and grey mottled clay. (Very stiff. Moist)	54	
65 - 66'	Yellow-brown and grey mottled silty clay.	42	
66 - 67'	"	27	
67 - 68'	"	55	
68 - 69'	Yellow and grey mottled silty and finely sandy clay.	38	
69 - 70'	"	37	
	END OF BORE.		

ENGINEERING GEOLOGY

PERCUSSION DRILLING

BORE SERIAL NO. 766/62
D.M. 780/62

BORE NUMBER 9

PROJECT: S.A. BULK HANDLING, PT. ADELAIDE HD.: PT. ADELAIDE

PURPOSE: FOUNDATION TESTING SEC.: H.B. BLK. 53

DRILLER: D. WILSON

DATE COMMENCED: 22/6/62 DATE COMPLETED: 26/6/62

LOGGED BY: E.R. HILLWOOD DATE: 5/7/62

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons.Sq.Ft.
0 - 1'	Brown fine sand and silt with shell fragments and limestone rubble. (Dry)	12	
1 - 2'	"	23	
2 - 3'	"	30	
3 - 4'	" (Dry. Friable)	19	
4 - 5'	"	12	
5 - 9'	"	(29 (16 (16	
9 - 10'	"	32	
10 - 11'	" (Damp)	25	
11 - 12'	" (Wet)	14	
12 - 13'	"	18	
13 - 14'	Grey fine sand with some calcareous sand and fragments. (Wet)	11	
14 - 15'	"	30	
15 - 16'	"	31	
16 - 17'	"	25	
17 - 18'	"	20	
18 - 20'	"	25	
20 - 21'	"	32	
21 - 22'	"	12	
22 - 23'	"	14	
23 - 24'	"	22	

BORE 9 (Contd.)

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
24 - 25'	Grey fine sand with some calcareous sand and fragments. (Wet)	22	
25 - 27'	Grey fine silt and sand with abundant shell fragments.	19	
27 - 28'	Grey-brown fine silty clay with frequent lime concretions	14	
28 - 29'	"	10	
29 - 31'	"	11	
31 - 32'	Off-white medium grained clastic lime sand. (Wet. Friable)	14	
32 - 33'	"	42	
33 - 34'	"	21	
34 -35'	Clastic lime sand becoming coarse and yellow. Abundant shell fragments.		
35 - 36'	Grey-brown fine silty clay. (Moist. Soft.)	15	
36 - 37'	" (Soft. Wet)	15	
37 - 38'	"	10	
38 - 39'	Grey-brown fine-medium sand with some silt. (Soft. Wet)	11	
39 - 40'	Grey-brown fine silt. (Soft. Wet)	9	
40 - 41'	"	8	
41 - 42'	"	15	
42 - 43'	" (Firm. Moist)	14	
43 - 44'6	Sealed tube. Yellow-brown and grey-brown silty clay with abundant lime nodules.	35	
44'6 - 45'	" (Stiff. Moist)	13	
45 - 46'	"	22	
46 - 47'	"	18	
47 - 48'	"	34	
48 - 49'	"	29	
49 - 50'	Yellow-brown and light brown mottled very limey clay. (Very stiff. Moist.)	23	
50 - 51'	" abundant lime. (Very stiff-hard. Moist).	42	
51 - 52'	"	41	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
52 - 53'	Yellow-brown and grey mottled limey clay with nodules of off-white lime.	19	
53 - 54'	" (Very stiff. Moist)	54	
54 - 55'	" Very stiff. Hard. Moist.	39	
55 - 56'	Yellow and grey mottled silty clay with disseminations of lime.	46	
56 - 57'	Yellow-brown and grey mottled clayey sand. (Firm. Moist)	17	
57 - 58'	Yellow-brown and grey mottled clayey sand. (Firm. Moist)	17	
58 - 59'	" with some rounded quartz pebbles.	18	
59 - 60'	" (Firm. Moist)	20	
60 - 61'	Yellow-brown and grey mottled fine sand. Little clay. (Stiff. Friable. Wet)	22	
61 - 62'	" (Soft. Wet)	24	
62 - 63'	Yellow-brown and grey mottled medium-coarse sand. (Wet. Friable.)	52	
63 - 64'	"	33	
64 - 65'	Yellow and grey mottled silty clay and clay. (Stiff. Moist)	38	
65 - 66'	Yellow-brown and grey mottled slightly silty clay with some lime concretions. (Very stiff. Moist)	45	
66 - 67'	" (Very stiff. Moist)	55	
67 - 68'	"	45	
68 - 69'	" finely sandy.	47	
69 - 70'	" (Very stiff. Moist)	40	
	END OF BORE.		

ENGINEERING GEOLOGY

PERCUSSION DRILLING

BORE SERIAL NO. 778/62
D.M. 780/62

BORE NUMBER 10

PROJECT: S.A. BULK HANDLING, PT. ADELAIDE HD. PORT ADELAIDE

PURPOSE: FOUNDATION TESTING SEC.: H.B. BLK. 53

DRILLER: D. WILSON

DATE COMMENCED: 12/6/62 DATE COMPLETED: 4/7/62

LOGGED BY: E.R. HILLWOOD DATE: 10/7/62

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
0 - 1'	Light brown fine loose sand with some limestone rubble. (Dry)	12	
1 - 2'	"	14	
2 - 3'	"	15	
3 - 4'	"	12	
4 - 5'	"	10	
5 - 6'	"	6	
6 - 7'	"	10	
7 - 8'	Brown soft clay with some silt and grey-black organic matter. (Soft. Wet.)	9	
8 - 9'	Grey fine sand.	9	
9 - 10'	" (Wet)	9	
10 - 11'	"	23	
11 - 12'	"	25	
12 - 14'	"	13	
14 - 15'	" (Wet)	26	
15 - 16'	" "	20	
16 - 18'	" "	34	
18 - 20'	"	16	
20 - 21'	"	26	
21 - 22'	"	17	
22 - 23'	"	15	
23 - 25'	"	17	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
25 - 26'	Dark grey fragmental shells and clay. (Wet.)	6	
26 - 28'	Grey-brown soft clayey silt. (Soft, wet).	16	
28 - 31'	Brown sandy and silty clay (very soft. Wet).	13	
31 - 32'	Off-white clastic lime sand. Partly cemented in patches. (Wet, friable)	46	
32 - 33'	"	83	
33 - 34'	"	30	
34 - 35'	Off-white and yellow clastic lime sand with some larger shell fragments. (Wet, Friable)	24	
35 - 36'	Brown and grey-brown fine clayey silt. (Friable - firm, Wet)	25	
36 - 37'	"	22	2.5
37 - 38'	" (Stiff, moist)	18	2.5
38 - 39'	Brown and grey-brown fine clayey silt. (Friable - firm. Wet).	20	2.0
39 - 40'	" (Soft. Moist)	12	1.5
40 - 41'	"	12	
41 - 42'	Yellow-brown fine-medium sand. (Soft - friable. Wet).	15	
42 - 43'	Brown and grey-brown sandy silt. (Soft. Wet.)	15	
43 - 44'	"	25	
44 - 45'	Reddish-brown and greyish-grey mottled silty clay. (Very stiff, Moist)	34	3.75
45 - 46'	" with abundant small nodules of lime. (Very stiff. Moist)	29	
46 - 47'	"	25	
47 - 48'	"	34	
48 - 49'	"	23	> 4.5
49 - 50'	Pale brown, reddish-brown and grey mottled limey clay. (Very stiff, Moist.)	21	
50 - 51'	Grey-brown and pale brown limey clay with frequent hard disseminations and nodules of lime. (Very stiff. Moist)	57	

BORE 10 (Contd.)

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq. Ft.
51 - 52'	Grey-brown and pale brown limey clay with frequent hard disseminations and nodules of lime. (Very stiff. Moist)	49	4.5
52 - 53'	Yellow-brown and grey mottled finely sandy silty clay.	20	4.0
53 - 54'	Grey and reddish-brown silty clay with disseminations and nodules of hard lime. (Very stiff. Moist)	36	
54 - 55'	"	30	>4.5
55 - 56'	Pale brown limey clay and grey and reddish-brown silty clay. (Very stiff. Moist.)	32	
56 - 57'	"	45	
57 - 58'	Yellow coarse sand and grit with abundant rounded gravel and pebbles. (Wet. Friable.)	42	
58 - 59'	"	52	
59 - 59'6"	Coarse rounded water worn gravel and large pebbles in a matrix of sandy clay.	22	
59'6" - 60'	Reddish-brown and grey-brown fine silt.		
60 - 61'	Coarse grit, gravel and pebbles in a matrix of sand. (Wet.)	45	
61 - 62'	Grey and yellow fine-medium grained sand. (Wet. Friable.)	71	
62 - 63'	"	53	
63 - 64'	Coarse yellow sand and sparse pebbles. (Wet. Friable)	26	
64 - 65'	Reddish-brown and grey mottled clay. (Very stiff. Moist)	41	
65 - 66'	" with narrow sand band.	54	>4.5
66 - 67'	Yellow-brown and grey silty clay. (Very stiff. Moist.)	52	
67 - 68'	Yellow-brown and grey mottled clay.	54	
68 - 69'	"	64	
69 - 70'	"	48	

END OF BORE

ENGINEERING GEOLOGY

PERCUSSION DRILLING

BORE SERIAL NO. 516/62

D.M. 780/62

BORE NUMBER 11

PROJECT: S.A. BULK HANDLING, PT. ADELAIDE HD.: PT. ADELAIDE

PURPOSE: FOUNDATION TESTING SEC.: H.B. BLK. 53

DRILLER: D. WILSON

DATE COMMENCED: 4/7/62 DATE COMPLETED: 6/7/62

LOGGED BY: E.R. HILLWOOD DATE: 10/7/62

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
0 - 1'	Brown fine sand with some lime-stone rubble. (Friable)	18	
1 - 2'	"	30	
2 - 3'	" (Dry. Friable)	26	
3 - 4'	"	29	
4 - 5'	"	18	
5 - 8'	" (Dry. Friable)	6 4 8	
8 - 9'	"	16	
9 - 10'	"	18	
10 - 11'	" (Damp. Friable)	23	
11 - 12'	" becoming grey. (Wet).	17	
12 - 13'	Grey fine-medium sand with some clastic lime sand with shell fragmen ts. (Wet)	34	
13 - 14'	"	29	
14 - 15'	"	17	
15 - 16'	"	13	
16 - 17'	"	16	
17 - 18'	"	24	
18 - 19'	"	43	
19 - 20'	"	11	
20 - 21'	"	31	
21 - 22'	"	18	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
22 - 23'	Grey fine-medium sand with some clastic lime sand with shell fragments. (Wet.)	42	
23 - 24'	Grey fine-medium sand with some clastic lime sand with shell fragments. (Wet.)	14	
24 - 26'	"	14	
26 - 28'	"	13	
28 - 29'	Grey sand and silt with oyster and shell fragments.		
29 - 30'	Brown fine sand and silt.		
31 - 32'	Off-white clastic lime sand. Partly cemented at top.	56	
32 - 33'	Off-white clastic lime sand. Fine-medium grained.	47	
33 - 34'	" (Wet. Friable)	35	
34 - 35'	" becoming coarser. Abundant small shell fragments.	23	
35 - 36'	Yellow and off-white coarse clastic lime sand with abundant shell fragments.	15	
36 - 37'	"	7	
37 - 39'	Yellow-brown silt and lime sand. (Soft. Wet.)	11	
39 - 40'	Brown finely sandy silty clay. (Soft. Wet.)	8	1.5
40 - 41'	"	14	1.25
41 - 42'	Brown fine sand and silt. Poorly consolidated. (Soft. Wet)	24	
42 - 43'	" (Firm. Moist)	25	
43 - 44'	Brown and reddish-brown finely silty clay. (Stiff. Moist)	20	
44 - 45'	" with frequent hard limestone nodules. (Very stiff. Moist).	21	4.5
45 - 46'	"	24	
46 - 47'	"	28	
47 - 48'	"	36	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
48 - 49'	Brown and reddish-brown finely silty clay with frequent hard limestone nodules. (Very stiff. Moist)	40	
49 - 50'	Yellow-brown and grey mottled very limey clay. (Very stiff. Moist)	37	>4.5
50 - 51'	Yellow-brown and grey mottled very limey clay with hard lime disseminations at base. (Very stiff hard. Moist).	51	
51 - 52'	Yellow and grey mottled finely sandy silt with nodules and disseminations of lime.	38	
52 - 53'	Pale brown very limey clay with hard concretions of lime. (Very stiff. Moist.)	34	>4.5
53 - 54'	"	35	>4.5
54 - 55'	" with some red clayey sand.	36	>4.5
55 - 56'	Yellow and grey mottled clayey sand with disseminations of lime. (Stiff. Moist)	29	3.5
56 - 57'	Yellow and grey mottled slightly clayey sand. (Firm. Moist)	21	2.25
57 - 58'	"	17	3.25
58 - 59'	"	22	
59 - 60'	"	21	
60 - 61'	Grey and yellow mottled fine-medium poorly consolidated clayey sand.	20	
61 - 62'	Grey and yellow- fine-medium sand. Poorly consolidated (Wet. Friable)	28	
62 - 63'	"	39	
63 - 64'	"	35	
64 - 65'	Yellow and grey mottled silty clay with sparse nodules of lime. (Very stiff, moist)	52	
65 - 66'	" Vertical sand filled crack runs to 68'6"	47	
66 - 67'	"	52	>4.5
67 - 68'	" (Very stiff. Moist)	59	
68 - 69'	"	53	
69 - 70'	"	58	
	END OF BORE.		

ENGINEERING GEOLOGY

PERCUSSION DRILLING

BORE SERIAL NO. PD 535/63
D.M. 780/62

BORE NUMBER 12

PROJECT: S.A. BULK HANDLING, PT. ADELAIDE HD.: PT. ADELAIDE

PURPOSE: FOUNDATION TESTING SEC.: H.B. BK. 53

DRILLER: D. WILSON

DATE COMMENCED: 9/7/62 DATE COMPLETED: 17/7/62

LOGGED BY: E.R. HILLWOOD DATE: 18/7/62

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
0 - 1'	Light brown fine sand with shelly and limestone rubble. Fill material.	22	STRATIGRAPHY BY N.H. LUDBROOK (Q.G.N. 57)
1 - 2'	"	16	
2 - 3'	"	18	
3 - 4'	"	15	
4 - 5'	"	12	
5 - 7'	"	10 2	FILL
7 - 9'	" (Damp)	11	
9 - 10'	"	8	
10 - 11'	"	12	
11 - 12'	Grey and brown fine sand with some clay (Wet.)	23	
12 - 13'	"	14	
13 - 14'	"	9	
14 - 15'	Grey fine-medium well sorted sand with some shell fragments. (Wet)	16	
15 - 16'	"	12	
16 - 17'	"	21	
17 - 18'	"	28	ST. KILDA FM.
18 - 19'	"	24	
19 - 20'	"	17	
? 20 - 21'	"	14	
21 - 22'	"	26	
22 - 23'	"	29	

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
23 - 25'	Grey fine-medium well sorted sand with some shell fragments (Wet)	16	
25 - 28'	Grey fine-medium well sorted sand with some shell fragments. (Wet.)	12	ST. KILDA FM.
28 - 31'	Grey soft coal and silt with abundant shell fragments. (Wet. Very soft.)	9	POORAKA FM.
31 - 32'	Brown clay and silt with some shell fragments. (Very soft. Wet).	8	
32 -33'	"	10	
33 - 34'	Shell and oyster fragments at top. Off-white, yellow medium grained clastic lime sand. (Friable. Wet)	48	
34 - 35'	Off-white fine-medium clastic lime sand with some shell fragments. (Friable)	41	GLANVILLE FM.
35 - 36'	"	31	
36 - 37'	Yellow fine clastic lime sand with some shell fragments. (Friable. Wet)	14	
37 - 38'	Brown silt and finely sandy silt.	12	
38 - 39'	" with some hard limestone nodules.		
39 - 40'	Grey-brown fine sand with coarse clastic lime sand and shell fragments.		
40 - 43'	" Coarse shell fragments at top. (Wet. Soft, friable).	(16 (12 (28	HINDMARSH CLAY
43 - 44'	Brown fine-medium sand. (Wet. Friable)	39	
44 - 45'	Reddish-brown and grey silty clay.	20	3.25
45 - 46'6"	Sealed tube. " (Stiff. Moist)	26	
46'6 - 47'	Reddish-brown clay with nodules of hard limestone.	12	
47 - 48'	"	18	
48 - 49'	"	19	
49 ¾- 50'	"	22	>4.5
50 - 51'	Pale brown and grey-brown limey clay. (Very stiff - hard. Moist)	35	

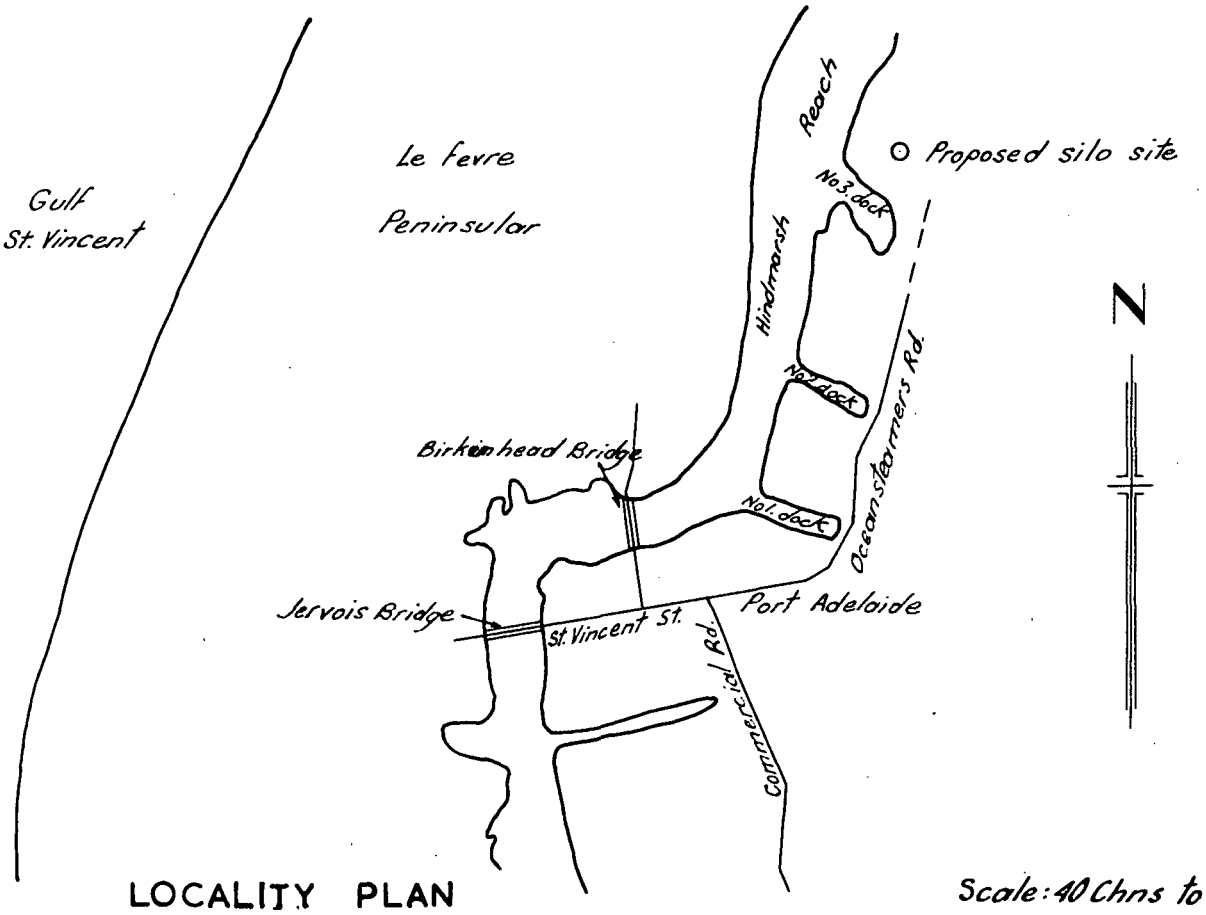
DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
51 - 52'	Pale brown and grey-brown limey clay with disseminations of hard lime.	51	
52 - 53'	"	54	
53 - 54'	Yellow and grey-brown finely silty clay.		>4.5
54 - 55'	Yellow and grey clay with abundant nodules and disseminations of lime.	38	
55 - 56'6"	Sealed tube "	69	
56'6 - 57	"		
57 - 58'	Yellow-brown and grey mottled silty and finely sandy clay with frequent hard nodules of lime.	47	4.5
58 - 58'6"	"	24	2.2
58'6 - 59'	Grey and yellow-brown mottled sandy clay.	16	3.0
59 - 60'	"		4.0
60 - 61'	Yellow-brown and grey silty and finely sandy clay.	23	4.5
61 - 62'	"	18	3.75
62 - 63'	"	21	2.75
63 - 64'	Yellow-brown and grey slightly clayey sand. (Wet. Friable)	39	
64 - 64'6"	"		
64'6 - 65'	Grey and yellow silty and sandy clay. (Firm. Moist)	30	
65 - 66'6"	Sealed tube. Yellow-brown and grey mottled slightly silty clay. (Very stiff-hard. Moist)	74	
66'6" - 67'	"	22	
67 - 68'	"	31	
68 - 69'	"	49	>4.5
69 - 69'6"	"	37	
69'6 - 70'	"	41	
70 - 71'	"	44	
71 - 72'	Grey and yellow-brown clay with pockets of lime. (Very stiff. Moist)	51	
72 - 73'	Yellow andgrey mottled silty clay. Soft.	46	2.25

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
73 - 74'	Yellow and grey mottled silty and finely sandy clay. (Stiff. Moist.)	29	4.5
74 - 74'6"	"	12	3.0
74'6 - 75'	"	31	3.0
75 - 76'6"	Sealed tube. Reddish-brown and grey mottled slightly silty clay with some nodules of lime.	73	
76'6" - 77'	" (Very stiff - hard. Moist)	35	
77 - 78'	"	48	>4.5
78 - 79'	"	49	
79 - 80'	"	56	
80 - 81'	Grey and yellow-brown fine sand.	54	
81 - 82'	Grey and yellow brown fine sand to 81'6". Yellow brown and grey mottled silty clay.	41	
82 - 83'	" (Firm - stiff. Moist)4	44	
83 - 84'	Reddish-brown and grey mottled silty and gritty clay. (Stiff. Moist)	43	
84 - 85'	Yellow-brown and grey mottled clay. (Very stiff. Moist).	39	
85 - 85'6"	"	48	
85'6 - 86'	"	34	
86 - 87'6"	Sealed tube. " (Very stiff. Moist)	66	
87'6" - 88'	"	44	
88 - 89'	Reddish-brown and grey mottled clay with pockets of white lime. (Very stiff - hard. Moist)	41	4.5
89 - 90'	"	71	
90 - 91'	Yellow-brown and grey mottled clay with hard disseminations of lime. (Very stiff - hard. Moist)	76	
91 - 92'	"	37	
92 - 93'	"	47	
93 - 94'	Grey and yellow-brown mottled clay with occasional small nodules of lime. (Very stiff. Moist)	35	
94 - 95'	"	32	
95 - 96'6"	"		

DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
96'6" - 97'	Grey and yellow-brown mottled clay with occasional small nodules of lime. (Very stiff. Moist)	21	
97 - 98'	"	28	
98 - 99'	Yellow and grey mottled silty clay with some nodules of hard lime.	36	
99 - 100'	Yellow and grey mottled silty clay with abundant large hard nodules of lime. (Very stiff. Moist)	61	4.5
100 - 101'	"	66	
101 - 102'	"	35	
102 - 103'	"	43	
103 - 104'	"	29	
104 - 105'	Yellow and grey mottled very silty clay. (Firm. Moist)	41	4.0
105 - 106'6"	"	48	4.0
106'6 - 107'6	" finely sandy	56	3.0
107'6 - 109'	Yellow-brown and grey silty clay.	59	
109 - 110'	"	53	
110 - 111'	"	98	
111 - 112'	"	34	
112 - 113'	" with limey patches. (Very stiff. Moist)	84	
113 - 114'	"	47	
114 - 115'	" very limey.	40	
115 - 116'6"	Sealed tube. Yellow-brown and grey mottled clay with hard dissemination of lime.	76	>4.5
116'6 - 117'	"	34	
117 - 118'	"	93	
118 - 119'	"	68	
119 - 120'	" Large nodules of lime.	123	
120 - 121'	"	87	
121 - 122'	"	67	
122 - 123'	"	68	

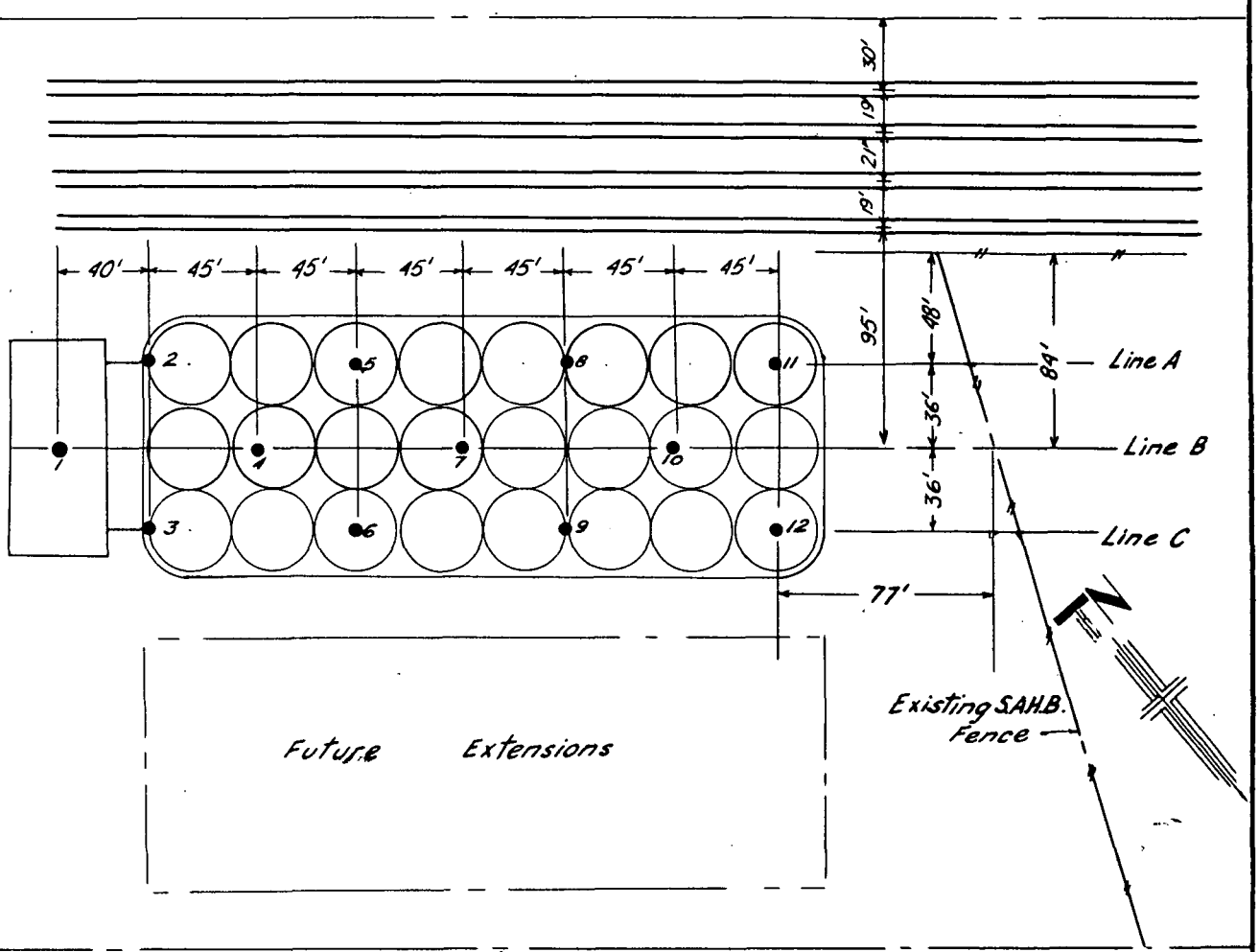
DEPTH	DESCRIPTION	BLOWS PER FOOT	UNCONFINED STRENGTH Tons/Sq.Ft.
123 - 124'	Yellow-brown and grey mottled clay with small hard nodules of lime	35	
124 - 125'	"	40	
125 - 126'6"	Sealed Tube "	47	
126'6 - 128'	"	53	
128 - 129'	Yellow and grey silty clay with some lime. (Very stiff. Moist)	44	>4.5
129 - 130'6"	"	92	
130'6" - 132'	"	84	
132 - 133'6"	Sealed Tube. Reddish-brown and grey mottled clay.	64	

END OF BORE



LOCALITY PLAN

Scale: 40 Chns to 1"



To accompany report by E.R. Hillwood

S.A. DEPARTMENT OF MINES

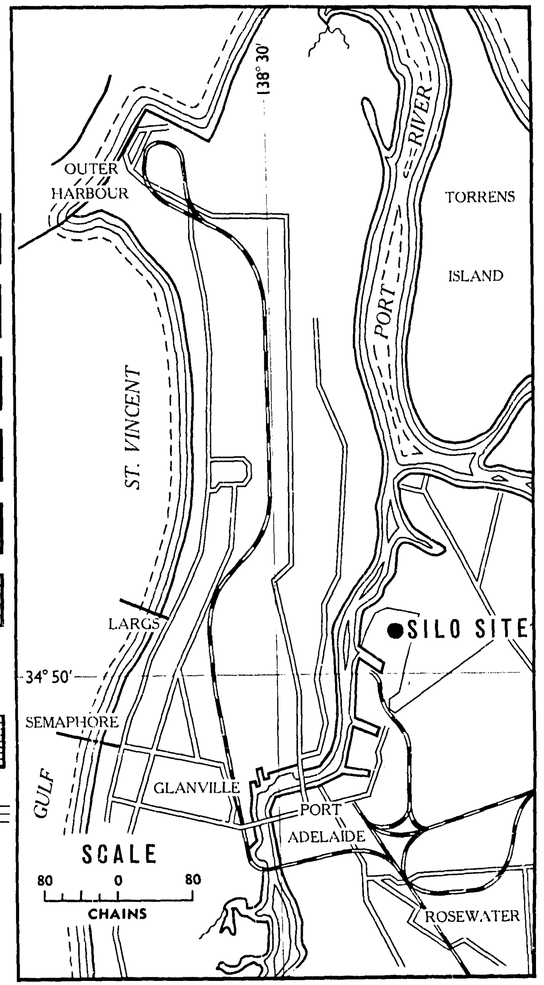
Approved	Passed	Drn.	SILO SITE	D.M.	Scale 1" = 80 Feet.
		Tcd. B.L.G.	S.A. CO-OP BULK HANDLING	Req.	S3208 Hal
		Ckd. M&L.	PT. ADELAIDE		
Director		Exd.	BORE LOCATION PLAN		Date 2-8-62

200—9-61 8805

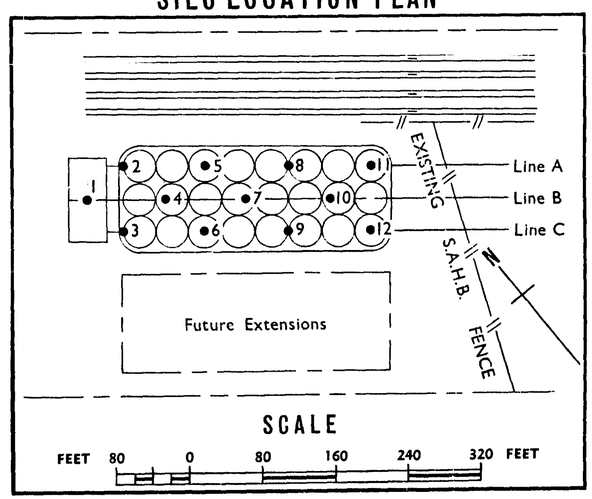
LEGEND

- Light brown fine sand fill, some clay at base
- Grey fine—medium sands Beach deposits
- Brown silty clays with shell beds and oysters Estuaries-marine
- Yellow clastic lime sands
- Brown, reddish brown silty and limey clays, some sand bands
- Brown and red brown limey clays Hard-cemented lime in places
- Yellow, red, brown and grey silty clays Sandy and sandy clay lenses common Nodules and cemented limey patches frequent in lower portion
- Static water level — S. W. L.
- Water Cut (with depth) — 32'
- N. B. R. L. Surface approximately — 16'

LOCALITY MAP



SILO LOCATION PLAN



62–571

E. R. Hillwood Geologist

S.A. Dept. of Mines