Appendix H

GQAL NATA Laboratory Results

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EB0709854**	Page	: 1 of 11
Client	: **CONNELL WAGNER PTY LTD**	Laboratory	: Environmental Division Brisbane
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Project	: HR7906 JILALAN	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 31-AUG-2007
Sampler	: MH	Issue Date	: 14-SEP-2007
Site	: SARINA		
		No. of samples received	: 43
Quote number	: BN/212/07	No. of samples analysed	: 42

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes.

Key : CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
^ = Result(s) reported is calculated using analyte detections at or above the LOR. (eg. <5 + 5 + 7 = 12).

- **LCS recovery for ED007 analyses fall outside Dynamic Control Limits. They are however within ALS Static Control Limits and hence deemed acceptable.**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID : GQAL4 0.2-0.3	GQAL1 0-0.1	GQAL7 0.5-0.6	GQAL6 1.1-1.2	GQAL8 0-0.1
				Client sampling date / time : 29-AUG-2007 15:00	28-AUG-2007 15:00	30-AUG-2007 15:00	29-AUG-2007 15:00	30-AUG-2007 15:00
				EB0709854-001	EB0709854-002	EB0709854-003	EB0709854-004	EB0709854-005
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**5.5**	**5.8**	**5.4**	**5.6**	**7.0**
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	**17**	**30**	**308**	**17**	**19**
EA055: Moisture Content								
^ Moisture Content (dried @ 103)	----	1.0	%	**7.1**	**8.2**	**15.7**	**11.1**	**7.9**
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	**0.1**	**0.1**	**1.2**	<0.1	**0.8**
^ Exchangeable Magnesium	----	0.1	meq/100g	<0.1	<0.1	**0.8**	**0.7**	**1.6**
^ Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	**0.1**	<0.1	**0.1**
^ Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	**0.1**	**0.1**	**0.2**
^ Cation Exchange Capacity	----	0.1	meq/100g	**0.2**	**0.2**	**2.3**	**1.0**	**2.6**
^ Exchangeable Sodium Percent	----	0.1	%	----	<0.1	**1.2**	**2.6**	**1.1**
ED037: Alkalinity								
Alkalinity	----	1	meq/kg	----	**1**	**3**	<1	**3**
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	----	**1**	**3**	<1	**3**
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	----	<1	<1	<1	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	----	**30**	**480**	<10	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	----	<10	**50**	<10	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	**50**	<10	**20**
Magnesium	7439-95-4	10	mg/kg	<10	<10	**30**	**20**	**30**
Sodium	7440-23-5	10	mg/kg	<10	<10	**100**	**20**	**40**
Potassium	7440-09-7	10	mg/kg	**20**	**20**	**20**	<10	<10

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID :	GQAL7 0.8-0.9	GQAL2 0.8-0.9	GQAL8 0.8-0.9	GQAL4 1.1-1.2	GQAL4 0-0.1
				Client sampling date / time :	30-AUG-2007 15:00	28-AUG-2007 15:00	30-AUG-2007 15:00	29-AUG-2007 15:00	29-AUG-2007 15:00
					EB0709854-006	EB0709854-007	EB0709854-008	EB0709854-009	EB0709854-010
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		**6.4**	**5.6**	**8.0**	**6.5**	**5.9**
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		**11**	**19**	**76**	**17**	**24**
EA055: Moisture Content									
^ Moisture Content (dried @ 103)	----	1.0	%		**12.6**	**9.9**	**18.4**	**12.4**	**13.0**
ED007: Exchangeable Cations									
^ Exchangeable Calcium	----	0.1	meq/100g		**1.1**	<0.1	**2.2**	**1.1**	**0.2**
^ Exchangeable Magnesium	----	0.1	meq/100g		**0.6**	**0.7**	**1.6**	**0.6**	**0.4**
^ Exchangeable Potassium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
^ Exchangeable Sodium	----	0.1	meq/100g		<0.1	**0.1**	**0.3**	<0.1	<0.1
^ Cation Exchange Capacity	----	0.1	meq/100g		**1.8**	**1.0**	**4.2**	**1.9**	**0.6**
^ Exchangeable Sodium Percent	----	0.1	%		----	----	----	**0.7**	**0.7**
ED037: Alkalinity									
Alkalinity	----	1	meq/kg		----	----	----	**2**	**2**
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg		----	----	----	**2**	**2**
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg		----	----	----	<1	<1
ED040S: Soluble Major Anions									
Sulphate as SO4 2-	14808-79-8	10	mg/kg		----	----	----	<10	**20**
ED045: Chloride									
Chloride	16887-00-6	10	mg/kg		----	----	----	<10	<10
ED093S: Soluble Major Cations									
Calcium	7440-70-2	10	mg/kg		<10	<10	<10	**60**	<10
Magnesium	7439-95-4	10	mg/kg		<10	**20**	<10	**20**	<10
Sodium	7440-23-5	10	mg/kg		<10	**30**	**60**	**10**	**10**
Potassium	7440-09-7	10	mg/kg		<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID : GQAL2 0-0.1	GQAL2 0.2-0.3	GQAL6 0.5-0.6	GQAL8 0.5-0.6	GQAL2 0.5-0.6
			Client sampling date / time :	28-AUG-2007 15:00	28-AUG-2007 15:00	29-AUG-2007 15:00	30-AUG-2007 15:00	28-AUG-2007 15:00
				EB0709854-011	EB0709854-012	EB0709854-013	EB0709854-014	EB0709854-015
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**5.6**	**5.8**	**6.4**	**6.8**	**6.6**
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	**27**	**25**	**22**	**39**	**20**
EA055: Moisture Content								
^ Moisture Content (dried @ 103)	----	1.0	%	**17.3**	**11.4**	**17.8**	**14.2**	**12.8**
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	**0.1**	**0.8**	**1.5**	**1.4**	**1.2**
^ Exchangeable Magnesium	----	0.1	meq/100g	**0.3**	**0.5**	**0.9**	**2.5**	**0.7**
^ Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
^ Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	<0.1	**0.2**	<0.1
^ Cation Exchange Capacity	----	0.1	meq/100g	**0.5**	**1.4**	**2.6**	**4.1**	**2.0**
^ Exchangeable Sodium Percent	----	0.1	%	**0.7**	----	**0.7**	**0.8**	**0.7**
ED037: Alkalinity								
Alkalinity	----	1	meq/kg	**2**	----	**3**	**5**	**2**
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	**2**	----	**3**	**5**	**2**
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	----	<1	<1	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	**30**	----	<10	<10	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	----	**10**	**20**	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	**70**	<10	<10	**50**
Magnesium	7439-95-4	10	mg/kg	<10	**20**	<10	<10	**20**
Sodium	7440-23-5	10	mg/kg	**10**	**20**	**10**	**30**	**10**
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID : GQAL7 0.2-0.3	GQAL3 0-0.1	GQAL8 0.2-0.3	GQAL5 0.5-0.8	GQAL1 1.1-1.2
				Client sampling date / time : 30-AUG-2007 15:00	29-AUG-2007 15:00	30-AUG-2007 15:00	29-AUG-2007 15:00	28-AUG-2007 15:00
				EB0709854-016	EB0709854-017	EB0709854-018	EB0709854-019	EB0709854-020
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**5.5**	**6.0**	**6.6**	**6.6**	**7.0**
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	**45**	**21**	**20**	**15**	**10**
EA055: Moisture Content								
^ Moisture Content (dried @ 103)	----	1.0	%	**18.9**	**7.1**	**19.5**	**15.2**	**9.1**
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	**2.0**	**0.1**	**0.4**	**1.2**	**0.8**
^ Exchangeable Magnesium	----	0.1	meq/100g	**1.5**	**0.1**	**0.3**	**0.6**	**0.4**
^ Exchangeable Potassium	----	0.1	meq/100g	<0.1	**0.1**	<0.1	<0.1	<0.1
^ Exchangeable Sodium	----	0.1	meq/100g	**0.2**	<0.1	<0.1	<0.1	<0.1
^ Cation Exchange Capacity	----	0.1	meq/100g	**3.9**	**0.4**	**0.8**	**2.0**	**1.3**
^ Exchangeable Sodium Percent	----	0.1	%	----	**0.9**	----	**0.8**	**1.4**
ED037: Alkalinity								
Alkalinity	----	1	meq/kg	----	<1	----	**2**	**1**
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	----	<1	----	**2**	**1**
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	----	<1	----	<1	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	----	**30**	----	<10	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	----	<10	----	<10	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	**10**	<10	**10**	**40**	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	**10**	<10
Sodium	7440-23-5	10	mg/kg	**100**	<10	**20**	**20**	<10
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: GQAL1 0.8-0.9	GQAL5 0.2-0.3	GQAL12 0.5-0.6	GQAL2 1.1-1.2	GQAL12 0-0.1
				Client sampling date / time: 28-AUG-2007 15:00	29-AUG-2007 15:00	30-AUG-2007 15:00	28-AUG-2007 15:00	30-AUG-2007 15:00
				EB0709854-021	EB0709854-022	EB0709854-023	EB0709854-024	EB0709854-025
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**7.4**	**7.8**	**6.5**	**8.2**	**6.0**
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	**325**	**11**	**11**	**89**	**12**
EA055: Moisture Content								
^ Moisture Content (dried @ 103)	----	1.0	%	**18.5**	**15.1**	**12.7**	**16.6**	**12.4**
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	**3.0**	**0.9**	**0.4**	**2.3**	**0.4**
^ Exchangeable Magnesium	----	0.1	meq/100g	**1.7**	**0.2**	**0.2**	**1.7**	**0.2**
^ Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
^ Exchangeable Sodium	----	0.1	meq/100g	**0.7**	**0.1**	<0.1	**0.4**	<0.1
^ Cation Exchange Capacity	----	0.1	meq/100g	**5.5**	**1.3**	**0.7**	**4.5**	**0.7**
^ Exchangeable Sodium Percent	----	0.1	%	----	----	**1.9**	**1.6**	**1.7**
ED037: Alkalinity								
Alkalinity	----	1	meq/kg	----	----	**1**	**11**	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	----	----	**1**	**11**	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	----	----	<1	<1	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	----	----	<10	<10	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	----	----	<10	**70**	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	**240**	**50**	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	**90**	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	**640**	**20**	<10	**110**	**10**
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID : GQAL5 0-0.1	GQAL12 0.2-0.3	GQAL3 0.2-0.3	GQAL3 0.5-0.6	GQAL6 0.2-0.3
				Client sampling date / time : 29-AUG-2007 15:00	30-AUG-2007 15:00	29-AUG-2007 15:00	29-AUG-2007 15:00	29-AUG-2007 15:00
				EB0709854-026	EB0709854-027	EB0709854-028	EB0709854-029	EB0709854-030
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**6.5**	**6.0**	**5.2**	**5.7**	**5.9**
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	**19**	**11**	**66**	**99**	**16**
EA055: Moisture Content								
^ Moisture Content (dried @ 103)	----	1.0	%	**4.6**	**12.8**	**21.0**	**14.0**	**7.2**
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	**1.0**	**0.7**	**0.7**	**0.5**	**0.5**
^ Exchangeable Magnesium	----	0.1	meq/100g	**0.3**	**0.4**	**2.4**	**2.8**	**0.3**
^ Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
^ Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	**0.3**	**0.5**	<0.1
^ Cation Exchange Capacity	----	0.1	meq/100g	**1.4**	**1.3**	**3.5**	**3.9**	**0.9**
^ Exchangeable Sodium Percent	----	0.1	%	**1.1**	----	----	**2.7**	----
ED037: Alkalinity								
Alkalinity	----	1	meq/kg	**2**	----	----	**2**	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	**2**	----	----	**2**	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	----	----	<1	----
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	----	----	<10	----
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	----	----	**110**	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	**30**	**10**	**60**	**50**	**20**
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID : GQAL1 0.5-0.6	GQAL4 0.8-0.9	GQAL3 1.1-1.2	GQAL3 0.8-0.9	GQAL5 0.8-0.9
				Client sampling date / time : 28-AUG-2007 15:00	29-AUG-2007 15:00	29-AUG-2007 15:00	29-AUG-2007 15:00	29-AUG-2007 15:00
				EB0709854-031	EB0709854-032	EB0709854-033	EB0709854-034	EB0709854-035
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**6.9**	**7.2**	**7.1**	**6.4**	**6.0**
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	**86**	**28**	**123**	**127**	**23**
EA055: Moisture Content								
^ Moisture Content (dried @ 103)	----	1.0	%	**19.2**	**6.8**	**15.0**	**15.9**	**9.4**
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	**2.1**	**0.7**	**0.4**	**0.4**	**1.5**
^ Exchangeable Magnesium	----	0.1	meq/100g	**1.1**	**1.3**	**2.2**	**2.6**	**1.2**
^ Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
^ Exchangeable Sodium	----	0.1	meq/100g	**0.2**	**0.2**	**0.6**	**0.6**	**0.2**
^ Cation Exchange Capacity	----	0.1	meq/100g	**3.4**	**2.2**	**3.3**	**3.7**	**2.9**
^ Exchangeable Sodium Percent	----	0.1	%	**1.4**	----	**4.0**	----	----
ED037: Alkalinity								
Alkalinity	----	1	meq/kg	**7**	----	**2**	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	**7**	----	**2**	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	----	<1	----	----
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	----	<10	----	----
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	**120**	----	**160**	----	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	**100**	**30**	**90**	**90**	**20**
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID :	GQAL7 0.0-0.1	GQAL5 1.1-1.2	GQAL4 0.5-0.7	GQAL7 1.1-1.2	GQAL6 0-0.1
				Client sampling date / time :	30-AUG-2007 15:00	29-AUG-2007 15:00	29-AUG-2007 15:00	30-AUG-2007 15:00	29-AUG-2007 15:00
					EB0709854-036	EB0709854-037	EB0709854-038	EB0709854-039	EB0709854-040
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		**6.1**	**7.0**	**6.2**	**5.8**	**6.2**
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		**15**	**38**	**10**	**31**	**23**
EA055: Moisture Content									
^ Moisture Content (dried @ 103)	----	1.0	%		**5.0**	**5.7**	**8.4**	**10.5**	**7.5**
ED007: Exchangeable Cations									
^ Exchangeable Calcium	----	0.1	meq/100g		**0.4**	**1.6**	**0.1**	<0.1	**0.6**
^ Exchangeable Magnesium	----	0.1	meq/100g		**0.2**	**1.2**	**0.2**	**0.6**	**0.3**
^ Exchangeable Potassium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
^ Exchangeable Sodium	----	0.1	meq/100g		<0.1	**0.3**	<0.1	**0.2**	<0.1
^ Cation Exchange Capacity	----	0.1	meq/100g		**0.7**	**3.2**	**0.3**	**0.9**	**1.0**
^ Exchangeable Sodium Percent	----	0.1	%		**0.8**	**1.8**	**1.4**	**3.9**	**1.1**
ED037: Alkalinity									
Alkalinity	----	1	meq/kg		<1	**3**	<1	<1	**1**
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg		<1	**3**	<1	<1	**1**
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg		<1	<1	<1	<1	<1
ED040S: Soluble Major Anions									
Sulphate as SO4 2-	14808-79-8	10	mg/kg		<10	**10**	<10	**40**	**10**
ED045: Chloride									
Chloride	16887-00-6	10	mg/kg		<10	**20**	<10	<10	<10
ED093S: Soluble Major Cations									
Calcium	7440-70-2	10	mg/kg		<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg		<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg		<10	**30**	<10	**30**	**30**
Potassium	7440-09-7	10	mg/kg		**10**	<10	**20**	<10	<10

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID : GQAL1 0.2-0.3	GQAL8 1.1-1.2			
				Client sampling date / time : 28-AUG-2007 15:00	30-AUG-2007 15:00			
				EB0709854-041	EB0709854-042			
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**6.0**	**6.5**			
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	**39**	**10**			
EA055: Moisture Content								
^ Moisture Content (dried @ 103)	----	1.0	%	**17.9**	**17.1**			
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	**1.6**	**1.3**			
^ Exchangeable Magnesium	----	0.1	meq/100g	**0.9**	**0.6**			
^ Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1			
^ Exchangeable Sodium	----	0.1	meq/100g	**0.2**	<0.1			
^ Cation Exchange Capacity	----	0.1	meq/100g	**2.7**	**2.0**			
^ Exchangeable Sodium Percent	----	0.1	%	----	**0.8**			
ED037: Alkalinity								
Alkalinity	----	1	meq/kg	----	**1**			
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	----	**1**			
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	----	<1			
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	----	<10			
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	----	<10			
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10			
Magnesium	7439-95-4	10	mg/kg	**10**	<10			
Sodium	7440-23-5	10	mg/kg	**40**	<10			
Potassium	7440-09-7	10	mg/kg	**20**	<10			

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB0709854**	Page	: 1 of 8
Client	: **CONNELL WAGNER PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: HR7906 JILALAN	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: SARINA		
C-O-C number	: ----	Date Samples Received	: 31-AUG-2007
Sampler	: MH	Issue Date	: 14-SEP-2007
Order number	: ----		
		No. of samples received	: 43
Quote number	: BN/212/07	No. of samples analysed	: 42

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA002 : pH (Soils) (QC Lot: 484707)									
EB0709854-002	GQAL1 0-0.1	EA002: pH Value	----	0.1	pH Unit	5.8	5.8	0.0	0% - 20%
EB0709854-010	GQAL4 0-0.1	EA002: pH Value	----	0.1	pH Unit	5.9	5.8	0.0	0% - 20%
EA002 : pH (Soils) (QC Lot: 484713)									
EB0709854-021	GQAL1 0.8-0.9	EA002: pH Value	----	0.1	pH Unit	7.4	7.4	0.0	0% - 20%
EB0709854-030	GQAL6 0.2-0.3	EA002: pH Value	----	0.1	pH Unit	5.9	5.9	0.0	0% - 20%
EA002 : pH (Soils) (QC Lot: 484719)									
EB0709854-036	GQAL7 0.0-0.1	EA002: pH Value	----	0.1	pH Unit	6.1	6.0	0.0	0% - 20%
EA010: Conductivity (QC Lot: 484708)									
EB0709854-002	GQAL1 0-0.1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	30	34	12.5	0% - 20%
EB0709854-010	GQAL4 0-0.1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	24	22	8.7	0% - 20%
EA010: Conductivity (QC Lot: 484714)									
EB0709854-021	GQAL1 0.8-0.9	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	325	320	1.6	0% - 20%
EB0709854-030	GQAL6 0.2-0.3	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	16	17	6.1	0% - 50%
EA010: Conductivity (QC Lot: 484720)									
EB0709854-036	GQAL7 0.0-0.1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	15	14	6.9	0% - 50%
EA055: Moisture Content (QC Lot: 484703)									
EB0709844-010	Anonymous	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	9.3	9.0	2.8	No Limit
EB0709854-001	GQAL4 0.2-0.3	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	7.1	9.1	25.2	No Limit
EA055: Moisture Content (QC Lot: 484704)									
EB0709854-014	GQAL8 0.5-0.6	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	14.2	16.1	12.3	0% - 50%
EB0709854-021	GQAL1 0.8-0.9	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	18.5	18.9	2.1	0% - 50%
EA055: Moisture Content (QC Lot: 484705)									
EB0709854-034	GQAL3 0.8-0.9	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	15.9	16.5	3.6	0% - 50%
EB0709854-041	GQAL1 0.2-0.3	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	17.9	18.3	2.3	0% - 50%
ED007: Exchangeable Cations (QC Lot: 487241)									
EB0709854-001	GQAL4 0.2-0.3	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.1	0.1	0.0	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
EB0709854-009	GQAL4 1.1-1.2	ED007: Exchangeable Calcium	----	0.1	meq/100g	1.1	1.2	0.0	0% - 50%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.6	0.6	0.0	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
ED007: Exchangeable Cations (QC Lot: 487242)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED007: Exchangeable Cations (QC Lot: 487242) - continued									
EB0709854-021	GQAL1 0.8-0.9	ED007: Exchangeable Calcium	----	0.1	meq/100g	3.0	3.0	0.0	0% - 20%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	1.7	1.7	0.0	0% - 50%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.7	0.7	0.0	No Limit
EB0709854-029	GQAL3 0.5-0.6	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.5	0.5	0.0	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	2.8	2.8	0.0	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.5	0.5	0.0	No Limit
ED007: Exchangeable Cations (QC Lot: 487243)									
EB0709854-041	GQAL1 0.2-0.3	ED007: Exchangeable Calcium	----	0.1	meq/100g	1.6	1.6	0.0	0% - 50%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.9	0.9	0.0	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.2	0.2	0.0	No Limit
ED037: Alkalinity (QC Lot: 484712)									
EB0709854-002	GQAL1 0-0.1	ED037: Alkalinity	----	1	meq/kg	1	1	0.0	No Limit
EB0709854-017	GQAL3 0-0.1	ED037: Alkalinity	----	1	meq/kg	<1	<1	0.0	----
ED037: Alkalinity (QC Lot: 484718)									
EB0709854-036	GQAL7 0.0-0.1	ED037: Alkalinity	----	1	meq/kg	<1	1	0.0	No Limit
ED040S: Soluble Major Anions (QC Lot: 484711)									
EB0709854-002	GQAL1 0-0.1	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	30	30	0.0	No Limit
EB0709854-017	GQAL3 0-0.1	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	30	30	0.0	No Limit
ED040S: Soluble Major Anions (QC Lot: 484717)									
EB0709854-036	GQAL7 0.0-0.1	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	<10	0.0	----
ED045: Chloride (QC Lot: 484710)									
EB0709854-002	GQAL1 0-0.1	EDO45S: Chloride	16887-00-6	10	mg/kg	<10	<10	0.0	----
EB0709854-017	GQAL3 0-0.1	EDO45S: Chloride	16887-00-6	10	mg/kg	<10	<10	0.0	----
ED045: Chloride (QC Lot: 484716)									
EB0709854-036	GQAL7 0.0-0.1	EDO45S: Chloride	16887-00-6	10	mg/kg	<10	<10	0.0	----
ED093S: Soluble Major Cations (QC Lot: 484709)									
EB0709854-002	GQAL1 0-0.1	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	----
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	----
		ED093S: Sodium	7440-23-5	10	mg/kg	<10	<10	0.0	----
		ED093S: Potassium	7440-09-7	10	mg/kg	20	20	0.0	No Limit
EB0709854-010	GQAL4 0-0.1	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	----
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	----
		ED093S: Sodium	7440-23-5	10	mg/kg	10	10	0.0	No Limit
		ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.0	----
ED093S: Soluble Major Cations (QC Lot: 484715)									
EB0709854-021	GQAL1 0.8-0.9	ED093S: Calcium	7440-70-2	10	mg/kg	240	230	0.0	0% - 20%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED093S: Soluble Major Cations (QC Lot: 484715) - continued									
EB0709854-021	GQAL1 0.8-0.9	ED093S: Magnesium	7439-95-4	10	mg/kg	90	80	0.0	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	640	610	4.6	0% - 20%
		ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.0	----
EB0709854-030	GQAL6 0.2-0.3	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	----
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	----
		ED093S: Sodium	7440-23-5	10	mg/kg	20	20	0.0	No Limit
		ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.0	----
ED093S: Soluble Major Cations (QC Lot: 484721)									
EB0709854-036	GQAL7 0.0-0.1	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	----
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	----
		ED093S: Sodium	7440-23-5	10	mg/kg	<10	<10	0.0	----
		ED093S: Potassium	7440-09-7	10	mg/kg	10	10	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010: Conductivity (QCLot: 484708)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1413 µS/cm	100	97.7	102
EA010: Conductivity (QCLot: 484714)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1413 µS/cm	100	97.7	102
EA010: Conductivity (QCLot: 484720)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1413 µS/cm	100	97.7	102
ED007: Exchangeable Cations (QCLot: 487241)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1.47 meq/100g	93.0	70.2	105
ED007: Exchangeable Magnesium	----	0.1	meq/100g	----	0.77 meq/100g	# 119	76.4	110
				<0.1	----	----	----	----
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.20 meq/100g	88.1	70	95.3
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.51 meq/100g	86.4	70	104
ED007: Cation Exchange Capacity	----	0.1	meq/100g	----	2.95 meq/100g	98.2	70.1	104
ED007: Exchangeable Cations (QCLot: 487242)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1.47 meq/100g	99.8	70.2	105
ED007: Exchangeable Magnesium	----	0.1	meq/100g	----	0.77 meq/100g	# 119	76.4	110
				<0.1	----	----	----	----
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.20 meq/100g	89.0	70	95.3
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.51 meq/100g	94.1	70	104
ED007: Cation Exchange Capacity	----	0.1	meq/100g	----	2.95 meq/100g	103	70.1	104
ED007: Exchangeable Cations (QCLot: 487243)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1.47 meq/100g	96.8	70.2	105
ED007: Exchangeable Magnesium	----	0.1	meq/100g	----	0.77 meq/100g	# 115	76.4	110
				<0.1	----	----	----	----
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.20 meq/100g	88.8	70	95.3
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.51 meq/100g	92.3	70	104
ED007: Cation Exchange Capacity	----	0.1	meq/100g	----	2.95 meq/100g	100	70.1	104
ED037: Alkalinity (QCLot: 484712)								
ED037: Alkalinity	----	1	meq/kg	<1	500 meq/kg	95.2	85	106
ED037: Alkalinity (QCLot: 484718)								
ED037: Alkalinity	----	1	meq/kg	<1	500 meq/kg	95.0	85	106
ED040S: Soluble Major Anions (QCLot: 484711)								
ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	----	----	----	----
ED040S: Soluble Major Anions (QCLot: 484717)								

Sub-Matrix: **SOIL**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
ED040S: Soluble Major Anions (QCLot: 484717) - continued								
ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	----	----	----	----
ED045: Chloride (QCLot: 484710)								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	5000 mg/kg	98.8	76	123
ED045: Chloride (QCLot: 484716)								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	5000 mg/kg	99.6	76	123
ED093S: Soluble Major Cations (QCLot: 484709)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----
ED093S: Soluble Major Cations (QCLot: 484715)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----
ED093S: Soluble Major Cations (QCLot: 484721)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045: Chloride (QCLot: 484710)							
EB0709854-002	GQAL1 0-0.1	EDO45S: Chloride	16887-00-6	2450 mg/kg	100	70	130
ED045: Chloride (QCLot: 484716)							
EB0709854-036	GQAL7 0.0-0.1	EDO45S: Chloride	16887-00-6	2450 mg/kg	99.2	70	130

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB0709854**	Page	: 1 of 12
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: HR7906 JILALAN	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: SARINA		
C-O-C number	: ----	Date Samples Received	: 31-AUG-2007
Sampler	: MH	Issue Date	: 14-SEP-2007
Order number	: ----		
		No. of samples received	: 43
Quote number	: BN/212/07	No. of samples analysed	: 42

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved							
GQAL1 - 0-0.1, GQAL2 - 0.8-0.9, GQAL2 - 0-0.1, GQAL2 - 0.2-0.3, GQAL2 - 0.5-0.6, GQAL1 - 1.1-1.2, GQAL1 - 0.8-0.9, GQAL2 - 1.1-1.2, GQAL1 - 0.5-0.6, GQAL1 - 0.2-0.3	**28-AUG-2007**	**07-SEP-2007**	24-FEB-2008	✓	**10-SEP-2007**	07-SEP-2007	×
Soil Glass Jar - Unpreserved							
GQAL4 - 0.2-0.3, GQAL6 - 1.1-1.2, GQAL4 - 1.1-1.2, GQAL4 - 0-0.1, GQAL6 - 0.5-0.6, GQAL3 - 0-0.1, GQAL5 - 0.5-0.8, GQAL5 - 0.2-0.3, GQAL5 - 0-0.1, GQAL3 - 0.2-0.3, GQAL3 - 0.5-0.6, GQAL6 - 0.2-0.3, GQAL4 - 0.8-0.9, GQAL3 - 1.1-1.2, GQAL3 - 0.8-0.9, GQAL5 - 0.8-0.9, GQAL5 - 1.1-1.2, GQAL4 - 0.5-0.7, GQAL6 - 0-0.1	**29-AUG-2007**	**07-SEP-2007**	25-FEB-2008	✓	**10-SEP-2007**	07-SEP-2007	×
Soil Glass Jar - Unpreserved							
GQAL7 - 0.5-0.6, GQAL8 - 0-0.1, GQAL7 - 0.8-0.9, GQAL8 - 0.8-0.9, GQAL8 - 0.5-0.6, GQAL7 - 0.2-0.3, GQAL8 - 0.2-0.3, GQAL12 - 0.5-0.6, GQAL12 - 0-0.1, GQAL12 - 0.2-0.3, GQAL7 - 0.0-0.1, GQAL7 - 1.1-1.2, GQAL8 - 1.1-1.2	**30-AUG-2007**	**07-SEP-2007**	26-FEB-2008	✓	**10-SEP-2007**	07-SEP-2007	×

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA010: Conductivity								
Soil Glass Jar - Unpreserved								
GQAL1 - 0-0.1,	GQAL2 - 0.8-0.9,	**28-AUG-2007**	**07-SEP-2007**	24-FEB-2008	✓	**10-SEP-2007**	05-OCT-2007	✓
GQAL2 - 0-0.1,	GQAL2 - 0.2-0.3,							
GQAL2 - 0.5-0.6,	GQAL1 - 1.1-1.2,							
GQAL1 - 0.8-0.9,	GQAL2 - 1.1-1.2,							
GQAL1 - 0.5-0.6,	GQAL1 - 0.2-0.3							
Soil Glass Jar - Unpreserved								
GQAL4 - 0.2-0.3,	GQAL6 - 1.1-1.2,	**29-AUG-2007**	**07-SEP-2007**	25-FEB-2008	✓	**10-SEP-2007**	05-OCT-2007	✓
GQAL4 - 1.1-1.2,	GQAL4 - 0-0.1,							
GQAL6 - 0.5-0.6,	GQAL3 - 0-0.1,							
GQAL5 - 0.5-0.8,	GQAL5 - 0.2-0.3,							
GQAL5 - 0-0.1,	GQAL3 - 0.2-0.3,							
GQAL3 - 0.5-0.6,	GQAL6 - 0.2-0.3,							
GQAL4 - 0.8-0.9,	GQAL3 - 1.1-1.2,							
GQAL3 - 0.8-0.9,	GQAL5 - 0.8-0.9,							
GQAL5 - 1.1-1.2,	GQAL4 - 0.5-0.7,							
GQAL6 - 0-0.1								
Soil Glass Jar - Unpreserved								
GQAL7 - 0.5-0.6,	GQAL8 - 0-0.1,	**30-AUG-2007**	**07-SEP-2007**	26-FEB-2008	✓	**10-SEP-2007**	05-OCT-2007	✓
GQAL7 - 0.8-0.9,	GQAL8 - 0.8-0.9,							
GQAL8 - 0.5-0.6,	GQAL7 - 0.2-0.3,							
GQAL8 - 0.2-0.3,	GQAL12 - 0.5-0.6,							
GQAL12 - 0-0.1,	GQAL12 - 0.2-0.3,							
GQAL7 - 0.0-0.1,	GQAL7 - 1.1-1.2,							
GQAL8 - 1.1-1.2								

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content								
Soil Glass Jar - Unpreserved								
GQAL1 - 0-0.1,	GQAL2 - 0.8-0.9,	**28-AUG-2007**	**----**	----	----	**04-SEP-2007**	04-SEP-2007	✓
GQAL2 - 0-0.1,	GQAL2 - 0.2-0.3,							
GQAL2 - 0.5-0.6,	GQAL1 - 1.1-1.2,							
GQAL1 - 0.8-0.9,	GQAL2 - 1.1-1.2,							
GQAL1 - 0.5-0.6,	GQAL1 - 0.2-0.3							
Soil Glass Jar - Unpreserved								
GQAL4 - 0.2-0.3,	GQAL6 - 1.1-1.2,	**29-AUG-2007**	**----**	----	----	**04-SEP-2007**	05-SEP-2007	✓
GQAL4 - 1.1-1.2,	GQAL4 - 0-0.1,							
GQAL6 - 0.5-0.6,	GQAL3 - 0-0.1,							
GQAL5 - 0.5-0.8,	GQAL5 - 0.2-0.3,							
GQAL5 - 0-0.1,	GQAL3 - 0.2-0.3,							
GQAL3 - 0.5-0.6,	GQAL6 - 0.2-0.3,							
GQAL4 - 0.8-0.9,	GQAL3 - 1.1-1.2,							
GQAL3 - 0.8-0.9,	GQAL5 - 0.8-0.9,							
GQAL5 - 1.1-1.2,	GQAL4 - 0.5-0.7,							
GQAL6 - 0-0.1								
Soil Glass Jar - Unpreserved								
GQAL7 - 0.5-0.6,	GQAL8 - 0-0.1,	**30-AUG-2007**	**----**	----	----	**04-SEP-2007**	06-SEP-2007	✓
GQAL7 - 0.8-0.9,	GQAL8 - 0.8-0.9,							
GQAL8 - 0.5-0.6,	GQAL7 - 0.2-0.3,							
GQAL8 - 0.2-0.3,	GQAL12 - 0.5-0.6,							
GQAL12 - 0-0.1,	GQAL12 - 0.2-0.3,							
GQAL7 - 0.0-0.1,	GQAL7 - 1.1-1.2,							
GQAL8 - 1.1-1.2								

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED007: Exchangeable Cations							
Pulp Bag GQAL1 - 0-0.1, GQAL2 - 0.8-0.9, GQAL2 - 0-0.1, GQAL2 - 0.2-0.3, GQAL2 - 0.5-0.6, GQAL1 - 1.1-1.2, GQAL1 - 0.8-0.9, GQAL2 - 1.1-1.2, GQAL1 - 0.5-0.6, GQAL1 - 0.2-0.3	**28-AUG-2007**	**07-SEP-2007**	24-FEB-2008	✓	**12-SEP-2007**	24-FEB-2008	✓
Pulp Bag GQAL4 - 0.2-0.3, GQAL6 - 1.1-1.2, GQAL4 - 1.1-1.2, GQAL4 - 0-0.1, GQAL6 - 0.5-0.6, GQAL3 - 0-0.1, GQAL5 - 0.5-0.8, GQAL5 - 0.2-0.3, GQAL5 - 0-0.1, GQAL3 - 0.2-0.3, GQAL3 - 0.5-0.6, GQAL6 - 0.2-0.3, GQAL4 - 0.8-0.9, GQAL3 - 1.1-1.2, GQAL3 - 0.8-0.9, GQAL5 - 0.8-0.9, GQAL5 - 1.1-1.2, GQAL4 - 0.5-0.7, GQAL6 - 0-0.1	**29-AUG-2007**	**07-SEP-2007**	25-FEB-2008	✓	**12-SEP-2007**	25-FEB-2008	✓
Pulp Bag GQAL7 - 0.5-0.6, GQAL8 - 0-0.1, GQAL7 - 0.8-0.9, GQAL8 - 0.8-0.9, GQAL8 - 0.5-0.6, GQAL7 - 0.2-0.3, GQAL8 - 0.2-0.3, GQAL12 - 0.5-0.6, GQAL12 - 0-0.1, GQAL12 - 0.2-0.3, GQAL7 - 0.0-0.1, GQAL7 - 1.1-1.2, GQAL8 - 1.1-1.2	**30-AUG-2007**	**07-SEP-2007**	26-FEB-2008	✓	**12-SEP-2007**	26-FEB-2008	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037: Alkalinity							
Soil Glass Jar - Unpreserved							
GQAL1 - 0-0.1, GQAL2 - 0-0.1, GQAL2 - 0.5-0.6, GQAL1 - 1.1-1.2, GQAL2 - 1.1-1.2, GQAL1 - 0.5-0.6	**28-AUG-2007**	**07-SEP-2007**	24-FEB-2008	✓	**11-SEP-2007**	24-FEB-2008	✓
Soil Glass Jar - Unpreserved							
GQAL6 - 1.1-1.2, GQAL4 - 1.1-1.2, GQAL4 - 0-0.1, GQAL6 - 0.5-0.6, GQAL3 - 0-0.1, GQAL5 - 0.5-0.8, GQAL5 - 0-0.1, GQAL3 - 0.5-0.6, GQAL3 - 1.1-1.2, GQAL5 - 1.1-1.2, GQAL4 - 0.5-0.7, GQAL6 - 0-0.1	**29-AUG-2007**	**07-SEP-2007**	25-FEB-2008	✓	**11-SEP-2007**	25-FEB-2008	✓
Soil Glass Jar - Unpreserved							
GQAL7 - 0.5-0.6, GQAL8 - 0-0.1, GQAL8 - 0.5-0.6, GQAL12 - 0.5-0.6, GQAL12 - 0-0.1, GQAL7 - 0.0-0.1, GQAL7 - 1.1-1.2, GQAL8 - 1.1-1.2	**30-AUG-2007**	**07-SEP-2007**	26-FEB-2008	✓	**11-SEP-2007**	26-FEB-2008	✓
ED040S: Soluble Major Anions							
Soil Glass Jar - Unpreserved							
GQAL1 - 0-0.1, GQAL2 - 0-0.1, GQAL2 - 0.5-0.6, GQAL1 - 1.1-1.2, GQAL2 - 1.1-1.2, GQAL1 - 0.5-0.6	**28-AUG-2007**	**07-SEP-2007**	24-FEB-2008	✓	**14-SEP-2007**	05-OCT-2007	✓
Soil Glass Jar - Unpreserved							
GQAL6 - 1.1-1.2, GQAL4 - 1.1-1.2, GQAL4 - 0-0.1, GQAL6 - 0.5-0.6, GQAL3 - 0-0.1, GQAL5 - 0.5-0.8, GQAL5 - 0-0.1, GQAL3 - 0.5-0.6, GQAL3 - 1.1-1.2, GQAL5 - 1.1-1.2, GQAL4 - 0.5-0.7, GQAL6 - 0-0.1	**29-AUG-2007**	**07-SEP-2007**	25-FEB-2008	✓	**14-SEP-2007**	05-OCT-2007	✓
Soil Glass Jar - Unpreserved							
GQAL7 - 0.5-0.6, GQAL8 - 0-0.1, GQAL8 - 0.5-0.6, GQAL12 - 0.5-0.6, GQAL12 - 0-0.1, GQAL7 - 0.0-0.1, GQAL7 - 1.1-1.2, GQAL8 - 1.1-1.2	**30-AUG-2007**	**07-SEP-2007**	26-FEB-2008	✓	**14-SEP-2007**	05-OCT-2007	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045: Chloride								
Soil Glass Jar - Unpreserved								
GQAL1 - 0-0.1,	GQAL2 - 0-0.1,	**28-AUG-2007**	**07-SEP-2007**	24-FEB-2008	✓	**11-SEP-2007**	05-OCT-2007	✓
GQAL2 - 0.5-0.6,	GQAL1 - 1.1-1.2,							
GQAL2 - 1.1-1.2,	GQAL1 - 0.5-0.6							
Soil Glass Jar - Unpreserved								
GQAL6 - 1.1-1.2,	GQAL4 - 1.1-1.2,	**29-AUG-2007**	**07-SEP-2007**	25-FEB-2008	✓	**11-SEP-2007**	05-OCT-2007	✓
GQAL4 - 0-0.1,	GQAL6 - 0.5-0.6,							
GQAL3 - 0-0.1,	GQAL5 - 0.5-0.8,							
GQAL5 - 0-0.1,	GQAL3 - 0.5-0.6,							
GQAL3 - 1.1-1.2,	GQAL5 - 1.1-1.2,							
GQAL4 - 0.5-0.7,	GQAL6 - 0-0.1							
Soil Glass Jar - Unpreserved								
GQAL7 - 0.5-0.6,	GQAL8 - 0-0.1,	**30-AUG-2007**	**07-SEP-2007**	26-FEB-2008	✓	**11-SEP-2007**	05-OCT-2007	✓
GQAL8 - 0.5-0.6,	GQAL12 - 0.5-0.6,							
GQAL12 - 0-0.1,	GQAL7 - 0.0-0.1,							
GQAL7 - 1.1-1.2,	GQAL8 - 1.1-1.2							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED093S: Soluble Major Cations								
Soil Glass Jar - Unpreserved								
GQAL1 - 0-0.1,	GQAL2 - 0.8-0.9,	**28-AUG-2007**	**07-SEP-2007**	24-FEB-2008	✓	**14-SEP-2007**	24-FEB-2008	✓
GQAL2 - 0-0.1,	GQAL2 - 0.2-0.3,							
GQAL2 - 0.5-0.6,	GQAL1 - 1.1-1.2,							
GQAL1 - 0.8-0.9,	GQAL2 - 1.1-1.2,							
GQAL1 - 0.5-0.6,	GQAL1 - 0.2-0.3							
Soil Glass Jar - Unpreserved								
GQAL4 - 0.2-0.3		**29-AUG-2007**	**07-SEP-2007**	25-FEB-2008	✓	**12-SEP-2007**	25-FEB-2008	✓
Soil Glass Jar - Unpreserved								
GQAL6 - 1.1-1.2,	GQAL4 - 1.1-1.2,	**29-AUG-2007**	**07-SEP-2007**	25-FEB-2008	✓	**14-SEP-2007**	25-FEB-2008	✓
GQAL4 - 0-0.1,	GQAL6 - 0.5-0.6,							
GQAL3 - 0-0.1,	GQAL5 - 0.5-0.8,							
GQAL5 - 0.2-0.3,	GQAL5 - 0-0.1,							
GQAL3 - 0.2-0.3,	GQAL3 - 0.5-0.6,							
GQAL6 - 0.2-0.3,	GQAL4 - 0.8-0.9,							
GQAL3 - 1.1-1.2,	GQAL3 - 0.8-0.9,							
GQAL5 - 0.8-0.9,	GQAL5 - 1.1-1.2,							
GQAL4 - 0.5-0.7,	GQAL6 - 0-0.1							
Soil Glass Jar - Unpreserved								
GQAL7 - 0.5-0.6,	GQAL8 - 0-0.1,	**30-AUG-2007**	**07-SEP-2007**	26-FEB-2008	✓	**14-SEP-2007**	26-FEB-2008	✓
GQAL7 - 0.8-0.9,	GQAL8 - 0.8-0.9,							
GQAL8 - 0.5-0.6,	GQAL7 - 0.2-0.3,							
GQAL8 - 0.2-0.3,	GQAL12 - 0.5-0.6,							
GQAL12 - 0-0.1,	GQAL12 - 0.2-0.3,							
GQAL7 - 0.0-0.1,	GQAL7 - 1.1-1.2,							
GQAL8 - 1.1-1.2								

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	3	26	**11.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	5	42	**11.9**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	3	26	**11.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	5	42	**11.9**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	5	42	**11.9**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	3	26	**11.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	6	60	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	5	42	**11.9**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	2	26	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	2	26	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	3	42	**7.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	3	42	**7.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	2	26	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	3	42	**7.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	2	26	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	3	42	**7.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	3	42	**7.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	2	26	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride - Soluble	EDO45S	2	26	**7.7**	**5.0**	✓	ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	(APHA 21st ed., 2510) Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 104)
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Exchangeable Cations	ED007	SOIL	Rayment & Higginson (1992) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (1999) Schedule B(3) (Method 301)
Alkalinity in Soil	ED037	SOIL	APHA 21st ed., 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Cations - soluble by ICP-AES	ED093S	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Chloride - Soluble	EDO45S	SOIL	APHA 21st ed., 4500Cl- Soluble Chloride is determined titremetrically on soil samples following a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 401)

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). "Anonymous" Client Sample IDs refer to samples which are not specifically part of this work order but formed part of the QC process lot. This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
ED007: Exchangeable Cations	538415-002	Anonymous	**Exchangeable Magnesium**	----	119 %	76.4-110%	**Recovery greater than upper control limit**
ED007: Exchangeable Cations	538416-002	Anonymous	**Exchangeable Magnesium**	----	119 %	76.4-110%	**Recovery greater than upper control limit**
ED007: Exchangeable Cations	538416-026	Anonymous	**Exchangeable Magnesium**	----	115 %	76.4-110%	**Recovery greater than upper control limit**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method / Container / Client Sample ID(s)		Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved							
GQAL1 - 0-0.1,	GQAL2 - 0.8-0.9,	----	----	----	10-SEP-2007	07-SEP-2007	**3**
GQAL2 - 0-0.1,	GQAL2 - 0.2-0.3,						
GQAL2 - 0.5-0.6,	GQAL1 - 1.1-1.2,						
GQAL1 - 0.8-0.9,	GQAL2 - 1.1-1.2,						
GQAL1 - 0.5-0.6,	GQAL1 - 0.2-0.3						

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils) - Analysis Holding Time Compliance						
Soil Glass Jar - Unpreserved						
GQAL4 - 0.2-0.3, GQAL6 - 1.1-1.2, GQAL4 - 1.1-1.2, GQAL4 - 0-0.1, GQAL6 - 0.5-0.6, GQAL3 - 0-0.1, GQAL5 - 0.5-0.8, GQAL5 - 0.2-0.3, GQAL5 - 0-0.1, GQAL3 - 0.2-0.3, GQAL3 - 0.5-0.6, GQAL6 - 0.2-0.3, GQAL4 - 0.8-0.9, GQAL3 - 1.1-1.2, GQAL3 - 0.8-0.9, GQAL5 - 0.8-0.9, GQAL5 - 1.1-1.2, GQAL4 - 0.5-0.7, GQAL6 - 0-0.1	----	----	----	10-SEP-2007	07-SEP-2007	**3**
Soil Glass Jar - Unpreserved						
GQAL7 - 0.5-0.6, GQAL8 - 0-0.1, GQAL7 - 0.8-0.9, GQAL8 - 0.8-0.9, GQAL8 - 0.5-0.6, GQAL7 - 0.2-0.3, GQAL8 - 0.2-0.3, GQAL12 - 0.5-0.6, GQAL12 - 0-0.1, GQAL12 - 0.2-0.3, GQAL7 - 0.0-0.1, GQAL7 - 1.1-1.2, GQAL8 - 1.1-1.2	----	----	----	10-SEP-2007	07-SEP-2007	**3**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control data available for this section.**

Golder Associates

MANSFIELD LABORATORY

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PO Box 2034 Mansfield DC QLD 4122
Phone:(07) 3343 3166 Fax:(07) 3849 4705
www.golder.com.au

TEST RESULTS

Client :	ALS Environmental Brisbane	Report No. :	R6680
Address :	32 Shand Street, Stafford	Job No. :	077634002/1
Project :	Delivered Samples	Date Received :	7/09/2007
Batch No. :	EB0710054	Sampled by :	Client

EMERSON CLASSIFICATION

Reg'n No.	Sample No.	Sample ID	Description	Emerson Classification Number
L17364	28	GQAL 1 0.2-0.5	(CH) Silty CLAY dark grey	5
L17365	29	GQAL 1 0.5-0.6	(CH) Silty CLAY dark grey	5
L17366	30	GQAL 1 0.8-0.9	(CH) Silty CLAY dark grey	5
L17367	31	GQAL 1 1.1-1.2	(CH) Silty CLAY dark grey	5
L17368	32	GQAL 2 0.0-0.1	(CL) Silty CLAY dark grey	5
L17369	33	GQAL 2 0.2-0.3	(CH) Silty CLAY dark grey	5
L17370	34	GQAL 2 0.5-0.6	(CH) Silty CLAY pale grey brown	5
L17372	36	GQAL 2 1.1-1.2	(CH) Silty CLAY pale grey brown	2
L17373	37	GQAL 3 0.0-0.1	(SC) Clayey SAND dark brown	5
L17374	38	GQAL 3 0.2-0.3	(CH) Silty CLAY brown, with some gravel	2
L17375	39	GQAL 3 0.5-0.6	(CH) Silty CLAY grey brown, with some gravel	1

Remarks : Deionised water at 23 °C used in Emerson Class test.

Test Procedure : AS 1289 3.8.1

Prepared by NF Checked by SA

NATA 1446

N Jamm 20/9/7

Authorised Signatory

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB0710054**	Page	: 1 of 10
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: HR7906 Jilalan	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Sarina		
C-O-C number	: ----	Date Samples Received	: 06-SEP-2007
Sampler	: MH	Issue Date	: 25-SEP-2007
Order number	: ----		
		No. of samples received	: 41
Quote number	: BN/212/07	No. of samples analysed	: 38

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved							
GQAL13 - 0-0.1, GQAL13 - 0.2-0.3, GQAL13 - 0.5-0.6, GQAL13 - 0.8-0.9, GQAL13 - 1.1-1.2	**01-SEP-2007**	**10-SEP-2007**	28-FEB-2008	✓	**13-SEP-2007**	10-SEP-2007	×
Soil Glass Jar - Unpreserved							
GQAL16 - 0.0-0.1, GQAL16 - 0.2-0.3, GQAL16 - 0.5-0.6, GQAL16 - 0.8-0.9, GQAL16 - 1.1-1.2	**04-SEP-2007**	**10-SEP-2007**	02-MAR-2008	✓	**13-SEP-2007**	10-SEP-2007	×
Soil Glass Jar - Unpreserved							
GQAL10 - 0-0.1, GQAL10 - 0.2-0.3, GQAL10 - 0.5-0.6, GQAL10 - 0.8-0.9, GQAL10 - 1.1-1.2, GQAL9 - 0.0-0.1, GQAL9 - 0.2-0.3, GQAL9 - 0.5-0.6, GQAL9 - 0.8-0.9, GQAL9 - 1.1-1.2, GQAL11 - 0.0-0.1, GQAL11 - 0.2-0.3, GQAL11 - 0.5-0.6, GQAL11 - 0.8-0.9, GQAL11 - 1.1-1.2, GQAL12 - 0.8-0.9, GQAL12 - 1.1-1.2	**30-AUG-2007**	**10-SEP-2007**	26-FEB-2008	✓	**13-SEP-2007**	10-SEP-2007	×

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA010: Conductivity							
Soil Glass Jar - Unpreserved							
GQAL13 - 0-0.1, GQAL13 - 0.2-0.3, GQAL13 - 0.5-0.6, GQAL13 - 0.8-0.9, GQAL13 - 1.1-1.2	**01-SEP-2007**	**10-SEP-2007**	28-FEB-2008	✓	**13-SEP-2007**	08-OCT-2007	✓
Soil Glass Jar - Unpreserved							
GQAL16 - 0.0-0.1, GQAL16 - 0.2-0.3, GQAL16 - 0.5-0.6, GQAL16 - 0.8-0.9, GQAL16 - 1.1-1.2	**04-SEP-2007**	**10-SEP-2007**	02-MAR-2008	✓	**13-SEP-2007**	08-OCT-2007	✓
Soil Glass Jar - Unpreserved							
GQAL10 - 0-0.1, GQAL10 - 0.2-0.3, GQAL10 - 0.5-0.6, GQAL10 - 0.8-0.9, GQAL10 - 1.1-1.2, GQAL9 - 0.0-0.1, GQAL9 - 0.2-0.3, GQAL9 - 0.5-0.6, GQAL9 - 0.8-0.9, GQAL9 - 1.1-1.2, GQAL11 - 0.0-0.1, GQAL11 - 0.2-0.3, GQAL11 - 0.5-0.6, GQAL11 - 0.8-0.9, GQAL11 - 1.1-1.2, GQAL12 - 0.8-0.9, GQAL12 - 1.1-1.2	**30-AUG-2007**	**10-SEP-2007**	26-FEB-2008	✓	**13-SEP-2007**	08-OCT-2007	✓
EA055: Moisture Content							
Soil Glass Jar - Unpreserved							
GQAL13 - 0-0.1, GQAL13 - 0.2-0.3, GQAL13 - 0.5-0.6, GQAL13 - 0.8-0.9, GQAL13 - 1.1-1.2	**01-SEP-2007**	**----**	----	----	**10-SEP-2007**	08-SEP-2007	×
Soil Glass Jar - Unpreserved							
GQAL16 - 0.0-0.1, GQAL16 - 0.2-0.3, GQAL16 - 0.5-0.6, GQAL16 - 0.8-0.9, GQAL16 - 1.1-1.2	**04-SEP-2007**	**----**	----	----	**10-SEP-2007**	11-SEP-2007	✓
Soil Glass Jar - Unpreserved							
GQAL10 - 0-0.1, GQAL10 - 0.2-0.3, GQAL10 - 0.5-0.6, GQAL10 - 0.8-0.9, GQAL10 - 1.1-1.2, GQAL9 - 0.0-0.1, GQAL9 - 0.2-0.3, GQAL9 - 0.5-0.6, GQAL9 - 0.8-0.9, GQAL9 - 1.1-1.2, GQAL11 - 0.0-0.1, GQAL11 - 0.2-0.3, GQAL11 - 0.5-0.6, GQAL11 - 0.8-0.9, GQAL11 - 1.1-1.2, GQAL12 - 0.8-0.9, GQAL12 - 1.1-1.2	**30-AUG-2007**	**----**	----	----	**10-SEP-2007**	06-SEP-2007	×

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED007: Exchangeable Cations							
Pulp Bag GQAL13 - 0-0.1, GQAL13 - 0.2-0.3, GQAL13 - 0.5-0.6, GQAL13 - 0.8-0.9, GQAL13 - 1.1-1.2	**01-SEP-2007**	**12-SEP-2007**	28-FEB-2008	✓	**12-SEP-2007**	28-FEB-2008	✓
Pulp Bag GQAL16 - 0.0-0.1, GQAL16 - 0.2-0.3, GQAL16 - 0.5-0.6, GQAL16 - 0.8-0.9, GQAL16 - 1.1-1.2	**04-SEP-2007**	**12-SEP-2007**	02-MAR-2008	✓	**12-SEP-2007**	02-MAR-2008	✓
Pulp Bag GQAL10 - 0-0.1, GQAL10 - 0.2-0.3, GQAL10 - 0.5-0.6, GQAL10 - 0.8-0.9, GQAL10 - 1.1-1.2, GQAL9 - 0.0-0.1, GQAL9 - 0.2-0.3, GQAL9 - 0.5-0.6, GQAL9 - 0.8-0.9, GQAL9 - 1.1-1.2, GQAL11 - 0.0-0.1, GQAL11 - 0.2-0.3, GQAL11 - 0.5-0.6, GQAL11 - 0.8-0.9, GQAL11 - 1.1-1.2, GQAL12 - 0.8-0.9, GQAL12 - 1.1-1.2	**30-AUG-2007**	**12-SEP-2007**	26-FEB-2008	✓	**12-SEP-2007**	26-FEB-2008	✓
ED037: Alkalinity							
Soil Glass Jar - Unpreserved GQAL13 - 0-0.1, GQAL13 - 0.5-0.6, GQAL13 - 1.1-1.2	**01-SEP-2007**	**10-SEP-2007**	28-FEB-2008	✓	**13-SEP-2007**	28-FEB-2008	✓
Soil Glass Jar - Unpreserved GQAL16 - 0.0-0.1, GQAL16 - 0.5-0.6, GQAL16 - 1.1-1.2	**04-SEP-2007**	**10-SEP-2007**	02-MAR-2008	✓	**13-SEP-2007**	02-MAR-2008	✓
Soil Glass Jar - Unpreserved GQAL10 - 0-0.1, GQAL10 - 0.5-0.6, GQAL10 - 1.1-1.2, GQAL9 - 0.0-0.1, GQAL9 - 0.5-0.6, GQAL9 - 1.1-1.2, GQAL11 - 0.0-0.1, GQAL11 - 0.5-0.6, GQAL11 - 1.1-1.2, GQAL12 - 1.1-1.2	**30-AUG-2007**	**10-SEP-2007**	26-FEB-2008	✓	**13-SEP-2007**	26-FEB-2008	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED040S: Soluble Major Anions								
Soil Glass Jar - Unpreserved								
GQAL13 - 0-0.1,	GQAL13 - 0.5-0.6,	**01-SEP-2007**	**10-SEP-2007**	28-FEB-2008	✓	**18-SEP-2007**	08-OCT-2007	✓
GQAL13 - 1.1-1.2								
Soil Glass Jar - Unpreserved								
GQAL16 - 0.0-0.1,	GQAL16 - 0.5-0.6,	**04-SEP-2007**	**10-SEP-2007**	02-MAR-2008	✓	**13-SEP-2007**	08-OCT-2007	✓
GQAL16 - 1.1-1.2								
Soil Glass Jar - Unpreserved								
GQAL12 - 1.1-1.2		**30-AUG-2007**	**10-SEP-2007**	26-FEB-2008	✓	**13-SEP-2007**	08-OCT-2007	✓
Soil Glass Jar - Unpreserved								
GQAL10 - 0-0.1,	GQAL10 - 0.5-0.6,	**30-AUG-2007**	**10-SEP-2007**	26-FEB-2008	✓	**18-SEP-2007**	08-OCT-2007	✓
GQAL10 - 1.1-1.2,	GQAL9 - 0.0-0.1,							
GQAL9 - 0.5-0.6,	GQAL9 - 1.1-1.2,							
GQAL11 - 0.0-0.1,	GQAL11 - 0.5-0.6,							
GQAL11 - 1.1-1.2								
ED045: Chloride								
Soil Glass Jar - Unpreserved								
GQAL13 - 0-0.1,	GQAL13 - 0.5-0.6,	**01-SEP-2007**	**10-SEP-2007**	28-FEB-2008	✓	**13-SEP-2007**	08-OCT-2007	✓
GQAL13 - 1.1-1.2								
Soil Glass Jar - Unpreserved								
GQAL16 - 0.0-0.1,	GQAL16 - 0.5-0.6,	**04-SEP-2007**	**10-SEP-2007**	02-MAR-2008	✓	**13-SEP-2007**	08-OCT-2007	✓
GQAL16 - 1.1-1.2								
Soil Glass Jar - Unpreserved								
GQAL10 - 0-0.1,	GQAL10 - 0.5-0.6,	**30-AUG-2007**	**10-SEP-2007**	26-FEB-2008	✓	**13-SEP-2007**	08-OCT-2007	✓
GQAL10 - 1.1-1.2,	GQAL9 - 0.0-0.1,							
GQAL9 - 0.5-0.6,	GQAL9 - 1.1-1.2,							
GQAL11 - 0.0-0.1,	GQAL11 - 0.5-0.6,							
GQAL11 - 1.1-1.2,	GQAL12 - 1.1-1.2							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED093S: Soluble Major Cations							
Soil Glass Jar - Unpreserved							
GQAL13 - 0-0.1, GQAL13 - 0.2-0.3, GQAL13 - 0.5-0.6, GQAL13 - 0.8-0.9, GQAL13 - 1.1-1.2	**01-SEP-2007**	**10-SEP-2007**	28-FEB-2008	✓	**18-SEP-2007**	28-FEB-2008	✓
Soil Glass Jar - Unpreserved							
GQAL16 - 0.0-0.1, GQAL16 - 0.2-0.3, GQAL16 - 0.5-0.6, GQAL16 - 0.8-0.9, GQAL16 - 1.1-1.2	**04-SEP-2007**	**10-SEP-2007**	02-MAR-2008	✓	**13-SEP-2007**	02-MAR-2008	✓
Soil Glass Jar - Unpreserved							
GQAL12 - 1.1-1.2	**30-AUG-2007**	**10-SEP-2007**	26-FEB-2008	✓	**13-SEP-2007**	26-FEB-2008	✓
Soil Glass Jar - Unpreserved							
GQAL10 - 0-0.1, GQAL10 - 0.2-0.3, GQAL10 - 0.5-0.6, GQAL10 - 0.8-0.9, GQAL10 - 1.1-1.2, GQAL9 - 0.0-0.1, GQAL9 - 0.2-0.3, GQAL9 - 0.5-0.6, GQAL9 - 0.8-0.9, GQAL9 - 1.1-1.2, GQAL11 - 0.0-0.1, GQAL11 - 0.2-0.3, GQAL11 - 0.5-0.6, GQAL11 - 0.8-0.9, GQAL11 - 1.1-1.2, GQAL12 - 0.8-0.9	**30-AUG-2007**	**10-SEP-2007**	26-FEB-2008	✓	**18-SEP-2007**	26-FEB-2008	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	2	16	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	7	**14.3**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	2	19	**10.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	3	27	**11.1**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	4	29	**13.8**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	4	40	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	3	30	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	1	19	**5.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	2	27	**7.4**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	2	29	**6.9**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	2	27	**7.4**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	1	19	**5.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	2	27	**7.4**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	2	29	**6.9**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	19	**5.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride - Soluble	EDO45S	1	19	**5.3**	**5.0**	✓	ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	(APHA 21st ed., 2510) Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 104)
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Exchangeable Cations	ED007	SOIL	Rayment & Higginson (1992) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (1999) Schedule B(3) (Method 301)
Alkalinity in Soil	ED037	SOIL	APHA 21st ed., 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Cations - soluble by ICP-AES	ED093S	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Chloride - Soluble	EDO45S	SOIL	APHA 21st ed., 4500Cl- Soluble Chloride is determined titremetrically on soil samples following a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 401)
Emerson Aggregate Testing	EME-SOL	SOIL	Emerson Aggregate Testing per AS1289.3.8.1 performed by Subcontrator Laboratory.

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). "Anonymous" Client Sample IDs refer to samples which are not specifically part of this work order but formed part of the QC process lot. This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)						
Soil Glass Jar - Unpreserved						
GQAL13 - 0-0.1, GQAL13 - 0.2-0.3, GQAL13 - 0.5-0.6, GQAL13 - 0.8-0.9, GQAL13 - 1.1-1.2	----	----	----	13-SEP-2007	10-SEP-2007	**3**
Soil Glass Jar - Unpreserved						
GQAL16 - 0.0-0.1, GQAL16 - 0.2-0.3, GQAL16 - 0.5-0.6, GQAL16 - 0.8-0.9, GQAL16 - 1.1-1.2	----	----	----	13-SEP-2007	10-SEP-2007	**3**
Soil Glass Jar - Unpreserved						
GQAL10 - 0-0.1, GQAL10 - 0.2-0.3, GQAL10 - 0.5-0.6, GQAL10 - 0.8-0.9, GQAL10 - 1.1-1.2, GQAL9 - 0.0-0.1, GQAL9 - 0.2-0.3, GQAL9 - 0.5-0.6, GQAL9 - 0.8-0.9, GQAL9 - 1.1-1.2, GQAL11 - 0.0-0.1, GQAL11 - 0.2-0.3, GQAL11 - 0.5-0.6, GQAL11 - 0.8-0.9, GQAL11 - 1.1-1.2, GQAL12 - 0.8-0.9, GQAL12 - 1.1-1.2	----	----	----	13-SEP-2007	10-SEP-2007	**3**
EA055: Moisture Content						

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EA055: Moisture Content - Analysis Holding Time Compliance						
Soil Glass Jar - Unpreserved						
GQAL13 - 0-0.1, GQAL13 - 0.2-0.3, GQAL13 - 0.5-0.6, GQAL13 - 0.8-0.9, GQAL13 - 1.1-1.2	----	----	----	10-SEP-2007	08-SEP-2007	**2**
Soil Glass Jar - Unpreserved						
GQAL10 - 0-0.1, GQAL10 - 0.2-0.3, GQAL10 - 0.5-0.6, GQAL10 - 0.8-0.9, GQAL10 - 1.1-1.2, GQAL9 - 0.0-0.1, GQAL9 - 0.2-0.3, GQAL9 - 0.5-0.6, GQAL9 - 0.8-0.9, GQAL9 - 1.1-1.2, GQAL11 - 0.0-0.1, GQAL11 - 0.2-0.3, GQAL11 - 0.5-0.6, GQAL11 - 0.8-0.9, GQAL11 - 1.1-1.2, GQAL12 - 0.8-0.9, GQAL12 - 1.1-1.2	----	----	----	10-SEP-2007	06-SEP-2007	**4**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control data available for this section.**

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB0710054**	Page	: 1 of 6
Client	: **CONNELL WAGNER PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: HR7906 Jilalan	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Sarina		
C-O-C number	: ----	Date Samples Received	: 06-SEP-2007
Sampler	: MH	Issue Date	: 25-SEP-2007
Order number	: ----		
		No. of samples received	: 41
Quote number	: BN/212/07	No. of samples analysed	: 38

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA002 : pH (Soils) (QC Lot: 488088)									
EB0710129-002	Anonymous	EA002: pH Value	----	0.1	pH Unit	6.7	7.0	4.4	0% - 20%
EB0710129-004	Anonymous	EA002: pH Value	----	0.1	pH Unit	8.1	8.1	0.0	0% - 20%
EA002 : pH (Soils) (QC Lot: 488094)									
EB0710129-006	Anonymous	EA002: pH Value	----	0.1	pH Unit	6.1	6.1	0.0	0% - 20%
EA010: Conductivity (QC Lot: 488091)									
EB0710054-001	BH 1 4.1-4.55m	EA010: Electrical Conductivity @ 25°C	----	----	µS/cm	64	65	1.6	0% - 20%
EB0710054-010	BH 1 11.5-11.95m	EA010: Electrical Conductivity @ 25°C	----	----	µS/cm	11	12	8.7	0% - 20%
EA010: Conductivity (QC Lot: 488095)									
EB0710054-021	BH 3 2.3-2.4m	EA010: Electrical Conductivity @ 25°C	----	----	µS/cm	25	24	4.1	0% - 20%
EA055: Moisture Content (QC Lot: 488065)									
EB0710054-004	GQAL13 0.8-0.9	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	8.6	7.4	14.5	No Limit
EB0710054-011	GQAL9 0.0-0.1	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	17.5	17.0	2.8	0% - 50%
EA055: Moisture Content (QC Lot: 488066)									
EB0710054-024	GQAL16 0.2-0.3	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	8.8	8.6	2.0	No Limit
EB0710075-004	Anonymous	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	7.8	7.7	1.5	No Limit
ED007: Exchangeable Cations (QC Lot: 490157)									
EB0710054-001	GQAL13 0-0.1	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.4	0.5	0.0	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.7	0.7	0.0	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.1	0.1	0.0	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.2	0.2	0.0	No Limit
EB0710054-009	GQAL10 0.8-0.9	ED007: Exchangeable Calcium	----	0.1	meq/100g	1.6	1.7	0.0	0% - 50%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.7	0.8	0.0	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
ED007: Exchangeable Cations (QC Lot: 490158)									
EB0710054-021	GQAL12 0.8-0.9	ED007: Exchangeable Calcium	----	0.1	meq/100g	1.1	1.2	0.0	0% - 50%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.9	0.9	0.0	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.2	0.2	0.0	No Limit
ES0712307-002	Anonymous	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.8	0.8	0.0	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	1.1	1.0	0.0	0% - 50%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.1	0.1	0.0	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.5	0.5	0.0	No Limit
ED037: Alkalinity (QC Lot: 488093)									
EB0710054-001	BH 1 4.1-4.55m	ED037: Alkalinity	----	1	meq/kg	3	3	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED037: Alkalinity (QC Lot: 488093) - continued									
EB0710054-010	BH 1 11.5-11.95m	ED037: Alkalinity	----	1	meq/kg	2	2	0.0	No Limit
ED045: Chloride (QC Lot: 488089)									
EB0710054-001	BH 1 4.1-4.55m	EDO45S: Chloride	16887-00-6	10	mg/kg	40	30	0.0	No Limit
EB0710054-010	BH 1 11.5-11.95m	EDO45S: Chloride	16887-00-6	10	mg/kg	<10	<10	0.0	----
ED093S: Soluble Major Cations (QC Lot: 488096)									
EB0710054-021	BH 3 2.3-2.4m	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	----
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	----
		ED093S: Sodium	7440-23-5	10	mg/kg	20	20	0.0	No Limit
		ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.0	----

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010: Conductivity (QCLot: 488091)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1413 µS/cm	100	97.7	102
EA010: Conductivity (QCLot: 488095)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1413 µS/cm	99.2	97.7	102
ED007: Exchangeable Cations (QCLot: 490157)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1.47 meq/100g	88.3	70.2	105
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	0.77 meq/100g	106	76.4	110
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.20 meq/100g	83.5	70	95.3
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.51 meq/100g	84.1	70	104
ED007: Cation Exchange Capacity	----	0.1	meq/100g	----	2.95 meq/100g	91.7	70.1	104
ED007: Exchangeable Cations (QCLot: 490158)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1.47 meq/100g	87.9	70.2	105
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	0.77 meq/100g	109	76.4	110
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.20 meq/100g	85.5	70	95.3
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.51 meq/100g	90.6	70	104
ED007: Cation Exchange Capacity	----	0.1	meq/100g	----	2.95 meq/100g	93.6	70.1	104
ED037: Alkalinity (QCLot: 488093)								
ED037: Alkalinity	----	1	meq/kg	<1	500 meq/kg	96.2	85	106
ED040S: Soluble Major Anions (QCLot: 488090)								
ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	----	----	----	----
ED045: Chloride (QCLot: 488089)								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	5000 mg/kg	101	76	123
ED093S: Soluble Major Cations (QCLot: 488092)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----
ED093S: Soluble Major Cations (QCLot: 488096)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045: Chloride (QCLot: 488089)							
EB0710054-001	GQAL13 0-0.1	EDO45S: Chloride	16887-00-6	2000 mg/kg	129	70	130

ALS Environmental

CERTIFICATE OF ANALYSIS

Client	: **CONNELL WAGNER PTY LTD**	*Laboratory*	: **Environmental Division Brisbane**	*Page*	: **1 of 9**
Contact	: **MS MONIQUE HARRISON**	*Contact*	: **Tim Kilmister**	*Work Order*	: **EB0710054**
Address	: **LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004**	*Address*	: **32 Shand Street Stafford QLD Australia 4053**		
E-mail	: **harrisonm@conwag.com**	*E-mail*	: **Services.Brisbane@alsenviro.com**		
Telephone	: **32461000**	*Telephone*	: **+61-7-3243 7222**		
Facsimile	: **32461001**	*Facsimile*	: **+61-7-3243 7218**		
Project	: **HR7906 Jilalan**	*Quote number*	: **BN/212/07**	*Date received*	: **6 Sep 2007**
Order number	: **- Not provided -**			*Date issued*	: **25 Sep 2007**
C-O-C number	: **- Not provided -**			*No. of samples*	- *Received* : **41**
Site	: **Sarina**				*Analysed* : **27**

ALSE - Excellence in Analytical Testing

NATA Accredited Laboratory 825

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatory	*Position*	*Department*
Kim McCabe	**Senior Inorganic Chemist**	**Inorganics - NATA 825 (818 - Brisbane)**
Stephen Hislop	**Senior Inorganic Chemist**	**Inorganics - NATA 825 (818 - Brisbane)**

Comments

This report for the ALSE reference EB0710054 supersedes any previous reports with this reference. Results apply to the samples as submitted. All pages of this report have been checked and approved for release.

This report contains the following information:

- **Analytical Results for Samples Submitted**
- **Surrogate Recovery Data**

The analytical procedures used by ALS Environmental have been developed from established internationally-recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported herein. Reference methods from which ALSE methods are based are provided in parenthesis.

When moisture determination has been performed, results are reported on a dry weight basis. When a reported 'less than' result is higher than the LOR, this may be due to primary sample extracts/digestion dilution and/or insuffient sample amount for analysis. Surrogate Recovery Limits are static and based on USEPA SW846 or ALS-QWI/EN38 (in the absence of specified USEPA limits). Where LOR of reported result differ from standard LOR, this may be due to high moisture, reduced sample amount or matrix interference. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number, LOR = Limit of Reporting. * Indicates failed Surrogate Recoveries.

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL13 0-0.1	GQAL13 0.2-0.3	GQAL13 0.5-0.6	GQAL13 0.8-0.9	GQAL13 1.1-1.2
				Sample Matrix Type / Description : SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Date / Time : 1 Sep 2007 15:00	1 Sep 2007 15:00	1 Sep 2007 15:00	1 Sep 2007 15:00	1 Sep 2007 15:00
				Laboratory Sample ID : EB0710054-001	EB0710054-002	EB0710054-003	EB0710054-004	EB0710054-005
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	5.6	5.2	5.4	5.8	6.0
EA010: Conductivity								
Electrical Conductivity @ 25°C			µS/cm	64	128	221	159	271
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	7.7	14.1	11.2	8.6	8.3
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	0.4	0.5	0.4	0.3	0.5
Exchangeable Magnesium		0.1	meq/100g	0.7	1.4	1.4	0.8	0.8
Exchangeable Potassium		0.1	meq/100g	0.1	0.1	0.1	<0.1	<0.1
Exchangeable Sodium		0.1	meq/100g	0.2	0.5	0.8	0.7	1.6
Cation Exchange Capacity		0.1	meq/100g	1.4	2.5	2.7	1.8	2.9
Exchangeable Sodium Percent		0.1	%	2.6	----	5.9	----	10.6
ED037: Alkalinity								
Alkalinity		1	meq/kg	3	----	2	----	6
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	3	----	2	----	6
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	----	<1	----	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	30	----	170	----	50
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	40	----	230	----	340
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	80	120	250	160	280
Potassium	7440-09-7	10	mg/kg	10	<10	<10	<10	<10

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL10 0-0.1	GQAL10 0.2-0.3	GQAL10 0.5-0.6	GQAL10 0.8-0.9	GQAL10 1.1-1.2
			Sample Matrix Type / Description :	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Date / Time :	30 Aug 2007 15:00	30 Aug 2007 15:00	30 Aug 2007 15:00	30 Aug 2007 15:00	30 Aug 2007 15:00
			Laboratory Sample ID :	EB0710054-006	EB0710054-007	EB0710054-008	EB0710054-009	EB0710054-010
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	5.3	5.7	5.8	6.0	5.8
EA010: Conductivity								
Electrical Conductivity @ 25°C			µS/cm	22	14	14	12	11
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	18.0	18.8	19.2	19.0	18.1
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	1.6	1.7	1.7	1.6	1.4
Exchangeable Magnesium		0.1	meq/100g	0.8	0.8	0.8	0.7	0.7
Exchangeable Potassium		0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium		0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
Cation Exchange Capacity		0.1	meq/100g	2.5	2.7	2.6	2.5	2.2
Exchangeable Sodium Percent		0.1	%	0.6	----	0.6	----	0.7
ED037: Alkalinity								
Alkalinity		1	meq/kg	2	----	3	----	2
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	2	----	3	----	2
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	----	<1	----	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	10	----	<10	----	10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	----	<10	----	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	10	<10	<10	<10	<10
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL9 0.0-0.1	GQAL9 0.2-0.3	GQAL9 0.5-0.6	GQAL9 0.8-0.9	GQAL9 1.1-1.2
				Sample Matrix Type / Description : SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Date / Time : 30 Aug 2007 15:00	30 Aug 2007 15:00	30 Aug 2007 15:00	30 Aug 2007 15:00	30 Aug 2007 15:00
				Laboratory Sample ID : EB0710054-011	EB0710054-012	EB0710054-013	EB0710054-014	EB0710054-015
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	5.0	5.4	5.1	5.4	5.2
EA010: Conductivity								
Electrical Conductivity @ 25°C			µS/cm	34	16	14	11	14
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	17.5	15.8	14.5	15.4	16.3
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	1.1	1.2	0.9	1.0	1.1
Exchangeable Magnesium		0.1	meq/100g	0.7	0.7	0.5	0.5	0.6
Exchangeable Potassium		0.1	meq/100g	0.1	<0.1	<0.1	<0.1	0.1
Exchangeable Sodium		0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
Cation Exchange Capacity		0.1	meq/100g	2.0	2.1	1.6	1.7	1.9
Exchangeable Sodium Percent		0.1	%	0.5	----	0.9	----	0.6
ED037: Alkalinity								
Alkalinity		1	meq/kg	2	----	<1	----	1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	2	----	<1	----	1
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	----	<1	----	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	20	----	10	----	10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	----	<10	----	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	<10	10	10	<10	<10
Potassium	7440-09-7	10	mg/kg	10	<10	<10	<10	<10

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL11 0.0-0.1	GQAL11 0.2-0.3	GQAL11 0.5-0.6	GQAL11 0.8-0.9	GQAL11 1.1-1.2
			Sample Matrix Type / Description :	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Date / Time :	30 Aug 2007 15:00	30 Aug 2007 15:00	30 Aug 2007 15:00	30 Aug 2007 15:00	30 Aug 2007 15:00
			Laboratory Sample ID :	EB0710054-016	EB0710054-017	EB0710054-018	EB0710054-019	EB0710054-020
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	6.8	7.1	7.3	7.2	7.5
EA010: Conductivity								
Electrical Conductivity @ 25°C			µS/cm	39	38	44	25	35
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	10.2	11.2	12.3	19.5	16.6
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	1.5	1.5	5.6	1.9	2.2
Exchangeable Magnesium		0.1	meq/100g	0.6	0.7	0.9	1.1	1.0
Exchangeable Potassium		0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium		0.1	meq/100g	<0.1	<0.1	<0.1	0.1	0.1
Cation Exchange Capacity		0.1	meq/100g	2.4	2.4	6.7	3.2	3.4
Exchangeable Sodium Percent		0.1	%	0.7	----	0.2	----	0.7
ED037: Alkalinity								
Alkalinity		1	meq/kg	4	----	5	----	7
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	4	----	5	----	7
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	----	<1	----	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	30	----	40	----	20
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	----	<10	----	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	10	<10	20	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	20	20	30	20	40
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL12 0.8-0.9	GQAL12 1.1-1.2	GQAL16 0.0-0.1	GQAL16 0.2-0.3	GQAL16 0.5-0.6
				Sample Matrix Type / Description : SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Date / Time : 30 Aug 2007 15:00	30 Aug 2007 15:00	4 Sep 2007 15:00	4 Sep 2007 15:00	4 Sep 2007 15:00
				Laboratory Sample ID : EB0710054-021	EB0710054-022	EB0710054-023	EB0710054-024	EB0710054-025
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	6.2	6.9	6.9	5.6	5.3
EA010: Conductivity								
Electrical Conductivity @ 25°C			µS/cm	25	49	31	26	14
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	16.4	14.5	10.3	8.8	7.6
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	1.1	1.2	0.1	0.1	<0.1
Exchangeable Magnesium		0.1	meq/100g	0.9	1.0	0.2	0.1	<0.1
Exchangeable Potassium		0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium		0.1	meq/100g	0.2	0.4	<0.1	<0.1	<0.1
Cation Exchange Capacity		0.1	meq/100g	2.3	2.7	0.4	0.4	0.2
Exchangeable Sodium Percent		0.1	%	----	2.8	3.0	----	2.4
ED037: Alkalinity								
Alkalinity		1	meq/kg	----	6	1	----	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	----	6	1	----	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	----	<1	<1	----	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	----	<10	20	----	10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	----	<10	<10	----	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	20	40	40	30	10
Potassium	7440-09-7	10	mg/kg	<10	<10	10	<10	<10

ALS Environmental

Analytical Results

				Client Sample ID :	GQAL16 0.8-0.9	GQAL16 1.1-1.2			
				Sample Matrix Type / Description :	SOIL	SOIL			
				Sample Date / Time :	4 Sep 2007 15:00	4 Sep 2007 15:00			
				Laboratory Sample ID :					
Analyte	*CAS number*	*LOR*	*Units*		EB0710054-026	EB0710054-027			
EA002 : pH (Soils)									
pH Value		0.1	pH Unit		5.2	5.5			
EA010: Conductivity									
Electrical Conductivity @ 25°C			µS/cm		17	33			
EA055: Moisture Content									
Moisture Content (dried @ 103°C)		1.0	%		10.7	9.5			
ED007: Exchangeable Cations									
Exchangable Calcium		0.1	meq/100g		<0.1	<0.1			
Exchangeable Magnesium		0.1	meq/100g		0.1	0.4			
Exchangeable Potassium		0.1	meq/100g		<0.1	<0.1			
Exchangeable Sodium		0.1	meq/100g		<0.1	0.1			
Cation Exchange Capacity		0.1	meq/100g		0.2	0.6			
Exchangeable Sodium Percent		0.1	%		----	5.0			
ED037: Alkalinity									
Alkalinity		1	meq/kg		----	1			
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg		----	1			
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg		----	<1			
ED040S: Soluble Major Anions									
Sulphate as SO4 2-	14808-79-8	10	mg/kg		----	10			
ED045: Chloride									
Chloride	16887-00-6	10	mg/kg		----	<10			
ED093S: Soluble Major Cations									
Calcium	7440-70-2	10	mg/kg		<10	<10			
Magnesium	7439-95-4	10	mg/kg		<10	<10			
Sodium	7440-23-5	10	mg/kg		20	30			
Potassium	7440-09-7	10	mg/kg		<10	<10			

ALS Environmental

Surrogate Control Limits

- **No surrogates present on this report.**

Golder Associates

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TEST RESULTS

Client :	ALS Environmental Brisbane	Report No. :	R6685
Address :	32 Shand Street, Stafford	Job No. :	077634002/1
Project :	Delivered Samples	Date Received :	12/09/2007
Batch No. :	EB0710168	Sampled by :	Client

EMERSON CLASSIFICATION

Reg'n No.	Sample No.	Sample ID	Description	Emerson Classification Number
L17441	1	GQAC 7 0-0.1	(SC) Clayey SAND, red brown, some gravel	6
L17442	2	GQAC 7 0.2-0.3	(SC) Clayey SAND, red brown, some gravel	6
L17443	6	GQAC 8 0-0.1	(SC) Clayey SAND, brown	5
L17444	8	GQAC 8 0.5-0.6	(SC) Clayey SAND, brown	5
L17445	9	GQAC 8 0.8-0.9	(SC) Clayey SAND, brown	6
L17446	11	GQAC 9 0.8-0.9	(SC) Clayey SAND, brown	5
L17447	12	GQAC 9 0.5-0.6	(SC) Clayey SAND, brown	6
L17448	13	GQAC 9 1.1-1.2	(SC) Clayey SAND, brown	6
L17449	14	GQAC 4 0-0.1	(SC) Clayey SAND, grey brown	6
L17450	17	GQAC 4 0.8-0.9	(SC) Clayey SAND, orange brown	6
L17451	18	GQAC 4 1.1-1.2	(SC) Clayey SAND, orange brown	6
L17452	20	GQAC 5 0.2-0.3	(SC) Clayey SAND, dark grey brown	6
L17453	22	GQAC 5 0.8-0.9	(CH) Silty CLAY, grey brown	6
L17454	24	GQAC 6 0-0.1	(SC) Clayey SAND, dark grey	6
L17455	25	GQAC 6 0.2-0.3	(SC) Clayey SAND, dark brown	6
L17456	26	GQAC 6 0.5-0.6	(CH) Silty CLAY, pale brown	5
L17457	29	GQAC 10 0-0.1	(SC) Clayey SAND, brown	6
L17458	30	GQAC 10 0.2-0.3	(SC) Clayey SAND, brown	5
L17459	33	GQAC 10 1.1-1.2	(SC) Clayey SAND, brown	5
L17460	36	GQAC 12 0-0.1	(SC) Clayey SAND, dark grey	6
L17461	37	GQAC 12 0.2-0.3	(SC) Clayey SAND, dark brown & grey	6
L17462	38	GQAC 12 0.5-0.6	(SC) Clayey SAND, dark grey	6
L17463	39	GQAC 12 0.8-0.9	(SC) Clayey SAND, dark grey	6
L17464	40	GQAC 12 1.1-1.2	(CH) Sandy CLAY, pale brown	2
L17465	43	GQAC 13 0.5-0.6	(CH) Sandy CLAY, pale brown, some gravel	1
L17466	44	GQAC 13 0.8-0.9	(CI) Sandy CLAY, dark brown	2
L17467	49	GQAC 16 0.8-0.9	Lost in transit	
L17468	50	GQAC 16 1.1-1.2	(CI) Sandy CLAY, orange brown	6
L17469	51	GQAC 17 0-0.1	(SC) Clayey SAND, dark grey	6
L17470	52	GQAC 17 0.2-0.5	(SC) Clayey SAND, pale brown	6

Remarks : Deionised water at 23 °C used in Emerson Class test.

Test Procedure : AS 1289 3.8.1

Prepared by NF Checked by JA

NATA 1446

R Jones 24/9/7
Authorised Signatory

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB0710168**	Page	: 1 of 6
Client	: CONNELL HATCH	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 31358000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 31358400	Facsimile	: +61-7-3243 7218
Project	: HR7906 Jilalan Rail Tunnel Upgrade	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Sarina		
C-O-C number	: ----	Date Samples Received	: 07-SEP-2007
Sampler	: Connell Hatch	Issue Date	: 24-SEP-2007
Order number	: ----		
		No. of samples received	: 71
Quote number	: ----	No. of samples analysed	: 44

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved								
GQAL 14 0-0.1,	GQAL 14 0.2-0.3,	**06-SEP-2007**	**17-SEP-2007**	04-MAR-2008	✓	**17-SEP-2007**	17-SEP-2007	✓
GQAL 14 0.5-0.6,	GQAL 14 0.8-0.9,							
GQAL 14 1.1-1.2,	GQAL 15 0-0.1,							
GQAL 15 0.2-0.3,	GQAL 15 0.5-0.6,							
GQAL 15 0.8-0.9,	GQAL 15 1.1-1.2,							
GQAL 17 0-0.1,	GQAL 17 0.2-0.3,							
GQAL 17 0.5-0.6,	GQAL 17 0.8-0.9							
EA010: Conductivity								
Soil Glass Jar - Unpreserved								
GQAL 14 0-0.1,	GQAL 14 0.2-0.3,	**06-SEP-2007**	**17-SEP-2007**	04-MAR-2008	✓	**17-SEP-2007**	15-OCT-2007	✓
GQAL 14 0.5-0.6,	GQAL 14 0.8-0.9,							
GQAL 14 1.1-1.2,	GQAL 15 0-0.1,							
GQAL 15 0.2-0.3,	GQAL 15 0.5-0.6,							
GQAL 15 0.8-0.9,	GQAL 15 1.1-1.2,							
GQAL 17 0-0.1,	GQAL 17 0.2-0.3,							
GQAL 17 0.5-0.6,	GQAL 17 0.8-0.9							
EA055: Moisture Content								
Soil Glass Jar - Unpreserved								
GQAL 14 0-0.1,	GQAL 14 0.2-0.3,	**06-SEP-2007**	**----**	----	----	**12-SEP-2007**	13-SEP-2007	✓
GQAL 14 0.5-0.6,	GQAL 14 0.8-0.9,							
GQAL 14 1.1-1.2,	GQAL 15 0-0.1,							
GQAL 15 0.2-0.3,	GQAL 15 0.5-0.6,							
GQAL 15 0.8-0.9,	GQAL 15 1.1-1.2,							
GQAL 17 0-0.1,	GQAL 17 0.2-0.3,							
GQAL 17 0.5-0.6,	GQAL 17 0.8-0.9							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED007: Exchangeable Cations								
Pulp Bag								
GQAL 14 0.2-0.3,	GQAL 14 0.5-0.6,	**06-SEP-2007**	**20-SEP-2007**	04-MAR-2008	✓	**21-SEP-2007**	04-MAR-2008	✓
GQAL 14 0.8-0.9,	GQAL 14 1.1-1.2,							
GQAL 15 0-0.1,	GQAL 15 0.2-0.3,							
GQAL 15 0.5-0.6,	GQAL 15 0.8-0.9,							
GQAL 15 1.1-1.2,	GQAL 17 0-0.1,							
GQAL 17 0.2-0.3,	GQAL 17 0.5-0.6,							
GQAL 17 0.8-0.9								
ED037: Alkalinity								
Soil Glass Jar - Unpreserved								
GQAL 14 0.5-0.6,	GQAL 14 1.1-1.2,	**06-SEP-2007**	**17-SEP-2007**	04-MAR-2008	✓	**17-SEP-2007**	04-MAR-2008	✓
GQAL 15 0-0.1,	GQAL 15 0.5-0.6,							
GQAL 15 1.1-1.2,	GQAL 17 0-0.1,							
GQAL 17 0.5-0.6,	GQAL 17 0.8-0.9							
ED040S: Soluble Major Anions								
Soil Glass Jar - Unpreserved								
GQAL 14 0.5-0.6,	GQAL 14 1.1-1.2,	**06-SEP-2007**	**17-SEP-2007**	04-MAR-2008	✓	**17-SEP-2007**	15-OCT-2007	✓
GQAL 15 0-0.1,	GQAL 15 0.5-0.6,							
GQAL 15 1.1-1.2,	GQAL 17 0-0.1,							
GQAL 17 0.5-0.6,	GQAL 17 0.8-0.9							
ED045: Chloride								
Soil Glass Jar - Unpreserved								
GQAL 14 0.5-0.6,	GQAL 14 1.1-1.2,	**06-SEP-2007**	**17-SEP-2007**	04-MAR-2008	✓	**17-SEP-2007**	15-OCT-2007	✓
GQAL 15 0-0.1,	GQAL 15 0.5-0.6,							
GQAL 15 1.1-1.2,	GQAL 17 0-0.1,							
GQAL 17 0.5-0.6,	GQAL 17 0.8-0.9							
ED093S: Soluble Major Cations								
Soil Glass Jar - Unpreserved								
GQAL 14 0-0.1,	GQAL 14 0.2-0.3,	**06-SEP-2007**	**17-SEP-2007**	04-MAR-2008	✓	**17-SEP-2007**	04-MAR-2008	✓
GQAL 14 0.5-0.6,	GQAL 14 0.8-0.9,							
GQAL 14 1.1-1.2,	GQAL 15 0-0.1,							
GQAL 15 0.2-0.3,	GQAL 15 0.5-0.6,							
GQAL 15 0.8-0.9,	GQAL 15 1.1-1.2,							
GQAL 17 0-0.1,	GQAL 17 0.2-0.3,							
GQAL 17 0.5-0.6,	GQAL 17 0.8-0.9							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	1	8	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	2	15	**13.3**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	2	13	**15.4**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	2	15	**13.3**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	2	16	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	2	13	**15.4**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	2	20	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	2	19	**10.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	1	8	**12.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	1	13	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	15	**6.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	1	8	**12.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	15	**6.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	1	13	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	15	**6.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	13	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride - Soluble	EDO45S	1	13	**7.7**	**5.0**	✓	ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	(APHA 21st ed., 2510) Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 104)
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Exchangeable Cations	ED007	SOIL	Rayment & Higginson (1992) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (1999) Schedule B(3) (Method 301)
Alkalinity in Soil	ED037	SOIL	APHA 21st ed., 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Cations - soluble by ICP-AES	ED093S	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Chloride - Soluble	EDO45S	SOIL	APHA 21st ed., 4500Cl- Soluble Chloride is determined titremetrically on soil samples following a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 401)
Emerson Aggregate Testing	EME-SOL	SOIL	Emerson Aggregate Testing per AS1289.3.8.1 performed by Subcontrator Laboratory.

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). "Anonymous" Client Sample IDs refer to samples which are not specifically part of this work order but formed part of the QC process lot. This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control data available for this section.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Client	: CONNELL HATCH	Laboratory	: Environmental Division Brisbane	Page	: 1 of 6
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister	Work Order	: EB0710168
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053		
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com		
Telephone	: 31358000	Telephone	: +61-7-3243 7222		
Facsimile	: 31358400	Facsimile	: +61-7-3243 7218		
Project	: HR7906 Jilalan Rail Tunnel Upg	Quote number	: ----	Date received	: 7 Sep 2007
Order number	: - Not provided -			Date issued	: 24 Sep 2007
C-O-C number	: - Not provided -			No. of samples	- Received : 71
Site	: Sarina				Analysed : 14

ALSE - Excellence in Analytical Testing

NATA Accredited Laboratory 825

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatory	Position	Department
Kim McCabe	Senior Inorganic Chemist	Inorganics - NATA 825 (818 - Brisbane)
Stephen Hislop	Senior Inorganic Chemist	Inorganics - NATA 825 (818 - Brisbane)

Comments

This report for the ALSE reference EB0710168 supersedes any previous reports with this reference. Results apply to the samples as submitted. All pages of this report have been checked and approved for release.

This report contains the following information:

- **Analytical Results for Samples Submitted**
- **Surrogate Recovery Data**

The analytical procedures used by ALS Environmental have been developed from established internationally-recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported herein. Reference methods from which ALSE methods are based are provided in parenthesis.

When moisture determination has been performed, results are reported on a dry weight basis. When a reported 'less than' result is higher than the LOR, this may be due to primary sample extracts/digestion dilution and/or insuffient sample amount for analysis. Surrogate Recovery Limits are static and based on USEPA SW846 or ALS-QWI/EN38 (in the absence of specified USEPA limits). Where LOR of reported result differ from standard LOR, this may be due to high moisture, reduced sample amount or matrix interference. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number, LOR = Limit of Reporting. * Indicates failed Surrogate Recoveries.

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL 14 0-0.1	GQAL 14 0.2-0.3	GQAL 14 0.5-0.6	GQAL 14 0.8-0.9	GQAL 14 1.1-1.2
				Sample Matrix Type / Description : SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Date / Time : 6 Sep 2007 15:00	6 Sep 2007 15:00	6 Sep 2007 15:00	6 Sep 2007 15:00	6 Sep 2007 15:00
				Laboratory Sample ID : EB0710168-055	EB0710168-056	EB0710168-057	EB0710168-058	EB0710168-059
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	6.1	6.2	5.8	5.9	5.2
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	µS/cm	8	10	14	12	17
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	3.0	3.3	8.0	9.3	14.7
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	----	0.1	0.1	0.1	<0.1
Exchangeable Magnesium		0.1	meq/100g	----	0.1	0.2	0.2	0.4
Exchangeable Potassium		0.1	meq/100g	----	0.1	<0.1	<0.1	0.1
Exchangeable Sodium		0.1	meq/100g	----	<0.1	<0.1	<0.1	<0.1
Cation Exchange Capacity		0.1	meq/100g	----	0.4	0.4	0.4	0.6
Exchangeable Sodium Percent		0.1	%	----	----	0.7	----	1.7
ED037: Alkalinity								
Alkalinity		1	meq/kg	----	----	1	----	1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	----	----	1	----	1
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	----	----	<1	----	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	----	----	20	----	10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	----	----	<10	----	20
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	<10	<10	<10	<10	10
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL 15 0-0.1	GQAL 15 0.2-0.3	GQAL 15 0.5-0.6	GQAL 15 0.8-0.9	GQAL 15 1.1-1.2
				Sample Matrix Type / Description : SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Date / Time : 6 Sep 2007 15:00	6 Sep 2007 15:00	6 Sep 2007 15:00	6 Sep 2007 15:00	6 Sep 2007 15:00
				Laboratory Sample ID : EB0710168-060	EB0710168-061	EB0710168-062	EB0710168-063	EB0710168-064
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	6.2	6.3	5.5	6.0	5.5
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	µS/cm	11	7	10	14	24
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	4.8	5.9	10.7	11.6	13.9
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Magnesium		0.1	meq/100g	0.1	0.1	0.2	0.3	0.4
Exchangeable Potassium		0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	0.1
Exchangeable Sodium		0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
Cation Exchange Capacity		0.1	meq/100g	0.3	0.3	0.4	0.5	0.7
Exchangeable Sodium Percent		0.1	%	1.7	----	1.6	----	1.9
ED037: Alkalinity								
Alkalinity		1	meq/kg	1	----	1	----	1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	1	----	1	----	1
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	----	<1	----	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	----	<10	----	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	----	<10	----	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	30	50
Sodium	7440-23-5	10	mg/kg	10	<10	<10	30	70
Potassium	7440-09-7	10	mg/kg	<10	<10	10	<10	<10

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL 17 0-0.1	GQAL 17 0.2-0.3	GQAL 17 0.5-0.6	GQAL 17 0.8-0.9	
				Sample Matrix Type / Description : SOIL	SOIL	SOIL	SOIL	
				Sample Date / Time : 6 Sep 2007 15:00	6 Sep 2007 15:00	6 Sep 2007 15:00	6 Sep 2007 15:00	
				Laboratory Sample ID : EB0710168-065	EB0710168-066	EB0710168-067	EB0710168-068	
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	6.1	6.3	5.9	6.2	
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	µS/cm	29	13	47	23	
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	12.2	8.0	19.7	12.9	
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	0.3	0.1	<0.1	<0.1	
Exchangeable Magnesium		0.1	meq/100g	0.1	0.1	1.3	2.0	
Exchangeable Potassium		0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	
Exchangeable Sodium		0.1	meq/100g	<0.1	<0.1	0.4	0.6	
Cation Exchange Capacity		0.1	meq/100g	0.6	0.4	1.8	2.7	
Exchangeable Sodium Percent		0.1	%	2.8	----	4.2	4.7	
ED037: Alkalinity								
Alkalinity		1	meq/kg	1	----	3	2	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	1	----	3	2	
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	----	<1	<1	
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	----	<10	<10	
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	----	20	20	
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	80	20	<10	<10	
Magnesium	7439-95-4	10	mg/kg	20	20	70	40	
Sodium	7440-23-5	10	mg/kg	40	20	260	130	
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	

ALS Environmental

Surrogate Control Limits

- **No surrogates present on this report.**

Golder Associates

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LABORATORY

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TEST RESULTS

Client :	ALS Environmental Brisbane	Report No. :	R6689
Address :	32 Shand Street, Stafford	Job No. :	077634002/1
Project :	Delivered Samples	Date Received :	14/09/2007
Batch No. :	EB0710298	Sampled by :	Client

EMERSON CLASSIFICATION

Reg'n No.	Sample No.	Sample ID	Description	Emerson Classification Number
L17600	1	GQAL 18 0-0.1	(CI) Sandy CLAY, dark grey brown	5
L17601	2	GQAL 18 0.2-0.3	(CL) Sandy CLAY, dark grey brown	5
L17602	5	GQAL 18 1.1-1.2	(CH) Silty CLAY, dark grey, some gravel	2
L17603	6	GQAL 19 0-0.1	(CL) Sandy CLAY, dark grey	5
L17604	7	GQAL 19 0.2-0.3	(CL) Sandy CLAY, dark grey	5
L17605	8	GQAL 19 0.5-0.6	(CI) Sandy CLAY, dark brown	5
L17606	10	GQAL 20 0-0.1	(SC) Clayey SAND, dark grey	6
L17607	11	GQAL 20 0.2-0.3	(SC) Clayey SAND, dark grey	6
L17608	12	GQAL 21 0-0.1	(SC) Clayey SAND, dark grey & brown	6
L17609	15	GQAL 21 0.8-0.9	(CH) Silty CLAY, dark grey, some gravel	2
L17610	17	GQAL 22 0-0.1	(CI) Sandy CLAY, dark grey brown	6
L17611	21	GQAL 22 1.1-1.2	(CH) Silty CLAY, dark grey	2
L17612	22	GQAL 23 0.2-0.3	(CI) Sandy CLAY, dark grey brown	6
L17613	26	GQAL 23 1.1-1.2	(SC) Clayey SAND, brown	2

Remarks : Deionised water at 23 °C used in Emerson Class test.

Test Procedure : AS 1289 3.8.1

Prepared by NF Checked by JA

NATA
1446

N Jann 25/9/7
Authorised Signatory

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB0710298**	Page	: 1 of 7
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: JILALAN RAIL ARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: SARINA		
C-O-C number	: ----	Date Samples Received	: 11-SEP-2007
Sampler	: MONIQUE HARRISON	Issue Date	: 25-SEP-2007
Order number	: HR7906		
		No. of samples received	: 52
Quote number	: BN/212/07	No. of samples analysed	: 40

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved								
GQAL 18 - 0-0.1,	GQAL 18 - 0.2-0.3,	**07-SEP-2007**	**19-SEP-2007**	05-MAR-2008	✓	**20-SEP-2007**	19-SEP-2007	×
GQAL 18 - 0.5-0.6,	GQAL 18 - 0.8-0.9,							
GQAL 18 - 1.1-1.2,	GQAL 19 - 0-0.1,							
GQAL 19 - 0.2-0.3,	GQAL 19 - 0.5-0.6,							
GQAL 19 - 0.8-0.9,	GQAL 20 - 0-0.1,							
GQAL 20 - 0.2-0.3,	GQAL 21 - 0-0.1,							
GQAL 21 - 0.2-0.3,	GQAL 21 - 0.5-0.6,							
GQAL 21 - 0.8-0.9,	GQAL 21 - 1.1-1.2,							
GQAL 22 - 0-0.1,	GQAL 22 - 0.2-0.3,							
GQAL 22 - 0.5-0.6,	GQAL 22 - 0.8-0.9,							
GQAL 22 - 1.1-1.2,	GQAL 23 - 0.0-0.1,							
GQAL 23 - 0.2-0.3,	GQAL 23 - 0.5-0.6,							
GQAL 23 - 0.8-0.9,	GQAL 23 - 1.1-1.2							
EA010: Conductivity								
Soil Glass Jar - Unpreserved								
GQAL 18 - 0-0.1,	GQAL 18 - 0.2-0.3,	**07-SEP-2007**	**19-SEP-2007**	05-MAR-2008	✓	**20-SEP-2007**	17-OCT-2007	✓
GQAL 18 - 0.5-0.6,	GQAL 18 - 0.8-0.9,							
GQAL 18 - 1.1-1.2,	GQAL 19 - 0-0.1,							
GQAL 19 - 0.2-0.3,	GQAL 19 - 0.5-0.6,							
GQAL 19 - 0.8-0.9,	GQAL 20 - 0-0.1,							
GQAL 20 - 0.2-0.3,	GQAL 21 - 0-0.1,							
GQAL 21 - 0.2-0.3,	GQAL 21 - 0.5-0.6,							
GQAL 21 - 0.8-0.9,	GQAL 21 - 1.1-1.2,							
GQAL 22 - 0-0.1,	GQAL 22 - 0.2-0.3,							
GQAL 22 - 0.5-0.6,	GQAL 22 - 0.8-0.9,							
GQAL 22 - 1.1-1.2,	GQAL 23 - 0.0-0.1,							
GQAL 23 - 0.2-0.3,	GQAL 23 - 0.5-0.6,							
GQAL 23 - 0.8-0.9,	GQAL 23 - 1.1-1.2							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content								
Soil Glass Jar - Unpreserved								
GQAL 18 - 0-0.1,	GQAL 18 - 0.2-0.3,	**07-SEP-2007**	**----**	----	----	**13-SEP-2007**	14-SEP-2007	✓
GQAL 18 - 0.5-0.6,	GQAL 18 - 0.8-0.9,							
GQAL 18 - 1.1-1.2,	GQAL 19 - 0-0.1,							
GQAL 19 - 0.2-0.3,	GQAL 19 - 0.5-0.6,							
GQAL 19 - 0.8-0.9,	GQAL 20 - 0-0.1,							
GQAL 20 - 0.2-0.3,	GQAL 21 - 0-0.1,							
GQAL 21 - 0.2-0.3,	GQAL 21 - 0.5-0.6,							
GQAL 21 - 0.8-0.9,	GQAL 21 - 1.1-1.2,							
GQAL 22 - 0-0.1,	GQAL 22 - 0.2-0.3,							
GQAL 22 - 0.5-0.6,	GQAL 22 - 0.8-0.9,							
GQAL 22 - 1.1-1.2,	GQAL 23 - 0.0-0.1,							
GQAL 23 - 0.2-0.3,	GQAL 23 - 0.5-0.6,							
GQAL 23 - 0.8-0.9,	GQAL 23 - 1.1-1.2							
ED007: Exchangeable Cations								
Pulp Bag								
GQAL 18 - 0-0.1,	GQAL 18 - 0.2-0.3,	**07-SEP-2007**	**19-SEP-2007**	05-MAR-2008	✓	**20-SEP-2007**	05-MAR-2008	✓
GQAL 18 - 0.5-0.6,	GQAL 18 - 0.8-0.9,							
GQAL 18 - 1.1-1.2,	GQAL 19 - 0-0.1,							
GQAL 19 - 0.2-0.3,	GQAL 19 - 0.5-0.6,							
GQAL 19 - 0.8-0.9,	GQAL 20 - 0-0.1,							
GQAL 20 - 0.2-0.3,	GQAL 21 - 0-0.1,							
GQAL 21 - 0.2-0.3,	GQAL 21 - 0.5-0.6,							
GQAL 21 - 0.8-0.9,	GQAL 21 - 1.1-1.2,							
GQAL 22 - 0-0.1,	GQAL 22 - 0.2-0.3,							
GQAL 22 - 0.5-0.6,	GQAL 22 - 0.8-0.9,							
GQAL 22 - 1.1-1.2,	GQAL 23 - 0.0-0.1,							
GQAL 23 - 0.2-0.3,	GQAL 23 - 0.5-0.6,							
GQAL 23 - 0.8-0.9,	GQAL 23 - 1.1-1.2							
ED037: Alkalinity								
Soil Glass Jar - Unpreserved								
GQAL 18 - 0-0.1,	GQAL 18 - 0.5-0.6,	**07-SEP-2007**	**19-SEP-2007**	05-MAR-2008	✓	**20-SEP-2007**	05-MAR-2008	✓
GQAL 18 - 1.1-1.2,	GQAL 19 - 0.5-0.6,							
GQAL 19 - 0.8-0.9,	GQAL 20 - 0-0.1,							
GQAL 20 - 0.2-0.3,	GQAL 21 - 0-0.1,							
GQAL 21 - 0.5-0.6,	GQAL 21 - 1.1-1.2,							
GQAL 22 - 0-0.1,	GQAL 22 - 0.5-0.6,							
GQAL 22 - 1.1-1.2,	GQAL 23 - 0.0-0.1,							
GQAL 23 - 0.5-0.6,	GQAL 23 - 1.1-1.2							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED040S: Soluble Major Anions								
Soil Glass Jar - Unpreserved								
GQAL 18 - 0-0.1,	GQAL 18 - 0.5-0.6,	**07-SEP-2007**	**19-SEP-2007**	05-MAR-2008	✓	**20-SEP-2007**	17-OCT-2007	✓
GQAL 18 - 1.1-1.2,	GQAL 19 - 0.5-0.6,							
GQAL 19 - 0.8-0.9,	GQAL 20 - 0-0.1,							
GQAL 20 - 0.2-0.3,	GQAL 21 - 0-0.1,							
GQAL 21 - 0.5-0.6,	GQAL 21 - 1.1-1.2,							
GQAL 22 - 0-0.1,	GQAL 22 - 0.5-0.6,							
GQAL 22 - 1.1-1.2,	GQAL 23 - 0.0-0.1,							
GQAL 23 - 0.5-0.6,	GQAL 23 - 1.1-1.2							
ED045: Chloride								
Soil Glass Jar - Unpreserved								
GQAL 18 - 0-0.1,	GQAL 18 - 0.5-0.6,	**07-SEP-2007**	**19-SEP-2007**	05-MAR-2008	✓	**20-SEP-2007**	17-OCT-2007	✓
GQAL 18 - 1.1-1.2,	GQAL 19 - 0.5-0.6,							
GQAL 19 - 0.8-0.9,	GQAL 20 - 0-0.1,							
GQAL 20 - 0.2-0.3,	GQAL 21 - 0-0.1,							
GQAL 21 - 0.5-0.6,	GQAL 21 - 1.1-1.2,							
GQAL 22 - 0-0.1,	GQAL 22 - 0.5-0.6,							
GQAL 22 - 1.1-1.2,	GQAL 23 - 0.0-0.1,							
GQAL 23 - 0.5-0.6,	GQAL 23 - 1.1-1.2							
ED093S: Soluble Major Cations								
Soil Glass Jar - Unpreserved								
GQAL 18 - 0-0.1,	GQAL 18 - 0.2-0.3,	**07-SEP-2007**	**19-SEP-2007**	05-MAR-2008	✓	**20-SEP-2007**	05-MAR-2008	✓
GQAL 18 - 0.5-0.6,	GQAL 18 - 0.8-0.9,							
GQAL 18 - 1.1-1.2,	GQAL 19 - 0-0.1,							
GQAL 19 - 0.2-0.3,	GQAL 19 - 0.5-0.6,							
GQAL 19 - 0.8-0.9,	GQAL 20 - 0-0.1,							
GQAL 20 - 0.2-0.3,	GQAL 21 - 0-0.1,							
GQAL 21 - 0.2-0.3,	GQAL 21 - 0.5-0.6,							
GQAL 21 - 0.8-0.9,	GQAL 21 - 1.1-1.2,							
GQAL 22 - 0-0.1,	GQAL 22 - 0.2-0.3,							
GQAL 22 - 0.5-0.6,	GQAL 22 - 0.8-0.9,							
GQAL 22 - 1.1-1.2,	GQAL 23 - 0.0-0.1,							
GQAL 23 - 0.2-0.3,	GQAL 23 - 0.5-0.6,							
GQAL 23 - 0.8-0.9,	GQAL 23 - 1.1-1.2							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	2	16	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	3	26	**11.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	2	18	**11.1**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	4	35	**11.4**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	3	26	**11.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	2	18	**11.1**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	4	39	**10.3**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	4	37	**10.8**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	1	18	**5.6**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	2	35	**5.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	2	26	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	2	26	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	1	18	**5.6**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	2	35	**5.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	2	26	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	18	**5.6**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride - Soluble	EDO45S	1	18	**5.6**	**5.0**	✓	ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	(APHA 21st ed., 2510) Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 104)
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Exchangeable Cations	ED007	SOIL	Rayment & Higginson (1992) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (1999) Schedule B(3) (Method 301)
Alkalinity in Soil	ED037	SOIL	APHA 21st ed., 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Cations - soluble by ICP-AES	ED093S	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Chloride - Soluble	EDO45S	SOIL	APHA 21st ed., 4500Cl- Soluble Chloride is determined titremetrically on soil samples following a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 401)
Emerson Aggregate Testing	EME-SOL	SOIL	Emerson Aggregate Testing per AS1289.3.8.1 performed by Subcontrator Laboratory.

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). "Anonymous" Client Sample IDs refer to samples which are not specifically part of this work order but formed part of the QC process lot. This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved							
GQAL 18 - 0-0.1,	GQAL 18 - 0.2-0.3,	----	----	----	20-SEP-2007	19-SEP-2007	**1**
GQAL 18 - 0.5-0.6,	GQAL 18 - 0.8-0.9,						
GQAL 18 - 1.1-1.2,	GQAL 19 - 0-0.1,						
GQAL 19 - 0.2-0.3,	GQAL 19 - 0.5-0.6,						
GQAL 19 - 0.8-0.9,	GQAL 20 - 0-0.1,						
GQAL 20 - 0.2-0.3,	GQAL 21 - 0-0.1,						
GQAL 21 - 0.2-0.3,	GQAL 21 - 0.5-0.6,						
GQAL 21 - 0.8-0.9,	GQAL 21 - 1.1-1.2,						
GQAL 22 - 0-0.1,	GQAL 22 - 0.2-0.3,						
GQAL 22 - 0.5-0.6,	GQAL 22 - 0.8-0.9,						
GQAL 22 - 1.1-1.2,	GQAL 23 - 0.0-0.1,						
GQAL 23 - 0.2-0.3,	GQAL 23 - 0.5-0.6,						
GQAL 23 - 0.8-0.9,	GQAL 23 - 1.1-1.2						

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control data available for this section.**

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB0710298**	Page	: 1 of 6
Client	: **CONNELL WAGNER PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: JILALAN RAIL ARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: SARINA		
C-O-C number	: ----	Date Samples Received	: 11-SEP-2007
Sampler	: MONIQUE HARRISON	Issue Date	: 25-SEP-2007
Order number	: HR7906		
		No. of samples received	: 52
Quote number	: BN/212/07	No. of samples analysed	: 40

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA002 : pH (Soils) (QC Lot: 494997)									
EB0710298-027	GQAL 18 0-0.1	EA002: pH Value	----	0.1	pH Unit	5.8	5.8	0.0	0% - 20%
EB0710298-036	GQAL 20 0-0.1	EA002: pH Value	----	0.1	pH Unit	6.2	6.1	0.0	0% - 20%
EA002 : pH (Soils) (QC Lot: 495003)									
EB0710298-043	GQAL 22 0-0.1	EA002: pH Value	----	0.1	pH Unit	6.0	5.9	0.0	0% - 20%
EB0710364-005	Anonymous	EA002: pH Value	----	0.1	pH Unit	6.6	6.6	0.0	0% - 20%
EA010: Conductivity (QC Lot: 495000)									
EB0710298-027	GQAL 18 0-0.1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	54	51	5.7	0% - 20%
EB0710298-036	GQAL 20 0-0.1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	17	18	5.7	0% - 50%
EA010: Conductivity (QC Lot: 495004)									
EB0710298-047	GQAL 22 1.1-1.2	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	257	268	4.2	0% - 20%
EB0710364-005	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	27	30	10.5	0% - 20%
EA055: Moisture Content (QC Lot: 491026)									
EB0710175-007	Anonymous	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	17.4	15.1	14.3	0% - 50%
EB0710288-003	Anonymous	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	3.7	3.8	0.0	No Limit
EA055: Moisture Content (QC Lot: 491027)									
EB0710298-037	GQAL 20 0.2-0.3	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	8.8	9.2	4.9	No Limit
EB0710298-044	GQAL 22 0.2-0.3	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	17.0	17.2	0.9	0% - 50%
ED007: Exchangeable Cations (QC Lot: 494977)									
EB0710298-027	GQAL 18 0-0.1	ED007: Exchangeable Calcium	----	0.1	meq/100g	1.4	1.1	27.1	0% - 50%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.7	0.5	28.1	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.2	0.2	0.0	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.1	<0.1	0.0	----
EB0710298-035	GQAL 19 0.8-0.9	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.8	0.6	30.1	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.6	0.4	32.0	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.1	<0.1	0.0	----
ED007: Exchangeable Cations (QC Lot: 494979)									
EB0710298-047	GQAL 22 1.1-1.2	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.7	0.6	0.0	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	1.8	1.7	0.0	0% - 50%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.1	0.1	0.0	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.9	1.0	0.0	0% - 50%
ED037: Alkalinity (QC Lot: 495002)									
EB0710298-027	GQAL 18 0-0.1	ED037: Alkalinity	----	1	meq/kg	2	2	0.0	No Limit
EB0710298-043	GQAL 22 0-0.1	ED037: Alkalinity	----	1	meq/kg	2	2	0.0	No Limit
ED040S: Soluble Major Anions (QC Lot: 494999)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED040S: Soluble Major Anions (QC Lot: 494999) - continued									
EB0710298-027	GQAL 18 0-0.1	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	20	20	0.0	No Limit
EB0710298-043	GQAL 22 0-0.1	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	20	20	0.0	No Limit
ED045: Chloride (QC Lot: 494998)									
EB0710298-027	GQAL 18 0-0.1	EDO45S: Chloride	16887-00-6	10	mg/kg	20	20	0.0	No Limit
EB0710298-043	GQAL 22 0-0.1	EDO45S: Chloride	16887-00-6	10	mg/kg	<10	<10	0.0	----
ED093S: Soluble Major Cations (QC Lot: 495001)									
EB0710298-027	GQAL 18 0-0.1	ED093S: Calcium	7440-70-2	10	mg/kg	10	10	0.0	No Limit
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	----
		ED093S: Sodium	7440-23-5	10	mg/kg	30	30	0.0	No Limit
		ED093S: Potassium	7440-09-7	10	mg/kg	20	20	0.0	No Limit
EB0710298-036	GQAL 20 0-0.1	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	----
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	----
		ED093S: Sodium	7440-23-5	10	mg/kg	10	10	0.0	No Limit
		ED093S: Potassium	7440-09-7	10	mg/kg	10	<10	0.0	----
ED093S: Soluble Major Cations (QC Lot: 495005)									
EB0710298-047	GQAL 22 1.1-1.2	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	----
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	----
		ED093S: Sodium	7440-23-5	10	mg/kg	250	250	0.0	0% - 20%
		ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.0	----

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010: Conductivity (QCLot: 495000)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1413 µS/cm	----	97.7	102
EA010: Conductivity (QCLot: 495004)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1413 µS/cm	----	97.7	102
ED007: Exchangeable Cations (QCLot: 494977)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1.47 meq/100g	83.1	70.2	105
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	0.77 meq/100g	85.8	76.4	110
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.20 meq/100g	80.4	70	95.3
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.51 meq/100g	82.3	70	104
ED007: Cation Exchange Capacity	----	0.1	meq/100g	----	2.95 meq/100g	83.3	70.1	104
ED007: Exchangeable Cations (QCLot: 494979)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1.47 meq/100g	85.1	70.2	105
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	0.77 meq/100g	87.3	76.4	110
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.20 meq/100g	81.6	70	95.3
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.51 meq/100g	86.3	70	104
ED007: Cation Exchange Capacity	----	0.1	meq/100g	----	2.95 meq/100g	85.5	70.1	104
ED037: Alkalinity (QCLot: 495002)								
ED037: Alkalinity	----	1	meq/kg	<1	500 meq/kg	94.0	85	106
ED040S: Soluble Major Anions (QCLot: 494999)								
ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	----	----	----	----
ED045: Chloride (QCLot: 494998)								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	5000 mg/kg	101	76	123
ED093S: Soluble Major Cations (QCLot: 495001)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----
ED093S: Soluble Major Cations (QCLot: 495005)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045: Chloride (QCLot: 494998)							
EB0710298-027	GQAL 18 0-0.1	EDO45S: Chloride	16887-00-6	2450 mg/kg	95.4	70	130

ALS Environmental

CERTIFICATE OF ANALYSIS

Client	: **CONNELL WAGNER PTY LTD**	*Laboratory*	: **Environmental Division Brisbane**	*Page*	: **1 of 9**
Contact	: **MS MONIQUE HARRISON**	*Contact*	: **Tim Kilmister**	*Work Order*	: **EB0710298**
Address	: **LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004**	*Address*	: **32 Shand Street Stafford QLD Australia 4053**		
E-mail	: **harrisonm@conwag.com**	*E-mail*	: **Services.Brisbane@alsenviro.com**		
Telephone	: **32461000**	*Telephone*	: **+61-7-3243 7222**		
Facsimile	: **32461001**	*Facsimile*	: **+61-7-3243 7218**		
Project	: **JILALAN RAIL ARD UPGRADE**	*Quote number*	: **BN/212/07**	*Date received*	: **11 Sep 2007**
Order number	: **HR7906**			*Date issued*	: **25 Sep 2007**
C-O-C number	: **- Not provided -**			*No. of samples*	- *Received* : **52**
Site	: **SARINA**				*Analysed* : **26**

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NATA Accredited Laboratory 825

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Accredited for compliance with ISO/IEC 17025.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatory	*Position*	*Department*
Kim McCabe	**Senior Inorganic Chemist**	**Inorganics - NATA 825 (818 - Brisbane)**
Stephen Hislop	**Senior Inorganic Chemist**	**Inorganics - NATA 825 (818 - Brisbane)**

Comments

This report for the ALSE reference EB0710298 supersedes any previous reports with this reference. Results apply to the samples as submitted. All pages of this report have been checked and approved for release.

This report contains the following information:

- **Analytical Results for Samples Submitted**
- **Surrogate Recovery Data**

The analytical procedures used by ALS Environmental have been developed from established internationally-recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported herein. Reference methods from which ALSE methods are based are provided in parenthesis.

When moisture determination has been performed, results are reported on a dry weight basis. When a reported 'less than' result is higher than the LOR, this may be due to primary sample extracts/digestion dilution and/or insuffient sample amount for analysis. Surrogate Recovery Limits are static and based on USEPA SW846 or ALS-QWI/EN38 (in the absence of specified USEPA limits). Where LOR of reported result differ from standard LOR, this may be due to high moisture, reduced sample amount or matrix interference. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number, LOR = Limit of Reporting. * Indicates failed Surrogate Recoveries.

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL 18 0-0.1	GQAL 18 0.2-0.3	GQAL 18 0.5-0.6	GQAL 18 0.8-0.9	GQAL 18 1.1-1.2
Sample Matrix Type / Description :				SOIL	SOIL	SOIL	SOIL	SOIL
Sample Date / Time :				7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00
Laboratory Sample ID :				EB0710298-027	EB0710298-028	EB0710298-029	EB0710298-030	EB0710298-031
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	5.8	5.2	7.0	7.5	7.6
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	µS/cm	54	56	77	86	103
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	17.3	13.8	17.2	14.4	16.7
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	1.4	1.0	2.0	1.9	1.5
Exchangeable Magnesium		0.1	meq/100g	0.7	0.5	1.2	1.2	1.1
Exchangeable Potassium		0.1	meq/100g	0.2	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium		0.1	meq/100g	0.1	0.1	0.3	0.3	0.3
Cation Exchange Capacity		0.1	meq/100g	2.4	1.8	3.6	3.4	3.0
Exchangeable Sodium Percent		0.1	%	1.3	----	1.6	----	2.4
ED037: Alkalinity								
Alkalinity		1	meq/kg	2	----	8	----	10
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	2	----	8	----	10
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	----	<1	----	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	20	----	20	----	30
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	20	----	100	----	90
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	30	50	80	90	120
Potassium	7440-09-7	10	mg/kg	20	<10	<10	<10	<10

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL 19 0-0.1	GQAL 19 0.2-0.3	GQAL 19 0.5-0.6	GQAL 19 0.8-0.9	GQAL 20 0-0.1
				Sample Matrix Type / Description : SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Date / Time : 7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00
				Laboratory Sample ID : EB0710298-032	EB0710298-033	EB0710298-034	EB0710298-035	EB0710298-036
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	5.9	6.1	6.3	6.9	6.2
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	µS/cm	23	15	19	44	17
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	19.0	17.8	17.2	21.6	10.5
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	1.4	1.0	0.7	0.8	0.5
Exchangeable Magnesium		0.1	meq/100g	0.7	0.5	0.4	0.6	0.3
Exchangeable Potassium		0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium		0.1	meq/100g	0.1	<0.1	<0.1	0.1	<0.1
Cation Exchange Capacity		0.1	meq/100g	2.3	1.7	1.2	1.6	0.9
Exchangeable Sodium Percent		0.1	%	----	----	1.4	2.0	1.3
ED037: Alkalinity								
Alkalinity		1	meq/kg	----	----	2	3	1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	----	----	2	3	1
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	----	----	<1	<1	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	----	----	20	<10	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	----	----	<10	<10	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	20	10	20	50	10
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	10

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL 20 0.2-0.3	GQAL 21 0-0.1	GQAL 21 0.2-0.3	GQAL 21 0.5-0.6	GQAL 21 0.8-0.9
Sample Matrix Type / Description :				SOIL	SOIL	SOIL	SOIL	SOIL
Sample Date / Time :				7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00
Laboratory Sample ID :				EB0710298-037	EB0710298-038	EB0710298-039	EB0710298-040	EB0710298-041
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	5.4	5.8	5.6	5.5	6.1
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	µS/cm	11	25	45	56	84
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	8.8	20.8	10.6	14.4	13.2
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	0.2	0.6	0.4	0.8	0.8
Exchangeable Magnesium		0.1	meq/100g	0.1	0.3	0.2	0.6	1.1
Exchangeable Potassium		0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium		0.1	meq/100g	<0.1	0.1	0.2	0.2	0.4
Cation Exchange Capacity		0.1	meq/100g	0.6	1.1	0.9	1.7	2.4
Exchangeable Sodium Percent		0.1	%	2.7	2.1	----	2.8	----
ED037: Alkalinity								
Alkalinity		1	meq/kg	<1	1	----	2	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	<1	1	----	2	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	<1	----	<1	----
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	10	20	----	50	----
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	<10	----	20	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	<10	20	30	40	60
Potassium	7440-09-7	10	mg/kg	<10	10	<10	<10	<10

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL 21 1.1-1.2	GQAL 22 0-0.1	GQAL 22 0.2-0.3	GQAL 22 0.5-0.6	GQAL 22 0.8-0.9
				Sample Matrix Type / Description : SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Date / Time : 7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00
				Laboratory Sample ID : EB0710298-042	EB0710298-043	EB0710298-044	EB0710298-045	EB0710298-046
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	7.0	6.0	5.7	5.9	6.3
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	µS/cm	93	38	38	92	176
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	14.3	19.2	17.0	18.9	17.6
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	0.9	0.6	0.5	0.7	0.7
Exchangeable Magnesium		0.1	meq/100g	1.4	0.3	0.6	1.4	1.8
Exchangeable Potassium		0.1	meq/100g	<0.1	<0.1	<0.1	0.1	0.1
Exchangeable Sodium		0.1	meq/100g	0.5	0.1	0.2	0.5	0.8
Cation Exchange Capacity		0.1	meq/100g	2.9	1.1	1.4	2.8	3.3
Exchangeable Sodium Percent		0.1	%	3.5	2.5	----	3.5	----
ED037: Alkalinity								
Alkalinity		1	meq/kg	6	2	----	3	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	6	2	----	3	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	<1	----	<1	----
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	10	20	----	40	----
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	100	<10	----	80	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	20	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	70	40	30	70	140
Potassium	7440-09-7	10	mg/kg	40	<10	10	10	<10

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Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL 22 1.1-1.2	GQAL 23 0.0-0.1	GQAL 23 0.2-0.3	GQAL 23 0.5-0.6	GQAL 23 0.8-0.9
Sample Matrix Type / Description :				SOIL	SOIL	SOIL	SOIL	SOIL
Sample Date / Time :				7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00	7 Sep 2007 15:00
Laboratory Sample ID :				EB0710298-047	EB0710298-048	EB0710298-049	EB0710298-050	EB0710298-051
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	6.7	6.4	6.5	6.3	5.8
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	µS/cm	257	40	60	93	159
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	16.4	9.9	9.1	10.9	12.4
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	0.7	0.7	0.7	0.4	0.2
Exchangeable Magnesium		0.1	meq/100g	1.8	0.3	0.2	0.8	1.1
Exchangeable Potassium		0.1	meq/100g	0.1	0.1	<0.1	<0.1	0.1
Exchangeable Sodium		0.1	meq/100g	0.9	0.2	0.2	0.4	0.6
Cation Exchange Capacity		0.1	meq/100g	3.4	1.3	1.2	1.7	2.1
Exchangeable Sodium Percent		0.1	%	5.7	3.1	----	5.6	----
ED037: Alkalinity								
Alkalinity		1	meq/kg	4	3	----	3	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	4	3	----	3	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	<1	----	<1	----
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	20	10	----	70	----
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	390	<10	----	70	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	10	<10
Sodium	7440-23-5	10	mg/kg	250	40	60	80	120
Potassium	7440-09-7	10	mg/kg	<10	10	<10	20	<10

ALS Environmental

Analytical Results

				Client Sample ID :	GQAL 23 1.1-1.2				
				Sample Matrix Type / Description :	SOIL				
				Sample Date / Time :	7 Sep 2007 15:00				
				Laboratory Sample ID :	EB0710298-052				
Analyte	*CAS number*	*LOR*	*Units*						
EA002 : pH (Soils)									
pH Value		0.1	pH Unit		6.4				
EA010: Conductivity									
Electrical Conductivity @ 25°C		1	µS/cm		59				
EA055: Moisture Content									
Moisture Content (dried @ 103°C)		1.0	%		12.2				
ED007: Exchangeable Cations									
Exchangable Calcium		0.1	meq/100g		0.1				
Exchangeable Magnesium		0.1	meq/100g		0.8				
Exchangeable Potassium		0.1	meq/100g		<0.1				
Exchangeable Sodium		0.1	meq/100g		0.4				
Cation Exchange Capacity		0.1	meq/100g		1.4				
Exchangeable Sodium Percent		0.1	%		6.2				
ED037: Alkalinity									
Alkalinity		1	meq/kg		2				
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg		2				
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg		<1				
ED040S: Soluble Major Anions									
Sulphate as SO4 2-	14808-79-8	10	mg/kg		20				
ED045: Chloride									
Chloride	16887-00-6	10	mg/kg		50				
ED093S: Soluble Major Cations									
Calcium	7440-70-2	10	mg/kg		<10				
Magnesium	7439-95-4	10	mg/kg		<10				
Sodium	7440-23-5	10	mg/kg		50				
Potassium	7440-09-7	10	mg/kg		<10				

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Surrogate Control Limits

- **No surrogates present on this report.**

Golder Associates

MANSFIELD
LABORATORY

1/51 Secam Street, Mansfield QLD 4122
PO Box 2034 Mansfield DC QLD 4122
Phone:(07) 3343 3166 Fax:(07) 3849 4705
www.golder.com.au

TEST RESULTS

Client :	ALS Environmental Brisbane	Report No. :	R6686
Address :	32 Shand Street, Stafford	Job No. :	077634002/1
Project :	Delivered Samples	Date Received :	14/09/2007
Batch No. :	EB0710323	Sampled by :	Client

EMERSON CLASSIFICATION

Reg'n No.	Sample No.	Sample ID	Description	Emerson Classification Number
L17576	13	GQAL 24 0.5-0.6	(Cl) Sandy CLAY, brown	6
L17577	14	GQAL 24 0.8-0.9	(Cl) Sandy CLAY, brown	4
L17578	16	GQAL 25 0-0.1	(SC) Clayey SAND, brown	6
L17579	17	GQAL 25 0.2-0.3	(SC) Clayey SAND, brown	6
L17580	20	GQAL 25 1.1-1.2	(Cl) Sandy CLAY, brown	2

Remarks : Deionised water at 23 °C used in Emerson Class test.

Test Procedure : AS 1289 3.8.1

Prepared by NK Checked by JA

NATA
1446

24/9/7
Authorised Signatory

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB0710323**	Page	: 1 of 6
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: HR7906 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: SARINA		
C-O-C number	: ----	Date Samples Received	: 12-SEP-2007
Sampler	: CONNELL HATCH	Issue Date	: 24-SEP-2007
Order number	: ----		
		No. of samples received	: 20
Quote number	: BN/212/07	No. of samples analysed	: 15

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved							
GQAL 24 - 0-0.1, GQAL 24 - 0.2-0.3, GQAL 24 - 0.5-0.6, GQAL 24 - 0.8-0.9, GQAL 24 - 1.1-1.2, GQAL 25 - 0-0.1, GQAL 25 - 0.2-0.3, GQAL 25 - 0.5-0.6, GQAL 25 - 0.8-0.9, GQAL 25 - 1.1-1.2	**11-SEP-2007**	**21-SEP-2007**	09-MAR-2008	✓	**21-SEP-2007**	21-SEP-2007	✓
EA010: Conductivity							
Soil Glass Jar - Unpreserved							
GQAL 24 - 0-0.1, GQAL 24 - 0.2-0.3, GQAL 24 - 0.5-0.6, GQAL 24 - 0.8-0.9, GQAL 24 - 1.1-1.2, GQAL 25 - 0-0.1, GQAL 25 - 0.2-0.3, GQAL 25 - 0.5-0.6, GQAL 25 - 0.8-0.9, GQAL 25 - 1.1-1.2	**11-SEP-2007**	**21-SEP-2007**	09-MAR-2008	✓	**21-SEP-2007**	19-OCT-2007	✓
EA055: Moisture Content							
Soil Glass Jar - Unpreserved							
GQAL 24 - 0-0.1, GQAL 24 - 0.2-0.3, GQAL 24 - 0.5-0.6, GQAL 24 - 0.8-0.9, GQAL 24 - 1.1-1.2, GQAL 25 - 0-0.1, GQAL 25 - 0.2-0.3, GQAL 25 - 0.5-0.6, GQAL 25 - 0.8-0.9, GQAL 25 - 1.1-1.2	**11-SEP-2007**	**----**	----	----	**13-SEP-2007**	18-SEP-2007	✓
ED007: Exchangeable Cations							
Pulp Bag							
GQAL 24 - 0-0.1, GQAL 24 - 0.2-0.3, GQAL 24 - 0.5-0.6, GQAL 24 - 0.8-0.9, GQAL 24 - 1.1-1.2, GQAL 25 - 0-0.1, GQAL 25 - 0.2-0.3, GQAL 25 - 0.5-0.6, GQAL 25 - 0.8-0.9, GQAL 25 - 1.1-1.2	**11-SEP-2007**	**20-SEP-2007**	09-MAR-2008	✓	**21-SEP-2007**	09-MAR-2008	✓
ED037: Alkalinity							
Soil Glass Jar - Unpreserved							
GQAL 24 - 0-0.1, GQAL 24 - 0.5-0.6, GQAL 24 - 1.1-1.2, GQAL 25 - 0-0.1, GQAL 25 - 0.5-0.6, GQAL 25 - 1.1-1.2	**11-SEP-2007**	**21-SEP-2007**	09-MAR-2008	✓	**21-SEP-2007**	09-MAR-2008	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED040S: Soluble Major Anions								
Soil Glass Jar - Unpreserved								
GQAL 24 - 0-0.1,	GQAL 24 - 0.5-0.6,	**11-SEP-2007**	**21-SEP-2007**	09-MAR-2008	✓	**21-SEP-2007**	19-OCT-2007	✓
GQAL 24 - 1.1-1.2,	GQAL 25 - 0-0.1,							
GQAL 25 - 0.5-0.6,	GQAL 25 - 1.1-1.2							
ED045: Chloride								
Soil Glass Jar - Unpreserved								
GQAL 24 - 0-0.1,	GQAL 24 - 0.5-0.6,	**11-SEP-2007**	**21-SEP-2007**	09-MAR-2008	✓	**21-SEP-2007**	19-OCT-2007	✓
GQAL 24 - 1.1-1.2,	GQAL 25 - 0-0.1,							
GQAL 25 - 0.5-0.6,	GQAL 25 - 1.1-1.2							
ED093S: Soluble Major Cations								
Soil Glass Jar - Unpreserved								
GQAL 24 - 0-0.1,	GQAL 24 - 0.2-0.3,	**11-SEP-2007**	**21-SEP-2007**	09-MAR-2008	✓	**21-SEP-2007**	09-MAR-2008	✓
GQAL 24 - 0.5-0.6,	GQAL 24 - 0.8-0.9,							
GQAL 24 - 1.1-1.2,	GQAL 25 - 0-0.1,							
GQAL 25 - 0.2-0.3,	GQAL 25 - 0.5-0.6,							
GQAL 25 - 0.8-0.9,	GQAL 25 - 1.1-1.2							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	1	6	**16.7**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	2	10	**20.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	1	6	**16.7**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	10	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	2	14	**14.3**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	6	**16.7**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	4	40	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	1	10	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	1	6	**16.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	1	6	**16.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	10	**10.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	1	14	**7.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	1	6	**16.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	10	**10.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	1	6	**16.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	10	**10.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	1	14	**7.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	6	**16.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride - Soluble	EDO45S	1	6	**16.7**	**5.0**	✓	ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	(APHA 21st ed., 2510) Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 104)
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Exchangeable Cations	ED007	SOIL	Rayment & Higginson (1992) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (1999) Schedule B(3) (Method 301)
Alkalinity in Soil	ED037	SOIL	APHA 21st ed., 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Cations - soluble by ICP-AES	ED093S	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Chloride - Soluble	EDO45S	SOIL	APHA 21st ed., 4500Cl- Soluble Chloride is determined titremetrically on soil samples following a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 401)
Emerson Aggregate Testing	EME-SOL	SOIL	Emerson Aggregate Testing per AS1289.3.8.1 performed by Subcontrator Laboratory.

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). "Anonymous" Client Sample IDs refer to samples which are not specifically part of this work order but formed part of the QC process lot. This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control data available for this section.**

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB0710323**	Page	: 1 of 5
Client	: **CONNELL WAGNER PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: HR7906 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: SARINA		
C-O-C number	: ----	Date Samples Received	: 12-SEP-2007
Sampler	: CONNELL HATCH	Issue Date	: 24-SEP-2007
Order number	: ----		
		No. of samples received	: 20
Quote number	: BN/212/07	No. of samples analysed	: 15

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA002 : pH (Soils) (QC Lot: 495976)									
EB0710323-001	GQAL 24 0-0.1	EA002: pH Value	----	0.1	pH Unit	5.7	5.7	0.0	0% - 20%
EA010: Conductivity (QC Lot: 495979)									
EB0710323-001	GQAL 24 0-0.1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	19	19	0.0	0% - 50%
EA055: Moisture Content (QC Lot: 491027)									
EB0710298-037	Anonymous	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	8.8	9.2	4.9	No Limit
EB0710298-044	Anonymous	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	17.0	17.2	0.9	0% - 50%
EA055: Moisture Content (QC Lot: 491028)									
EB0710323-005	GQAL 24 1.1-1.2	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	13.5	11.9	12.4	0% - 50%
EB0710324-002	Anonymous	EA055-103: Moisture Content (dried @ 103)	----	1.0	%	25.4	27.1	6.4	0% - 20%
ED007: Exchangeable Cations (QC Lot: 496090)									
EB0710323-001	GQAL 24 0-0.1	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.7	0.6	0.0	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.7	0.7	0.0	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.1	<0.1	0.0	----
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
EB0710323-009	GQAL 25 0.8-0.9	ED007: Exchangeable Calcium	----	0.1	meq/100g	1.6	1.7	0.0	0% - 50%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	1.2	1.3	0.0	0% - 50%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.0	----
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.5	0.5	0.0	No Limit
ED037: Alkalinity (QC Lot: 495981)									
EB0710323-001	GQAL 24 0-0.1	ED037: Alkalinity	----	1	meq/kg	15	16	6.4	0% - 50%
ED040S: Soluble Major Anions (QC Lot: 495978)									
EB0710323-001	GQAL 24 0-0.1	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	10	10	0.0	No Limit
ED045: Chloride (QC Lot: 495977)									
EB0710323-003	GQAL 24 0.5-0.6	EDO45S: Chloride	16887-00-6	10	mg/kg	50	50	0.0	No Limit
ED093S: Soluble Major Cations (QC Lot: 495980)									
EB0710323-001	GQAL 24 0-0.1	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	----
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	----
		ED093S: Sodium	7440-23-5	10	mg/kg	<10	<10	0.0	----
		ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.0	----
EB0710323-010	GQAL 25 1.1-1.2	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	----
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	----
		ED093S: Sodium	7440-23-5	10	mg/kg	260	260	0.0	0% - 20%
		ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.0	----

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010: Conductivity (QCLot: 495979)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1413 µS/cm	99.6	97.7	102
ED007: Exchangeable Cations (QCLot: 496090)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1.47 meq/100g	84.8	70.2	105
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	0.77 meq/100g	89.5	76.4	110
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.20 meq/100g	80.3	70	95.3
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.51 meq/100g	83.5	70	104
ED007: Cation Exchange Capacity	----	0.1	meq/100g	----	2.95 meq/100g	85.4	70.1	104
ED037: Alkalinity (QCLot: 495981)								
ED037: Alkalinity	----	1	meq/kg	<1	500 meq/kg	93.4	85	106
ED040S: Soluble Major Anions (QCLot: 495978)								
ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	----	----	----	----
ED045: Chloride (QCLot: 495977)								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	5000 mg/kg	100	76	123
ED093S: Soluble Major Cations (QCLot: 495980)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	----	----	----	----
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	----	----	----	----
ED093S: Sodium	7440-23-5	10	mg/kg	<10	----	----	----	----
ED093S: Potassium	7440-09-7	10	mg/kg	<10	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045: Chloride (QCLot: 495977)							
EB0710323-001	GQAL 24 0-0.1	EDO45S: Chloride	16887-00-6	2450 mg/kg	106	70	130

ALS Environmental

CERTIFICATE OF ANALYSIS

Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane	Page	: 1 of 5
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister	Work Order	: EB0710323
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053		
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com		
Telephone	: 32461000	Telephone	: +61-7-3243 7222		
Facsimile	: 32461001	Facsimile	: +61-7-3243 7218		
Project	: HR7906 JILALAN RAIL YARD UPGRA	Quote number	: BN/212/07	Date received	: 12 Sep 2007
Order number	: - Not provided -			Date issued	: 24 Sep 2007
C-O-C number	: - Not provided -			No. of samples	- Received : 20
Site	: SARINA				Analysed : 10

ALSE - Excellence in Analytical Testing

NATA Accredited Laboratory 825

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatory	Position	Department
Kim McCabe	Senior Inorganic Chemist	Inorganics - NATA 825 (818 - Brisbane)
Stephen Hislop	Senior Inorganic Chemist	Inorganics - NATA 825 (818 - Brisbane)

Comments

This report for the ALSE reference EB0710323 supersedes any previous reports with this reference. Results apply to the samples as submitted. All pages of this report have been checked and approved for release.

This report contains the following information:

- **Analytical Results for Samples Submitted**
- **Surrogate Recovery Data**

The analytical procedures used by ALS Environmental have been developed from established internationally-recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported herein. Reference methods from which ALSE methods are based are provided in parenthesis.

When moisture determination has been performed, results are reported on a dry weight basis. When a reported 'less than' result is higher than the LOR, this may be due to primary sample extracts/digestion dilution and/or insuffient sample amount for analysis. Surrogate Recovery Limits are static and based on USEPA SW846 or ALS-QWI/EN38 (in the absence of specified USEPA limits). Where LOR of reported result differ from standard LOR, this may be due to high moisture, reduced sample amount or matrix interference. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number, LOR = Limit of Reporting. * Indicates failed Surrogate Recoveries.

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL 24 0-0.1	GQAL 24 0.2-0.3	GQAL 24 0.5-0.6	GQAL 24 0.8-0.9	GQAL 24 1.1-1.2
Sample Matrix Type / Description :				SOIL	SOIL	SOIL	SOIL	SOIL
Sample Date / Time :				11 Sep 2007 15:00	11 Sep 2007 15:00	11 Sep 2007 15:00	11 Sep 2007 15:00	11 Sep 2007 15:00
Laboratory Sample ID :				EB0710323-001	EB0710323-002	EB0710323-003	EB0710323-004	EB0710323-005
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	5.7	6.3	7.2	8.7	8.8
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	µS/cm	19	32	58	149	199
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	14.5	18.9	14.6	9.4	13.5
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	0.7	2.4	3.6	7.4	7.8
Exchangeable Magnesium		0.1	meq/100g	0.7	2.8	2.4	1.9	1.7
Exchangeable Potassium		0.1	meq/100g	0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium		0.1	meq/100g	<0.1	0.3	0.4	0.4	0.5
Cation Exchange Capacity		0.1	meq/100g	1.6	5.5	6.5	9.8	10.0
Exchangeable Sodium Percent		0.1	%	0.9	----	1.2	----	0.9
ED037: Alkalinity								
Alkalinity		1	meq/kg	15	----	66	----	310
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	15	----	66	----	286
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	----	<1	----	24
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	10	----	<10	----	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	10	----	50	----	100
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	130	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	50	<10
Sodium	7440-23-5	10	mg/kg	<10	20	40	1590	20
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : GQAL 25 0-0.1	GQAL 25 0.2-0.3	GQAL 25 0.5-0.6	GQAL 25 0.8-0.9	GQAL 25 1.1-1.2
				Sample Matrix Type / Description : SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Date / Time : 11 Sep 2007 15:00	11 Sep 2007 15:00	11 Sep 2007 15:00	11 Sep 2007 15:00	11 Sep 2007 15:00
				Laboratory Sample ID : EB0710323-006	EB0710323-007	EB0710323-008	EB0710323-009	EB0710323-010
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	5.7	5.6	6.1	6.6	7.6
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	µS/cm	16	6	29	95	278
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	14.6	8.5	13.4	15.8	11.4
ED007: Exchangeable Cations								
Exchangable Calcium		0.1	meq/100g	1.0	1.5	1.0	1.6	1.5
Exchangeable Magnesium		0.1	meq/100g	0.3	0.3	0.8	1.2	1.2
Exchangeable Potassium		0.1	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium		0.1	meq/100g	<0.1	<0.1	0.3	0.5	0.8
Cation Exchange Capacity		0.1	meq/100g	1.5	1.9	2.2	3.5	3.5
Exchangeable Sodium Percent		0.1	%	1.0	----	2.6	----	4.4
ED037: Alkalinity								
Alkalinity		1	meq/kg	20	----	27	----	81
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	20	----	27	----	81
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	----	<1	----	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	----	20	----	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	----	<10	----	370
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	10	<10	<10	60	260
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10

ALS Environmental

Surrogate Control Limits

- **No surrogates present on this report.**

Golder Associates

MANSFIELD LABORATORY

1/51 Secam Street, Mansfield QLD 4122
PO Box 2034 Mansfield DC QLD 4122
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TEST RESULTS

Client :	ALS Environmental Brisbane	Report No. :	R6767
Address :	32 Shand Street, Stafford	Job No. :	077634002/1
Project :	Delivered Samples	Date Received :	20/11/2007
Batch No. :	EB0713369	Sampled by :	Client

EMERSON CLASSIFICATION

Reg'n No.	Sample No.	Sample ID	Description	Emerson Classification Number
L19228	8	GQAL 28 0-0.1	(CH) CLAY, dark grey, with some sand	6
L19229	9	GQAL 28 0.5-0.6	(CH) Silty CLAY, brown	6
L19230	10	GQAL 28 0.8-0.9	(CH) Silty CLAY, brown	5
L19231	11	GQAL 28 1.1-1.2	(CH) Silty CLAY, brown	4
L19232	12	GQAL 29 0.2-0.3	(CH) Sandy CLAY, brown	4
L19233	13	GQAL 29 0.5-0.6	(CH) Silty CLAY, brown, with some sand	4
L19234	14	GQAL 26 0-0.1	(SC) Clayey SAND, dark brown	3
L19235	16	GQAL 26 0.5-0.6	(CI) CLAY, dark grey brown, with some sand	3
L19236	18	GQAL 26 1.1-1.2	(CH) Silty CLAY, pale brown	6
L19237	20	GQAL 27 0-0.1	(SC) Clayey SAND, dark grey brown	5
L19238	22	GQAL 27 0.5-0.6	(CH) Silty CLAY, pale brown	6
L19239	24	GQAL 27 1.1-1.2	(CH) Silty CLAY, brown	2
L19240	25	GQAL 29 1.1-1.2	(CH) Silty CLAY, brown	1

Remarks : Deionised water at 23 °C used in Emerson Class test.

Test Procedure : AS 1289 3.8.1

Prepared by NF Checked by JA

NATA 1446

N Jarman 23/11/07
Authorised Signatory

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB0713369**	Page	: 1 of 6
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: 30420 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: SARINA		
C-O-C number	: ----	Date Samples Received	: 14-NOV-2007
Sampler	: ----	Issue Date	: 27-NOV-2007
Order number	: ----		
		No. of samples received	: 25
Quote number	: BN/212/07	No. of samples analysed	: 20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non -volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA029-A: pH Measurements							
Snap Lock Bag - frozen							
ASS7 0.0m, ASS7 0.5m, ASS7 1m, ASS7 1.5m, ASS7 2.0m, ASS7 2.5m, ASS7 3.0m	**12-NOV-2007**	**14-NOV-2007**	11-NOV-2008	✓	**19-NOV-2007**	17-FEB-2008	✓
EA029-B: Acidity Trail							
Snap Lock Bag - frozen							
ASS7 0.0m, ASS7 0.5m, ASS7 1m, ASS7 1.5m, ASS7 2.0m, ASS7 2.5m, ASS7 3.0m	**12-NOV-2007**	**14-NOV-2007**	11-NOV-2008	✓	**19-NOV-2007**	17-FEB-2008	✓
EA029-C: Sulfur Trail							
Snap Lock Bag - frozen							
ASS7 0.0m, ASS7 0.5m, ASS7 1m, ASS7 1.5m, ASS7 2.0m, ASS7 2.5m, ASS7 3.0m	**12-NOV-2007**	**14-NOV-2007**	11-NOV-2008	✓	**19-NOV-2007**	17-FEB-2008	✓
EA029-D: Calcium Values							
Snap Lock Bag - frozen							
ASS7 0.0m, ASS7 0.5m, ASS7 1m, ASS7 1.5m, ASS7 2.0m, ASS7 2.5m, ASS7 3.0m	**12-NOV-2007**	**14-NOV-2007**	11-NOV-2008	✓	**19-NOV-2007**	17-FEB-2008	✓
EA029-E: Magnesium Values							
Snap Lock Bag - frozen							
ASS7 0.0m, ASS7 0.5m, ASS7 1m, ASS7 1.5m, ASS7 2.0m, ASS7 2.5m, ASS7 3.0m	**12-NOV-2007**	**14-NOV-2007**	11-NOV-2008	✓	**19-NOV-2007**	17-FEB-2008	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA029-F: Excess Acid Neutralising Capacity							
Snap Lock Bag - frozen							
ASS7 0.0m, ASS7 0.5m, ASS7 1m, ASS7 1.5m, ASS7 2.0m, ASS7 2.5m, ASS7 3.0m	**12-NOV-2007**	**14-NOV-2007**	11-NOV-2008	✓	**19-NOV-2007**	17-FEB-2008	✓
EA029-G: Retained Acidity							
Snap Lock Bag - frozen							
ASS7 0.0m, ASS7 0.5m, ASS7 1m, ASS7 1.5m, ASS7 2.0m, ASS7 2.5m, ASS7 3.0m	**12-NOV-2007**	**14-NOV-2007**	11-NOV-2008	✓	**19-NOV-2007**	17-FEB-2008	✓
EA029-H: Acid Base Accounting							
Snap Lock Bag - frozen							
ASS7 0.0m, ASS7 0.5m, ASS7 1m, ASS7 1.5m, ASS7 2.0m, ASS7 2.5m, ASS7 3.0m	**12-NOV-2007**	**14-NOV-2007**	11-NOV-2008	✓	**19-NOV-2007**	17-FEB-2008	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	7	**14.3**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	7	**14.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	SOIL	Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Emerson Aggregate Testing	EME-SOL	SOIL	Emerson Aggregate Testing per AS1289.3.8.1 performed by Subcontrator Laboratory.

Preparation Methods	Method	Matrix	Method Descriptions
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB0713369**	Page	: 1 of 5
Client	: **CONNELL WAGNER PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: 30420 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: SARINA		
C-O-C number	: ----	Date Samples Received	: 14-NOV-2007
Sampler	: ----	Issue Date	: 27-NOV-2007
Order number	: ----		
		No. of samples received	: 25
Quote number	: BN/212/07	No. of samples analysed	: 20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Jessica Garwood	Supervisor - Acid Sulphate Soils	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA029-A: pH Measurements (QC Lot: 536841)									
EB0713369-001		EA029: pH KCl (23A)	----	0.1	pH Unit	6.2	6.1	1.6	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	5.8	5.2	10.9	0% - 20%
EA029-B: Acidity Trail (QC Lot: 536841)									
EB0713369-001		EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	No Limit
EA029-C: Sulfur Trail (QC Lot: 536841)									
EB0713369-001		EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA029-D: Calcium Values (QC Lot: 536841)									
EB0713369-001		EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.07	0.07	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.08	0.07	0.0	No Limit
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA029-E: Magnesium Values (QC Lot: 536841)									
EB0713369-001		EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.02	0.02	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.02	0.02	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA029-B: Acidity Trail (QCLot: 536841)								
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----
EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029-C: Sulfur Trail (QCLot: 536841)								
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	----	----	----	----
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	----	----	----
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----
EA029-D: Calcium Values (QCLot: 536841)								
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	----	----	----	----
EA029-E: Magnesium Values (QCLot: 536841)								
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	----	----	----	----
EA029-F: Excess Acid Neutralising Capacity (QCLot: 536841)								
EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	<0.02	----	----	----	----
EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	<0.02	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EB0713369**	Page	: 1 of 5
Client	: **CONNELL WAGNER PTY LTD**	Laboratory	: Environmental Division Brisbane
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Project	: 30420 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 14-NOV-2007
Sampler	: ----	Issue Date	: 27-NOV-2007
Site	: SARINA		
		No. of samples received	: 25
Quote number	: BN/212/07	No. of samples analysed	: 20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Jessica Garwood	Supervisor - Acid Sulphate Soils	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes.

Key : CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from □kg/t dry weight□ to □kg/m3 in-situ soil□, multiply □reported results□ x □wet bulk density of soil in t/m3□.**
- **Retained Acidity not required because pH KCl greater than or equal to 4.5**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: ASS7 0.0m	ASS7 0.5m	ASS7 1m	ASS7 1.5m	ASS7 2.0m
				Client sampling date / time: 12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00
				EB0713369-001	EB0713369-002	EB0713369-003	EB0713369-004	EB0713369-005
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**6.2**	**6.3**	**5.7**	**5.9**	**5.6**
pH OX (23B)	----	0.1	pH Unit	**5.8**	**7.1**	**6.6**	**6.5**	**5.4**
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	**4**	**2**	**4**
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	**0.07**	**0.06**	**0.05**	**0.06**	**0.05**
Peroxide Calcium (23Wh)	----	0.02	% Ca	**0.08**	**0.07**	**0.06**	**0.06**	**0.06**
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	<10	<10	<10
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	**0.02**	<0.02	**0.02**	**0.03**	**0.03**
Peroxide Magnesium (23Tm)	----	0.02	% Mg	**0.02**	**0.02**	**0.02**	**0.03**	**0.03**
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	**0.02**	<0.02	<0.02	<0.02
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	**18**	<10	<10	<10
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	**0.03**	<0.02	<0.02	<0.02
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	**0.11**	**0.05**	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	**22**	**11**	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	**0.04**	<0.02	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**

Analytical Results

Sub-Matrix: SOIL			Client sample ID	ASS7 0.0m	ASS7 0.5m	ASS7 1m	ASS7 1.5m	ASS7 2.0m
			Client sampling date / time	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00
Compound	CAS Number	LOR	Unit	EB0713369-001	EB0713369-002	EB0713369-003	EB0713369-004	EB0713369-005
EA029-H: Acid Base Accounting - Continued								
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: ASS7 2.5m Client sampling date / time: 12-NOV-2007 15:00 EB0713369-006	Client sample ID: ASS7 3.0m Client sampling date / time: 12-NOV-2007 15:00 EB0713369-007	---- ---- ----	---- ---- ----	---- ---- ----
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**5.0**	**5.4**	----	----	----
pH OX (23B)	----	0.1	pH Unit	**5.3**	**4.5**	----	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**10**	**5**	----	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	----	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	----	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	----	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	----	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	----	----	----
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	----	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	----	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	----	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	**0.05**	**0.05**	----	----	----
Peroxide Calcium (23Wh)	----	0.02	% Ca	**0.05**	**0.06**	----	----	----
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	----	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	----	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	----	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	**0.02**	**0.02**	----	----	----
Peroxide Magnesium (23Tm)	----	0.02	% Mg	**0.02**	**0.02**	----	----	----
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	----	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	----	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	----	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	**10**	<10	----	----	----
Liming Rate	----	1	kg CaCO3/t	<1	<1	----	----	----