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## **BFP Consultants Pty Ltd**

Geotechnical, Mining & Geological Consultants

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13 May 2004

Our Ref: 2304247

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

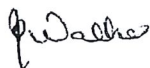
Dear Sirs,

**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**



for **G.K. Searle**



#### 4.0 DISCUSSION & RECOMMENDATIONS

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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.

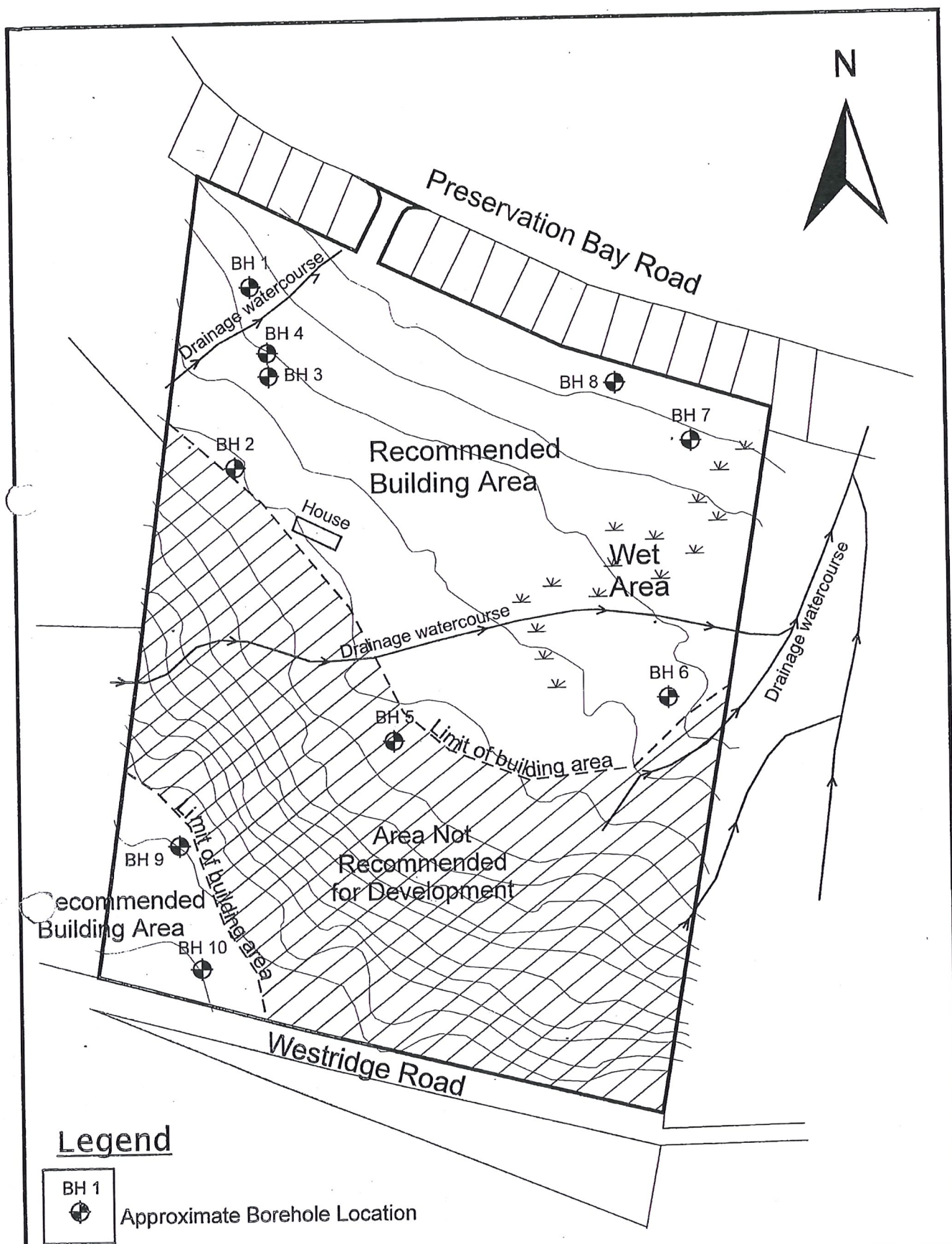
It is considered that a limited development of the site can proceed with some limitations and restrictions provided engineering practices sympathetic to the contours of the land are employed. The following recommendations should be included in the design and development of the site.

- 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 (1V: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**





### Legend

BH 1



Approximate Borehole Location

CLIENT

**Mr T Briggs & Mr M Summers**

PROJECT

**130A Preservation Bay Road, Preservation Bay**

**BFP Consultants Pty Ltd**

JOB NO.

**2304247**

SCALE

**NOT TO SCALE**

**Fig. 1**





**APPENDIX**  
**FIELD INVESTIGATION RESULTS**

## DESCRIPTIVE TERMS - BOREHOLE/EXCAVATION LOG

### Method

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

### Support

\*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  
N\*

undisturbed sample, 63mm diameter  
disturbed sample  
standard penetration test + sample, figure = results

### Structures, additional observations

PP  
V  
DCP

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, granular soils run freely through the hands.

moist (M) Soil feels cool, darkened in colour, cohesive soils usually weakened by moisture, 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,  $C_u$  (generally estimated or measured by vane shear test).

very soft VS	soft S	firm F	stiff St	very stiff VSt	hard H
$C_u$ (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):

very loose VL	loose L	medium dense MD	dense D	very dense VD
15	35	65	85	

density index ID%





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**ENGINEERING  
BOREHOLE LOG**

Borehole no. 1

Sheet no. 1 of 1

Job no. 2304247

Client : T BRIGGS & M SUMMERS		Date : 14/04/04							
Project : SITE INVESTIGATION		Logged By : TB							
Location : 130A PRESERVATION BAY ROAD, PRESERVATION BAY									
Drill model : Proline Auger Rig		Slope 90 deg							
Hole diameter : 130mm		Bearing - deg							
		Datum : -							
RL Surface : <i>Not measured</i>									
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
CLAYEY SILT, (ML), dark grey brown.			*	M	M				D
SILTY CLAY, (CH), high plasticity, grey/brown.	0.50			M	St	V = 80 kPa			
becoming stiffer	1.00					V = >140 kPa			
	1.50								
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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Borehole no. 2  
Sheet no. 1 of 1  
Job no. 2304247

Client :		T BRIGGS & M SUMMERS				Date :		14/04/04	
Project :		SITE INVESTIGATION				Logged By :		TB	
Location :		130A PRESERVATION BAY ROAD, PRESERVATION BAY							
Drill model :		Proline Auger Rig		Slope		90 deg		RL Surface : <i>Not measured</i>	
Hole diameter :		130mm		Bearing		- deg		Datum : -	
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
SILTY CLAY, (CL/CH), medium plasticity, red/brown, some fine sand.	0.50		*	M	VSt	V = >140 kPa		D	-
	1.00					V = 114 kPa			
	1.50								
	2.00					V = >140 kPa			
	2.50								
becoming slightly softer	3.00			M	St				
	3.50			M	St / VSt				
SILTY CLAY, (CH), high plasticity, orange, grey, brown mottled.									
BH2 - Terminated @ 4.00 metres.	4.00								



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## ENGINEERING BOREHOLE LOG

Borehole no. 3

Sheet no. 1 of 1

Job no. 2304247

Client : T BRIGGS & M SUMMERS		Date : 14/04/04							
Project : SITE INVESTIGATION		Logged By : TB							
Location : 130A PRESERVATION BAY ROAD, PRESERVATION BAY									
Drill model : Proline Auger Rig	Slope 90 deg	RL Surface : <i>Not measured</i>							
Hole diameter : 130mm	Bearing - deg	Datum : -							
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
SILTY CLAY, (CL/CH), medium plasticity, red/brown.	0.50		*	M	St / VSt	V = 90 kPa			D -
	1.00					V = >140 kPa			
BH3 - Terminated @ 1.20 metres. (Refusal on cobbles & boulders)	1.50								
	2.00								
	2.50								
	3.00								
	3.50								
	4.00								





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Borehole no. 4  
Sheet no. 1 of 1  
Job no. 2304247

Client :		T BRIGGS & M SUMMERS				Date :		14/04/04	
Project :		SITE INVESTIGATION				Logged By :		TB	
Location :		130A PRESERVATION BAY ROAD, PRESERVATION BAY							
Drill model :		Proline Auger Rig		Slope		90 deg		RL Surface : <i>Not measured</i>	
Hole diameter :		130mm		Bearing		- deg		Datum : -	
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
SILTY CLAY, (CL/CH), red/brown, medium plasticity.	0.50		*	M	St	V = 88 kPa		D	-
some cobbles	1.00			M	VSt	V = >140 kPa			
SILTY CLAY, (CH), high plasticity, brown, 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. 5  
Sheet no. 1 of 1  
Job no. 2304247

Client :	T BRIGGS & M SUMMERS					Date :	14/04/04		
Project :	SITE INVESTIGATION					Logged By :	TB		
Location :	130A PRESERVATION BAY ROAD, PRESERVATION BAY								
Drill model :	Proline Auger Rig		Slope	90 deg		RL Surface :	Not measured		
Hole diameter :	130mm		Bearing	- deg		Datum :	-		
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
SILTY CLAY, (CL/CH), medium plasticity, red/brown, some medium to coarse gravel.	0.50		*	M	St	V = 90 kPa		D	-
	1.00				VSt	V = >140 kPa			
	1.50					V = >140 kPa			
SILTY CLAY, (CH), high plasticity, brown, trace red orange.	2.00			M	St / VSt				
	2.50								
	3.00					LL=81% LS=17%	D		
BH5 - Terminated @ 3.00 metres.	3.50								
	4.00								



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## ENGINEERING BOREHOLE LOG

Borehole no. 6

Sheet no. 1 of 1

Job no. 2304247

Client : T BRIGGS & M SUMMERS						Date : 14/04/04		
Project : SITE INVESTIGATION						Logged By : TB		
Location : 130A PRESERVATION BAY ROAD, PRESERVATION BAY								
Drill model : Proline Auger Rig			Slope 90 deg		RL Surface : <i>Not measured</i>			
Hole diameter : 130mm			Bearing - deg		Datum : -			
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method Support
TOPSOIL, dark grey brown			*	M	MD			D -
SILTY CLAY, (CH), high plasticity, grey orange mottled, tree roots	0.50			M	VSt	Residual V = 108 kPa		
	1.00					V>140 kPa		
	1.50							
becoming orange grey, mottled, trace black, possible decayed roots	2.00					V = 112 kPa		
	2.50							
	3.00							
BH6 - Terminated @ 3.0 metres								
	3.50							
	4.00							





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Job no. 2304247

Client :	T BRIGGS & M SUMMERS					Date :	14/04/04		
Project :	SITE INVESTIGATION					Logged By :	TB		
Location :	130A PRESERVATION BAY ROAD, PRESERVATION BAY								
Drill model :	Proline Auger Rig		Slope	90 deg		RL Surface :	Not measured		
Hole diameter :	130mm		Bearing	- deg		Datum :	-		
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
TOPSOIL, dark brown			*	M	MD			D	-
SILTY CLAY, (CH), grey orange mottled, high plasticity, trace gravel	0.50			M	VSt	V = 120 kPa			
	1.00					V>140 kPa			
	1.50								
	2.00					V>140 kPa	LL=80% LS=18% NMC=44.2%	D	
	2.50								
	3.00								
BH7 - Terminated @ 3.0 metres	3.50								
	4.00								



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**ENGINEERING  
BOREHOLE LOG**

Borehole no. 9

Sheet no. 1 of 1

Job no. 2304247

Client : T BRIGGS & M SUMMERS		Date : 14/04/04							
Project : SITE INVESTIGATION		Logged By : TB							
Location : 130A PRESERVATION BAY ROAD, PRESERVATION BAY									
Drill model : Proline Auger Rig	Slope 90 deg	RL Surface : Not measured							
Hole diameter : 130mm	Bearing - deg	Datum : -							
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
TOPSOIL, CLAYEY SILT, (ML), red brown				M	MD	V = 92 kPa			D -
SILTY CLAY, (CH/CL), medium plasticity, red orange	1.00			M	VSt	V Refusal			
	2.00					V = 116 kPa	LL=67% LS=16% NMC=47.4%	D	
becoming wetter	3.00								
	4.00								
becoming gravelly, fine to medium gravel, blue grey to red brown gravel	5.00								
	6.00								
BH9 - Terminated @ 6.0 metres	7.00								
	8.00								





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Job no. 2304247

Client :	T BRIGGS & M SUMMERS					Date :	14/04/04		
Project :	SITE INVESTIGATION					Logged By :	TB		
Location :	130A PRESERVATION BAY ROAD, PRESERVATION BAY								
Drill model :	Proline Auger Rig		Slope	90 deg		RL Surface :	Not measured		
Hole diameter :	130mm		Bearing	- deg		Datum :	-		
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 plasticity, red orange brown, some fine sand, trace fine gravel	1.00		*	M	VSt	V>140 kPa		D	-
becoming brown	2.00					V>140 kPa			
	3.00					V>140 kPa			
	4.00								
becoming gravelly, fine to medium gravel	5.00								
BH10 - Terminated @ 5.0 metres	6.00								
	7.00								
	8.00								

