Soil Chemistry Profile

Test Type: EC (1:5)

Order No: Job No: G23085/1

Reference Naval College Rd & Wool Rd, Vincentia

Sample Name: TPF6 0.1-0.4m 30/7/03

Sample No: 75692

Date Received 31/07/2003 Total No Pages: 45

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http://www.sesl.com.au
Email: sesl@sesl.com.au

TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.05	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium					
Potassium					
Calcium					
Magnesium					
Aluminium					
		ECEC			
		Ca/Mg			

mg/kg

Phosphate as P
Ammonium as N
Nitrate as N
Sulphate as S
Iron
Zinc
Copper
Manganese
Boron

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 11/08/2003

Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5)

Order No: Job No: G23085/1

Reference Naval College Rd & Wool Rd, Vincentia

Sample Name: TPF6 0.7-1.0m 30/7/03

Sample No: 75693

Date Received 31/07/2003 Total No Pages: 45

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Email: sesl@sesl.com.au

TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.09	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium					
Potassium					
Calcium					
Magnesium					
Aluminium					
		ECEC			
		Ca/Mg			

mg/kg

Phosphate as P
Ammonium as N
Nitrate as N
Sulphate as S
Iron
Zinc
Copper
Manganese
Boron

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 11/08/2003

Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5), eCEC + sol SO4
Order No: Job No: G23085/1
Reference Naval College Rd & Wool Rd, Vincentia
Sample Name: TPF6 1.5-2.0m 30/7/03
Sample No: 75694
Date Received 31/07/2003 Total No Pages: 45
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TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.13	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium	.45		1.12	9.20	elevated - sodic
Potassium	.01		.08	0.70	very low
Calcium	< 0.08		1.61	13.20	low
Magnesium	.13		9.27	76.20	high
Aluminium			.09	0.70	slightly available
		ECEC	12.17		
		Ca/Mg	0.20		unbalanced ratio

	mg/kg
Phosphate as P	
Ammonium as N	
Nitrate as N	
Sulphate as S	147
Iron	
Zinc	
Copper	
Manganese	
Boron	

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 11/08/2003

Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5), eCEC + sol SO4
Order No: Job No: G23085/1
Reference Naval College Rd & Wool Rd, Vincentia
Sample Name: TPF8 0.5-1.0m 30/7/03
Sample No: 75695
Date Received 31/07/2003 Total No Pages: 45
CLIENT: Network Geotechnics Pty Ltd
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TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.39	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium	1.32		.44	8.10	high - sodic
Potassium	< 0.006		.05	0.90	very low
Calcium	< 0.08		.45	8.30	low
Magnesium	.11		3.19	59.00	high
Aluminium			1.28	23.70	available
		ECEC	5.41		
		Ca/Mg	0.10		unbalanced ratio

mg/kg

Phosphate as P	
Ammonium as N	
Nitrate as N	
Sulphate as S	21
Iron	
Zinc	
Copper	
Manganese	
Boron	

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 11/08/2003

Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5)

Order No: Job No: G23085/1

Reference Naval College Rd & Wool Rd, Vincentia

Sample Name: TPF8 1.4-1.7m 30/7/03

Sample No: 75696

Date Received 31/07/2003 Total No Pages: 45

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TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.32	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium					
Potassium					
Calcium					
Magnesium					
Aluminium					
		ECEC			
		Ca/Mg			

mg/kg

Phosphate as P
Ammonium as N
Nitrate as N
Sulphate as S
Iron
Zinc
Copper
Manganese
Boron

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

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Simon Leake Date of Report 11/08/2003

Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5)

Order No: Job No: G23085/1

Reference Naval College Rd & Wool Rd, Vincentia

Sample Name: TPF8 2.0-2.5m 30/7/03

Sample No: 75697

Date Received 31/07/2003 Total No Pages: 45

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TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.19	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium					
Potassium					
Calcium					
Magnesium					
Aluminium					
		ECEC			
		Ca/Mg			

mg/kg

Phosphate as P
Ammonium as N
Nitrate as N
Sulphate as S
Iron
Zinc
Copper
Manganese
Boron

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

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Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5)

Order No: Job No: G23085/1

Reference Naval College Rd & Wool Rd, Vincentia

Sample Name: TPG2 0.3-0.7m 29/7/03

Sample No: 75698

Date Received 31/07/2003 Total No Pages: 45

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TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.04	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium					
Potassium					
Calcium					
Magnesium					
Aluminium					
		ECEC			
		Ca/Mg			

mg/kg

Phosphate as P
Ammonium as N
Nitrate as N
Sulphate as S
Iron
Zinc
Copper
Manganese
Boron

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992) **Chloride:** Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 11/08/2003

Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5)

Order No: Job No: G23085/1

Reference Naval College Rd & Wool Rd, Vincentia

Sample Name: TPG2 0.7-1.1m 29/7/03

Sample No: 75699

Date Received 31/07/2003 Total No Pages: 45

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TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.05	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium					
Potassium					
Calcium					
Magnesium					
Aluminium					
		ECEC			
		Ca/Mg			

mg/kg

Phosphate as P
Ammonium as N
Nitrate as N
Sulphate as S
Iron
Zinc
Copper
Manganese
Boron

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992) **Chloride:** Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 11/08/2003

Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5), eCEC + sol SO4

Order No: Job No: G23085/1

Reference Naval College Rd & Wool Rd, Vincentia

Sample Name: TPG2 1.9-2.4m 29/7/03

Sample No: 75700

Date Received 31/07/2003 Total No Pages: 45

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TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.06	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium	.21		.3	1.40	low - not sodic
Potassium	.01		.12	0.60	very low
Calcium	< 0.08		< 0.20	0.00	very low
Magnesium	.02		2.62	12.40	slightly low
Aluminium			18.15	85.60	high - available
		ECEC	21.20		
		Ca/Mg	0.00		unbalanced ratio

	mg/kg
Phosphate as P	
Ammonium as N	
Nitrate as N	
Sulphate as S	<5
Iron	
Zinc	
Copper	
Manganese	
Boron	

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 11/08/2003

Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5)

Order No: Job No: G23085/1

Reference Naval College Rd & Wool Rd, Vincentia

Sample Name: TPG7 0.2-0.4m 29/7/03

Sample No: 75701

Date Received 31/07/2003 Total No Pages: 45

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TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.04	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium					
Potassium					
Calcium					
Magnesium					
Aluminium					
		ECEC			
		Ca/Mg			

mg/kg

Phosphate as P
Ammonium as N
Nitrate as N
Sulphate as S
Iron
Zinc
Copper
Manganese
Boron

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992) **Chloride:** Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 11/08/2003

Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5), eCEC + sol SO4
Order No: Job No: G23085/1
Reference Naval College Rd & Wool Rd, Vincentia
Sample Name: TPG7 0.5-1.0m 29/7/03
Sample No: 75702
Date Received 31/07/2003 Total No Pages: 45
CLIENT: Network Geotechnics Pty Ltd
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TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.29	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium	1.09		2.16	17.40	high - sodic
Potassium	.01		.13	1.00	very low
Calcium	< 0.08		.6	4.80	very low
Magnesium	.54		8.46	68.10	high
Aluminium			1.08	8.70	available
		ECEC	12.43		
		Ca/Mg	0.10		unbalanced ratio

mg/kg

Phosphate as P	
Ammonium as N	
Nitrate as N	
Sulphate as S	928
Iron	
Zinc	
Copper	
Manganese	
Boron	

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

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Soil Chemistry Profile

Test Type: EC (1:5)

Order No: Job No: G23085/1

Reference Naval College Rd & Wool Rd, Vincentia

Sample Name: TPG7 2.5-3.0m 29/7/03

Sample No: 75703

Date Received 31/07/2003 Total No Pages: 45

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Email: sesl@sesl.com.au

TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.37	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium					
Potassium					
Calcium					
Magnesium					
Aluminium					
		ECEC			
		Ca/Mg			

mg/kg

Phosphate as P
Ammonium as N
Nitrate as N
Sulphate as S
Iron
Zinc
Copper
Manganese
Boron

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 11/08/2003

Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5), eCEC + sol SO4

Order No: Job No: G23085/1

Reference Naval College Rd & Wool Rd, Vincentia

Sample Name: TPH4 0.15-0.9m 30/7/03

Sample No: 75704

Date Received 31/07/2003 Total No Pages: 45

CLIENT: Network Geotechnics Pty Ltd
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ISO9002 QEC14315
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Sydney Environmental and Soil Laboratory

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Email: sesl@sesl.com.au

TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.04	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium	.15		.21	1.50	low - not sodic
Potassium	.03		.13	0.90	very low
Calcium	< 0.08		.21	1.50	very low
Magnesium	.14		2.13	15.50	OK
Aluminium			11.1	80.60	high - available
		ECEC	13.78		
		Ca/Mg	0.10		unbalanced ratio

mg/kg

Phosphate as P	
Ammonium as N	
Nitrate as N	
Sulphate as S	1286
Iron	
Zinc	
Copper	
Manganese	
Boron	

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992) **Chloride:** Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 11/08/2003

Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5)

Order No: Job No: G23085/1

Reference Naval College Rd & Wool Rd, Vincentia

Sample Name: TPH4 0.9-1.1m 30/7/03

Sample No: 75705

Date Received 31/07/2003 Total No Pages: 45

CLIENT: Network Geotechnics Pty Ltd
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Email: sesl@sesl.com.au

TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.04	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium					
Potassium					
Calcium					
Magnesium					
Aluminium					
		ECEC			
		Ca/Mg			

mg/kg

Phosphate as P
Ammonium as N
Nitrate as N
Sulphate as S
Iron
Zinc
Copper
Manganese
Boron

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992) **Chloride:** Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 11/08/2003

Consultant.....
N.Burrows

Soil Chemistry Profile

Test Type: EC (1:5)

Order No: Job No: G23085/1

Reference Naval College Rd & Wool Rd, Vincentia

Sample Name: TPH4 1.1-1.3m 30/7/03

Sample No: 75706

Date Received 31/07/2003 Total No Pages: 45

CLIENT: Network Geotechnics Pty Ltd
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Quality System
Quality Endorsed Company
ISO9002 QEC1345
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Email: sesl@sesl.com.au

TEST	RESULT	COMMENTS
pH in water 1:2		
pH in $CaCl_2$ 1:2		
EC mS/cm 1:2	.04	
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium					
Potassium					
Calcium					
Magnesium					
Aluminium					
		ECEC			
		Ca/Mg			

mg/kg

Phosphate as P
Ammonium as N
Nitrate as N
Sulphate as S
Iron
Zinc
Copper
Manganese
Boron

Recommendations

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992) **Chloride:** Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 11/08/2003

Consultant.....
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ATTERBERG LIMITS & LINEAR SHRINKAGE TEST REPORT SHEET

(Document No R12.1)

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1

Date Tested: 8/8/03

SAMPLE DATA

Sample Number:	TPA1 (0.45 – 0.55m)	TPC4 (1.0 – 1.1m)	TPD5 (0.75 – 0.8m)
Sample Location:	Approximate sample locations are shown on Drawing No G23085/1-1		
	(Slope)	(Slope)	(Ridge)
Date Sampled:	30/7/03	29/7/03	29/7/03
Sample Description:	(SC/CL) Clayey SAND/Sandy CLAY, low plasticity, fine grained, brown mottled orange	(CH) CLAY, high plasticity, pale grey mottled orange-brown	(CH) CLAY, high plasticity, orange-brown mottled pale grey
	(Residual)	(Slopewash)	(Residual)
Sample History:	Oven Dried	Oven Dried	Oven Dried
Preparation Method:	Dry Sieved	Dry Sieved	Dry Sieved

TEST PROCEDURE		TEST RESULTS		
AS1289 3.1.2 - 1995 Liquid Limit (W_L)	%	20	62	67
AS1289 3.2.1-1995 Plastic Limit (W_P)	%	20	22	23
AS1289 3.3.1-1995 Plasticity Index (I_P)	%	Borderline Non Plastic	40	44

Comments:

Approved Signatory: S Waugh 26/11/03

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ATTERBERG LIMITS & LINEAR SHRINKAGE TEST REPORT SHEET

(Document No R12.1)

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1

Date Tested: 8/8/03

SAMPLE DATA

Sample Number:	TPE1 (0.55 – 0.7m)	TPE4 (0.4 – 0.55m)	TPG2 (0.7 – 1.1m)
Sample Location:	Approximate sample locations are shown on Drawing No G23085/1-1		
	(Slope)	(Slope)	(Slope)
Date Sampled:	29/7/03	29/7/03	29/7/03
Sample Description:	(CH) CLAY, high plasticity, orange-brown mottled red/pale grey	(CL) Sandy CLAY, medium plasticity, orange-brown mottled grey, fine to medium sand	(CL-CH) Sandy CLAY, medium to high plasticity, red-brown/orange-brown/pale grey, fine to medium sand
	(Residual)	(Residual)	(Residual)
Sample History:	Oven Dried	Oven Dried	Oven Dried
Preparation Method:	Dry Sieved	Dry Sieved	Dry Sieved

TEST PROCEDURE		TEST RESULTS		
AS1289 3.1.2 - 1995 Liquid Limit (W_L)	%	70	45	57
AS1289 3.2.1-1995 Plastic Limit (W_P)	%	22	17	18
AS1289 3.3.1-1995 Plasticity Index (I_P)	%	48	28	39

Comments:

Approved Signatory: S Waugh 24/11/03

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ATTERBERG LIMITS & LINEAR SHRINKAGE TEST REPORT SHEET

(Document No R12.1)

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1

Date Tested: 8/8/03

SAMPLE DATA

Sample Number:	TPG5 (0.3 – 0.7m)	TPG8 (0.5 – 1.0m)	TPH2 (0.5 – 0.8m)
Sample Location:	Approximate sample locations are shown on Drawing No G23085/1-1		
	(Slope)	(Slope)	(Ridge)
Date Sampled:	29/7/03	29/7/03	30/7/03
Sample Description:	(SM-SC) Silty Clayey SAND, fine to medium grained, pale grey mottled yellow-brown	(CL/CH) Sandy Silty CLAY, medium to high plasticity, orange-brown mottled pale grey	(CH) Silty CLAY, high plasticity, yellow-brown mottled pale grey
	(Probable Slopewash)	(Residual)	(Residual)
Sample History:	Oven Dried	Oven Dried	Oven Dried
Preparation Method:	Dry Sieved	Dry Sieved	Dry Sieved

TEST PROCEDURE		TEST RESULTS		
AS1289 3.1.2 - 1995 Liquid Limit (W_L)	%	28	59	74
AS1289 3.2.1-1995 Plastic Limit (W_P)	%	12	14	22
AS1289 3.3.1-1995 Plasticity Index (I_P)	%	16	45	49

Comments:

Approved Signatory: S Waugh 26/11/03

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CALIFORNIA BEARING RATIO REPORT SHEET

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1
Tested by: MK/SW
Checked by: SW

SAMPLE DATA

Sample Number:	TPA1 (0.45 – 0.55m)	TPC4 (1.0 – 1.1m)	TPD5 (0.75 – 0.8m)
Sample Location:	Refer to Drawing No G23085/1-1		
	Slope	Slope	Ridge
Date Sampled:	30/7/03	29/7/03	29/7/03
Sample Description:	(SC/CL) Clayey SAND/Sandy CLAY, low plasticity, fine grained, brown mottled orange	(CH) CLAY, high plasticity, pale grey mottled orange-brown	(CH) CLAY, high plasticity, orange-brown mottled pale grey, trace fine to medium gravel
	(Residual)	(Slopewash)	(Residual)
Field Moisture Content:	18.5	23.5	25.0

LABORATORY COMPACTION DATA [AS1289 5.1.1-2003]

Maximum Dry Density	t/m^3	1.95	1.67	1.63
Optimum Moisture Content	%	11.0	19.0	22.0

CALIFORNIA BEARING RATIO TEST RESULTS [AS1289 6.1.1-1998] (AS1289 2.1.1-1992)

Date Tested			9/8/03	9/8/03	9/8/03
Before Soaking	Dry Density	t/m^3	1.93	1.68	1.64
	Density Ratio	%	99.0	100.5	100.5
	Moisture Content	%	11.0	19.0	21.5
Number of days soaked			4	4	4
Surcharge		kg	9.0	9.0	9.0
Swell after soaking		%	0.0	2.5	2.0
After Soaking	Dry Density	t/m^3	1.93	1.63	1.60
	Density Ratio	%	99.0	97.5	98.5
	Moisture Content	%	12.0	23.5	25.5
After Test	Moisture Content Top 30mm	%	12.0	27.0	26.5
	Moisture Content Whole sample	%	11.5	23.5	25.5
CBR value @ 2.5/5.0mm penetration		%	60/70	4½/5	6/6

Comments: Material Retained on AS 19.0mm sieve excluded

Approved Signatory: S Waugh 24/11/03

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CALIFORNIA BEARING RATIO REPORT SHEET

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia
Job No: G23085/1
Tested by: LB
Checked by: SW

SAMPLE DATA

Sample Number:	TPE4 (0.4 to 0.55m)		
Sample Location:	Refer to Drawing No. G23085/1-1		
	Slope		
Date Sampled:	29/7/03		
Sample Description:	(CL) Sandy CLAY, low to medium plasticity, orange-brown mottled grey (with 3% Lime)		
	(Residual)		
Field Moisture Content:	20.5		

LABORATORY COMPACTION DATA [AS1289 5.1.1-1993]

Maximum Dry Density	t/m^3	1.73		
Optimum Moisture Content	%	18.5		

CALIFORNIA BEARING RATIO TEST RESULTS [AS1289 6.1.1-1998] (AS1289 2.1.1-1992)

Date Tested			26/8/03		
Before Soaking	Dry Density	t/m^3	1.71		
	Density Ratio	%	99.0		
	Moisture Content	%	19.0		
Number of days soaked			4		
Surcharge		kg	9.0		
Swell after soaking		%	0.5		
After Soaking	Dry Density	t/m^3	1.70		
	Density Ratio	%	98.5		
	Moisture Content	%	21.0		
After Test	Moisture Content Top 30mm	%	24.0		
	Moisture Content Whole sample	%	20.5		
CBR value @ 2.5/5.0mm penetration		%	35/30		

Comments: Material Retained on AS 19.0mm sieve excluded

Approved Signatory: S Waugh 26/11/03

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(Document No R11.5)

CALIFORNIA BEARING RATIO REPORT SHEET

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1
Tested by: MK/SW
Checked by: SW

SAMPLE DATA

Sample Number:	TPE1 (0.55 – 0.7m)	TPE4 (0.4 – 0.55m)	TPG2 (0.7 – 1.1m)
Sample Location:	Refer to Drawing No G23085/1-1		
	Slope	Slope	Slope
Date Sampled:	29/7/03	29/7/03	29/7/03
Sample Description:	(CH) CLAY, high plasticity, orange-brown	(CL) Sandy CLAY, low to medium plasticity, orange-brown mottled grey	(CL/CH) Sandy CLAY, medium to high plasticity, red-brown/orange-brown/pale grey, fine to medium sand
	(Residual)	(Residual)	(Residual)
Field Moisture Content:	25.0	20.5	23.5

LABORATORY COMPACTION DATA [AS1289 5.1.1-2003]

Maximum Dry Density	t/m^3	1.60	1.72	1.65
Optimum Moisture Content	%	22.5	18.5	20.5

CALIFORNIA BEARING RATIO TEST RESULTS [AS1289 6.1.1-1998] (AS1289 2.1.1-1992)

Date Tested			9/8/03	11/8/03	9/8/03
Before Soaking	Dry Density	t/m^3	1.56	1.72	1.66
	Density Ratio	%	98.0	100.5	100.5
	Moisture Content	%	23.0	20.5	21.0
Number of days soaked			4	4	4
Surcharge		kg	9	9	9
Swell after soaking		%	3.5	1.0	0.5
After Soaking	Dry Density	t/m^3	1.51	1.71	1.65
	Density Ratio	%	94.5	99.5	100.0
	Moisture Content	%	28.5	21.0	22.5
After Test	Moisture Content Top 30mm	%	29.5	21.5	23.5
	Moisture Content Whole sample	%	28.0	20.5	22.5
CBR value @ 2.5/5.0mm penetration		%	3½/3	7/7	9/8

Comments: Material Retained on AS 19.0mm sieve excluded

Approved Signatory: S Waugh 26/11/03

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(Document No R11.5)

CALIFORNIA BEARING RATIO REPORT SHEET

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1
Tested by: MK/SW
Checked by: SW

SAMPLE DATA

Sample Number:	TPG2 (0.7 – 1.0m)	TPG5 (0.3 – 0.7m)	TPG5 (0.3 – 0.7m)
Sample Location:	Refer to Drawing No G23085/1-1		
	Slope	Slope	Slope
Date Sampled:	29/7/03	29/7/03	29/7/03
Sample Description:	(CL/CH) Sandy CLAY, medium to high plasticity, red-brown/orange-brown/pale grey, fine to medium sand	(SM-SC) Silty Clayey SAND, fine to medium grained, pale grey mottled yellow-brown	(SM-SC) Silty Clayey SAND, fine to medium grained, pale grey mottled yellow-brown
	(Residual +3% Lime)	(Probable Slopewash)	(Probable Slopewash +3% Lime)
Field Moisture Content:	23.5	14.5	14.5

LABORATORY COMPACTION DATA [AS1289 5.1.1-2003]

Maximum Dry Density	t/m^3	1.62	1.88	1.83
Optimum Moisture Content	%	22.0	12.0	15.0

CALIFORNIA BEARING RATIO TEST RESULTS [AS1289 6.1.1-1998] (AS1289 2.1.1-1992)

Date Tested			11/8/03	9/8/03	11/8/03
Before Soaking	Dry Density	t/m^3	1.64	1.93	1.83
	Density Ratio	%	101.5	102.5	100.0
	Moisture Content	%	20.5	12.0	14.0
Number of days soaked			4	4	4
Surcharge		kg	9	9	9
Swell after soaking		%	0	0.5	0.5
After Soaking	Dry Density	t/m^3	1.64	1.92	1.82
	Density Ratio	%	101.5	102.5	99.5
	Moisture Content	%	23.5	13.0	18.5
After Test	Moisture Content Top 30mm	%	23.5	14.0	15.5
	Moisture Content Whole sample	%	23.0	13.0	18.5
CBR value @ 2.5/5.0mm penetration		%	40/35	6/7	60/60

Comments: Material Retained on AS 19.0mm sieve excluded

Approved Signatory: S Waugh 24/11/03

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(Document No R11.5)

CALIFORNIA BEARING RATIO REPORT SHEET

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1
Tested by: MK/SW
Checked by: SW

SAMPLE DATA

Sample Number:	TPG8 (0.5 – 1.0m)	TPH2 (0.5 – 0.8m)	
Sample Location:	Refer to Drawing No G23085/1-1		
	Slope	Ridge	
Date Sampled:	29/7/03	30/7/03	
Sample Description:	(CL/CH) Sandy Silty CLAY, medium to high plasticity, orange-brown mottled pale grey	(CL) Silty CLAY, low to medium plasticity, yellow-brown mottled pale grey	
	(Residual)	(Residual)	
Field Moisture Content:	26.5	25.5	

LABORATORY COMPACTION DATA [AS1289 5.1.1-2003]

Maximum Dry Density	t/m^3	1.72	1.62	
Optimum Moisture Content	%	19.0	20.0	

CALIFORNIA BEARING RATIO TEST RESULTS [AS1289 6.1.1-1998] (AS1289 2.1.1-1992)

Date Tested			11/8/03	11/8/03	
Before Soaking	Dry Density	t/m^3	1.66	1.55	
	Density Ratio	%	96.5	96.0	
	Moisture Content	%	18.5	20.0	
Number of days soaked			4	4	
Surcharge		kg	9	9	
Swell after soaking		%	4.5	5.0	
After Soaking	Dry Density	t/m^3	1.59	1.48	
	Density Ratio	%	92.5	91.0	
	Moisture Content	%	23.5	29.0	
After Test	Moisture Content Top 30mm	%	26.0	29.5	
	Moisture Content Whole sample	%	23.5	28.5	
CBR value @ 2.5/5.0mm penetration		%	2½/2½	2½/2½	

Comments: Material Retained on AS 19.0mm sieve excluded

Approved Signatory: S Waugh 26/11/03

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SHRINK/SWELL INDEX TEST REPORT SHEET

(Document No R19.1)

Client: Forbes Rigby Pty Ltd

Job No: G23085/1

Project: Feasibility for Development

Location: Naval College Road & The Wool Road, Vincentia

Date: 13/8/03

SAMPLE DATA

Sample Number:	TPC2 (0.7 – 0.88m)	TPC4 (0.9 – 1.3m)	TPD5 (0.75 – 0.8m)*
Sample Location:	Refer to Drawing No G23085/1-1		
	Slope	Slope	Ridge
Date Sampled:	30/7/03	30/7/03	29/7/03
Sample Description:	(CL) Sandy CLAY, low plasticity, pale grey mottled orange-brown	(CH) CLAY, high plasticity, pale grey mottled orange-brown, some silt fines	(CH) CLAY, high plasticity, orange-brown, trace of fine to medium gravel
	(Residual)	(Slopewash)	(Residual)

TEST PROCEDURE		TEST RESULTS		
AS1289 2.1.1-1992 Moisture Content (Field)	%	24.5	23.8	25.6
AS1289 2.1.1-1992 Moisture Content (After Test)	%	26.7	24.9	28.5
AS1289 7.1.1-1998 Swelling Strain (Esw)	%	0.5	0.0	0.0
Shrinkage Strain (Esh)	%	4.6	2.4	5.5
Shrink/Swell Index (Iss)	%	2.7	1.3	3.1

Comment: *Specimens remoulded at 100% Standard compactive effort at field moisture content

Approved Signatory: S Waugh 26/11/03

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SHRINK/SWELL INDEX TEST REPORT SHEET

(Document No R19.1)

Client: Forbes Rigby Pty Ltd

Job No: G23085/1

Project: Feasibility for Development

Location: Naval College Road & The Wool Road, Vincentia

Date: 13/8/03

SAMPLE DATA

Sample Number:	TPE1 (0.55 – 0.7m)*	TPE4 (0.6 – 0.9m)	TPG2 (0.7 – 1.1m)*
Sample Location:	Refer to Drawing No G23085/1-1		
	Slope	Slope	Slope
Date Sampled:	29/7/03	29/7/03	29/7/03
Sample Description:	(CH) CLAY, high plasticity, orange-brown mottled red/pale grey	(CL) Sandy CLAY, low to medium plasticity, orange-brown mottled pale grey	(CL/CH) Sandy CLAY, medium to high plasticity, red-brown/orange-brown/pale grey, fine to medium sand
	(Residual)	(Residual)	(Residual)

TEST PROCEDURE	TEST RESULTS		
AS1289 2.1.1-1992 Moisture Content (Field) %	24.7	21.2	22.8
AS1289 2.1.1-1992 Moisture Content (After Test)%	29.5	25.7	25.3
AS1289 7.1.1-1998 Swelling Strain (Esw) %	0.0	0.0	0.0
Shrinkage Strain (Esh) %	1.6	0.9	4.4
Shrink/Swell Index (Iss) %	0.9	0.5	2.4

Comment: *Specimens remoulded at 100% Standard compactive effort at field moisture content

Approved Signatory: S Waugh 26/11/03

Network Geotechnics Pty Ltd

ACN 069 211 561
6/6 Morton Close
TUGGERAH NSW 2259
Telephone 4351 6200
Facsimile 4351 6300
Email: gosnetgeo@bigpond.com

SHRINK/SWELL INDEX TEST REPORT SHEET

(Document No R19.1)

Client: Forbes Rigby Pty Ltd

Job No: G23085/1

Project: Feasibility for Development

Location: Naval College Road & The Wool Road, Vincentia

Date: 13/8/03

SAMPLE DATA

Sample Number:	TPG3 (0.5 – 0.8m)	TPG7 (0.5 – 0.8m)	TPH2 (0.5 – 0.8m)
Sample Location:	Refer to Drawing No G23085/1-1		
	Slope	Slope	Ridge
Date Sampled:	29/7/03	29/7/03	30/7/03
Sample Description:	(CL) Sandy CLAY, low to medium plasticity, red-brown/orange-brown/pale grey	(CL)Sandy CLAY, medium plasticity, orange-brown/pale grey, fine to medium sand	(CL) Silty CLAY, low to medium plasticity, yellow-brown mottled pale grey
	(Residual)	(Residual)	(Residual)

TEST PROCEDURE		TEST RESULTS		
AS1289 2.1.1-1992 Moisture Content (Field)	%	19.4	19.5	28.7
AS1289 2.1.1-1992 Moisture Content (After Test)	%	20.7	21.2	31.1
AS1289 7.1.1-1998 Swelling Strain (Esw)	%	0.0	0.1	0.1
Shrinkage Strain (Esh)	%	1.7	2.7	3.1
Shrink/Swell Index (Iss)	%	1.0	1.5	1.7

Comment:

Approved Signatory: S Waugh 26/11/03

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PARTICLE SIZE DISTRIBUTION REPORT SHEET

(Document No R16.2)

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1

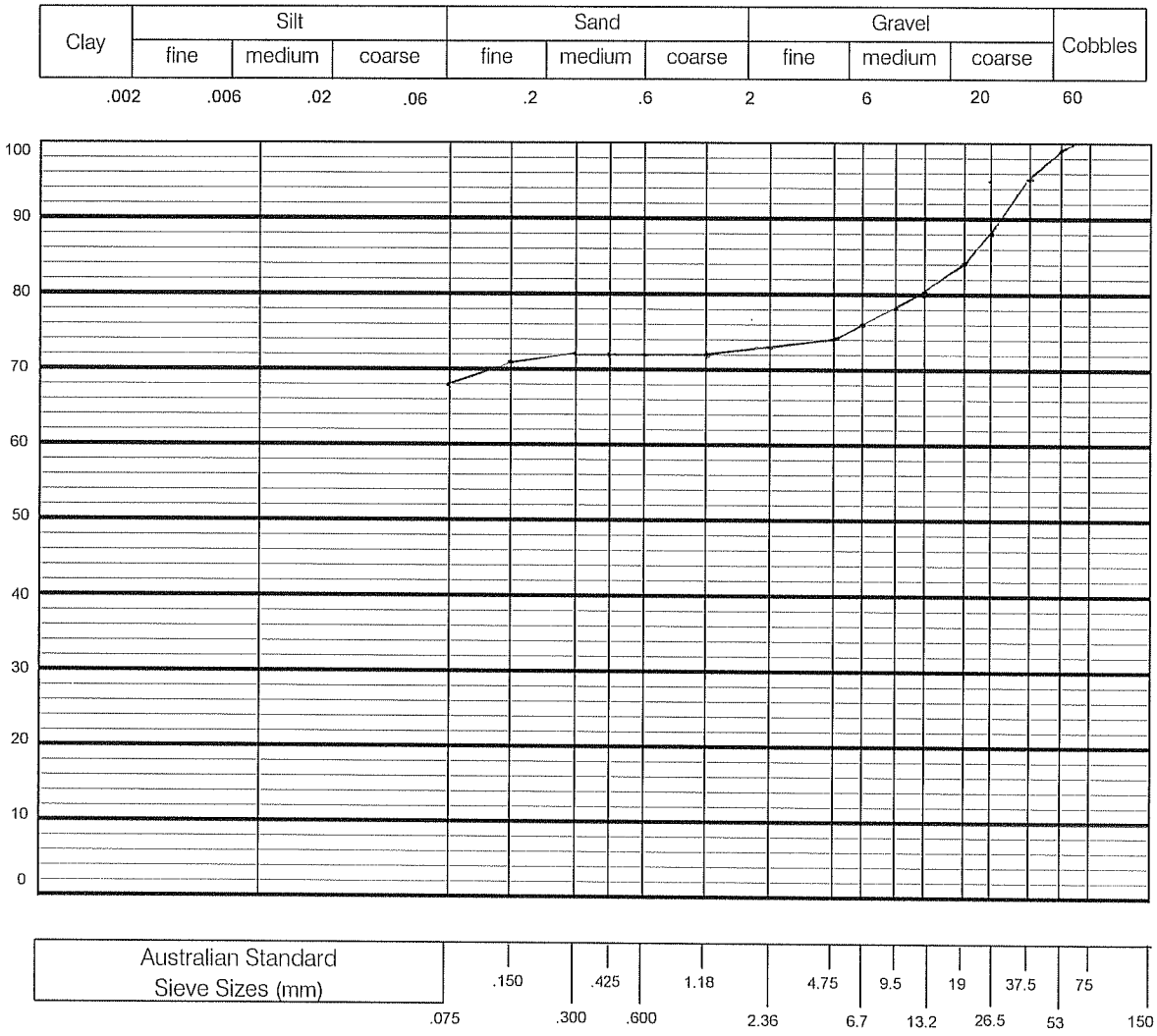
Date Tested: 13/8/03

Sample Identification
TP D5 (0.75-0.8m)

Test Procedure
AS 1289 3.6.1 (washed)

Material Description
(CH) CLAY, high plasticity, orange-brown, some fine to medium gravel
(Residual)

Grading Results			
AS Sieve	% Passing	AS Sieve	% Passing
63mm	100	4.75mm	74
53mm	99	2.36mm	73
37.5mm	95	1.18mm	72
26.5mm	88	600um	72
19mm	84	425um	72
13.2mm	80	300um	72
9.5mm	78	150um	71
6.7mm	76	75um	68



Authorised Signature: S Waugh 26/11/03

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PARTICLE SIZE DISTRIBUTION REPORT SHEET

(Document No R16.2)

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1

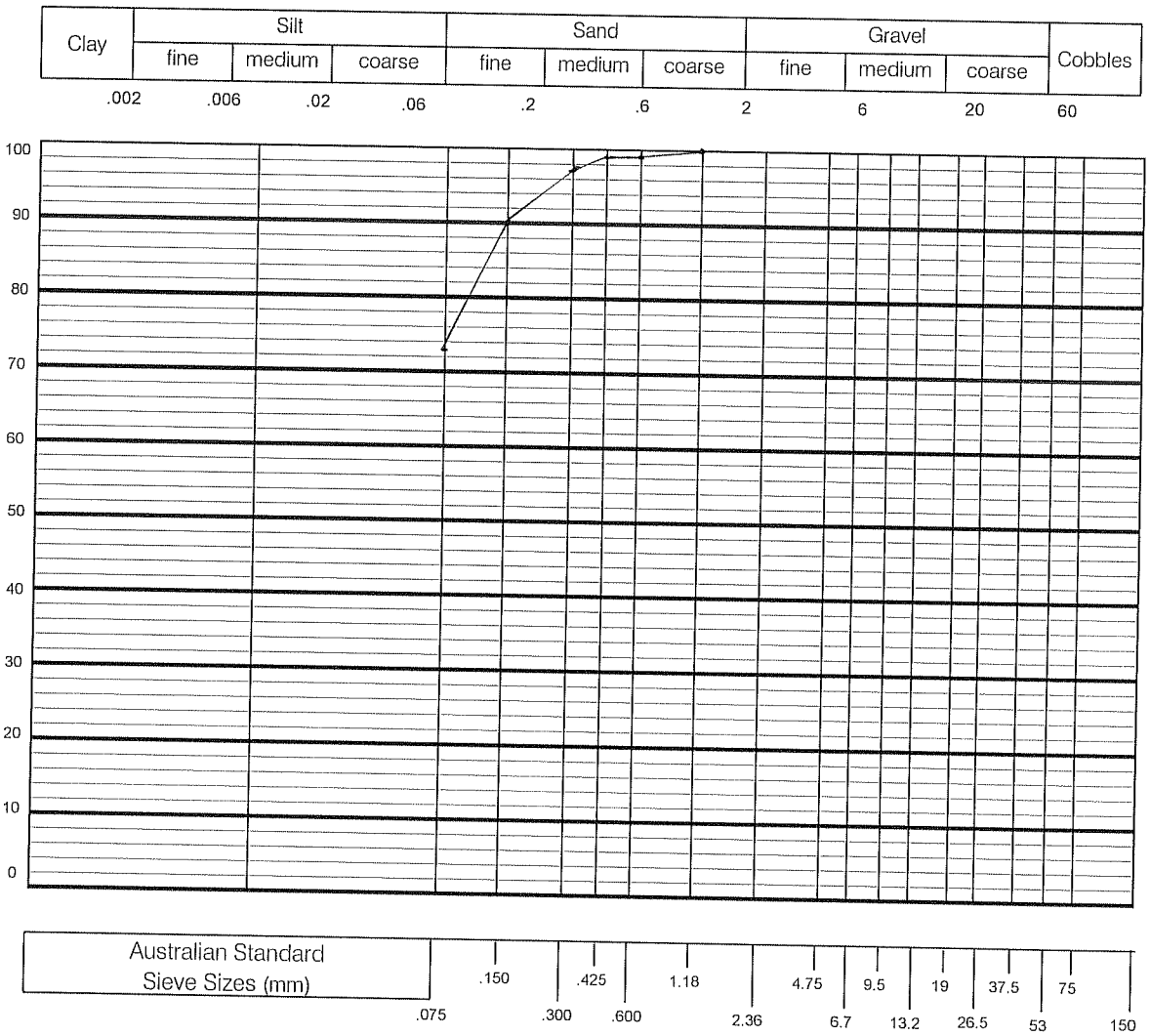
Date Tested: 13/8/03

Sample Identification
TPE4 (0.4-0.55m)

Test Procedure
AS 1289 3.6.1 (washed)

Material Description
(CL) Sandy CLAY, low to medium plasticity, orange-brown mottled grey (Residual)

Grading Results			
AS Sieve	% Passing	AS Sieve	% Passing
150mm		4.75mm	
53mm		2.36mm	
37.5mm		1.18mm	100
26.5mm		600um	99
19mm		425um	99
13.2mm		300um	97
9.5mm		150um	90
6.7mm		75um	73



Authorised Signature: S Waugh 26/11/03

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PARTICLE SIZE DISTRIBUTION REPORT SHEET

(Document No R16.2)

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1

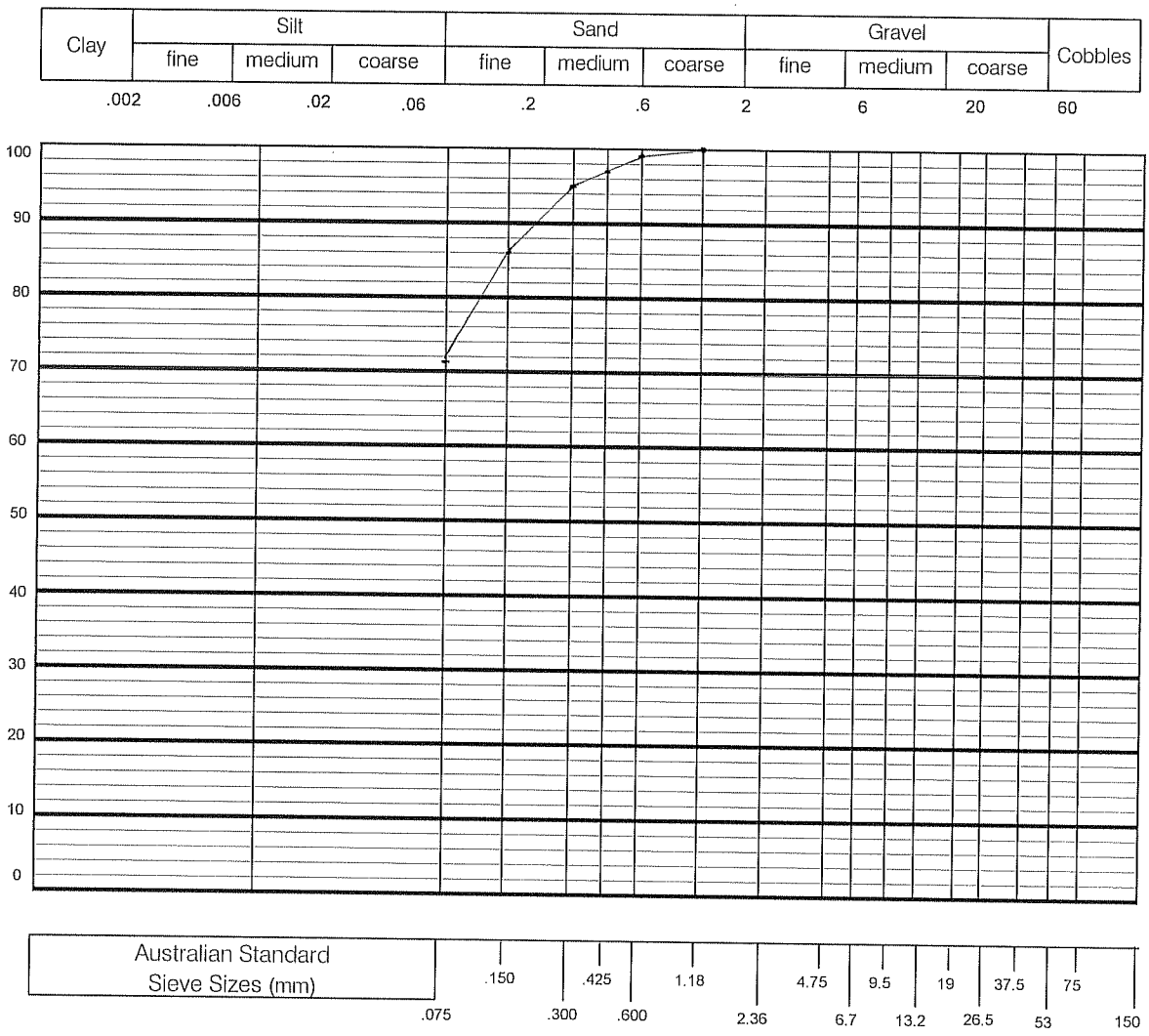
Date Tested: 13/8/03

Sample Identification
TP G2 (0.7-1.1m)

Test Procedure
AS 1289 3.6.1 (washed)

Material Description
(CL/CH) Sandy CLAY, medium to high plasticity, red-brown/orange-brown/pale grey, fine to medium sand (Residual)

Grading Results			
AS Sieve	% Passing	AS Sieve	% Passing
150mm		4.75mm	
53mm		2.36mm	
37.5mm		1.18mm	100
26.5mm		600um	99
19mm		425um	97
13.2mm		300um	95
9.5mm		150um	86
6.7mm		75um	71



Authorised Signature: S Waugh 26/11/03

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PARTICLE SIZE DISTRIBUTION REPORT SHEET

(Document No R16.2)

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1

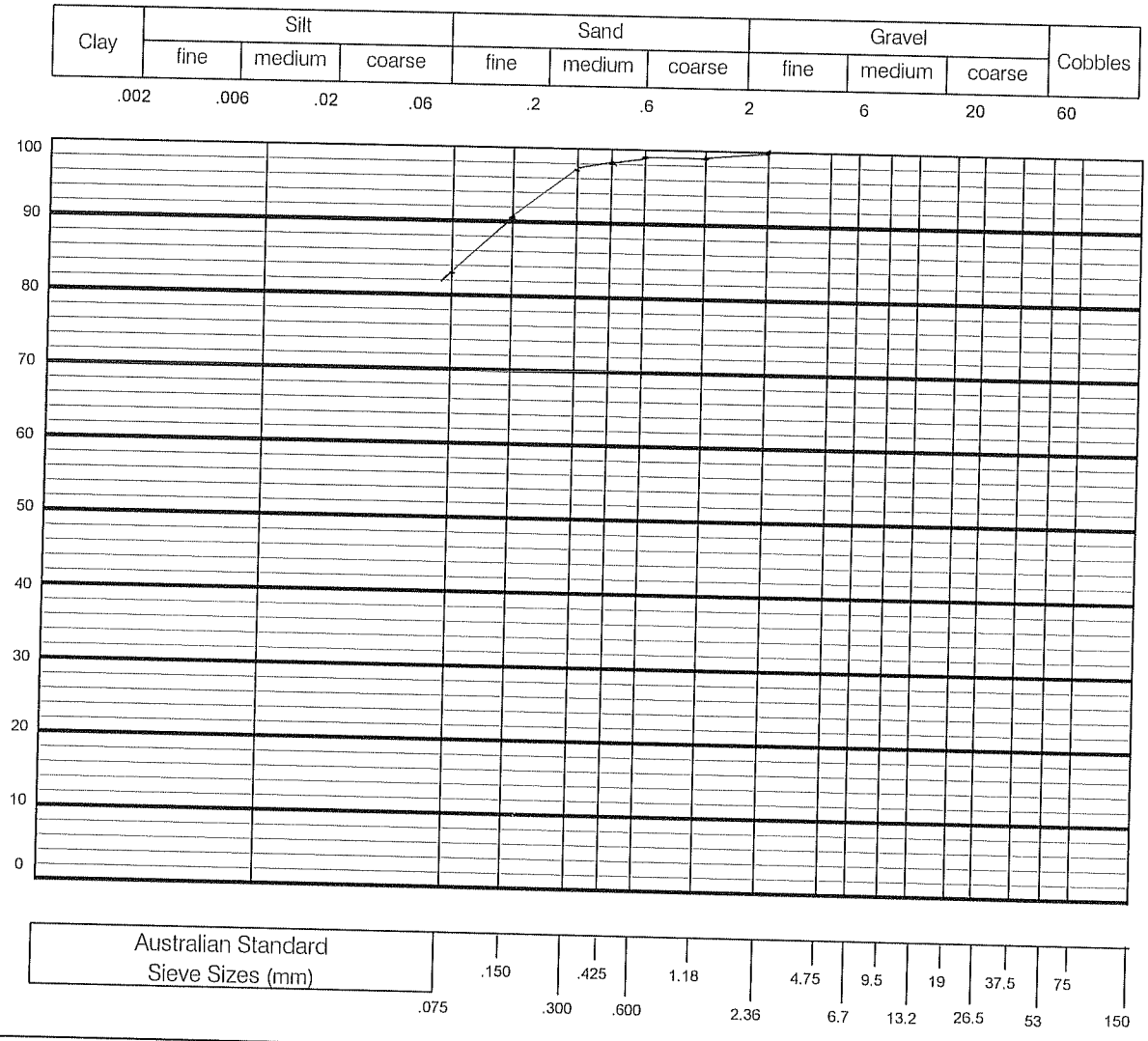
Date Tested: 13/8/03

Sample Identification
TP H2 (0.5-0.8m)

Test Procedure
AS 1289 3.6.1 (washed)

Material Description
(CL) Silty CLAY, low to medium plasticity, yellow-brown mottled pale grey (Residual)

Grading Results			
AS Sieve	% Passing	AS Sieve	% Passing
63mm		4.75mm	
53mm		2.36mm	100
37.5mm		1.18mm	99
26.5mm		600um	99
19mm		425um	98
13.2mm		300um	97
9.5mm		150um	90
6.7mm		75um	83



Authorised Signature: S Waugh 26/11/03

TERRATEST
"the best down under"
Drilling and Testing Service

Our Job: 23026
Batch No: 4
Your Ref: G23085/1
Page: 1 of 1

Laboratory Report

CLIENT: Network Geotechnics Pty. Ltd.

Address: 6/6 Morton Close, Tuggerah NSW 2259

PROJECT: Material Analysis - Forbes Rigby P/L Vincentia

particle size distribution
sieving in combination with hydrometer

Sample submitted by Client/ Analysed as received

TEST METHOD (S) **AS1289.3.6.2**

PRETREATMENT : Nil - Standard Oven Drying
particle density assumed - 2.65 g/cm3 (ASTM g/l hydrometer)

SAMPLE No.		TP D5 0.75 - 0.80m	TP E4 0.40 - 0.55m	TP G2 0.70 - 1.10m	TP H2 0.50 - 0.80m
% Passing AS Sieve					
	75.0 mm				
	37.5 mm				
	26.5 mm	100			
	19.0 mm	100			
	13.2 mm	95			
	9.5 mm	91			100
	6.7 mm	88			100
	4.75 mm	86	100	100	99
	2.36 mm	84	100	100	99
	1.18 mm	82	99	99	98
	600 um	81	99	98	97
	425 um	81	98	97	97
	300 um	80	96	95	95
	150 um	75	72	74	88
% finer than	75 um	75	72	74	82
	60 um	55	46	43	57
	30 um	52	43	30	54
	20 um	50	41	28	53
	13.5 um	48	41	24	51
	6 um	40	37	20	45
	2 um	27	29	17	31

Approved Signatory ..... (Marten Sweeney)
Laboratory Manager

Date: 29th August 2003

TERRATEST Pty. Ltd. **(ABN 52 082 867 945)**
117 Magowar Road, Girraween NSW 2145 Ph: (02) 9636 7377 Fax: (02) 9688 4757

NATA Accredited Laboratory No 541
The tests, calibrations or measurements covered by this document have been performed in accordance with NATA requirements which include the requirements of ISO/IEC 17025 and are traceable to Australian national standards of measurement. This document shall not be reproduced except in full.

TERRATEST
"the best down under"
Drilling and Testing Service

Job No: 23026
Batch No: 4
Your Ref: G23085/1
Page: 1 of 2

Laboratory Report

CLIENT: Network Geotechnics Pty. Ltd.

Address: 6/6 Morton Close, Tuggerah NSW 2259

PROJECT: Material Analysis - Forbes Rigby P/L Vincentia

emerson class number

TEST METHOD(S) AS1289 3.8.1

SAMPLE No.	CLASS No.	Classification
TP A1 0.45 - 0.55m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present
TP C4 1.00 - 1.10m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present
TP D5 0.75 - 0.80m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present
TP E1 0.55 - 0.70m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present
TP E4 0.40 - 0.55m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present

Sample supplied by Client/ Analysed as Received

Approved Signatory .....(Peter Weir)
General Manager

Date: 20th August, 2003.

TERRATEST Pty. Ltd. (ABN 52 082 867 945)
117 Magowar Road, Girraween NSW 2145 Ph (02) 9636 7377 Fax: (02) 9688 4757

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TERRATEST
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Drilling and Testing Service

Job No: 23026
Batch No: 4
Your Ref: G23085/1
Page: 2 of 2

Laboratory Report

CLIENT: Network Geotechnics Pty. Ltd.

Address: 6/6 Morton Close, Tuggerah NSW 2259

PROJECT: Material Analysis - Forbes Rigby P/L Vincentia

emerson class number

TEST METHOD(S) AS1289 3.8.1

SAMPLE No.	CLASS No.	Classification
TP G2 0.70 - 1.10m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present
TP G5 0.30 - 0.70m	2	Air Dried crumbs of soil shall show a moderate to slight reaction. A moderate reaction consists of an easily recognised cloud of colloids in suspension. A slight reaction consists of a bare hint of cloud at the surface of the crumbs.
TP G8 0.50 - 1.00m	3	The soil remoulded at the plastic limit shall disperse in water.
TP H2 0.50 - 0.80m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present

Sample supplied by Client/ Analysed as Received

Approved Signatory .....P.Weir.....(Peter Weir)
General Manager

Date: 29th August, 2003.

TERRATEST Pty. Ltd. (ABN 52 082 867 945)
117 Magowar Road, Girraween NSW 2145 Ph (02) 9636 7377 Fax: (02) 9688 4757

NATA Accredited Laboratory No 541
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Environmental Analysis Laboratory
Norsearch Ltd
ABN: 57 003 082 406

PO Box 5125 East Lismore 2480 NSW Australia
Telephone (02) 6620 3678
Facsimile (02) 6620 3957

Job Number	E0832
Sample Accession No.	Samples 1 - 8
Sample Type	SOIL
No. of samples	8
Date supplied	6th August, 2003

3rd September, 2003

Att/ Gary Peake
Network Geotechnics
6/6 Moreton Close
TUGGERAH NSW 2259

Dear Gary,

Herewith are the analysis results of 8 soil samples supplied on the 6th August, 2003.

Results were supplied by fax on the 7th August, 2003.

Please contact the laboratory if you have any queries.

Yours faithfully,

Graham Lancaster,
Laboratory Manager

Analysis performed according to Rayment and Higgins, 1992. Australian Laboratory Handbook of Soil and Water Chemical Methods, except where stated otherwise.

RESULTS OF ACID SULPHATE SOIL ANALYSIS (Page 1 of 1)

8 samples supplied by Network Geotechnics on 6th August, 2003 - Lab. Job No. E0832

Analysis requested by Gary Peake - **Your Job No. G23085/1**

Sample Site	Depth (m)	Texture (note 9)	Reduced Inorganic Sulphur (% chromium reducible S) (%Scr) (note 2)	Lab. Bulk Density tonne DW/m^3	Potential Acidity Neutralising Calculation Kg Lime/m^3 (based on %Scr)	COMMENTS RE: Classification as potential acid sulphate soil (ASS) (based on %Scr results)
BHF9	0.75-1.0	Fine	0.022	0.92	0.6	**NOT** Potential ASS
BHF9	1.7-2.0	Fine	0.037	1.15	1.3	**NOT** Potential ASS
BHI1	0.2-0.5	Fine	0.018	1.27	0.7	**NOT** Potential ASS
BHI1	0.7-1.0	Fine	0.018	1.51	0.9	**NOT** Potential ASS
BHI2	0.2-0.5	Fine	0.009	1.71	0.5	**NOT** Potential ASS
BHI2	1.2-1.5	Fine	0.008	1.43	0.4	**NOT** Potential ASS
BHJ1	0.75-1.0	Fine	0.006	1.60	0.3	**NOT** Potential ASS
BHJ1	1.7-2.0	Fine	0.011	1.35	0.5 Refer Note 6 & 7	**NOT** Potential ASS

NOTE:

1 - All analysis is Dry Weight (DW) - samples dried and ground immediately upon arrival (unless supplied dried and ground)

2 - Samples analysed by **'Chromium Reducible Sulphur' technique** (Scr - Method 22B)

3 - Methods from Stone, Y. Ahern CR, and Blunden B (1998). **Acid Sulphate Soil Manual 1998.** ASSMAC, Wollongbar, NSW.

4 - Total carbon and total sulphur determined using a LECO CNS 2000 analyser

5 - Bulk density was determined immediately on arrival to laboratory (insitu bulk density is preferred)

6 - Neutralising Requirement (based on NAGP, chromium reducible sulphur **or** total sulphur) = Kg H_2SO_4/tonne x bulk density

7 - The neutralising requirement does not include a safety margin for complete neutralisation (a factor of 1.5 is often recommended)

8 - Conductivity 1 dS/m = 1 mS/cm = 1000 μS/cm

9 - For Texture: coarse = sands to loamy sands; medium = sandy loams to light clays; fine = medium to heavy clays and silty clays

10 - Neutralisation Calculation for neutralisation of actual and potential acidity (ie. sum of calculation based on Crs and TAA)

11 - ANC= Acid Neutralising Capacity of the Soil (Detection limit of 0.05% $CaCO_3$ Equivalent)

12 - NAGP= Net Acid Generating Potential= (31.3*%S_{ox})-(10*%ANC) (From Mulvey, 1993)

(Classification of potential acid sulphate material if: coarse Scr≥0.03%S; medium Scr≥0.06%S; fine Scr≥0.1%S)

(equivalent conversions - 0.03%S = 0.019 mole/ Kg; 0.06%S = 0.037 mole/ Kg; 0.1%S = 0.062 mole/ Kg)

* Projects that disturb >1000 tonnes of ASS soils with ≥0.03% S, a detailed management plan may be required.

checked: .....

ALS Environmental

CERTIFICATE OF ANALYSIS

CONTACT:	MR G PEAKE	**BATCH:**	ES41419
CLIENT:	NETWORK GEOTECHNICS PTY LTD	**SUB BATCH:**	0
ADDRESS:	6/6 MORTON CLOSE TUGGERAH NSW 2259	**LABORATORY:**	SYDNEY
		DATE RECEIVED:	01/08/2003
		DATE COMPLETED:	08/08/2003
ORDER No.:	G23085/1	**SAMPLE TYPE:**	WATER
PROJECT:		**No. of SAMPLES:**	3

COMMENTS

Samples digested by USEPA method 3005 prior to the determination of total metals. True colour determined at pH EA-005. Ionic balance out of acceptable limits due to analytes not quantified in this report.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number.
All pages of this report have been checked and approved for release.

ISSUING LABORATORY: SYDNEY

Address
277-289 Woodpark Road
SMITHFIELD NSW 2164

Phone: 61-2-8784 8555
Fax: 61-2-8784 8500
Email: cindy.suen@alsenviro.com

Signatory Craig Vogel

Batch: ES41419
Sub Batch: 0
Date of Issue: 08/08/2003
Client: NETWORK GEOTECHNICS PTY LTD
Client Reference:

CERTIFICATE OF ANALYSIS

				SAMPLE IDENTIFICATION		
	Laboratory I.D.			1	2	3
	Date Sampled			31/07/2003	31/07/2003	31/07/2003
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	SW1	SW2	SW3
EA-005	pH Value		0.01	6.07	5.62	4.47
EA-005-P	pH Value		0.01	7.20	5.93	5.26
EA-015	Total Dissolved Solids (TDS)	mg/L	1	358	630	478
EA-041	Colour (True)	PCU	1	150	70	5
EA-045	Turbidity	NTU	0.1	70.0	2400	65.0
EA-065	Total Hardness as CaCO3	mg/L	1	71	39	116
ED-005F	Calcium - Filtered	mg/L	1	11	5	11
ED-010F	Magnesium - Filtered	mg/L	1	11	7	21
ED-015F	Sodium - Filtered	mg/L	1	54	45	102
ED-020F	Potassium - Filtered	mg/L	1	3	1	2
ED-035-P	Bicarbonate as CaCO3	mg/L	1	10	12	<1
ED-040F	Sulphate - Filtered	mg/L	1	24	5	53
ED-045-P	Chloride	mg/L	1	125	99	241
EG-005T	Iron - Total	mg/L	0.01	4.42	29.2	7.08
EG-020T	Silver - Total	mg/L	0.001	<0.001	<0.001	<0.001
EG-020T	Aluminium - Total	mg/L	0.01	0.75	29.2	1.69
EG-020T	Arsenic - Total	mg/L	0.001	<0.001	0.008	<0.001
EG-020T	Boron - Total	mg/L	0.01	0.01	0.03	0.01
EG-020T	Barium - Total	mg/L	0.001	0.020	0.161	0.059
EG-020T	Cadmium - Total	mg/L	0.001	<0.001	0.001	<0.001
EG-020T	Chromium - Total	mg/L	0.001	0.004	0.024	0.003
EG-020T	Copper - Total	mg/L	0.001	0.002	0.030	0.003
EG-020T	Manganese - Total	mg/L	0.001	0.004	0.162	0.020
EG-020T	Molybdenum - Total	mg/L	0.001	<0.001	<0.001	<0.001
EG-020T	Nickel - Total	mg/L	0.001	0.001	0.011	0.001
EG-020T	Lead - Total	mg/L	0.001	<0.001	0.072	0.006
EG-020T	Antimony - Total	mg/L	0.001	<0.001	<0.001	<0.001
EG-020T	Selenium - Total	mg/L	0.01	<0.01	<0.01	<0.01
EG-020T	Zinc - Total	mg/L	0.005	0.007	0.051	0.042
EG-035T	Mercury - Total	mg/L	0.0001	<0.0001	<0.0001	<0.0001
EK-026MA	Total Cyanide	mg/L	0.005	<0.005	<0.005	<0.005
EK-040-P	Fluoride	mg/L	0.1	<0.1	<0.1	<0.1
EK-055A	Ammonia as N	mg/L	0.01	0.02	0.18	<0.01
EK-057A	Nitrite as N	mg/L	0.01	<0.01	<0.01	<0.01

Batch: ES41419
Sub Batch: 0
Date of Issue: 08/08/2003
Client: NETWORK GEOTECHNICS PTY LTD
Client Reference:

CERTIFICATE OF ANALYSIS

				SAMPLE IDENTIFICATION									
		Laboratory I.D.		1	2	3							
		Date Sampled		31/07/2003	31/07/2003	31/07/2003							
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	SW1	SW2	SW3							
EK-058A	Nitrate as N	mg/L	0.01	<0.01	<0.01	<0.01							
EK-085	Sulphide	mg/L	0.1	<0.1	<0.1	<0.1							
EZ-005	Total Cations	me/L	0.01	3.86	2.79	6.84							
EZ-010	Total Anions	me/L	0.01	4.23	3.14	7.92							
EZ-015	Actual (Anion / Cation) Difference	me/L	0.01	0.37	0.35	1.09							
EZ-020	Allowed (Anion / Cation) Difference	me/L	0.01	0.17	0.16	0.23							

Batch: ES41419
Sub Batch: 0
Date of Issue: 08/08/2003
Client: NETWORK GEOTECHNICS PTY LTD
Client Reference:

QUALITY CONTROL REPORT

METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	SAMPLE IDENTIFICATION									
		Laboratory I.D.		200	201	202							
		Date Sampled		01/08/2003	01/08/2003	01/08/2003							
				METHOD BLANK	LCS	MS							
				CHECKS AND SPIKES									
EA-005	pH Value		0.01	----	----	----							
EA-005-P	pH Value		0.01	----	----	----							
EA-015	Total Dissolved Solids (TDS)	mg/L	1	<1	----	----							
EA-041	Colour (True)	PCU	1	----	----	----							
EA-045	Turbidity	NTU	0.1	<0.1	101%	----							
EA-065	Total Hardness as CaCO3	mg/L	1	----	----	----							
ED-005F	Calcium - Filtered	mg/L	1	<1	----	----							
ED-010F	Magnesium - Filtered	mg/L	1	<1	----	----							
ED-015F	Sodium - Filtered	mg/L	1	<1	----	----							
ED-020F	Potassium - Filtered	mg/L	1	<1	----	----							
ED-035-P	Bicarbonate as CaCO3	mg/L	1	----	----	----							
ED-040F	Sulphate - Filtered	mg/L	1	<1	----	----							
ED-045-P	Chloride	mg/L	1	<1	105%	112%							
EG-005T	Iron - Total	mg/L	0.01	<0.01	----	115%							
EG-020T	Silver - Total	mg/L	0.001	<0.001	85.0%	----							
EG-020T	Aluminium - Total	mg/L	0.01	<0.01	109%	82.0%							
EG-020T	Arsenic - Total	mg/L	0.001	<0.001	91.0%	97.0%							
EG-020T	Boron - Total	mg/L	0.01	<0.01	104%	92.0%							
EG-020T	Barium - Total	mg/L	0.001	<0.001	103%	103%							
EG-020T	Cadmium - Total	mg/L	0.001	<0.001	98.0%	96.0%							
EG-020T	Chromium - Total	mg/L	0.001	<0.001	90.0%	89.0%							
EG-020T	Copper - Total	mg/L	0.001	<0.001	98.0%	101%							
EG-020T	Manganese - Total	mg/L	0.001	<0.001	99.0%	96.0%							
EG-020T	Molybdenum - Total	mg/L	0.001	<0.001	99.0%	----							
EG-020T	Nickel - Total	mg/L	0.001	<0.001	93.0%	92.0%							
EG-020T	Lead - Total	mg/L	0.001	<0.001	99.0%	94.0%							
EG-020T	Antimony - Total	mg/L	0.001	<0.001	100%	----							
EG-020T	Selenium - Total	mg/L	0.01	<0.01	107%	100%							
EG-020T	Zinc - Total	mg/L	0.005	<0.005	98.0%	98.0%							
EG-035T	Mercury - Total	mg/L	0.0001	<0.0001	103%	98.0%							
EK-026MA	Total Cyanide	mg/L	0.005	<0.005	109%	101%							
EK-040-P	Fluoride	mg/L	0.1	<0.1	93.0%	97.0%							

Batch: ES41419
Sub Batch: 0
Date of Issue: 08/08/2003
Client: NETWORK GEOTECHNICS PTY LTD
Client Reference:

QUALITY CONTROL REPORT

METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	SAMPLE IDENTIFICATION								
		Laboratory I.D.		200	201	202						
		Date Sampled		01/08/2003	01/08/2003	01/08/2003						
				METHOD BLANK	LCS	MS						
				CHECKS AND SPIKES								
EK-055A	Ammonia as N	mg/L	0.01	<0.01	100%	100%						
EK-057A	Nitrite as N	mg/L	0.01	<0.01	100%	99.0%						
EK-058A	Nitrate as N	mg/L	0.01	<0.01	98.0%	95.0%						
EK-085	Sulphide	mg/L	0.1	<0.1	105%	----						
EZ-005	Total Cations	me/L	0.01	----	----	----						
EZ-010	Total Anions	me/L	0.01	----	----	----						
EZ-015	Actual (Anion / Cation) Difference	me/L	0.01	----	----	----						
EZ-020	Allowed (Anion / Cation) Difference	me/L	0.01	----	----	----						

CHAIN OF CUSTODY DOCUMENTATION

019782

Australian Laboratory Services Pty Ltd
32 Shand Street
STAFFORD QLD 4053
TEL: (07) 3243 7222
FAX: (07) 3243 7218

CLIENT: NETWORK GEOTECHNICS PTY LTD
POSTAL ADDRESS: UNIT 6, 6 MORTON CLOSE, TUGGERAH
SEND REPORT TO: AS ABOVE SEND INVOICE TO:
DATA NEEDED BY: 6/8/03 REPORT NEEDED BY:
PROJECT ID: G23085/1 QUOTE NO.: SY/405/02
P.O. NO.: COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LABORATORY BATCH NO.:
SAMPLERS: G.P.
PHONE: FAX: 43516300 E-MAIL:
REPORT FORMAT: HARD: ☐ FAX: ☐ DISK: ☐ BULLETIN BOARD: ☐ E-MAIL: ☐
QC LEVEL: QCS1: ☐ QCS2: ☐ QCS3: ☐ QCS4: ☐

FAXED

FOR LAB USE ONLY
COOLER SEAL
Yes ..... No .....
Broken ..... Intact .....
COOLER TEMP: deg. C

ANALYSIS REQUIRED

SAMPLE DATA				*CONTAINER DATA			DRINKING WATER ANALYSIS SCHEDULE 3	NOTES
SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	NO.	pH		
SW1 (1)	WATER	31/7/03	AM	VARIOUS			/	
SW2 (2)	"	"	"				/	
SW3 (3)	"	"	"				/	

Batch No.: ES41419 ☐ ORG
Batched date: 1/8/03
☐ Soil ☐ Ambient
☑ Water ☑ Chilled
☐ Other °C
☐ Subcontract Work
☐ Bottle Return
☐ Imm. Anal. Actioned
2

RELINQUISHED BY

NAME: GARY PEAKE DATE: 1/8/03
OF: NETWORK GEOTECHNICS P/L TIME: 5PM

NAME: DATE:
OF: TIME:

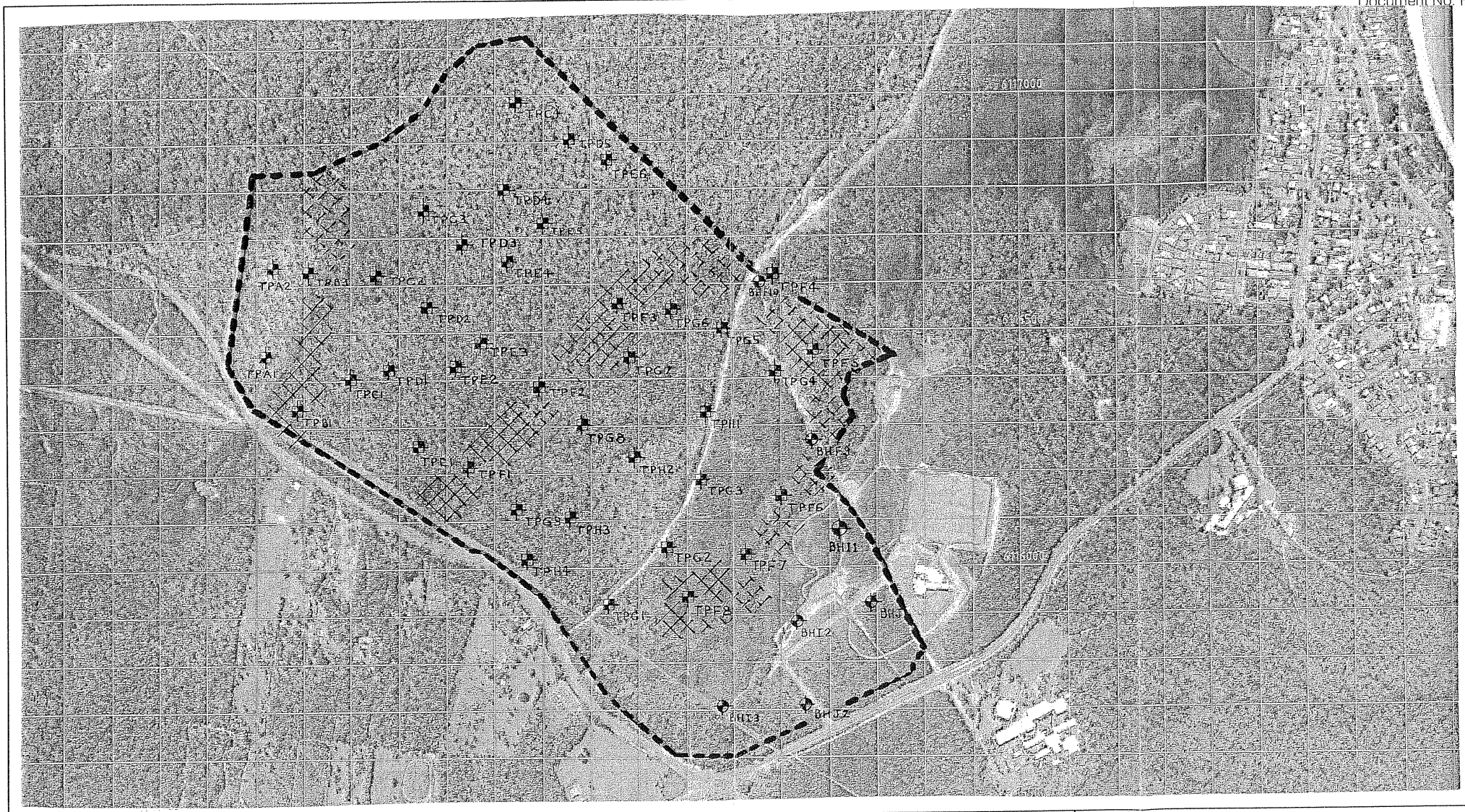
RECEIVED BY

NAME: ZORAN DATE: 1/8/03
OF: ALS TIME: 6.30pm

NAME: DATE:
OF: TIME:

METHOD OF SHIPMENT
CONSIGNMENT NOTE NO.
TRANSPORT CO. NAME.

*Container Type and Preservative Codes: **P** = Natural Plastic; **N** = Nitric Acid Preserved; **C** = Sodium Hydroxide Preserved; **J** = Solvent Washed Acid Rinsed Jar; **S** = Solvent Washed Acid Rinsed Glass Bottle; **VC** = Hydrochloric Acid Preserved Vial; **VS** = Sulphuric Acid Preserved Vial; **BS** = Sulphuric Acid Preserved Glass Bottle; **Z** = Zinc Acetate Preserved Bottle; **E** = EDTA Preserved Bottle; **ST** = Sterile Bottle; **O** = Other.



LEGEND

Approximate location of test pits

Approximate location of boreholes

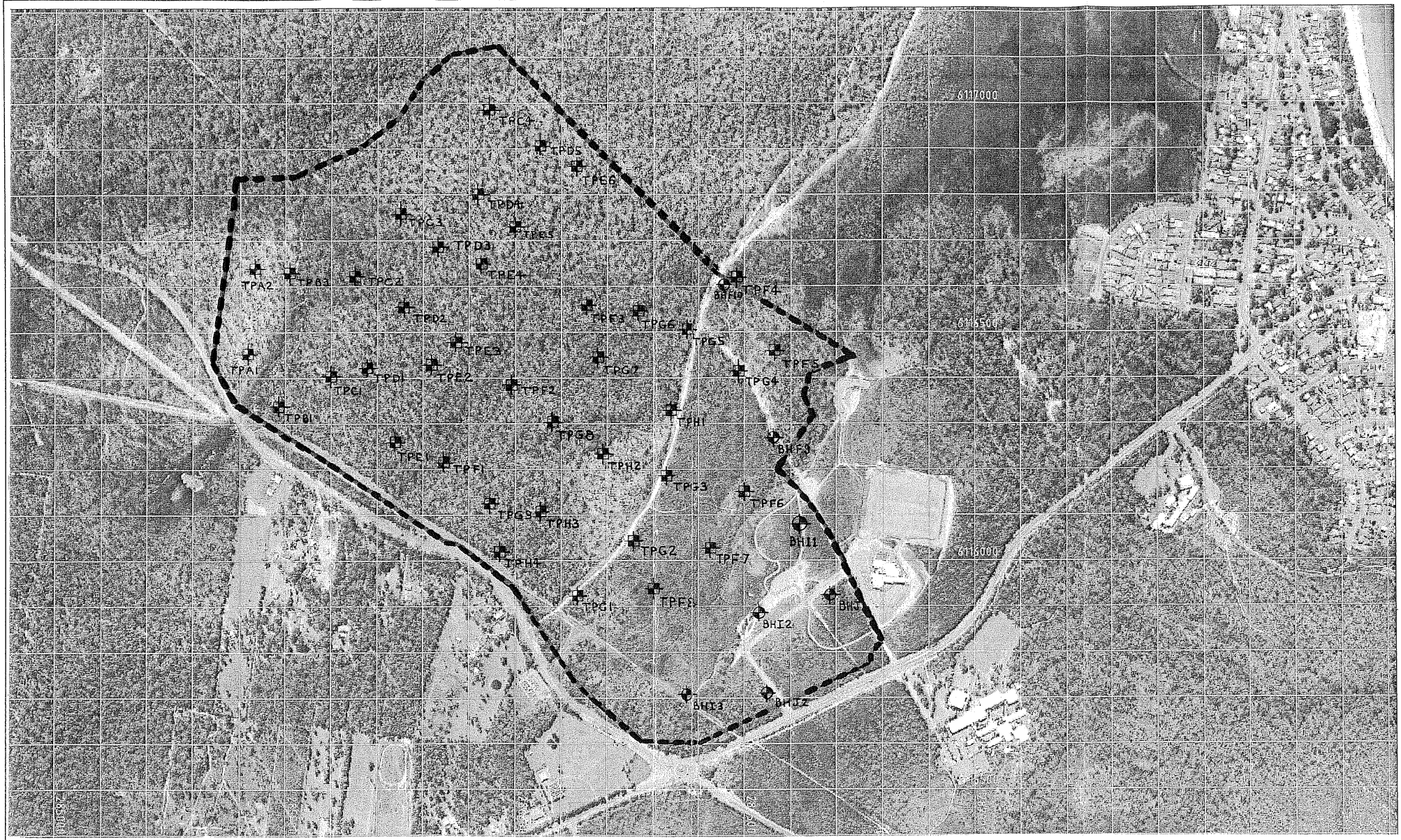
Typically 0.5 to 1m depth of non saline soil ~ elsewhere the thickness is generally >1.5m

Interpreted 0.5 to 1m depth of non saline soil ~ elsewhere the thickness is generally >1.5m

Network Geotechnics Pty Ltd
6/6 Morton Close TUGGERAH NSW 2259
Tel: (02) 4351 6200 Fax: (02) 4351 6300
Email: gosnetgeo@bigpond.com

Scale:	1:4000 A1 sheet
AMG Zone 56 Co-ordinates 100m grid Plot size: A3	
Drawn:	GP
Drawing No:	G23085/1-2

Client:	FORBES RIGBY PTY LTD
Project:	FEASIBILITY FOR DEVELOPMENT, NAVAL COLLEGE & THE WOOL ROAD, VINCENTIA
Location:	TEST PIT & BOREHOLE LOCATIONS



LEGEND

APPROXIMATE LOCATION OF TEST PITS

APPROXIMATE LOCATION OF BOREHOLES

Network Geotechnics Pty Ltd
6/6 Morton Close TUGGERAH NSW 2259
Tel: (02) 4351 6200 Fax: (02) 4351 6300
Email: gosnetgeo@bigpond.com

Scale:	1:4000 A1 sheet
AMG Zone 56 Co-ordinates 100m grid Plot size:	A3
Drawn:	GV
Drawing No:	G23085/1-1

FORBES RIGBY PTY LTD

FEASIBILITY FOR DEVELOPMENT
NAVAL COLLEGE & THE WOOL ROAD,
VINCENTIA

TEST PIT LOCATIONS