



Tonkin & Taylor

ENVIRONMENTAL AND ENGINEERING CONSULTANTS



REPORT

**SHOTOVER PROPERTY
INVESTMENTS LTD**

Frankton Flats Development

Geotechnical Investigations

Report prepared for:

SHOTOVER PROPERTY INVESTMENTS LTD

Report prepared by:

TONKIN & TAYLOR LTD

Distribution:

SHOTOVER PROPERTY INVESTMENTS LTD

TONKIN & TAYLOR LTD (FILE)

December 2010

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1. Introduction

1.1. General

This report presents the results of geotechnical investigations which have been completed by Tonkin & Taylor Ltd (T&T) for the site at Frankton Flats (S.H. 6), Queenstown. The site (pt Sec 5, Blk XXI Shotover Survey District, SO 6431, SO1516 and Lot 1 DP26426) is located immediately east of the existing Frankton Cemetery.

This report was commissioned by Shotover Property Investments Ltd and is a revision of an earlier report by T&T for the site (T&T Reference No 890762.00).

This report has been completed in accordance with the scope of work and conditions of engagement outlined in the T&T proposal dated 10 August 2010.

1.2. Development

We understand it is proposed to re-zone the area of the site currently designated as 'low density residential' to 'mixed use' which is likely to comprise commercial, business and residential.

As the project is only a zone change application at this stage the proposed building size and layout has not yet been determined. For the purposes of this report, T&T expect any future development is likely to comprise 2 to 4 storey building blocks with associated parking and landscaping.

2. Site Description

2.1. General

The larger part of the site is bounded on its south-eastern side by State Highway 6 (SH6), on its eastern side by Hansen Road, and, by Frankton Cemetery to the south-west. A separate small area (Lot 1 DP26426) is located to the east of the main site and adjacent to Hansen Road

The site is currently undeveloped and covered in grass with trees and scrub lining most boundaries. A water race runs sub-parallel to the base of the steep slope which is present in the north-western portion of the site.

A temporary unsealed roadway crosses the site from SH6. This roadway was constructed to provide site access for construction of the Terrace Junction development and some imported gravels, and mounds of removed topsoil are present in this area.

2.2. Topography and Surface Drainage

The majority of the site is flat, the exception being the toe of a steep hill slope is present in the north-western portion of the site. This hill slope is highly undulating with numerous outcrops and small bluffs of schist rock. The site map (see Appendix A) does not show these undulations, as the surveyor's contours are an average slope derived from the difference in elevation between points at the bottom and top of the slope. The toe of the hill runs parallel to the proposed re-zoning area.

The proposed area of re-zoning is on the flat land at the base of the slope. There are no overland flow paths across the proposed development area, although portions of this flat area form slight depressions that may act as areas for surface water to pool during periods of increased rainfall.

3. Investigations

An engineering geologist from T&T conducted a walkover inspection of the site on 22 November 2010 and twelve test pits have been excavated to a maximum depth of 3.8 m. Scala penetrometer tests were carried out adjacent to Test Pits 2, 7, 9, 11 and 12 (results attached) Test pit locations and logs are shown in Appendices A and B, respectively. The test pits and scala penetrometer testing were completed in July 2004.

4. Subsurface Conditions

4.1. Geological Setting

The site is located on the north flank of the Wakatipu Basin, which is a feature formed by former glacial advances. The regional basement rock comprises ice-scoured schist of the Haast Schist Group. Locally, sedimentary cover consists of Quaternary till, outwash sediments, and lake sediments. Post-glacial deposits comprise fluvial valley infill and localised colluvium.

Active fault traces were not observed at the site or in the vicinity. However, significant seismic risk exists in this region from potentially strong ground-shaking likely to be associated with a rupture of the Alpine Fault, located along the West Coast of South Island. There is a high probability that an earthquake with an expected magnitude of over 7.5 will occur along the Alpine Fault within the next 50 years.

4.2. Stratigraphy

The stratigraphy beneath the site comprises a surface layer of topsoil and roots underlain by lake sediments that include silt, and sand with minor silt. Test Pit 9 encountered fill underlying the topsoil horizon. These units are underlain by deltaic gravel. In Test Pits 3, 4, 7, 8, 10, and 12 the lake sediment and deltaic gravel layers were interbedded, and lenses of sand and silt occur within the deltaic gravels.

The site is typically covered by 300-400 mm of topsoil that comprises slightly moist and rare moist to wet, loose, non-stratified, dark brown organic silt with rare sand and gravel, and minor roots.

The lake sediments underlying the topsoil comprises two distinctive soil-types:

1. Slightly moist (rare moist), medium dense to dense, brownish grey, silt with rare sand and roots, and rare horizons of sandy silt. The silt is highly micaceous and the sand is fine. The silt is well graded and has poorly developed, sub-horizontal, thin to laminated bedding.
2. Slightly moist, medium dense, light grey sand with minor silt. The sand is fine to medium. The sand is uniform, dilatant, non-stratified, and the unit is sub-horizontal.

The lake sediments occur as lenses and interbedded layers within the deltaic gravel. Scala penetrometer testing indicates that the lake silt is firm to very stiff where it occurs near the surface adjacent to Test Pits 2, 7, 9, 11, and 12.

The fill in Test Pit 9 comprises moist, loose, brown silt with minor sand and gravel, and rare roots and cobbles. The fill is uniform, dilatant, non-plastic, and non-stratified. Scala penetrometer testing adjacent to Test Pit 9 indicates that the fill is firm to stiff.

Deltaic gravel was the lowest unit observed in all test pits, apart from Test Pit 7 where lake silt is lowest. As mentioned above, the deltaic gravel is interbedded with layers of the lake silt and sand, and lenses of the lake sediments (0.1 m-0.2 m thick) also occur within the gravel. The deltaic gravel comprises slightly moist, dense sandy gravel with rare silt, and rare thin (<100 mm) beds of sandy silt. In Test Pit 2 the gravel is present as sandy gravel with rare silt, interbedded with sand with some silt. The gravel is well graded with poorly developed bedding (~ 50 - 200 mm thick) that dips very gently to the southeast.

Schist, the regional basement rock, is exposed on the steep slopes on the northwest of the site. Foliation planes in the schist dip about 30° towards south to southwest, which is typical for schist in the Queenstown area. The schist is expected to occur at moderate depth beneath the area of the proposed development.

4.3. Groundwater

A single minor seep was observed on the north side of Test Pit 9 at a depth of 1.6 m. This seep occurs within lake sands with minor silt, and is probably derived from the nearby water race. All other test pits were dry and all soil-types were slightly moist to moist. The regional water table is expected to be deep in the high permeability sediments, grading gently towards the lake.

5. Engineering Considerations

5.1. General

Recommendations and opinions in this report are based on the data sources noted above. The nature and continuity of subsoil conditions away from the test pits and exposures are inferred, and it must be appreciated that actual conditions could vary from the assumed model.

5.2. Site Preparation

All topsoil and any fill should be removed to at least 0.5 m past the extent of any future structures or pavement areas. The surface of the exposed platform and any fill required should be compacted in accordance with NZS 4431 to 95% of maximum density with a heavy vibrating roller.

5.3. Excavations

No cuts are currently proposed, however, basement excavation could be carried out within the deltaic gravels if required. Cohesionless strata may be encountered, which may fret back to slopes of 1.5:1 (horizontal to vertical). All temporary excavations should be trimmed back to this gradient. Provided excavations do not pass beneath a 1.5:1 from property boundaries, or in close proximity to the water race, no stability issues are envisaged.

5.4. Settlement and Foundations

Foundations for the structures will be predominantly on lake sediments including silt and sand. Enhanced bearing could be obtained by founding on the deltaic gravel or fill compacted in accordance with NZS 4431.

Conservative site-specific bearing for shallow footings is recommended in Figure 5-1, but higher bearing may be possible after inspection of excavations and testing of the foundation subgrade areas. Footing stresses are limited by differential settlement where foundations straddle the different materials.

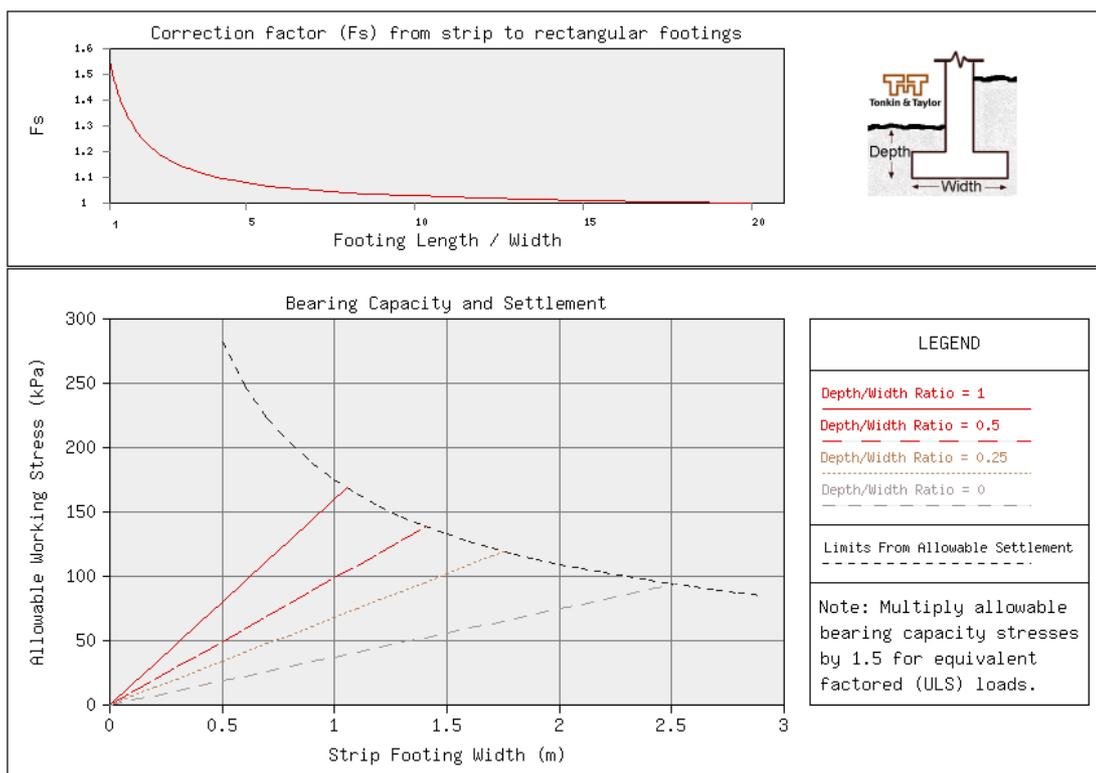


Figure 5-1. Recommended Bearing Pressures for Footings

No reduction for earthquake loading is applicable.

For detailed design purposes it is recommended that the magnitude of seismic acceleration be estimated in accordance with the recommendations provided in NZS 1170.5:2004.

It is recommended that Class C subsoil conditions be adopted for the site.

5.5. Slope Stability

The south facing hillsides throughout the Frankton area show extensive instability with both dormant and actively creeping schist debris landslides.

The slopes directly above the site show relatively surficial creep and rates of 5-20 mm/yr may be expected. More rapid surficial (<0.5 m thick) failures may occur, with minor blockage of the water race being the only likely hazard. Some ongoing maintenance of the water race will be required to mitigate the risk of flooding, with back up drainage paths established between the race and the proposed development. However, provided no un-retained cuts are made into the slope, accelerated movement rates are unlikely.

It is recommended that the building walls are not used to retain any cuts formed in the toe of the north-western slope. In addition, a nominal 5.0m wide service vehicle access should be maintained between the rear of any building and the slope toe. All excavations required in close proximity to the water race should be designed by a chartered professional engineer to ensure the stability of the water race is not jeopardised. If required, recommendations for protection of the water race (e.g. permanent or temporary culverting or diversion), suitable construction techniques

or staging of the works should also be provided. It should also be noted that Arrow Irrigation, as owner and operator of the water race, will need to review and approve any earthworks affecting the water race.

5.6. Liquefaction

A detailed liquefaction assessment has not been completed for the site. Based on a review of ground investigation data held on the T&T database for the general site area the risk of liquefaction is expected to be low, however, to provide confirmation of the risk from liquefaction it is recommended specific assessment be completed as part of the detailed design phase of future development.

5.7. Neighbouring Structures/Boundaries

No buildings are present within close proximity to the site.

5.8. Environmental Issues

It is understood the site was once owned or used by Queenstown airport, and in recent years, an old decommissioned concrete sewage tank was temporarily stored at the site. The site is not listed on the Otago Regional Council verified contaminated sites list.

An appropriately qualified and experienced Environmental Engineer should an environmental desk top study and confirm the need, or otherwise, to undertake testing as part of the detailed design phase and prior to the commencement of future construction.

6. Conclusions and Recommendations

- Re-zoning of the site to 'mixed use' (commercial, residential and business) is considered acceptable from a geotechnical perspective provided the recommendations of this report are followed.
- Subsurface conditions at the Frankton Flats Development site are quite straightforward, consisting of shallow topsoil overlying lake silt and rarely overlying fill. A thin layer of lake sediment underlies the silt and fill. Deltaic gravels are expected to persist well below the depth of influence of the proposed structures.
- Groundwater is deep and no issues are envisaged with the development.
- The site is suited to lightly loaded spread footings for which allowable bearing capacity has been prescribed.
- The recommendations of Section 5.5. should be adhered to with respect to earthworks completed in close proximity to the water race and/or toe of the adjacent hillside slopes.
- During the detailed design phase specific assessment should be completed to assess the risk posed to the site from liquefaction.

- An appropriately qualified and experienced Environmental Engineer should complete an environmental desk top study and confirm the need, or otherwise, to undertake testing prior to the commencement of construction.



7. Applicability

This report has been prepared for the benefit of Shotover Property Investments Ltd with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

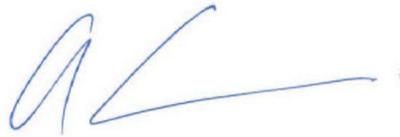
During excavation, exposures should be examined at an early stage and progressively by an inspector or engineer competent to confirm that localised subsurface conditions encountered are compatible with the inferred conditions on which this report has been based. It is important that we be contacted if there is any variation in subsoil conditions from those described in this report.

TONKIN & TAYLOR LTD

Environmental and Engineering Consultants

Report prepared by:

Authorised for Tonkin & Taylor by:



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Paul Faulkner

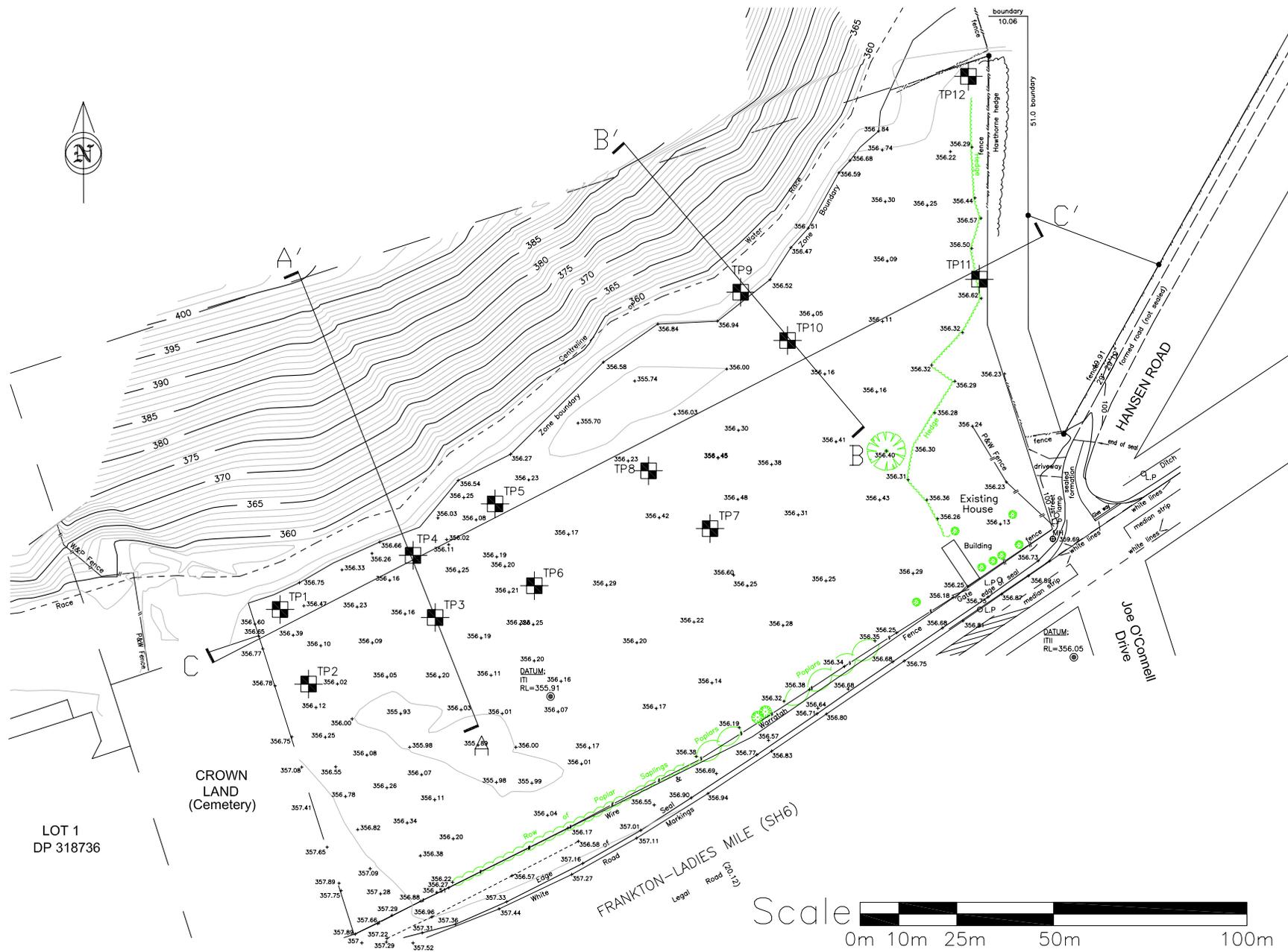
Anthony Fairclough

Engineering Geologist

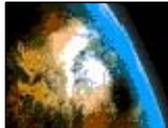
Project Coordinator

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Appendix A: Site Map and Cross Sections



LOT 1
DP 318736

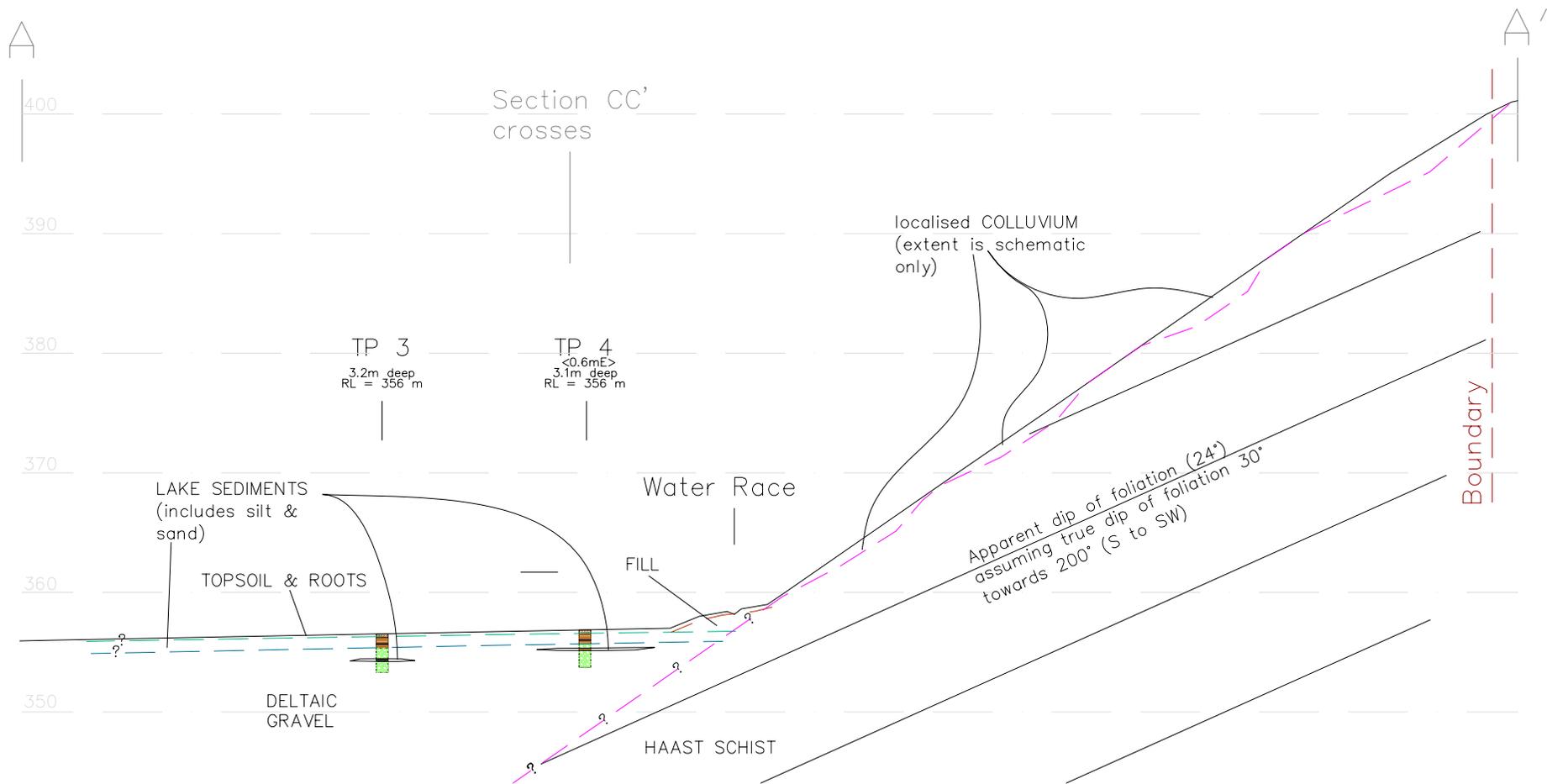


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DRAWN	EJD	23.11.10
DRAFTING CHECKED		
APPROVED		
CADFILE :		
SCALES (AT A4 SIZE)		
PROJECT No.	880229.00	FIG. No. Fig. 1

Shotover Property Investment Ltd.
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Site Plan

REV. 0



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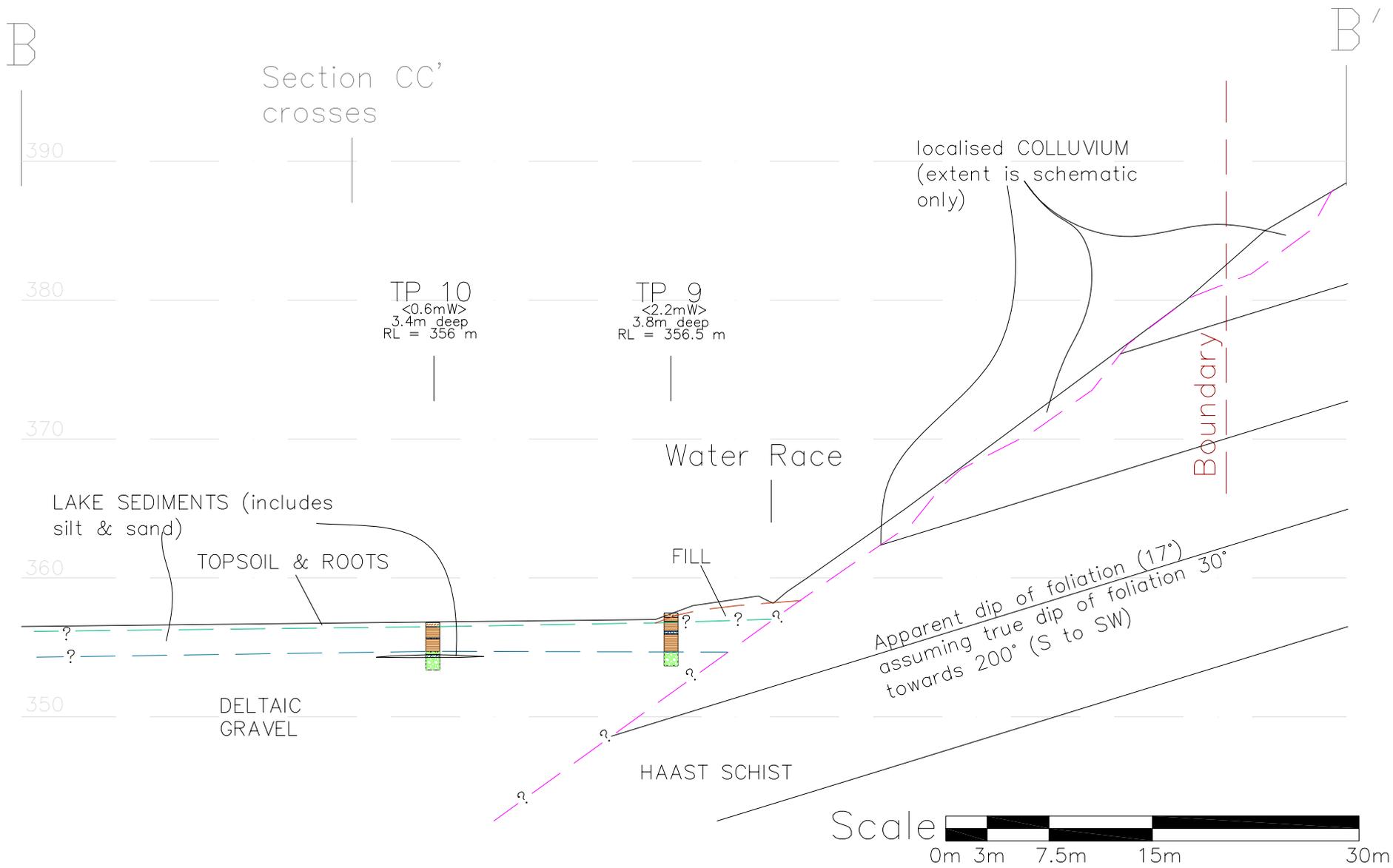
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APPROVED		
CADFILE :		
SCALES (AT A4 SIZE)		
PROJECT No.	880229.00	

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Section A - A'

FIG. No. Fig. 2a

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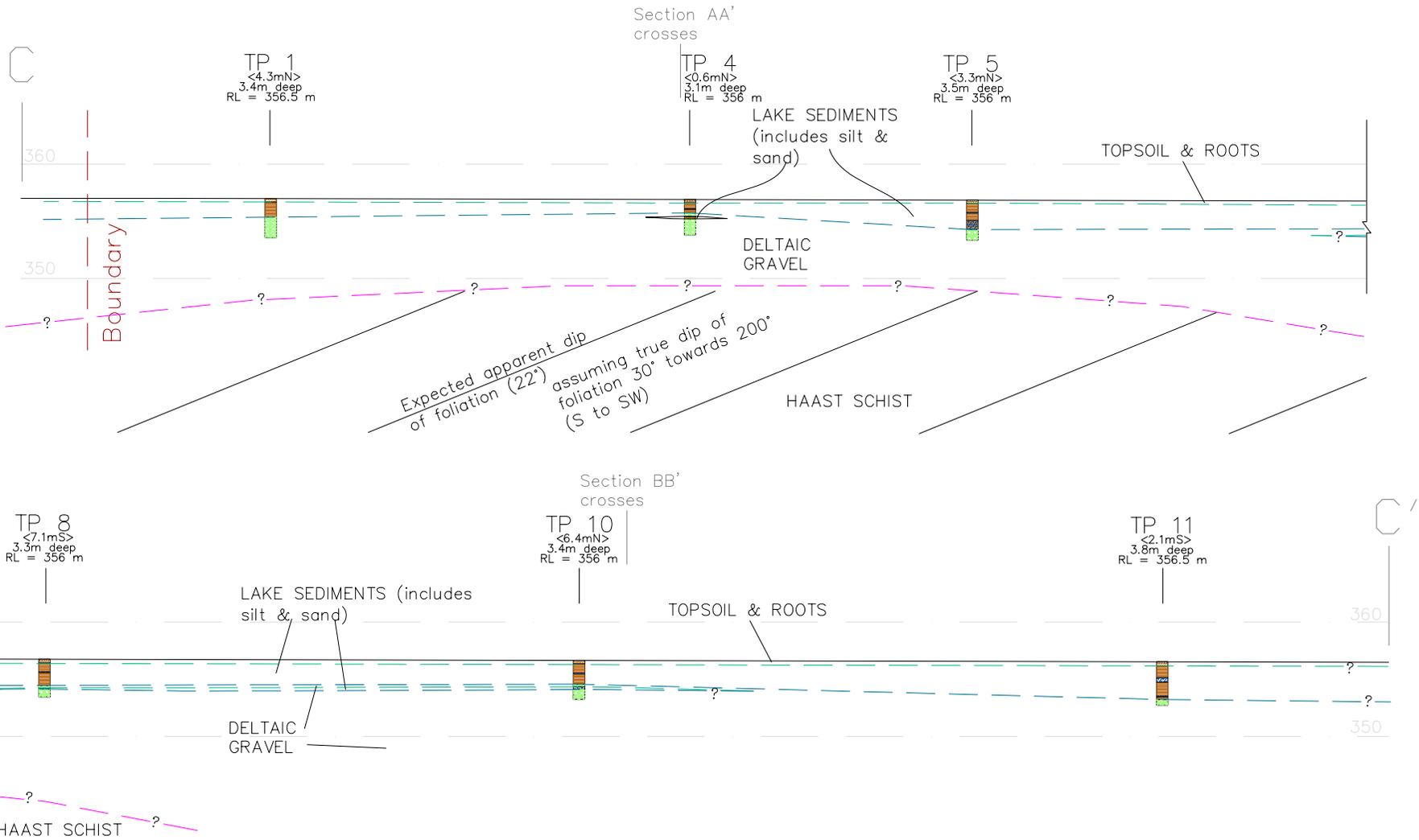
- AUCKLAND
- WELLINGTON
- HAMILTON
- DUNEDIN
- CHRISTCHURCH
- WHANGAREI

DRAWN	EJD	23.11.10
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APPROVED		
CADFILE :		
SCALES (AT A4 SIZE)		
PROJECT No.	880229.00	

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 Section B - B'

FIG. No. Fig. 2b

REV. 0



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DRAWN	EJD	23.11.10
DRAFTING CHECKED		
APPROVED		
CADFILE :		

SCALES (AT A4 SIZE)
PROJECT No. 880229.00

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 Section C - C'

FIG. No. Fig. 2c

REV. 0

**Appendix B: Test Pit Logs and Scala
Penetrometer Tests**



TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 1

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: North West Corner		Inclination: Vertical	Direction: N/A
CO-ORDINATES: See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel	
Method: See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting	
ELEVATION: 356.5 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04	
Method: Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04	

PENETRATION				ENGINEERING DESCRIPTION			GEOLOGICAL		
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
No Seepage				0.4		OL	dark brown, organic SILT with rare sand and gravel, and minor roots, sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist, uniform, dilatant, non-plastic, loose, non-stratified, unit is sub-horizontal	slightly moist	TOPSOIL & ROOTS
				0.8		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT
				1.2					
				1.6					
				2.0		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE		DELTAIC GRAVEL
				2.4					
				2.8					
				3.2					
				3.6					
				Total Depth = 3.4 m					
				4.0					
				4.4					
				4.8					
				5.2					
				5.6					
				6.0					
				6.4					

PURPOSE:	Logged By: BXB
	Checked Date:
PHOTO REF.:	Sheet: 1 of 1



TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 2

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: Near NW Corner		Inclination: Vertical	Direction: N/A
CO-ORDINATES:	See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel
Method:	See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	356 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
Method:	Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04

PENETRATION				ENGINEERING DESCRIPTION			GEOLOGICAL	
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
No Seepage				0.4		OL	slightly moist	TOPSOIL & ROOTS
				0.8		MH		LAKE SILT
				1.2		GW		DELTAIC GRAVEL
				1.6		GW		DELTAIC GRAVEL & SAND
				2.0		GW		
				2.4				
				2.8				
				3.2				
				3.6				
				4.0				
4.4								
4.8								
5.2								
5.6								
6.0								
6.4								
						Total Depth = 3.4 m		

PURPOSE:	Logged By: BXB
	Checked Date:
PHOTO REF.:	Sheet: 1 of 1



TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 3

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: Near NW Corner		Inclination: Vertical	Direction: N/A
CO-ORDINATES: See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel	
Method: See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting	
ELEVATION: 356 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04	
Method: Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04	

PENETRATION				ENGINEERING DESCRIPTION			GEOLOGICAL	
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
No Seepage				0.2		OL	slightly moist	TOPSOIL & ROOTS
				0.4		MH		LAKE SILT
				0.6		MH		LAKE SAND
				0.8		MH		
				1.0		SP		LAKE SILT
				1.2		MH		DELTAIC GRAVEL
				1.4		GW		
				1.6		GW		
				1.8		GW		LAKE SILT
				2.0		GW		
				2.2		MH		LAKE SAND
				2.4		SP		DELTAIC GRAVEL
				2.6		GW		
2.8		GW						
3.0		GW						
3.2		GW						

Total Depth = 3.2 m

PURPOSE:	Logged By: BXB
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PHOTO REF.:	Sheet: 1 of 1



TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 4

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: North Side		Inclination: Vertical	Direction: N/A
CO-ORDINATES:	See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel
Method:	See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	356 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
Method:	Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04

PENETRATION				ENGINEERING DESCRIPTION				GEOLOGICAL	
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
				0.2		OL	dark brown, organic SILT with rare sand and gravel, and minor roots, sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist, uniform, dilatant, non-plastic, loose, non-stratified, unit is sub-horizontal	moist to wet	TOPSOIL & ROOTS
				0.4		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal	moist	LAKE SILT
			0.6						
			0.8						
			1.0						
				1.2		SP	light grey, SAND with minor silt, sand is fine to medium, uniform, dilatant, loose to medium dense, non-stratified, unit is sub-horizontal	slightly moist	LAKE SAND
			1.4	MH		brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal	LAKE SILT		
				1.6		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE	slightly moist	DELTAIC GRAVEL
			1.8	MH		brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal	LAKE SILT		
				2.0		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE	slightly moist	DELTAIC GRAVEL
			2.2						
			2.4						
			2.6						
				2.8		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE	slightly moist	DELTAIC GRAVEL
			3.0						
				3.2			Total Depth = 3.1 m		

PURPOSE:	Logged By: BXB
PHOTO REF.:	Checked Date:
	Sheet: 1 of 1



TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 5

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: North Side		Inclination: Vertical	Direction: N/A
CO-ORDINATES: See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel	
Method: See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting	
ELEVATION: 356 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04	
Method: Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04	

PENETRATION				ENGINEERING DESCRIPTION			GEOLOGICAL		
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
No Seepage				0.4		OL	dark brown, organic SILT with rare sand and gravel, and minor roots, sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist, uniform, dilatant, non-plastic, loose, non-stratified, unit is sub-horizontal	slightly moist	TOPSOIL & ROOTS
				0.8		MH	brownish grey, SILT with rare sand, and rare sandy SILT, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT
				1.2		SP	light grey, SAND with minor silt, sand is fine to medium, uniform, dilatant, loose to medium dense, non-stratified, unit is sub-horizontal		LAKE SAND
				1.6		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT
				2.0		MH-SP	brownish grey, sandy SILT, sand is fine to medium, silt is highly micaceous, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		
				2.4					
				2.8		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE		DELTAIC GRAVEL
				3.2					
				3.6					
Total Depth = 3.5 m									
				4.0					
				4.4					
				4.8					
				5.2					
				5.6					
				6.0					
				6.4					

PURPOSE:	Logged By: BXB
	Checked Date:
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TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 6

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: Centre of Site		Inclination: Vertical	Direction: N/A
CO-ORDINATES:	See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel
Method:	See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	356 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
Method:	Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04

PENETRATION				ENGINEERING DESCRIPTION			GEOLOGICAL	
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
No Seepage				0.2		OL	slightly moist	TOPSOIL & ROOTS
				0.4		MH		LAKE SILT
				0.6		MH		
				0.8		MH		
				1.0		MH		
				1.2		SP		LAKE SAND
				1.2		MH-SP		LAKE SILT
				1.4		GW		DELTAIC GRAVEL
				1.6		GW		
				1.8		GW		
				2.0		GW		
				2.2		GW		
				2.4		GW		
2.6		GW						
2.8		GW						
3.0		GW						
3.2		GW						

Log continues on next page

PURPOSE:	Logged By: BXB
	Checked Date:
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TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 6

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: Centre of Site		Inclination: Vertical	Direction: N/A
CO-ORDINATES:	See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel
Method:	See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	356 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
Method:	Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04

PENETRATION				ENGINEERING DESCRIPTION			GEOLOGICAL		
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
No Seepage				3.4		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE Total Depth = 3.4 m	slightly moist	DELTAIC GRAVEL
				3.6					
				3.8					
				4.0					
				4.2					
				4.4					
				4.6					
				4.8					
				5.0					
				5.2					
				5.4					
				5.6					
				5.8					
				6.0					
6.2									
6.4									

PURPOSE:	Logged By: BXB
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TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 7

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: Centre of Site		Inclination: Vertical	Direction: N/A
CO-ORDINATES: See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel	
Method: See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting	
ELEVATION: 356.5 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04	
Method: Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04	

PENETRATION				ENGINEERING DESCRIPTION			GEOLOGICAL		
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
No Seepage				0.2		OL	dark brown, organic SILT with rare sand and gravel, and minor roots, sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist, uniform, dilatant, non-plastic, loose, non-stratified, unit is sub-horizontal	slightly moist	TOPSOIL & ROOTS
				0.4		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT
				0.6					
				0.8					
				1.0					
				1.2					
				1.4					
				1.6					
				1.8					
				2.0					
				2.2		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE		DELTAIC GRAVEL
				2.4		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT
2.6		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE	DELTAIC GRAVEL					
2.8									
3.0		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal	LAKE SILT					
3.2									

Log continues on next page

PURPOSE:	Logged By: BXB
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TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 7

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: Centre of Site		Inclination: Vertical	Direction: N/A
CO-ORDINATES:	See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel
Method:	See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	356.5 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
Method:	Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04

PENETRATION				ENGINEERING DESCRIPTION			GEOLOGICAL	
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
	No Seepage			3.4	X	MH	slightly moist	LAKE SILT
				3.6				
				3.8				
				4.0				
				4.2				
				4.4				
				4.6				
				4.8				
				5.0				
				5.2				
				5.4				
				5.6				
				5.8				
				6.0				
				6.2				
				6.4				

PURPOSE:	Logged By: BXB
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TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 8

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: North Side Central		Inclination: Vertical	Direction: N/A
CO-ORDINATES:	See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel
Method:	See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	356 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
Method:	Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04

PENETRATION				ENGINEERING DESCRIPTION			GEOLOGICAL		
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
No Seepage				0.4		OL	dark brown, organic SILT with rare sand and gravel, and minor roots, sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist, uniform, dilatant, non-plastic, loose, non-stratified, unit is sub-horizontal	moist	TOPSOIL & ROOTS
				0.8		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT
				1.2		SP	light grey, SAND with minor silt, sand is fine to medium, uniform, dilatant, loose to medium dense, non-stratified, unit is sub-horizontal	slightly moist	LAKE SAND
				1.6		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT
				2.0		MH			
				2.4		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE		DELTAIC GRAVEL
				2.8		SP	light grey, SAND with minor silt, sand is fine to medium, uniform, dilatant, loose to medium dense, non-stratified, unit is sub-horizontal	slightly moist	LAKE SAND
				2.8		GW			DELTAIC GRAVEL
				3.2		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE		
				3.6				Total Depth = 3.3 m	
4.0									
4.4									
4.8									
5.2									
5.6									
6.0									
6.4									

PURPOSE:	Logged By: BXB
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TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 9

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: North Side		Inclination: Vertical	Direction: N/A
CO-ORDINATES:	See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel
Method:	See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	356.5 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
Method:	Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04

PENETRATION				ENGINEERING DESCRIPTION				GEOLOGICAL	
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
Rare minor seeps @ 1.6 m	→			0.4		OL	dark brown, organic SILT with rare sand and gravel, and minor roots, sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist, uniform, dilatant, non-plastic, loose, non-stratified, unit is sub-horizontal	slightly moist	TOPSOIL & ROOTS
				0.8		MH	brown, SILT with minor sand and gravel, and rare roots and cobbles, sand is fine to coarse, gravel is fine to coarse, cobbles up to 100 mm, clasts are angular to rounded schist and meta-sediments, uniform, dilatant, non-plastic, loose, non-stratified	moist	FILL
				1.2		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy silt, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal	moist	LAKE SILT
				1.6		SP	light grey, SAND with minor silt, sand is fine to medium, uniform, dilatant, loose to medium dense, non-stratified, unit is sub-horizontal	slightly moist	LAKE SAND
				2.0		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal	slightly moist	LAKE SILT
				2.4		MH		slightly moist	
				2.8		MH		slightly moist	
				3.2		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE	slightly moist	DELTAIC GRAVEL
				3.6		GW		slightly moist	
				4.0					Total Depth = 3.8 m
				4.4					
				4.8					
				5.2					
				5.6					
				6.0					
				6.4					

PURPOSE:	Logged By: BXB
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TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 10

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: Centre of Site		Inclination: Vertical	Direction: N/A
CO-ORDINATES:	See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel
Method:	See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	356 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
Method:	Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04

PENETRATION				ENGINEERING DESCRIPTION				GEOLOGICAL					
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION				
No Seepage				0.4		OL	dark brown, organic SILT with rare sand and gravel, and minor roots, sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist, uniform, dilatant, non-plastic, loose, non-stratified, unit is sub-horizontal	slightly moist	TOPSOIL & ROOTS				
				0.8		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT				
				1.2		SP	light grey, SAND with minor silt, sand is fine to medium, uniform, dilatant, loose to medium dense, non-stratified, unit is sub-horizontal		LAKE SAND				
				1.6		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT				
				2.0		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT				
				2.4		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE		DELTAIC GRAVEL				
				2.8		SP	light grey, SAND with minor silt, sand is fine to medium, uniform, dilatant, loose to medium dense, non-stratified, unit is sub-horizontal		LAKE SAND				
				3.2		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE		DELTAIC GRAVEL				
				3.6	Total Depth = 3.4 m								
				4.0									
4.4													
4.8													
5.2													
5.6													
6.0													
6.4													

PURPOSE:	Logged By: BXB
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TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 11

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: Near NE Corner		Inclination: Vertical	Direction: N/A
CO-ORDINATES: See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel	
Method: See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting	
ELEVATION: 356.5 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04	
Method: Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04	

PENETRATION				ENGINEERING DESCRIPTION				GEOLOGICAL	
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
No Seepage				0.4		OL	dark brown, organic SILT with rare sand and gravel, and minor roots, sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist, uniform, dilatant, non-plastic, loose, non-stratified, unit is sub-horizontal	slightly moist	TOPSOIL & ROOTS
				0.8		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT
				1.2		MH			
				1.6		SP	light grey, SAND with minor silt, sand is fine to medium, uniform, dilatant, loose to medium dense, non-stratified, unit is sub-horizontal		LAKE SAND
				2.0		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT
				2.4		MH			
				2.8		MH			
				3.2		SP	light grey, SAND with minor silt, sand is fine to medium, uniform, dilatant, loose to medium dense, non-stratified, unit is sub-horizontal		LAKE SAND
				3.2		MH	brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%, silt is highly micaceous, sand is fine, uniform, dilatant, non-plastic, loose to medium dense, poorly developed thin to laminated bedding, sub-horizontal		LAKE SILT
				3.6		GW	greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT, sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist, well graded, dense, poorly developed beds (~50 to 200 mm) dipping very gently SE		DELTAIC GRAVEL
				4.0			Total Depth = 3.8 m		
				4.4					
				4.8					
				5.2					
				5.6					
				6.0					
				6.4					

PURPOSE:	Logged By: BXB
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TONKIN & TAYLOR LTD EXCAVATION LOG

EXCAVATION NUMBER:
TP 12

PROJECT: Frank Cemetery		Job Number: 890762	
LOCATION: NE Corner		Inclination: Vertical	Direction: N/A
CO-ORDINATES:	See site plan mE	EQUIPMENT: 20T Excavator	OPERATOR: Nigel
Method:	See site plan mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	356.5 m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
Method:	Site plan	EXCAV. DATUM: Ground Level	HOLE FINISHED: 1-Jul-04

PENETRATION				ENGINEERING DESCRIPTION			GEOLOGICAL		
PENETRATION (N)	GROUNDWATER / SEEPAGE	INSTALLED INSTRUMENTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION	
No Seepage				0.4		OL	slightly moist	TOPSOIL & ROOTS	
				0.8		MH		LAKE SILT	
				1.2					
				1.6					
				2.0					
				2.4					
				2.8		GW			DELTAIC GRAVEL
				2.8		SP			LAKE SAND
				3.2		GW			DELTAIC GRAVEL
				3.6					
Total Depth = 3.8 m									
				4.0					
				4.4					
				4.8					
				5.2					
				5.6					
				6.0					
				6.4					

PURPOSE:	Logged By: BXB
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TONKIN & TAYLOR
SCALA PENETROMETER LOG

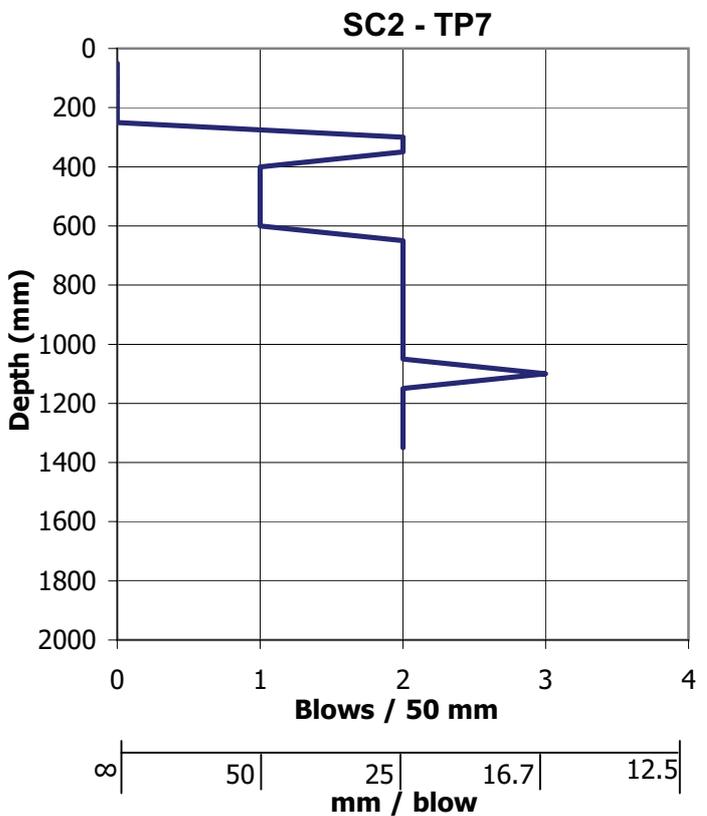
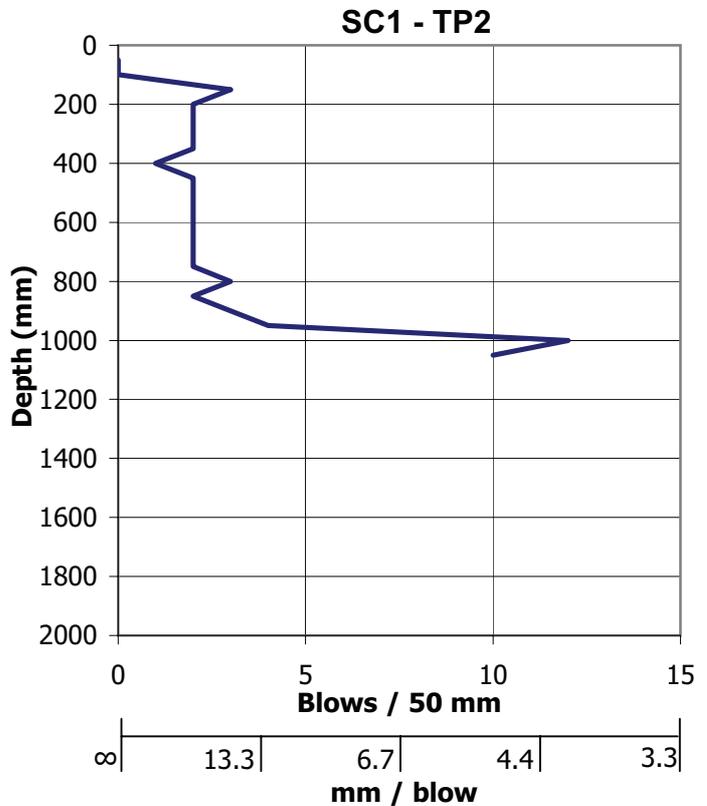
Job No: **890762**
 Project: **Frankton Flats Development**

Date: **1/07/2004**
 Operated by: **AB**
 Logged by: **AB**

SC1 - TP2 & SC2 - TP7
 Sheet of **1**
 of **3**

SC1 - TP2	
Location: RL: 0m	
mm Driven	No. of Blows
50	
100	
150	3
200	2
250	2
300	2
350	2
400	1
450	2
500	2
550	2
600	2
650	2
700	2
750	2
800	3
850	2
900	3
950	4
1000	12
1050	10
1100	
1150	
1200	
1250	
1300	
1350	
1400	
1450	
1500	
1550	
1600	
1650	
1700	
1750	
1800	
1850	
1900	
1950	
2000	

SC2 - TP7	
Location: RL: 0m	
mm Driven	No. of Blows
50	
100	
150	
200	
250	
300	2
350	2
400	1
450	1
500	1
550	1
600	1
650	2
700	2
750	2
800	2
850	2
900	2
950	2
1000	2
1050	2
1100	3
1150	2
1200	2
1250	2
1300	2
1350	2
1400	
1450	
1500	
1550	
1600	
1650	
1700	
1750	
1800	
1850	
1900	
1950	
2000	





TONKIN & TAYLOR
SCALA PENETROMETER LOG

Job No: **890762**
Project: **Frankton Flats Development**

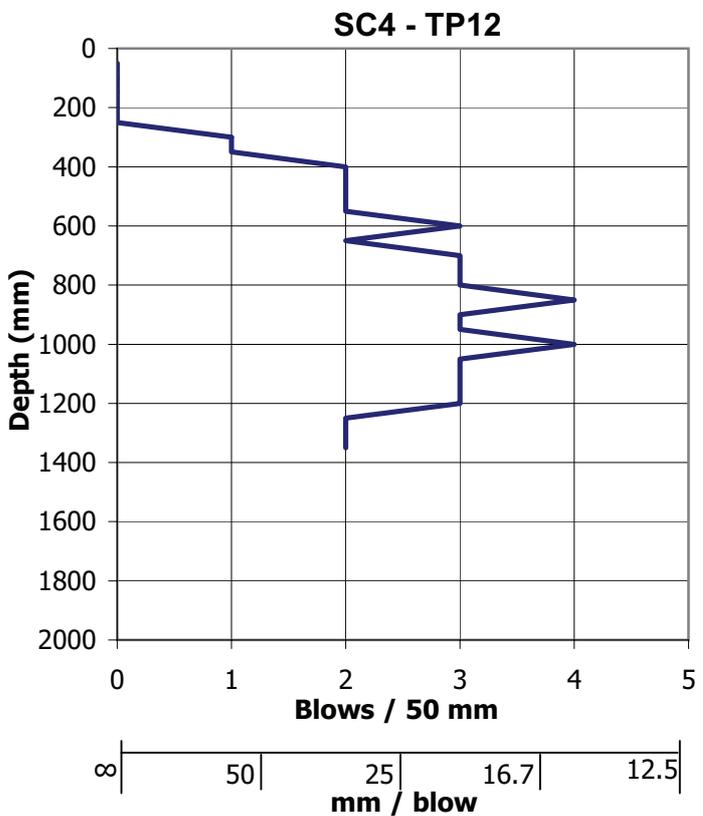
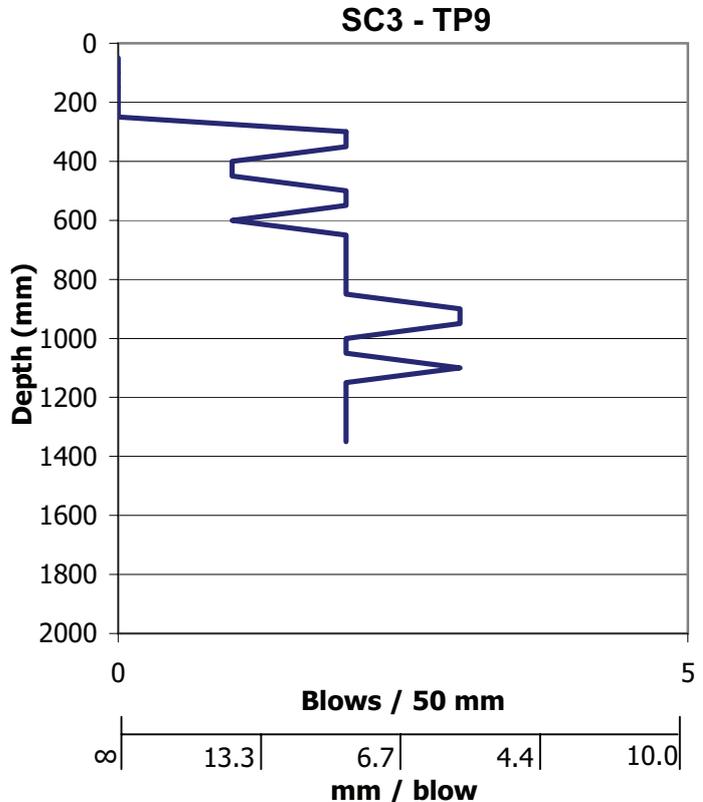
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Operated by: **AB**
Logged by: **AB**

SC3 - TP9 & SC4 - TP12

Sheet **2**
of **3**

SC3 - TP9	
Location: RL: 0m	
mm Driven	No. of Blows
50	
100	
150	
200	
250	
300	2
350	2
400	1
450	1
500	2
550	2
600	1
650	2
700	2
750	2
800	2
850	2
900	3
950	3
1000	2
1050	2
1100	3
1150	2
1200	2
1250	2
1300	2
1350	2
1400	
1450	
1500	
1550	
1600	
1650	
1700	
1750	
1800	
1850	
1900	
1950	
2000	

SC4 - TP12	
Location: RL: 0m	
mm Driven	No. of Blows
50	
100	
150	
200	
250	
300	1
350	1
400	2
450	2
500	2
550	2
600	3
650	2
700	3
750	3
800	3
850	4
900	3
950	3
1000	4
1050	3
1100	3
1150	3
1200	3
1250	2
1300	2
1350	2
1400	
1450	
1500	
1550	
1600	
1650	
1700	
1750	
1800	
1850	
1900	
1950	
2000	





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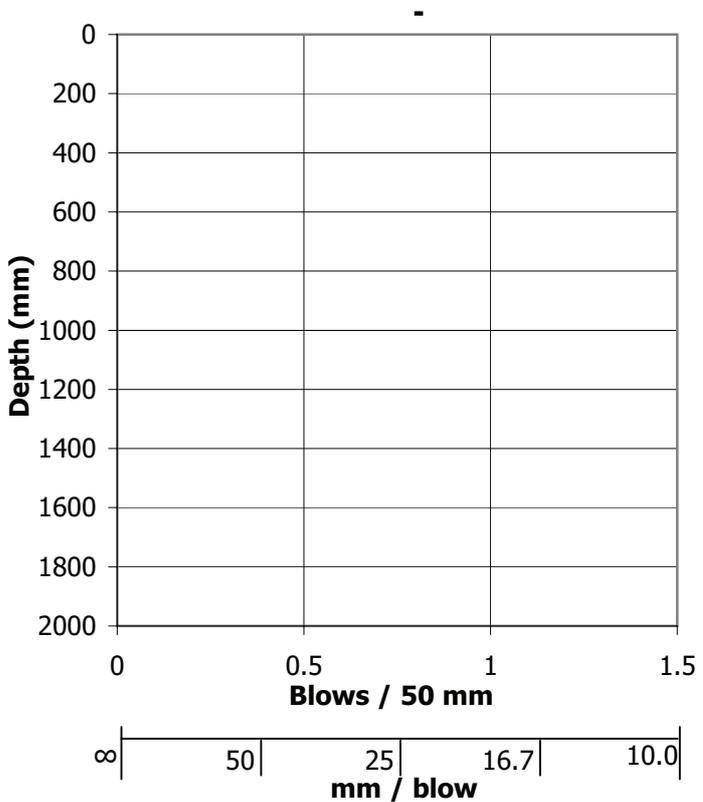
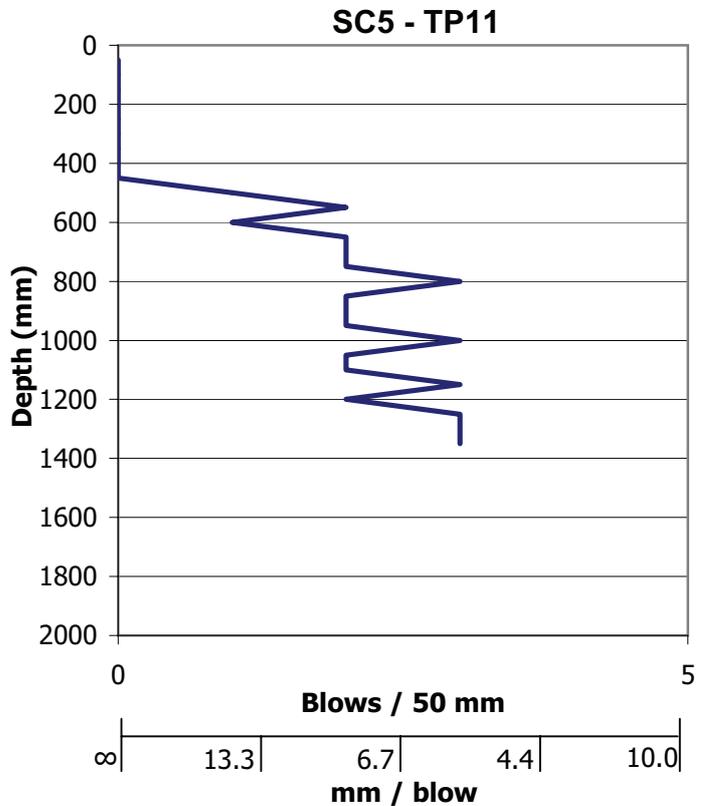
Date: **1/07/2004**
Operated by: **AB**
Logged by: **AB**

SC5 - TP11

Sheet **3**
of **3**

SC5 - TP11	
Location: RL: 0m	
mm Driven	No. of Blows
50	
100	
150	
200	
250	
300	
350	
400	
450	
500	1
550	2
600	1
650	2
700	2
750	2
800	3
850	2
900	2
950	2
1000	3
1050	2
1100	2
1150	3
1200	2
1250	3
1300	3
1350	3
1400	
1450	
1500	
1550	
1600	
1650	
1700	
1750	
1800	
1850	
1900	
1950	
2000	

-	
Location: RL: 0m	
mm Driven	No. of Blows
50	
100	
150	
200	
250	
300	
350	
400	
450	
500	
550	
600	
650	
700	
750	
800	
850	
900	
950	
1000	
1050	
1100	
1150	
1200	
1250	
1300	
1350	
1400	
1450	
1500	
1550	
1600	
1650	
1700	
1750	
1800	
1850	
1900	
1950	
2000	





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