

# AUSTRALIAN SOIL TESTING PTY LTD. A.B.N. 79 003 493 623

24 Bermill Street, Rockdale, NSW, 2216 P.O. Box 2014, Rockdale D.C. NSW 2216  
Tel: 9597 5599, 9597 3286 Fax: 9597 3442 Email: austst@bigpond.com

## EFFECTIVE STRESS TRIAXIAL TEST REPORT

**CLIENT:****URS**

Level 3, 116 Miller Street North Sydney NSW 2060

**PROJECT:****Costco 43217997****Sample Source:** BHMW02 3.0-3.5m **Lab No:** 53780**Sample Description:** SILTY CLAY: mottled grey and yellow-brown, low plasticity, with fine to coarse sand (pockets of sandy clay), roots present.**Initial Moisture Content (%):** 25.3 **Dry Density (t/m<sup>3</sup>):** 2.12**Final Moisture Content (%):** 20.4**Sample Diameter (mm):** 62.1 **Sample Height (mm):** 119.2**Coefficient of Consolidation (m<sup>2</sup>/yr):** 0.15 **Rate of Strain (mm):** 0.001**Shear Details at Peak Stress Ratio****Net Confining Pressure (kPa):** 50 100 200**Deviator Stress (kPa):** 45 73 117**Pore Water Pressure (kPa):** 33 65 135**Strain At Failure (%):** 2.47 4.80 6.78**From Mohr Circles****Effective Cohesion (kPa):** 8**Effective Angle Of Friction (degrees):** 25.0

Date Tested: 31.7.09

Job Number: 119-226-2

Sampled By: URS

Tested By: CS

**Test Type:** Backsaturated, consolidated, multistaged with pore water pressure measurement.**Test procedure:** AS 1289 6.4.2 Determination of compressive strength of soil - Compressive strength of a saturated specimen tested in undrained triaxial compression with measurement of pore water pressure.

Form TX02 CU Triaxial Issue 3 January 2008 CL

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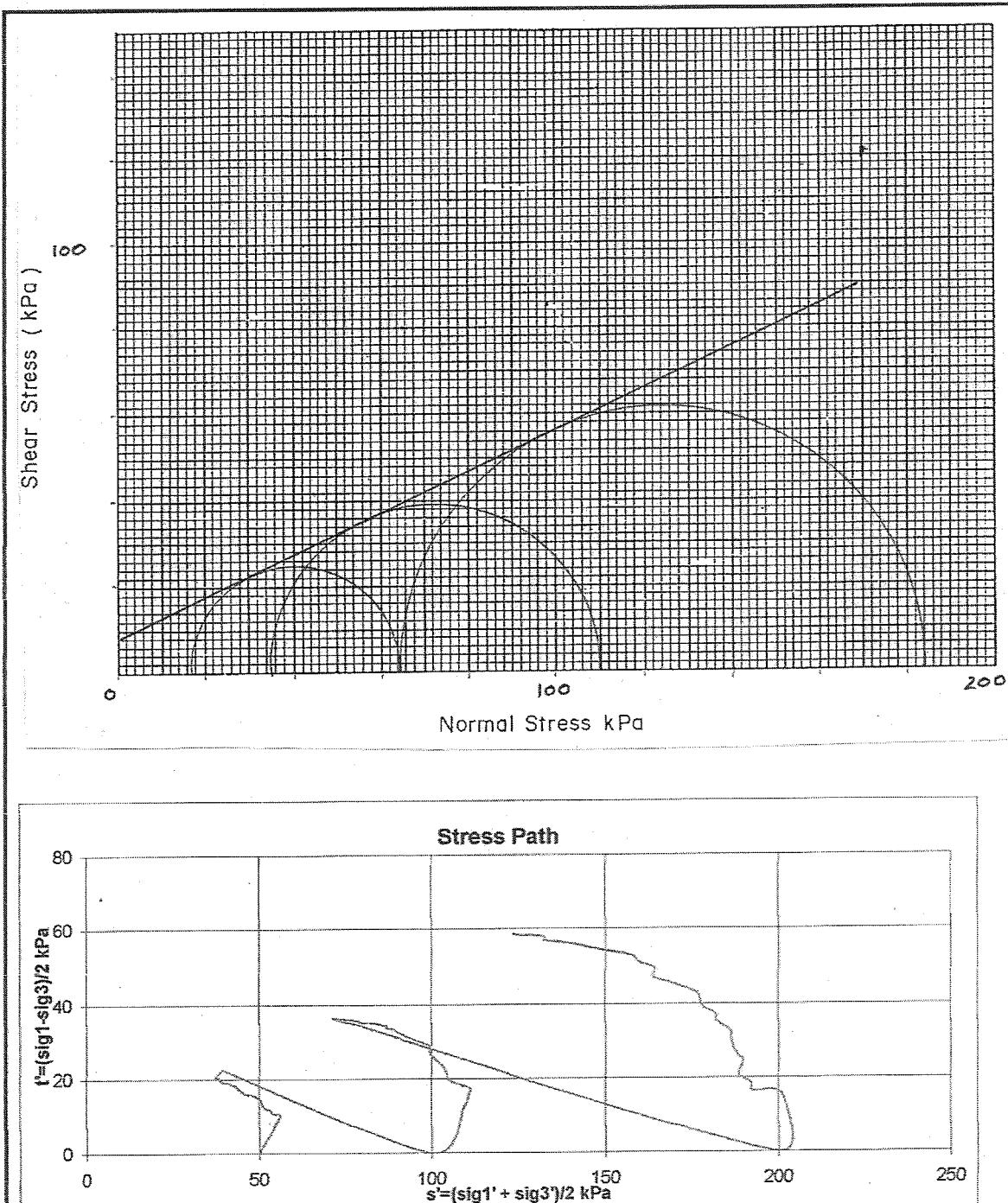
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Signed: .....   
Title: ..... LK

Name: ..... C. Liogd  
Date: ..... 17/8/09

# EFFECTIVE STRESS TRIAXIAL TEST REPORT

**CLIENT:** URS  
Level 3, 116 Miller Street North Sydney NSW 2060  
**PROJECT:** Costco 43217997



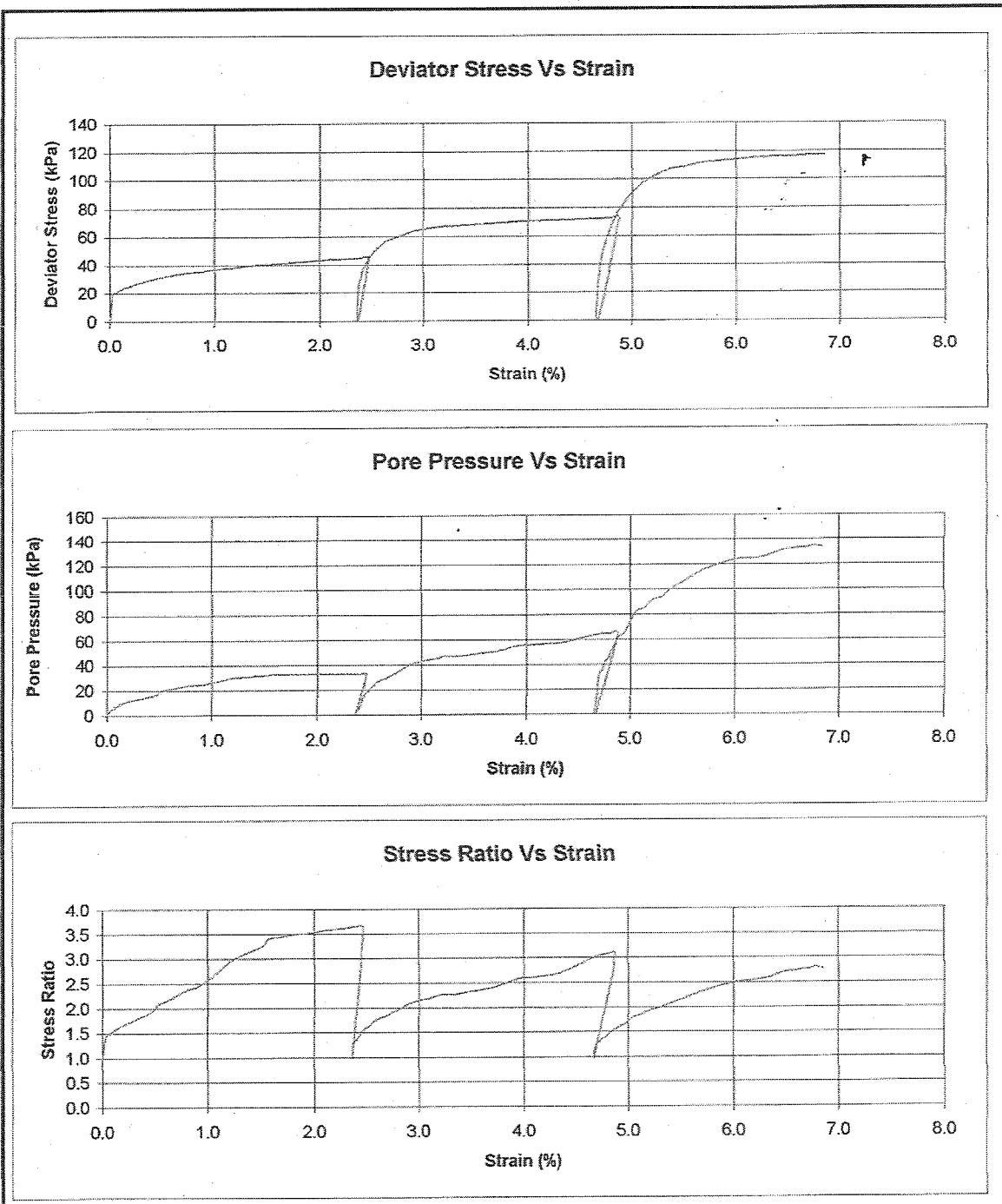
Lab No: 53780

Sample Source: BHMW02 3.0-3.5m

Test procedure: AS 1289 6.4.2 Determination of compressive strength of soil - Compressive strength of a saturated specimen tested in undrained triaxial compression with measurement of pore water pressure.

# EFFECTIVE STRESS TRIAXIAL TEST REPORT

CLIENT: URS  
Level 3, 116 Miller Street North Sydney NSW 2060  
PROJECT: Costco 43217997



Lab No: 53780      Sample Source: BHMW02 3.0-3.5m

Test procedure: AS 1289 6.4.2 Determination of compressive strength of soil - Compressive strength of a saturated specimen tested in undrained triaxial compression with measurement of pore water pressure.

# EFFECTIVE STRESS TRIAXIAL TEST REPORT

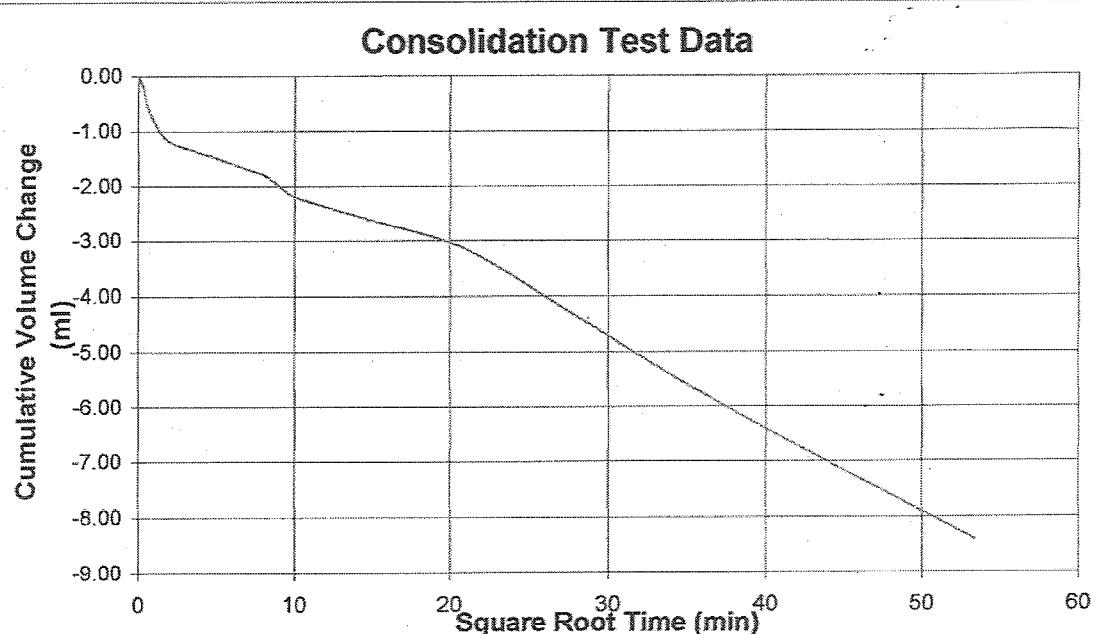
CLIENT:

URS

Level 3, 116 Miller Street North Sydney NSW 2060

PROJECT:

Costco 43217997



Sample Source: BHMW02 3.0-3.5m Lab No: 53780

Drainage Conditions: Bottom, Side  
Stage 1

Net Cell Pressure (kPa): 50

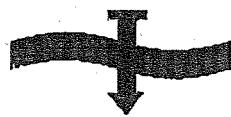
Time for 100% Consolidation (min): 400

Coefficient of Consolidation ( $m^2/yr$ ): 0.15

B Bar Response: 1.00 Rate Of Strain (mm/min): 0.001

Test procedure: AS 1289 6.4.2 Determination of compressive strength of soil - Compressive strength of a saturated specimen tested in undrained triaxial compression with measurement of pore water pressure.

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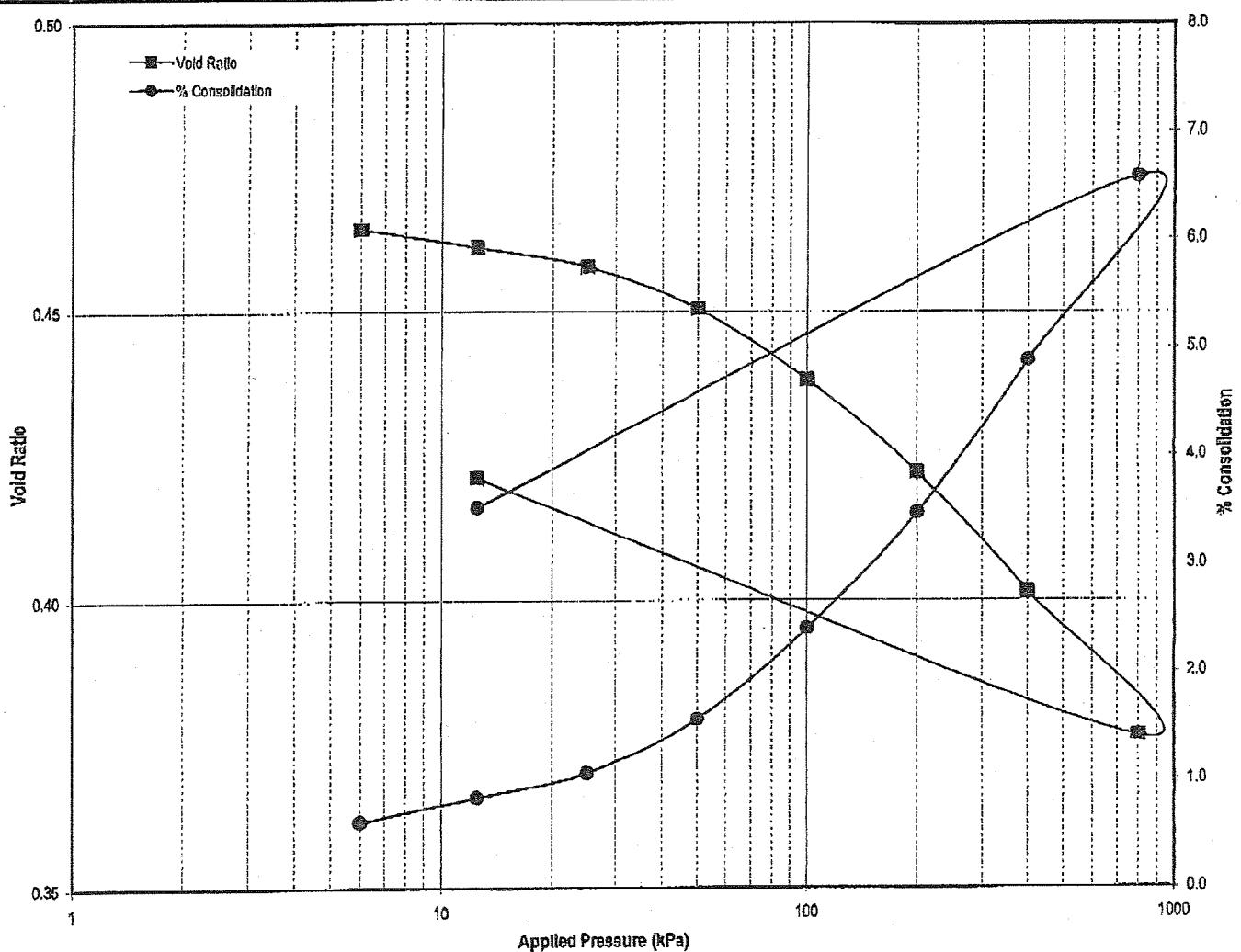
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**OEDOMETER TEST REPORT**

Test Method: AS1289.6.6.1

Client: URS	Lab No.: 52826
Project: 43217997	Test Date: 22.6.09 Report Date: 1.7.09
Client Id.: BH12	Depth (m): 3.4-3.8m

Description: SILTY CLAY; mottled grey &amp; dark-grey, low plasticity, with fine sand.



Dry Density ( $t/m^3$ ): 1.80	Initial Moisture (%): 17.9	Test Condition: Inundated on load
Assumed Particle Density ( $t/m^3$ ): 2.65	Initial Voids Ratio: 0.473	Initial Degree of Saturation (%): 100.2
Undisturbed sample supplied by the client	Remarks:	
	Page 1 of 2	

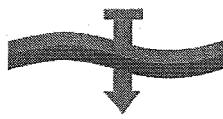


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Signed: C. J. S.Title: LiaName: C. J. S.Date: 1/7/09

## OEDOMETER TEST REPORT

**Test Method: AS1289.6.6.1**



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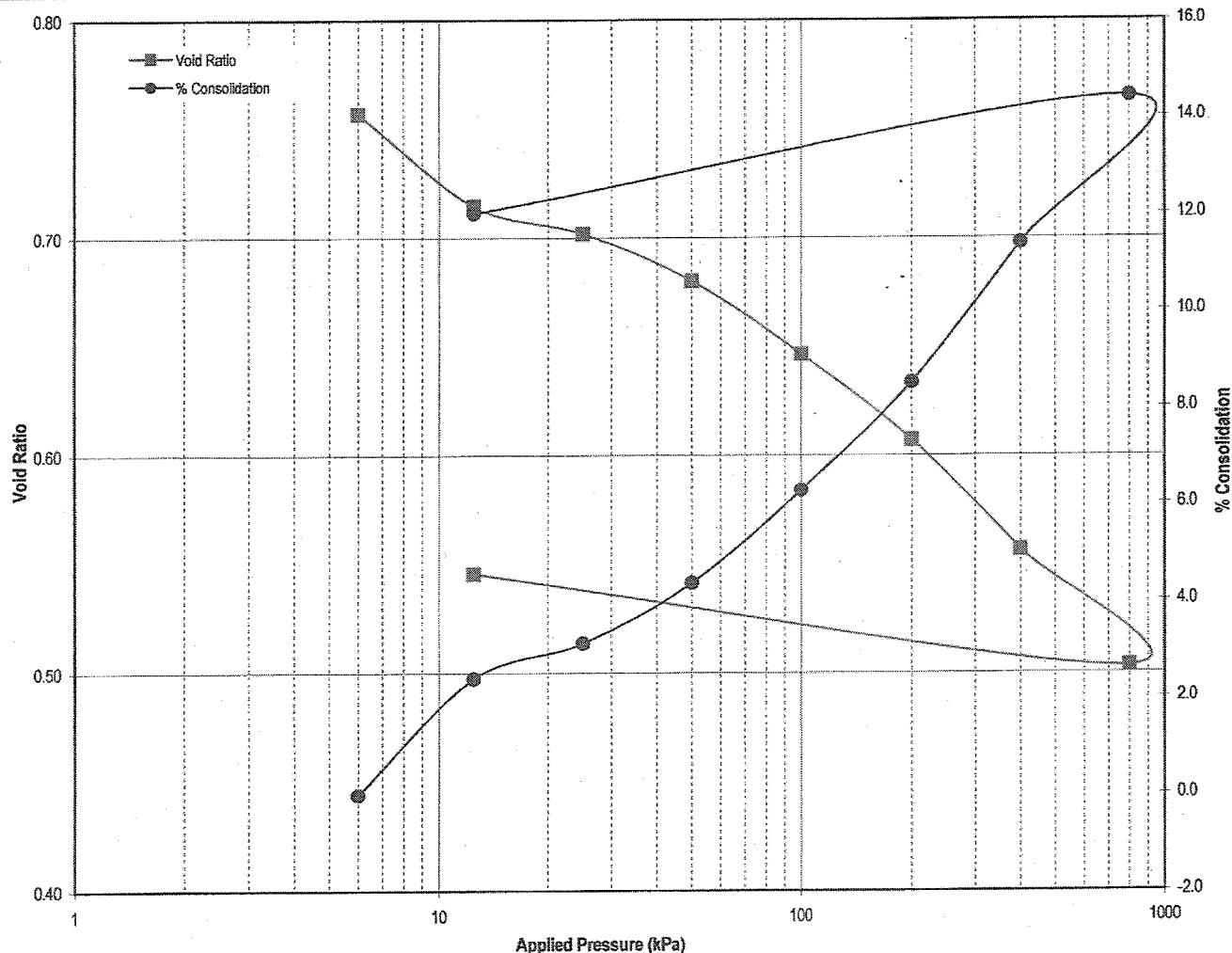
Tel: 9597 5599, 9597 3286 Fax: 9597 3442 Email: austst@bigpond.com

## OEDOMETER TEST REPORT

Test Method: AS1289.6.6.1

Client:	URS	Lab No.:	53780
Project:	Costco	Test Date:	4.8.09
Client Id.:	43217997	Report Date:	17.8.09
		Depth (m):	BHMW02 3.0-3.5m

Description: SILTY CLAY: mottled grey & brown, low plasticity, with fine to coarse sand.



Dry Density ( $\text{t/m}^3$ ):	1.51	Initial Moisture (%):	30.9	Test Condition: Inundated on load
Assumed Particle Density ( $\text{t/m}^3$ ):	2.65	Initial Voids Ratio:	0.756	Initial Degree of Saturation (%): 108.5
Undisturbed sample supplied by the client	Remarks:			Page 1 of 2



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Signed: Lloyd  
Title: LA

Name: Lloyd  
Date: 17/8/09

## OEDOMETER TEST REPORT

Test Method: AS1289.6.6.1

Client: URS		Lab No.: 53780									
Project: Costco		Test Date: 4.8.09 Report Date: 17.8.09									
Client Id.: 43217997		Depth (m): BHMW02 3.0-3.5m									
Description: SILTY CLAY: mottled grey & brown, low plasticity, with fine to coarse sand.											
<b><u>TEST RESULTS</u></b>											
Stage	Load (kPa)	Cc	Cv (m <sup>2</sup> /yr)		Mv (kPa <sup>-1</sup> ×10 <sup>-3</sup> )	C <sub>a</sub> × 10 <sup>-3</sup>					
			t <sub>50</sub>	t <sub>90</sub>							
1	6-12.5	0.132	0.95	1.62	3.690	1.06					
2	12.5-25	0.042	0.68	1.70	0.595	1.06					
3	25-50	0.073	0.73	2.60	0.514	0.76					
4	50-100	0.112	1.12	3.04	0.401	1.90					
5	100-200	0.130	1.25	2.49	0.238	3.21					
6	200-400	0.168	1.56	3.47	0.157	3.12					
7	400-800	0.177	2.16	3.48	0.085	2.85					
8	800-12.5	-	-	-	-	12.0					
Remarks:						Page 2 of 2					

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**POINT LOAD STRENGTH INDEX TEST REPORT**

**CLIENT:** URS  
Level 3, 116 Miller street, North Sydney 2060  
**PROJECT:** 43217997

LAB. NO.	SAMPLE SOURCE	LITHOLOGY	PLATEN SEPARATION		MOISTURE CONTENT (%)	DRY DENSITY (t/m <sup>3</sup> )	TEST ORIENTATION	POINT LOAD STRENGTH Is (MPa)	POINT LOAD STRENGTH Is 50 (MPa)
			DIAM (mm)	HEIGHT (mm)					
52828	8.67m	Siltstone	51.5	38.9	N/A "	N/A "	Diametral Axial	0.29 0.34	0.29 0.34
52829	9.29m	Siltstone	51.5	46.6	N/A "	N/A "	Diametral Axial	0.42 0.31	0.43 0.33

**NOTES TO TESTING**

Testing Device: ELE Point Load Tester

Sample History: Unsoaked

Sampled by: Client

Job Number: 119-226

Date Tested: 06.09

Test method: AS 4133.4.1 1993

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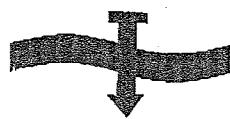
Signed: .....

Title: ..... L.M. ....

Name: ..... C. Lloyd .....

Date: ..... 11/7/09 .....

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**POINT LOAD STRENGTH INDEX TEST REPORT**

**CLIENT:** URS  
Level 3, 116 Miller street, North Sydney 2060

**PROJECT:** 43217997

LAB. NO.	SAMPLE SOURCE	LITHOLOGY	PLATEN SEPARATION		MOISTURE CONTENT (%)	DRY DENSITY (t/m <sup>3</sup> )	TEST ORIENTATION	POINT LOAD STRENGTH Is (MPa)	POINT LOAD STRENGTH Is 50 (MPa)
			DIAM (mm)	HEIGHT (mm)					
52830	8.51m	Siltstone	51.4	44.5	N/A "	N/A "	Diametral Axial	0.09 0.32	0.09 0.33
52831	9.56m	Siltstone	51.4	48.7	N/A "	N/A "	Diametral Axial	0.27 0.63	0.28 0.67

**NOTES TO TESTING**

Testing Device: ELE Point Load Tester

Sample History: Unsoaked

Sampled by: Client

Job Number: 119-226

Date Tested: 9.06.09

Test method: AS 4133.4.1 1993

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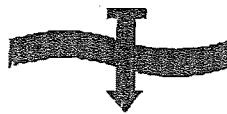
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Signed: C. Lloyd

Title: L.P.

Name: C. LloydDate: 11/7/09

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**POINT LOAD STRENGTH INDEX TEST REPORT**

**CLIENT:** URS  
Level 3, 116 Miller street, North Sydney 2060

**PROJECT:** 43217997

LAB. NO.	SAMPLE SOURCE	LITHOLOGY	PLATEN SEPARATION		MOISTURE CONTENT (%)	DRY DENSITY (t/m <sup>3</sup> )	TEST ORIENTATION	POINT LOAD STRENGTH Is (MPa)	POINT LOAD STRENGTH Is 50 (MPa)
			DIAM (mm)	HEIGHT (mm)					
52832	7.08m	Siltstone	51.2	38.8	N/A "	N/A "	Diametral Axial	0.72 0.60	0.73 0.60
52833	8.05m	Siltstone	51.3	34.8	N/A "	N/A "	Diametral Axial	0.50 0.50	0.51 0.49

**NOTES TO TESTING**

Testing Device: ELE Point Load Tester

Sample History: Unsoaked

Sampled by: Client

Job Number: 119-226

Date Tested: 9.06.09

Test method: AS 4133.4.1 1993

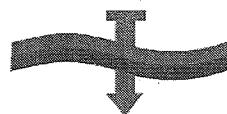
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Signed: C. LloydTitle: URSName: C. LloydDate: 11/7/09



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A.B.N. 79 003 493 623

## POINT LOAD STRENGTH INDEX TEST REPORT

**CLIENT:**

URS

Level 3, 116 Miller Street, North Sydney, NSW 2060

**PROJECT:**

43217997

LAB. NO.	SAMPLE SOURCE BH MW03D	LITHOLOGY	PLATEN SEPARATION		TEST ORIENTATION	POINT LOAD STRENGTH $I_s$ (MPa)	POINT LOAD STRENGTH $I_s(50)$ (MPa)
			DIAM (mm)	HEIGHT (mm)			
53828	5.83m	Siltstone	58.47	41.53	Diametral Axial	0.03 0.09	0.03 0.09
53829	8.73m	Siltstone	59.87	50.81	Diametral Axial	0.39 0.27	0.43 0.30
53830	11.34m	Siltstone	60.15	46.49	Diametral Axial	0.27 0.62	0.29 0.67

**NOTES TO TESTING**

Testing Device: ELE Point Load Tester  
Sample History: Unsoaked  
Sampled by: Client  
Job Number: 119-226-3  
Date Tested: 04.08.09  
Test method: AS 4133.4.1 2007

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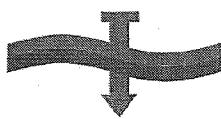
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Signed: .....

Title: ..... LM .....

Name: .....

Date: ..... 10/8/09 .....



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## POINT LOAD STRENGTH INDEX TEST REPORT

**CLIENT:**

URS

Level 3, 116 Miller Street, North Sydney, NSW 2060

**PROJECT:**

43217997

LAB. NO.	SAMPLE SOURCE BH MW04D	LITHOLOGY	PLATEN SEPARATION		TEST ORIENTATION	POINT LOAD STRENGTH $I_s$ (MPa)	POINT LOAD STRENGTH $I_s(50)$ (MPa)
			DIAM (mm)	HEIGHT (mm)			
53831	9.21m	Siltstone	58.47	41.53	Diametral Axial	0.03 0.09	0.03 0.09
53832	9.88m	Siltstone	59.93	47.07	Diametral Axial	0.33 0.63	0.36 0.69
53833	11.62m	Siltstone	59.96	43.21	Diametral Axial	0.55 0.78	0.59 0.83

**NOTES TO TESTING**

Testing Device: ELE Point Load Tester  
Sample History: Unsoaked  
Sampled by: Client  
Job Number: 119-226-3  
Date Tested: 04.08.09  
Test method: AS 4133.4.1 2007

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Title: ..... 

Name: .....   
Date: ..... 10/8/09 .....



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## POINT LOAD STRENGTH INDEX TEST REPORT

**CLIENT:**

URS  
Level 3 Miller Street, North Sydney, NSW 2060

**PROJECT:**

43217997

LAB. NO.	SAMPLE SOURCE BH MW01D	LITHOLOGY	PLATEN SEPARATION		TEST ORIENTATION	POINT LOAD STRENGTH $I_s$ (MPa)	POINT LOAD STRENGTH $I_s(50)$ (MPa)
			DIAM (mm)	HEIGHT (mm)			
53751	8.18-8.40m	Siltstone	60.65	45.64	Diametral Axial	0.15 0.37	0.17 0.40
53752	9.77-9.96m	Siltstone	60.66	54.08	Diametral Axial	0.53 0.18	0.58 0.21
53753	11.45-11.55m	Siltstone	60.79	53.59	Diametral Axial	0.48 0.36	0.53 0.40
53754	14.76-15.04m	Siltstone	60.87	46.81	Diametral Axial	0.68 0.58	0.74 0.63

**NOTES TO TESTING**

Testing Device: ELE Point Load Tester  
Sample History: Unsoaked  
Sampled by: Client  
Job Number: 119-226-2  
Date Tested: 30.07.09  
Test method: AS 4133.4.1 2007

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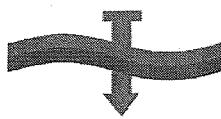
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Signed: .....   
Title: ..... LM .....

Name: C.Lloyd.....  
Date: 16/10/09.....



# AUSTRALIAN SOIL TESTING PTY LTD

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24 Bermill Street, Rockdale, NSW, 2216 P.O. Box 2014, Rockdale D.C. NSW 2216

Tel: 9597 5599, 9597 3286 Fax: 9597 3442 Email: dustst@bigpond.com

## POINT LOAD STRENGTH INDEX TEST REPORT

**CLIENT:**

URS

Level 3, 116 Miller Street, North Sydney, NSW 2060

**PROJECT:**

43217997

LAB. NO.	SAMPLE SOURCE BH MW02D	LITHOLOGY	PLATEN SEPARATION		TEST ORIENTATION	POINT LOAD STRENGTH $I_s$ (MPa)	POINT LOAD STRENGTH $I_s(50)$ (MPa)
			DIAM (mm)	HEIGHT (mm)			
53785	7.73-7.88m	Siltstone	60.75	57.27	Diametral Axial	0.66 0.37	0.72 0.42
53756	9.00-9.10m	Siltstone	60.83	51.05	Diametral Axial	0.01 0.41	0.01 0.46
53757	10.60-10.79m	Siltstone	60.9	44.97	Diametral Axial	0.87 0.79	0.95 0.85
53758	12.85-13.00m	Siltstone	60.82	44.3	Diametral Axial	0.25 1.33	0.27 1.43
53759	14.16-14.32m	Siltstone	60.8	56.35	Diametral Axial	0.69 0.66	0.76 0.75

**NOTES TO TESTING**

Testing Device: ELE Point Load Tester  
Sample History: Unsoaked  
Sampled by: Client  
Job Number: 119-226-2  
Date Tested: 30.07.09  
Test method: AS 4133.4.1 2007

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Signed: .....

Title: ..... LM

Name: ..... C.Lloyd  
Date: ..... 10/8/09

## Laboratory Acid Sulfate Soils Analytical Results

17-21 Parramatta Road, Lidcombe, NSW

URS Job No. 43217997

Primary Sample Location		MW01D_3.5_25/07/09	MW01D_4.0_25/07/09	MW01D_6.0_25/07/09	MW02D_1.8_26/07/09	MW02D_2.9_26/07/09	MW02D_4.6_26/07/09
Sample ID		MW01D_3.5_25/07/09	MW01D_4.0_25/07/09	MW01D_6.0_25/07/09	MW02D_1.8_26/07/09	MW02D_2.9_26/07/09	MW02D_4.6_26/07/09
Date Sampled		25/07/2009	25/07/2009	25/07/2009	26/07/2009	26/07/2009	26/07/2009
Sample Type		PS	PS	PS	PS	PS	PS
<b>Analyte grouping/Analyte</b>							
<b>EA029-A: pH Measurements</b>							
pH KCl (23A)	0.1	pH Unit	<b>5.7</b>	<b>5.4</b>	<b>5.3</b>	<b>5.4</b>	<b>4.1</b>
pH OX (23B)	0.1	pH Unit	<b>6.9</b>	<b>4.8</b>	<b>2.9</b>	<b>4.2</b>	<b>2.1</b>
<b>EA029-B: Acidity Trail</b>							
Titratable Actual Acidity (23F)	2	mole H+ / t	<b>6</b>	<b>20</b>	<b>11</b>	<b>14</b>	<b>39</b>
Titratable Peroxide Acidity (23G)	2	mole H+ / t	<2	<b>102</b>	<b>268</b>	<b>102</b>	<b>52</b>
Titratable Sulfidic Acidity (23H)	2	mole H+ / t	<2	<b>82</b>	<b>257</b>	<b>88</b>	<b>13</b>
sulfidic - Titratable Actual Acidity (s-23F)	0.02	% pyrite S	<0.02	<b>0.03</b>	<0.02	<b>0.02</b>	<b>0.06</b>
sulfidic - Titratable Peroxide Acidity (s-23G)	0.02	% pyrite S	<0.02	<b>0.16</b>	<b>0.43</b>	<b>0.16</b>	<b>0.08</b>
sulfidic - Titratable Sulfidic Acidity (s-23H)	0.02	% pyrite S	<0.02	<b>0.13</b>	<b>0.41</b>	<b>0.14</b>	<b>0.02</b>
<b>EA029-C: Sulfur Trail</b>							
KCl Extractable Sulfur (23Ce)	0.02	% S	<0.02	<0.02	<b>0.02</b>	<0.02	<b>0.04</b>
Peroxide Sulfur (23De)	0.02	% S	<0.02	<b>0.05</b>	<b>0.58</b>	<b>0.16</b>	<b>0.08</b>
Peroxide Oxidisable Sulfur (23E)	0.02	% S	<0.02	<b>0.05</b>	<b>0.56</b>	<b>0.16</b>	<b>0.04</b>
acidity - Peroxide Oxidisable Sulfur (a-23E)	10	mole H+ / t	<10	<b>33</b>	<b>348</b>	<b>98</b>	<b>25</b>
<b>EA029-D: Calcium Values</b>							
KCl Extractable Calcium (23Vh)	0.02	% Ca	<b>0.1</b>	<b>0.16</b>	<b>0.04</b>	<b>0.08</b>	<0.02
Peroxide Calcium (23Wh)	0.02	% Ca	<b>0.12</b>	<b>0.2</b>	<b>0.08</b>	<b>0.12</b>	<b>0.02</b>
Acid Reacted Calcium (23X)	0.02	% Ca	<b>0.03</b>	<b>0.04</b>	<b>0.04</b>	<b>0.05</b>	<0.02
acidity - Acid Reacted Calcium (a-23X)	10	mole H+ / t	<b>14</b>	<b>19</b>	<b>20</b>	<b>24</b>	<10
sulfidic - Acid Reacted Calcium (s-23X)	0.02	% S	<b>0.02</b>	<b>0.03</b>	<b>0.03</b>	<b>0.04</b>	<0.02
<b>EA029-E: Magnesium Values</b>							
KCl Extractable Magnesium (23Sm)	0.02	% Mg	<b>0.03</b>	<b>0.04</b>	<b>0.06</b>	<b>0.03</b>	<b>0.03</b>
Peroxide Magnesium (23Tm)	0.02	% Mg	<b>0.03</b>	<b>0.04</b>	<b>0.09</b>	<b>0.04</b>	<b>0.03</b>
Acid Reacted Magnesium (23U)	0.02	% Mg	<0.02	<0.02	<b>0.03</b>	<0.02	<0.02
Acidity - Acid Reacted Magnesium (a-23U)	10	mole H+ / t	<10	<10	<b>23</b>	<10	<10
sulfidic - Acid Reacted Magnesium (s-23U)	0.02	% S	<0.02	<0.02	<b>0.04</b>	<0.02	<0.02
<b>EA029-F: Excess Acid Neutralising Capacity</b>							
Excess Acid Neutralising Capacity (23Q)	0.02	% CaCO <sub>3</sub>	<b>0.08</b>	-	-	-	-
acidity - Excess Acid Neutralising Capacity (	10	mole H+ / t	<b>17</b>	-	-	-	-
sulfidic - Excess Acid Neutralising Capacity (	0.02	% S	<b>0.03</b>	-	-	-	-
<b>EA029-G: Retained Acidity</b>							
Net Acid Soluble Sulfur (20Je)	0.02	% S	-	-	-	-	<b>0.02</b>
acidity - Net Acid Soluble Sulfur (a-20J)	10	mole H+ / t	-	-	-	-	<10
sulfidic - Net Acid Soluble Sulfur (s-20J)	0.02	% pyrite S	-	-	-	-	<0.02
HCl Extractable Sulfur (20Be)	0.02	% S	-	-	-	-	<b>0.06</b>
<b>EA029-H: Acid Base Accounting</b>							
ANC Fineness Factor	0.5		<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>
Net Acidity (sulfur units)	0.02	% S	<0.02	<b>0.08</b>	<b>0.58</b>	<b>0.18</b>	<b>0.12</b>
Net Acidity (acidity units)	10	mole H+ / t	<10	<b>52</b>	<b>359</b>	<b>111</b>	<b>74</b>
Liming Rate	1	kg CaCO <sub>3</sub> /t	<1	4	27	8	6
							98

### Legend

PS : Primary Sample

LD : Laboratory Duplicate

- : Not analysed



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