

A series of diamond drill holes were put down during August, 1971 by Foundation Engineering for Maunsell & Partners, and the results were sent to the Mines Department as Drawings Nos. 2971/143-144 and 145. Logs of trenches Nos. 401 to 413 on Drawing 143 above were also made available.

Borehole Logs

The available descriptions, poor core recovery and the removal of samples have made correlations of the bores unreliable even after an examination of the core remaining.

The task of interpretation with this quality of information is therefore doubly difficult and firm conclusions are hard to find.

The relationship between B.H. 401, 402, 403 confirms the existence of the slip in the area by the displacement of the basalt.

B.H. 408, 409, 410 and 411 suggest that the slope consists of basalt talus overlying Tertiary clays but some solid basalt could be present - see comments on trenches following.

The absence of basalt in B.H. 416 is anomalous and it could be assumed that some of the clay represents weathered basalt. Gaps in the basalt are not unknown and B.H. 418 would have been very valuable information.

Trench Logs

Identification of three materials appears to be possible from the trench logs. The trenches filled with water or collapsed very quickly and were not examined by Departmental geologists. They are interpreted as follows:

- T 401 Tertiary clays
- T 402 Tertiary clays
- T 403 Basalt talus
- T 404 Tertiary clays
- T 405 Basalt talus over Tertiary clays
- T 406 Basalt talus over basalt
- T 407 Basalt talus over Tertiary clays
- T 408 Basalt
- T 409 ? Basalt over Tertiary clays
- T 410 Basalt
- T 411 Basalt talus over basalt
- T 412 ? Basalt talus or basalt
- T 413 Basalt talus over basalt.

Conclusions

The slope at sections CC, DD and EE appears to consist of variably and in some places, deeply weathered basalt down to about the 60 ft contour. Below this to sea level (and below) are grey Tertiary clays with minor amounts of sand. The whole slope is mantled by basalt talus up to 8 ft in thickness but more usually about 4 ft thick.

The stability of the slope seems to have been aided by the presence of the talus and recent signs of movement are not seen in this area.

At sections F, G and H the slip has disrupted the basalt talus mantle and revealed the basalt as a cliff, but the pre-slip condition of this area was probably much the same as that now seen at C, D, E.

The basalt seen lower than 60 ft above sea level in T 410 and T 411 could either be interpreted as a displacement due to old slips now relatively stabilised or could represent a change in height of the base of the basalt. This is known not to reach sea level anywhere near the shore section of the rail.

The alignments chosen for the rail and road, lying as they do as far as possible on the basalt can only be regarded as the best available in a most difficult situation.

Where a traverse of the Tertiary clays is unavoidable to the south of EE, the observation above that a talus cover appears to aid stability is offered, and would support the suggestion that a rockfill loading of the toe of the slip is the best practicable solution. The sea bed slope below the slip is steep ($7\frac{1}{2}^{\circ}$ to 8°) and the hazards of loading this clay slope are unknown.

P.C. Stevenson
SUPERVISING GEOLOGIST
Engineering Geology Section.

Department of Mines,
Hobart.

24th September, 1971

APPENDIX

Borehole Logs, Logs of Exploratory Trenches, Laboratory Test Results and Plans

Extracted from the following reports
by consultants Maunsell & Partners, Consulting Engineers
(data relevant to Bell Bay area only)

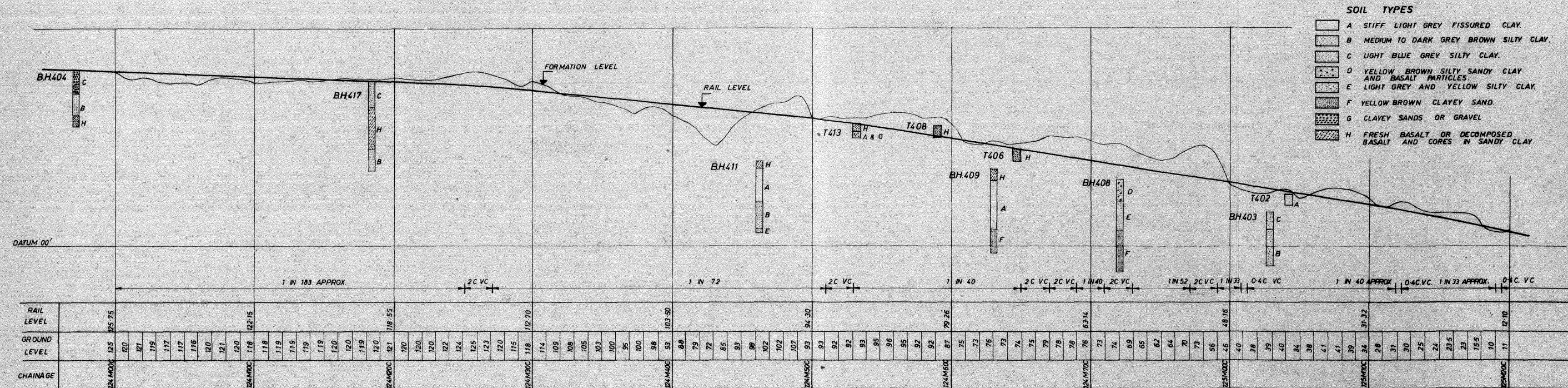
Bell Bay Railway Project
Report on Engineering Geology and Site Investigation
(plus Addendum No. 1)

1971

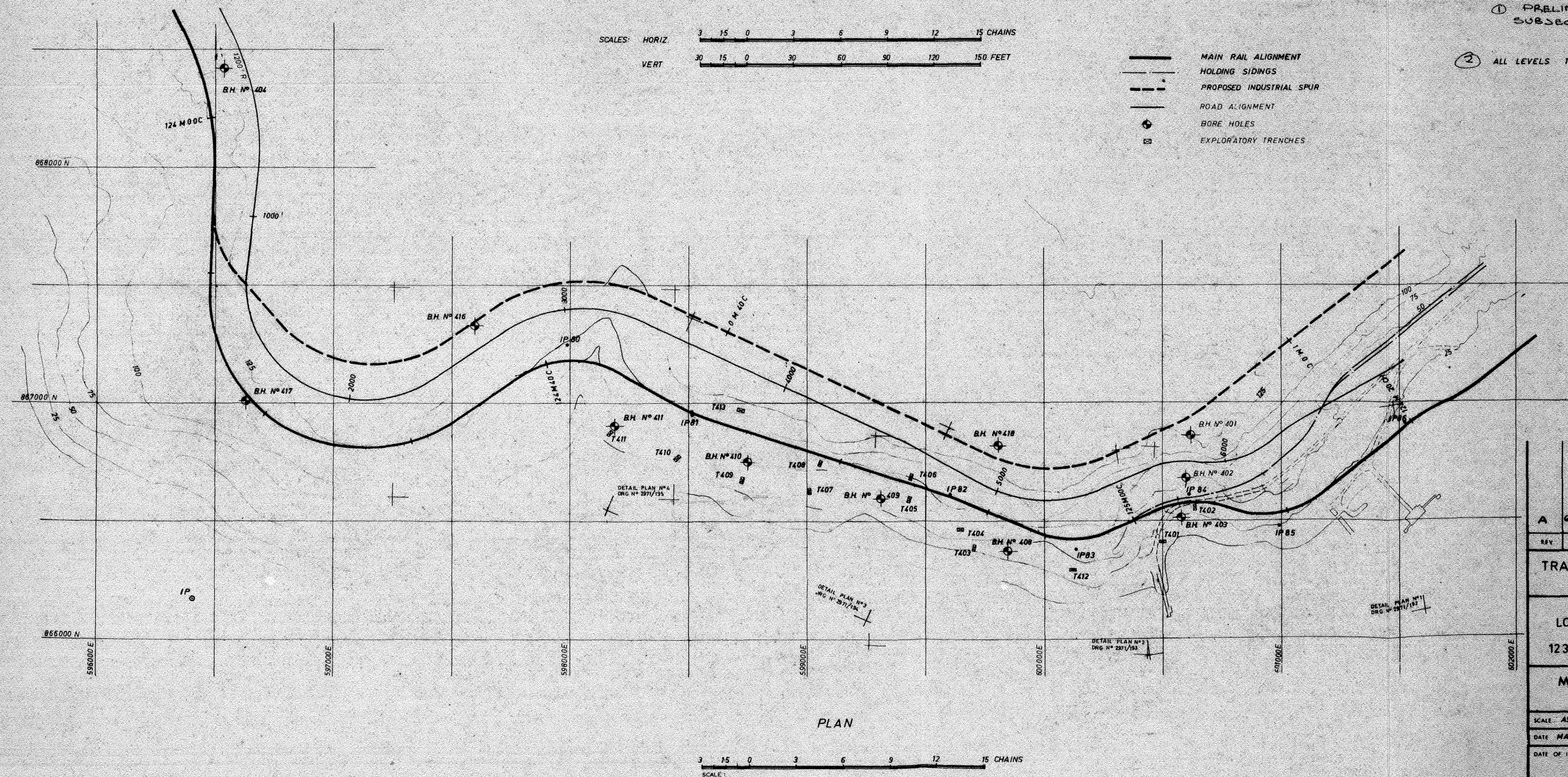
and

Bell Bay Railway Project
Final Report on Investigation of Slope Stability at Bell Bay
1973

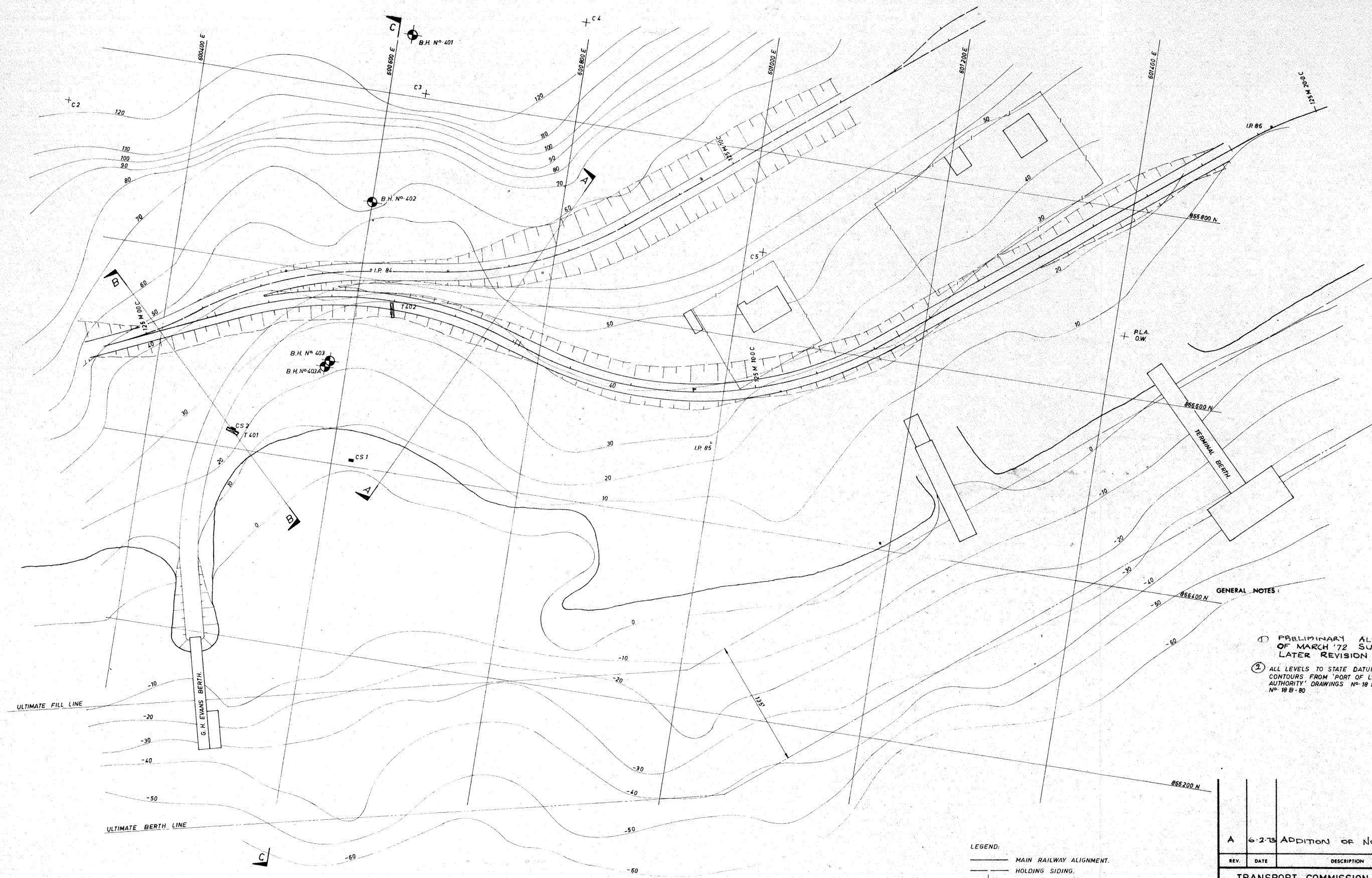
(Copies of full reports held in Mineral Resources Tasmania library)



LONGITUDINAL SECTION OF MAIN RAIL ALIGNMENT



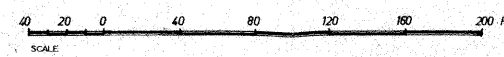
A 6-2-73 ADDITION OF NOTE ①		
REV.	DATE	DESCRIPTION
TRANSPORT COMMISSION TASMANIA RAILWAY BRANCH		
BELL BAY ESCARPMENT LOCALITY PLAN & GEOLOGICAL INFORMATION		
123 M 75 C TO 125 M 20 C		
MAUNSELL & PARTNERS PTY. LTD. CONSULTING ENGINEERS		
SCALE AS SHOWN		
DATE MARCH 1972		
DATE OF ISSUE B.C.C.		
K.B.		
L.K.W.		



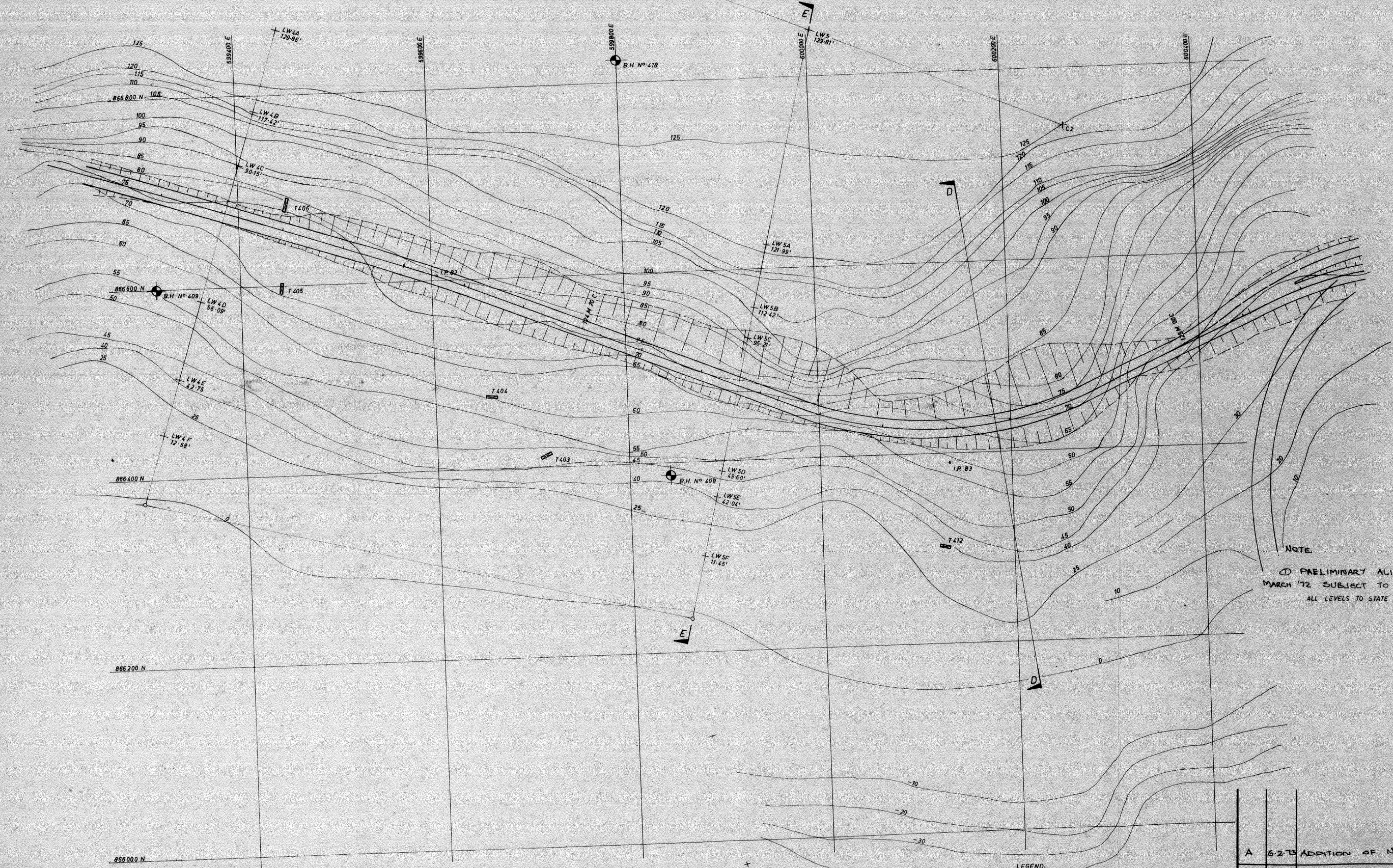
GENERAL NOTES:

- PRELIMINARY ALIGNMENT AS OF MARCH '72 SUBJECT TO LATER REVISION
- ALL LEVELS TO STATE DATUM. CONTOURS FROM 'PORT OF LAUNCESTON AUTHORITY' DRAWINGS N° 18 B-53 AND N° 18 B-80

- LEGEND:
- MAIN RAILWAY ALIGNMENT.
 - - - HOLDING SIDING.
 - ⊙ BORE HOLE.
 - ▬ EXPLORATORY TRENCH.
 - CUBE SAMPLE.
 - ⊕ SURVEY CONTROL STATION.



A 6-2-72 ADDITION OF NOTE ①	
REV.	DATE
TRANSPORT COMMISSION TASMANIA RAILWAY BRANCH	
BELL BAY ESCARPMENT DETAIL CONTOUR PLAN N° 1 125 M 00 C TO 125 M 20 C.	
MAUNSELL & PARTNERS PTY. LTD. CONSULTING ENGINEERS	
SCALE: AS SHOWN	DRG. No. 2971/192 A
DATE: MARCH 1972	
DATE OF ISSUE	
B.C.C.	
A.S.D.	
L.K.W.	



NOTE
 ① PRELIMINARY ALIGNMENT AS OF
 MARCH '72 SUBJECT TO LATER REVISION
 ALL LEVELS TO STATE DATUM

LEGEND:
 ——— MAIN RAILWAY ALIGNMENT.
 ○ BORE HOLE.
 ▭ EXPLORATORY TRENCH.
 + SURVEY CONTROL STATION.



A	6-2-73	ADDITION OF NOTE ①
REV.	DATE	DESCRIPTION
TRANSPORT COMMISSION TASMANIA RAILWAY BRANCH		
BELL BAY ESCARPMENT DETAIL CONTOUR PLAN No 2 124M 62C TO 125M 00C		
MAUNSELL & PARTNERS PTY. LTD. CONSULTING ENGINEERS		
SCALE: AS SHOWN		DRG. No. 2971 / 193 A
DATE: MARCH 1972		
DATE OF ISSUE		
B.C.C.		
A.S.D.		
L.K.W.		

ADDENDUM NO. 1

The following pages have been added to the Documents or have had amendments made to them:-

REPORT

<u>Page No.</u>	<u>Type of Correction</u>
49	Insertion
50	Insertion
51	Insertion

APPENDICES A, B, C & D

(i)	Correction
(ii)	Correction
(vi)	Correction
A1	Correction
A2	Correction
A3	Correction
A36/1	Insertion
A36/2	Insertion
A36/3	Insertion
A36/4	Insertion
A43	Insertion
A43/1	Insertion
A43/2	Insertion
A52	Insertion
A52/1	Insertion
A52/2	Insertion
A52/3	Insertion
A52/4	Insertion
A52/5	Insertion
A52/6	Insertion
A68/1	Insertion
A68/2	Insertion
A68/3	Insertion
B1	Correction
B3	Correction
C1	Correction
C3	Correction
C4	Correction
C6/1	Insertion
C10/1	Insertion
C10/2	Insertion
C20/1	Insertion

LONGREACH AREA (Continued)

trees in the area.

BRIDPORT ROAD BORROW PIT

Laboratory test results on samples taken during the investigation in and around the worked area are given in Appendix C. The borrow material available is a yellow brown fine sandy clay with a plasticity index ranging from between 20 and 40 and a fine sand content of the order of 50%. As previously stated this material should only prove suitable as a general fill.

BELL BAY PLATEAU

Upon drilling a series of auger holes on the alignment across the Bell Bay plateau, between Low Head Road and BH111, it is evident that the apparently once existing quartz gravel deposits have since been worked out. The logs of these holes are sub-numbered under BH308. The existing soil profile consists mainly of silty clays and sands with little or no quartz gravel content.

APPENDIX A

BOREHOLE LOGS

INDEX

OOX SERIES

	<u>Page No.</u>
Borehole Co-ordinates	A1
Borehole No.	
2	A5
5E	A6
5W	A7
7	A9
8	A10
9-A1	A11
9-A2	A12
12E	A13
12W	A14
17S	A16
19	A17
20	A18
23S	A19
25	A20
28	A22
33	A23
37	A24
37/1	A25
38	A26
39	A27
42	A28
43	A29
43	A30
44N	A31
45S.1	A32
45S.2	A33
45S.3	A34
49	A35
50N	A36/1
50S	A36/2
51	A36/3

INDEX continued

Page No.

10X SERIES

Borehole No.

101	A37
102	A37
103	A37
104	A38
105	A40
106	A42
106/1	A43
106/2	A43/2
107	A44
108	A45
109	A46
110	A47
111	A49
112	A52
113	A52/3
114	A52/5

20X SERIES

201	A53
202	A54
203	A55
204	A56
205	A57
206	A58
207	A59
208	A60

30X SERIES

301-A1	A61
301-A2	A62
302-A1	A63
302-A2	A64
304	A65
305	A66
306N	A67
306S	A68
307	A68/1
308	A68/2

INDEX continued

Borehole No.	Page No.
105-A1	C3
105-A6	C3
105-A6	C3
T.106.5	C3
T.106.6	C3
106-A3	C3
107-A1 ✓	C3
109-A1	C3
109-A2	C3
109-A3	C3
109	C3
111-A1	C3
111-A2	C4
111-A8	C4
111-A9	C4
111-A10	C4
111-A11	C4
112-A1	C4
301-A2	C5
302-A2	C5

Particle Size Distribution Curves	BH9-A1	C6/1
"	BH9-A2	C6/1
"	BH20-A1	C6
"	BH20-A2	C7
"	BH25-A5	C7
"	BH37/1-A1	C8
"	BH37/1-A2	C9
"	BH105/A1	C10
"	BH105/A6	C10/1
"	BH106-A3	C10
"	BH106-A5	C10/2
"	BH106-A6	C10/2
"	BH107-A1	C11
"	BH109/A1	C11
"	BH109	C12
"	BH109-A3	C13
"	BH111-A1	C14
"	BH111-A2	C16
"	BH111-A8	C18
"	BH111-A9	C19
"	BH111-A10	C19
"	BH112-A1	C20/1

LIST OF APPENDED BOREHOLE LOGS

OOX SERIES

Borehole No.	Sub Nos.	Co-ordinates		Chainage	
		N	E	Approx.	
2	-	857,800	622,450	115M	66 ch
5E	-	852,720	628,845	114M	15ch
5W	-	852,680	628,730	114M	15ch
7	-	855,440	624,180	115M	18ch
8	-	857,700	623,000	115M	61ch
9-A1	-	860,455	620,935	116M	30ch
9-A2	-	860,385	620,865	116M	30ch
12E	-	863,050	619,635	117M	
12W	-	863,090	619,610	117M	
17S	-	857,200	623,365	115M	47ch
19	A1-A3	849,820	633,000	113M	15ch
20	A1-A2	848,380	635,500	112M	51ch
23S	-	843,000	641,100	110M	78ch
25	A1-A7	837,000	645,920	109M	23ch
28	A1-A2	825,700	646,360	107M	0ch
33	A1-A2	832,850	646,480	108M	36ch
37	A1-A2	832,150	646,940	108M	30ch
37/1	A1-A2	832,440	646,440	108M	30ch
38	A1-A2	836,025	646,550	109M	5ch
39	A1	837,070	646,000	109M	23ch
42	A1-A2	842,520	641,305	110M	70ch
43	-	844,330	641,370	111M	19ch
43	A1-A2	"	"	111M	19ch
44 N	-	864,305	619,075	-	-
45S.1	-	844,945	641,060	111M	29ch
45S.2	-	844,895	641,085	111M	28ch
45S.3	-	844,870	641,080	111M	28ch
49	-	855,575	624,370	115M	18ch
50N	-	857,160	623,905	115M	47ch
50S	-	857,090	623,930	115M	47ch
51	-	855,400	623,470	-	

LIST OF APPENDED BOREHOLE LOGS

10X SERIES

Borehole No.	Sub Nos.	Co-ordinates		Chainage	
		N	E	Approx.	
101	-	815,140	654,980	104M	28ch
102	-	815,590	654,300	104M	40ch
103	-	815,320	652,440	-	-
104	A1-A8	850,400	630,850	-	-
105	A1-A7	850,750	630,700	-	-
106	A1-A6	848,800	635,400	112M	55ch
106/1	A1-A8	See Geological Strip Map Sheet 4			
106/2	A1-A4	850,210	631,370	-	-
107	A1-A2	837,100	646,000	109M	24ch
108	A1-A4	844,850	640,400	111M	37ch
109	A1-A4	874,500	611,000	-	-
110	A1-A10	813,580	654,600	-	-
111	A1-A11	868,600	596,400	124M	14ch
112	A1-A9	910,700	496,700	*	-
113	A1-A6	910,440	496,510	*	-
114	A1-A3	909,400	496,730	*	-

* Tasmanian Topography LILYDALE 835 III - N

Note: The chainages given are the closest point on the alignment from the borehole when less than 10 chains.

LIST OF APPENDED BOREHOLE LOGS

20X SERIES

Borehole No.	Sub Numbers	Co-ordinates	
		N	E
201	-		
202	-		
203	-		
204	-	896667	506834
205	-	896786	507000
206	-	896867	507057
207	-	896920	507067
208	-	896493	506709

Note: Co-ordinates are in yards

LIST OF APPENDED BOREHOLE LOGS

30X SERIES

Borehole No.	Sub Nos.	Co-ordinates	
		N	E
301	A1	873,446	607,312
301	A2	873,454	607,336
302	A1	873,510	607,007
304	-	868,775	612,143
305	-	874,689	604,273
306N	-	876,568	598,808
306S	-	876,460	598,740
307	-	871,300	609,000
308	A1-A6	along alignment 122M30ch to 123M40ch.	

40X SERIES

401	-	866,865	600,615
402	-	866,681	600,600
403	-	866,508	600,582
404	-	868,425	596,537
408	-	866,386	599,844
409	-	866,599	599,312
410	-	866,767	598,756
411	-	866,914	598,197
416	-	867,334	597,600
417	-	866,004	596,631
418	-	866,824	599,800

60X SERIES

614	-	808,880	658,160
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Maunsell & Partners Pty. Ltd.,
83 George Street,
LAUNCESTON

Tasmanian Geotechnical Services
19 Brisbane Street,
LAUNCESTON

PROJECT: BELL BAY RAILWAY - SITE INVESTIGATION

Proline Borehole Logs

Aug. '71

Borrow Material Search; Borehole 111

Co-ordinates: 868,600N; 596,400E

BH111.A1	0'-6'6"	Moist Yellow-Brown Sand with Quartz Gravel to $\frac{1}{2}$ ".
	6'6"-10'	Moist Dark Brown Quartz Gravelly Silt.
	10'-13'	Wet Grey Brown Silty Sand
	13'-15'	Moist Stiff Green Clay with Grey and White Fraction.

Water level at 12 ft.

Dis. Samples: 2'-3', 5'-6', 6'6"-8', 11'-12', 14'-15'.

BH111.A2	0'-2'	Moist Soft Grey Silty Sand.
	2'-9'	Yellow-Brown Sand, with some Quartz Gravel

Water level at 5ft.

Dist. Samples: 2'-3', 5'-6', 8'-9'.

BH111.A3	0'-3'6"	Moist Brown Silty Quartz Gravelly Sand.
	3'6"-12'0"	Grey Quartz Gravelly Sand.

Water level at 9ft.

Dist. Samples: 2'-3'6", 5'-6', 8'-9'.

BH111.A4	0'-6'6"	Moist Brown Silty Quartz Gravelly Sand.
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Water level at 3ft. 6in.

Dist. Samples: 2'-3'6".

BH111.A5	0'-4'	Moist Brown Silty Sand.
	4'-6'6"	Moist White Clay with Brown Silt.

Dist. Samples: 2'-3'

BH111.A6	0'-1'3"	Bound Quartz Gravel
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Hard to penetrate

Dist. Sample: 0'-1'

BH111.A7	0'-2'	Moist Brown Silty Sand.
	2'-3'6"	Moist Yellow-Brown Quartz Gravelly Sand.
	3'6"	Refusal.

Dist. Sample: 2'-3'

BH111.A8	0'-2'	Moist Grey Silty Sand.
	2'-3'	Moist Brown Silty Sand.
	3'-6"	Moist Red-Brown Silty Sand, with Grey Sand Fraction.
	6'-12'	Moist Yellow Brown Sand.

Dist. Sample: 2'-3', 5'-6', 9'-10'.

BH111.A9	0'-3'6"	Moist Brown Silty Sand.
	3' 6"-9'0"	Moist Grey Quartz Gravelly Sand.

Water level at 9ft.

Dist. Samples: 2'-3', 7'-8'

BH111.A10	0'-2'6"	Moist Red-Brown Silty Sand.
	2'-6"-3'6"	Yellow Brown Silty Sand.
	3'6"-15'0"	Grey Sand with Quartz Gravel.

Water level at 15ft.

Dist. Samples: 0'-2'6", 2'6"-3'6", 6'-7'6", 9'-10', 12'-15'.

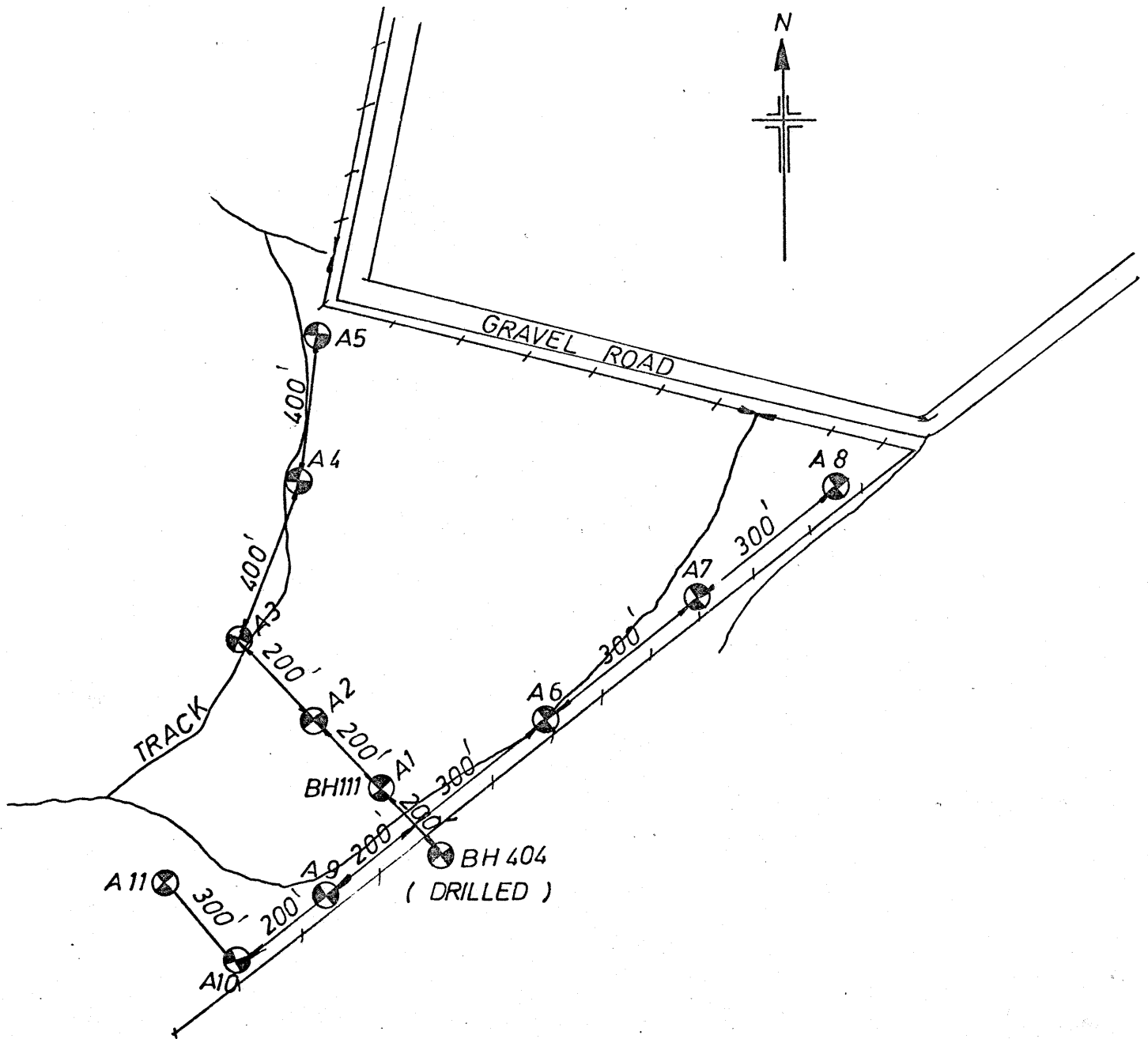
BH111.A11	0'-3'	Moist Dark Brown Silty Sand.
	3'-8'0"	Moist Grey Sand with Quartz Gravel

Water level at 8ft.

Dist. Sample: 5'-6'.

LOCALITY PLAN

Not to scale



BORE LOG RECORD

PROJECT : BELL BAY RAILWAY		JOB NO. 2971/1/31
DRILLING CO. : A. S. JAMES PTY. LTD.		SHEET NO. 1 OF 1
BORE LOCATION : 873,410N ; 607,300E		BORE NO. 301-A1
SURFACE R.L. :	DATUM :	DATE COMPLETED :
ANGLE FROM HORIZ. : 90°	DIRECTION : -	7-7-71
RIG TYPE : GEMCO	WATER LEVEL : NOT RECORDED	LOGGED BY : W.J. YAGG STATUS ENG/GEOL/TECH/DRILL

[illegible]

SYMBOLS:

BORE LOG RECORD

LOGGED BY: W. J. VAGG
STATUS ~~ENG/GEOL/TECH/DRILL~~

SYMBOLS:

BORE LOG RECORD

LOGGED BY: W. J. VAGG
STATUS ~~ENG/GEOL/TECH/~~DRILL

SYMBOLS:

MAUNSELL & PARTNERS PTY. LTD.

CONSULTING ENGINEERS

BORE LOG RECORD

PROJECT: BELL BAY RAILWAY		JOB NO: 2571/1/31
DRILLING CO.: A.S. JAMES PTY. LTD.		SHEET NO: 1 OF 1
BORE LOCATION: 873,503 N. 607,130 E.		BORE NO: 302 - A2
SURFACE R.L.:	DATUM:	DATE COMPLETED:
ANGLE FROM HORIZ.: 90°	DIRECTION:	7-7-71
RIG TYPE: GEMCO	WATER LEVEL: TIME/DATE NOT RECORDED	LOGGED BY: W.J. VAGG STATUS: ENG/GEOL/TECH/DRILL

R.L.	DEPTH	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
				WET DENSITY	MC %	LL	PL	
			FINE LOOSE GREY SILTY SAND					AUGERED ONLY
	10		STIFF YELLOW-BROWN CLAY					
			STIFF RED BROWN CLAY					
	20		SOFT VERY WET YELLOW CLAY					
	30							
	40							
			END OF HOLE 42 FT.					AUGER REFUSAL (ROCK)
	50							
			SAMPLES - DISTURBED BAG					LOCATION 3' NTH. OF B.H. 302-A1

UNITS: Ft.

SYMBOLS:

MAUNSELL & PARTNERS PTY. LTD.

CONSULTING ENGINEERS

BORE LOG RECORD

PROJECT: BELL BAY RAILWAY		JOB N ^o 2971/1/31
DRILLING CO.: A. S. JAMES PTY. LTD.		SHEET N ^o 1 OF 1
BORE LOCATION: 868,736 N; 612,190 E		BORE N ^o 304
SURFACE R.L.:	DATUM:	DATE COMPLETED:
ANGLE FROM HORIZ.: 90°	DIRECTION: -	16-7-71
RIG TYPE:	WATER LEVEL:	LOGGED BY: W J VAGG
GEMCO: N.M.L.C	NOT ENCOUNTERED	STATUS -ENG/GEOL/TECH/DRILL

R.L.	DEPTH	SAMP. CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET DENSITY	M.C. %	L.L.	P.I.	
				FRACTURED BLUE GREY DOLERITE WITH LIMITED CLAY SEAMS					HORIZ FRACTURE - ANGLED FRACTURE HORIZ FRACTURE - CLAY SEAM & FRACTURE - ANGLED FRACTURE - HORIZ FRACTURE
	5								
	10			END OF HOLE 10FT 1/2 IN.					
	15								

LOCATION:
6 FT. NORTH OF
BH PEG 304

UNITS: FT

SYMBOLS:

CONSULTING ENGINEERS

BORE LOG RECORD

PROJECT :

BELL BAY RAILWAY

JOB N° 2971 /1 /31

DRILLING CO.: A.S. James Pty. Ltd.

SHEET N° 1 OF 1

BORE LOCATION : 874, 710N; 604, 185E

BORE N° 305

SURFACE R.L. :

DATUM :

DATE COMPLETED:
21. 7. 71

ANGLE FROM HORIZ. :

DIRECTION :

RIG TYPE :

WATER LEVEL:

TIME / DATE

LOGGED BY: W. J. Vagg

GEMCO N. M. L. C.

STATUS ENG/GEOL/TECH/DRILL

R.I.

DEPT-

SAMP.	CORE
-------	------

S.P.T.
N.

DESCRIPTION

TEST RESULTS

WET
DENSITY

M.C.
%

L.L.

P.I.

ADDITIONAL INFORMATION

5

10

15

Grey silty sand
Very wet
Soft yellow brown silty
clay
Wet brown silty clay
Stiff yellow clay
Jointed Dolerite silty
Clay seams

End of Hole 15ft.

5" solid Auger

Auger Refusal

-Core lost - suggested
to be continuous
and fresh.

UNITS: ft.

SYMBOLS:

MAUNSELL & PARTNERS PTY. LTD.

CONSULTING ENGINEERS

BORE LOG RECORD

PROJECT : BELL BAY RAILWAY			JOB N° 2971/1/31		
DRILLING CO.: FOUNDATION ENGINEERING			SHEET N° 1 OF 1		
BORE LOCATION : 876,535N; 598,765E			BORE N° 306N		
SURFACE R.L. :		DATUM :		DATE COMPLETED:	
ANGLE FROM HORIZ. : 90°		DIRECTION : -		17.8.71	
RIG TYPE : GEMCO Roller Bit		WATER LEVEL: 6 in.		TIME/DATE 21/8/71	
LOGGED BY: D. Tubb STATUS ENG/GEOL/TECH/DRILL					

R.L.	DEPTH	SAMP.	CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
						WET DENSITY	M.C. %	LL.	P.I.	
				14	Grey med. sand					Casing to 20 ft. Small amount of decomposed basalt
					Dark brown med. sand					
					Light grey brown med. clayey sand					
					Med. grey clayey sand					
					Grey brown fine sandy stiff clay					
					Grey brown stiff clay					
					Dark grey brown fine sandy silty clay					
					Dark brown stiff clay					
					End of Hole 51 ft.					
					SAMPLE Undisturbed U2½					

UNITS: ft.

SYMBOLS:

MAUNSELL & PARTNERS PTY. LTD.
CONSULTING ENGINEERS
BORE LOG RECORD

PROJECT: BELL BAY RAILWAY			JOB N° 2971/1/31
DRILLING CO.: FOUNDATION ENGINEERING			SHEET N° 1 OF 1
BORE LOCATION: 876,470N; 598,720E			BORE N° 306S
SURFACE R.L.:	DATUM:	DATE COMPLETED:	
ANGLE FROM HORIZ.: 90°	DIRECTION: -	16.8.71	
RIG TYPE: Wash Bore GEMCO N.M.L.C.	WATER LEVEL: 1 ft.	TIME/DATE: 21/8/71	LOGGED BY: D. Tubb STATUS: ENG/GEOL/TECH /DRILL

DEPTH ft.	SPT N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
			WET DENSITY	M.C. %	LL	PI	
		Medium Grey Sand					Casing to 16 ft.
		Medium dark brown sand					
10	26	Light grey slightly clayey med. sand					
		Dark grey brown green stiff clay with decomposed Basalt					85% recovery
20		Grey weathered Basalt with clay seams					100% "
		Soft grey green Basalt					80% "
30		Grey brown stiff Clay with decomposed Basalt					100% "
		Grey brown stiff Clay					
40							
		Dark brown stiff Clay					
50							
		End of Hole 51ft.					
60							
		SAMPLE Undisturbed U2½					

UNITS: ft.

SYMBOLS:

Bore Log Record

PROJECT: BELL BAY RAILWAY			BORE N° 307
DRILLING CO.: Foundation Engineering			JOB. N° 2971/1/31
BORE LOCATION: 871,200N 60,900E			SHEET N° 1 OF 1
SURFACE R.L.:	DATUM:	DATE COMPLETED:	
ANGLE FROM HORIZ.: 90°	DIRECTION: -	30.9.71	
RIG TYPE: Gemco	WATER LEVEL: TIME/DATE	LOGGED BY: D. Quirk	
DRILL SIZE: N.M.L.C.	Not recorded	STATUS ENG/GEOL/TECH/DRILL	

R.L.	DEPTH	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
				WET	MC. %	LL.	PI.	
			Topsoil - soft					
			Stiff red grey clay					
			Stiff brown & grey clay some ironstone.					
	10		Dolerite floaters and stiff brown & grey clay.					100% recovery
								0
								73% recovery
	20							0
								74% recovery
								0
	30		Dolerite floaters & hard green brown clay					60% recovery
								93% recovery
	40		End of Hole 39ft. 6in.					
			SAMPLES:					
			Disturbed bag.					
			Undisturbed bag. U2 $\frac{1}{2}$					

UNITS: ft.

SYMBOLS:

A68/1

Maunsell & Partners Pty. Ltd.,
83 George Street,
LAUNCESTON

Tasmanian Geotechnical Services,
19 Brisbane Street,
LAUNCESTON

PROJECT: BELL BAY RAILWAY - SITE INVESTIGATION

Proline Borehole Logs

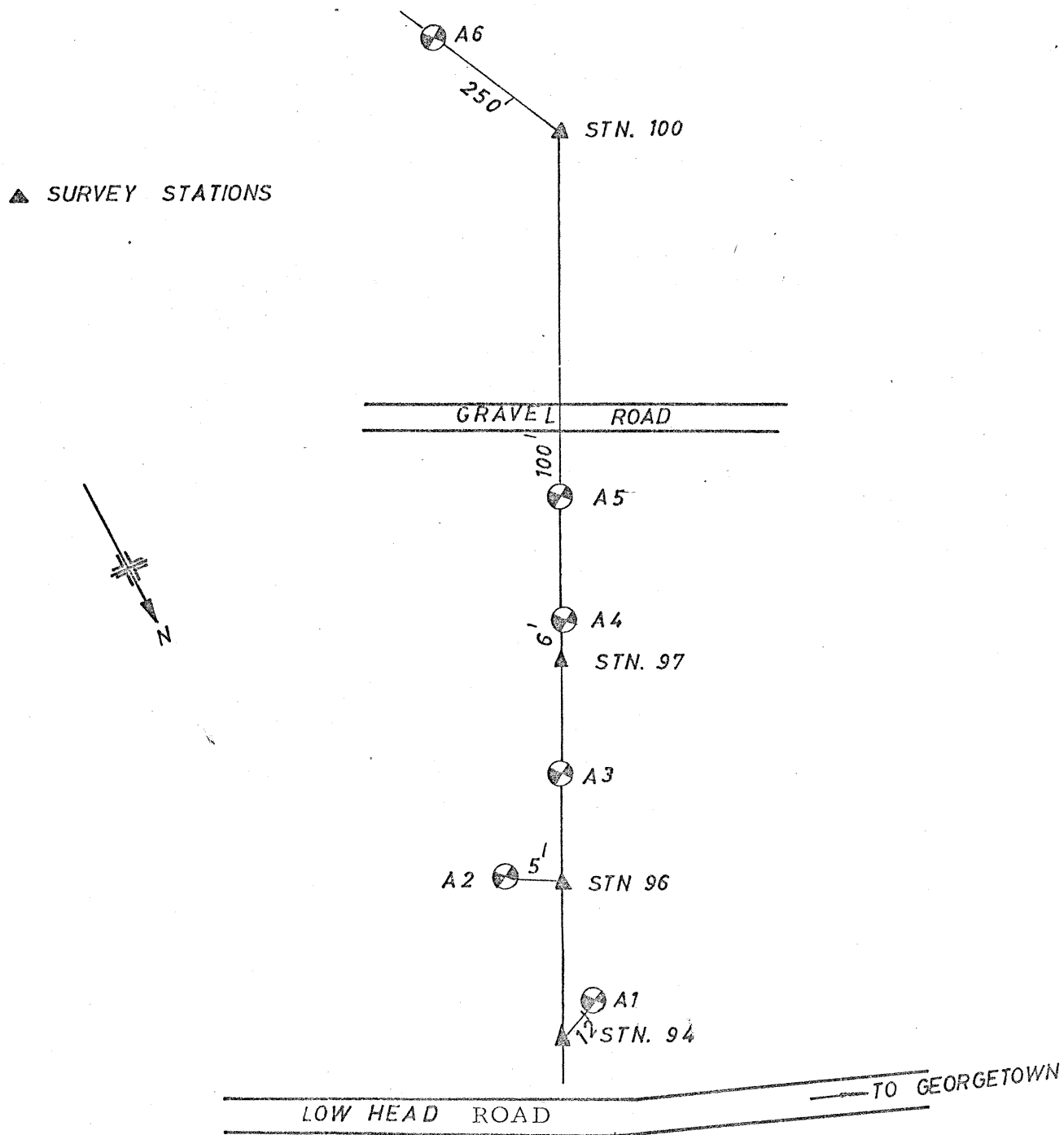
21st Sept. 1971.

Borehole 308 Co-ordinates A1,-A6 (along alignment see
Locality Plan)

BH308-A1	0'-5'	Moist Soft dark brown silty sand.
	5'-10'	Moist soft grey sand.
Water at 3'0"		
Dist. Samples 2'6"-3'6", 9'-10'		
BH308-A2	0'-2'	Moist Soft Grey Silty Sand
	2'-4'	Moist soft yellow brown sandy clay.
	4'-7'	Moist soft olive green clay
Water at 3'0"		
Dist. Samples 2'6"-3'6", 6'-7'.		
BH308-A3	0'-7'	Moist Soft Yellow Brown and Grey silty sandy clay.
Dist. samples 6'-7'.		
BH308-A4	0'-1'	Moist Soft Grey Silty Sand.
	1'-4'6"	Moist Soft Dark Brown Silty Sand.
	4'6"-10'0"	Moist Soft Grey Sandy Clay.
Dist. Samples 2'6"-3'6", 6'-7', 9'-10'		
BH308-A5	0'-5'	Moist Stiff yellow-brown clay with red clay fraction
	5'-7'9"	Moist soft red-brown clay, grey clay fraction
	7'9"-10'	Moist soft red-brown silty clay.
Dist. samples 2'6"-3'6", 6'-7', 9'-10'		
BH308-A6	0'-3'	Moist stiff Yellow silty clay with quartz gravel to 1/8"
	3'-6'	Moist stiff grey silty clay
	6'-8'	Moist soft grey silty clay.
	8'-10'	Moist soft red-brown silty clay with grey clay fraction.
Dist. samples 2'-3', 3'-3'6", 6'-7', 9'-10'.		

LOCALITY PLAN
Not to Scale

BOREHOLE NO 308



Bore Log Record

PROJECT: BELL BAY RAILWAY		BORE N° 401
DRILLING CO.: FOUNDATION ENGINEERING		JOB. N° 2970/1/31
BORE LOCATION: 866,865N 600,615E		SHEET N° 1 OF 2
SURFACE R.L.:	DATUM:	DATE COMPLETED:
ANGLE FROM HORIZ.: 90°	DIRECTION:	9/7/71
RIG TYPE: Gemco N.M.L.	WATER LEVEL:	TIME/DATE
DRILL SIZE:	Not Recorded	LOGGED BY: D. Tubb
STATUS: ENG /GEO/TECH/DRILL		

R.L.	DEPTH	SAMP CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET	M.C. %	LL.	P.I.	
				Stiff Brown Clay & Gravel					Wash Bored to 2'0"
				Stiff Brown Clay and Weathered Basalt					100% Recovery
10									
				Green Highly Weathered Basalt					25-75% Recovery
20									
									100% Recovery
30									
				Green Grey Decomposed Basalt					
40				Grey Brown Sandstone (Heat affected clay)					10% Recovery
				Fine grey brown clayey sand					60% Recovery
50				Stiff grey brown fine clayey sand					
60				Stiff dark brown Clayey Silt					Casing to 46' Roller Bit Below 48'.
70				Stiff Dark Brown Silty Clay					

UNITS: ft.

SYMBOLS:

Bore Log Record

PROJECT: BELL BAY RAILWAY	BORE N° 401
DRILLING CO.: FOUNDATION ENGINEERING	JOB N° 2971/1/31
BORE LOCATION: 866,865N; 600,615E	SHEET N° 2 OF 2

R.L.	DEPTH	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
				WET	M.C. %	LL	PI	
			Stiff Dark Brown Silty Clay					
	80		Stiff Medium Brown Silty Clay.					
	90							
	100		Stiff Light grey brown silty clay.					
	110		End of Hole 110'					Casing NX to 110'
			SAMPLE Undisturbed - U2 $\frac{1}{2}$					

Bore Log Record

PROJECT: BELL BAY RAILWAY		BORE N° 402
DRILLING CO.: FOUNDATION ENGINEERING		JOB. N° 2971/1/31
BORE LOCATION: 866,681 N; 600,600 E		SHEET N° 1 OF 2
SURFACE R.L.:	DATUM:	DATE COMPLETED:
ANGLE FROM HORIZ.: 90°	DIRECTION:	16/7/71
RIG TYPE: Gemco NMLC	WATER LEVEL: TIME/DATE	LOGGED BY: D. TUBB
PIPE SIZE:	See Below	STATUS: ENG/GEOL/TECH/DRILL

R.L.	DEPTH	SAMP CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET	M.C. %	LL.	P.I.	
				Stiff grey brown fine sandy clay					Roller Bit
				Soft decomposed basalt and grey sandy clay					
10				Grey weathered basalt					70% recovery
				Decomposed basalt and grey brown fine sandy clay					
20				Stiff grey brown fine sandy clay with basalt fragments					Medium grey brown silty clay
				Stiff dark brown clay					Medium grey brown clay
30									
				Stiff dark grey brown silty clay					Medium grey brown silty clay
40									
									Dark grey brown silty clay
50									
									Dark grey brown clay
60									
70									

UNITS:

ft.

SYMBOLS:

Bore Log Record

PROJECT: BELL BAY RAILWAY	BORE N° 402
DRILLING CO.: FOUNDATION ENGINEERING	JOB N° 2971/1/31
BORE LOCATION: 866,681 N; 600,600 E	SHEET N° 2 OF 2

R.L.	DEPTH	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
				WET	M.C. %	L.L.	P.I.	
			Stiff dark grey brown silty clay					Dark grey brown clay
	80							(Ditto)
			Medium grey brown fine sandy clay					
	90		Light grey fine sandy clay					
			Light grey clayey fine sand					Casing NX to 95'
	100		Light grey brown silty clay					
			End of Hole 101' 6"					Note :- Lost water while coring 20' of casing left in hole to allow measurement of water levels. 53ft 5.p.m. 17/7/71 55ft 8.a.m. 19/7/71
			SAMPLES					
			- Undisturbed U2½					Sample description
			- Unsuccessful U2½					
			- Disturbed - Bag					

Bore Log Record

PROJECT: BELL BAY RAILWAY			BORE N° 403	
DRILLING CO.: FOUNDATION ENGINEERING			JOB. N° 2971/1/31	
BORE LOCATION: 866, 508N; 600, 582E			SHEET N° 1 OF 1	
SURFACE R.L.:		DATUM:		DATE COMPLETED: 20.7.71
ANGLE FROM HORIZ.: 90°		DIRECTION:		
RIG TYPE: GEMCO Roller		WATER LEVEL: TIME/DATE		LOGGED BY: D. Tubb STATUS ENG/GEOL/TECH /DRILL
DRILL SIZE : Bit		See below		

R.L.	DEPTH	SAMP CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET	M.C. %	LL.	P.I.	
	10		U2½	Light grey brown fine sandy clay					▲ Light grey & yellow sandy silt ▲ Light grey clayey silt
	20			Stiff dark grey brown clay.					
	30			Dark grey brown clayey silt.					
	40			Dark grey brown silty clay					
				End of Hole 39ft.					Casing to 25 ft.
				SAMPLES					
				Undisturbed U4					▲ Sample description
				Unsuccessful					

UNITS:

SYMBOLS:

Bore Log Record

PROJECT: BELL BAY RAILWAY			BORE N° 403A
DRILLING CO.: FOUNDATION ENGINEERING			JOB. N° 2971/1/31
BORE LOCATION: 866,506 N; 600,582. E			SHEET N° 1 OF 1
SURFACE R.L.: 22.6	DATUM:	DATE COMPLETED:	
ANGLE FROM HORIZ.: 90°	DIRECTION: -	22/7/71	
RIG TYPE: GEMCO	WATER LEVEL: TIME/DATE	LOGGED BY: D. TUBB	
DRILL SIZE:	Not recorded	STATUS ENG/GEOL/TECH/DRILL	

R.L.	DEPTH	SAMP CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET	M.C. %	LL.	P.I.	
	10			Stiff light grey brown sandy clay					
				Stiff dark grey brown clay					20% rec
	20								32% rec
				End of Hole 21ft.					Intending coring clay to 65ft. Unable to obtain reasonable core recovery
	30								

UNITS: ft.

SYMBOLS:

Bore Log Record

PROJECT: BELL BAY RAILWAY			BORE N° 404
DRILLING CO.: FOUNDATION ENGINEERING			JOB. N° 2971/1/31
BORE LOCATION: 868,425 N; 596,537 E			SHEET N° 1 OF 1
SURFACE R.L.:	DATUM:	DATE COMPLETED:	
ANGLE FROM HORIZ.: 90°	DIRECTION:	23/7/71	
RIG TYPE: GEMCO NMLC	WATER LEVEL:	TIME/DATE	LOGGED BY: D. TUBB
DRILL SIZE:			STATUS ENG/GEOL/TECH/DRILL

R.L.	DEPTH	SAMP COR	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET	M.C. %	LL	P.I.	
				Topsoil (fill)					Casing to 20ft.
				Fine gravel with coarse sand and stiff grey clay					
10				Quartz gravel to 1 1/2" and coarse sand					
20				Light grey silty Clay					Medium stiff, medium grey clay
30				Soft grey Siltstone					Light grey hard clayey silt
				Fresh grey Basalt					100% rec
40				End of Hole 40ft. 6in.					100% rec
				SAMPLES					
				Undisturbed U2 1/2					Sample description

UNITS:

SYMBOLS:

Bore Log Record

PROJECT: BELL BAY RAILWAY			BORE N° 408	
DRILLING CO.: FOUNDATION ENGINEERING			JOB. N° 2971/1/31	
BORE LOCATION: 866,386 N; 599,844 E			SHEET N° 1 OF 1	
SURFACE R.L.:		DATUM:		DATE COMPLETED: 26/7/71
ANGLE FROM HORIZ.: 90°		DIRECTION:		
RIG TYPE: GEMCO		WATER LEVEL: TIME/DATE		LOGGED BY: D. TUBB STATUS ENG/GEOL/TECH /DRILL
ROLLER BIT Roller Bit				

R.L.	DEPTH	SAMP CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET	M.C. %	LL.	P.I.	
				Topsoil					SAMPLES: Undisturbed - U2½ ◀ Stiff yellow brown sandy clay and Basalt particles ◀ Light grey and yellow silty clay ◀ (Ditto) ◀ Yellow brown clayey sand Casing to 10ft.
	10			Stiff med. grey brown fine sandy clay. Some small particles of Decomposed Basalt					
	20			Light grey brown stiff clay.					
	30			Stiff med. grey brown silty clay. Some small particles of decomposed Basalt.					
	40			Brown Clayey sand					
	50		14	Fragments of grey basalt below 55ft.					
	60		30						
			61						
	70			End of Hole 66ft. 3in.					

UNITS: ft.

SYMBOLS:

Bore Log Record

PROJECT: BELL BAY RAILWAY		BORE N° 409
DRILLING CO.: FOUNDATION ENGINEERING		JOB. N° 2971/1/31
BORE LOCATION: 866,599 N; 599,312 E		SHEET N° 1 OF 1
SURFACE R.L.:	DATUM:	DATE COMPLETED:
ANGLE FROM HORIZ.: 90°	DIRECTION: -	28/7/71
RIG TYPE: Gemco Roller DRILL SIZE Bit	WATER LEVEL: TIME/DATE Not recorded	LOGGED BY: D. TUBB STATUS: ENG/GEOL/TECH /DRILL

R.L.	DEPTH	SAMP CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET	M.C. %	LL.	P.I.	
				Topsoil					
				Medium grey brown stiff fine sandy clay with Basalt Boulders					Boulders approx. 8" across
	10			Medium grey brown clayey sand					
				Medium grey brown fine sandy clay with particles of decomposed Basalt					Stiff fissured light grey & yellow silty clay
	20								
				Light grey brown stiff clay					(Ditto)
	30								
				Light grey brown and yellow clayey sand					Moist yellow brown clayey sand
	40								
	50								
	60		38						
				End of Hole 60ft. 6 in.					Casing to 10'
				SAMPLES					
				Undisturbed - U2½					Sample description

UNITS: ft.

SYMBOLS:

Bore Log Record

PROJECT: BELL BAY RAILWAY		BORE N° 410
DRILLING CO.: FOUNDATION ENGINEERING		JOB. N° 2971/1/31
BORE LOCATION: 866,767 N; 598,756 E		SHEET N° 1 OF 1
SURFACE R.L.:	DATUM:	DATE COMPLETED: 30/7/71
ANGLE FROM HORIZ.: 90°	DIRECTION: -	
RIG TYPE: Gemco Roller	WATER LEVEL: TIME/DATE	LOGGED BY: D. TUBB
DRILL SIZE: Bit	Not recorded	STATUS: ENG /GEO/TECH/DRILL

R.L.	DEPTH	SAMP. CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET	M.C. %	LL.	P.I.	
				Topsoil and Boulders					Cased to 10 ft.
				Medium grey brown fine sandy clay and boulders					
	10			End of Hole 10ft.					
	20								

UNITS: ft.

SYMBOLS:

Bore Log Record

PROJECT: BELL BAY RAILWAY		BORE N° 411
DRILLING CO.: FOUNDATION ENGINEERING		JOB. N° 2971/1/31
BORE LOCATION: 866, 914 N; 598, 197 E		SHEET N° 1 OF 1
SURFACE R.L.:	DATUM:	DATE COMPLETED:
ANGLE FROM HORIZ.: 90°	DIRECTION:	4/8/71
RIG TYPE: Roller Diamond	WATER LEVEL:	TIME/DATE
Bit GEMCO		LOGGED BY: D. TUBB
		STATUS: ENGINEER/TECH/DRILL

R.L.	DEPTH	SAMP CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET	M.C. %	LL.	P.I.	
				Topsoil & boulders					40% recovery
				Med. grey brown stiff fine sandy clay with boulders					
	10			Grey brown stiff clay with decomposed basalt					60% "
				Grey brown stiff clay with decomposed basalt particles					0% "
	20								Stiff fissured light grey & yellow silty clay
				Grey brown stiff clay					
	30			Dark brown silty clay					Dark red brown silty clay
				Grey brown stiff clay with decomposed basalt					
	40			Sandstone					60% recovery
				Dark brown fine sandy silty clay.					
	50			Grey brown stiff clay					Light grey yellow plastic silty clay
				End of Hole 51 ft.					Casing to 20'
	60								Stopped drilling due to lack of water
				SAMPLE - Undisturbed U2 1/2					Sample description

UNITS:

ft.

SYMBOLS:

Bore Log Record

PROJECT: BELL BAY RAILWAY			BORE N° 416
DRILLING CO.: FOUNDATION ENGINEERING			JOB. N° 2971/1/31
BORE LOCATION: 867, 334N; 597, 600E			SHEET N° 1 OF 2
SURFACE R.L.:	DATUM:	DATE COMPLETED:	
ANGLE FROM HORIZ.: 90°	DIRECTION:	7/8/71	
RIG TYPE: GEMCO Roller	WATER LEVEL:	TIME/DATE	LOGGED BY: D. Tubb
DRILL SIZE: Bit.			STATUS: ENG/GEOL/TECH/DRILL

R.L.	DEPTH	SAMP CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET	M.C. %	LL	P.I.	
				Fine to Med. Grey brown sand					
				Light grey brown coarse sandy clay					
	10								
			75						
	20			Coarse sand slightly clayey					
	30			Light grey fine sandy silty clay					Soft moist light blue grey silty clay
	40			Dark grey brown fine sandy silty clay					Dark grey brown clayey silt with organic matter
	50								
	60		40	Grey brown coarse clayey sand					
	70			Grey fine to medium sand					Casing to 40'

UNITS:

SYMBOLS:

BORE LOG RECORD

BORE N°. 416

R.L.	DEPTH	SAMPLE CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET DENSITY	M.C %	L.L	P.I.	
				Grey fine to medium sand.					
	80			End of Hole 75 ft.					

Bore Log Record

PROJECT: BELL BAY RAILWAY			BORE N° 417
DRILLING CO.: FOUNDATION ENGINEERING			JOB. N° 2971/1/31
BORE LOCATION: 867,004 : 596,631 E			SHEET N° 1 OF 1
SURFACE R.L.:	DATUM:	DATE COMPLETED:	
ANGLE FROM HORIZ.: 90°	DIRECTION:	10/8/71	
RIG TYPE: GEMCO:NMLC	WATER LEVEL:	TIME/DATE	LOGGED BY: D. TUBB
DRILL SIZE:			STATUS: ENG/GEOL/TECH/DRILL

R.L.	DEPTH	SAMP CORE	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
					WET	M.C. %	LL.	P.I.	
				Grey brown stiff clay					
	10								
				Grey brown stiff clay with decomp. basalt particles					Soft moist light blue grey silty clay
	20			Grey brown weathered basalt with clay seams					80% core recovery
									17% " "
	30			Grey basalt (fresh)					100% " "
	40								
	50			Coarse grey sand					70% " "
				Very stiff dark grey brown silty clay					80% " "
	60								100% " "
				End of Hole 64ft. 6in.					
	70			U 2 1/2 Sample					Sample description

UNITS: ft.

SYMBOLS:

Bore Log Record

PROJECT: BELL BAY RAILWAY			BORE N ^o 418
DRILLING CO.: FOUNDATION ENGINEERING			JOB. N ^o 2971/1/31
BORE LOCATION: 866,824 N 599,800 E			SHEET N. 1 OF 1
SURFACE R.L.:	DATUM:	DATE COMPLETED:	
ANGLE FROM HORIZ.: 90°	DIRECTION:	13/8/71	
RIG TYPE: Wash Bore	WATER LEVEL:	TIME/DATE	LOGGED BY: D. TUBB
DRILL SIZE Gemco NMLC			STATUS ENGAGED TECH/DRILL

R.L.	DEPTH	S.P.T. N.	DESCRIPTION	TEST RESULTS				ADDITIONAL INFORMATION
				WET	M.C. %	LL	P.I.	
			Grey sandy topsoil					Casing to 10 ft.
			Soft Decomp. Basalt					
			Grey brown stiff clay					
	10		Stiff grey brown fine sandy clay with Basalt particles					Light grey & yellow silty clay. Slightly fissured.
			Broken Basalt with Clay seams					100% core recovery
	20		Weathered Basalt					65% " "
			Fresh grey Basalt with some weathered seams					85% " "
	30							
								100% " "
	40							
			Grey brown fine clayey sand					70% " "
	50		Grey brown silty clay some fine sand					Medium grey brown clayey silt
			End of Hole 56 ft.					
	60		Sample					
			undisturbed U2½					sample description

UNITS: ft.

SYMBOLS:

BELL BAY RAILWAY PROJECT

SITE INVESTIGATION

LOGS OF EXPLORATORY TRENCHES

ALONG BELL BAY ESCARPMENT

Trench No's T401 to T413 inclusive

LIST OF EXPLORATORY TRENCH LOGS

Trench	Co-ordinates		Chainage	
	N	E	Approx.	
T.9.1	860,000	621,070	116M	30 ch.
T.9.2.	860,100	621,240	116M	23 ch.
T.9.3	859,700	621,650	116M	14 ch.
T.9.4	860,800	620,520	116M	38 ch.
T.9.5	861,480	620,400	116M	46 ch.
T.9.6	861,600	620,060	116M	52 ch.
T.12.1	863,130	619,560	117M	
T.20.1	848,380	635,500	112M	51 ch.
T.43.1	844,290	641,230	111M	18 ch.
T.43.2	844,180	641,220	111M	17 ch.
T.43.3	843,830	641,110	111M	11 ch.
T.45 S	844,910	641,040	111M	29 ch.
T.45 N	845,128	640,885	111M	33 ch.
T.106.1 to T.106.7	848,810	635,550		
T.401	866,423	600,497		
T.402	866,563	600,641		
T.403	866,415	599,720		
T.404	866,475	599,666		
T.405	866,603	599,443		
T.406	866,692	599,451		
T.407	866,632	599,010		
T.408	866,761	599,062		
T.409	866,702	598,734		
T.410	866,782	598,476		
T.411	866,906	598,187		
T.412	866,301	600,133		
T.413	866,884	598,737		

LOGS OF EXPLORATORY TRENCHES

Excavated 21/7/71

Logged 21/7/71

T401	0'-1'8" 1'8"-6'	Road Pavement and subgrade. Med. stiff light grey moist fissured clay with yellow clay seams. $\frac{1}{2}$ " to 1" wide Cu = 0.7 - 1.9 T.s.f. Cube Sample CS2 4'-5'
	6'-9'6"	Soft light grey yellow moist silty clay. Free water 6' to 7'6" Cu = 0.2 - 0.7 T.s.f.
T402	0'-1' 1'-8'	Top soil and road fill. Moist soft to med. stiff light grey clay. Free water below 2ft.

Trench collapsed during excavation and filled with water
overnight.

LOGS OF EXPLORATORY TRENCHES

Excavated 24.7.71

Logged 26.7.71

T 403	0'-2'	Topsoil - Dark grey silty Clay
		Free water below 1'6"
	2'-5'6"	Red brown silty clay (completely weathered basalt) with a few' weathered basalt cores to 6 in. across.
	5'6"-9'0"	Light yellow brown siltstone and weathered basalt cores to 1 ft. across.
	No water	
T 404	0'-2'6"	Topsoil - Dark grey silty Clay
		Free water below 1'0"
	2'6"-8'6"	Moist light grey highly fissured silty clay with irregular $\frac{1}{4}$ in. to 1 in. seams of yellow brown silty clay.
	Side caved in	
T 405	0'-1'6"	Topsoil - moist no free water
	1'6"-4'0"	Dark grey clay with rock cores to 1 ft. across.
	4'0"-8'6"	Moist, med. stiff light grey fissured clay with irregular seams of yellow brown silty clay.
	Water Level at 7'3"	
T 406	At toe of steep rise	
	0'-2'	Top soil - Dark grey brown silty clay
	2'-10'	Rock cores to 2 ft. across in a matrix of Dark grey brown silty clay to 6 ft.
		Below 6 ft. yellow green grey weathered basalt cores and relatively fresh cores.
	No water	
T 407	0'-1'9"	Topsoil - Grey silty clay
	1'9"-4'6"	Hard dark grey clay with weathered rock cores and bright yellow red clay pockets (completely weathered rock)
	4'6"-7'	Very hard light grey silty clay (claystone) lightly fissured
	No water	

T 408	At toe of steep rise 0'-1'6" 1'6"-9'	Topsoil - Dark grey clay Yellow green grey weathered cores (hard claystone) and fresh exfoliating cores to 1ft. across.
	No water	
T 409	0'-1' 1'-5'	Topsoil - Moist dark grey clay Light yellow grey moist silty clay with bright yellow clay seams and pockets (weathered rock cores)
	5'-8'9"	Stiff light grey fissured clay. Similar to cube from T 401
	Water level at 3'4"	
T 410	0'-1'6" 1'6"-8'	Topsoil - moist grey silty clay Stiff, fissured med. grey clay with bright yellow red pockets of weathered rock and a few exfoliating rock cores to 6 in. across.
	No water	
T 411	0'-1' 1'-5'	Topsoil - moist dark grey silty clay. Moist dark grey silty clay with a few rather fresh rock cores
	5'-8'6"	Stiff light grey fissured clay with bright yellow red seams and pockets of weathered rock a few rock cores to 6 in. across.
	No water	

LOGS OF EXPLORATORY TRENCHES

Excavated 27.7.71

Logged 27.7.71

T 412	0'-1'	Topsoil Dark grey clay
	1'-7'	Dark red brown just moist silty clay with slightly weathered rock cores to 1'6" across.
	7'-10'6"	Moist yellow brown clayey silt completely weathered rock containing rock fragments and light grey soft siltstone.
	No water	
T 413	0'-9"	Topsoil Dark grey clay
	9"-2'6"	Red brown clayey silt
	2'6"-6'	Med. grey moist sandy silt with some slightly weathered rock cores to 1 ft. across.
	6'-10'	Slightly weathered rock cores and grey green highly weathered cores. Some moist yellow highly fissured clay.
	10'	backhoe refusal
	No water	

APPENDIX C

LABORATORY TEST RESULTS

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Borehole No.	<u>Page No.</u>
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9-A2	C1
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20-A1	C1
20-A2	C1
23S	C1
23S	C1
25-A5	C1
28-A1	C1
33-A1	C1
33-A2	C1
37-A1	C2
37/1-A1	C2
37-A2	C2
38-A1	C2
38-A2	C2
39-A1	C2
42-A2	C2
43	C2
43-A2	C2

INDEX continued

Borehole No.	Page No.
105-A1	C3
105-A6	C3
105-A6	C3
T.106.5	C3
T.106.6	C3
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107-A1	C3
109-A1	C3
109-A2	C3
109-A3	C3
109	C3
111-A1	C3
111-A2	C4
111-A8	C4
111-A9	C4
111-A10	C4
111-A11	C4
112-A1	C4
301-A2	C5
302-A2	C5

Particle Size Distribution Curves	BH9-A1	C6/1	
"	"	BH9-A2	C6/1
"	"	BH20-A1	C6
"	"	BH20-A2	C7
"	"	BH25-A5	C7
"	"	BH37/1-A1	C8
"	"	BH37/1-A2	C9
"	"	BH105/A1	C10
"	"	BH105/A6	C10/1
"	"	BH106-A3	C10
"	"	BH106-A5	C10/2
"	"	BH106-A6	C10/2
"	"	BH107-A1	C11
"	"	BH109/A1	C11
"	"	BH109	C12
"	"	BH109-A3	C13
"	"	BH111-A1	C14
"	"	BH111-A2	C16
"	"	BH111-A8	C18
"	"	BH111-A9	C19
"	"	BH111-A10	C19
"	"	BH112-A1	C20/1

BELL BAY RAILWAY PROJECT
SOIL CLASSIFICATION TEST RESULTS

Borrow Material Search

Borehole or Trench No.	Depth	Description	Moisture Content	Liquid Limit	Plastic Index	p. H
105-A1	5'-6'	Red clayey sand (D)	6.9	33	21	-
105-A6	2'-3'	Yellow clayey medium sand (D)	13.3	76	58	-
105-A6	5'-6'	Yellow clayey gravel (D)	17.4	49	32	5.2
T106.5	3'-6'	Yellow clayey gravel (D)	13.8	65	47	-
T106.6	3'-8'	Yellow slightly clayey gravel (D)	8.7	38	22	-
106-A3	3'-12'	Yellow brown clayey quartz sand & gravel (D)	5.6	32	15	5.06
107-A1	5'-6'	Brown Clay (D)	-	102	75	-
109-A1	8'-9'	Red light yellow sandy clay (D)	-	44	33	-
109-A2	5'-6'	Yellow fine sandy clay	-	52	38	-
109-A3	5'-6'	Grey-brown sandy clay with pieces of ironstone (D)	-	35	25	-
109-A3	9'-10'	Yellow brown sandy clay (D)	-	34	23	-
109 face of quarry		Grey brown very sandy clay (D)	-	30	20	-
111-A1	2'-3'	Yellow sandy clay (D)	-	34	20	-
111-A1	5'-6'	Light grey fine sand (D)	-	-	-	-
111-A1	6'6"- 8'	Dark brown sand (D)	-	-	-	-
111-A1	11'- 12'	Brown slightly clayey sand (D)	-	-	-	-

* D - Particle Size Distribution

SOIL CLASSIFICATION TEST RESULTS (Continued)

Borehole or Trench No.	Depth	Description	Moisture content	Liquid Limit	Plastic Index	p. H.
111-A1	14'- 15'	Grey slightly sandy Clay (D)	-	62	28	-
111-A2	2'-3'	Brown sandy clayey silt (D)	-	18	6	-
111-A2	5'-6'	Brown clayey silt (D)	-	34	9	-
111-A8	5'-6'	Yellow sandy clay (D)	-	49	30	-
111-A8	9'-10'	Yellow sandy clay (D)	-	31	19	-
111-A9	7'-8'	Light grey clayey sand (D)	-	20	8	-
111-A10	6'- 7'6"	Light grey clayey silt (D)	-	25	14	-
111-A10	12'- 15'	Grey clayey sand (D)	-	29	13	-
111-A11	5'-6'	Light yellow-grey clay with brown sandy clay	-	43	25	-
112-A1	5'-6'	Red clayey gravel (D)	12.0	49	32	4.6

* D - Particle size distribution.

RESIDUAL AND PEAK STRENGTHS

SAMPLE	PEAK		RESIDUAL	
	C'	ϕ'	C'r	$\phi'r$
CS1 - Dark Brown silty clay	4.0 psi	28°	1.5 psi	22°
CS2 - Stiff fissured clay	2.5 psi	21°	0.75 psi	6°

SHEAR TESTS ON CUBE SAMPLES

SAMPLE	Ident.	W nat%	LL	PI	γ_{nat} lbs/ft ³	τ_{peak} lbs/in ²	σ_{peak} lbs/in ²	$\tau_{residual}$ lbs/in ²	$\sigma_{residual}$ lbs/in ²	Shearing Rate ins/min
CS2 Yellow-grey mottled stiff fissured clay (Soil Type A)	C1	38	78	44	112	11.1	15.3	2.62	15	.00064
	C2	38			110	27.1	63.8	7.27 1.10	60 5	.00064
	C3	37			111	11.0	20.8	2.68 9.62	20 100	.00064
	C4	38			109	8.1	10.4	2.02 1.28	10 5	.00064
	C5	-			112	4.3	5.4	1.62 0.90	5 2	.00064
	C6	38			112	27.0	62.7	8.18	60	.00064
CS1 Dark Brown silty clay with very fine sand layers. (Soil Type B)	S1	40	57	26	105	9.4	10.4	5.9	10	.00064
	S2	40			104	38.7	64.4	26.4	60	.00064
	S3	40			110	16.2	20.7	10.7	20	.00064

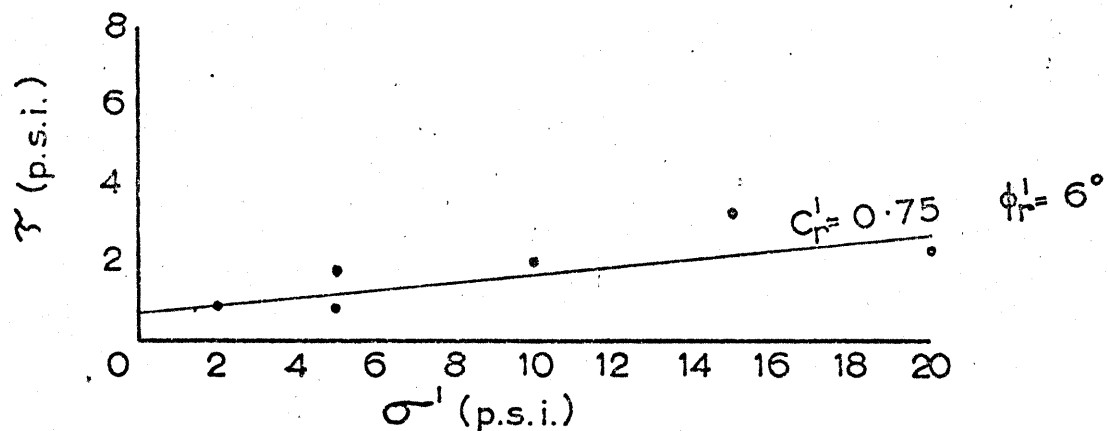
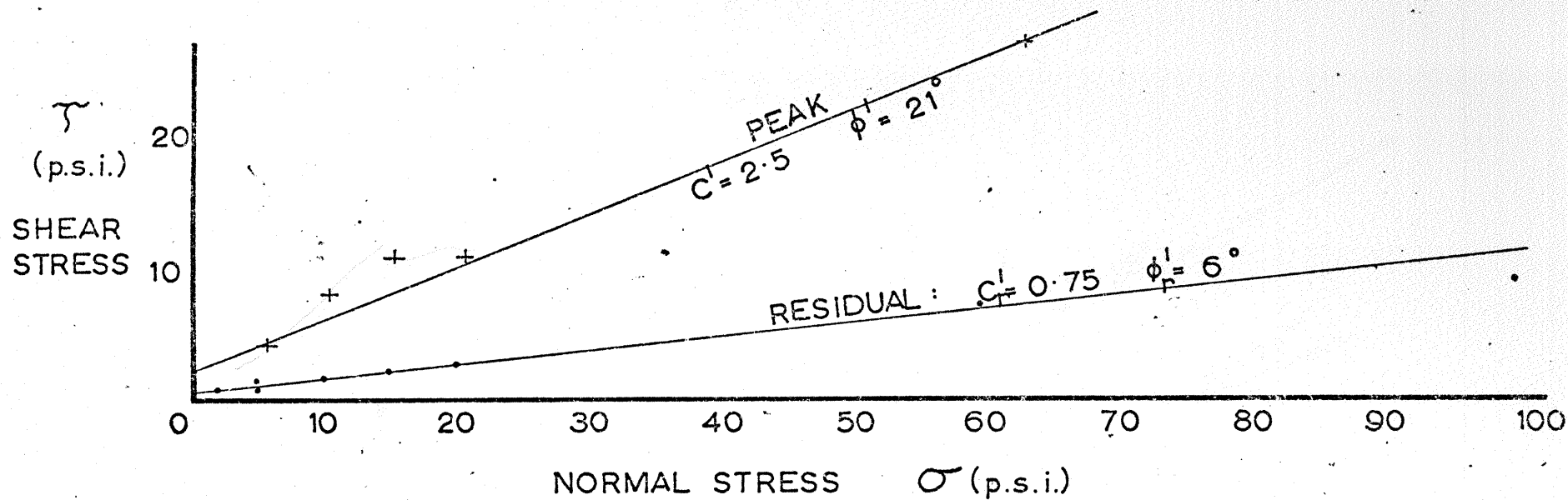
TABLE 1 - TEST DATA ON BELL BAY SOIL

SAMPLE	IDENT.	w _{remoulded}	LL	PI	σ_{peak} lbs/in ²	τ_{peak} lbs/in ²	$\sigma_{residual}$ lbs/in ²	$\tau_{residual}$ lbs/in ²	Shearing rate ins/min
Yellow-grey mottled stiff fissured clay from earlier block sample:									
a) air dried, ground and remoulded;	CR1	45.7	75	43	-	-	30	4.2	.00064
b) remoulded from natural	CR2	43.5	78	44	-	-	30	4.4	.00064
BH 409 @ 15'	T1	40.9	64	39	-	-	30	8.8	.00064
BH 409 @ 30' (natural)	T2	(29.1)	75	46	60	29.4	-	-	.00064
BH 409 @ 30' (remoulded)	T3	33.5	75	46	-	-	30	11.3	.00064
BH 411 @ 15'	T4	39.3	68	35	-	-	30	4.5	.00064

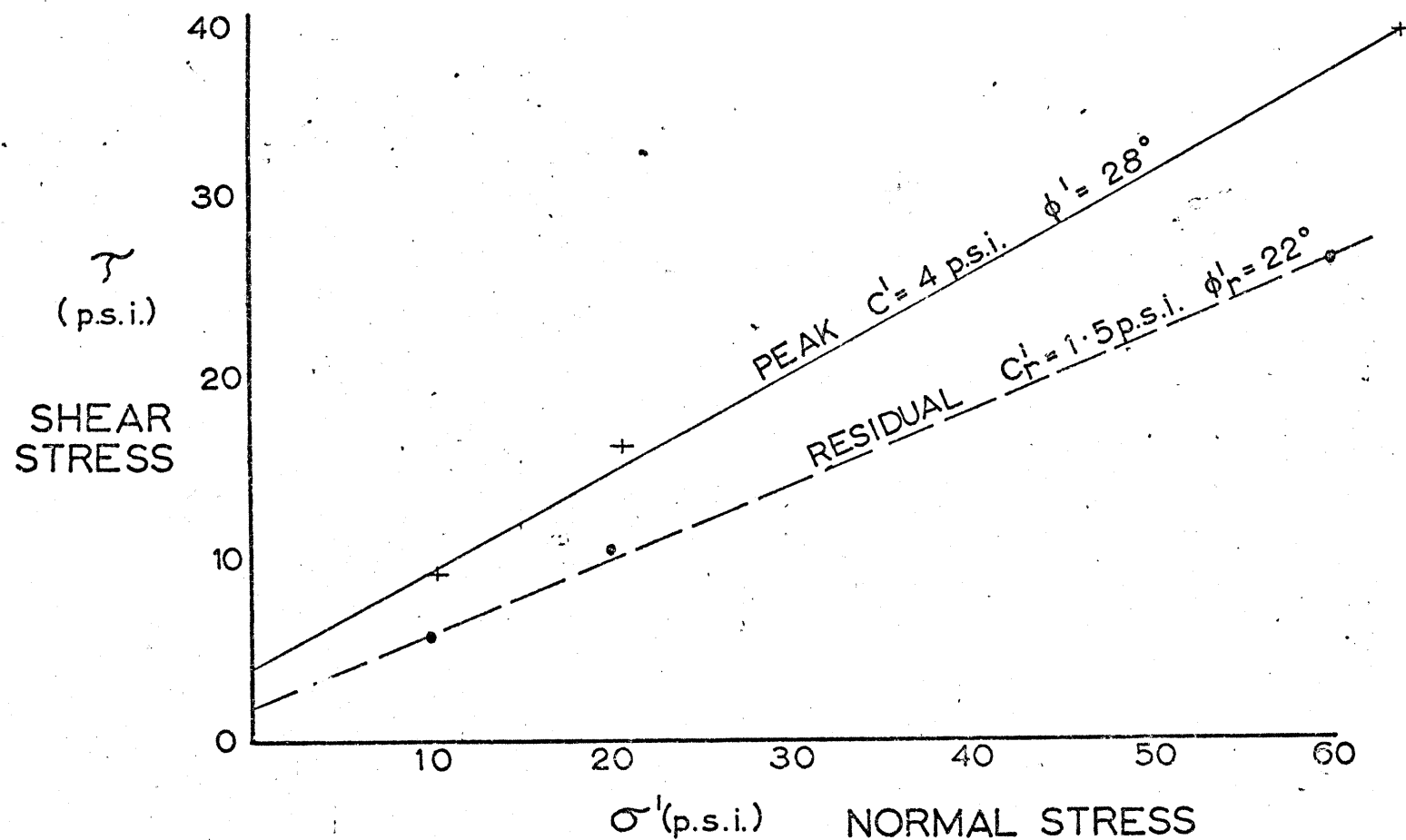
Using 2½" dia. tube samples it was only possible to obtain suitable size specimens for residual testing by remoulding the soil. To justify this procedure tests CR1/2 were run to determine whether the same value of shear strength would be obtained using remoulded material as using natural material for the particular soil at this site which has a known low residual strength.

$c'_p = 3 \text{ psi}$ $\phi'_p = 23^\circ$
 $c'_r = 1.6 \text{ psi}$ $\phi'_r = 12.5^\circ$
 $c'_r = 2$ $\phi'_r = 16.6^\circ$

$c'_r = 0.5$ $\phi'_r = 5.9^\circ$



RESIDUAL AND PEAK STRENGTH ENVELOPES
 SAMPLE CS2 - STIFF FISSURED CLAY
 (SOIL TYPE A)



RESIDUAL AND PEAK STRENGTH ENVELOPES

SAMPLE CS1 - DARK BROWN SILTY CLAY
(SOIL TYPE B)