Department of Mines

South Australia

REPORT ON SITE INVESTIGATION

PROPOSED BULK GRAIN STORAGE SILO

RAILWAY YARDS

WUDINNA

HD. PYGERY

by

P.G. Miller
Geologist

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D.M. 659/58

M 1177

Rept.Bk. 48/152

G.S. 1376

12th June, 1959

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I SUMMARY

Two percussion holes were put down, No. 1 to a depth of 30' and No. 2 to a depth of 26'. Sealed tube samples were taken in Hole No. 2. The soil profile consists of 6' of calcareous material overlying a sandy clay which grades into a clayey sand with depth. The calcareous horizon contains a 2'-2'6" thick band of hard travertine of high strength about 1 ft. below the surface. It is recommended that the foundation ring be seated on this travertine layer, provided the layer is continuous laterally, and that it is not necessary to penetrate the travertine for any significant depth. If these conditions are not possible, then all foundations should be located at 8' below the surface, where the bearing capacity is estimated to be greater than 2½ tons per square foot maximum safe. Care should be taken with drainage to prevent differential settlement.

II SOIL PROFILES AND FOUNDATION CONDITIONS:

Two percussion holes were put down using a Ruston Bucyrus Plant. Percussion Hole No. 1 was 30 feet deep, and Percussion Hole No. 2 was 26 feet deep. Sealed tube samples were taken in Hole No. 2 at the following depths: 3ft - 10'6"; 12'6" - 14 ft; 14'6" - 16 ft; 22 ft. - 25 ft.

The following soil profile was revealed by the test drilling.

0' - 1'	Topsoil with abundant travertine nodules near the base.
1' - 3'	Hard pisolitic travertine. This material has high strength and is stable.
3' - 6'	Sandy marl with abundant travertine fragments, the fragments decreasing with depth. This material although quite strong at the top becomes weaker with depth. It is subject to loss of strength with increase in moisture content. The estimated bearing capacity is 1 - 2 tons per square foot maximum safe.
6' - 30'	Sandy clay grading to a clayey sand with depth; This material is stable, and at a depth of 8 feet from the surface the bearing capacity is estimated to be greater than 2½ tons per square foot maximum safe. Below 8 feet the material is stable, the strength increasing with depth.

A detailed log of the drill holes, and the penetration data, are included as an appendix to this report.

III CONCLUSIONS AND RECOMMENDATIONS:

The profile revealed by the test drilling showed that a strong travertine layer is present at a depth of 1 foot below the surface. It is recommended that the ring foundations be located on this layer with the following provisions.

(1) The travertine layer must be continuous throughout the area of the proposed structure. This would appear to be the case from the results of the drilling but it would be advisable to check the continuity of the travertine with a series of shallow holes or trenches.

(2) During construction the travertine layer in the vicinity of the ring foundation must not be broken or penetrated. This is particularly important because beneath the travertine there is a zone of marl which has a very low strength. Should any portion of the ring foundation be seated on this material, differential settlement would be almost certain to occur.

If both these precautions are observed it is considered that the travertine horizon will have a very high bearing capacity, and will safely support a loading of $2\frac{1}{2}$ tons per square foot. It is advisable to locate the foundations on top of the travertine, as in this type of material this is usually the strongest zone, the material being more strongly cemented at the top.

Once the foundation ring has been placed it will be permissable to excavate within the ring for the conveyor tunnel. Care should be taken to ensure that the underlying marl does not become saturated when the tunnel excavation is open. If this occurs the marl could possibly become so unstable that the support of the hard travertine could be affected. Any excavations within the marl should therefore be scheduled to avoid any saturation, and the excavations should be covered as soon as possible.

When construction of the silo has been completed care should be taken with drainage to prevent any undue increase in moisture content in the marl horizon . Surface water and roof run-off should be carried well away from the foundations in properly

constructed drains.

If either the travertine layer is not continuous, or it is not convenient to locate all foundations at a depth of 1 foot below the surface, it will be necessary to locate all foundations at 8 feet below the surface. Beneath the travertine layer there is, as previously mentioned, a zone of low strength. This zone is also subject to loss of strength with increase in moisture content. It is estimated that the bearing capacity of this zone (4 feet to 8 feet below the surface) is from 1 - 2 tons per square foot maximum safe. Consequently foundations seated on this material would be subject to differential settlement.

At 8 feet below the surface the sandy clay is stable with an estimated bearing capacity of greater than 2½ tons per square foot maximum safe. Below this depth the material is stable and has a high bearing capacity, increasing with depth.

Summarizing the above, foundations should be located at either 1 foot below the surface, or at 8 feet below the surface, depending on the above-mentioned conditions.

P.G. MILLER

GEOLOGIST

SOILS GEOLOGY SECTION

PGM:CERF
12/6/59

APPENDIX

WUDINNA PERCUSSION BORE NO 1

Bore Serial NO: P.D. 520/59 **Location:** Wudinna Railway Yards.

Hundred: Pygery **Section:** Railways Reserve

Purpose: Foundation testing for proposed bulk grain storage silo

Plant No: Ruston No. 9 **Driller:** E. Schultz

Date Commenced: 9/7/58 **Date Completed:** 9/7/58

Depth: 30 feet **Diam.** 6 in.

Logged by P.G. Miller

Depth From	Depth To	Description	Penetration From	Penetration To	Blows
0'	6"	Reddish brown sandy and clayey loam.	0	1	35
6"	1'	Travertine nodules with some reddish-brown sandy loam.			
1'	2'	Hard, pale buff, pisolitic travertine with some earthy lime and some light brown limey clay.	1	2	70
2'	3'	Hard, pale buff, pisolitic travertine.	2 2'6"	2'6" 3'	153 97
3'	5'	Pale buff, friable, sandy marl with very abundant lumps and nodules of hard travertine.	3' 4'	4' 5'	50 25
5'	6'	As above, but becoming darker in colour with less travertine, nodules and some pockets of pale reddish-brown sandy clay.	5'	6'	11
6'	8'	Moist, soft to firm, light reddish-brown to mid-reddish brown, very sandy clay, becoming more sandy with depth. Some specks of black staining.	6 7	7 8	14 23
8'	16'	Firm, moist, red-brown and pale grey-brown mottled very sandy clay.	8 9 10 11 12 13 14 15	9 10 11 12 13 14 15 16	32 30 35 35 38 38 39 39
16'	18'	As above but more sandy	16 17	17 18	54 50
18'	21'	Red-brown and red mottled clayey sand to sandy clay with occasional light red-brown and light grey-brown mottling.	18 19 20 21	19 20 21 22	49 50 51 50
21'	27'	Red-brown and light red-brown vaguely mottled clayey sand to sandy clay with some pockets of grey and light grey mottling. Stiff, compact. Some pockets of fatty clay from 26' - 27'.	21 22 23 24 25 26	22 23 24 25 26 27	50 51 53 64 70 72

Depth		Description	Penetration		
From	To		From	To	Blows
27'	30'	Pale red-brown sand with pockets of red-brown and grey-brown mottled clayey sand and pockets of red-brown and grey-brown mottled slightly sandy clay. Stiff, compact.	27 28 29	28 29 30	90 92 90

END OF HOLE

APPENDIX.

WUDINNA PERCUSSION BORE NO.2

Bore Serial No: P.D. 521/59 **Location:** Wudinna Railway Yds.

Hundred: Pygery **Section:** Railways Reserve

Purpose: Foundation testing for proposed bulk grain storage silo.

Plant: Ruston No. 9 **Driller:** E. Schultz

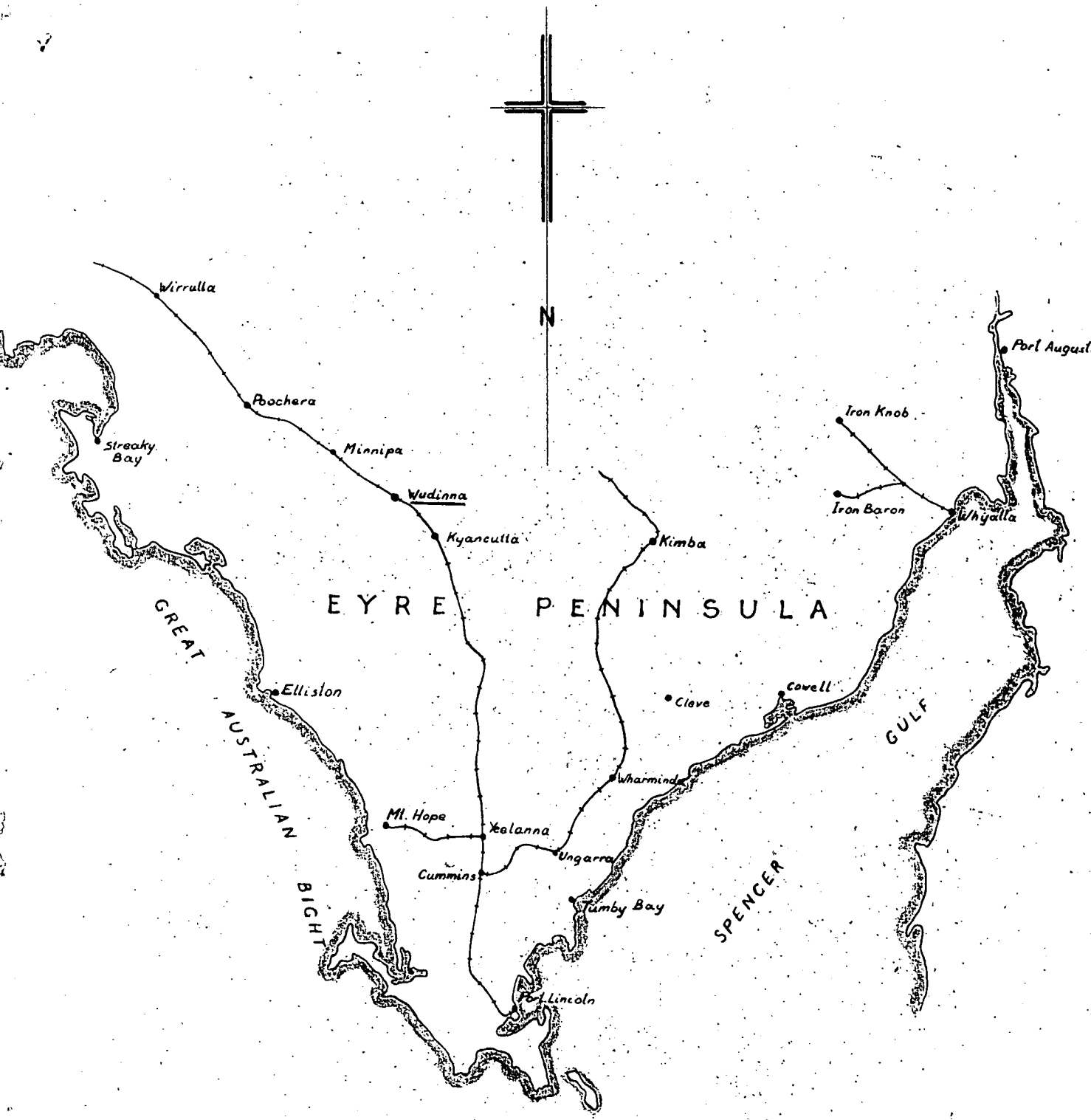
Date Commenced: 10/7/58 **Date completed:** 10/7/58

Depth: 26 feet **Diam:** 6 in.

Logged by P.G. Miller

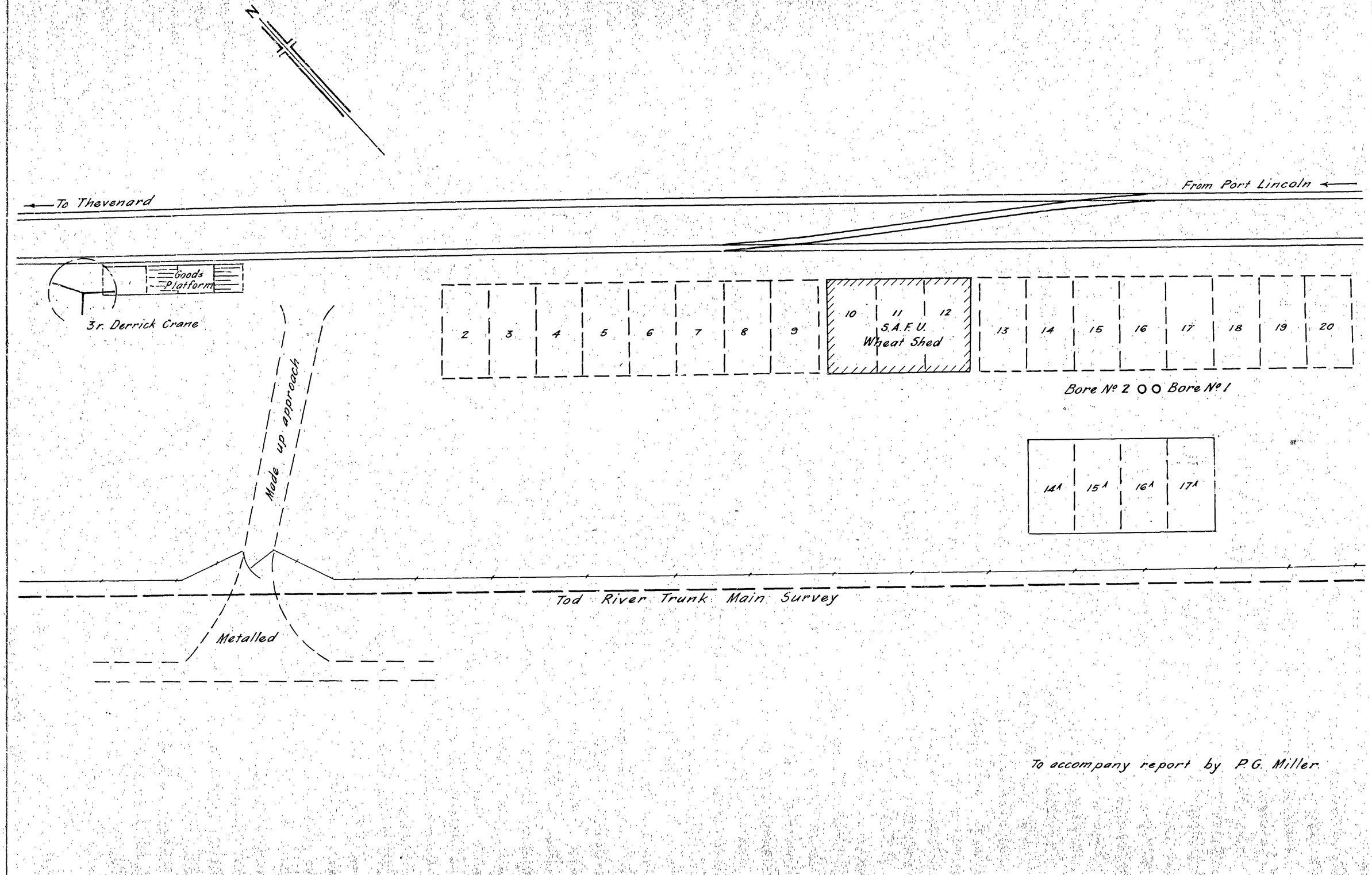
Depth From	Depth To	Description	Penetration From	Penetration To	Penetration Blows
0'	6"	Reddish-brown slightly clayey loam.	0'	1'	45
6"	1'	Pisolitic travertine nodules with some brown sandy clay.	1'	3'	Drilled
1'	3'	Hard pisolitic travertine boulders, with some earthy marl.	3'	4'6"	67
3'	10'6"	Sealed tube samples	4'6"	6'	28
			6'	7'6"	25
			7'6"	9'	32
			9'	10'6"	36
10'6"	12'6"	Red-brown very sandy clay to clayey sand. Firm to stiff. Compact, Earthy texture.	10'6"	11'6"	37
			11'6"	12'6"	38
12'6"	14'	Sealed tube sample	12'6"	14'	47
14'	14'6"	Reamed			
14'6"	16'0"	Sealed tube sample	14'6"	16'	47
16'0"	19'	Red-brown and grey-brown mottled very sandy clay, to clayey sand. Stiff, compact.	16'	17'	52
			17'	18'	54
			18'	19'	56
19'	20'6"	Red-brown and light red-brown vaguely mottled clayey sand. Occasional grey-brown mottling. Stiff, compact.	19'	20'6"	54
20'6"	22'	As above with specks of white earthy lime.	20'6"	22'	60
22'	25'	Sealed tube samples	22'	23'6"	62
			23'6"	25'	67
25'	26'	Red-brown, light red-brown grey and grey-brown mottled clayey sand. Stiff, compact.	25'	26'	74

END OF HOLE



To accompany report by P.G. Miller.

S.A. DEPARTMENT OF MINES					
Approved	Passed	Drn.	LOCALITY PLAN Showing Location of Proposed BULK SILO INSTALLATION EYRE PENINSULA	D.M.	Scale 32 Miles to 1 in.
		Tcd. G.S.		Req.	S 1881
		Ckd. R.R.			D.
Director		Exd.			Date 19-8-58



To accompany report by P.G. Miller.

S.A. DEPARTMENT OF MINES

LOCATION OF TEST BORES
PROPOSED STORAGE SILO
RAILWAY YARDS, WUDINNA
Hd PYGERY

Approved	Passed	Drn.	Tcd: A.R.	Ckd.	Exd.	Director

Scale: 40 Ft. to 1 in.
59-160
Dh 4
Date 22-5-59

No.	Amendment	Exd.	Date