

# Certificate of Analysis



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Report Number: **COV/558587/2008**

Issue **1**

Laboratory Number: **10888360**

Sample **15** of **16**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH8 0.50-1.00m 10:1**

Sample Date:

Sample Received

**31 October 2008**

Analysis Complete:

**13 November 2008**

Test Description	Result	Units	Accreditation		Method
Leachate BSEN 10:1 extract	Y		N	Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N	Mid	25C
Arsenic, Soluble	<50	ug/l	N	Mid	25C
Barium, Soluble	0.021	mg/l	Y	Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y	Mid	56
Calcium, Soluble	690	mg/l	Y	Mid	53F
Chromium, Soluble	<100	ug/l	Y	Mid	53F
Copper, Soluble	<100	ug/l	Y	Mid	53F
Lead, Soluble	<100	ug/l	Y	Mid	53F
Mercury, Soluble	<0.30	ug/l	Y	Mid	56
Molybdenum, Soluble	0.010	mg/l	N	Mid	68
Nickel, Soluble	<100	ug/l	Y	Mid	53F
Selenium, Soluble	<6.0	ug/l	N	Mid	25C
Zinc, Soluble	<100	ug/l	Y	Mid	53F
Phenol Index	<0.050	mg/l	N	Mid	32A
Sulphate as SO <sub>4</sub>	1500	mg/l	Y	Mid	60
Chloride as Cl	4.3	mg/l	Y	Mid	60
Dissolved Solids	2400	mg/l	N	Mid	18
Fluoride as F-	<0.20	mg/l	Y	Mid	20
TOC (Filtered)	5.2	mg/l	Y	Mid	41

Analyst Comments for 10888360:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. I/S=Insufficient sample

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Report Number: **COV/558587/2008**

Issue **1**

Laboratory Number: **10888361**

Sample **16** of **16**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH8 1.00-2.00m 10:1**

Sample Date:

Sample Received

**31 October 2008**

Analysis Complete:

**13 November 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.025	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	650	mg/l	Y Mid	53F
Chromium, Soluble	<100	ug/l	Y Mid	53F
Copper, Soluble	<100	ug/l	Y Mid	53F
Lead, Soluble	<100	ug/l	Y Mid	53F
Mercury, Soluble	<0.30	ug/l	Y Mid	56
Molybdenum, Soluble	0.0095	mg/l	N Mid	68
Nickel, Soluble	<100	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<100	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO <sub>4</sub>	1400	mg/l	Y Mid	60
Chloride as Cl	5.8	mg/l	Y Mid	60
Dissolved Solids	2400	mg/l	N Mid	18
Fluoride as F-	<0.20	mg/l	Y Mid	20
OC (Filtered)	7.3	mg/l	Y Mid	41

Analyst Comments for 10888361:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. I/S=Insufficient sample

Signed:

Name: **L. Ellis**

Date: **19 November 2008**

Title: **Team Leader**

Severn Trent Laboratories Ltd.

**Mr Crean  
O Callaghan Moran & Assoc.  
Granary House  
Rutland Street  
Cork**

24 December 2008

**Test Report: COV/569308/2008**

Dear Mr Crean

Analysis of your sample(s) submitted on 12 December 2008 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

Should you have any queries regarding this report(s) or any part of our service, please contact Customer Services on +44 (0)24 7642 1213 who will be happy to discuss your requirements.

If you would like to arrange any further analysis, please contact Customer Services. To arrange container delivery or sample collection, please call the Couriers Department directly on 024 7685 6562.

Thank you for using STL and we look forward to receiving your next samples.

Yours Sincerely,

Signed: 

Name: G. Smith

Title: Inorg and License Chem Manager

**STL Coventry**

STL Business Centre, Torrington Avenue,  
Coventry, CV4 9GU

**Severn Trent Laboratories Limited**

Registered in England & Wales Registration No. 2148934 Registered Office: 2297 Coventry Road, Birmingham B26

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Cert. No. 10269  
Environmental Management Systems



Certificate No. F567435



# Report Summary



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**Mr Donal Crean  
O Callaghan Moran & Assoc.  
Granary House  
Rutland Street  
Cork**

Date of Issue: **24 December 2008**

Report Number: **COV/569308/2008**

Issue **1**

**Job Description:** Donal Crean

**Job Location:** O Callaghan Moran & Associates

Number of Samples  
included in this report **22**

Job Received: **12 December 2008**

Number of Test Results  
included in this report **550**

Analysis Commenced: **12 December 2008**

Signed:

Name: **G. Smith**

Date: **24 December 2008**

Title: **Inorg and License Chem Manager**

STL was not responsible for sampling unless otherwise stated. Sampling is not covered by our UKAS accreditation.

Information on the methods of analysis and performance characteristics are available on request.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.

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**SEVERN**  
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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956742**

Sample **2** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH12 0.50m-1.00m**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
EN 12457-3 Leachate	Y		N Mid	EN12457-3
Moisture Content Ratio at 105C	0.39	% ratio	N Mid	33
Moisture at 105c	0.39	%	N Mid	33
TOC by Ignition in O2	5.3	%	N Mid	27
PCB, Total of 7 Congeners	<0.010	mg/kg	N Mid	312
Mineral Oils, >C10 - C40	640	mg/kg	Y Mid	317
Naphthalene	0.47	mg/kg	N Mid	307
Acenaphthylene	<0.10	mg/kg	N Mid	307
Acenaphthene	0.18	mg/kg	N Mid	307
Fluorene	0.11	mg/kg	N Mid	307
Phenanthrene	1.3	mg/kg	N Mid	307
Anthracene	0.19	mg/kg	N Mid	307
Fluoranthene	0.87	mg/kg	N Mid	307
Pyrene	1.1	mg/kg	N Mid	307
Benzo(a)anthracene	0.43	mg/kg	N Mid	307
Chrysene	0.36	mg/kg	N Mid	307
Benzo(b)fluoranthene	0.26	mg/kg	N Mid	307
Benzo(k)fluoranthene	0.15	mg/kg	N Mid	307
Benzo(a)pyrene	0.34	mg/kg	N Mid	307
benz(a,h)anthracene	<0.10	mg/kg	N Mid	307
Benzo(g,h,i)perylene	0.45	mg/kg	N Mid	307
Indeno(1,2,3-c,d)pyrene	0.37	mg/kg	N Mid	307
Coronene	<0.10	mg/kg	N Mid	307
PAH, Total of 17 WAC	6.6	mg/kg	N Mid	307
benzene	<0.10	mg/kg	Y Mid	327
toluene	<0.10	mg/kg	Y Mid	327
ethylbenzene	<0.10	mg/kg	Y Mid	327
m&p-Xylene	<0.20	mg/kg	Y Mid	327
o-xylene	<0.10	mg/kg	Y Mid	327
Dry Ratio (BSEN 12457)	99.61	%	N Mid	Calculated

Analyst Comments for 10956742:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.  
I/S=Insufficient sample

Severn Trent Laboratories Ltd.

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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956743**

Sample **3** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH12 3.00m-4.00m**

Sample Date:

Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
EN 12457-3 Leachate	Y		N Mid	EN12457-3
Moisture Content Ratio at 105C	0.29	% ratio	N Mid	33
Moisture at 105c	0.29	%	N Mid	33
TOC by Ignition in O2	3.0	%	N Mid	27
PCB, Total of 7 Congeners	<0.010	mg/kg	N Mid	312
Mineral Oils, >C10 - C40	170	mg/kg	Y Mid	317
Naphthalene	<0.10	mg/kg	N Mid	307
Acenaphthylene	<0.10	mg/kg	N Mid	307
Acenaphthene	<0.10	mg/kg	N Mid	307
Fluorene	<0.10	mg/kg	N Mid	307
Phenanthrene	0.11	mg/kg	N Mid	307
Anthracene	<0.10	mg/kg	N Mid	307
Fluoranthene	<0.10	mg/kg	N Mid	307
Pyrene	<0.10	mg/kg	N Mid	307
Benzo(a)anthracene	<0.10	mg/kg	N Mid	307
Chrysene	<0.10	mg/kg	N Mid	307
Benzo(b)fluoranthene	<0.10	mg/kg	N Mid	307
Benzo(k)fluoranthene	<0.10	mg/kg	N Mid	307
Benzo(a)pyrene	<0.10	mg/kg	N Mid	307
Dibenz(a,h)anthracene	<0.10	mg/kg	N Mid	307
Benzo(g,h,i)perylene	<0.10	mg/kg	N Mid	307
Indeno(1,2,3-c,d)pyrene	<0.10	mg/kg	N Mid	307
Coronene	<0.10	mg/kg	N Mid	307
PAH, Total of 17 WAC	<1.0	mg/kg	N Mid	307
benzene	<0.10	mg/kg	Y Mid	327
toluene	<0.10	mg/kg	Y Mid	327
ethylbenzene	<0.10	mg/kg	Y Mid	327
m&p-Xylene	<0.20	mg/kg	Y Mid	327
o-xylene	<0.10	mg/kg	Y Mid	327
Dry Ratio (BSEN 12457)	99.71	%	N Mid	Calculated

**Analyst Comments for 10956743:**

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

IS=Insufficient sample

**Severn Trent Laboratories Ltd.**

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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956744**

Sample **4** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH12 4.00m-5.00m**

Sample Date:

Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
EN 12457-3 Leachate	Y		N Mid	EN12457-3
Moisture Content Ratio at 105C	0.28	% ratio	N Mid	33
Moisture at 105c	0.28	%	N Mid	33
TOC by Ignition in O2	2.4	%	N Mid	27
PCB, Total of 7 Congeners	<0.010	mg/kg	N Mid	312
Mineral Oils, >C10 - C40	57	mg/kg	Y Mid	317
Naphthalene	0.15	mg/kg	N Mid	307
Acenaphthylene	<0.10	mg/kg	N Mid	307
Acenaphthene	<0.10	mg/kg	N Mid	307
Fluorene	<0.10	mg/kg	N Mid	307
Phenanthrene	<0.10	mg/kg	N Mid	307
Anthracene	<0.10	mg/kg	N Mid	307
Fluoranthene	<0.10	mg/kg	N Mid	307
Pyrene	<0.10	mg/kg	N Mid	307
Benzo(a)anthracene	<0.10	mg/kg	N Mid	307
Chrysene	<0.10	mg/kg	N Mid	307
Benzo(b)fluoranthene	<0.10	mg/kg	N Mid	307
Benzo(k)fluoranthene	<0.10	mg/kg	N Mid	307
Benzo(a)pyrene	<0.10	mg/kg	N Mid	307
Benzo(a,h)anthracene	<0.10	mg/kg	N Mid	307
Benzo(g,h,i)perylene	<0.10	mg/kg	N Mid	307
Indeno(1,2,3-c,d)pyrene	<0.10	mg/kg	N Mid	307
Coronene	<0.10	mg/kg	N Mid	307
PAH, Total of 17 WAC	<1.0	mg/kg	N Mid	307
benzene	<0.10	mg/kg	Y Mid	327
toluene	<0.10	mg/kg	Y Mid	327
ethylbenzene	<0.10	mg/kg	Y Mid	327
m&p-Xylene	<0.20	mg/kg	Y Mid	327
o-xylene	<0.10	mg/kg	Y Mid	327
Dry Ratio (BSEN 12457)	99.72	%	N Mid	Calculated

Analyst Comments for 10956744:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956746**

Sample **6** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH14 0.50m-1.00m**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation		Method
EN 12457-3 Leachate	Y		N	Mid	EN12457-3
Moisture Content Ratio at 105C	1.60	% ratio	N	Mid	33
Moisture at 105c	1.6	%	N	Mid	33
TOC by Ignition in O2	4.4	%	N	Mid	27
PCB, Total of 7 Congeners	<0.010	mg/kg	N	Mid	312
Mineral Oils, >C10 - C40	99	mg/kg	Y	Mid	317
Naphthalene	0.59	mg/kg	N	Mid	307
Acenaphthylene	<0.10	mg/kg	N	Mid	307
Acenaphthene	0.25	mg/kg	N	Mid	307
Fluorene	0.11	mg/kg	N	Mid	307
Phenanthrene	1.6	mg/kg	N	Mid	307
Anthracene	0.26	mg/kg	N	Mid	307
Fluoranthene	1.1	mg/kg	N	Mid	307
Pyrene	1.2	mg/kg	N	Mid	307
Benzo(a)anthracene	0.60	mg/kg	N	Mid	307
Chrysene	0.57	mg/kg	N	Mid	307
Benzo(b)fluoranthene	0.45	mg/kg	N	Mid	307
Benzo(k)fluoranthene	0.18	mg/kg	N	Mid	307
Benzo(a)pyrene	0.56	mg/kg	N	Mid	307
Dibenz(a,h)anthracene	<0.10	mg/kg	N	Mid	307
Benzo(g,h,i)perylene	0.37	mg/kg	N	Mid	307
Indeno(1,2,3-c,d)pyrene	0.26	mg/kg	N	Mid	307
Coronene	<0.10	mg/kg	N	Mid	307
PAH, Total of 17 WAC	8.1	mg/kg	N	Mid	307
benzene	<0.10	mg/kg	Y	Mid	327
toluene	<0.10	mg/kg	Y	Mid	327
ethylbenzene	<0.10	mg/kg	Y	Mid	327
m&p-Xylene	<0.20	mg/kg	Y	Mid	327
o-xylene	<0.10	mg/kg	Y	Mid	327
Dry Ratio (BSEN 12457)	98.43	%	N	Mid	Calculated

Analyst Comments for 10956746: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

Severn Trent Laboratories Ltd.



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# STL

Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956748**

Sample **8** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH14 2.00m-3.00m**

Sample Date:

Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation		Method
EN 12457-3 Leachate	Y		N	Mid	EN12457-3
Moisture Content Ratio at 105C	1.67	% ratio	N	Mid	33
Moisture at 105c	1.6	%	N	Mid	33
TOC by Ignition in O2	3.6	%	N	Mid	27
PCB, Total of 7 Congeners	<0.010	mg/kg	N	Mid	312
Mineral Oils, >C10 - C40	<50	mg/kg	Y	Mid	317
Naphthalene	0.32	mg/kg	N	Mid	307
Acenaphthylene	<0.10	mg/kg	N	Mid	307
Acenaphthene	<0.10	mg/kg	N	Mid	307
Fluorene	<0.10	mg/kg	N	Mid	307
Phenanthrene	0.19	mg/kg	N	Mid	307
Anthracene	<0.10	mg/kg	N	Mid	307
Fluoranthene	<0.10	mg/kg	N	Mid	307
Pyrene	<0.10	mg/kg	N	Mid	307
Benzo(a)anthracene	<0.10	mg/kg	N	Mid	307
Chrysene	<0.10	mg/kg	N	Mid	307
Benzo(b)fluoranthene	<0.10	mg/kg	N	Mid	307
Benzo(k)fluoranthene	<0.10	mg/kg	N	Mid	307
Benzo(a)pyrene	<0.10	mg/kg	N	Mid	307
Benzo(a,h)anthracene	<0.10	mg/kg	N	Mid	307
Benzo(g,h,i)perylene	<0.10	mg/kg	N	Mid	307
Indeno(1,2,3-c,d)pyrene	<0.10	mg/kg	N	Mid	307
Coronene	<0.10	mg/kg	N	Mid	307
PAH, Total of 17 WAC	<1.0	mg/kg	N	Mid	307
benzene	<0.10	mg/kg	Y	Mid	327
toluene	<0.10	mg/kg	Y	Mid	327
ethylbenzene	<0.10	mg/kg	Y	Mid	327
m&p-Xylene	<0.20	mg/kg	Y	Mid	327
o-xylene	<0.10	mg/kg	Y	Mid	327
Dry Ratio (BSEN 12457)	98.36	%	N	Mid	Calculated

Analyst Comments for 10956748:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

Severn Trent Laboratories Ltd.

# Certificate of Analysis



Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956749**

Sample **9** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH14 3.00m-4.00m**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
EN 12457-3 Leachate	Y		N Mid	EN12457-3
Moisture Content Ratio at 105C	0.40	% ratio	N Mid	33
Moisture at 105c	0.40	%	N Mid	33
TOC by Ignition in O2	3.5	%	N Mid	27
PCB, Total of 7 Congeners	<0.010	mg/kg	N Mid	312
Mineral Oils, >C10 - C40	<50	mg/kg	Y Mid	317
Naphthalene	0.31	mg/kg	N Mid	307
Acenaphthylene	<0.10	mg/kg	N Mid	307
Acenaphthene	<0.10	mg/kg	N Mid	307
Fluorene	<0.10	mg/kg	N Mid	307
Phenanthrene	0.12	mg/kg	N Mid	307
Anthracene	<0.10	mg/kg	N Mid	307
Fluoranthene	<0.10	mg/kg	N Mid	307
Pyrene	<0.10	mg/kg	N Mid	307
Benzo(a)anthracene	<0.10	mg/kg	N Mid	307
Chrysene	<0.10	mg/kg	N Mid	307
Benzo(b)fluoranthene	<0.10	mg/kg	N Mid	307
Benzo(k)fluoranthene	<0.10	mg/kg	N Mid	307
Benzo(a)pyrene	<0.10	mg/kg	N Mid	307
Dibenz(a,h)anthracene	<0.10	mg/kg	N Mid	307
Benzo(g,h,i)perylene	<0.10	mg/kg	N Mid	307
Indeno(1,2,3-c,d)pyrene	<0.10	mg/kg	N Mid	307
Coronene	<0.10	mg/kg	N Mid	307
PAH, Total of 17 WAC	<1.0	mg/kg	N Mid	307
benzene	<0.10	mg/kg	Y Mid	327
toluene	<0.10	mg/kg	Y Mid	327
ethylbenzene	<0.10	mg/kg	Y Mid	327
m&p-Xylene	<0.20	mg/kg	Y Mid	327
o-xylene	<0.10	mg/kg	Y Mid	327
Dry Ratio (BSEN 12457)	99.60	%	N Mid	Calculated

Analyst Comments for 10956749:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Reg = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

Severn Trent Laboratories Ltd.

# Certificate of Analysis



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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956750**

Sample **10** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH14 8.00m-10.00m**

Sample Date:

Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
EN 12457-3 Leachate	Y		N Mid	EN12457-3
Moisture Content Ratio at 105C	0.50	% ratio	N Mid	33
Moisture at 105c	0.49	%	N Mid	33
TOC by Ignition in O2	1.4	%	N Mid	27
PCB, Total of 7 Congeners	<0.010	mg/kg	N Mid	312
Mineral Oils, >C10 - C40	<50	mg/kg	Y Mid	317
Naphthalene	0.28	mg/kg	N Mid	307
Acenaphthylene	<0.10	mg/kg	N Mid	307
Acenaphthene	<0.10	mg/kg	N Mid	307
Fluorene	<0.10	mg/kg	N Mid	307
Phenanthrene	<0.10	mg/kg	N Mid	307
Anthracene	<0.10	mg/kg	N Mid	307
Fluoranthene	<0.10	mg/kg	N Mid	307
Pyrene	<0.10	mg/kg	N Mid	307
Benzo(a)anthracene	<0.10	mg/kg	N Mid	307
Chrysene	<0.10	mg/kg	N Mid	307
Benzo(b)fluoranthene	<0.10	mg/kg	N Mid	307
Benzo(k)fluoranthene	<0.10	mg/kg	N Mid	307
Benzo(a)pyrene	<0.10	mg/kg	N Mid	307
benz(a,h)anthracene	<0.10	mg/kg	N Mid	307
Benzo(g,h,i)perylene	<0.10	mg/kg	N Mid	307
Indeno(1,2,3-c,d)pyrene	<0.10	mg/kg	N Mid	307
Coronene	<0.10	mg/kg	N Mid	307
PAH, Total of 17 WAC	<1.0	mg/kg	N Mid	307
benzene	<0.10	mg/kg	Y Mid	327
toluene	<0.10	mg/kg	Y Mid	327
ethylbenzene	<0.10	mg/kg	Y Mid	327
m&p-Xylene	<0.20	mg/kg	Y Mid	327
o-xylene	<0.10	mg/kg	Y Mid	327
Dry Ratio (BSEN 12457)	99.51	%	N Mid	Calculated

Analyst Comments for 10956750:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=insufficient sample

Severn Trent Laboratories Ltd.



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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956752**

Sample **12** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH7 4.00m-5.00m 10:1**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation		Method
Leachate BSEN 10:1 extract	Y		N	Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N	Mid	25C
Arsenic, Soluble	<50	ug/l	N	Mid	25C
Barium, Soluble	0.0084	mg/l	Y	Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y	Mid	56
Calcium, Soluble	9.7	mg/l	Y	Mid	53F
Chromium, Soluble	<10	ug/l	Y	Mid	53F
Copper, Soluble	<10	ug/l	Y	Mid	53F
Lead, Soluble	<10	ug/l	Y	Mid	53F
Mercury, Soluble	1.2	ug/l	Y	Mid	56
Molybdenum, Soluble	<0.0030	mg/l	N	Mid	68
Nickel, Soluble	<10	ug/l	Y	Mid	53F
Selenium, Soluble	<6.0	ug/l	N	Mid	25C
Zinc, Soluble	<10	ug/l	Y	Mid	53F
Phenol Index	<0.050	mg/l	N	Mid	32A
Sulphate as SO4	<11	mg/l	Y	Mid	60
Chloride as Cl	<2.5	mg/l	Y	Mid	60
Dissolved Solids	<200	mg/l	N	Mid	18
Fluoride as F-	0.30	mg/l	Y	Mid	20
TOC (Filtered)	1.3	mg/l	Y	Mid	41

Analyst Comments for 10956752: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample



# Certificate of Analysis



Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956753**

Sample **13** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH12 0.50m-1.00m 10:1**

Sample Date:

Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.019	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	68	mg/l	Y Mid	53F
Chromium, Soluble	33	ug/l	Y Mid	53F
Copper, Soluble	<10	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	1.6	ug/l	Y Mid	56
Molybdenum, Soluble	0.0084	mg/l	N Mid	68
Nickel, Soluble	<10	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO <sub>4</sub>	91	mg/l	Y Mid	60
Chloride as Cl	<2.5	mg/l	Y Mid	60
Dissolved Solids	320	mg/l	N Mid	18
Fluoride as F-	0.30	mg/l	Y Mid	20
TOC (Filtered)	2.6	mg/l	Y Mid	41

Analyst Comments for 10956753:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

# Certificate of Analysis



Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956754**

Sample **14** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH12 3.00m-4.00m 10:1**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation		Method
Leachate BSEN 10:1 extract	Y		N	Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N	Mid	25C
Arsenic, Soluble	<50	ug/l	N	Mid	25C
Barium, Soluble	0.0033	mg/l	Y	Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y	Mid	56
Calcium, Soluble	18	mg/l	Y	Mid	53F
Chromium, Soluble	<10	ug/l	Y	Mid	53F
Copper, Soluble	<10	ug/l	Y	Mid	53F
Lead, Soluble	<10	ug/l	Y	Mid	53F
Mercury, Soluble	<0.30	ug/l	Y	Mid	56
Molybdenum, Soluble	0.031	mg/l	N	Mid	68
Nickel, Soluble	<10	ug/l	Y	Mid	53F
Selenium, Soluble	<6.0	ug/l	N	Mid	25C
Zinc, Soluble	<10	ug/l	Y	Mid	53F
Phenol Index	<0.050	mg/l	N	Mid	32A
Sulphate as SO4	30	mg/l	Y	Mid	60
Chloride as Cl	<2.5	mg/l	Y	Mid	60
Dissolved Solids	<200	mg/l	N	Mid	18
Fluoride as F-	0.23	mg/l	Y	Mid	20
TOC (Filtered)	2.2	mg/l	Y	Mid	41

**Analyst Comments for 10956754:** No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

Severn Trent Laboratories Ltd.



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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956756**

Sample **16** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH12 8.00m-10.00m 10:1**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation		Method
Leachate BSEN 10:1 extract	Y		N	Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N	Mid	25C
Arsenic, Soluble	<50	ug/l	N	Mid	25C
Barium, Soluble	0.017	mg/l	Y	Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y	Mid	56
Calcium, Soluble	17	mg/l	Y	Mid	53F
Chromium, Soluble	<10	ug/l	Y	Mid	53F
Copper, Soluble	<10	ug/l	Y	Mid	53F
Lead, Soluble	<10	ug/l	Y	Mid	53F
Mercury, Soluble	0.47	ug/l	Y	Mid	56
Molybdenum, Soluble	0.010	mg/l	N	Mid	68
Nickel, Soluble	<10	ug/l	Y	Mid	53F
Selenium, Soluble	7.9	ug/l	N	Mid	25C
Zinc, Soluble	19	ug/l	Y	Mid	53F
Phenol Index	<0.050	mg/l	N	Mid	32A
Sulphate as SO4	25	mg/l	Y	Mid	60
Chloride as Cl	4.1	mg/l	Y	Mid	60
Dissolved Solids	<200	mg/l	N	Mid	18
Fluoride as F-	0.27	mg/l	Y	Mid	20
TOC (Filtered)	1.9	mg/l	Y	Mid	41

Analyst Comments for 10956756:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=insufficient sample

Severn Trent Laboratories Ltd.



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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956758**

Sample **18** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH14 1.00m-2.00m 10:1**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.0097	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	69	mg/l	Y Mid	53F
Chromium, Soluble	48	ug/l	Y Mid	53F
Copper, Soluble	44	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	0.68	ug/l	Y Mid	56
Molybdenum, Soluble	0.043	mg/l	N Mid	68
Nickel, Soluble	<10	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	82	mg/l	Y Mid	60
Chloride as Cl	2.9	mg/l	Y Mid	60
Dissolved Solids	<200	mg/l	N Mid	18
Fluoride as F-	0.20	mg/l	Y Mid	20
TOC (Filtered)	6.9	mg/l	Y Mid	41

Analyst Comments for 10956758:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

Severn Trent Laboratories Ltd.

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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956759**

Sample **19** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH14 2.00m-3.00m 10:1**

Sample Date:

Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.013	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	130	mg/l	Y Mid	53F
Chromium, Soluble	17	ug/l	Y Mid	53F
Copper, Soluble	47	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	1.2	ug/l	Y Mid	56
Molybdenum, Soluble	0.034	mg/l	N Mid	68
Nickel, Soluble	12	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	14	mg/l	Y Mid	60
Chloride as Cl	5.4	mg/l	Y Mid	60
Dissolved Solids	<200	mg/l	N Mid	18
Fluoride as F-	<0.20	mg/l	Y Mid	20
TOC (Filtered)	8.2	mg/l	Y Mid	41

Analyst Comments for 10956759:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

Severn Trent Laboratories Ltd.

# Certificate of Analysis



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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956760**

Sample **20** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH14 3.00m-4.00m 10:1**

Sample Date:

Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.0046	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	18	mg/l	Y Mid	53F
Chromium, Soluble	<10	ug/l	Y Mid	53F
Copper, Soluble	<10	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	0.39	ug/l	Y Mid	56
Molybdenum, Soluble	0.018	mg/l	N Mid	68
Nickel, Soluble	<10	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	<11	mg/l	Y Mid	60
Chloride as Cl	<2.5	mg/l	Y Mid	60
Dissolved Solids	<200	mg/l	N Mid	18
Fluoride as F-	0.23	mg/l	Y Mid	20
TOC (Filtered)	2.7	mg/l	Y Mid	41

Analyst Comments for 10956760:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

Severn Trent Laboratories Ltd.



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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956761**

Sample **21** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH14 8.00m-10.00m 10:1**

Sample Date:

Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.027	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	24	mg/l	Y Mid	53F
Chromium, Soluble	<10	ug/l	Y Mid	53F
Copper, Soluble	<10	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	0.36	ug/l	Y Mid	56
Molybdenum, Soluble	0.015	mg/l	N Mid	68
Nickel, Soluble	<10	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	42	mg/l	Y Mid	60
Chloride as Cl	3.5	mg/l	Y Mid	60
Dissolved Solids	<200	mg/l	N Mid	18
Fluoride as F-	0.24	mg/l	Y Mid	20
TOC (Filtered)	2.3	mg/l	Y Mid	41

Analyst Comments for 10956761:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

Severn Trent Laboratories Ltd.

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# STL

Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956762**

Sample **22** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH9 4.00m-5.00m 10:1**

Sample Date:

Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation		Method
Leachate BSEN 10:1 extract	Y		N	Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N	Mid	25C
Arsenic, Soluble	<50	ug/l	N	Mid	25C
Barium, Soluble	0.0076	mg/l	Y	Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y	Mid	56
Calcium, Soluble	10	mg/l	Y	Mid	53F
Chromium, Soluble	<10	ug/l	Y	Mid	53F
Copper, Soluble	<10	ug/l	Y	Mid	53F
Lead, Soluble	<10	ug/l	Y	Mid	53F
Mercury, Soluble	0.78	ug/l	Y	Mid	56
Molybdenum, Soluble	0.0056	mg/l	N	Mid	68
Nickel, Soluble	<10	ug/l	Y	Mid	53F
Selenium, Soluble	<6.0	ug/l	N	Mid	25C
Zinc, Soluble	<10	ug/l	Y	Mid	53F
Phenol Index	<0.050	mg/l	N	Mid	32A
Sulphate as SO4	<11	mg/l	Y	Mid	60
Chloride as Cl	<2.5	mg/l	Y	Mid	60
Dissolved Solids	<200	mg/l	N	Mid	18
Fluoride as F-	0.27	mg/l	Y	Mid	20
TOC (Filtered)	1.4	mg/l	Y	Mid	41

Analyst Comments for 10956762:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

Signed:

Name: **G. Smith**

Date: **24 December 2008**

Title: **Inorg and License Chem Manager**

Severn Trent Laboratories Ltd.

STL Business Centre, Torrington Avenue, Coventry, CV4 9GU Tel:+44 (0)24 7642 1213 Fax:+44 (0)24 7685 6575

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**Mr Crean  
O Callaghan Moran & Associates  
Granary House  
Rutland Street  
Cork Cork**

19 December 2008

**Test Report: COV/566856/2008**

Dear Mr Crean

Analysis of your sample(s) submitted on 03 December 2008 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

Should you have any queries regarding this report(s) or any part of our service, please contact Customer Services on +44 (0)24 7642 1213 who will be happy to discuss your requirements.

If you would like to arrange any further analysis, please contact Customer Services. To arrange container delivery or sample collection, please call the Couriers Department directly on 024 7685 6562.

Thank you for using STL and we look forward to receiving your next samples.

Yours Sincerely,

Signed: *Susa Clancy*

Name: S. Clancy

Title: Organic Chemistry Manager

**STL Coventry**

STL Business Centre, Torrington Avenue,  
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**Severn Trent Laboratories Limited**

Registered in England & Wales Registration No. 2148934 Registered Office: 2297 Coventry Road, Birmingham B26



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1229  
1510



Cert. No. 10289  
Environmental Management Systems



Certificate No. PS67435



# Report Summary



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**Mr Donal Crean  
O Callaghan Moran & Associates  
Granary House  
Rutland Street  
Cork  
Cork**

Date of Issue: **19 December 2008**

Report Number: **COV/566856/2008**

Issue **1**

**Job Description:** Chemical Analysis

**Job Location:** 08-014-05

Number of Samples  
included in this report **4**

Job Received: **03 December 2008**

Number of Test Results  
included in this report **188**

Analysis Commenced: **03 December 2008**

Signed: *S. Clancy*

Name: **S. Clancy**

Date: **19 December 2008**

Title: **Organic Chemistry Manager**

STL was not responsible for sampling unless otherwise stated. Sampling is not covered by our UKAS accreditation.

Information on the methods of analysis and performance characteristics are available on request.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.

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# Certificate of Analysis



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# STL

Report Number: **COV/566856/2008**

Issue **1**

Laboratory Number: **10940877**

Sample **1** of **4**

Sample Source: **O Callaghan Moran & Associates**

Sample Point Description: **O Callaghan Moran & Associates**

Sample Description: **RC-16S**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Antimony, Soluble	0.00048	mg/l	Y MID	56
Arsenic, Soluble	0.0069	mg/l	Y MID	56
Barium, Soluble	0.056	mg/l	Y MID	54F
Cadmium, Soluble	<0.00010	mg/l	Y MID	56
Hardness, Calcium as CaCO3	100	mg/l	N MID	53F
Chromium, Soluble	<0.030	mg/l	Y MID	56
Copper, Soluble	0.025	mg/l	Y MID	56
Iron, Soluble	0.41	mg/l	Y MID	56
Lead, Soluble	0.0033	mg/l	Y MID	56
Magnesium, Soluble	6.6	mg/l	Y MID	53F
Manganese, Soluble	0.17	mg/l	Y MID	53F
Mercury, Soluble	<0.00030	mg/l	Y MID	56
Nickel, Soluble	0.0060	mg/l	Y MID	56
Potassium, Soluble	60	mg/l	Y MID	53F
Sodium, Soluble	100	mg/l	Y MID	53F
Tin, Soluble	<0.010	mg/l	N MID	68
Zinc, Soluble	0.053	mg/l	Y MID	56
Sulphate as SO4	<0.011	g/l	Y MID	60
Bicarbonate as CaCO3	710	mg/l	N MID	2
Chloride as Cl	150	mg/l	Y MID	60
Sulphide as S	0.14	mg/l	Y MID	38A
TPH >C6 - C10	<100	ug/l	Y MID	318
TPH >C10 - C20	330	ug/l	Y MID	318
TPH >C20 - C40	7700	ug/l	Y MID	318
TPH >C6 - C40, Total	8000	ug/l	Y MID	318
Naphthalene	2.2	ug/l	Y MID	331
Acenaphthene	0.68	ug/l	Y MID	331
Acenaphthylene	0.12	ug/l	Y MID	331
Fluorene	0.78	ug/l	Y MID	331
Phenanthrene	7.6	ug/l	Y MID	331
Anthracene	1.1	ug/l	Y MID	331
Fluoranthene	5.6	ug/l	Y MID	331
Pyrene	4.6	ug/l	Y MID	331
Benzo(a)anthracene	3.6	ug/l	Y MID	331
Chrysene	7.3	ug/l	Y MID	331

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Report Number: **COV/566856/2008**  
Laboratory Number: **10940877**

Issue **1**  
Sample **1** of **4**

Sample Source: **O Callaghan Moran & Associates**  
Sample Point Description: **O Callaghan Moran & Associates**  
Sample Description: **RC-16S**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Benzo(b)fluoranthene	0.51	ug/l	Y MID	331
Benzo(k)fluoranthene	0.36	ug/l	Y MID	331
Benzo(a)pyrene	0.91	ug/l	Y MID	331
Dibenz(a,h)anthracene	0.11	ug/l	Y MID	331
Benzo(g,h,i)perylene	0.65	ug/l	Y MID	331
Indeno(1,2,3-c,d)pyrene	0.70	ug/l	Y MID	331
PAH, Total	16	ug/l	Y MID	331
Benzene	<10	ug/l	N MID	329
Toluene	<10	ug/l	N MID	329
Ethylbenzene	<10	ug/l	N MID	329
m&p-Xylene	<20	ug/l	N MID	329
o-Xylene	<10	ug/l	N MID	329

Analyst Comments for 10940877: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.  
I/S=insufficient sample

# Certificate of Analysis



Report Number: **COV/566856/2008**

Issue **1**

Laboratory Number: **10940878**

Sample **2** of **4**

Sample Source: **O Callaghan Moran & Associates**

Sample Point Description: **O Callaghan Moran & Associates**

Sample Description: **RC-16B**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Antimony, Soluble	0.0023	mg/l	Y MID	56
Arsenic, Soluble	0.0059	mg/l	Y MID	56
Barium, Soluble	0.12	mg/l	Y MID	54F
Cadmium, Soluble	0.00024	mg/l	Y MID	56
Hardness, Calcium as CaCO <sub>3</sub>	210	mg/l	N MID	53F
Chromium, Soluble	<0.030	mg/l	Y MID	56
Copper, Soluble	0.0096	mg/l	Y MID	56
Iron, Soluble	0.55	mg/l	Y MID	56
Lead, Soluble	0.00081	mg/l	Y MID	56
Magnesium, Soluble	28	mg/l	Y MID	53F
Manganese, Soluble	0.070	mg/l	Y MID	53F
Mercury, Soluble	0.00074	mg/l	Y MID	56
Nickel, Soluble	0.0039	mg/l	Y MID	56
Potassium, Soluble	7.6	mg/l	Y MID	53F
Sodium, Soluble	680	mg/l	Y MID	53F
Tin, Soluble	<0.010	mg/l	N MID	68
Zinc, Soluble	0.016	mg/l	Y MID	56
Sulphate as SO <sub>4</sub>	0.23	g/l	Y MID	60
Bicarbonate as CaCO <sub>3</sub>	350	mg/l	N MID	2
Chloride as Cl	860	mg/l	Y MID	60
Sulphide as S	0.011	mg/l	Y MID	38A
TPH >C6 - C10	<100	ug/l	Y MID	318
TPH >C10 - C20	<100	ug/l	Y MID	318
TPH >C20 - C40	<100	ug/l	Y MID	318
TPH >C6 - C40, Total	<100	ug/l	Y MID	318
Naphthalene	0.11	ug/l	Y MID	331
Acenaphthene	<0.010	ug/l	Y MID	331
Acenaphthylene	0.016	ug/l	Y MID	331
Fluorene	0.021	ug/l	Y MID	331
Phenanthrene	0.046	ug/l	Y MID	331
Anthracene	<0.010	ug/l	Y MID	331
Fluoranthene	<0.010	ug/l	Y MID	331
Pyrene	0.016	ug/l	Y MID	331
Benzo(a)anthracene	0.011	ug/l	Y MID	331
Chrysene	<0.010	ug/l	Y MID	331

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RECEIVED: 13/12/2022

Report Number: **COV/566856/2008**

Issue **1**

Laboratory Number: **10940878**

Sample **2** of **4**

Sample Source: **O Callaghan Moran & Associates**

Sample Point Description: **O Callaghan Moran & Associates**

Sample Description: **RC-16B**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Benzo(b)fluoranthene	<0.010	ug/l	Y MID	331
Benzo(k)fluoranthene	<0.010	ug/l	Y MID	331
Benzo(a)pyrene	<0.010	ug/l	Y MID	331
Dibenz(a,h)anthracene	<0.010	ug/l	Y MID	331
Benzo(g,h,i)perylene	<0.010	ug/l	Y MID	331
Indeno(1,2,3-c,d)pyrene	<0.010	ug/l	Y MID	331
PAH, Total	0.25	ug/l	Y MID	331
Benzene	<10	ug/l	N MID	329
Toluene	<10	ug/l	N MID	329
Ethylbenzene	<10	ug/l	N MID	329
m&p-Xylene	<20	ug/l	N MID	329
o-Xylene	<10	ug/l	N MID	329

Analyst Comments for 10940878:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.  
I/S=Insufficient sample



# Certificate of Analysis



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Report Number: **COV/566856/2008**

Issue **1**

Laboratory Number: **10940879**

Sample **3** of **4**

Sample Source: **O Callaghan Moran & Associates**

Sample Point Description: **O Callaghan Moran & Associates**

Sample Description: **W1-S**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Antimony, Soluble	0.00017	mg/l	Y MID	56
Arsenic, Soluble	<0.0010	mg/l	Y MID	56
Barium, Soluble	0.015	mg/l	Y MID	54F
Cadmium, Soluble	0.00014	mg/l	Y MID	56
Hardness, Calcium as CaCO3	360	mg/l	N MID	53F
Chromium, Soluble	<0.030	mg/l	Y MID	56
Copper, Soluble	<0.0070	mg/l	Y MID	56
Iron, Soluble	0.045	mg/l	Y MID	56
Lead, Soluble	<0.00050	mg/l	Y MID	56
Magnesium, Soluble	8.8	mg/l	Y MID	53F
Manganese, Soluble	0.022	mg/l	Y MID	53F
Mercury, Soluble	<0.00030	mg/l	Y MID	56
Nickel, Soluble	<0.00050	mg/l	Y MID	56
Potassium, Soluble	11	mg/l	Y MID	53F
Sodium, Soluble	35	mg/l	Y MID	53F
Tin, Soluble	<0.010	mg/l	N MID	68
Zinc, Soluble	<0.0050	mg/l	Y MID	56
Sulphate as SO4	0.15	g/l	Y MID	60
Bicarbonate as CaCO3	200	mg/l	N MID	2
Chloride as Cl	39	mg/l	Y MID	60
Sulphide as S	<0.010	mg/l	Y MID	38A
TPH >C6 - C10	<100	ug/l	Y MID	318
TPH >C10 - C20	<100	ug/l	Y MID	318
TPH >C20 - C40	<100	ug/l	Y MID	318
TPH >C6 - C40, Total	<100	ug/l	Y MID	318
Naphthalene	0.054	ug/l	Y MID	331
Acenaphthene	<0.010	ug/l	Y MID	331
Acenaphthylene	<0.010	ug/l	Y MID	331
Fluorene	<0.010	ug/l	Y MID	331
Phenanthrene	0.017	ug/l	Y MID	331
Anthracene	<0.010	ug/l	Y MID	331
Fluoranthene	<0.010	ug/l	Y MID	331
Pyrene	<0.010	ug/l	Y MID	331
Benzo(a)anthracene	<0.010	ug/l	Y MID	331
Chrysene	<0.010	ug/l	Y MID	331

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Report Number: **COV/566856/2008**

Issue **1**

Laboratory Number: **10940879**

Sample **3** of **4**

DDC PLAN NO 5432/22  
RECEIVED: 13/12/2022

Sample Source: **O Callaghan Moran & Associates**

Sample Point Description: **O Callaghan Moran & Associates**

Sample Description: **W1-S**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Benzo(b)fluoranthene	<0.010	ug/l	Y MID	331
Benzo(k)fluoranthene	<0.010	ug/l	Y MID	331
Benzo(a)pyrene	<0.010	ug/l	Y MID	331
Dibenz(a,h)anthracene	<0.010	ug/l	Y MID	331
Benzo(g,h,i)perylene	<0.010	ug/l	Y MID	331
Indeno(1,2,3-c,d)pyrene	<0.010	ug/l	Y MID	331
PAH, Total	<0.10	ug/l	Y MID	331
Benzene	<10	ug/l	N MID	329
Toluene	<10	ug/l	N MID	329
Ethylbenzene	<10	ug/l	N MID	329
m&p-Xylene	<20	ug/l	N MID	329
o-Xylene	<10	ug/l	N MID	329

Analyst Comments for 10940879:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.  
I/S=Insufficient sample

Severn Trent Laboratories Ltd.

# Certificate of Analysis



Report Number: **COV/566856/2008**

Issue **1**

Laboratory Number: **10940880**

Sample **4** of **4**

Sample Source: **O Callaghan Moran & Associates**

Sample Point Description: **O Callaghan Moran & Associates**

Sample Description: **W1-B**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Antimony, Soluble	0.00015	mg/l	Y MID	56
Arsenic, Soluble	<0.0010	mg/l	Y MID	56
Barium, Soluble	0.018	mg/l	Y MID	54F
Cadmium, Soluble	<0.00010	mg/l	Y MID	56
Hardness, Calcium as CaCO3	360	mg/l	N MID	53F
Chromium, Soluble	<0.030	mg/l	Y MID	56
Copper, Soluble	<0.0070	mg/l	Y MID	56
Iron, Soluble	0.041	mg/l	Y MID	56
Lead, Soluble	<0.00050	mg/l	Y MID	56
Magnesium, Soluble	8.4	mg/l	Y MID	53F
Manganese, Soluble	<0.010	mg/l	Y MID	53F
Mercury, Soluble	<0.00030	mg/l	Y MID	56
Nickel, Soluble	<0.00050	mg/l	Y MID	56
Potassium, Soluble	10	mg/l	Y MID	53F
Sodium, Soluble	35	mg/l	Y MID	53F
Tin, Soluble	<0.010	mg/l	N MID	68
Zinc, Soluble	<0.0050	mg/l	Y MID	56
Sulphate as SO4	0.16	g/l	Y MID	60
Bicarbonate as CaCO3	200	mg/l	N MID	2
Chloride as Cl	41	mg/l	Y MID	60
Sulphide as S	<0.010	mg/l	Y MID	38A
TPH >C6 - C10	<100	ug/l	Y MID	318
TPH >C10 - C20	<100	ug/l	Y MID	318
TPH >C20 - C40	<100	ug/l	Y MID	318
TPH >C6 - C40, Total	<100	ug/l	Y MID	318
Naphthalene	0.081	ug/l	Y MID	331
Acenaphthene	0.054	ug/l	Y MID	331
Acenaphthylene	<0.010	ug/l	Y MID	331
Fluorene	0.051	ug/l	Y MID	331
Phenanthrene	0.26	ug/l	Y MID	331
Anthracene	0.034	ug/l	Y MID	331
Fluoranthene	0.16	ug/l	Y MID	331
Pyrene	0.27	ug/l	Y MID	331
Benzo(a)anthracene	0.15	ug/l	Y MID	331
Chrysene	0.12	ug/l	Y MID	331

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# Certificate of Analysis



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Report Number: **COV/566856/2008**  
Laboratory Number: **10940880**

Issue **1**  
Sample **4** of **4**

DDC PLAN NO 5432/22  
13/12/2022

Sample Source: **O Callaghan Moran & Associates**  
Sample Point Description: **O Callaghan Moran & Associates**  
Sample Description: **W1-B**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Benzo(b)fluoranthene	0.078	ug/l	Y MID	331
Benzo(k)fluoranthene	0.056	ug/l	Y MID	331
Benzo(a)pyrene	0.13	ug/l	Y MID	331
Dibenz(a,h)anthracene	0.023	ug/l	Y MID	331
Benzo(g,h,i)perylene	0.090	ug/l	Y MID	331
Indeno(1,2,3-c,d)pyrene	0.16	ug/l	Y MID	331
PAH, Total	1.7	ug/l	Y MID	331
Benzene	<10	ug/l	N MID	329
Toluene	<10	ug/l	N MID	329
Ethylbenzene	<10	ug/l	N MID	329
m&p-Xylene	<20	ug/l	N MID	329
o-Xylene	<10	ug/l	N MID	329

Analyst Comments for 10940880: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.  
I/S=Insufficient sample

Signed: *Susa Clancy*

Name: **S. Clancy**

Date: **19 December 2008**

Title: **Organic Chemistry Manager**

Severn Trent Laboratories Ltd.

STL Business Centre, Torrington Avenue, Coventry, CV4 9GU Tel:+44 (0)24 7642 1213 Fax:+44 (0)24 7685 6575

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ANALYST COMMENTS FOR REPORT

COV/566856/2008

Issue 1

Date of Issue: 19 December 2008

Sample No	Analyst Comments
10940877	
10940878	
10940879	
10940880	

Signed:



Name: S. Clancy

Date: 19 December 2008

Title: Organic Chemistry Manager

DETERMINAND COMMENTS FOR REPORT COV/566856/2008

ISSUE 1

Date of Issue : 19 December 2008

Sample No	Description	Determinand	Comments

Signed: *Ausa Clancy*

Name: S. Clancy

Date: 19 December 2008

Title: Organic Chemistry Manager

DDC PLAN NO 5432/22  
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RECEIVED: 13/12/2022





DDC PLAN NO. 5432/22  
RECEIVED: 13/12/2022

## APPENDIX 8.1 IRISH WATER CONFIRMATION OF FEASIBILITY

Esaivani Naicker

Waterman Moylan  
Block S  
East Point Business Park  
Dublin 3  
Co. Dublin  
D03H3F4

Uisce Éireann  
Bosca OP448  
Oifig Sheachadta na  
Cathrach Theas  
Cathair Chorcaí

Irish Water  
PO Box448,  
South City  
Delivery Office  
Cork City

[www.water.ie](http://www.water.ie)

12 May 2022

**Re: CDS20006528 pre-connection enquiry - Subject to contract | Contract denied**

**Connection for Multi/Mixed Use Development of 116 units at O Connell Street Upper, Dublin 1, Co. Dublin**

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at O Connell Street Upper, Dublin 1, Co. Dublin (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	OUTCOME OF PRE-CONNECTION ENQUIRY
	<b><u>THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.</u></b>
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
Water Connection	Connection to the network should be via a new 200 mm ID pipe to the existing 350 mm DI main in Parnell Street. A bulk meter is to be installed on the connection main and linked to telemetry online.
Wastewater Connection	The Development has to incorporate Sustainable Drainage Systems/ Attenuation in the management of storm water and to reduce surface water inflow into the receiving combined sewer. The Storm Water Management is to be based on the submitted Surface Water Drainage Feasibility Study.

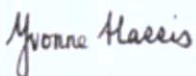


**General Notes:**

- 1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
- 2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
- 3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
- 4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at <https://www.water.ie/connections/get-connected/>
- 5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
- 6) Irish Water Connection Policy/ Charges can be found at <https://www.water.ie/connections/information/connection-charges/>
- 7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
- 8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
- 9) To access Irish Water Maps email [datarequests@water.ie](mailto:datarequests@water.ie)
- 10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Marina Byrne from the design team via email [mzbyrne@water.ie](mailto:mzbyrne@water.ie) For further information, visit [www.water.ie/connections](http://www.water.ie/connections).

Yours sincerely,



**Yvonne Harris**

**Head of Customer Operations**

DDC PLAN NO 5432/22  
RECEIVED: 13/12/2022



## APPENDIX 9.1 AMBIENT AIR QUALITY STANDARDS

National standards for ambient air pollutants in Ireland have generally ensued from Council Directives enacted in the EU (& previously the EC & EEC). The initial interest in ambient air pollution legislation in the EU dates from the early 1980s and was in response to the most serious pollutant problems at that time which was the issue of acid rain. As a result of this sulphur dioxide, and later nitrogen dioxide, were both the focus of EU legislation. Linked to the acid rain problem was urban smog associated with fuel burning for space heating purposes. Also apparent at this time were the problems caused by leaded petrol and EU legislation was introduced to deal with this problem in the early 1980s.

In recent years the EU has focused on defining a basis strategy across the EU in relation to ambient air quality. In 1996, a Framework Directive, Council Directive 96/62/EC, on ambient air quality assessment and management was enacted. The aims of the Directive are fourfold. Firstly, the Directive's aim is to establish objectives for ambient air quality designed to avoid harmful effects to health. Secondly, the Directive aims to assess ambient air quality on the basis of common methods and criteria throughout the EU. Additionally, it is aimed to make information on air quality available to the public via alert thresholds and fourthly, it aims to maintain air quality where it is good and improve it in other cases.

As part of these measures to improve air quality, the European Commission has adopted proposals for daughter legislation under Directive 96/62/EC. The first of these directives to be enacted, Council Directive 1999/30/EC, has been passed into Irish Law as S.I. No 271 of 2002 (Air Quality Standards Regulations 2002), and has set limit values which came into operation on 17<sup>th</sup> June 2002. The Air Quality Standards Regulations 2002 detail margins of tolerance, which are trigger levels for certain types of action in the period leading to the attainment date. The margin of tolerance varies from 60% for lead, to 30% for 24-hour limit value for PM<sub>10</sub>, 40% for the hourly and annual limit value for NO<sub>2</sub> and 26% for hourly SO<sub>2</sub> limit values. The margin of tolerance commenced from June 2002, and started to reduce from 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by the attainment date. A second daughter directive, EU Council Directive 2000/69/EC, has published limit values for both carbon monoxide and benzene in ambient air. This has also been passed into Irish Law under the Air Quality Standards Regulations 2002.

The most recent EU Council Directive on ambient air quality was published on the 11/06/08 which has been transposed into Irish Law as S.I. 180 of 2011. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive and its subsequent daughter directives. Provisions were also made for the inclusion of new ambient limit values relating to PM<sub>2.5</sub>. The margins of tolerance specific to each pollutant were also slightly adjusted from previous directives. In regards to existing ambient air quality standards, it is not proposed to modify the standards but to strengthen existing provisions to ensure that non-compliances are removed. In addition, new ambient standards for PM<sub>2.5</sub> are included in Directive 2008/50/EC. The approach for PM<sub>2.5</sub> was to establish a target value of 25 µg/m<sup>3</sup>, as an annual average (to be attained everywhere by 2010) and a limit value of 25 µg/m<sup>3</sup>, as an annual average (to be attained everywhere by 2015), coupled with a target to reduce human exposure generally to PM<sub>2.5</sub> between 2010 and 2020. This exposure reduction target will range from 0% (for PM<sub>2.5</sub> concentrations of less than 8.5 µg/m<sup>3</sup> to 20% of the average exposure indicator (AEI) for concentrations of between 18 - 22 µg/m<sup>3</sup>). Where the AEI is currently greater than 22 µg/m<sup>3</sup> all appropriate measures should be employed to reduce this level to 18 µg/m<sup>3</sup> by 2020. The AEI is based on measurements taken in urban background locations averaged over a three year period from 2008 - 2010 and again from 2018-2020. Additionally, an exposure concentration obligation of 20 µg/m<sup>3</sup> was set to be complied with by 2015 again based on the AEI.

Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions. The Alert Threshold is defined in Council Directive 96/62/EC as "a level beyond which there is a risk to human health from brief exposure and at which immediate steps shall be taken as laid down in Directive 96/62/EC". These steps include undertaking to ensure that the necessary steps are taken to inform the public (e.g. by means of radio, television and the press).

The Margin of Tolerance is defined in Council Directive 96/62/EC as a concentration which is higher than the limit value when legislation comes into force. It decreases to meet the limit value by the attainment date. The Upper Assessment Threshold is defined in Council Directive 96/62/EC as a concentration above which high quality measurement is mandatory. Data from measurement may be supplemented by information from other sources, including air quality modelling.

An annual average limit for both NO<sub>x</sub> (NO and NO<sub>2</sub>) is applicable for the protection of vegetation in highly rural areas away from major sources of NO<sub>x</sub> such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. Annex VI of EU Directive 1999/30/EC identifies that monitoring to demonstrate compliance with the NO<sub>x</sub> limit for the protection of vegetation should be carried out distances greater than: -

- 5 km from the nearest motorway or dual carriageway.
- 5 km from the nearest major industrial installation.
- 20 km from a major urban conurbation.

As a guideline, a monitoring station should be indicative of approximately 1,000 km<sup>2</sup> of surrounding area.

Under the terms of EU Framework Directive on Ambient Air Quality (96/62/EC), geographical areas within member states have been classified in terms of zones. The zones have been defined in order to meet the criteria for air quality monitoring, assessment and management as described in the Framework Directive and Daughter Directives. Zone A is defined as Dublin and its environs, Zone B is defined as Cork City, Zone C is defined as 23 urban areas with a population greater than 15,000 and Zone D is defined as the remainder of the country. The Zones were defined based on among other things, population and existing ambient air quality.

EU Council Directive 96/62/EC on ambient air quality and assessment has been adopted into Irish Legislation (S.I. No. 33 of 1999). The act has designated the Environmental Protection Agency (EPA) as the competent authority responsible for the implementation of the Directive and for assessing ambient air quality in the State. Other commonly referenced ambient air quality standards include the World Health Organisation. The WHO guidelines differ from air quality standards in that they are primarily set to protect public health from the effects of air pollution. Air quality standards, however, are air quality guidelines recommended by governments, for which additional factors, such as socio-economic factors, may be considered.



## APPENDIX 9.2 DUST MANAGEMENT PLAN

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland (DCC, 2018), the UK (IAQM (2014), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997).

### Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 9.1 for the windrose for Dublin Airport). As the prevailing wind is predominantly south-westerly to westerly, locating construction compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (IAQM, 2014; UK ODPM, 2002). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods where care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions: -

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised.
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details.
- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses.
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out.
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein.
- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

### Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

### Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 20 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

### Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

### Waste Management

- Avoid bonfires and burning of waste materials.

### Measures Specific to Demolition

- Prior to demolition blocks should be soft striped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).

- During the demolition process, water suppression should be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.

#### Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

#### Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

#### Measures Specific to Trackout

Site roads (particularly unpaved) can be a significant source of fugitive dust from construction sites if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK ODPM, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles.
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. If sweeping using a road sweeper is not possible due to the nature of the surrounding area then a suitable smaller scale street cleaning vacuum will be used.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log-book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.

- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

### **Summary of Dust Mitigation Measures**

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be: -

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues.
- The development of a documented system for managing site practices with regard to dust control.
- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

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## APPENDIX 11.1

## GLOSSARY OF ACOUSTIC TERMINOLOGY

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<b>Ambient Noise</b>	The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.
<b>Background Noise</b>	The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ( $L_{AF90,T}$ ).
<b>dB</b>	Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 $\mu$ Pa).
<b>dB(A)</b>	An 'A-weighted decibel' - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. 'A'-weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
<b><math>D_{n,e,w}</math></b>	Weighted element-normalized level difference. This is the value of sound insulation performance of a ventilator measured under laboratory conditions. It is a weighted single figure index that is derived from values of sound insulation across a defined frequency spectrum. Technical literature for acoustic ventilators typically presents sound insulation data in terms of the $D_{n,e,w}$ parameter.
<b>Hertz (Hz)</b>	The unit of sound frequency in cycles per second.
<b><math>L_{Aeq,T}</math></b>	This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T). The closer the $L_{Aeq}$ value is to either the $L_{AF10}$ or $L_{AF90}$ value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources such as traffic on the background.
<b><math>L_{AFN}</math></b>	The A-weighted noise level exceeded for N% of the sampling interval. Measured using the "Fast" time weighting.
<b><math>L_{AF90}</math></b>	Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to estimate a background level. Measured using the "Fast" time weighting.
<b><math>L_{AF10}</math></b>	Refers to those A-weighted noise levels in the upper 10 percentile of the sampling interval; it is the level which is exceeded for 10% of the measurement period. It is typically representative of traffic noise levels. Measured using the "Fast" time weighting.

<b>L<sub>AFmax</sub></b>	is the instantaneous fast time weighted maximum sound level measured during the sample period.
<b>Octave band</b>	A frequency interval, the upper limit of which is twice that of the lower limit. For example, the 1,000Hz octave band contains acoustical energy between 707Hz and 1,414Hz. The centre frequencies used for the designation of octave bands are defined in ISO and ANSI standards.
<b>PPV</b>	Peak Particle Velocity (PPV) is defined as the instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position and is measured in mm/s.
<b>R<sub>w</sub></b>	Weighted Sound Reduction Index – This is the value of the sound insulation performance of a partition or element measured under <u>laboratory conditions</u> . It is a weighted single figure index that is derived from values of sound insulation across a defined frequency spectrum. Technical literature typically presents sound insulation data in terms of the R <sub>w</sub> parameter.
<b>R'<sub>w</sub></b>	Weighted Apparent Sound Reduction Index – This is similar to R <sub>w</sub> but is used to express <i>in-situ</i> sound insulation performance, where issues such as flanking issue noise transfer may affect the measured level. As stated previously, technical literature typically uses the R <sub>w</sub> parameter. In order to reflect the likely <i>in-situ</i> performance of an element an appropriate correction should be applied for the expected reduction in performance. Note that in instances where significant flanking issues are present the <i>in-situ</i> performance may be further reduced.
<b>VDV</b>	Vibration Dose Value (VDV). This is an assessment of the effect of building vibration on the people within. The VDV is the fourth root of the integral of the fourth power of acceleration after it has been frequency-weighted (as defined in BS6472: 2008). The frequency-weighted acceleration is measured in m/s <sup>2</sup> and the time period over which the VDV is measured is in seconds. This yields VDV in m/s <sup>1.75</sup> .



## APPENDIX 11.2 AIR QUALITY MONITORING AND NOISE CONTROL UNIT'S GOOD PRACTICE GUIDE FOR CONSTRUCTION AND DEMOLITION

Prior to the commencement of work on the site a construction and demolition plan must be developed. When developing the construction and demolition plan reference must be made to the requirements of the Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition.

This Guide has been produced with reference to the London Good Practice Guide: Noise and Vibration Control for Demolition and Construction produced by the London Authorities Noise Action Forum, July 2016.

In order to ensure that demolition and construction work does not have an adverse impact on those living and working nearby, the following best practice guidance has been developed. All construction and demolition work has the potential to have adverse environmental impacts no matter what the scale. The following best practice guide sets out the measures which all developers should consider prior to commencement of work and provides further recommendations for the control of noise, vibration and air pollution.

A risk based approach is to be used taking into account the locality, nature of the work and the expected duration of the work.

### Risk Assessment A – Locality / Site Information

The site should be assessed in relation to the duration of the work, distance to sensitive receptors, ambient noise levels and working hours. Tick the field most likely to apply and add up the number of ticks in each column.

### Risk Assessment B – Work Information

Tick the field that is most likely to represent the works in each category, add up the total number of ticks in each column.

### Total Risk Assessment

The table 'total risk assessment' contains the sub-total numbers from 'Risk Assessment A and B. The column in total risk assessment with the most ticks indicates the risk category that should be employed for the site.

If two risk categories have an equal number of ticks, the higher category of the two shall apply. Once the risk category is known the 'good practice measures' outlined in this code of practice shall be employed.

## 1. Locality

Identify those who may be affected by noise, including particularly sensitive locations (hospitals/schools) and determine ambient noise levels (noise maps or noise monitoring)

	Low	Medium	High
<b>Expected duration of work</b>			
Less than 6 months			
6 months to 12 months			
Over 12 months			X
<b>Proximity of nearest sensitive receptors</b>			
Greater than 50 metres from site			
Between 25m and 50m			
Less than 25 metres			
Hospital or school within 100 metres			X
<b>Day time ambient noise levels</b>			
High ambient noise levels (>65dB(A))			
Medium ambient noise levels (55-65dB(A))		X	
Low ambient noise levels (<55dB(A))			
<b>Working Hours</b>			
7am – 6pm Mon-Fri; 8am-1pm Sat	X		
Some extended evening or weekend work			
Some night time working, including likelihood of concrete power floating at night			
SUBTOTAL A	1	1	2

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	Low	Medium	High
<b>Location of works</b>			
Majority within existing building			
Majority External			X
<b>External Demolition</b>			
Limited to two weeks			
Between 2 weeks and 3 months			
Over three months			X
<b>Ground Works</b>			
Basement level planned			X
Non-percussive methods only			
Percussive methods for less than 3 months			
Percussive methods for more than 3 months			
<b>Piling</b>			
Limited to one week			
Bored Piling Only			
Impact or vibratory piling			X
<b>Vibration generating activities</b>			
Limited to less than 1 week			
Between 1 week and 1 month			
Greater than 1 month			X
<b>SUBTOTAL B</b>	0	0	5

	Low	Medium	High
Risk Assessment A	1	1	2
Risk Assessment B	0	0	5
Total	1	1	7

The column in total risk assessment with the most ticks indicates the risk category that should be employed for the site.

#### 1. General Considerations

All site staff shall be briefed on noise mitigation measures and the application of best practicable means to be employed to control noise.	All sites
Good Quality site hoarding should be erected to maximise the reduction in noise levels	Medium and High risk sites
The contact details of the contractor and site manager shall be displayed to the public, together with the permitted operating hours, including any special permissions given for out of hours work	Medium and High risk sites
The site entrance shall be located to minimise disturbance to noise sensitive receptors	Medium and High risk sites
Internal haul routes shall be maintained and steep gradients shall be avoided	Medium and High risk sites
Material and plant loading and unloading shall only take place during normal working hours unless the requirement for extended hours is for traffic management(i.e road closure) or health and reasons(application must be made to DCC a minimum of 4 days prior to proposed works)	All sites
Use rubber linings in chutes, dumpers and hoppers to reduce impact noise	High risk sites
Minimise opening and shutting of gates through good coordination of deliveries and vehicle movements	Medium and High risk sites
No materials shall be burned on site	All sites
Adequate dust/debris screening should be in place at the site boundary to contain and minimise the amount of windblown dust. This must be maintained in good condition at all times.	Medium and High Risk sites

All consignments containing material with the potential to cause air pollution being transported by skips, lorries, trucks or tippers must be covered during transit on and off site.	All sites DDC PLAN NO 5432/22 REVISED: 13/12/2022
The site shall be dampened down as necessary to minimise windblown dust when necessary or during periods of dry weather.	All sites
Dust suppression equipment must be used when point source emissions are likely.	All sites
The entry and exit points to the site should be constructed of hard standing which is regularly dampened to minimise dust emissions.	Medium and High Risk Sites

## 2. Plant

Ensure that each item of plant and equipment complies with the noise limits quoted in the relevant European Commission Directive 2000/14/EC	All sites
Fit all plant and equipment with appropriate mufflers or silencers of the type recommended by the manufacturer	All sites
Use all plant and equipment only for the tasks for which it has been designed	All Sites
Shut down all plant and equipment in intermittent use in the intervening periods between work or throttle down to a minimum	All sites
Power all plant by mains electricity where possible rather than generators	Medium and High Risk Sites
Maximise screening from existing features or structures and employ the use of partial or full enclosures for fixed plant	Medium and High Risk Sites
Locate movable plant away from noise sensitive receptors	All sites

## 3. Vehicle activity

Ensure all vehicle movements (on site) occur within normal working hours. (other than where extension of work requiring such movements has been granted in cases of required road closures or for health and safety reasons )	All sites
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Plan deliveries and vehicle movements so that vehicles are not waiting or queuing on the public roads. If unavoidable engines should be turned off.	Medium and High Risk Sites
Minimise the opening and closing of the site access through good coordination of deliveries and vehicle movements	Medium and High Risk Sites
Plan the site layout to ensure that reversing is kept to a minimum	Medium and High Risk Sites
Where reversing is required use broadband reverse sirens or where it is safe to do so disengage all sirens and use banks-men	Medium and High Risk Sites
Rubber/neoprene or similar non-metal lining material matting to line the inside of material transportation vehicles to avoid first drop high noise levels.	Medium and High Risk Sites
Wheel washing of vehicles prior to exiting the site shall take place to ensure that adjoining roads are kept clean of dirt and debris. Regular washing of adjoining streets should also be carried out by the developer, as required by mechanical road sweepers	Medium and High Risk Sites

#### 4. Demolition Phase

Employ the use of acoustic screening; this can include planning the demolition sequence to utilise screening afforded by buildings to be demolished.	Medium and High Risk Sites
If working out of hours for Health and Safety reasons (following approval by DCC) limit demolition activities to low level noise activity unless absolutely unavoidable)	All sites
Use low impact demolition methods such as non-percussive plant where practicable	Medium and High Risk Sites
Use rotary drills and 'bursters' activated by hydraulic or electrical power or chemically based expansion compounds to facilitate fragmentation and excavation of hard material.	High Risk sites
Avoid the transfer of noise and vibration from demolition activities to adjoining occupied buildings through cutting any vibration transmission path or by structural separation of buildings	Medium and High Risk Sites
Consider the removal of larger sections by lifting them out and breaking them down either in an area away from sensitive receptors or off site.	High Risk Sites

## 5. Ground Works and Piling Phase

<p>The following hierarchy of groundwork/piling methods should be used if ground conditions, design and safety allows:</p> <ul style="list-style-type: none"> <li>• pressed in methods, e.g., hydraulic jacking</li> <li>• Auger/bored piling</li> <li>• Diaphragm walling</li> <li>• Vibratory piling or vibro-replacement</li> <li>• Driven Piling or dynamic consolidation</li> </ul>	<p>Medium and High Risk Sites</p> <p>DDC PLAN NO 5432/22 VED: 13/12/2022</p>
<p>The location and layout of the piling plant should be designed to minimise potential noise impact of generators and motors</p>	<p>Medium and High Risk Sites</p>
<p>Where impact piling is the only option utilise a non-metallic dolly between the hammer and driving helmet or enclose the hammer and helmet with an acoustic shroud</p>	<p>Medium and High Risk Sites</p>
<p>Consider concrete pour sizes and pump locations. Plan the start of concrete pours as early as possible to avoid overruns</p>	<p>Medium and High Risk Sites</p>
<p>Where obstructions are encountered, work should be stopped and a review undertaken to ensure that work methods that minimise noise are used.</p>	<p>Medium and High Risk Sites</p>
<p>When using an auger piling rig do not dislodge material from the auger by rotating it back and forth. Use alternate methods where safe to do so.</p>	<p>Medium and High Risk Sites</p>
<p>Prepare pile caps using methods which minimise the use of breakers, e.g., use hydraulic splitters to crack the top of the pile.</p>	<p>Medium and High Risk Sites</p>

## 6. Monitoring

<p>Establish pre-existing levels of ambient noise by baseline monitoring or use of the noise maps.</p>	<p>Medium and High Risk Sites</p>
<p>Carry out regular on site observation monitoring and checks/audits to ensure that BPM is being used at all times. Such checks shall include;</p> <ul style="list-style-type: none"> <li>• Hours of work</li> <li>• Presence of mitigation measures</li> <li>• Number and type of plant</li> <li>• Construction methods</li> </ul>	<p>High Risk Sites</p>

Site reviews must be recorded and made available for inspection	
<p>Monitor noise and vibration continuously during demolition, piling, excavation and sub and superstructure works at agreed locations and report to DCC at agreed intervals and in an agreed format.</p> <p>To comply with this the following must take place.</p> <p>The monitoring locations for existing sites as agreed with officers of Dublin City Council must remain in situ. If additional monitoring is required this will be provided and the new locations will be agreed with Dublin City Council. For all new sites the monitoring locations must be agreed with Dublin City Council.</p> <p>The results of the monitoring must be forwarded to officers of the Air Quality Monitoring and Noise Control Unit every two weeks in the following format:</p> <ul style="list-style-type: none"> <li>• Provide the construction noise level as defined in British Standard 5228 and the peak particle velocity readings for the hours of operation of the site. This will include the construction noise level for any overtime period worked outside of normal working hours. Provide a report detailing and discussing the noise and vibration levels over the reporting period. If a breach is recorded the follow up action that took place to prevent any further breaches must be included in the report.</li> <li>• This information must be provided in electronic format. If results are required owing to complaints the results will be provided as soon as possible by the contractor to Dublin City Council.</li> </ul>	High Risk Sites
Appraise and review working methods, processes and procedures on a regular basis to ensure continuous development of BPM	Medium and High Risk Sites
The 'ABC' Method detailed in Paragraph E.3.2 of BS 5228-1:2009 shall be used to determine acceptable noise levels for day, evening and night time work.	Medium and High Risk Sites
Vibration levels must be kept below 1.0 mm/sec (PPV) where possible. Where levels are expected to exceed this value residents must be warned and an explanation given.	Medium and High Risk Sites
Appropriate dust suppression must be employed to prevent fugitive emissions affecting those occupying neighbouring properties or pathways	All sites
Street and footpath cleaning must be undertaken during the demolition and ground works phase to minimise dust emissions	Medium and High Risk Sites



Continuous dust monitoring along the site boundary should be undertaken during any demolition or ground works	High Risk Sites
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## 7. Communication and Liaison

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A Community Liaison Plan should be developed by the developer in consultation with local residents/businesses and a single point of contact nominated to engage with Dublin City Council and the residents/businesses and to handle complaints and communication of site information. A copy of this plan must be sent to Dublin City Council Planning Department as a matter of urgency in the case of sites where development has already commenced and 14 days in advance of commencement of works for any other site	Medium and High Risk Sites
Contact details for the site manager and liaison officer should be displayed prominently on the site hoarding	Medium and High Risk Sites
All staff should be briefed on the complaints procedure and the mitigation requirement and their responsibilities to register and escalate complaints received.	Medium and High Risk Sites
Send regular updates at appropriate intervals to all identified affected neighbours/ businesses via a newsletter and post relevant information on the site hoarding. Also make the information available via email/website including weekly noise monitoring reports	Medium and High Risk Sites
Arrange regular community liaison meetings at appropriate intervals including prior to commencement of the project.	High Risk Sites
Meet regularly with neighbouring construction sites to ensure activities are coordinated to minimise any potential cumulative issues.	High Risk Sites

**Extensions of Working Hours in exceptional circumstances**

Ensure at least 4 days notice is given to Dublin City Council Planning Department when applying for extensions to normal working hours. Do not undertake out of hours work unless permission to do so has been granted.	All sites
The applicant must demonstrate in writing that the works required cannot be carried out during normal working hours. The documentation sent in must be accompanied by a detailed engineering or/and traffic management or/and safety case as to why the works are required outside normal hours.	All sites

<p>Power floating after 6pm is the only activity that will be permitted during the extensions where they relate to required large concrete pours. All reasonable and appropriate measures to minimise noise associated with these works must be put in place and no works other than those approved may be carried out during extended working hours.</p> <p>The Developer/his agent must give the times and dates of the proposed work, and the mitigation measures that are to be used to minimise noise/disturbance</p>	
<p>Advise neighbours about requirement for and duration of any permitted works outside of normal working hours, and associated environmental mitigation measures being put in place during the course of the extended works, following receipt of approval from DCC</p>	All sites
<p>All complaints will be referred directly to the site liaison person and a reply must issue to the complaint within 3 hours of receipt of the complaint.</p>	All sites
<p>A log of all complaints and a summary of how they were dealt with should be kept and be made available to DCC, as required</p>	All sites
<p>Any breaches of permitted working hours or permitted extended working hours or developers or subcontractors not carrying out their requirements under this protocol may lead to enforcement action and may also result in the withdrawal of any extension of hours of works for a period that will be at the discretion of Dublin City Council.</p>	All sites

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**APPENDIX 14.1      RESOURCE & WASTE MANAGEMENT PLAN**

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