

LEGEND

GSI Aquifer Classification - Importance

- L: Local - Locally productive
- Pl: Poor - Unproductive except local zone
- Pu: Poor - Generally unproductive

Urban Areas

Urban Areas

Groundwater Body

Boundary

Site Boundary

GSI Well Yields (cu. m/day)

- 0 to 40
- 40 to 100
- 100 to 400
- 400 +

SLR

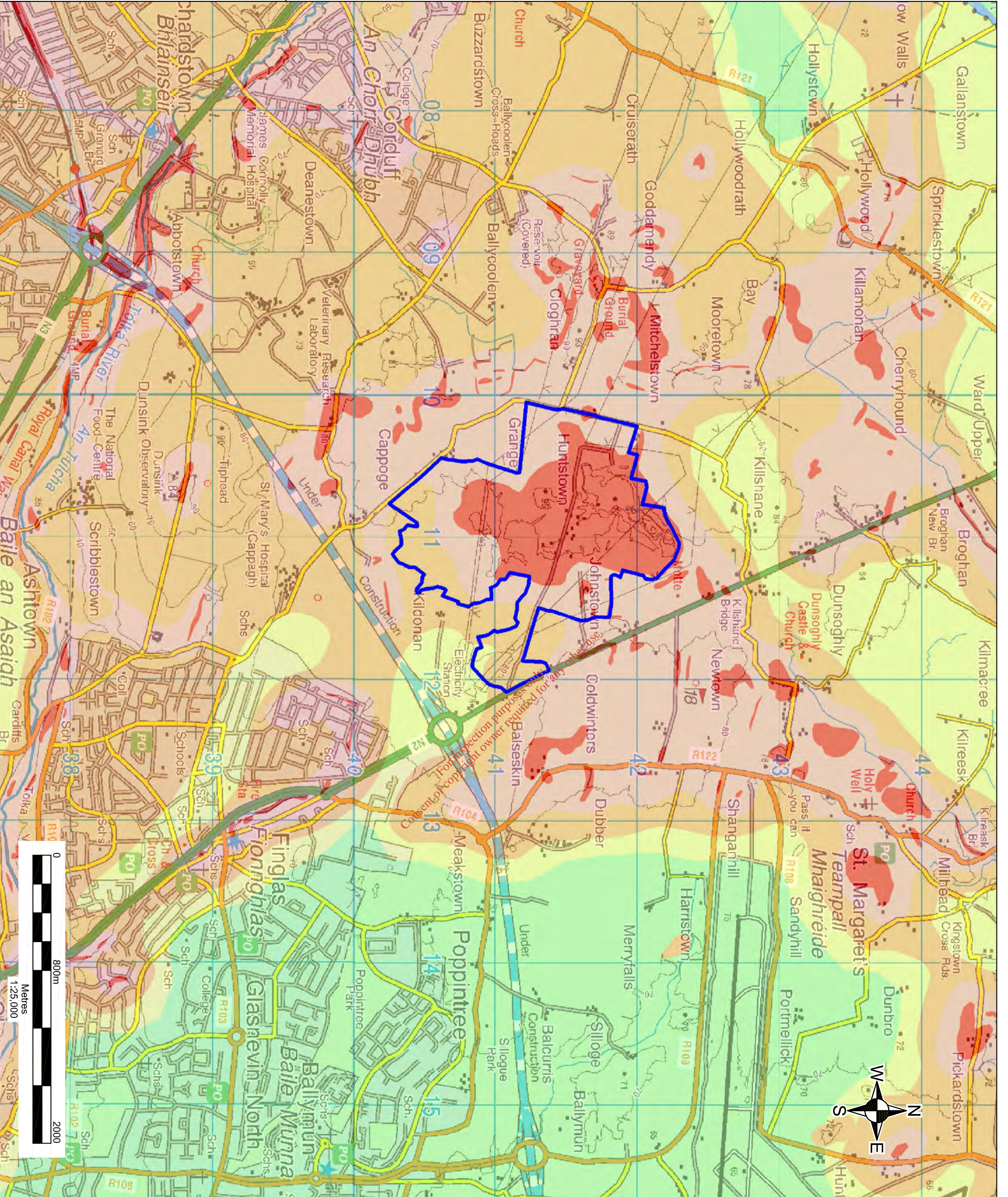
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7 DUNDRUM BUSINESS PARK
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www.slrconsulting.com

ROADSTONE WOOD
The Right Choice

ROADSTONE WOOD LTD.
ENVIRONMENTAL IMPACT STATEMENT
HUNTSTOWN QUARRY,
NORTH ROAD, FINGLAS, DUBLIN 11
BEDROCK AQUIFER MAP

FIGURE 6-5

Scale: No Scale @ A3 Date: FEBRUARY 2012



NOTES

1. EXTRACT FROM 1:50,000 ORDNANCE SURVEY DISCOVERY SERIES MAP NO. 56
2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000712 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

- ROADSTONE WOOD LTD. LANDHOLDING (c. 211 ha)
- EXTREME (ROCK AT OR CLOSE TO SURFACE)
- EXTREME
- HIGH
- MODERATE
- LOW

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HUNTSTOWN QUARRY,
NORTH ROAD, FINGLAS, DUBLIN 11
AQUIFER VULNERABILITY MAP

FIGURE 6-6

Scale 1:25,000 @ A3 Date FEBRUARY 2012

SURFACE WATER AND GROUNDWATER 6

APPENDICES

**Appendix 6-A
Groundwater Well Construction Records**

**Appendix 6-B
Water Quality Results**

**Appendix 6-C
Site Water Balance**

**Appendix 6-D
Spill Kit Details**

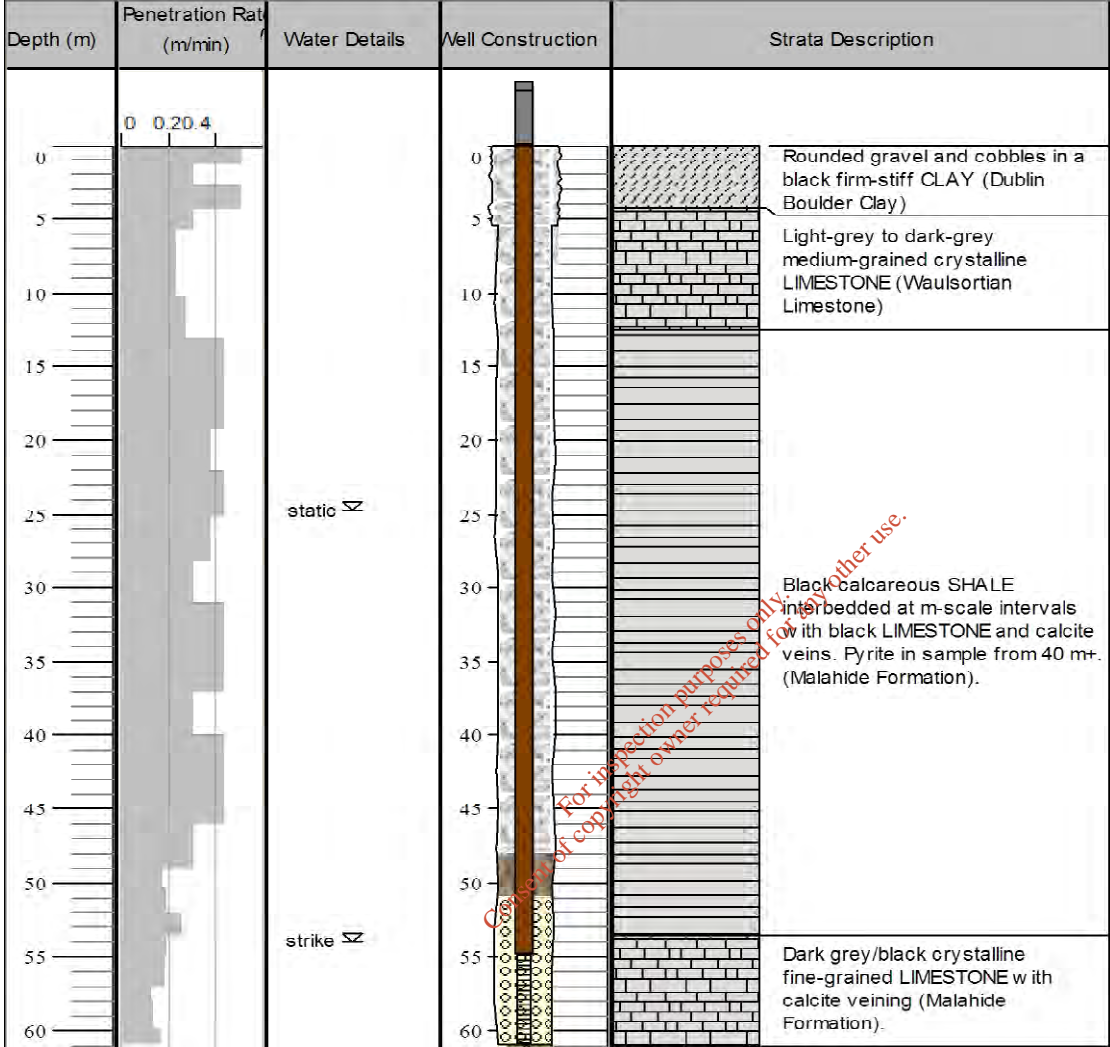
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SURFACE WATER AND GROUNDWATER 6

Appendix 6-A Groundwater Well Construction Records

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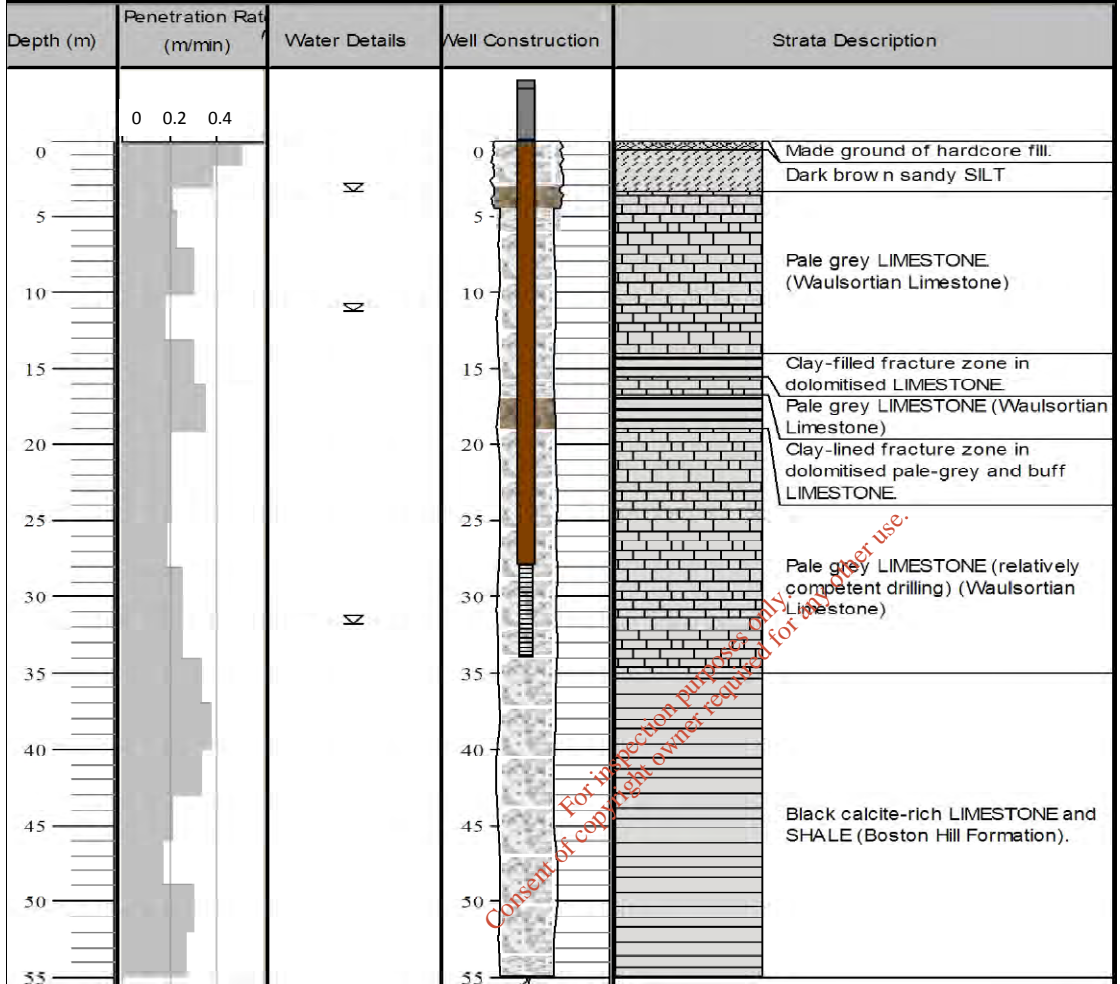
Project Name	Huntstown Quarry PA	WELL LOG		SLR Consulting (Ireland) Ltd.			
Client	Roadstone Wood Ltd.	Well Name	GW01	7 Dundrum Business Park			
Project No.	501.0180.00011	Easting	311785.7	Windy Arbour			
Location	Huntstown, County Dublin	Northing	240902.1	Dublin 14			
Contractor	Petersen Drilling Services	Elevation (gl)	80.98 mOD	Casing Length	55 m	Hole ID	170 mm
Drill Rig	Knebel	Elevation (TOC)	81.74 mOD	Casing Diameter	50 mm	Static Level	24.7 mbgl
Drill Method	Symmetrix and DTH Air	Boring Depth	61 m	Screen Length	6 m	Depth to Bedrock	4.3 mbgl
Start Date	17-Jul-10	Well Depth	61 m	Screen Diameter	50 mm	Logged By	OH
End Date	20-Jul-10						



Drilling Diameters			Steel Support Casings			Driller Yield Estimate:	
Diameter	From	To	Diameter	From	To	Development Time:	
0.17	0	5.5					
0.14	5.5	61					

Other Remarks:

Project Name	Huntstown Quarry PA	WELL LOG		SLR Consulting (Ireland) Ltd.			
Client	Roadstone Wood Ltd.	Well Name	GW02	7 Dundrum Business Park			
Project No.	501.0180.00011	Easting	311158.0	Windy Arbour			
Location	Huntstown, County Dublin	Northing	241167.5	Dublin 14			
Contractor	Petersen Drilling Services	Elevation (gl)	81.51 mOD	Casing Length	28 m	Hole ID	170 mm
Drill Rig	Knebel	Elevation (TOC)	82.33 mOD	Casing Diameter	50 mm	Static Level	11.2mbgl
Drill Method	Symmetrix and DTH Air	Boring Depth	55 m	Screen Length	6 m	Depth to Bedrock	3.4 mbgl
Start Date	17-Jul-10	Well Depth	34 m	Screen Diameter	50 mm	Logged By	OH
End Date	20-Jul-10						

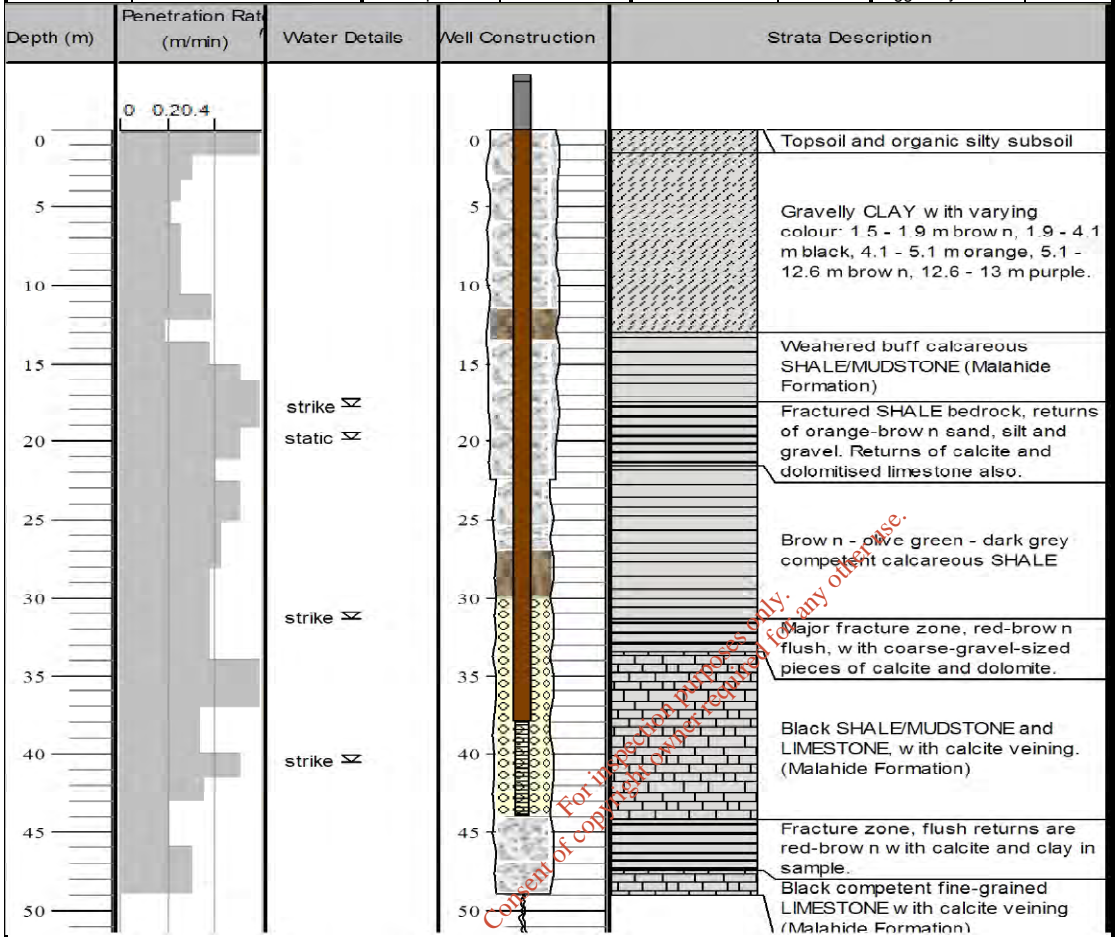


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Drilling Diameters			Steel Support Casings			Driller Yield Estimate:
Diameter	From	To	Diameter	From	To	Development Time:
0.17	0	4.5				
0.14	4.5	55				

Other Remarks:

Project Name	Huntstown Quarry PA	WELL LOG		SLR Consulting (Ireland) Ltd.			
Client	Roadstone Wood Ltd.	Well Name	GW03	7 Dundrum Business Park			
Project No.	501.0180.00011	Easting	311274.1	Windy Arbour			
Location	Huntstown, County Dublin	Northing	241775.0	Dublin 14			
Contractor	Petersen Drilling Services	Elevation (gl)	77.94 mOD	Casing Length	38 m	Hole ID	170 mm
Drill Rig	Knebel	Elevation (TOC)	78.47 mOD	Casing Diameter	50 mm	Static Level	19.9 mbgl
Drill Method	Symmetrix and DTH Air	Boring Depth	49 m	Screen Length	6 m	Depth to Bedrock	13 mbgl
Start Date	17-Jul-10	Well Depth	44 m	Screen Diameter	50 mm	Logged By	OH
End Date	20-Jul-10						

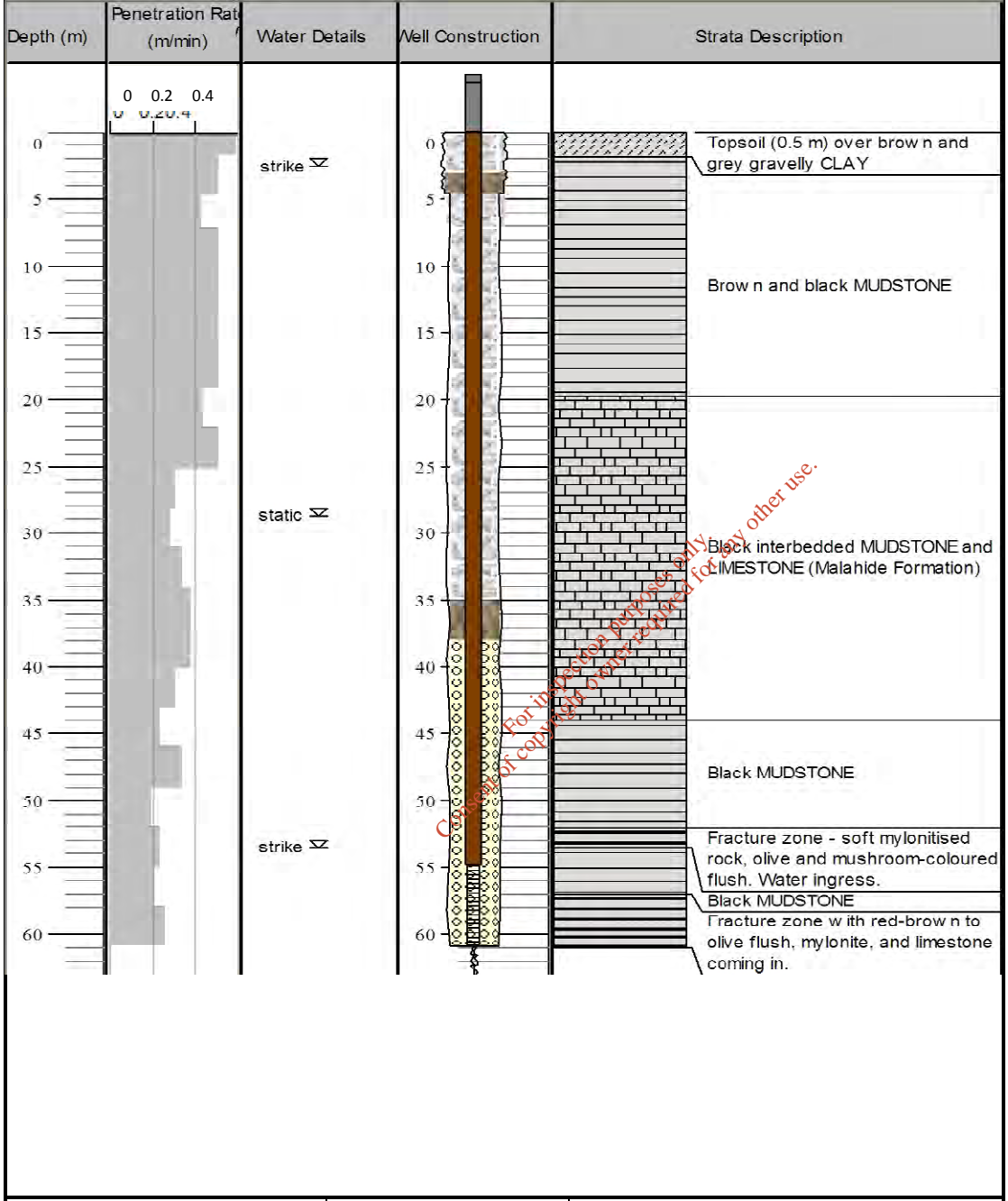


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Drilling Diameters			Steel Support Casings			Driller Yield Estimate:
Diameter	From	To	Diameter	From	To	Development Time:
0.17	0	22.5				
0.14	22.5	49				

Other Remarks:

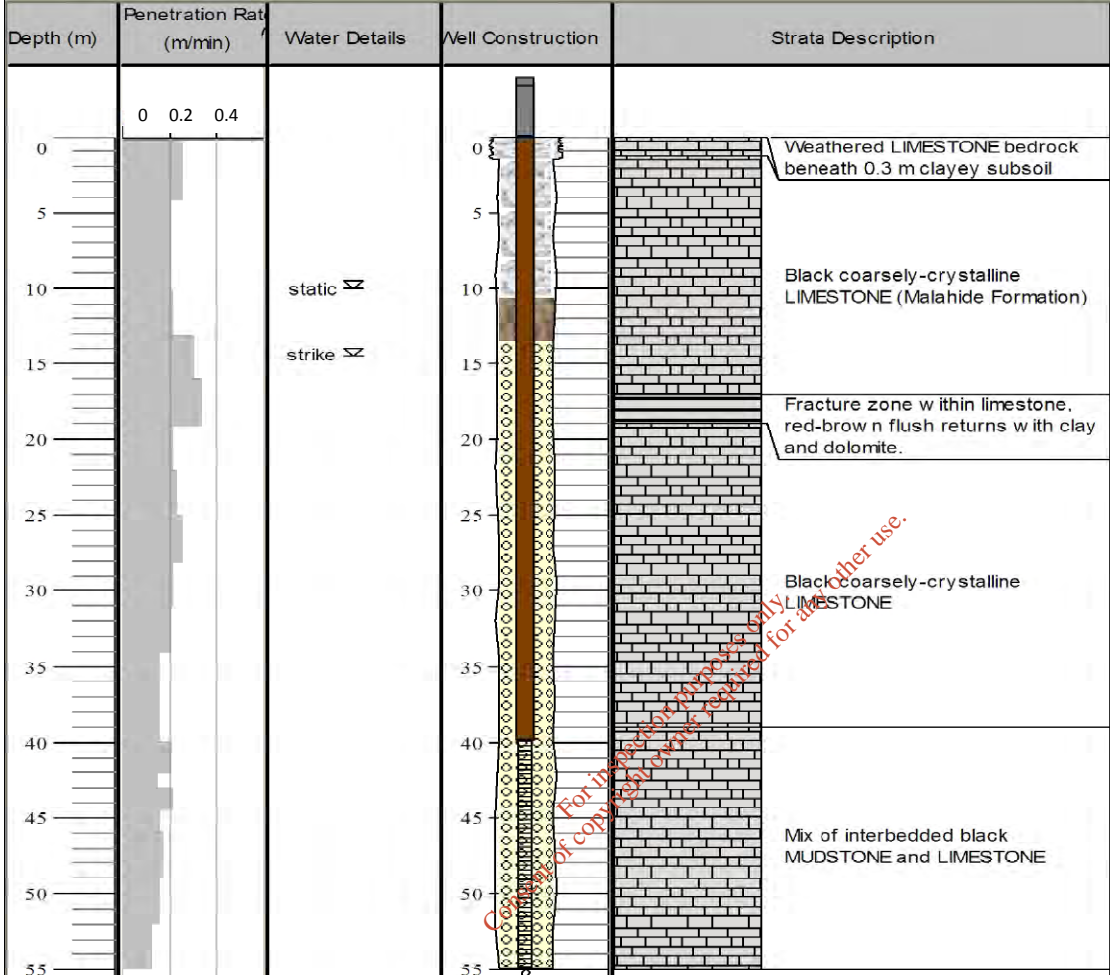
Project Name	Huntstown Quarry PA	WELL LOG		SLR Consulting (Ireland) Ltd.			
Client	Roadstone Wood Ltd.	Well Name	GW04	7 Dundrum Business Park			
Project No.	501.0180.00011	Easting	310466.2	Windy Arbour			
Location	Huntstown, County Dublin	Northing	241917.7	Dublin 14			
Contractor	Petersen Drilling Services	Elevation (gl)	81.21 mOD	Casing Length	55 m	Hole ID	170 mm
Drill Rig	Knebel	Elevation (TOC)	81.73 mOD	Casing Diameter	50 mm	Static Water Level	28.7 mbgl
Drill Method	Symmetrix and DTH Air	Boring Depth	61 m	Screen Length	6 m	Depth to Bedrock	1.9 mbgl
Start Date	17-Jul-10	Well Depth	61 m	Screen Diameter	50 mm	Logged By	OH
End Date	20-Jul-10						



Drilling Diameters			Steel Support Casings			Driller Yield Estimate:	
Diameter	From	To	Diameter	From	To	Development Time:	
0.17	0	4.5					
0.14	4.5	61					

Other Remarks:

Project Name	Huntstown Quarry PA	WELL LOG		SLR Consulting (Ireland) Ltd.			
Client	Roadstone Wood Ltd	Well Name	GW05	7 Dundrum Business Park			
Project No.	501.0180.00011	Easting	310273.0	Windy Arbour			
Location	Huntstown, County Dublin	Northing	241374.9	Dublin 14			
Contractor	Petersen Drilling Services	Elevation (gl)	84.95 mOD	Casing Length	40 m	Hole ID	170 mm
Drill Rig	Knebel	Elevation (TOC)	85.33 mOD	Casing Diameter	50 mm	Static Level	10 mbgl
Drill Method	Symmetrix and DTH Air	Boring Depth	55 m	Screen Length	15 m	Depth to Bedrock	0.3 mbgl
Start Date	17-Jul-10	Well Depth	55 m	Screen Diameter	50 mm	Logged By	OH
End Date	20-Jul-10						

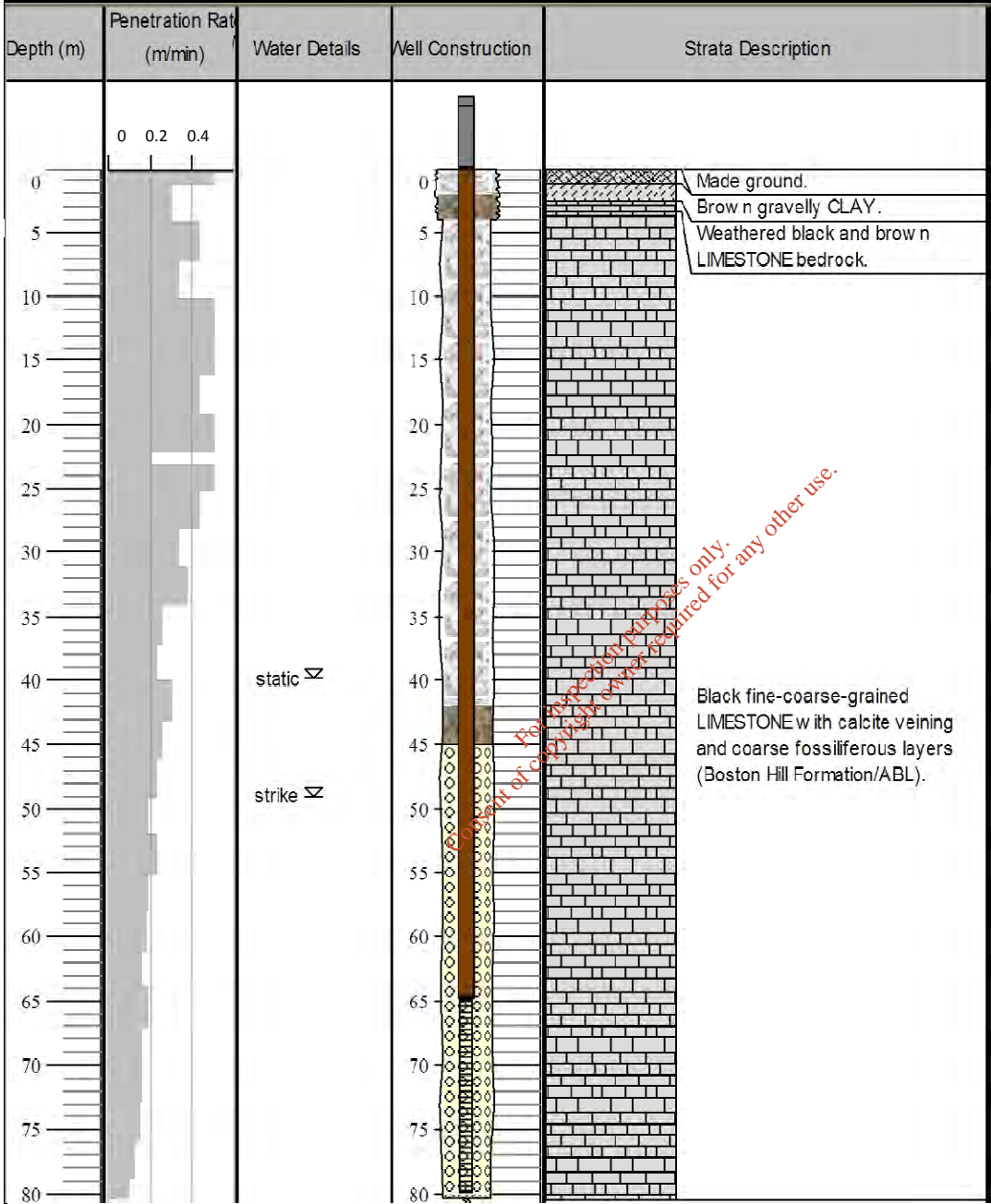


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Drilling Diameters			Steel Support Casings			Driller Yield Estimate:	
Diameter	From	To	Diameter	From	To	Development Time:	
0.17	0						
0.14							

Other Remarks:
 Approximately 2.5 m of soil and subsoil have been stripped from this area.

Project Name	Huntstown Quarry PA	WELL LOG		SLR Consulting (Ireland) Ltd.			
Client	Roadstone Wood Ltd	Well Name	GW06	7 Dundrum Business Park			
Project No.	501.0180.00011	Easting	310847.3	Windy Arbour			
Location	Huntstown, County Dublin	Northing	240902.1	Dublin 14			
Contractor	Petersen Drilling Services			T: 01 2964667 F: 01 2964676			
Drill Rig	Knebel	Elevation (gl)	82.16 mOD	Casing Length	65.5 m	Hole ID	170 mm
Drill Method	Symmetrix and DTH Air	Elevation (TOC)	82.78 mOD	Casing Diameter	50 mm	Static Level	39.8 mbgl
Start Date	17-Jul-10	Boring Depth	80.5 m	Screen Length	15 m	Depth to Bedrock	2.5 mbgl
End Date	20-Jul-10	Well Depth	80.5 m	Screen Diameter	50 mm	Logged By	OH



Drilling Diameters			Steel Support Casings			Driller Yield Estimate:	
Diameter	From	To	Diameter	From	To	Development Time:	
0.17	0	4					
0.14	4	80.5					

Other Remarks:

SURFACE WATER AND GROUNDWATER 6

Appendix 6-B Water Quality Results

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24 AUG 2010

TEST REPORT

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Consulting
Calibrating



Client: SLR Consulting Ireland
7 Dundrum Business Park
Windy Arbour
Dublin 14

BHP Ref. No.: 94060.1
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpцем2@bhp.ie

FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
	Central Sump			
pH		-	7.04	APHA-4500-H ⁺ -B
Electrical Conductivity		µScm ⁻¹	227	APHA - 2510 - B
Sodium		mg/l	12.56	APHA - 3120 - B
Potassium		mg/l	1.21	APHA - 3120 - B
Calcium		mg/l	54.3	APHA - 3120 - B
Magnesium		mg/l	0.95	APHA - 3120 - B
Chloride		mg/l	24.7	APHA - 4110 - B
Sulphate (as SO ₄)		mg/l	8.16	APHA - 4110 - B
Total Alkalinity (as CaCO ₃)		mg/l	151	APHA - 2320 -B
Total Hardness (as CaCO ₃)		mg/l	330	APHA - 2340- B
Nitrate (as NO ₃)		mg/l	4.66	APHA - 4110 - B
Nitrite (as NO ₂)		mg/l	<0.05	APHA - 4110 - B
BOD		mg/l	2	APHA - 5210 - B
Diesel Range Organics		mg/l	<0.01	GC-FID
Mineral Oils		mg/l	<0.01	GC-FID

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Additional information :

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For and on behalf of BHP laboratories :

P. O'Sullivan
Pat O'Sullivan
Issue Date : 20/08/2010

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Testing
Consulting
Calibrating



Client: SLR Consulting Ireland
7 Dundrum Business Park
Windy Arbour
Dublin 14

BHP Ref. No.: 94060.1
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
	Central Sump			
Ammoniacal Nitrogen (as NH ₃ -N)		mg/l	0.04	APHA -4500- NH ₃ -D
Iron		mg/l	<0.001	APHA - 3120 - B
Manganese		mg/l	<0.001	APHA - 3120 - B
OrthoPhosphate (PO ₄ -P)		mg/l	0.07	APHA - 4110 - B

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Client: SLR Consulting Ireland
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Dublin 14

BHP Ref. No.: 94060.2
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

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New Road
Thomondgate
Limerick
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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpцем2@bhp.ie

FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
	Northern Sump			
pH			7.11	APHA-4500-H ⁺ -B
Electrical Conductivity		µScm ⁻¹	329	APHA - 2510 - B
Sodium		mg/l	20.54	APHA - 3120 - B
Potassium		mg/l	4.89	APHA - 3120 - B
Calcium		mg/l	102.4	APHA - 3120 - B
Magnesium		mg/l	3.25	APHA - 3120 - B
Chloride		mg/l	30.21	APHA - 4110 - B
Sulphate (as SO ₄)		mg/l	19.27	APHA - 4110 - B
Total Alkalinity (as CaCO ₃)		mg/l	209	APHA - 2320 - B
Total Hardness (as CaCO ₃)		mg/l	430	APHA - 2340 - B
Nitrate (as NO ₃)		mg/l	3.27	APHA - 4110 - B
Nitrite (as NO ₂)		mg/l	<0.05	APHA - 4110 - B
BOD		mg/l	1	APHA - 5210 - B
Diesel Range Organics		mg/l	<0.01	GC-FID
Mineral Oils		mg/l	<0.01	GC-FID

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Windy Arbour
Dublin 14

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Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
	Northern Sump			
Ammoniacal Nitrogen (as NH ₃ -N)		mg/l	0.02	APHA -4500- NH ₃ -D
Iron		mg/l	0.016	APHA - 3120 - B
Manganese		mg/l	0.002	APHA - 3120 - B
OrthoPhosphate (PO ₄ -P)		mg/l	0.04	APHA - 4110 - B

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7 Dundrum Business Park
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Dublin 14

BHP Ref. No.: 94060.3
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

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FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
	SW01			
pH			6.96	APHA-4500-H ⁺ -B
Electrical Conductivity		μScm^{-1}	459	APHA - 2510 - B
Sodium		mg/l	31.2	APHA - 3120 - B
Potassium		mg/l	3.12	APHA - 3120 - B
Calcium		mg/l	80.4	APHA - 3120 - B
Magnesium		mg/l	2.45	APHA - 3120 - B
Chloride		mg/l	56.74	APHA - 4110 - B
Sulphate (as SO ₄)		mg/l	20.4	APHA - 4110 - B
Total Alkalinity (as CaCO ₃)		mg/l	210	APHA - 2320 - B
Total Hardness (as CaCO ₃)		mg/l	424	APHA - 2340 - B
Nitrate (as NO ₃)		mg/l	11.24	APHA - 4110 - B
Nitrite (as NO ₂)		mg/l	<0.05	APHA - 4110 - B
BOD		mg/l	1	APHA - 5210 - B
Diesel Range Organics		mg/l	<0.01	GC-FID
Mineral Oils		mg/l	<0.01	GC-FID

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Dublin 14

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Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

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Limerick
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Fax + 353 61 455447
E Mail bhpce2@bhp.ie

FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
Ammoniacal Nitrogen (as NH ₃ -N)	SW01	mg/l	0.01	APHA -4500- NH ₃ -D
Iron		mg/l	<0.001	APHA - 3120 - B
Manganese		mg/l	<0.001	APHA - 3120 - B
OrthoPhosphate (PO ₄ -P)		mg/l	0.08	APHA - 4110 - B

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Windy Arbour
Dublin 14

BHP Ref. No.: 94060.4

Order No.:

Date Received: 06/08/10

Date Completed: 20/08/10

Test Specification: Nil

Item : See below

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New Road
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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpem2@bhp.ie

FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
	GW01			
pH			7.34	APHA-4500-H ⁺ -B
Electrical Conductivity		μScm^{-1}	114	APHA - 2510 - B
Sodium		mg/l	24.52	APHA - 3120 - B
Potassium		mg/l	3.54	APHA - 3120 - B
Calcium		mg/l	80.7	APHA - 3120 - B
Magnesium		mg/l	17.54	APHA - 3120 - B
Chloride		mg/l	19.23	APHA - 4110 - B
Sulphate (as SO ₄)		mg/l	48.96	APHA - 4110 - B
Total Alkalinity (as CaCO ₃)		mg/l	301	APHA - 2320 - B
Total Hardness (as CaCO ₃)		mg/l	340	APHA - 2340 - B
Nitrate (as NO ₃)		mg/l	18.66	APHA - 4110 - B
Nitrite (as NO ₂)		mg/l	<0.05	APHA - 4110 - B
Total Organic Carbon		mg/l	4.1	APHA - 5310 - C

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Windy Arbour
Dublin 14

BHP Ref. No.: 94060.4
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

BHP
New Road
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Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
Ammoniacal Nitrogen (as NH ₃ -N)	GW01	mg/l	0.02	APHA -4500- NH ₃ -D
Iron		mg/l	0.006	APHA - 3120 - B
Manganese		mg/l	0.001	APHA - 3120 - B
OrthoPhosphate (PO ₄ -P)		mg/l	0.1	APHA - 4110 - B

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Windy Arbour
Dublin 14

BHP Ref. No.: 94060.5
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpцем2@bhp.ie

FTAO: Oliver Higgins


Test	Client Reference	Units	Results	Standard Reference
	GW02			
pH			6.84	APHA-4500-H ⁺ -B
Electrical Conductivity		μScm^{-1}	229	APHA - 2510 - B
Sodium		mg/l	17.89	APHA - 3120 - B
Potassium		mg/l	2.99	APHA - 3120 - B
Calcium		mg/l	75.45	APHA - 3120 - B
Magnesium		mg/l	15.42	APHA - 3120 - B
Chloride		mg/l	24.68	APHA - 4110 - B
Sulphate (as SO ₄)		mg/l	12.09	APHA - 4110 - B
Total Alkalinity (as CaCO ₃)		mg/l	292	APHA - 2320 -B
Total Hardness (as CaCO ₃)		mg/l	352	APHA - 2340- B
Nitrate (as NO ₃)		mg/l	12.45	APHA - 4110 - B
Nitrite (as NO ₂)		mg/l	<0.05	APHA - 4110 - B
Total Organic Carbon		mg/l	4.4	APHA - 5310 - C

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Additional information :

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Client: SLR Consulting Ireland
7 Dundrum Business Park
Windy Arbour
Dublin 14

BHP Ref. No.: 94060.5
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpцем2@bhp.ie

FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
Ammoniacal Nitrogen (as NH ₃ -N)	GW02	mg/l	0.01	APHA -4500- NH ₃ -D
Iron		mg/l	<0.001	APHA - 3120 - B
Manganese		mg/l	<0.001	APHA - 3120 - B
OrthoPhosphate (PO ₄ -P)		mg/l	0.09	APHA - 4110 - B

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Additional information :

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For and on behalf of BHP laboratories :


Pat O'Sullivan
Issue Date : 20/08/2010

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TEST REPORT

Analysing
Testing
Consulting
Calibrating



Client: SLR Consulting Ireland
7 Dundrum Business Park
Windy Arbour
Dublin 14

BHP Ref. No.: 94060.6
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

BHP
New Road
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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
	GW03			
pH		-	7.46	APHA-4500-H ⁺ -B
Electrical Conductivity		µScm ⁻¹	376	APHA - 2510 - B
Sodium		mg/l	28.62	APHA - 3120 - B
Potassium		mg/l	4.01	APHA - 3120 - B
Calcium		mg/l	92.52	APHA - 3120 - B
Magnesium		mg/l	20.27	APHA - 3120 - B
Chloride		mg/l	43.11	APHA - 4110 - B
Sulphate (as SO ₄)		mg/l	17.24	APHA - 4110 - B
Total Alkalinity (as CaCO ₃)		mg/l	351	APHA - 2320 -B
Total Hardness (as CaCO ₃)		mg/l	440	APHA - 2340- B
Nitrate (as NO ₃)		mg/l	24.77	APHA - 4110 - B
Nitrite (as NO ₂)		mg/l	<0.05	APHA - 4110 - B
Total Organic Carbon		mg/l	1.5	APHA - 5310 - C

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FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
	GW03			
Ammoniacal Nitrogen (as NH ₃ -N)		mg/l	0.04	APHA -4500- NH ₃ -D
Iron		mg/l	0.052	APHA - 3120 - B
Manganese		mg/l	0.013	APHA - 3120 - B
OrthoPhosphate (PO ₄ -P)		mg/l	0.06	APHA - 4110 - B

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Client: SLR Consulting Ireland
7 Dundrum Business Park
Windy Arbour
Dublin 14

BHP Ref. No.: 94060.7
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

BHP
New Road
Thomondgate
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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
	GW04			
pH		-	7.32	APHA-4500-H ⁺ -B
Electrical Conductivity		µS/cm ⁻¹	512	APHA - 2510 - B
Sodium		mg/l	25.42	APHA - 3120 - B
Potassium		mg/l	3.12	APHA - 3120 - B
Calcium		mg/l	85.42	APHA - 3120 - B
Magnesium		mg/l	19.85	APHA - 3120 - B
Chloride		mg/l	27.49	APHA - 4110 - B
Sulphate (as SO ₄)		mg/l	36.11	APHA - 4110 - B
Total Alkalinity (as CaCO ₃)		mg/l	332	APHA - 2320 - B
Total Hardness (as CaCO ₃)		mg/l	494	APHA - 2340 - B
Nitrate (as NO ₃)		mg/l	16.62	APHA - 4110 - B
Nitrite (as NO ₂)		mg/l	<0.05	APHA - 4110 - B
Total Organic Carbon		mg/l	0.5	APHA - 5310 - C

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Dublin 14

BHP Ref. No.: 94060.7
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

BHP
New Road
Thomondgate
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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Oliver Higgins


Test	Client Reference	Units	Results	Standard Reference
	GW04			
Ammoniacal Nitrogen (as NH ₃ -N)		mg/l	0.02	APHA -4500- NH ₃ -D
Iron		mg/l	<0.001	APHA - 3120 - B
Manganese		mg/l	<0.001	APHA - 3120 - B
OrthoPhosphate (PO ₄ -P)		mg/l	0.02	APHA - 4110 - B

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Client: SLR Consulting Ireland
7 Dundrum Business Park
Windy Arbour
Dublin 14

BHP Ref. No.: 94060.8
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpem2@bhp.ie

FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
	GW05			
pH		-	6.86	APHA-4500-H ⁺ -B
Electrical Conductivity		μScm^{-1}	681	APHA - 2510 - B
Sodium		mg/l	16.89	APHA - 3120 - B
Potassium		mg/l	1.58	APHA - 3120 - B
Calcium		mg/l	68.57	APHA - 3120 - B
Magnesium		mg/l	14.56	APHA - 3120 - B
Chloride		mg/l	19.51	APHA - 4110 - B
Sulphate (as SO ₄)		mg/l	24.66	APHA - 4110 - B
Total Alkalinity (as CaCO ₃)		mg/l	247	APHA - 2320 -B
Total Hardness (as CaCO ₃)		mg/l	220	APHA - 2340 - B
Nitrate (as NO ₃)		mg/l	9.32	APHA - 4110 - B
Nitrite (as NO ₂)		mg/l	<0.05	APHA - 4110 - B
Total Organic Carbon		mg/l	3.2	APHA - 5310 - C

Additional information :

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Client: SLR Consulting Ireland
7 Dundrum Business Park
Windy Arbour
Dublin 14

BHP Ref. No.: 94060.8
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

BHP
New Road
Thomondgate
Limerick
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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Oliver Higgins


Test	Client Reference	Units	Results	Standard Reference
	GW05			
Ammoniacal Nitrogen (as NH ₃ -N)		mg/l	0.01	APHA -4500- NH ₃ -D
Iron		mg/l	<0.001	APHA - 3120 - B
Manganese		mg/l	<0.001	APHA - 3120 - B
OrthoPhosphate (PO ₄ -P)		mg/l	<0.01	APHA - 4110 - B

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Client: SLR Consulting Ireland
7 Dundrum Business Park
Windy Arbour
Dublin 14

BHP Ref. No.: 94060.9
Order No.:
Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item :See below

BHP
New Road
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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

FTAO: Oliver Higgins


Test	Client Reference	Units	Results	Standard Reference
	GW06			
pH		-	7.12	APHA-4500-H ⁺ -B
Electrical Conductivity		µS/cm ⁻¹	354	APHA - 2510 - B
Sodium		mg/l	18.45	APHA - 3120 - B
Potassium		mg/l	2.57	APHA - 3120 - B
Calcium		mg/l	78.45	APHA - 3120 - B
Magnesium		mg/l	20.12	APHA - 3120 - B
Chloride		mg/l	34.16	APHA - 4110 - B
Sulphate (as SO ₄)		mg/l	18.71	APHA - 4110 - B
Total Alkalinity (as CaCO ₃)		mg/l	313	APHA - 2320 -B
Total Hardness (as CaCO ₃)		mg/l	252	APHA - 2340- B
Nitrate (as NO ₃)		mg/l	6.44	APHA - 4110 - B
Nitrite (as NO ₂)		mg/l	<0.05	APHA - 4110 - B
Total Organic Carbon		mg/l	9.9	APHA - 5310 - C

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TEST REPORT

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Client: SLR Consulting Ireland
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BHP Ref. No.: 94060.9
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Date Received: 06/08/10
Date Completed: 20/08/10
Test Specification: Nil
Item : See below

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Oliver Higgins

Test	Client Reference	Units	Results	Standard Reference
Ammoniacal Nitrogen (as NH ₃ -N)	GW06	mg/l	<0.01	APHA -4500- NH ₃ -D
Iron		mg/l	0.067	APHA - 3120 - B
Manganese		mg/l	0.021	APHA - 3120 - B
OrthoPhosphate (PO ₄ -P)		mg/l	0.01	APHA - 4110 - B

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SURFACE WATER AND GROUNDWATER 6

Appendix 6-C Site Water Balance

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Climate Data	
Average Annual Rainfall (AvgR)	733 mm
Potential Evapotranspiration (PE)	mm
Actual Evapotranspiration (AE)	425 mm
Effective Rainfall (ER)	308 mm
Wettest Winter Month (December) rainfall	76 mm
Driest Summer Month (July) rainfall	50 mm
Wettest Winter Month (December) AE (Gnfld/Rstrd.)	11 mm
Driest Summer Month (July) AE (Gnfld/Rstrd.)	86 mm
Wettest Winter Month (December) AE (Operational)	5 mm
Driest Summer Month (July) AE (Operational)	15 mm
Annual AE greenfield/restored areas	467 mm/yr
Annual AE operational areas	50 mm/yr
5 yr return period: 48 hr event	50 mm
5 yr return period: 1 hr event	15 mm

Site Operational Sizes (ha.)	North quarry	West quarry	Central quarry	South quarry
Operational	3.9	10.3	16.4	25.0
Greenfield				
Restored				

AVERAGE ANNUAL POTENTIAL RUNOFFS	North quarry	West quarry	Central quarry	South quarry
Operational Area				
Average daily rainfall (P) (Operational) (cu. m/day)	78.3	206.7	329.1	501.7
Av. Daily AE (Operational) (cu. m/day)	5.3	14.1	22.5	34.2
Av. potential runoff from operational area (ER)	72.9	192.6	306.7	467.5
Av. potential runoff from operational area (ER) (l/sec)	0.8	2.2	3.5	5.4
Greenfield/Restored Area				
Average daily rainfall (P) (Greenfield) (cu. m/day)	0.0	0.0	0.0	0.0
Average daily rainfall (P) (Restored) (cu. m/day)	0.0	0.0	0.0	0.0
Average Daily AE (Greenfield/restored)(cu. m/day)	0.0	0.0	0.0	0.0
Average potential runoff from gnfld/rstrd area (ER)	0.0	0.0	0.0	0.0
Average potential runoff (Gnfld./rstrd.)(ER) (l/sec)	0.0	0.0	0.0	0.0
Combined Areas				
Average Potential Runoff from site (cu. m/day)	72.9	192.6	306.7	467.5
Average Potential Runoff from site (l/sec)	0.8	2.2	3.5	5.4

WETTEST/DRIEST MONTHLY POTENTIAL RUNOFFS				
WETTEST WINTER MONTH (DECEMBER)				
	North quarry	West quarry	Central quarry	South quarry
Operational Area				
Average daily rainfall (P) (Operational) (cu. m/day)	95.6	252.5	402.1	612.9
Average Daily AE (Operational) (cu. m/day)	6.3	16.6	26.5	40.3
Average potential runoff (operational) (ER)	89.3	235.9	375.6	572.6
Average potential runoff (operational) (ER) (l/sec)	1.0	2.7	4.3	6.6
Greenfield/Restored Area				
Average daily rainfall (P) (Greenfield) (cu. m/day)	0.0	0.0	0.0	0.0
Average daily rainfall (P) (Restored) (cu. m/day)	0.0	0.0	0.0	0.0
Average Daily AE (Greenfield/restored)(cu. m/day)	0.0	0.0	0.0	0.0
Average potential runoff from gnfld/rstrd area (ER)	0.0	0.0	0.0	0.0
Average potential runoff (Gnfld./rstrd.)(ER) (l/sec)	0.0	0.0	0.0	0.0
Combined Areas				
Average Potential Runoff from site (cu. m/day)	89.3	235.9	375.6	572.6
Average Potential Runoff from site (l/sec)	1.0	2.7	4.3	6.6

DRIEST MONTH				
	North quarry	West quarry	Central quarry	South quarry
Operational Area				
Average daily rainfall (P) (Operational) (cu. m/day)	62.9	166.1	264.5	403.2
Average Daily AE (Operational) (cu. m/day)	18.9	49.8	79.4	121.0
Av. potential runoff from operational area (ER)	44.0	116.3	185.2	282.3
Av. potential runoff from operational area (ER) (l/sec)	0.5	1.3	2.1	3.3
Greenfield/Restored Area				
Average daily rainfall (P) (Greenfield) (cu. m/day)	0.0	0.0	0.0	0.0
Average daily rainfall (P) (Restored) (cu. m/day)	0.0	0.0	0.0	0.0
Average Daily AE (Greenfield/restored)(cu. m/day)	0.0	0.0	0.0	0.0
Average potential runoff from gnfld/rstrd area (ER)	-	-	-	-
Average potential runoff (Gnfld./rstrd.)(ER) (l/sec)	-	-	-	-
Combined Areas				
Average Potential Runoff from site (cu. m/day)	44.0	116.3	185.2	282.3
Average Potential Runoff from site (l/sec)	0.5	1.3	2.1	3.3

PEAK FLOWS				
	North quarry	West quarry	Central quarry	South quarry
5 yr:48 hr duration				
Flow on operational area (cu. m/day)	975	2575	4100	6250
Flow on operational area (l/sec)	11	30	47	72
Flow on greenfield area (cu. m/day)	0	0	0	0
Flow on restored area (cu. m/day)	0	0	0	0
Total Flows (cu. m/day)	975	2575	4100	6250
5 yr:1 hr duration				
Flow to operational area (cu. m/hr)	400.4	1057.5	1683.8	2566.7
Flow on greenfield area (cu. m/hr)	0	0	0	0
Flow on restored area (cu. m/hr)	0	0	0	0

Run-off Summary

	Ward Catch			
	North quarry	West quarry	Central quarry	
av an	72.9	192.6	306.7	572.2
wetest m	89.3	235.9	375.6	700.8
48hr st	975	2575	4100	7650.0
dry	44.0	116.3	185.2	345.5

	Tolka
	South quarry
av an	467.5
wetest m	572.6
48hr st	6250
dry	282.3

SURFACE WATER AND GROUNDWATER 6

Appendix 6-D Spill Kit Details

*For inspection purposes only.
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Safety Storage Systems Ltd.
- Spill Kit Details

Emergency Spill Response Kits designed to tackle chemical spills which occur outside bunded areas. Contents include Absorbent Socks, Mats, Pads, Instructions, Disposal Bags and PPE.

Supplied in highly visible mobile wheeled Bins.

Spill Kit type: General Purpos.



250 Litre Spill Kit

- 1 250 Litre Wheeled Bin
- 4 Socks (3m x 8cm)
- 20 Cushions
- 140 Pads (Double Weight)
- 1 Plug Rug (61cm X 40cm)
- 1 5Kg Plugging Granules
- 1 Caution Tape
- 4 Disposal Bags and Tie
- 1 Instruction Sheet