



BFP Consultants Pty Ltd

Geotechnical, Mining & Geological Consultants

369A Bass Highway Prospect Vale TAS 7250 PO Box 465 Kings Meadows TAS 7249 Tel: 03 6340 2155 Fax: 03 6340 2177

Email: mmaundrill@bfp.com.au Web Site: www.bfp.com.au

13 May 2004

Our Ref: 2304247

Mr T Briggs & Mr M Summers C/- M Summers PO Box 871 BURNIE TAS 7320

Dear Sirs,

RE: SITE INVESTIGATION - 130A Preservation Bay Road, Preservation Bay

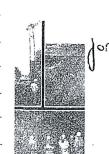
We have pleasure in submitting herein our report detailing the results of the geotechnical investigation conducted at the above site.

Should you require clarification of any aspect of this report, please contact Mr Mike Maundrill at this office on - (03) 6340 2155.

Yours faithfully BFP CONSULTANTS PTY LTD

Proalher

G.K. Searle



4.0 DISCUSSION & RECOMMENDATIONS

The morphology of the area is typical of much of the North West Coast where many landslips have occurred between the coastal platform and the basalt plateau. In several areas along the coast the debris, in the form of talus, creates a raised area often seven hundred metres wide between the shoreline and the southern escarpment.

Landslides often occur at the interface between the basalt above and the clay below particularly where springs are present.

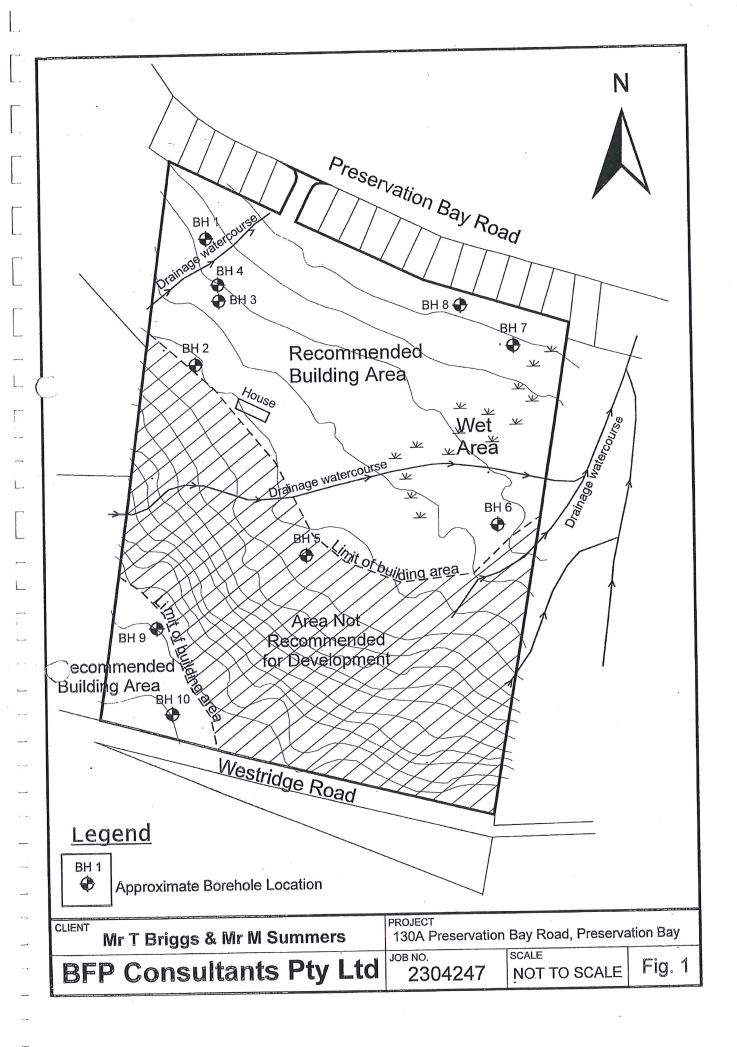
The site's undulating ground surface indicates that past slope instability has occurred. The steep escarpment slopes shows signs of more recent slope instability as evidenced by a number of bowl shaped features. However, no evidence was observed of back scarps or steps within the ground surface, suggesting that slope instability has not occurred in the immediate past.

It is considered that a limited development of the site can proceed with some limitations and restrictions provided engineering practices sympathetic to the contours of the land are employed. The following recommendations should be included in the design and development of the site.

- No development should proceed on the steep escarpment slopes and within a buffer zone as shown on the attached drawing.
- Road alignments should be designed to limit cut and fill requirements across the slopes. Proposed roads should integrate with the surface water system.
- Proposed cuts and fills should be battered to slope angles no greater than 1 vertical to 3 horizontal (IV:3H) or alternatively, may be retained. Retaining walls greater than 1 metre in height should be engineer designed with drainage connected to the stormwater system.
- Works to improve drainage within the north eastern portion of the site would benefit the stability of the area. Drainage works would be required if development is proposed within the north eastern portion of the site.

- Should groundwater seepage be encountered during earthworks or service trench excavations, subsoil drainage should be provided to collect and discharge seepage to the stormwater system or drainage water course.
- All stormwater should be piped to council mains or discharge to a drainage watercourse. Stormwater should not be allowed to discharge uncontrolled onto ground surface.
- Sewerage should be connected to council mains. Where council mains are
 not available an Envirocycle, Biocycle or similar system should be provided.
 These systems should be located away from proposed residences and in
 areas which will not impact on the stability of slopes.
- A review of the proposed subdivision plans should be undertaken by a recognised geotechnical consultant to ensure stability concerns have been addressed.

References: AS 2870 - 1996 Residential Slabs and Footings Construction



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그들은 사람들은 사람들이 하는 사람이 얼마다			
- "지상 기상이 보다고 되었다. 뭐라요" 하다.			
네 다양 경향을 시하고 하는 것이 무리하는 말았다.			
그림 교통 시간 시간 시간 사람들이 하나 되었다.			
네 그의 시간 시내는 그 가지 않았다.			
- '맞아하는 경기를 만든 것을 하는데 하는데 없다.			
그 개설과 전기가는 시계상에 되면질요??			
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그리고 내용한다는 시간 빛으로 보냈다니다.			
\mathbb{C}^{C}			
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[Pic 문항기 - 177 보통 약원 수업 보다		경기 남자한 모	
그렇다 얼마 아침 싫어서 다음하다면 어떻			
"나이의 아내를 가장이다면 살았다.			
두 하기 하는 요즘 사람들이다. 기계하다			
그는데 그리고 말했다면 얼마나 되었다.			
그 모든 사람들은 경찰에 다른다.			
보고 이 시민생활 교육 제공보다			*
	•		
<u> </u>			

APPENDIX FIELD INVESTIGATION RESULTS



DESCRIPTIVE TERMS - BOREHOLE/EXCAVATION LOG

Method

Support

S auger screwing D auger drilling R roller/tricone W washbore N natural exposure E existing excavation

B blade/bucket C cable tool H hammer drill *nil C casing M mud

Water



not observed

observed water level (with date shown) observed water inflow (with date shown) observed water outflow (with date shown)

refer to report for details

Notes, samples, tests, etc

U63 D undisturbed sample, 63mm diameter

disturbed sample

N*

standard penetration test + sample, figure = results

Structures, additional observations

PP V DCP

3

pocket penetrometer test figure = result (kPa) vane shear test figure = result (kPa)

dynamic cone test, figure = blows/300mm

Surface

known boundary	probable boundary	possible boundary
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classification of Material based on Unified Classification System (refer SAA Geotechnical Site Investigations Code AS 1726 - 1993 Appendix A)

Moisture

Condition

Based on appearance and feel of soil

dry (D)

Looks and feels dry, cohesive soils usually hard, powdery or friable, granul

soils run freely through the hands.

moist (M)

Soil feels cool, darkened in colour, cohesive soils usually weakened by moi granular soils tend to cohere, no free water on hands when remoulding.

wet (W)

Soil feels cool, darkened in colour, cohesive soils weakened, granular soils to cohere, free water collects on hands when remoulding.

Consistency

based on undrained shear strength, C $_{
m u}$ (generally estimated or measured b $_{
m S}$

vane shear test).

	very soft	soft	firm	stiff	very stiff	hard
	VS	S	F	St	VSt	H
τ	: /kPa\	12.5	25	50	100	200

If soil crumbles on test without meaningful result it is described as friable.

Density Index

(generally estimated or based on penetrometer results):







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Borehole no.

1

Sheet no.

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Job no.

Client: T BRIGGS & M SUMMERS		•				Date :	
Project : SITE INVESTIGATION	***					Logged By :	TB
Location : 130A PRESERVATION BAY R	ROAD, PR	ESE	RVA	TIOIT	V BA	Y	C101, 01 100 100
Drill model : Proline Auger Rig		lope			deg	RL Surface :	Not measured
Hole diameter: 130mm	В	earir	ng	-	deg	Datum :	-
Material Description	Depth (m)	Graphic log	Water		Consistency density, index	Structure, additional observations	Notes pour podding Tests
CLAYEY SILT, (ML), dark grey brown.	_		*	М	М		D -
SILTY CLAY, (CH), high plasticity, grey/brown.	0.50			М	St	V = 80 kPa	
peconing states	1.00					V = >140 kPa	
SILTY CLAY, (CH), high plasticity, some sand, grey, orange, brown mottled.	2.00					V = >140 kPa	
BH1 - Terminated @ 2.30 metres. (Refusal on inferred boulder/rock?)	- 2.50 - 3.00 - 3.50 - 4.00						



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2304247 Job no.

Client :	T BRIGGS & M SUMMERS						Date :	14/04/	04	
Project :	SITE INVESTIGATION						Logged By:	TB		
Location :	130A PRESERVATION BAY F	ROAD, PR	ESE	RVA	TIOIT	N BA	Y			
Drill model :	Proline Auger Rig		lope			deg	RL Surface :	Not meas	sure	ea
Hole diameter :	130mm	E	Beari	ng	-	deg	Datum :			
	terial Description	Depth (m)	Graphic log	Water		Consistency density, index	Structure, additional observations	Notes Samples Tests		Support
SILTY CLAY, (red/brown, son	CL/CH), medium plasticity, ne fine sand.	- -		*	М	VSt			D	-
		0.50					V = >140 kPa	. •		
		1.00					V = 114 kPa			
		1.50								
		2.00			->_		V = >140 kPa			
	-	2.50 - -			М	St	•			
becoming sligh	nuy soπer	3.00			IVI	SI		, , , , , , , , , , , , , , , , , , ,		
SILTY CLAY, grey, brown m	(CH), high plasticity, orange, ottled.	3.50			М	St / VSt				
BU2 Torming	ated @ 4.00 metres.	4.00		1						1



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Job no.

Client :	T BRIGGS & M SUMMERS						Date :		
Project :	SITE INVESTIGATION	,					Logged By:	TB	
Location :	130A PRESERVATION BAY	ROAD, PR	ESE	RVA	TIOI	N BA	Υ		
Drill model :	Proline Auger Rig	S	lope		90	deg		Not measure	d
Hole diameter :	130mm	Е	earii	ng	-	deg	Datum :		_
	aterial Description	Depth (m)	Graphic log	Water		Consistency density, index	Structure, additional observations	Notes policies Samples Tests V	Support
	CL/CH), medium plasticity,			*	М			D	0
red/brown.		0.50				VSt	V = 90 kPa		
		1.00					V = >140 kPa		
	ted @ 1.20 metres.	_							
(Refusal on co	bbles & boulders)	1.50							
		2.00							
		-							
	- -	2.50							
		3.00							
		3.50		7					



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ENGINEERING BOREHOLE LOG

Borehole no.

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Job no. 2304247

14/04/04 T BRIGGS & M SUMMERS Date: Client: TB Logged By: SITE INVESTIGATION Project: Location: 130A PRESERVATION BAY ROAD, PRESERVATION BAY RL Surface: Not measured Drill model: Proline Auger Rig Slope 90 deg Datum: 130mm Bearing deg Hole diameter: Moisture condition Sonsistency dens index Graphic log Notes Notes po Samples to Tests ≥ Water Depth Structure, additional **Material Description** observations (m) Tests SILTY CLAY, (CL/CH), red/brown, medium plasticity. 0.50 V = 88 kPasome cobbles SILTY CLAY, (CH), high plasticity, brown, 1.00 VSt V = >140 kPa trace of orange gravel, cobbles. 1.50 becoming brown, grey, orange mottled 2.00 BH4 - Terminated @ 2.00 metres. (Refusal on inferred rock/boulder?) 2.50 3.00 3.50 4.00



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Borehole no.

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Job no.

Client: T BRIGGS & M SUMMERS						Date :	14/04/	04
Project : SITE INVESTIGATION						Logged By:	TB	
Location: 130A PRESERVATION BAY F	ROAD, PR	ESE	RVA	TIOI	N BA	Υ		
Drill model : Proline Auger Rig	S	Slope		90	deg	RL Surface :	Not meas	sured
Hole diameter: 130mm	E	Beari	ng	-	deg	Datum :	-	
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	
SILTY CLAY, (CL/CH), medium plasticity,	_		*	М	St			D -
red/brown, some medium to coarse gravel.	- - 0.50 -				VSt	V = 90 kPa	-	
	1.00					V = >140 kPa V = >140 kPa		
SILTY CLAY, (CH), high plasticity, brown, arace red orange.	2.00			М	St / VSt	, 3		
-	2.50					LL=81%	D	,
	3.00					LS=17%		\sqcup
BH5 - Terminated @ 3.00 metres.	3.50					·		



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Client: T BRIG	GS & M SUMMERS				-		Date :	14/04/04
	NVESTIGATION						Logged By :	ТВ
	RESERVATION BAY	ROAD, PR	ESE	RVA	TIO	N BA	Υ	
	Auger Rig		lope			deg		Not measure
Hole diameter: 130mm			eari		-	deg	Datum :	•
Material De		Depth (m)	Graphic log	* Water		Consistency density, index	Structure, additional observations	Notes po Samples to Tests Z
TOPSOIL, dark grey b	rown	-			IVI	טואו		
SILTY CLAY, (CH), hig orange mottled, tree ro		0.50			М	VSt	Residual V = 108 kPa	
		1.00					V>140 kPa	
becoming orange grey black, possible decaye		2.00					V = 112 kPa	
	•	2.50						
BH6 - Terminated @ 3	3.0 metres	3.50						



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2304247

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L	Cilett.	1 Britises a m semmer to							TB		\dashv
	Project :	SITE INVESTIGATION						Logged By :	ID		_
	Location :	130A PRESERVATION BAY R						Υ			<u>.</u>
	Drill model :	Proline Auger Rig		lope		90	deg	RL Surface :		ure	<u>d</u>
ľ	Hole diameter :	130mm	Е	Bearin	ng	-	deg	Datum :	-		=1
	4	iterial Description	Depth (m)	Graphic log	Water		Consistency density, index	Structure, additional observations	Notes Samples Tests		Juddno
	TOPSOIL, dark	k brown	_		*	М	MD			D	-
	SILTY CLAY, (high plasticity,	CH), grey orange mottled, trace gravel	0.50			M	VSt	V = 120 kPa V>140 kPa			
			1.50					LL=80% LS=18% V>140 kPa NMC=44.	D 2%		
	BH7 - Termina	ted @ 3.0 metres	2.50					-			
		•	3.50 - - - - 4.00								



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Job no.

Client: TBRIGGS & M SUMM	IERS					Date :	14/04/	04	
Project : SITE INVESTIGATION	1	•				Logged By:	ТВ		
Location: 130A PRESERVATION	N BAY ROAD, PF	RESE	RVA	TIO	N BA				
Drill model : Proline Auger Rig		Slope		90	deg	RL Surface :	Not meas	sure	ed
Hole diameter: 130mm	E	Beari	ng	-	deg	Datum :	-		
Material Description	Depth (m)	Graphic log	Water		Consistency density, index	Structure, additional observations	Notes Samples Tests		Support
TOPSOIL, Clay sand, dark grey to bla	ck _		*	М	MD			D	-
SILTY SAND, (SM), medium grained, brown	grey			М	MD				
BH8 - Terminated @ 1.0 metres								Г	
	2.50 - 3.50								
•	4.00								



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Job no.

Client: T BRIGGS & M SUMMERS						Date :		-
Project : SITE INVESTIGATION						Logged By:	TB	
Location : 130A PRESERVATION BAY F	ROAD, PR	ESE	RVA	TIOI	N BA	Υ		
Drill model : Proline Auger Rig		lope			deg	RL Surface :		red
Hole diameter: 130mm	В	earir	ng	-	deg	Datum :	T	
Material Description	Depth (m)	Graphic log	Water		Consistency density, index	Structure, additional observations	Notes Samples Tests .	Support
TOPSOIL, CLAYEY SILT, (ML), red brown	_			М	MD	V = 92 kPa		
SILTY CLAY, (CH/CL), medium plasticity, red orange	1.00			М	VSt			
	2.00					V = 116 kPa LL=67% LS=16% NMC=47	D 4%	
becoming wetter	3.00							
becoming gravelly, fine to medium gravel, blue grey to red brown gravel	4.00		¥					
·	- - - 6.00		30/04/04					
BH9 - Terminated @ 6.0 metres	7.00							



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Job no.

Γ	Client: T BRIGGS & M SUMMI	ERS	-					Date	: 14/04/	104	-
_	Project : SITE INVESTIGATION							Logged By			
_	Location: 130A PRESERVATION		ROAD, PE	RESE	ERV/	TIO	N BA		. 10		-
t	Drill model : Proline Auger Rig			Slope			deg		: Not meas	sure	ed
	Hole diameter : 130mm			Beari		_	deg				
III				T	Ť	Ę			T	П	7
	Material Description		Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
	SILTY CLAY, (CH/CL), medium plastici		_		*	М	VSt			D	-
C	red orange brown, some fine sand, trac fine gravel	е	_								
	ine graver		_					V>140 kPa		$\ \ $	
			1.00								
			_					V>140 kPa		$\ \ $	
Ш			_ ,								
Ш	becoming brown		-								
III		İ	2.00					V>140 kPa			
			- 1								
		ł	-								
\parallel		ŀ	-								
\parallel			3.00								Ш
III		-	-								
III		-	- ,								
			-								
Î			4.00		ł						
\parallel	becoming gravelly, fine to medium grave	,	-								
\parallel	grave, mo to medium grave	" -	-					,			II
\parallel						ı				1	
\parallel	BH10 - Terminated @ 5.0 metres		5.00								
	2.7.10 - Terrimiated (@ 5.0 Metres	F									
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