



Adelaide Geotechnics Pty. Ltd.

A.C.N. 091 878 821

A.B.N. 66 091 878 821

47 James Street, Plympton SA 5038

☎ (08) 8351 2830 Fax (08) 8351 2831 email adelgeotech@bigpond.com

ADELAIDE GEOTECHNICS ANALYSIS REPORT

Adelaide Geotechnics Analysis Reports



Adelaide Geotechnics Pty. Ltd.

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SUMMARY OF REPORTS FOR TESTING Biocentral Laboratories Ltd POLYCOM RESEARCH

DATE Sampled	REPORT NO	REPORT TYPE	LAB NO	DETAILS
25/11/04	2004-108			
	1	MDR	AG04-3332	MDD=2.20 OMC=7.5 no PolyCom added to material – Gravelly Sandy SILT grey
	2	MDR	AG04-3333	MDD=2.22 OMC=6.0 3500:1 PolyCom added to material – Gravelly Sandy SILT grey Kpa=360
	3	MDR	AG04-3334	MDD=2.20 OMC=7.5 no PolyCom added to material – Gravelly Sandy SILT grey Kpa=305
	4	UCS	AG04-3335	Mpa=0.46 after 7 days curing Gravelly Sandy SILT grey WITH PolyCom at -2% of OMC
			AG04-3336	Mpa=0.62 after 21 days curing Gravelly Sandy SILT grey WITH PolyCom at -2% of OMC
	5	UCS	AG04-3337	Mpa=0.20 after 7 days curing Gravelly Sandy SILT grey NO PolyCom. Compacted near OMC (8.0% M/C)
			AG04-3338	Mpa=0.32 after 21 days curing Gravelly Sandy SILT grey NO PolyCom. Compacted near OMC (8.0% M/C)

Commentary on above

Stage 1

- The first compaction (MDR i.e. Moisture Density Relationship) was carried out normally to determine the Optimum Moisture Content (OMC) to achieve the Maximum Dry Density (MDD) for the material being tested (*Actual OMC was 7.6% but AS1289.5.2.1 reporting requirement is to round to the nearest .5%*)
- The second compaction was carried out using the PolyCom additive at a ratio of 3500:1 with Kpa test done after compaction on sample at -1.8% of normal OMC. It was found that this sample produced a higher MDD and lower OMC when compared with the first sample. Compare Kpa of 360 for this sample with the next one.
- The third compaction was tested at 6.3% MC i.e. 1.3% less than OMC and produced a Kpa of 305

Conclusion: The addition of PolyCom clearly produced a denser compacted material at a lower moisture content.

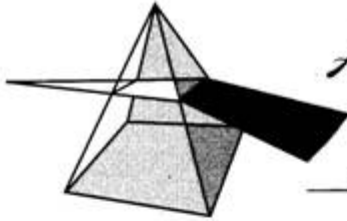
Stage 2

- 4 UCS samples were prepared – 2 with PolyCom added and 2 without.
- One sample from each category was tested for Mpa after 7 days curing and the second sample from each was tested after 21 days curing
- Refer to Mpa results in summary above

Conclusion: The addition of PolyCom produced double the Mpa results of the samples without PolyCom

Monday, 10 January 2005

Colin Gatgens
Laboratory Manager



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Unconfined Compressive Strength Report

Client :	biocentral lab limited, 46 Sir Donald Bradman Dr	Report Number:	2004.108 - 4
Job Number :	2004.108	Report Date:	04/01/2005
Project :	Polycom Research & Investigation	Order Number:	
Location :	Various Soils and Locations,	Test Method:	AS1141.51

Page 1 of 1

Lab No :	AG04-3335	AG04-3336		
ID No :	Polycom added	Polycom added		
Lot No :	7 Days Curing	21 Days curing		
Item No :				
Date Tested :	23/12/2004	04/01/2005		
Material Source :				
For Use As :	Road base	Road base		
Sample Location :	Unconfined Compressive Testing Polycom binder added Compacted at (-2% dried back) from OMC 7.6%	Unconfined Compressive Testing Polycom binder added Compacted at (-2% dried back) from OMC 7.6%		
Compactive Effort :	Modified	Modified		
Dry Density (t/m ³) :	2.22	2.22		
Moisture Content (%) :	6.0	6.0		
Unconfined Compressive Strength(Mpa):	0.46	0.62		
Remarks :	Gravelly Sandy SILT grey			



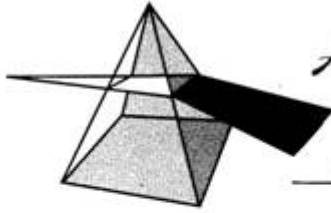
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APPROVED SIGNATORY

Colin Gatgens
Nata Accred. No: 14470

Form Number:

REP UCS-1



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Unconfined Compressive Strength Report

Client :	biocentral lab limited, 46 Sir Donald Bradman Dr	Report Number:	2004.108 - 5
Job Number :	2004.108	Report Date:	04/01/2005
Project :	Polycom Research & Investigation	Order Number:	
Location :	Various Soils and Locations,	Test Method:	AS1141.51

Page 1 of 1

Lab No :	AG04-3337	AG04-3338		
ID No :	Water added	Water added		
Lot No :	7 Days curing	21 Days curing		
Item No :				
Date Tested :	25/11/2004	04/01/2005		
Material Source :				
For Use As :	Road base	Road base		
Sample Location :	Unconfined Compressive Testing Water binder added Compacted at OMC 8.0 %	Unconfined Compressive Testing Water binder added Compacted at OMC 8.0 %		
Compactive Effort :	Modified	Modified		
Dry Density (t/m ³) :	2.19	2.19		
Moisture Content (%) :	8.0	8.0		
Unconfined Compressive Strength(Mpa):	0.20	0.32		
Remarks :	Gravelly Sandy SILT grey			



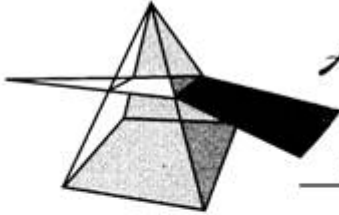
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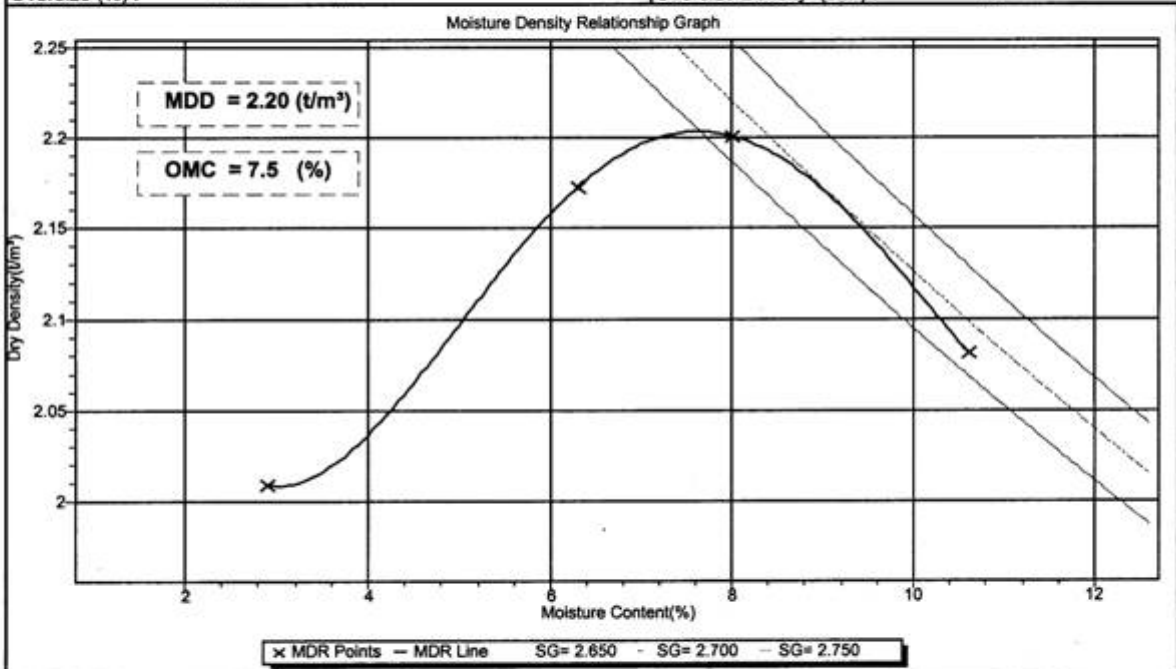
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Moisture Density Relationship Report

Client : biocentral lab limited, 46 Sir Donald Bradman Dr	Report Number : 2004.108 - 1
Job Number : 2004.108	Report Date : 28/12/2004
Project : Polycom Research & Investigation	Order Number :
Location : Various Soils and Locations ,	Test Method : AS1289.5.2.1
Lab No: AG04-3332 Sample ID : Gravelly Sandy SILT grey	Sample Location Testing soil for Optimum compaction Optimum Moisture (OMC) to achieve Density.
Date Sampled: 25/11/2004	
Date Tested: 07/12/2004	
Sampled By: client	
Sample Method:	
Material Source:	
For Use As: Road base	Lot Number: Compaction test
Remarks: Test carried out to find Optimum Moisture for Compaction	Item Number:

Page 1 of 1

Compactive Effort : Modified	Moisture Content Test Method : AS 1289.2.1.1
Maximum Size (mm) : 19.0	Oversize Test Method : n/a
Oversize (%) : n/a	Oversize Density (t/m ³) : n/a



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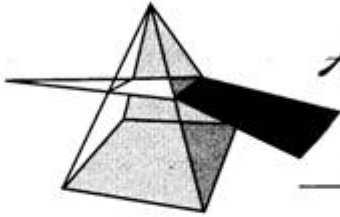
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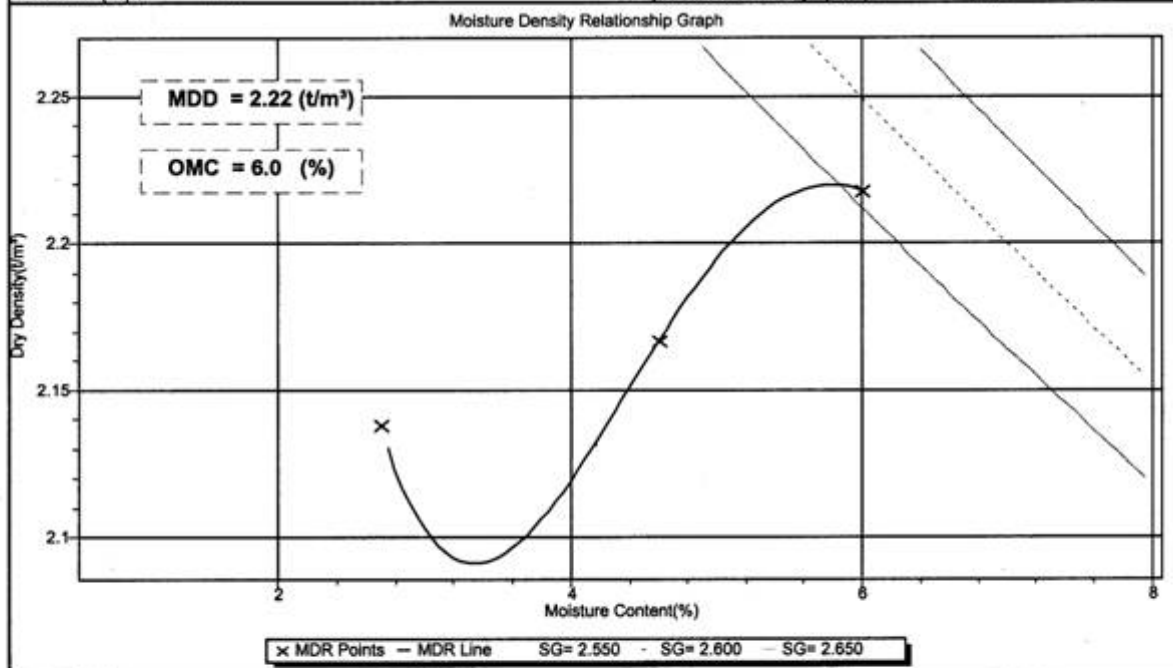
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Moisture Density Relationship Report

Client : biocentral lab limited, 46 Sir Donald Bradman Dr	Report Number : 2004.108 - 2
Job Number : 2004.108	Report Date : 28/12/2004
Project : Polycom Research & Investigation	Order Number :
Location : Various Soils and Locations ,	Test Method : AS1289.5.2.1
Lab No: AG04-3333 Sample ID : Gravelly Sandy SILT grey	Sample Location
Date Sampled: 25/11/2004	Testing soil with Polycom ratio 3500:1 for Kpa, after compaction. Tested at m/c. 1.8% back from (OMC 7.6) Kpa = 360
Date Tested: 08/12/2004	
Sampled By: client	
Sample Method:	
Material Source:	
For Use As: Road base	Lot Number:
Remarks: 2nd test carried out for Kpa results POLYCOM ADDED	Item Number:

Page 1 of 1

Compactive Effort : Modified	Moisture Content Test Method : AS 1289.2.1.1
Maximum Size (mm) : 19.0	Oversize Test Method : n/a
Oversize (%) : n/a	Oversize Density (t/m ³) : n/a



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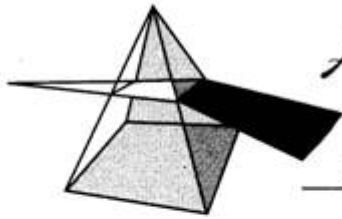
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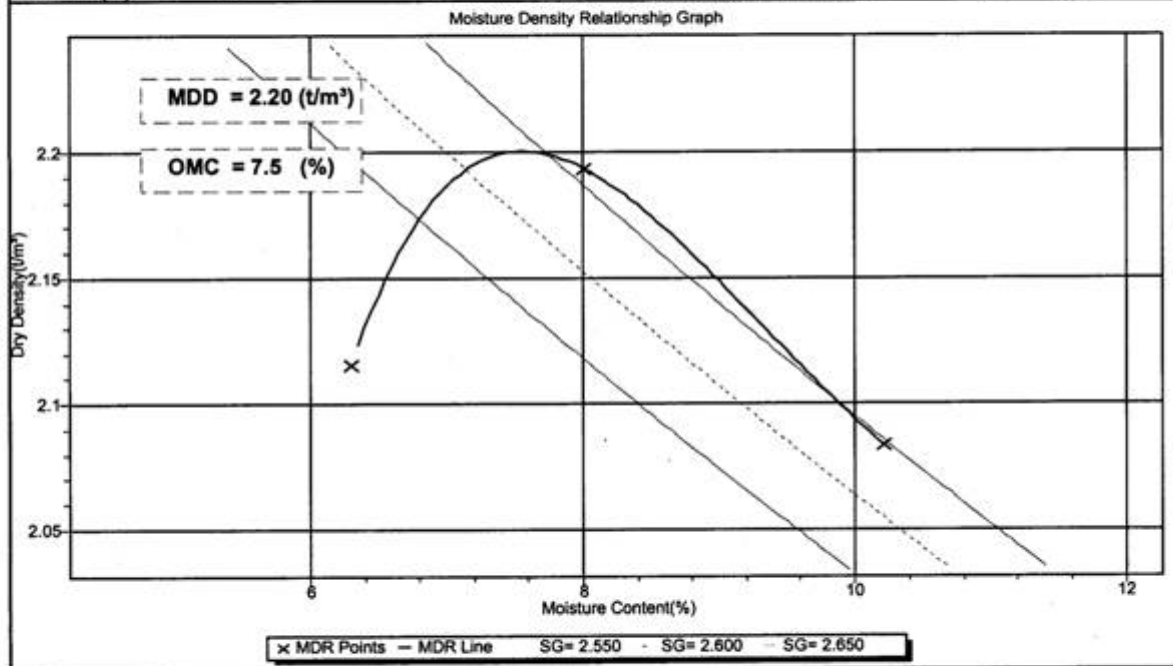
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Moisture Density Relationship Report

Client : biocentral lab limited, 46 Sir Donald Bradman Dr	Report Number : 2004.108 - 3
Job Number : 2004.108	Report Date : 28/12/2004
Project : Polycom Research & Investigation	Order Number :
Location : Various Soils and Locations ,	Test Method : AS1289.5.2.1
Lab No: AG04-3334 Sample ID : Gravelly Sandy SILT grey	Sample Location Testing soil with water for Kpa after compaction. Tested at 6.3 % m/c 1.3% back from (OMC 7.6) Kpa = 305
Date Sampled: 25/11/2004	
Date Tested: 08/12/2004	
Sampled By: client	
Sample Method:	
Material Source:	Lot Number:
For Use As: Road base	Item Number:
Remarks: 3rd test carried out for Kpa results WATER ADDED	

Page 1 of 1

Compactive Effort : Modified	Moisture Content Test Method : AS 1289.2.1.1
Maximum Size (mm) : 19.0	Oversize Test Method : n/a
Oversize (%) : n/a	Oversize Density (t/m ³) : n/a



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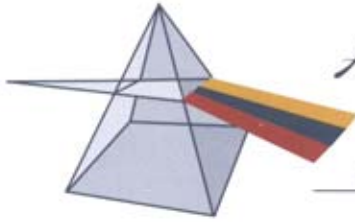
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Form Number:

REP MDR-1

1. Custom PSD



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Custom PSD Report

Client :	Biocentral Laboratories Limited, Mile End 5031	Report Number:	2004.084 - 1
Job Number :	2004.084	Report Date:	01/10/2004
Project :	PolyCom Trial Testing	Order Number:	
Location :	Tatiara Roadworks,	Test Method:	AS1289.3.6.1

Page 1 of 2

Lab No :	AG04-2792				
ID No :	PSD test 1				
Lot No :	-				
Spec No :					
Date Tested :	27/09/2004				
Material Source :	Ex Borrow Pit				
Material Type :					
For Use As :	Roadworks				
Sample Location :	Spec testing , ex borrow pit 70% passing 2.36mm sieve 40mm Limestone Rubble SAND pale brown				
	Sieve Size	% Passing	Sieve Size	Sieve Size	Sieve Size
	53	100			
	37.5	96			
	26.5	92			
	19	91			
	16.0	88			
	13.2	87			
	9.5	82			
	6.7	78			
	4.75	74			
	2.36	70			
	1.18	64			
	0.600	56			
	0.425	50			
	0.300	41			
	0.150	17			
	0.075	1			



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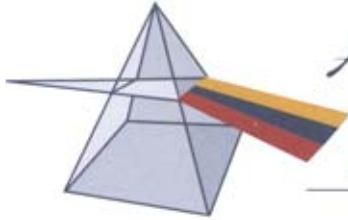
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Custom PSD Graph

Client : Biocentral Laboratories Limited, Mile End 5031

Lab Number : AG04-2792

Job Number : 2004.084

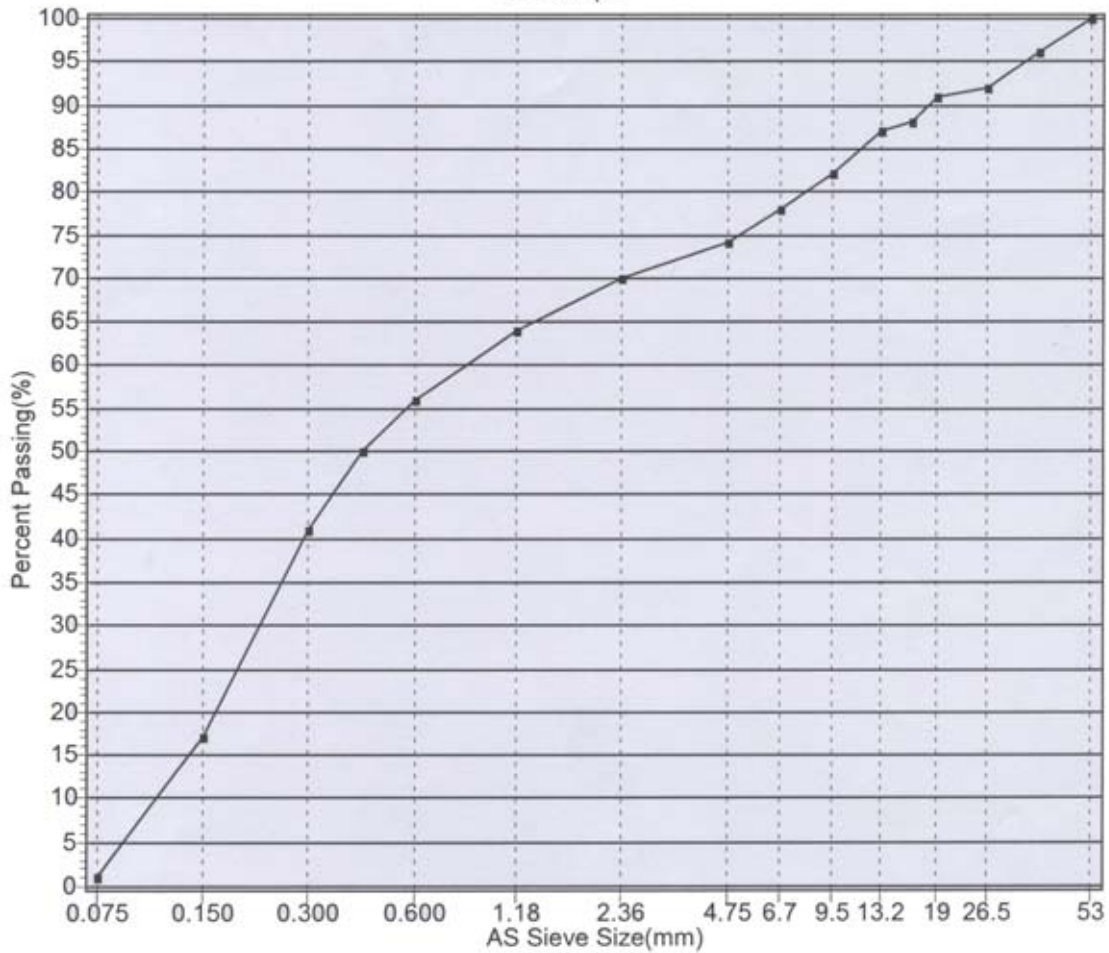
Report Number : 1

Project : PolyCom Trial Testing

Page 2 of 2

Location : Tatiara Roadworks

PSD Graph



2. Atterberg Limits



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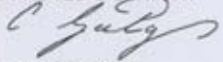
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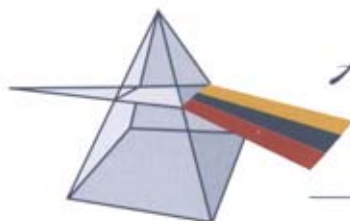
Atterberg Limits Report

Client: Biocentral Laboratories Limited, Mile End 5031	Report Number: 2004.084 - 2
Job Number: 2004.084	Report Date: 01/10/2004
Project: PolyCom Trial Testing	Order Number:
Location: Tatiara Roadworks,	Page 1 of 1
Lab No: AG04-2792 Sample ID: Atterberg test 1	Sample Location Spec testing , ex borrow pit 40mm Limestone Rubble SAND pale brown Lot Number: Spec Number:
Date Sampled: 27/09/2004 Item No: -	
Date Tested: 27/09/2004	
Sampled By: client Sample History: Air Dried	
Sample Method: - LS Comments: No Curling or Crumbling Occurred	
Material Source: Ex Borrow Pit	
For Use As: Roadworks	
Remarks: SAND. Slippage in cup unable to test Liquid Limit.	

Plasticity Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		0	
Plastic Limit (%)	AS1289.3.2.1		22	
Plastic Index	AS1289.3.3.1		0	
Linear Shrinkage (%)	AS1289.3.4.1		0.0	

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3. Moisture Density Relationship



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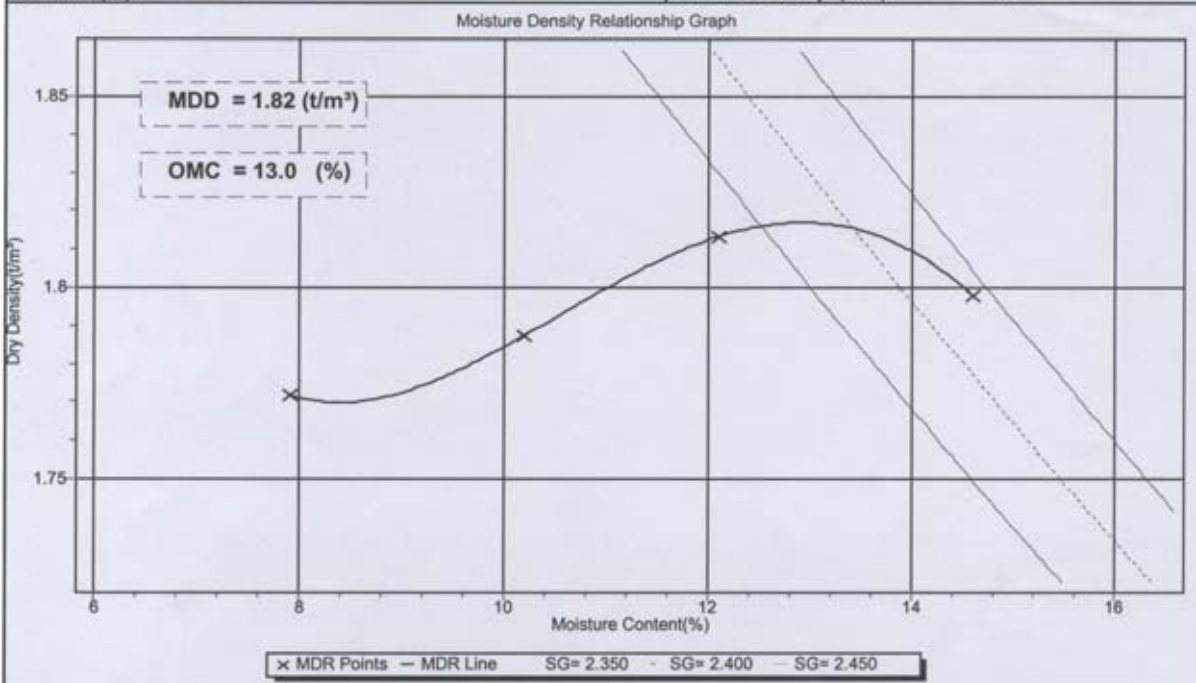
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Moisture Density Relationship Report

Client : Biocentral Laboratories Limited, Mile End 5031	Report Number : 2004.084 - 3
Job Number : 2004.084	Report Date : 01/10/2004
Project : PolyCom Trial Testing	Order Number :
Location : Tatiara Roadworks ,	Test Method : AS1289.5.2.1
Lab No: AG04-2793 Sample ID : Compaction test 1	Sample Location
Date Sampled: 27/09/2004	Raw Feed & PolyCom
Date Tested: 27/09/2004	Trial Testing
Sampled By: client	4 point compaction
Sample Method:	Tatiara Roadworks -
Material Source: Ex Borrow Pit	ex Borrow pit
For Use As: Road material	Lot Number:
Remarks: 40mm Limestone Rubble SAND pale brown	Item Number:

Page 1 of 1

Compactive Effort : Modified	Moisture Content Test Method : AS 1289.2.1.1
Maximum Size (mm) : 19.0	Overize Test Method : n/a
Overize (%) : n/a	Overize Density (t/m ³) : n/a



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4. Summary of Reports



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SUMMARY OF REPORTS FOR TESTING PolyCom Trial Testing BIOCENTRAL LABORATORIES PTY LTD

DDR Dry Density Ratio report of field density & lab moisture content tests				
MDR Moisture Density Relationship report of laboratory compaction				
DATE	REPORT NO 2004-084	REPORT TYPE	LAB NO	DETAILS
1/10/04	1	PSD	AG04-2792	40 mm Limestone Rubble Sand
	2	Att Limits	AG04-2792	NP Sand. Slippage in cup therefore unable to test liquid limit to obtain PI
	3	MDD	AG04-2793	MDD=1.82 OMC=13.0
1/10/04 Separate report for PolyCom trial testing for density (mass) & kPa of compacted soil cylinders comparing 2 strengths of PolyCom & 2 different M/C% plus control with water				

5. PolyCom Trial Testing



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POLYCOM TRIAL TESTING

For Biocentral Laboratories Limited, Hilton Central – Suite 6, 46 Sir Donald Bradman Drive, MILE END SA 5031

On sample of 40mm Limestone Rubble SAND pale brown from Tatiara roadworks Borrow Pit

Procedure

1. MDD & OMC determined by AS1289.5.2.1
 - a. MDD=1.817t/m³ rounded on report to 1.82t/m³
 - b. OMC=12.9% rounded on report to 13.0%
2. Remaining sample dried to 0% Moisture Content
3. 5 sub-samples of 2500g prepared by addition of
 - a. 11% 5500:1 PolyCom Solution
 - b. 9% 5500:1 PolyCom Solution
 - c. 11% 3500:1 PolyCom Solution
 - d. 9% 3500:1 PolyCom Solution
 - e. 12.9% water to OMC for control sample
4. Sub-sample material was compacted into 1lt mould in 5 layers by 25 blows of modified compaction hammer as per method described in AS1289.5.2.1
5. Compacted sample extruded from mould, weighed then wrapped in cling wrap.
6. kPa measured by pocket penetrometer following day

Scheduling

1. Samples delivered 27/9/04 and test preparation commenced the same day.
2. Modified compaction carried out 27/9/04 and MDD & OMC calculated 28/9/04.
3. Material dried back to 0% M/C overnight on 29/9/04.
4. Sub-samples prepared and compacted 30/9/04 (spread over 2 hours)
5. kPa measured 1/10/04 approx 14 – 16 hrs after compaction

Refer to page 2 for results

For any further Information on this testing please contact the undersigned or Peter Duffy of Biocentral Laboratories Limited 8234 8886.

Colin Gatgens
Laboratory Manager
Adelaide Geotechnics

Friday, 1 October 2004



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POLYCOM TRIAL TESTING for Biocentral Laboratories Limited

TEST DATA & RESULTS

AG JOB NO 2004-084

Sample	1	2	3	4	5 Control
AG Lab No	AG04-2794	AG04-2795	AG04-2796	AG04-2797	AG04-2798
Total mass of dry sample	2500g	2500g	2500g	2500g	2500g
Type of additive	Water:PolyCom 5500:1	Water:PolyCom 5500:1	Water:PolyCom 3500:1	Water:PolyCom 3500:1	Water
Amount of additive	275g	225g	275g	225g	322.5g
M/C of sample	11%	9%	11%	9%	12.9%
+/- OMC	-2%	-4%	-2%	-4%	0%
Date/Time of Compaction	30/9/04:15.30	30/9/04:15.50	30/9/04:16.15	30/9/04:16.40	30/9/04:17.20
Mass of compacted sample	1957g	1920g	1959g	1917g	2008g
Date/Time of Pocket Penetrometer test	1/10/04:07.10	1/10/04:07.12	1/10/04:07.14	1/10/04:07.16	1/10/04:07.18
KPa test results	7	5	11	9	3

Colin Gatgens
Laboratory Manager
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Friday, 1 October 2004



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